Avian and Bat Protection Plan:
Including
Bird and Bat Conservation Strategies and an Eagle Conservation Plan

New Era Wind Project

Goodhue County, Minnesota
Project Number: 20081147.00

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PART I OVERVIEW

1.0 Project Description

New Era Wind Farm, LLC (New Era), *f/k/a* AWA Goodhue LLC (AWA Goodhue) received a site permit from the Minnesota Public Utilities Commission (MPUC) on August 23, 2011 to construct a 78 megawatt (MW) large wind energy conversion system in Goodhue County, Minnesota (the Project). The site permit authorizes construction of the Project within an area that includes approximately 32,684 acres (51 square miles) (**Exhibit 1**), which is mostly agricultural land.

The Project will involve construction of 48 1.6 MW GE turbines with a total nameplate capacity of 76.8 MW, two project substations, collector and feeder lines, an operation and maintenance (O&M) facility, one or two permanent meteorological towers, associated access roads and a new approximately four-mile 69 kV transmission line. The final turbine layout depicts 52 total turbines locations, of which 48 are primary turbines and will actually be constructed and four are alternate locations (*see* **Exhibit 1**). The number of turbines has been reduced from 52, as originally proposed, to 48 by shifting from 1.5 MW turbines to using entirely 1.6 MW machines. The four alternate turbine locations exist in case any proposed turbine locations are eliminated due to unforeseen constraints.

Throughout this Avian and Bat Protection Plan (ABPP), several terms are used to describe areas covered by wildlife surveys. Early survey work was based on the Site Permit Area as defined below. As the layout of turbines and other infrastructure became more refined and certain, wildlife survey areas were narrowed in accordance with U.S. Fish and Wildlife Service (USFWS) guidelines. The terms used to describe areas in this ABPP are as follows:

Site Permit Area – The term "Site Permit Area" shown on **Exhibit 1** refers to the 32,684 acre area permitted for the Project on August 23, 2011.

Operational Project Area – In past reports, the term "Operational Project Area" was used to approximate the area within which project infrastructure would be built and was used as a baseline for winter aerial and ground transect surveys for Important Eagle Use Areas (IEUAs). This area was defined by adding a two-mile buffer around all turbines, roads and cable routes and then subtracting two miles to generate a polygon. This area is almost identical to the portion of the "Project Footprint" (defined below) that encompasses all project infrastructure except the transmission line at the north end of the Project.

Project Footprint – The term "Project Footprint" is defined in the *2011 USFWS Draft ECP Guidance* as: "…the 'minimum-convex polygon' that encompasses the wind-facility area inclusive of a 100-meter radius of all turbines and any associated utility infrastructure, roads, etc." The boundary of the "Project Footprint" and a two mile survey buffer used in the Programmatic Non-purposeful Bald Eagle Take Permit application (eagle permit) and eagle-related field surveys is depicted in **Exhibit 2**. The Project Footprint comprises approximately 22,314 acres.

Project Area – The term "Project Area" is defined in the March 27, 2012 *USFWS Land-Based Wind Energy Guidelines* as "[t]he area that includes the project site as well as contiguous land that shares relevant characteristics." The term "Project Area" is considered synonymous with the term "Site Permit Area" and the latter term has been used throughout the text of this ABPP.

Project Site – The term "Project Site" is defined in the March 27, 2012 *USFWS Land-Based Wind Energy* Guidelines as "[t]he land that is included in the project where development occurs or is proposed to occur." The term "Project Site" is considered synonymous with the term "Project Footprint".

To minimize confusion, the limits of the wildlife surveys described in this ABPP will be described as they relate to the "Site Permit Area" and/or the "Project Footprint." The terms "Operational Project Area," "Project Area," "Project Site" will generally not be used in this ABPP.

2.0 Purpose of the ABPP

New Era Wind Farm, LLC is committed to being a good steward of the environment and adhering to the law. As part of this commitment, New Era has developed this ABPP to serve jointly as Bird and Bat Conservation Strategies (BBCS) and an Eagle Conservation Plan (ECP), under the *USFWS Land-Based Wind Energy Guidelines* (March 2012) and *Draft Eagle Conservation Plan Guidance* (January 2011), respectively. In addition, this ABPP fulfills the specific requirements of Sections 6.7 and 13.1 of the MPUC Site Permit.

The purpose of this ABPP is to explain the analyses, studies and reasoning that support progressing from one tier to the next in the study process, to describe steps taken or to be taken to mitigate impacts to wildlife and to address post-construction monitoring efforts that will be undertaken. Importantly, this ABPP is intended to be a living document that establishes the framework, reporting and tools necessary to adapt to changing information and circumstances during the lifetime of the Project. Specific objectives are to ensure that:

- Avian and bat fatalities and secondary effects on wildlife are minimized at the Project;
- Project-related actions comply with federal and state wildlife regulations;
- The wildlife-related conditions contained in the MPUC Site Permit (i.e., Sections 6.1, 6.7 and 13.1) are fulfilled;
- Bird and bat injuries and fatalities are effectively documented, so as to provide the basis of ongoing development of avian protection procedures;
- Ongoing surveys, monitoring and management efforts are undertaken to avoid and minimize adverse wildlife impacts throughout all phases of the Project;
- Adequate implementation training is provided to the Construction Contractor and Operations and Maintenance staff;

- Coordination between New Era, wildlife agencies, MDOC-EFP and the MPUC is ongoing and understanding is maximized;

- Document adherence to the *2012 USFWS Land-Based Wind Energy Guidelines* and efforts undertaken to comply with the *2011 Draft Eagle Conservation Plan Guidance*.

This ABPP is the culmination of over three years of coordination between New Era, Minnesota Department of Commerce, Energy Facility Planning Staff (MDOC-EFP), Minnesota Department of Natural Resources (MDNR) and U.S. Fish and Wildlife Service (USFWS) to adequately address wildlife issues. This coordination included ongoing telephone and email coordination, several comment letters and multiple meetings and/or conference calls.

3.0 ABPP Guidance Documents

This ABPP is specific to the New Era wind project. It describes protocols, studies and measures to understand the interaction of wildlife with the New Era wind project and responsibly address wildlife risks. The organization and content of this ABPP is based on a number of sources, which include, but are not limited to:

- *2012 U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (USFWS 2012);

- *2011 Draft Eagle Conservation Plan Guidance* issued by the USFWS (USFWS 2011);

- A white paper on suggested ABPP content prepared by the USFWS (USFWS 2010a);

- Recommendations prepared by the Wind Turbine Guidelines Advisory Committee (WTGAC 2008a);

- ABPPs prepared across the United States for other wind power projects;

- Specific requirements set forth in the MPUC Site Permit;

- *Draft Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems* issued by the MDNR; and

- Extensive input and feedback obtained from the USFWS, MDNR and MDOC-EFP through a series of written reviews and coordination meetings.

This document uses a variety of acronyms and shortened terms to describe involved corporations, agencies, units of measure, regulations, programs, and technical terms. These acronyms and abbreviations are supplied in **Appendix A**.

4.0 Applicable Wildlife Laws and Guidance

A number of federal and state wildlife laws apply to the Project and guided various aspects of this ABPP. These laws are summarized in **Appendix B**. The *2012 USFWS Land-Based Wind Energy Guidelines* indicate on page 6 that adherence to guidelines, including communication with the USFWS, represents "an appropriate means of identifying and implementing reasonable and effective measures to avoid the take of species protected under the MBTA and BGEPA" and that the USFWS "will take such adherence and communication fully into account when exercising discretion" regarding MBTA and BGEPA enforcement actions.

Also, the USFWS has recommended that New Era apply for a non-purposeful programmatic bald eagle take permit under 50 CFR 22.26. New Era submited an eagle take permit application to USFWS on November 1, 2012, concurrent with filing this ABPP with the MPUC. This ABPP will also be submitted in support of the eagle take permit application. New Era acknowledges that any action taken by the MPUC or recommendations made by the USFWS regarding this document do not constrain the decision of either agency in the context of their respective proceedings. Nonetheless, this ABPP is intended to address the varied requirements of the MPUC, DNR and USFWS in a balanced and programmatic manner.

PART II BIRD AND BAT CONSERVATION STRATEGIES

5.0 Introduction

In accordance with the *2012 USFWS Land-Based Wind Energy Guidelines*, this Part II has been prepared to document the analyses, studies and reasoning New Era used to evaluate potential avian and bat risks in the Site Permit Area. In addition, this Part II provides New Era's efforts to avoid, minimize and mitigate adverse effects on avian and bat species present in the Site Permit Area through avoidance, minimization and other mitigation measures. Note that additional information regarding risks and mitigation for bald eagles is provided in Part III.

While the *2012 USFWS Land-Based Wind Energy Guidelines* were only recently published in March of 2012, New Era has used its best efforts to provide analysis consistent with the Guidelines' tiered approach and, wherever feasible, New Era has incorporated best management and other mitigation recommendations.

This Part II is also intended to comply with Site Permit Sections 6.1, 6.7, 13.1.2 and 13.1.3.

6.0 Summary of Tier I, II and III Studies and Risk Analysis

6.1 Tiers I and II – Preliminary Site Evaluation and Site Characterization

In 2008, when New Era selected the Site Permit Area as the site for its Project, limited site selection or eagle risk guidance was available from the USFWS.[1] Both the *2012 Land-Based Wind Energy Guidelines* and the *2011 Draft ECP Guidance* were several years from publication when the Site Permit Area was selected.

[1] The majority of lands participating in the Project had been selected and contracts signed by December 2009.

New Era did, however, consider a number of factors when selecting the Site Permit Area, including the results of a high-level evaluation of environmental risks.

New Era began with a broad assessment of potential areas to site a wind farm, focusing primarily on the availability of transmission infrastructure, commercially viable wind speed, and landowner interest. For example, New Era relied on the *Dispersed Renewable Generation Study* (DRG Study) prepared for the Minnesota Department of Commerce in 2008 to identify locations within the state's existing infrastructure that could accommodate additional energy generation without the need for significant transmission upgrades. In June 2008, the first phase of that study identified approximately 40 substations located around the state, including two in Goodhue County, as points on the system capable of handling more power with minimal added upgrades. Goodhue Wind, LLC, New Era's predecessor, was the first developer to make transmission interconnection requests at both the Goodhue and Vasa substations in Goodhue County. The requests sought 39 MWs of interconnection capacity at each substation to accommodate the 78 MW project. In addition, New Era utilized available wind data from the United States Department of Energy and Minnesota Department of Commerce to assess whether wind speeds in the area supported a commercial wind development. Finally, representatives met with area landowners to determine if there was adequate local interest to host a wind farm.

Once a general area was identified, a desktop environmental risk assessment was conducted to determine, on the basis of desktop studies, if there were any significant environmental issues that would prevent project construction. No fatal flaws were identified within the desktop assessment study area, so that general study area became the Site Permit Area. Additional information regarding this initial fatal flaw analysis and its findings is included in **Appendix C** Biological Inventories.

The Project initiated agency coordination in October 2008 by sending correspondence seeking comments from a number of federal and state agencies, including the USFWS and MDNR. After reviewing proposed protocols with the USFWS and MDNR, New Era then proceeded to commission additional studies and data collection to further inform the turbine siting process. A summary of all agency correspondence is provided in **Appendix D**.

In October 2009, the Project submitted applications for a certificate of need and site permit seeking authorization to place wind facilities within the Site Permit Area identified in **Exhibit 1**. Notably, the Site Permit Area does not include any MDNR Wildlife Management Areas (WMAs), Scientific and Natural Areas (SNAs), USFWS Waterfowl Production Areas (WPAs), state parks, or state forests. Additionally, there are no Minnesota County Biological Survey Areas of moderate, high or outstanding diversity within the Site Permit Area. As depicted in **Exhibits 3 and 4**, the Site Permit Area lacks public conservation lands and other sensitive natural resources that are present in other parts of Goodhue County and adjacent western Wabasha County.

New Era reviewed Important Bird Areas, wildlife and conservation lands, locations of threatened and endangered species, areas of moderate to outstanding biological diversity, and forested and wetland land cover in and around the Site Permit Area to better understand the potential for site specific or regional ecological impacts from the proposed Project. This review acknowledged that the Mississippi River corridor is important to the migratory flyway, but concluded that the

Site Permit Area has few areas of high quality avian migration stopover habitat and ecological diversity in comparison to the overall landscape within a 25-mile radius. At a landscape scale, the Site Permit Area is ecologically suitable for wind development. In particular, the Mississippi River and related eagle concentration areas are located 10.5 miles northeast of the Site Permit Area. The Site Permit Area lies in a landscape that is mostly devoid of forestlands, riparian corridors, sites of significant biodiversity, and Natural Heritage Information System (NHIS) records. These elements of ecological richness are concentrated outside the Site Permit Area (**Exhibits 3 and 4**).

When preparing the site permit and certificate of need applications for the Project, New Era completed a desktop avian and bat risk assessment to assess the risk of the proposed project affecting birds, bats, species of conservation status, and their important habitats. The predominant land use was agricultural, primarily consisting of corn, soybeans, hay and pasture. Grasslands, woodlands, and wetlands covered smaller areas. State lists of threatened and endangered species for Goodhue County include seven state-listed threatened, endangered, or special concern avian species (**Table 6.1**). No federally listed threatened or endangered species were documented in the Site Permit Area at the time the site permit application was prepared.

Using publicly available data sources, New Era assembled a project bird list that included 211 avian species recorded in Goodhue County as both migrants and breeders. Many avian species considered likely to nest in the Site Permit Area were grassland breeding birds. About one-third of the Site Permit Area was found to be grassland or pasture, but such areas were highly fragmented. Many of the avian species with state conservation status were associated with woodlands or wetlands, which are somewhat limited in the Site Permit Area.

Table 6.1 Goodhue County Birds of Conservation Status[1]

Common Name	Scientific Name	State Status[2]	Potential to Occur in Project Area[3]	Comments
Bald Eagle	Haliaeetus leucocephalus	SC	Confirmed	Confirmed nest in Site Permit Area
Red-shouldered Hawk	Buteo lineatus	SC	Moderate	More likely to nest along Mississippi or Cannon Rivers
Peregrine Falcon	Falco peregrines	THR	Moderate	More likely to nest along Mississippi River
Acadian Flycatcher	Empidonax virescens	SC	Moderate	Potential suitable habitat
Loggerhead Shrike	Lanius ludocicianus	THR	Confirmed	Suitable habitat in Site Permit Area
Cerulean Warbler	Dendroica cerulean	SC	Low	Lack of suitable habitat
Henslow's Sparrow	Ammodramus henslowii	END	Confirmed	Lack of suitable habitat

[1] Information adapted from MDNR (2008).
[2] Status of state-listed species (THR=Threatened, END=Endangered, SC=Special Concern); MDNR (2007).
[3] Species listed as confirmed were documented in the Site Permit Area during field studies as described in Section 6.2 of this ABPP.

Bats likely to use the Site Permit Area were considered fairly common in abundance and distribution. Seven species of bats are known to occur in Minnesota (ASM 2001, BCI 2003). **Table 6.2** lists the species recorded in the state and their distribution and conservation status according to MDNR (2007). The Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, and Little Brown Bat were initially considered the most likely to occur in the Site Permit Area. Of the seven bat species, three roost primarily in trees, one in man-made structures, one in trees and structures, and two in caves or rock crevices. Land cover mapping indicates the Site Permit Area is about 4% forested and no caves or mines have been noted in the Site Permit Area. More abundant roosting habitat for tree roosting bats is available north of the Site Permit Area in the Richard Dorer Memorial Hardwood State Forest and along the Mississippi River, which generally runs north-south approximately 15 miles east of the Site Permit Area.

Table 6.2 Distribution and Status of Bat Species Known to Occur in Minnesota[1]

Common Name	Scientific Name	Minnesota Distribution	Occurrence	Potential to Occur in Project Area[2]	Species Status[3]	Typical Roosting Habitat
Big Brown Bat	Eptesicus fuscus	Statewide	Common	Confirmed		Man-made structures and hollow trees
Silver-haired Bat[4]	Lasionycteris noctivagans	Statewide	Common	Confirmed		Under bark and in hollow trees
Eastern Red Bat[4]	Lasiurus borealis	Statewide	Common	Confirmed		Trees
Hoary Bat[4]	Lasiurus cinereus	Statewide	Common	Confirmed		Trees
Little Brown Bat	Myotis lucifigus	Statewide	Common	Confirmed		Man-made structures
Northern Long-eared Bat	Myotis septentrionalis	Statewide	Species of Special Concern	Confirmed	SC	Caves and mines
Tri-colored Bat	Pipistrellus subflavus	Southeast ¼ of state	Species of Special Concern	Confirmed	SC	Rock Crevices

[1] Information adapted from ASM (2001), BCI (2003), and MDNR (2007).
[2] Species listed as confirmed were documented in the Site Permit Area during field studies described in Section 6.2.3 of this ABPP.
[3] SC = Special Concern; MDNR (2007).
[4] Solitary, tree-roosting bat species, typically more affected by wind energy projects.

The risk of direct avian and bat fatalities due to collisions with wind turbines was estimated based on available post-construction studies of wind projects in similar environments. Although the Site Permit Area is located within the broad corridor of the Mississippi Flyway, the closest turbine is located about 15 miles west of the Mississippi River. Review of land cover data suggested that the most suitable migration stopover habitats in Goodhue County were outside the Site Permit Area. These were the Richard Dorer Memorial Hardwood State Forest, and the Mississippi and Cannon River corridors. Despite the predominance of cropland, the risk assessment advised that the USFWS and the MDNR routinely recommend pre- and post-construction wildlife field studies.

The *2012 USFWS Land-based Wind Energy Guidelines* set forth a series of suggested questions to be considered in Tier I and Tier II evaluations. These questions are similar to the Tier I and II questions posed in the recommendations of the Wind Turbine Guidelines Advisory Committee WTGAC (2010). The Tier I and II questions posed in the 2012 *USFWS Land-based Wind Energy Guidelines* are set forth below along with New Era's Project-specific answers to these questions.

Tier 1 Questions and Answers:

1. Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?

Answer: At the time the New Era Site Permit Area was selected, there were records of stated-listed threatened loggerhead shrikes and special concern bald eagles within 2 miles of the Site Permit Area. At that time, the NHIS database indicated no federal or state listed species records within the Site Permit Area. There continue to be no records of any federally listed species within the Site Permit Area or within two miles of the Project Footprint. Field studies have since documented the presence of bald eagles (state special concern, proposed for de-listing since 2007), loggerhead shrikes (state-threatened), a trumpeter swan (state-threatened, proposed for down-listing to Special Concern since 2007), Henslow's sparrow (state-endangered), northern long-eared bats (state special concern) and tri-colored bats (state special concern) within the Site Permit Area.

2. Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally-designated critical habitat; high-priority conservation areas for non-government organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations.

Answer: At the time the Site Permit Area was selected, no areas within it were precluded from development by law or designated as sensitive by a local, state, regional, federal, tribal government or non-governmental entity. No federally-designated critical habitat; high-priority conservation areas for NGOs; or other local, state, regional, federal, tribal, or international categorizations were identified within the Site Permit Area. These conclusions remain true under current conditions.

3. Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks or other areas of seasonal importance?

Answers:

Maternity roosts: No bat maternity roost locations are known within the Site Permit Area, though some may exist in forested areas of the site.

Hibernacula: No bat hibernacula have been identified within the Site Permit Area.

Staging areas: No staging areas for migratory wildlife species (typically a water feature where large numbers of waterfowl congregate prior to or during migration periods) have been identified within the Site Permit Area.

Winter ranges: Not applicable (refers to western species such as elk, pronghorns, etc.).

Nesting sites: At the time the New Era project Site Permit Area was selected, three bald eagle nest territories were listed in the NHIS database near but outside of the Site Permit Area: Hay Creek, Belle Creek and Zumbro River. In 2011, the West of Goodhue bald eagle nest was built within the Site Permit Area but outside the Project Footprint. Once field surveys were initiated (*see* Tier III discussion), various red-tailed hawk and great-horned owl nests have been identified within the Project Footprint. Loggerhead shrikes have been observed within the Project Footprint during migration periods but no nests have been found and, to date, none have been observed during the breeding season.

Migration stopovers or corridors: At the time the Site Permit Area was selected, no wildlife migration corridors or stopovers were identified within the Site Permit Area. The Mississippi River (about 15 miles east of the Site Permit Area) was then the nearest known major migration corridor. Since field surveys have been undertaken, Belle Creek has been documented to be used as a migration corridor for bald eagles and small numbers of golden eagles.

Leks: At the time the New Era Site Permit Area was selected, it did not contain any leks (i.e., communal breeding grounds for prairie grouse). This remains true today.

4. Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?

Answer: The Site Permit Area lies within a predominantly agricultural landscape that is already fragmented, having about 60 percent cropland and 32 percent pastures and hay fields. At the time the Site Permit Area was selected, there were no large contiguous blocks of native woodland, grassland or wetland habitat identified within the Site Permit Area that would be subject to fragmentation. This remains true today.

Tier II Questions and Answers:

1. Are known species of concern present on the proposed site, or is habitat (including designated critical habitat) present for these species?

Answer: *See* response to Tier I question 1 above.

2. Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally-designated critical habitat; high-priority conservation areas for NGOs; or other local, state, regional, federal, tribal, or international categorizations.

Answer: *See* response to Tier I question 2 above.

3. Are there plant communities of concern present or likely to be present at the site(s)?

Answer: It is possible that small native prairie remnants could exist in some steeper, untilled parts of the Project Footprint but none have been identified. Such remnants have not been found in surveys of areas where turbines, access roads and other project infrastructure will be constructed.

4. Are there known critical areas of congregation of species of concern, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?

Answer: *See* response to Tier I question 3 above.

5. Using best available scientific information, has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?

Answer: No such species were known to be present in the Site Permit Area at the time the Site Permit Area was selected and none have been identified to date.

6. Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?

Answer: A desktop assessment regarding the species of birds and bats likely to be found within the Site Permit Area was prepared and submitted to the USFWS and MDNR on January 19, 2010. **Tables 6.1** and **6.2** above summarize the bird and bat species of primary concern with regard to potential adverse impacts.

7. Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?

Answer: Based on the answers to the questions above and comments from the USFWS and MDNR, the species of primary concern for potential adverse impacts and recommended for Tier III studies are:

- Bald eagle
- Golden eagle
- Loggerhead shrike
- Bats generally; northern long-eared bats specifically
- Raptors generally and
- Trumpeter swan

6.2 Tier III – Field Studies

Based on the results of the Tiers I and II assessments and agency consultations, New Era proceeded to collect site-specific data on bird and bat use of the Site Permit Area to better identify the risks to birds and bats and mitigate the Project's potential impacts. Most surveys were focused on the Project Footprint (the portion of the Site Permit Area where infrastructure

will actually be built) with an added survey buffer recommended by the USFWS. The field studies consisted of point count, raptor nest, eagle flight and acoustic bat monitoring surveys. Each of these studies is described in this section. Further details regarding eagle surveys are provided in Part III below.

6.2.1 2010 Spring Migration Point Counts

New Era completed a pre-construction avian migration survey from April 5 to May 24, 2010 (the *2010 Spring Survey*). A field ornithologist conducted 5-minute point counts at 20 locations along roadside transects, recorded other observations of rare birds, and documented locations of raptor stick nests visible from the survey route. Point counts were established at approximate 2-mile intervals throughout the Site Permit Area in representative habitats and near proposed turbine locations. This *2010 Spring Survey* characterized the spring avian community and quantified flight patterns and collision risk.

New Era observed a total of 2,927 birds of 58 species in the Site Permit Area during the 8-week 2010 Spring Survey. Generally, species observed are common in distribution and/or abundance in Minnesota. Overall, mean bird use was 18.3 birds per 5 minutes. The most frequently observed species was the red-winged blackbird. The avian community was dominated by passerines (songbirds), most of which are common and/or abundant in an agricultural landscape during migration and/or breeding seasons. Waterfowl/waterbirds were notably absent, presumably due to the lack of water features these birds characteristically utilize during migration and breeding. The Site Permit Area has limited public wildlife lands, contiguous tracts of grassland, and water features that typically supports rare species. It also has limited suitable migration stopover habitat for birds in general.

No federally listed species were observed. The only two state listed special concern species recorded include the bald eagle and the Franklin's gull. At the time of the *2010 Spring Survey*, three bald eagle nests existed at distances of 0.25, 1.0 and 3.5 miles outside the Site Permit Area, but no bald eagles nests were observed inside the Site Permit Area during these initial surveys.[2] One Franklin's gull was recorded as an incidental observation during the first week of the avian survey. The incidental Franklin's gull observation was recorded outside of the point counts and Franklin's gulls are considered unlikely to breed in the Site Permit Area due to the lack of suitable habitat.[3]

Observations of large flocks of migrating birds, such as warblers, sparrows, and ducks and geese, were fewer than expected. Of 1,114 avian observations recorded, only 27 (2.4%) involved groups of more than 10 birds, and only one involved more than 25 birds. Only about 5% of flights were above the rotor-swept height where migratory flights typically occur, few flocks were observed, and few species known to breed north of Goodhue County were recorded. High altitude flights were generally of raptors. However, high raptor flights do not necessarily

[2] Spring 2010 point count surveys were conducted at 20 locations along public roadways through the Site Permit Area. The point count locations nearest to the documented bald eagle nests were 0.3, 1.6 and 4.0 mile from the Belle Creek, Zumbro River and Hay Creek nests, respectively.

[3] The Franklin's gull depends on extensive prairie marshes for breeding, where it nests over water on floating vegetation or muskrat (*Ondantra zibethica*) houses.
See http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNNM03020

indicate migratory behavior because raptors soar on thermals or hot air pockets that facilitate effortless flight, even in their daily movements. The lack of flock and non-breeding bird observations may be partially attributed to the uncharacteristically early spring in 2010, which may have altered typical migration patterns and timing.

There were 38 species of birds observed in flight. Only 12 of these species had a measurable index of collision hazard (I > 0.001). The species with the highest indices of collision hazard were brown-headed cowbird (0.02), common grackle (0.015), and American crow (0.011). Only 15 percent of flights observed during 2010 Spring Survey were at rotor-swept height.

Passerines accounted for 88% of the individual birds observed during the 2010 Spring Survey. Most observed passerines were generalist species that are adapted to the agricultural landscape.[4] Nationwide, passerines have been the most abundant bird fatality at wind-energy facilities, often accounting for over 80% of avian fatalities at wind projects outside of California (Erickson et al. 2002, NWCC Wildlife Workgroup 2010). However, high passerine use has not been clearly correlated with high mortality (Erickson et al. 2002).

6.2.2 Raptors

Raptor nest surveys were initiated as part of the 2010 Spring Survey. The 2010 raptor nest survey was conducted within the Site Permit Area. A follow-up raptor nest survey was conducted in 2012. Consistent with the March *2012 USFWS Land-based Wind Energy Guidelines*, the 2012 raptor nest survey was conducted within one mile of the wind turbines, transmission lines, and other project infrastructure. The Twin Cities Field Office of the USFWS confirmed in an email dated March 30, 2012 that this was the correct survey area for raptor nests (USFWS 2012). Note that the raptor nest survey focused on non-eagle raptors such as hawks and owls. Eagle nest searches were conducted during a different time period and within a larger survey area. A more detailed discussion of eagle nests is provided in Section 9.2.2.6.

Methods

Raptor stick nests, which tend to be large and elevated in trees, were inventoried because some raptors tend to fly within the rotor-swept-height. Raptor stick nests are quite visible in the spring prior to deciduous tree leaf emergence. Other raptor nests may exist within the survey areas because raptors also nest on the ground, in cavities, and in abandoned structures, but these nests could not be located from roadside transects. Stick nests were located by scanning woodlots and tree lines from the roadside. In some locations, access to private land was sought in order to get better vantage points of potential nests. However, access was unavailable in many such locations. To the extent allowed by visibility, identified nests were observed until they could be verified as active based on raptor nesting behavior (i.e., material carries, incubation, or nest/territory defense).

Results

In 2010, eight active raptor stick nests of two different species were recorded in the Site Permit Area. Raptor nest occupancy was confirmed during weeks 1-3 of the weekly avian point count

[4] Migratory passerines are protected by the MBTA regardless of whether they are common.

survey. Red-tailed hawk nests were most abundant, with seven nests located within the Site Permit Area. An additional red-tailed hawk nest was located approximately one mile south of the Site Permit Area and within a quarter mile of the Zumbro River bald eagle nest. Two great horned owl nests were also located, one of which was approximately 0.2 mile east of the eastern edge of the Site Permit Area.

Thirteen unverified, possible raptor nests were located throughout the Site Permit Area in 2010. Unverified nests were stick nests observed early in the spring, but for which raptor nesting behavior and occupancy could not be subsequently confirmed. These nests were located in early spring when trees were leafless, but could not be subsequently confirmed as active due to lack of access and presence of visual obstructions related to deciduous tree leaf emergence and rolling terrain. Additionally, the early spring in 2010 limited the opportunity to observe nesting behavior because deciduous leaf-out coincided with the initiation of the raptor breeding season.

As stated above, the survey area for the 2012 raptor nest survey was modified to comply with the *2012 USFWS Land-Based Wind Energy Guidelines*. Twelve raptor nests were identified within one mile of Project infrastructure: eleven red-tailed hawk and one great horned owl (**Exhibit 5**). Additionally, one red-tailed hawk nest was identified 0.36 miles south of the 2012 survey area. The 2012 raptor nest survey depicts the most current raptor nesting data for the area within one mile of project infrastructure. Some nests identified in 2010 were found to be no longer active while others remained active. Many of the 2010 unverified nests were confirmed in 2012 as to their activity status. Additionally, some new nests were identified in 2012. Although not raptors, three American crow nests were also identified in 2012. Crow nests are very similar in size and shape to red-tailed hawk nests. Consequently, during the course of monitoring potential nests to determine activity status and species occupancy, some nests were observed to be those of crows. Other raptors observed consistently in the raptor nest survey area but for which nests were not identified include American kestrel and northern harrier. Kestrels typically nest in abandoned structures or cavities and harriers nest on the ground in grasslands.

Five raptor territories were also delineated in 2012. These territories depict areas where repeated observations of raptors have been made, but for which a nest could not be located from the roadside. Four territories are those of red-tailed hawks and one is a northern harrier.

6.2.3 Bats

Site Permit Section 13.1.2 required New Era to install a minimum of two Anabat detectors on each temporary and permanent meteorological tower and collect data from July 15 to November 15, 2011 and May 1 to November 15, 2012. New Era provided the MPUC with the results of its 2011 bat monitoring in a report titled *2011 Preconstruction Acoustic Bat Monitoring Report* (2011 Bat Report), which was posted to the project docket, Docket IP6701/WS-08-1233 document number 201112-69301-01, on December 15, 2011 in compliance with Site Permit Condition 13.1.2. On April 24, 2012, New Era again installed the required Anabat detectors on Temporary Met Tower 1 in order to perform the bat surveys required for 2012 (*See* **Exhibit 1**). At the same time, New Era also installed Wildlife Acoustics detectors on Temporary Met Tower 1 to enhance the amount and quality of data collected during the bat surveys, while providing an opportunity to minimize the risk of lost data through duplicative sampling.

Anabat detectors record "zero-crossing" data, which allows analysis of the dominant time-frequency pattern of bat calls and minimizes the computer memory required to store bat signals. Some bat detectors, such as those manufactured by Wildlife Acoustics, record "full-spectrum" data. Full spectrum data allows analysis of the time, frequency, and amplitude of bat calls by enabling the analyst to view the full spectrum of each call in a sonogram. While zero-crossing detectors provide reliable and cost-effective estimates of bat use and allow some species discrimination, full-spectrum detectors record more information and allow enhanced species discrimination (USFWS 2012).

In an effort to supplement the data collected on Temporary Met Tower 1 with additional data from other portions of the Site Permit Area, New Era installed Wildlife Acoustics detectors on three additional meteorological towers on July 13 and July 14, 2012 (Temporary Met Towers 2, 3, and 4; See Exhibits 1 and 6).[5] The new sample locations and the use of Wildlife Acoustics detectors were installed to address requests for data from different habitats across the Site Permit Area and MPUC concerns about data gaps and unknown bat calls in the 2011 data. The locations of Temporary Met Towers 2, 3, and 4 were determined through careful consideration of the additional habitats that would be sampled, the availability of land under lease, and consultations with the USFWS and MDNR. The installation of Wildlife Acoustics detectors on Temporary Met Tower 1 allows for comparison between Wildlife Acoustics detectors across the Site Permit Area and the assessment of geographic variability in bat activity. The use of Anabat detectors on Temporary Met Tower 1 will allow for comparison between sample years. Redundant Anabat and Wildlife Acoustics systems on one tower will allow side-by-side comparison of data collected using two detection technologies. However, the Wildlife Acoustics detectors are generally expected to provide more information and greater species discrimination than Anabat detectors.

The data obtained in the 2011 and 2012 surveys have been used to formulate necessary mitigation strategies outlined in this ABPP and will continue to be used to provide a basis for future adaptive management and implementation of mitigation strategies to reduce the Project's direct and indirect impacts on bats. The 2011 survey data has been provided in the 2011 Bat Report. As of the writing of this ABPP, the 2012 bat survey season was still ongoing. Thus, the 2012 bat survey data is represented in this ABPP by sub-samples of the 2012 data from the spring, summer, and fall seasons. A comprehensive report of the 2012 bat survey data will be provided to the MDNR, USFWS, and MPUC by December 15, 2012 in compliance with Section 13.1.2 of the Site Permit.

6.2.3.1 Bat Surveys

Methods

New Era is using Anabat and Wildlife Acoustics detectors to collect zero-crossing and full-spectrum bat data, respectively, during 2012. Anabat and Wildlife Acoustics detectors were deployed on Temporary Met Tower 1 on April 24, 2012, with microphones from both types of detectors mounted at 5 and 45 m above the ground. Wildlife Acoustics bat detectors and

[5] Temporary Met Towers 2, 3, and 4 were erected in July 2012 for the express purpose of providing a platform for the additional Wildlife Acoustics detectors.

microphones were deployed at the same heights on three additional met towers (Temporary Met Towers 2, 3 and 4) on July 13-14, 2012 (**Exhibits 1 and 6**). This voluntary action was initiated in response to MPUC concerns and new USFWS guidelines, released on March 23, 2012, which indicated that full-spectrum detectors allow enhanced species discrimination and noted that the number of detectors necessary to precisely estimate bat activity is not well established (USFWS 2012). Wildlife Acoustics detectors on Temporary Met Towers 2, 3 and 4 were installed to capture data during the July 15 – November 15 period specified in the Site Permit. All bat detectors were programmed to monitor bat activity nightly between sunset and sunrise through November 15, 2012.

New Era systematically selected three weeks of bat data to provide this preliminary analysis sub-sample, report, and an early indication of bat activity within the Site Permit Area for inclusion in this ABPP. Sub-sample weeks were spaced seven weeks apart and selected to provide a representative characterization of bat presence in spring, summer, and fall periods. All sample weeks allowed an assessment of bat presence data at Met Tower 1. The fall (i.e., August) sub-sample allowed comparison of bat presence data among the four met tower locations. The sample weeks were:

1. Spring: May 15 to 21, 2012, Met Tower 1

2. Summer: July 3 to 9, 2012, Met Tower 1

3. Fall: August 21 to 27, 2012, Met Towers 1, 2, 3, and 4

Qualitative analysis of acoustic data was performed using methods similar to those described in the 2011 Bat Report. Anabat data were analyzed using Analook version 3.7w (Corben 2009). Wildlife Acoustics data were analyzed using Sonobat version 2.9.5 (Sonobat, Arcata, CA; Szewczak 2004). The presence of one species or species group within a call file was used to describe a bat pass. Thus, call analysis may result in more bat passes than call files if two or more species (or species groups) can be identified in the same call file.

Results

The results of the 2011 bat surveys were reported to the MPUC and made available to the MDNR and USFWS on December 15, 2011. The report is available in Docket No. 08-1233, eDockets ID 201112-69301-01.

A total of 2,502 bat passes were recorded at the four met towers during the three sub-sample weeks, with 847 bat passes detected at 45 m and 1,655 bat passes detected at 5 m. All bat detectors were operational during all sub-sample weeks. Bats were recorded at every monitoring location during every sub-sample week.

At Temporary Met Tower 1, where bats were monitored during all three seasons:

1. more bat passes were detected during the fall sub-sample than during spring or summer sub-samples;

2. more bat passes were detected at 5 meters than at 45 meters in all sub-samples; and

3. passes classified as species of concern (northern long-eared bats and tri-colored bats) occurred more frequently during the fall sub-sample than spring or summer sub-samples.

The composition of bat passes detected at Temporary Met Tower 1 during all three sub-sample weeks is summarized in Figure 6.1 below.

Table 6.3 Bat Species During Three Sub-Sample Weeks in 2012 at Temporary Met Towers 1, 2, 3, and 4.

Species/Species Group	No. of Bat Passes	
	5m	45m
Big brown bat	35	9
Big brown/silver-haired bat group	173	160
Big brown/silver-haired/hoary bat group	30	96
Eastern Red bat	84	79
Eastern red/tri-colored bat group	19	2
Hoary bat	17	126
Hoary/silver-haired bat group	9	71
Silver-haired bat	47	146
Little brown bat	245	8
Little brown/northern long-eared bat group	644	82
Northern long-eared bat	0	3
Tri-colored bat	76	13
Unclassified	276	52
Total	**1655**	**847**
Total Classified	**1379**	**795**

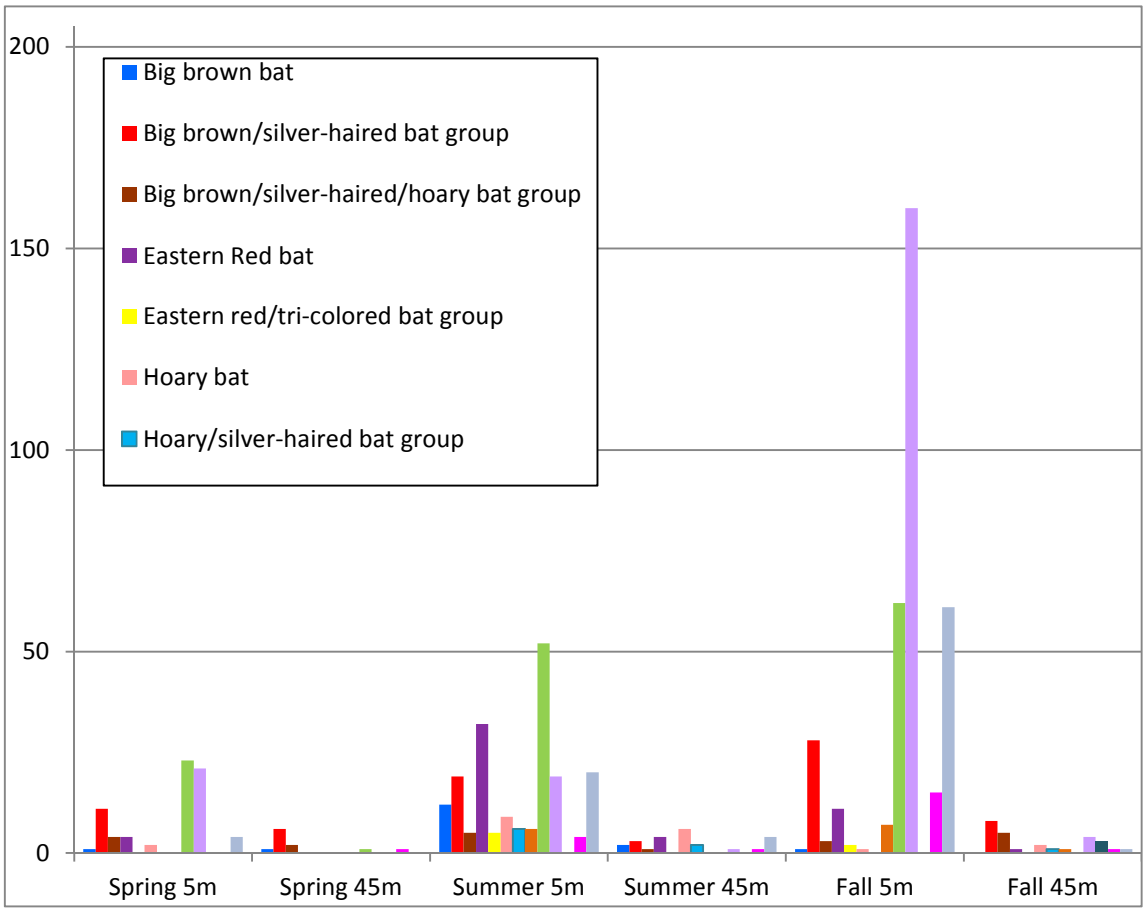
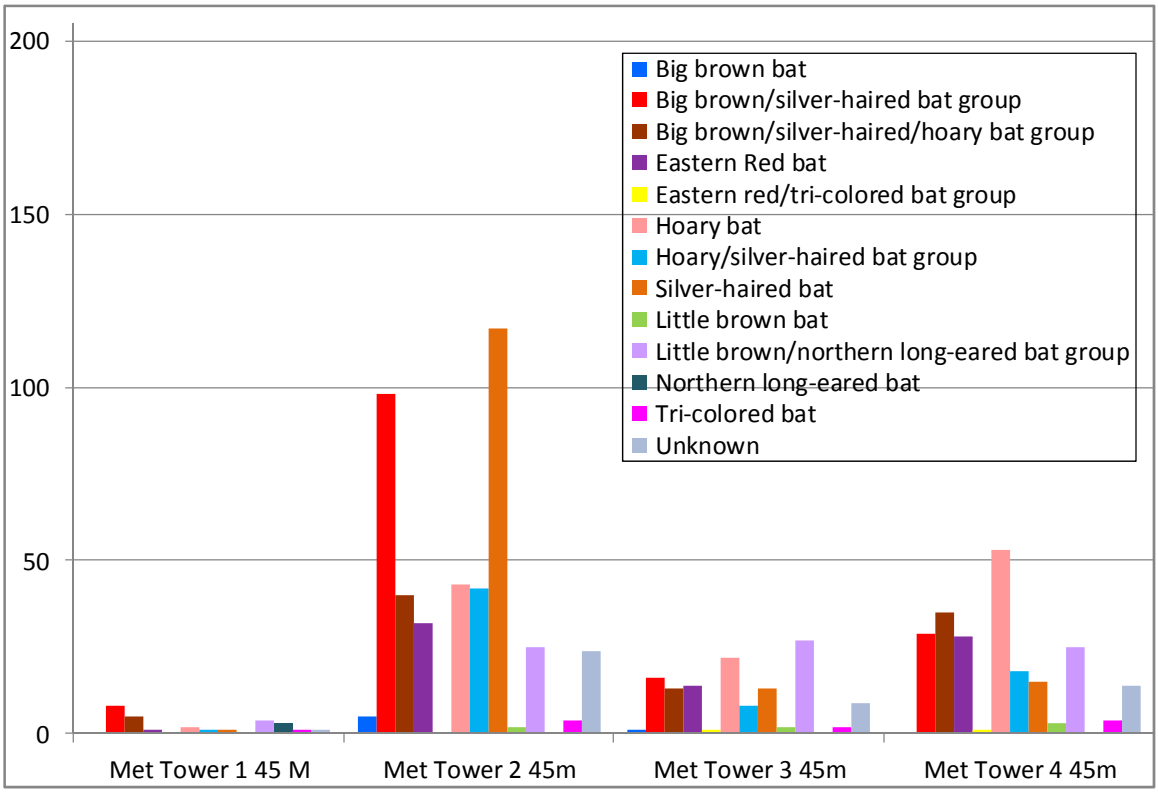


Figure 6.1 Bat Species Detected at Met Tower 1 During 1-week Sub-samples in the Spring, May 15 – 21; Summer, July 3 – 9; and Fall, August 21 – 27, 2012

Comparison of bat passes among four met towers during fall 2012 found that:

1. more bats passes were detected at Met Tower 2 than other met towers;
2. for all locations except Met Tower 4, more bat passes were detected at 5 meters than at 45 meters;
3. passes classified as tri-colored bats occurred primarily at the 5-meter height.

A preliminary comparison of bat passes among four met towers during fall 2012 is summarized in Figure 6.2 below.



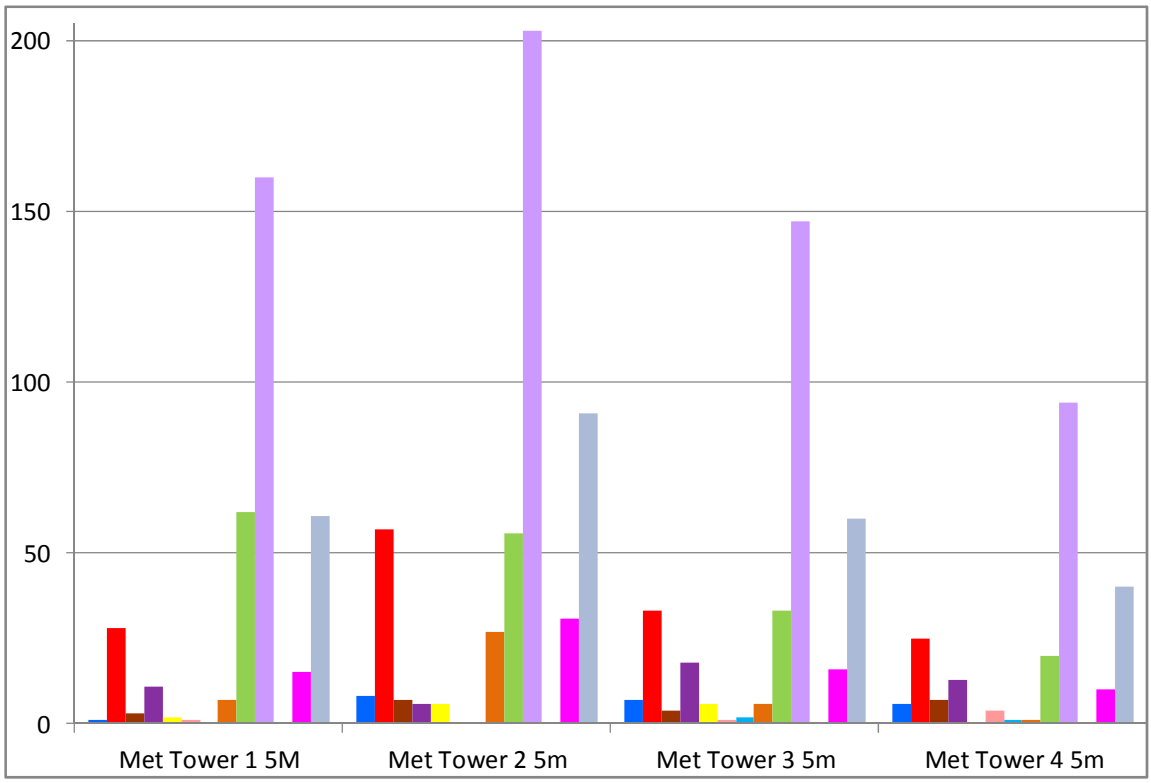


Figure 6.2 Bat Species Detected at Four Met Towers During Fall, Aug 21-27, 2012 at 5 and 45 meters above the ground

Discussion of 2011 Survey and 2012 Sub-sample Results

The hoary bat, a migratory tree-roosting species, was the species most detected in 2011, followed by the little brown bat. The little brown bat was the species most detected in the 2012 sub-samples.[6] In 2011, bat activity at 45 m was largely attributed to the hoary bat, while the bat activity at 5 m was largely attributed to the little brown bat, possibly the northern long-eared bat, the big brown bat, and the silver-haired bat. Overall, average nightly bat activity in 2011 was significantly lower at the 45 m height than the 5 m height. Similarly, overall nightly bat activity was significantly lower at the 45 m height than at the 5 m height for all 2012 sub-samples at Met Tower 1.

The northern long-eared bat and tri-colored bat are Minnesota species of special concern that were both detected during both years of this study. Although no federally threatened or endangered bat species were detected, the northern long-eared bat was the subject of a petition for listing under the Endangered Species Act. As of October 29, 2012, the USFWS had not yet determined whether it will be listed. Both the northern long-eared bat and tri-colored bat were only detected near ground level in 2011 and in the 2012 sub-samples, except three northern long-eared bat calls were recorded at a height of 45 meters at Temporary Met Tower 1 in the fall 2012 sub-sample. It is possible that additional calls of these species northern long-eared bat calls were detected at 45 m, but overlapping call characteristics with similar species made them difficult to distinguish. Nonetheless, only 3.15% (n=9) of the identified calls recorded at 45 m in the 2011 sampling season were assigned to the little brown/northern long-eared bat group.

Because the northern long-eared bat overlaps in call characteristics with the little brown bat, call identification and differentiation between these species is difficult. Differentiation of calls between these species is especially problematic in open (low clutter) environments (Broders et al. 2004). The temporary meteorological towers where bat monitoring data were collected are located in this type of open environment. In cluttered habitats (e.g., forests), however, the echolocation call of the northern long-eared bat is more easily distinguished due to its feeding specialization in these habitats. The 2012 data collected using the Wildlife Acoustics detectors may provide greater call differentiation between the little brown bat and northern long-eared bat, resulting in more definitive northern long-eared bat activity patterns.

Given that the bat detectors were located on towers in open fields and that calls were identified as little brown bats much more frequently than northern long-eared bats, it is probable that the majority of the calls grouped as little brown/northern-long eared bats are also attributed to little brown bats. The northern long-eared bat typically uses forested areas for both roosting and foraging activity (Caceres and Barclay 2000), whereas the little brown bat is more likely to occur in open habitats, but does occupy a variety of habitats (Broders et al. 2004).

In addition to the data being collected throughout 2012, additional site-specific bat studies will be conducted during the 2013 season to further understand bat use of the Project Footprint and the risk of direct and indirect effects on bats from the Project. Passive acoustic bat monitoring

[6] Note that the 2012 sub-samples provide some indication of the bat activity in the Site Permit Area in 2012, but are not conclusive as to the overall seasonal composition, species distribution, or levels of activity for all of 2012. A more comprehensive analysis of the 2012 data will be provided to the MPUC after the 2012 sampling season is complete.

will continue to occur in 2013 at the four locations associated with turbine clusters in the Project Footprint using Anabat and Wildlife Acoustics bat detectors.

6.2.4 Habitat Assessments

In addition to general bird and bat population assessment studies, New Era conducted species specific habitat studies for sensitive species identified in desktop and general field studies as having potential to use the Site Permit Area. Each of these habitat assessments is discussed in this section.

6.2.4.1 Loggerhead Shrike

New Era's *Loggerhead Shrike Habitat Assessment* (Westwood Professional Services 2009) identified and ranked suitable shrike breeding habitat based on an adaptation of a shrike habitat model previously developed for Minnesota by Brooks and Temple (1990). This habitat assessment was a first-of-its-kind effort for a proposed wind farm and was conducted on a voluntary basis, not having been requested by either MDNR or USFWS. New Era enlisted the assistance of Ms. Bonnie (Brooks) Erpelding to complete the *Loggerhead Shrike Habitat Assessment*. Ms. Erpelding is an authority on loggerhead shrikes in Minnesota.

The assessment and related work were designed to:

- assess the suitability of loggerhead shrike habitat in the Site Permit Area;
- assess the compatibility of the Project with loggerhead shrikes; and
- demonstrate wind turbine siting that avoids and minimizes effects on loggerhead shrikes and their habitat.

The Site Permit Area was divided into 207 quarter-sections and each quarter-section was ranked for breeding loggerhead shrike habitat suitability based on interpretation of aerial photography followed by a field review. The *Loggerhead Shrike Habitat Assessment* report, which describes the assessment method in detail, was posted to the project docket, Docket IP6701/WS-08-1233 document number 201010-55330-02, filed October 11, 2010. The results of the habitat suitability initial screening model are depicted in **Exhibit 7**. The habitat suitability model was used broadly in the initial siting of turbines.

This initial screening was then followed by an aerial photo-based, turbine-specific review of shrike habitat. New Era provided MDNR staff with detailed aerial photography of habitats ranked moderately to very highly suitable. This information resolved concerns that the initial habitat model classified habitats at a scale much larger than shrike breeding territories. Many turbines located in habitat blocks classified as suitable were actually sited in agricultural fields, away from grasslands and small trees that provide key habitat components. On November 17, 2010, MDNR staff indicated that the detailed aerial photography was very helpful and agreed that most turbines in highly suitable quarter-sections avoided high-value habitat components. MDNR's initial concerns about two specific turbine locations were resolved through the aerial photo-based, turbine-centered habitat review (**Exhibit 8**).

On June 13, 2011, New Era, MDNR and USFWS conducted a field review of highly suitable shrike habitats and proposed turbine locations and discussed potential effects on shrikes. MDNR

staff advocated elimination of two turbines proposed in high quality shrike habitat. In response to MDNR concerns regarding potential shrike habitat, New Era eliminated two additional turbines from the layout, and adjusted the location of Turbine 6 to separate it from potential shrike habitat (**Exhibits 9 and 10**).[7] As a result, the 48 proposed and 4 alternate turbine locations all avoid high quality shrike habitat. In a letter dated September 21, 2011, the MDNR indicated that New Era's re-siting efforts had addressed concerns regarding loggerhead shrike breeding habitat:

> "DNR staff have reviewed [New Era's] efforts to relocate turbines away from state-listed threatened loggerhead shrike habitat. The DNR appreciates the project proposer's willingness to make project adjustments. The adjustments made … address DNR concerns regarding the location of turbines in highly suitable and very highly suitable habitat."

Habitat avoidance alone is adequate as mitigation for potential impacts to loggerhead shrikes because: (1) loggerhead shrikes generally fly low, typically below the rotor swept zone; (2) they are tolerant of human disturbance; and (3) they have small breeding territories. (*See* Section 6.3.3 for a more detailed discussion.)

6.2.4.2 Henslow's Sparrow

A pair of Henslow's sparrows was observed from eagle monitoring plot 2 at the edge of a fallow field southeast of the Belle Creek Watershed District Reservoir on the mornings of July 23 and July 31, 2012. Both birds were audibly and visually confirmed on July 23 and 31 and observed making repeated flights to a patch of tall grass. No nest or young were located during a search of the area.

Henslow's sparrow is listed as state endangered in Minnesota. They require relatively large fields of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation (MnDNR 2008). Habitat also usually dominated by grasses and has scattered forbs for singing perches (Herkert et al. 2002). Areas used for breeding one year may be abandoned the next year if the grass becomes too long or too short (which is common in mowed hayfields). The species' distribution is therefore sporadic and unpredictable. Reported average breeding home range size varies from 0.74 acres in Michigan to 1.73 acres in Wisconsin (Herkert et al. 2002). The major cause of the species' decline is habitat loss and degradation resulting from urban sprawl, intensive agriculture, increased frequency of mowing hayfields, and conversion of pastures, hay fields, and old fields to row crops (MnDNR 2008).

The location of 2012 Henslow's sparrow observations at New Era Wind Farm is shown on Exhibit 5. It is 0.33 mile from the nearest turbines (Turbines 26 and 27) and is separated from these turbine locations by habitat unsuitable for Henslow's sparrows, consisting of crops fields, grazed pastures and woodlots. Both of these turbines were relocated to their current locations to avoid potential impacts to potential loggerhead shrike habitat, which is contiguous to the fallow field in which the Henslow's sparrows were observed. Given the small home range size of

[7] Note that Exhibit 8 reflects the final 2012 turbine numbering.

Henslow's sparrows and the large expanse of intervening unsuitable habitat, Turbines 26 and 27 are expected to have no impact upon Henslow's sparrows and their habitat.

6.2.4.3 Trumpeter Swans

Trumpeter swans were considered extirpated in Minnesota as of the mid-1800s due to overhunting. Through recovery efforts, Minnesota now supports 2,400 free-flying trumpeter swans. Trumpeter swans were listed by the State of Minnesota as threatened in 1996, but, due to the success of recovery efforts, have been proposed for down-listing to "special concern" since 2007.[8] Continued threats to trumpeter swans in Minnesota include loss or degradation of wetland habitat, lead poisoning, power line collisions, and illegal shooting. Lead poisoning is the primary man-induced cause of trumpeter swan mortality. It is estimated that lead poisoning from ingestion of lead shot and fish sinkers is responsible for more than half of the mortality of Midwestern trumpeter swans (Gillette and Shea 1995). Powerline collisions are a less prevalent, but still important, source of trumpeter swan mortality. Of 75 trumpeter swan deaths recorded from 1958 to 1973, 19% of the fatalities were due to powerline collisions (Weaver and St. Ores 1974).

The following three records of trumpeter swans have been documented in or near the Site Permit Area:

1. In August of 2011, the MDNR confirmed a report of trumpeter swans nesting and raising a brood of goslings in a farm pond about 1/3 mile west of the southwest corner of the Site Permit Area in Township 110 North, Range 16 West, NW ¼ of Section 8 (*see* **Exhibit 5**). The swan nest location is within an impounded farm pond about 1.8 miles southwest of the nearest wind turbine location. The pond involved is about 2.8 miles northwest of the Zumbro River and has about 1.8 acre of open water and a fringe of emergent vegetation. The pond lies at the confluence of several grassy drainage ways and is about 0.35 mile from the nearest road. This nest is 1.8 miles from the nearest proposed turbine.[9]

2. On October 4, 2011, the MDNR reported that a dead trumpeter swan had been found somewhere near the Site Permit Area (the location was not supplied by the MDNR) and that the death had been from aspergillosis, caused by a fungus common in the environment that can affect the throat and lungs. Aspergillosis can be caused by the natural environment or from piles of moldy corn that sometimes are found on agricultural lands.

3. On March 14, 2012 a single trumpeter swan was observed foraging along the southeast edge of the Belle Creek Watershed District reservoir in the west-central part of the Site Permit Area. This bird was likely migrating through, as no other swans were observed at this reservoir either in 2011 or to date in 2012.

[8] http://files.dnr.state.mn.us/input/rules/ets/birds.pdf

[9] The 2011 nesting site was checked on May 4, 2012. Neither a nest or swans were observed (*see* Section 6.3.4 for further discussion).

(One of the bald eagle point count survey locations overlooks the reservoir so observations in this location are very frequent).

Appendix E supplies a summary of scientific literature that provides a more detailed discussion on the habitat preferences of trumpeter swans throughout the year. Based on this summary, the Site Permit Area encompasses very little habitat potentially suitable for nesting trumpeter swans. With the exception of the Belle Creek Watershed District reservoirs in the area, impounded farm ponds are generally too small for cygnets to take flight and mostly lack sufficient emergent vegetation for nesting. The characteristics of these ponds differ from those of the pond on which the 2011 nest is located. The pond with the nest is slightly larger than other ponds in the Site Permit Area, has a fringe of emergent aquatic vegetation and has sufficient open water (i.e., 1.8 acre) for trumpeter swans to take flight.

The Site Permit Area also encompasses two watershed district reservoirs with sufficient size and open water to support use by breeding trumpeter swans but they both lack sufficient emergent vegetation for trumpeter swan nest sites. There is another reservoir and a farm pond one-fourth to one-half mile west of the northwest corner of the Site Permit Area that could provide suitable nesting habitat for trumpeter swans. However, these water bodies are not located between any proposed turbine locations and other suitable swan habitat. The remaining wetlands in and around the Site Permit Area are virtually all wet meadows or scrub shrub wetlands located along ditches or drainage ways. These wetland types lack both open water and aquatic emergent vegetation that would be suitable for trumpeter swans nesting or foraging.

6.3 Risk Analysis

6.3.1 Overall Avian Community

Overall, avian fatalities from the Project are not expected to be a substantial source of avian mortality compared to other anthropogenic factors. The predicted annual avian mortality from wind turbines is estimated to account for less than 0.01% of the mortality caused by the top eight anthropogenic causes (Erickson et al. 2005). The proportion of avian fatality attributable to wind turbines ranked seventh, behind buildings, power lines, cats, automobiles, pesticides, and communication towers (Erickson et al. 2005).

Post-construction monitoring of modern wind energy facilities has shown avian fatalities to be lower than observed during early avian fatality studies. Tubular steel turbines, buried electrical cables, diligent siting, and other practices have reduced avian fatality rates in the last 10 to 15 years. Regional average fatality rates at wind farms studied across the U.S. have ranged from 2.31 birds/MW/year in the Rocky Mountain Region to 3.50 birds/MW/year in the Upper Midwest (National Research Council 2007). It is acknowledged that some avian fatalities will inevitably result from the Project. However, in a comment letter dated September 12, 2011, the Minnesota DNR characterized the Site Permit Area as a “moderate risk site” with regard to the likelihood of avian collisions with wind turbines.

As discussed below under Section 6.3.3, many avian species are not sensitive to displacement by wind turbines. Birds that have been shown to avoid wind turbines are generally open grassland species, which are adapted to large blocks of undisturbed grassland habitats that do not exist in

the Site Permit Area. New Era's siting of most turbines in agricultural fields is expected to help minimize avian displacement impacts. Similarly, the Project is expected to result in minimal habitat fragmentation impacts due to the high degree of fragmentation that already exists within the Site Permit Area.

6.3.2 Raptors

Red-tailed hawks are the most abundant raptor in the Project Footprint and are also one of the most widespread and commonly observed birds of prey in North America. This species typically inhabits open agricultural land with scattered forested woodlots and has seen its population increase through much of North America since the mid-to-late 20th Century. The observed population increase has apparently been in response to the widespread establishment of open, wooded "parkland" in areas formerly consisting of grassland or dense forest (Preston and Beane 2009). The red-tail hawk nests identified within the 2012 raptor nest survey area in the Project Footprint show this pattern, as many of the recorded nests are in small woodlots, small riparian areas, or farmsteads. The New Era project design generally avoids these raptor nest features. The average distance of a raptor nest to the nearest turbine is 1,005 meters (3,296 feet), which is well over half a mile. The closest raptor nest to a turbine is a red-tailed hawk nest located approximately 400 feet from a turbine.

The 2012 raptor nest survey confirms that raptor nest density in the Site Permit Area is consistent with that reported at other wind projects across the United States (Erickson et al. 2002 and NWC 2010). According to Erickson et al. (2002), the highest known raptor nesting density at a wind farm occurs at the Foote Creek Rim Wind Plant in Wyoming. At Foote Creek Rim, red-tailed hawk nests were associated with most nests within two miles of turbines, but no red-tailed hawk fatalities were reported (Young et al. 2003). Erickson et al. (2002) cautioned that there are currently not enough data on turbines within 0.5 miles of raptor nests to determine potential impacts. The *2012 USFWS Land-Based Wind Energy Guidelines* also state that there is no consensus on recommended raptor nest buffer distances. Recent data suggest that 74 studies of wind projects across North America averaged 0.1 raptor fatalities per year (Erickson 2012).

6.3.3 Loggerhead Shrikes

The adjustments in turbine siting to avoid high quality shrike habitat (*see* Section 6.2.4.1) and elements of loggerhead shrike ecology and behavior suggest that the potential for loggerhead shrike collisions with wind turbines on this project is low.

Several facets of loggerhead shrike ecology and behavior suggest that this species is less vulnerable to effects from wind energy development than other avian species such as prairie chickens that inhabit open landscapes with uninterrupted horizons and few structures.

Information documenting the potential compatibility of wind energy with loggerhead shrikes and their habitat was presented at national and regional wildlife conferences (Bouta et al. 2010, Bouta et al. 2010a). Factors that suggest wind energy projects may not have a substantial effect on loggerhead shrike include:

1. Loggerhead shrike nest and forage in proximity to roads, power lines, fence lines, and farmsteads. The association of shrikes with roads and structures suggests that they

would be less likely than many avian species to avoid habitats due to the presence of wind turbines.

2. Loggerhead shrikes nest and often fly much closer to the ground than wind turbine blades. Shrikes typically nest 1.2-6 m above the ground (INHS 2010, Lee 2001). Keinath and Schneider (2005) indicated most foraging flights are within 10 m of elevated perches, which suggests that most local flights of shrikes are at 16 m or below. Conversely, the rotor swept height of Project wind turbines will extend from 38.8 to 121.3 m.

3. Loggerhead shrikes have small breeding territories. Such localized habitat use would tend to reduce the probability of collisions with wind turbine blades, particularly when most turbines are sited in cropland. The largest territories are often about 12.6 ha or 31 acres (Kridelbaugh 1982, Porter et al. 1975). Dechant et al. (2002) indicated territories usually cover about 6-9 ha and can range from 2.7 to 25 ha in the U.S. and Canada.

4. Loggerhead shrikes have relatively low population densities and suitable habitat is not considered a limiting factor for shrikes in Minnesota. Even if shrikes are displaced from suitable habitats, which appear unlikely, evidence suggests that the Site Permit Area includes up to 80 suitable but unoccupied shrike territories that could be utilized were any shrikes displaced. Brooks and Temple (1990) found substantial suitable unoccupied shrike habitat in Minnesota. Roadside surveys of shrikes in Minnesota and Iowa have found 0.11-0.15 pair/km (Brooks and Temple 1990, DeGeus 1990). A reasonable maximum shrike population for the Site Permit Area, based on twice the density of 0.15 pair/km, would be 1 pair for every 330 ha of quarter-section habitat ranked 3-5, or 12.6 pairs for the Site Permit Area. Alternatively, a reasonable habitat-based population potential for the Site Permit Area would be 1 territory for each quarter-section ranked 3 and 2 territories for each quarter-section ranked 4-5, resulting in a total of 93 potential shrike territories.

As indicated above, loggerhead shrikes may be less likely to be displaced from suitable habitats on wind projects because shrikes use habitats associated with human activities: fences, roads, power lines and buildings. Existing literature does not clearly establish whether shrikes will avoid wind turbines. Although some grassland birds avoid wind turbines, many do not. Shaffer and Johnson (2008) found that one of five species of grassland birds avoided wind turbines in North and South Dakota. Although grasshopper sparrows avoided wind turbines, western meadowlarks, chestnut-collared longspur, and killdeer did not. Results for clay-colored sparrows were ambiguous. Research at wind projects on the Buffalo Ridge in Minnesota indicated birds were displaced in small areas located within 80-100 m of wind turbines (Leddy et al. 1999, Johnson et al. 2000).

The low flights of loggerhead shrikes may minimize the potential for shrike fatalities from collisions with wind turbine blades. A recent avian fatality study in Oregon recorded an incidental loggerhead shrike observation, but detected no loggerhead shrike fatalities (Enk et al. 2010). A conversation with a biologist from Western Ecosystems Technology, Inc. (a company that performs many post-construction fatality surveys throughout the United States) indicated he

did not recall any loggerhead shrike fatalities during post-construction fatality monitoring studies (Thompson 2011 pers. comm.).

In a letter dated November 15, 2010, the USFWS suggested that fragmentation of grassland habitats would have the greatest effect on loggerhead shrikes. However, grasslands in the Site Permit Area are already relatively fragmented. Furthermore, the effects of small grassland patch size on loggerhead shrikes is not well understood (Pruitt 2000). Cultivated cropland accounts for approximately 60% of the Site Permit Area. Grasslands, pastures, and hay fields cover up to half of a square mile in certain areas and account for about 30% of the land cover in the Site Permit Area.

New Era has avoided placing turbines in highly suitable and very highly suitable habitat and minimized turbine siting in grasslands and near important nest and perch sites such as scattered solitary trees, tree rows, and eastern red cedars. Instead, New Era sited its turbines in agricultural row-crop fields wherever practicable. These practices, combined with the low flights, small territories, and low population densities of loggerhead shrikes, support New Era's expectation that the potential for loggerhead shrike collisions with wind turbines on this project is low. This is supported by the September 21, 2011 letter from the MDNR, which indicated that New Era's re-siting efforts had addressed concerns regarding loggerhead shrike breeding habitat. (*See* Section 6.2.4.1).

6.3.4 Trumpeter Swans

The risk of a trumpeter swan collision with a wind turbine appears low. The nest site documented in 2011 is 1.8 miles from the nearest turbine and there are no open water bodies on the intervening land. No suitable trumpeter swan nesting habitat is apparent between the nest site and any of the turbines within the Project Footprint. It is possible that trumpeter swans may fly through the Project Footprint during migration periods. However, the only specific landscape features that appear to afford potential stopover habitat are the watershed district reservoirs in and adjacent to the northwestern corner of the Project Footprint.[10] Harvested crop fields may also be used for foraging during migration periods but there is no way to predict which fields would be most likely to be used. The crop planting and harvest dates vary from year to year and such fields are the predominant landscape feature in and around the Project Footprint. Which crop fields might receive use by swans, if any, would depend on the conditions on the specific dates that trumpeter swans might move through the area.

The 2011 trumpeter swan nesting site was checked on May 4, 2012 to assess the breeding status this year. Neither a nest nor trumpeter swans were observed at this pond during a time in which the swans should be incubating eggs. The landowner reported a neighbor recently observing a pair of swans foraging in crop fields near the pond. However, it is unclear if the observed birds were, in fact, trumpeter swans and of breeding age or second year swans. Trumpeter swans do not breed until 3 or 4 years of age. We will continue to record any observations of trumpeter swans through other surveys. If incidental observations of trumpeter swans occurs throughout the 2012 breeding season, the potential collision risk to breeding trumpeter swans will be re-

[10] As previously indicated, one trumpeter swan was observed foraging in the western-most of these reservoirs on March 14, 2012.

assessed after nesting season observations have been completed. In addition, any observed movements and habitat use of trumpeter swans during fall, winter and spring survey periods will be documented and included in the re-assessment of collision risk.

6.3.5 Bats

Some bat fatalities are expected to result from collisions with Project turbines. Scientific literature regarding bat fatalities at wind energy projects have shown that bat fatality rates cannot be reliably predicted based on project area vegetation and topography. Relatively high fatality rates have been documented in some agricultural areas at wind projects in Iowa (8.59 bats per MW per year, Jain 2005), Wisconsin (24.57 bats/MW/year, Gruver et al. 2009), and Alberta (10.27 bats/MW/year, Brown and Hamilton 2006). In southern Alberta, two wind projects located near one another and with similar vegetation and topography had dramatically different bat fatality rates (Arnett et al. 2008).

Regional averages in bat fatality levels at wind projects are informative, but general patterns can be influenced by factors that are not yet understood. Prior to 2007, the overall average bat fatality rate for U.S. wind projects was estimated at 3.4 bats/turbine/year and 4.6 bats/MW/year (Johnson 2004). Early studies indicate most wind farms in grassland and agricultural landscapes tended to have lower fatality, ranging from 0.74 to 2.32 bats/turbine/year (Erickson et al. 2002, Johnson 2004). A compilation of bat fatalities at wind projects across North America (Arnett et al. 2008) indicated that bat fatalities were lowest at wind projects in the Rocky Mountains and Pacific Northwest regions, and highest in the eastern United States. In the eastern region where turbines have been placed on forested ridges, fatalities averaged 37.0 bats/turbine/year and 37.1 bats/MW/year. Data from Arnett et al. (2008) indicates that fatalities in the Midwest have averaged 3.3 bats/turbine/year and 4.2 bats/MW/year. Recent compilation of data from 91 bat fatality studies in North America indicates the overall average bat fatality rate is 5.7 bats/MW/year (Erickson 2012).

The annual peak of bat fatalities at wind projects is typically correlated with the fall migration period. More generally, bat fatality at wind farms has been associated primarily with dispersing and migrating bats, and has typically involved solitary, tree-roosting species such as silver-haired, hoary and eastern red bats (Erickson et al. 2002, Johnson 2004). As indicated in Section 6.2.3, all three of these species were detected in the Site Permit Area during the acoustic monitoring surveys. One national overview indicates that the hoary bat and eastern red bat together account for 64.4% of the bat fatalities at wind projects (National Research Council 2007). Thus, these three species are likely to constitute a substantial segment of the bat fatalities from the Project.

Current scientific knowledge regarding bat fatalities at wind energy projects limits the ability of project proponents and wildlife agencies to accurately predict risks to bats at specific projects based on pre-construction acoustic survey data (USFWS 2012). However, the apparent lack of large roosts and *hibernacula* within or near the Project Footprint suggests that the best methods of assessing and mitigating risks to bats is use of acoustic monitoring before and during project operation and to monitor bat fatalities after project construction. Analysis of acoustic monitoring data from pre-construction and operation periods in conjunction with fatality monitoring will facilitate development of risk correlations for this Project. The risk analysis will assess bat

species occurrence, activity, and fatality related to project operation and determine whether bat fatality rates are consistent with the range and average rate reported for other wind projects in the Midwest. If post-construction bat fatalities are substantially above the national average, New Era will consult with the MDNR and USFWS regarding appropriate remedial action as part of the adaptive management process.

7.0 Tier IV - Post Construction Fatality Monitoring

Tier IV of the *2012 USFWS Land-Based Wind Energy Guidelines* addresses post-construction studies designed to assess whether predictions of fatality risk and direct and indirect impacts to habitat were correct. New Era is committed to addressing Tier IV recommendations by implementing the following study protocols.

7.1 Number and Selection of Turbines for Monitoring

New Era will conduct post-construction fatality monitoring at 10 turbines, which represents 21 percent of the total number of turbines to be constructed. This is considered adequate coverage, as it provides monitoring of one turbine from each of the seven turbine clusters plus three additional turbines. The *2012 USFWS Land-Based Wind Energy Guidelines* do not recommend a specific percentage of turbines for post-construction fatality monitoring. The turbines selected for monitoring are those which appear to be in the closest proximity to woodlands and/or wetlands that might afford suitable avian and bat habitat. The locations of the turbines to be monitored for post-construction fatality are depicted in **Exhibit 11**.

7.2 Fatality Monitoring Protocol

Per recommendations from the MDNR, the proposed avian and bat fatality survey protocol is based on the Minnesota DNR draft *Protocol for Bat and Avian Fatality Monitoring at Large Wind Energy Conversion Systems* (Mixon et al. 2011) for a moderate risk site. The post-construction monitoring protocol has been developed to allow the following Tier 4a questions in the *2012 USFWS Land-Based Wind Energy Guidelines* to be answered:

1. What are the bird and bat fatality rates for the project?
2. What are the fatality rates of species of concern?
3. How do the estimated fatality rates compare to the predicted fatality rates?
4. Do bird and bat fatalities vary within the project site in relation to site characteristics?
5. How do the fatality rates compare to the fatality rates from existing projects in similar landscapes with similar species composition and use?
6. What is the composition of fatalities in relation to migrating and resident birds and bats at the site?
7. Do fatality data suggest the need for measures to reduce impacts?

In accordance with the above-cited MDNR and USFWS guidance, New Era will utilize the following protocol for monitoring post-construction fatalities:

1. Fatality monitoring will be conducted 2 times per week at 10 turbines (21 percent of the total turbines) from April 1 - November 15 for a minimum of 2 years following the initiation of commercial operation. Whether additional fatality monitoring is

needed will be determined in coordination with the USFWS and MDNR based on the monitoring results from the first 2 years;

2. Search transects will be spaced no more than 6 m apart within 160 x 160 m plots centered on turbines at a maximum speed of 1 turbine/person/hour;

3. Search areas will be assigned to visibility classes ranging from bare ground to >25% vegetative cover >1 foot tall. Vegetation control may be applied in the search plots if needed to increase visibility of carcasses;

4. Carcass removal and searcher efficiency trials will be performed in accordance with MDNR guidelines;

5. Weather conditions will be recorded at the initiation of each plot search; and

6. Modified MDNR datasheets (expanded to include additional information desired by USFWS) will be used to document searches and fatalities (**Appendix F**)

Searcher efficiency can have a major influence on fatality estimates and their accuracy. Visibility and searcher efficiency can decline substantially with increasing vegetation density. Some fatality studies in agricultural environments have involved mowing, herbicidal, or manual vegetative controls to limit vegetation height and increase carcass visibility (Jain 2005, Gruver et al. 2009). On the Project, vegetative control will be done by mowing 6 one-meter wide transects approximately every 2 weeks during the growing season. The mowed transects will be distributed to cover roughly 33% of the 160-m x160-m (1 ha) search plots. **Exhibit 12** provides a schematic of a 160-m x160-m search plot with mowed transects.

Visibility classes will be assigned to search areas on a seasonal basis. Carcass removal and searcher efficiency trials will be distributed temporally and spatially in proportion to the seasons and visibility classes, respectively. Carcass collection and data recording and reporting will be in general conformance with MDNR and USFWS protocols, except that data recording and reporting may be digitally customized and optimized. New Era will obtain the necessary MDNR salvage permit and USFWS migratory bird permit prior to commencing fatality monitoring.

7.3 Fatality Reporting

Fatality monitoring results will be reported to MDOC-EFP, USFWS and MDNR using the MDNR forms and reporting guidelines contained in Appendix F and according to the schedule described in Part IV, Section 9.9. Fatality monitoring results will be compared to the results of the pre-construction acoustic bat survey and pre-construction bird survey and collision risk assessment. This will be done to determine if the relative abundance of species documented during pre-construction surveys and results from collision risk models are consistent with the observed fatalities.

8.0 Best Management Practices and Mitigation

8.1 Pre-Construction Avoidance and Minimization

8.1.1 Overall Avian and Wildlife Communities

Chapter 7 of the *2012 USFWS Land-Based Wind Energy Guidelines* sets forth a series of Best Management Practices (BMPs) that wind power developers are recommended to follow. **Appendix G** lists the USFWS-recommended BMPs and indicates the section(s) of this ABPP that document New Era's application of the respective BMP.

Among the USFWS-recommended BMPs is a recommendation that wind developers site wind power facilities to avoid areas with habitat for species of concern, minimize the fragmentation of large blocks of high quality habitat and avoid separating bird and bat species of concern from their daily roosting, feeding or nesting sites. In practical terms, this means that turbines and other project infrastructure should be clustered to the extent possible so that the "project footprint" is as small as possible and that travel corridors between habitat elements are impeded as little as possible. New Era has followed this recommendation. Most turbines will be constructed on cropland and turbines have been clustered. Unlike many wind power facilities (particularly in the western United States), New Era's turbine layout does not use parallel turbine "strings."

Pre-construction efforts to avoid and minimize avian and bat impacts have focused on siting turbines on cropland to minimize impacts to forest stands, grasslands and wetlands that provide suitable habitat for sensitive species birds and bats. Turbines have also been clustered in locations that maximize distances to high quality habitats and likely flight corridors. Moreover, all collector lines will be buried underground to minimize habitat fragmentation and other risks to birds. These avoidance and minimization efforts have been informed by a series of past and ongoing pre-construction avian and bat studies and surveys described in Section 6.2 of this ABPP, as well as by consultations with and comments from USFWS, MDNR and MDOC-EFP.

8.1.2 Loggerhead Shrike

A proactive approach to siting turbines and related improvements increased the compatibility of the Project with loggerhead shrike habitat. Based on the methods discussed in Section 6.2.4.1, New Era adjusted turbine locations to avoid highly suitable and very highly suitable loggerhead shrike habitat as identified and delineated by loggerhead shrike experts.

As discussed in Section 6.2.4.1, several facets of loggerhead shrike ecology and behavior suggest this species is less vulnerable to effects from wind development than other avian species. Siting turbines outside of highly suitable habitat is expected to preserve substantial suitable unoccupied shrike habitat within the Site Permit Area for the establishment of future breeding territories, thus mitigating direct or indirect effects on loggerhead shrikes from the Project. This habitat avoidance and shrike conservation strategy is expected to help sustain and preserve existing and future loggerhead shrike populations.

Between October 21, 2010 and June 30, 2011, proposed turbine locations were revised several times, and a number of turbines were moved out of suitable habitats into habitats ranked

unsuitable to minimally suitable. Turbines proposed in higher quality habitats (ranks 3-5) were shifted within those areas to avoid habitat features that contribute to high suitability rankings. Avoidance of suitable shrike habitat was balanced against multiple constraints that affected acceptable turbine siting locations, including landowner acceptance, property boundary setbacks, residence setbacks, wind resources, raptor nest setbacks, wetlands, cultural resources, construction feasibility, site access, telecommunications signals, radar, and aircraft flight navigation. However, even given those other constraints, only one alternate and four proposed turbine locations are located in areas mapped as highly or very highly suitable habitat based on the coarse filter habitat model. Detailed, turbine-centered habitat review documented that all five of these turbines are actually sited in cropland and none met turbine-centered criteria for highly suitable shrike habitat:

1. area within a 40-meter radius of the turbine is dominated by grassland;

2. area within a 200-meter radius of the turbine is over 40% grassland; and

3. perches exist on over 40% of the area within a 200-meter radius of the turbine.

After the June 13, 2011 field investigation with MDNR staff, the following turbine siting adjustments further minimize potential effects on loggerhead shrikes:

1. Two turbines, respectively located in the NW ¼ of Section 1 and the SW ¼ of Section 28, Township 111 North, Range 16 West were eliminated from the layout because they were located in grassland within quarter-sections ranked very highly suitable for loggerhead shrikes.

2. Turbine 6 was moved 735 feet south-southeast within a quarter-section ranked unsuitable increasing the distance between Turbine 6 and a 15-acre grassland from 60 feet to 340 feet.

Proper micrositing alone is considered by New Era to be an adequate mitigation strategy for avoiding long-term impacts to loggerhead shrikes. While no turbine moves are currently expected prior to construction, New Era will coordinate with MDNR to conduct a turbine specific loggerhead shrike habitat assessment prior to moving any proposed turbine locations.

New Era will minimize construction disturbance and vegetation removal to avoid and minimize short-term, construction-related impacts on loggerhead shrikes. Site-specific preconstruction breeding shrike surveys will be conducted prior to non-turbine infrastructure construction activities (access roads, underground cables, crane paths) during the shrike breeding season (i.e. between mid-April and mid-July) within quarter-sections ranked as containing highly or very highly suitable shrike habitat. If necessary, refinements will be made to construction timing in such areas if breeding shrikes are found. If grassland or suitable nesting locations are directly affected, such areas will be reseeded to grassland as needed and affected shrubs re-planted to mitigate short-term impacts.

8.1.3 Trumpeter Swans

At this time, the potential for construction disturbance or turbine collision risk to trumpeter swans from the Project is considered low, given that only one breeding pair has been documented in the general area and the nest site is outside the Project Footprint, 1.8 miles from the nearest turbine. The Project Footprint encompasses very limited aquatic foraging habitat, and New Era has avoided impacts to wetland habitats that may be potentially suitable for aquatic foraging. No suitable trumpeter swan nesting habitat, as described by the MDNR and other scientific literature, has been observed within the Project Footprint. Potential breeding season foraging habitat for trumpeter swans is likewise extremely limited within the Project Footprint. The only water bodies observed within the Project Footprint that offer foraging opportunities for swans are the watershed district reservoirs in the western and northern parts of the Project Footprint. As previously stated, one trumpeter swan was observed during eagle surveys during the spring 2012 migration season, foraging in the Belle Creek Watershed District reservoir located in the west-central part of the Project Footprint. However, as previously stated, the reservoirs lack emergent vegetation and do not appear to offer any suitable nesting opportunities for trumpeter swans.

Trumpeter swans will forage in crop fields during the migration periods and row crops are the predominant land cover in and around the Project Footprint. However, crops change from year-to-year and, while it is possible that trumpeter swans utilizing the nest site found off-site in 2011 could utilize the Project Footprint for foraging, it is not possible to predict what areas they might use or during what time periods. If cropped fields within the Project Footprint are used for fall foraging, it is likely that such use would be transitory and short-term.

Given the above factors, it appears unlikely that any specific impact avoidance, minimization or adaptive management measures beyond avoidance of impacts to potential trumpeter swan nesting habitat will be necessary. However, New Era is committed to continued monitoring of the Project Footprint during all pre-construction surveys and after the Project becomes operational. If trumpeter swans are documented in the Project Footprint after the Project is operational, New Era will consult with the MDNR and USFWS regarding appropriate management strategies to minimize the potential for impacts to trumpeter swans. Specific examples of avoidance, minimization or adaptive management measures that might be explored under such circumstances are summarized in Section 8.3.3.

8.1.4 Raptors

Throughout the design of the Project, efforts have been made to site turbines 0.25 mile or more from active raptor nests. Twelve non-eagle raptor nests were identified in the 2012 raptor nest survey, two of which are within 0.25 mile of a turbine (both red-tailed hawk nests, one built in 2012). As stated in Section 8.2.4, flight activity at these nests will be observed during and immediately after construction to evaluate whether the bird movements are putting them at risk for a collision. If risky flight behavior is observed or post-construction raptor fatality occurs that appears attributable to a nearby nest, coordination will be undertaken with the USFWS and MDNR to determine whether habitat alteration or nest removal during an inactive period would be warranted. These are considered last-resort mitigation measures and would only be pursued if approved in advance by the USFWS and MDNR.

8.1.5 Bats

New Era designed the Project to avoid and minimize effects on bats and bat habitats to the extent practicable. Turbine siting avoids woodland habitats preferred by many bat species by up to 2,500 feet and an average of 777 feet. Land cover mapping indicates the Site Permit Area is only about 4% forested. The woodlands that do exist in relative proximity to proposed turbines consist mostly of small woodlots, tree lines, and farmstead shelterbelts that are not large enough to appear as forest land on land cover mapping. Nonetheless, New Era has avoided impacts to small woodlots, tree lines, and shelterbelts and individual trees with nearly all proposed turbines, collectors, and access roads. A small number of trees would be impacted if alternate turbine A49 were constructed.

The avoidance of impacts to trees will minimize direct fatality and indirect habitat effects on bat species that utilize loose bark and/or tree cavities as roosting locations. If turbine A49 is constructed or if other trees are impacted by construction, New Era will conduct surveys of the trees that will be impacted prior to disturbing the trees to assess the risk that those trees are or could be utilized as bat roost trees. If potential roost trees may be affected, New Era will coordinate with the MDNR and the USFWS regarding appropriate remedial action.

8.2 Construction

8.2.1 Overall Avian and Wildlife Communities

8.2.1.1 Minimize Construction Disturbance

Construction practices to be followed by the contractor will be documented in a manual which will be presented during construction phase environmental training (*see* Section 10.2). New Era will minimize the area of construction disturbance to the extent practicable. The majority of access road, turbine pad, and electrical collection line construction will occur within cultivated agricultural fields. The Project design minimizes habitat fragmentation and habitat disturbance by virtue of its location in a landscape dominated by corn and soybean fields. Temporary construction areas that occur in areas of natural vegetation, such as underground electrical cable routes and construction crane paths, will be restored to pre-construction contours and grassland vegetation.

The construction contractor will implement practices to maintain a safe and orderly construction site during project construction. The potential for wildfire will be minimized by properly storing petroleum chemicals and clearing combustible vegetative materials from construction zones where appropriate. The accumulation of garbage and related food waste will be limited by use of proper solid waste disposal activities so that garbage does not attract birds and bats. The introduction and spread of invasive plant species will be limited by emphasizing native seed mixes, avoiding unnecessary soil disturbance, and stabilizing disturbed soils with approved seed mixes or other erosion control measures as soon as appropriate.

8.2.1.2 Minimize Vegetation Removal

Project construction will minimize clearing of perennial vegetation and disturbance of potential avian nesting cover. Substantial nesting cover impacts are not anticipated because the project

layout avoids most grasslands. To avoid and minimize potential effects on grassland nesting birds, areas with planned grassland disturbance will be mowed or tilled during the late fall or early spring (outside of the nesting season if possible) so that temporary disturbance areas do not provide attractive nesting cover.

8.2.1.3 Minimize Wetland Impacts

The Project has been designed to minimize impacts to wetlands. Permanent wetland impacts were quantified at 0.225 acre. Access road alignments, collector cable routes and crane paths were refined to avoid wetland impacts wherever possible. Compensatory mitigation in the form of wetland banking credits were purchased to offset the unavoidable wetland impacts.

8.2.1.4 Reseed with Native Seed Mixes

Native seed mixes will be used to re-seed any disturbed areas that previously consisted of predominantly native vegetation. Few, if any, such areas are anticipated as no native plant communities have been identified in areas to be disturbed by construction. Appropriate native seed mixes will be selected from those approved by the Minnesota Board of Water and Soil Resources. *See*: http://www.bwsr.state.mn.us/native_vegetation/state_seed_mixes.pdf.

8.2.2 Loggerhead Shrike

Turbines have been sited in locations that do not provide highly or very highly suitable loggerhead shrike habitat. Accordingly, construction activities associated with turbines are expected to have little to no effect on shrikes. Access roads and collector cable routes have also been designed to avoid and minimize effects on highly suitable shrike habitats. If access roads or collector cables routes coincide with shrike breeding locations that may be noted during 2012 avian surveys, routes will be modified or construction timing staged to avoid or minimize disturbance to the birds during nesting and brood rearing.

If construction activities will occur between April and July within 200 meters of shrike habitat considered highly suitable or very highly suitable by the MDNR, pre-construction loggerhead shrike surveys will be conducted in those areas to assess whether shrikes are present. The April-July period corresponds to the loggerhead shrike nesting and brood-rearing period. Based on a review of the turbine layout and shrike habitat rankings, only Turbines 17 and 26 lie within quarter-sections ranked highly suitable or very highly suitable for shrikes and within 200 meters of habitat features that generated these rankings. Turbines 18, 25, and A52 lie within quarter-sections ranked highly suitable or very highly suitable for shrikes, but more than 200 meters from substantial habitat that generated these rankings.

Construction activities will be staged to avoid causing a potential disturbance-related "take" of loggerhead shrikes. New Era will coordinate with the MDNR to review the final plans for the Project, confirm the boundaries of potentially sensitive shrike breeding habitat near the turbines mentioned above, and request concurrence on site-specific activities and time periods to avoid if breeding shrikes are observed. The results of this coordination will be reported at the preconstruction meeting to ensure contractor awareness of the sensitive areas. If practical and necessary, construction activity in such areas will be staged to avoid the April-July period

entirely. If construction in such areas is proposed during this time period, such construction will not commence until it is confirmed that breeding shrikes are not present.

8.2.3 Trumpeter Swans

At the present time, no trumpeter swans are nesting within the Project Footprint, and it is unlikely that trumpeter swan nesting habitat exists within this area. Moreover, New Era has avoided impacts to wetland habitats that may be potentially suitable for aquatic foraging. Thus, no further construction related mitigation is considered necessary for trumpeter swans at this time. If a significant risk is determined to be present at a later date, New Era will consult with the MDNR and USFWS on appropriate remedial action. Specific examples of avoidance, minimization or adaptive management measures that might be explored under such circumstances are summarized in Section 8.3.3.

8.2.4 Raptors

If new raptor nests are established within 0.25 mile of a turbine, construction will be staged and conducted in a manner that will minimize disturbance to raptors during the nesting period. Potential examples of such measures would include:

- Monitor the activity status of each nest to determine whether any impact minimization measures are necessary and, if so, for how long;
- Stage construction activity within 0.25 mile of active nests so as to avoid the period when the nest is active; and
- Route construction traffic away from roads nearest the nest location to the maximum degree possible during the active nesting period.

8.2.5 Bats

Project construction will avoid and minimize disturbance of preferred bat habitats and roost sites such as woodlands, water bodies, wetlands, caves, and rock formations. As stated in Section 8.1.5, if trees are impacted during construction, New Era will conduct surveys of the trees that will be impacted to assess the risk that these trees are or could be utilized for bat roosts. If potential roost trees may be impacted, New Era will coordinate with the MDNR and the USFWS on appropriate remedial action.

8.3 Operations and Maintenance

8.3.1 Overall Avian and Wildlife Communities

8.3.1.1 Minimize Turbine and Facility Lighting

The *2012 USFWS Land-Based Wind Energy Guidelines* provide recommended BMPs for turbine and facility lighting. New Era is following these guidelines when practicable (*see* **Appendix G**). New Era will minimize operational turbine lighting to the extent practicable in an effort to avoid attracting birds and bats to turbines. Lights can attract and confuse migrating birds (Gehring et

al. 2009, Manville 2005, 2009) and bats sometimes feed on concentrations of insects at lights (Fenton 1997). The USFWS recommends strobed, strobe-like or blinking incandescent lights, preferably with all lights illuminating simultaneously, to avoid disorienting or attracting birds and bats (USFWS 2010a). The USFWS states that only minimum intensity, maximum "off-phased" duel strobes are preferred. No steady burning lights, such as L-810 steady-burning obstruction lights, will be used. The USFWS recommends use of medium intensity flashing white lights (L-685) and the Federal Aviation Administration (FAA) lists these lights as an option for wind turbines. However, New Era does not propose to utilize such lights because they are substantially brighter than red lights and more noticeable to humans. The lighting of specific turbines at the Project will be in accordance with FAA standards for cluster turbine configurations (FAA 2007), which recommend:

- synchronized flashing red lights (L864);
- perimeter lighting that defines the periphery of the Project with gaps of no more than 0.5 mile (0.8 km) between lights;
- lighting gaps of no more than 1 horizontal mile (1.6 km) or 100 vertical feet (30.5 m) of terrain across the cluster; and
- lighting of isolated turbines that are distant from cluster groups.

The Project lighting plan is under review by the FAA and is consistent with several of the USFWS recommendations. The permanent met towers were approved for a dual lighting system that consists of red lights for nighttime and medium intensity flashing red lights for daytime and twilight. This lighting plan will remain the same when Project layout is finalized and alternate turbines are eliminated.

Lighting of operations, maintenance, and substations facilities will be at a minimum level for safety and security purposes. Use of motion or infrared light sensors and switches will be considered to enable lights to be kept off when they are not required. Lights on the maintenance facility may be shielded to minimize skyward illumination.

8.3.1.2 Follow APLIC Guidelines for Transmission Lines

The Avian Power Line Interaction Committee (APLIC) has developed practices for addressing electrocution risk factors and other interactions between birds and power lines (APLIC 2006). New Era will ensure that the transmission lines connecting its Project to the grid are designed in a fashion consistent with APLIC guidelines. Transmission line engineers are generally familiar with the design specifications and guidelines developed to reduce the potential for avian electrocutions. Consequently, modern transmission structure designs are generally consistent with APLIC recommendations on dimensions and configurations that reduce the risk of bird fatality.

8.3.2 Loggerhead Shrike

New Era avoided effects on loggerhead shrikes through siting turbines almost exclusively in crop fields and away from highly suitable shrike habitat. Accordingly, the implementation of

additional mitigation measures will be balanced with other ecological mitigation measures discussed in this plan.

New Era is considering several mitigation measures to help fill knowledge gaps regarding shrike ecology and maintain and enhance loggerhead shrike habitats. Various sources contributed to the development of the practices listed below, including but not limited to Dechant et al. (2002), Pruitt (2000), and WDNR (2011). Implementation of the following additional mitigation measures will depend upon construction timing, wildlife agency assistance, and landowner relations:

1. Keep fence lines intact to the extent practicable.

2. Record any loggerhead shrikes observed during point counts conducted for continued monitoring of bald eagle activity in the Project Footprint.

3. Report observed loggerhead shrikes and/or shrike nesting activity, if any, to the MDNR Natural Heritage Program.

4. Record locations of incidental loggerhead shrike observations in relation to turbine locations during post-construction avian fatality monitoring.

5. Consider implementing a program of periodic behavioral observations to assess the risk to any breeding shrikes that may be detected in the vicinity of wind turbines.

6. Educate landowners on measures that enhance loggerhead shrike habitat, including:

    a. periodic burning or mowing of ungrazed grasslands to discourage succession to woodland and maintain open grassland with scattered small trees and shrubs;

    b. rest-rotation grazing to provide preferred habitat by shortening tall grasslands;

    c. tree and shrub nest site and perch site protection from grazing and rubbing by livestock;

    d. use of fencing or other methods to protect old shelterbelts and nest trees from cattle;

    e. planting or protecting low shrubs and trees along fences and in otherwise open pastures and fields;

    f. maintaining and diversifying shelterbelts adjacent to grassland by incorporating thorny trees and shrubs; and

    g. avoiding creation of continuous linear strips of woody vegetation.

8.3.3 Trumpeter Swans

As previously stated in this ABPP, it appears unlikely that any specific impact avoidance, minimization or adaptive management measures specific to trumpeter swans will be necessary.

However, this conclusion will be re-visited after the completion of the fall 2012 surveys. If that data suggests that impact avoidance, minimization or adaptive management measures might be warranted, such measures will be explored in coordination with MDNR and USFWS. Specific examples of impact avoidance, minimization or adaptive management measures that might be explored under such circumstances are:

1. If the nest is active, route construction traffic away from roads nearest the nest location;

2. If the nest is active, stage construction activity in the southwest corner of the Project Footprint to avoid the trumpeter swan nesting period;

3. Install bird diverters on the interconnection transmission line at the north end of the Project Footprint. While this will not traverse any potentially suitable aquatic habitat, foraging or migrating trumpeter swans could potentially pass through this area en route to the Mississippi River;

4. While existing electric distribution lines in the immediate area of the nesting pair are unrelated to the Project, additional bird diverters could be installed on lines in that area to minimize the potential for collisions;

5. With the permission of the landowner, signs could be posted around the known nesting location to alert humans that trumpeter swans might be present and must not be disturbed or shot; and

6. If trumpeter swans are observed foraging in crop fields near turbines during the migration periods, temporary activities could be employed to divert the birds to crop fields farther from turbines. If this management measure is ever employed, turbines in the immediate vicinity of the birds will be shut down to prevent a collision.

Again, whether any of the above adaptive management measures might be necessary will be determined based on 2012 field survey data and coordination with MDNR and USFWS. Any decision to undertake such measures will be communicated to the MPUC prior to being undertaken. Also, if temporary activities are needed to divert trumpeter swans from crop fields near turbines, USFWS will be contacted in advance to obtain any necessary depredation permit. In addition, curtailment is considered an adaptive management strategy that could potentially be utilized if other adaptive management measures are found ineffective.

8.3.4 Raptors

After construction is complete, the project biologist will survey the area around each turbine and document observed raptor nesting activity. If new nests are observed, they will be visited to confirm whether they are raptor nests and GPS-located to determine whether they are within 0.25 mile of a turbine. If so, the presence and location of the nest will be included in the next post-construction fatality monitoring report submitted to the agencies. If any post-construction raptor fatality occurs and appears attributable to a nearby nest, coordination will be undertaken with the USFWS and MDNR to determine whether the nest should be removed during a period when it is inactive.

If suitable habitat exists around the turbine such that foraging raptors may be attracted to it, New Era may pursue habitat modification to minimize its attractiveness to prey species. Again, this measure is included among the Advanced Conservation Practices set forth in the *2011 USFWS Draft ECP Guidance*. The type and scope of any such management activities cannot be predicted in advance, since the circumstances of surrounding any new nest establishment won't be known until such nests are built. However, New Era would coordinate with the USFWS and MDNR to develop the least intrusive measures possible. No habitat modifications for this purpose would be undertaken without prior USFWS and MDNR concurrence.

8.3.5 Bats

New Era has implemented turbine siting and construction practices that will continue to help avoid and minimize effects on bats after construction. Post-construction monitoring of bat activity and fatalities in 2012 and 2013 will help expand knowledge concerning the variability of bat fatalities at wind projects and assess the potential need for post-construction impact minimization practices. Project construction and operation will avoid activities that could enhance bat habitat in the vicinity of turbines, such as the creation of water features or roost sites.

8.4 Decommissioning

Prior to commercial operation, New Era will submit a decommissioning plan to the MPUC that documents the manner in which New Era anticipates decommissioning the Project in accordance with Minn. Rules Part 7854.0500, subp.13. New Era will ensure that it carries out its obligations to properly decommission the Project at the appropriate time.

Upon expiration of the Site Permit or termination of Project operation, New Era will dismantle and remove towers, turbine generators, transformers, overhead and underground cables, foundations, buildings and ancillary equipment to a depth of 4 feet. Access roads will be removed unless written approval is given by the affected landowner requesting that one or more roads, or portions thereof, be retained. Any agreement for removal to a lesser depth, or for no removal, will be recorded with the county and will show the locations of all foundations. In accordance with the Site Permit, the site will be restored within 18 months after expiration of the Site Permit. The Project will be considered a discontinued use after 1 year without energy production unless a plan is developed and submitted to the MPUC outlining the steps and schedule for returning the Project to service.

New Era will restore and reclaim the site to its pre-project topography and topsoil quality using BMPs consistent with those outlined by *2012 USFWS Land-Based Wind Energy Guidelines*. The goal of decommissioning will be to restore natural hydrology and plant communities to the greatest extent practical while minimizing new disturbance and removal of native vegetation. The decommissioning BMPs that will be employed on the Project to the extent practicable with the intent of meeting this goal include:

1. Minimize new disturbance and removal of native vegetation to the greatest extent practicable.

2. Remove foundations to four feet below surrounding grade, and cover with soil to allow adequate root penetration for native plants, and so that subsurface structures do not substantially disrupt ground water movements.

3. Stockpile topsoil that is removed and use as topsoil when restoring plant communities. Once decommissioning activity is complete, restore topsoils to assist in establishing and maintaining pre-construction native plant communities to the extent possible, consistent with landowner objectives.

4. Stabilize soil and re-vegetate with native plants appropriate for the soil conditions and adjacent habitat, and use local seed sources where feasible, consistent with landowner objectives.

5. Restore surface water flows to pre-disturbance conditions, including removal of stream crossings, roads, and pads, consistent with storm water management objectives and requirements.

6. Conduct survey, using qualified experts, to detect populations of invasive species, and implement and maintain comprehensive approaches to preventing and controlling invasive species as necessary.

7. Remove any unnecessary overhead pole lines.

8. After decommissioning, install erosion control measures in all disturbance areas where potential for erosion exists, consistent with storm water management objectives and requirements.

9. Remove fencing unless the landowner will be utilizing the fence.

10. Remediate any petroleum product leaks and chemical releases prior to completion of decommissioning.

PART III EAGLE CONSERVATION PLAN

9.0 Overview of Eagle Conservation Plan

In accordance with the *2011 Draft ECP Guidance*, this ECP is designed to support New Era's application for a non-purposeful bald eagle programmatic take permit (eagle permit) under 50 CFR 22.26. This section documents New Era's efforts to avoid, minimize and mitigate adverse effects on bald and golden eagles. Consistent with the *2011 Draft ECP Guidance*, this Part III is organized into the following five sections:

Stage 1 – Initial Site Assessment

Stage 2 – Site-specific Surveys and Assessment

Stage 3 – Initial Fatality Prediction Stage

Stage 4 – Application of Advanced Conservation Practices (ACPs) and Compensatory Mitigation

Stage 5 – Post-Construction Monitoring Risk Validation

In addition, this ECP addresses the requirements of Site Permit Section 13.1.1, which states:

> "The Permittee shall develop a plan for monitoring Bald and Golden Eagle nest sites near turbine locations and shall develop protocol to identify proposed point count locations, suggested count duration and number of survey visits. Point counts of 20-30 minutes shall be conducted to document eagle movements in these areas. Multiple point count visits shall be conducted to cover the remainder of the 2011 nesting season (eaglets are expected to fledge by mid-July). Additional point counts shall be conducted in the fall of 2011 and the winter of 2011-2012. Details of the plan shall be included in the Avian and Bat Protection Plan. Ongoing monitoring for eagles shall be conducted in accordance with the Avian and Bat Protection Plan and U.S. Fish and Wildlife Service requirements. The Permittee shall submit the results of the summer, fall, and winter surveys, and any subsequent surveys, to the Commission within one month of completion of the surveys."

9.1 Stage 1 – Initial Site Assessment

The objective of the Stage 1 site assessment is to broadly look at the landscape of interest and identify, based on existing information and studies, known or likely important eagle-use areas.

New Era had already established its Site Permit Area and was heavily engaged in permitting activities for the Project when the *2011 Draft ECP Guidance* were published. Nonetheless, as discussed in Section 6 above, New Era did consider a number of factors in selecting the Site Permit Area. Section 6.1 describes the equivalent Tiers I and II and Stage 1 assessments New Era considered when selecting the Site Permit Area. Without repeating that information, this section focuses on analyzing the Site Permit Area based on the four site categories identified by the USFWS for wind energy facilities:

Category 1 – high risk to eagles, potential to avoid or mitigate impacts is low;

Category 2 – high to moderate risk to eagles, opportunity to mitigate impacts;

Category 3 – minimal risk to eagles; and

Category 4 – uncertain risk to eagles, site lacks sufficient data to assign a category.

New Era worked with the USFWS to apply the analysis found in the *2011 Draft ECP Guidance* to determine the appropriate categorization for the Project. Project categorization is determined, in part, by assessments of nest location, nest density, and collision risk modeling.

As described in Section 9.2, multiple nest surveys, including an agency field review of eagles nests on March 27, 2012, were undertaken to determine nest locations and nest density for the

project. **Exhibit 13** depicts the Project Footprint, the verified bald eagle nests within 10 miles and the inter-nest distances for these verified nests. It should be noted that the USFWS did not recommend a comprehensive bald eagle nest survey out to 10 miles, but rather stated in a letter dated March 16, 2012:

> "…[w]e encourage you to record and share with the Service any new nest activity you encounter during your spring eagle surveys. Additionally, we encourage you to verify any possible new eagle occurrences provided by outside parties (landowners, citizens, etc.), both within the project footprint as well as within a 10-mile radius of the project. Please note the Service is not recommending Westwood embark on a detailed survey effort within a larger geographic area, rather to verify and share reports of any new eagle nests." (**Appendix H**)

As shown on **Exhibit 13**, the total number of verified active eagle nests within 10 miles of the complete Project Footprint is 15 nests. Section 9.2 provides a more detailed discussion of the nest surveys utilized to identify these nests.

The mean inter-nest distance was determined by measuring the distance from each verified nest within 10 miles to its nearest neighbor within the 10-mile buffer and then dividing by the total number of nests. The mean inter-nest distance was determined to be 3.663 miles. Based on this calculation, the Project Footprint falls partially within one-half of the mean inter-nest distance of the Belle Creek, West of Goodhue and Zumbro River nests. The mean inter-nest distance is considered by the USFWS in determining the proper Stage 1 site category for the Project.

The collision risk modeling performed for the Project also indicates that the range of predicted collision rates is consistent with maintaining stable or increasing bald eagle populations at both the regional and project area levels. (*See* Section 9.3 below.) However, there are (IEUAs) within and near the Site Permit Area, but outside of the Project Footprint, and there is a moderate collision risk to individual bald eagles (*see* **Exhibits 13** and **14** for IEUA locations). The *2011 Draft ECP Guidance* defines an IEUA as "an eagle nest, foraging area (to include as interpreted here migration corridors and migration stopover sites), or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles." The risks associated with IEUA proximity and collisions can be minimized to the maximum degree achievable through the conservation measures proposed in this ECP and the related eagle permit application. Section 9.3 provides additional detailed discussion regarding the collision risk modeling analysis for this Project.

Based on the nest location, nest density and collision risk modeling for the Project, the USFWS confirmed in an email dated April 30, 2012 that the New Era Project is a Category 2 project. Category 2 projects are projects that have "a risk of ongoing take of eagles, but this risk can be minimized." Based on the *2011 Draft ECP Guidance,* Category 2 projects are encouraged to apply for eagle take permits.

9.2 Stage 2 – Site-Specific Surveys and Assessments

In an effort to better understand eagle use of the Project Footprint and to inform the Stage 3 collision risk modeling for the Project, New Era conducted over 600 hours of eagle field surveys and hundreds more hours of aerial and ground transect surveys from 2010 to 2012. This section summarizes the Stage 2 surveys, methods and protocols and results of New Era's ongoing eagle survey work.

9.2.1 Bald Eagle Surveys

New Era conducted a series of eagle field surveys from 2010 to 2012.

9.2.1.1 2010 Surveys

In conjunction with a raptor nest survey conducted on March 24, 2010, an avian field biologist surveyed the Project Footprint plus a 2-mile survey buffer for bald eagle nests. During this survey, New Era verified the status of the three previously known bald eagle nests (i.e., Belle Creek, Zumbro River and Hay Creek) and searched for other eagle nests in and near the Site Permit Area. The USFWS had recommended monitoring of verified bald eagle nests within 2 miles of the Site Permit Area, and later revised their recommendation to include the Hay Creek nest, which is approximately 3.5 miles from the Site Permit Area.

Monitoring of active eagle nests focused on flight paths of bald eagles to and from nests to assess potential local food sources and roost sites. Observed flight paths were recorded on aerial mapping, along with notes on eagle behavior (i.e., material carry for nest repair, food carry, territory defense, etc.). Monitoring occurred at each active nest for two half-day (4 hour) intervals between March 24 and April 16, 2010. Each nest was monitored for one morning and one afternoon. The monitoring timing corresponded to the bald eagle incubating and early brood rearing period. Compilation of flight paths and behavioral clues helped highlight potential flight path corridors, local food sources, and roost sites.

At the time of the 2010 Spring Surveys, three bald eagle nesting territories were known to exist along the drainages of Belle Creek, Zumbro River and Hay Creek. These nests are located 0.25, 1.0 and 3.5 miles outside the Site Permit Area, respectively. The raptor nest survey conducted in March and April 2010 did not reveal any other eagle nests within 2 miles of the Site Permit Area. Observations of bald eagle flights to and from nests indicated they were mainly utilizing the stream corridors in the vicinity of their nests. No local food source concentrations, preferred roost sites or eagle flight paths through the Project Footprint were observed during these initial 2010 surveys.

9.2.2 2011 – 2012 Surveys

9.2.2.1 2011 Nest and Breeding Period Survey

In early May 2011, New Era field verified the location of two new citizen-reported eagle nests within or near the Project Footprint (*see* **Exhibits 13 and 14**). Both of these nests were built and first reported in 2011, during a time period when New Era was not performing any field surveys due to the pendency of proceedings before the Minnesota Office of Administrative Hearings

(OAH). All field work was suspended until the OAH's recommendation was issued. The two nests built in 2011 are hereafter referred to as the West of Goodhue and Southeast of Goodhue nests. The West of Goodhue nest is within the Site Permit Area boundary, but just outside the Project Footprint. The Southeast of Goodhue nest is 2.1 miles outside the Site Permit Area and 3.1 miles from the Project Footprint.

New Era initiated nest monitoring in 2011 at the two new bald eagle nests using the same techniques as for earlier nest surveys. A total of approximately 13 hours of observations were made at each new nest location.

On June 9, 2011, New Era representatives participated in a meeting and conference call with staff from the MDOC-EFP, USFWS and MDNR. The results of the 2011 nest monitoring activities were discussed. During this call, the USFWS recommended that the locations for ongoing bald eagle monitoring be shifted from the nests to the turbine cluster locations nearest to active nests. In response to this recommendation, a total of 152 additional hours of monitoring were spent at four survey plots that were each associated with turbine clusters (*see* **Exhibit 15**). Survey plots 1 through 4 and two survey plots that were added later (1a and 5) are listed in **Table 9.1**.

Table 9.1. New Era Eagle Survey Plots

Plot	Turbines within 800-m Radius Plot (Turbine #)	Other Nearby Turbines (Turbine #)	Location within Site Permit Area	Nearest Bald Eagle Nest or Habitat
1a	6-9	1-5, 15	Northwest	Belle Creek Nest
1	10-14	None	Northwest	Belle Creek Nest
2	26, 27	25, 28-30, 32-34, A52	West-Central	Belle Creek Watershed District Reservoir
3	36-39	35	East-Central	West of Goodhue Nest
4	41, 45-46	40, 42-44, 47, 48	South	Zumbro River Nest
5	22, 23	20, 21, 24	Northeast	West of Goodhue Nest

On July 29, 2011, the 2011 eagle monitoring data were discussed at a meeting between New Era representatives and staff from MDOC-EFP, USFWS and MDNR. Based on the results through that date, the USFWS recommended that one survey plot be shifted to the northwestern-most turbine cluster to determine whether eagles using the Belle Creek nest were flying through that area. From July 29 to August 10, 2011, 58 additional hours of bald eagle monitoring were performed, including 14.5 hours at Plot 1a (**Exhibit 15).**

Based on 210 hours of eagle flight path monitoring at turbine clusters conducted from June 17 to August, 2011, there were no consistent flight patterns through the Project Footprint. Rather, bald eagles of the breeding community in the vicinity of the Project Footprint were observed in response to food sources within about a half-mile from proposed turbines, particularly at Plots 2 and 3. Generally, as the summer went on and breeding territories loosened after juveniles left the

nest, New Era biologists observed bald eagles more frequently at all turbine clusters, as expected based on bald eagle breeding ecology.

9.2.2.2 Fall Migration Survey

In a letter dated September 16, 2011, the USFWS recommended New Era complete fall bald eagle migration surveys.

New Era initiated 60-minute point counts twice per week beginning on October 3, 2011 and ending on December 15, 2011. The results of the 2011 fall migration period survey were reported to the MPUC on January 17, 2012 (*see* Docket WS-08-1233 Document No. 20121-70384-01). Fall migration survey methods and results are described below.

Methods

Point counts were conducted at five previously established survey plots plus a sixth (Plot 5), which was located in the northeast portion of the Site Permit Area (*see* **Table 9.1** and **Exhibit 15**).

Point counts were conducted in the same manner as earlier counts in 2011, except that biologists recorded the amount of time spent by bald eagles along flight tracks within 800 meters of the observation point and up to 175 meters in altitude. These time periods are referred to as "exposure minutes" and are used in calculating collision risk. Flight tracks were broken out into segments observed to be below, within or above the RSZ to facilitate the application of an appropriate collision risk model. Flight tracks were also mapped on aerial photographs. A minimum of one exposure minute was ascribed to each eagle entering an 800-meter radius survey plot. This is consistent with recommendations provided on page 55 of the *2011 USFWS Draft ECP Guidelines*. If an eagle spent more than one minute within the plot, the additional minutes were documented on the survey datasheets.

Exposure minutes were also estimated for smaller 100-meter radius plots around each turbine location. The smaller plots may provide a more accurate picture of habitat-driven eagle movements near turbines, as the larger 800-meter plots may encompass habitat features nearly one mile from the nearest turbine. It should be noted that the allowable take threshold being requested in New Era's application for an eagle permit is based on the more conservative 800-meter radius plots. Data from the smaller plots is being provided for informational purposes only. Exposure minutes for 100-meter plots around turbine locations could not readily be counted in the field (due to the difficulty in identifying boundaries of small plots visually and the short time period involved in an eagle traverse of the smaller plots) so these minutes were estimated mathematically. It would take much less than one minute for an eagle to traverse a 100-meter radius plot surrounding an individual turbine, so it would be inappropriate to ascribe a full exposure minute such a traverse. Two approaches were considered for conservatively estimating traverse times for 100-meter radius plots. One approach was to divide 200 meters by 1600 meters (the respective distances involved in traversing the widest parts of 100- and 800-meter radius plots) and multiply by one minute (the baseline time increment recommended by the USFWS for 800-meter radius plots). This generates a traverse time of 7.5 seconds for a 100-meter radius plot. The other approach was to assume a conservative average flight speed of 15

meters per second over 200 meters, which generates a traverse time of 13 seconds for a 100-meter plot. New Era used the latter approach because it was the most conservative.

These surveys employed methods recommended by the USFWS in its September 16, 2011 letter to New Era. In accordance with that letter, the purpose of the surveys was to:

- document fall bald and golden eagle migration events;
- document winter (including pre-water freeze) use of Site Permit Area by bald and golden eagles; and
- document nests that were not discovered during the 2011 breeding season.

As recommended by the USFWS, New Era identified:

1. times that bald and golden eagles were migrating through the Site Permit Area;
2. populations of migrating and wintering bald and golden eagles in the Project Footprint;
3. food resources that eagles used prior to ice freeze-up; and
4. eagle roosting and foraging areas.

A total of 126 observation hours were spent conducting 2011 fall migration point counts. All six survey plots were visited for one hour on the following 21 dates in 2011:

1. October 3, 12, 13, 19, 20, 27 and 28
2. November 3, 4, 7, 11, 15, 16, 21, 22 and 30; and
3. December 1, 6, 8, 13 and 15.

Analysis

Data were tabulated to summarize bald eagle exposure minutes within each 800-meter radius survey plot and within 100-meter radius of each turbine location. For the observation point-centered 800-meter radius survey plots, an exposure minute was the time bald eagles spent within the volume of a cylinder with a height of 175 meters and a radius of 800 meters (i.e., 351,858,377 cubic meters). For the turbine-centered 100-meter radius survey plots, an exposure minute was the time spent within the volume of a cylinder with a height of 175 meters and a radius of 100 meters (i.e., 5,497,787 cubic meters).

Bald Eagle Use within Site Permit Area

Much of the bald eagle use observed during the 2011 fall migration period was associated with the Belle Creek Valley, which lies at the west edge of the Site Permit Area. Migratory bald eagle flights were primarily observed at survey plots in the western portion of the Site Permit Area (Plots 1, 1a, and 2) rather than at survey plots more distant from the Belle Creek Valley (Plots 3, 4, and 5).

Bald eagles observed in flight at Plots 1, 1a, and 2 showed strong migratory behavior in soaring, thermaling, and southbound flights. Migratory flights typically involved more than one bald eagle. Bald eagles that were not flying were typically perched or loafing in trees above the

agricultural fields where artificial food sources existed.[11] Bald eagles were only observed fishing the reservoir at Plot 2 once during fall migration. In contrast, bald eagles were routinely observed fishing the reservoir during the breeding season. Bald eagles observed at Plots 3, 4 and 5 were mostly either flying over in thermals or engaged in low, local point-to-point flights, rather than higher migratory flights. Each of these three survey plots had at least 12 of 21 survey days where no bald eagles were observed. Two migrating golden eagles were observed during these surveys. One was soaring and a second was associated with bald eagles feeding on a raccoon carcass. Bald eagles were also routinely observed foraging or loafing in agricultural fields. Harvested agricultural fields normally offer very few food resources for eagles. Crop residue and other plant matter do not provide eagle food sources because bald and golden eagles are hunting and scavenging carnivores. Observations of eagles on the ground in harvested crop fields suggest the presence of a food source consisting of some type of meat.

Documentation of artificial food sources in crop fields helps explain 62% (443/799) of the bald eagle exposure minutes recorded for 800-meter radius survey plots and 55% (48/78) of the bald eagle exposure minutes for 100-meter radius survey plots (*see* **Tables I-2 and I-4 in Appendix I**). Biologists regularly observed bald eagles feeding on artificial food sources during the fall migration period, particularly at Plot 1. Artificial food sources included whole carcasses of dead piglets, chopped-up pig parts, cow and calf carcasses and relocated road-killed deer and raccoons. Bald eagles repeatedly descended from high soaring flights on thermals to livestock carcasses and relocated road kills in fields. Bald eagles also frequently perched in trees at or near Plot 1, and circled low while looking for food, even when food was not present or readily visible. This behavior was associated with the recurrent availability of food at Plot 1. Observations of bald eagles on the ground were consistently associated with artificial food sources. Documentation of artificial food sources during the 2011 fall migration period was provided in Appendix A of the *Eagle Point Count Report: Fall Migration 2011* compliance filing (Docket WS-08-1233, Document No. 20121-70384-01; filed January 17, 2012).

Bald eagle foraging behavior during the 2011 fall migration season was dramatically different than during previous and subsequent seasons. During the 2011 breeding season, bald eagles were observed foraging or hunting over riparian corridors and the Belle Creek Watershed District Reservoir, which are characteristic bald eagle habitats. During the fall migration, bald eagles were observed hunting over the Belle Creek Reservoir only once on October 12. Bald eagle hunting was not observed over the reservoir after artificial food sources were present. During the fall, bald eagles were not observed at Plot 1 until artificial food sources were first documented on October 20. Bald eagles were not observed actively hunting natural food sources at Plot 1. Active hunting involves low flights circling over natural habitat and periodic hovering and swooping when prey is sighted. All other observations of bald eagles feeding on deer carcasses involved relocated road kills. All such deer lacked hunting-related evidence (e.g.,

[11] As used throughout this Section, "artificial food sources" refer to: (1) multiple incidents of improper livestock carcass disposal within or in close proximity to proposed turbine cluster locations and/or point count survey observation points and (2) deposition of road-killed wildlife carcasses in the same locations. Relocated road killed wildlife carcasses (raccoons or deer) were only considered evidence of artificial food sources if the carcasses exhibited no evidence of being hunting-related (i.e., no evidence of gunshot wounds, butchering, or tagging) and: (a) were found in immediate proximity to locations where pig carcasses had been found or (b) were part of a series of separate instances of wildlife carcass disposal observed in the same location or immediate proximity.

gunshot wounds, evidence of butchering, cuts in ears from tagging, etc.) and were found in close proximity to locations of repeated improper livestock disposal.

The September 16, 2011 USFWS letter indicated that documentation of bald eagle foraging and roosting areas away from large rivers was important, as features such as protected microclimates, open water maintained by springs, effluent and underground irrigation, as well as "reliable food sources such as road kill, cattle/hog die off/improper disposal, unburied garbage, or areas with "promiscuous ice fishing" may change throughout the year. New Era questions the "reliability" of artificial food sources observed during the fall migration survey for the following reasons: (1) the number and distribution of allocated road kills are unpredictable and transient; (2) improper disposal of livestock carcasses is not legal and has been consistently reported to the Board of Animal Health to promote rapid cleanup; (3) no "promiscuous ice fishing" or unburied garbage has been documented in the Project Footprint; and (4) the food base management program described later in this ECP will promote rapid identification and removal of these food sources.

It is important to note that New Era has collected analyzed and presented all observed fall migration bald eagle activity, regardless of the source of the activity. (*See* **Tables I-1 and I-3 in Appendix I**.) However, it is relevant to the Project's and agencies' understanding of bald eagle use in the Site Permit Area to consider the above-described artificial food sources, because it is unclear whether the food sources are, in fact, reliable sources that will support ongoing bald eagle use in these areas. Moreover, should these feeding activities continue into the operational phase of the Project, the food based management plan proposed in this ABPP could have a substantial influence on whether bald eagles continue to use these locations for foraging. For that reason, New Era presented fall migration bald eagle point count data and compared those data to the data that did not appear to be affected by artificial food sources. (*See* **Tables I-2 and I-4 in Appendix I**.) This will allow the MPUC and USFWS to evaluate collision risks associated with natural bald eagle movements separately from those demonstrably affected by artificial food source incidents. New Era's raw survey data have been supplied under separate cover to the USFWS to facilitate its independent modeling of collision risks.

Documentation of Undiscovered Nests

No additional bald eagle nests were discovered in the Project Footprint or a two-mile buffer during the fall 2011 migration survey.

9.2.2.3 Winter Aerial and Ground Transect Surveys

As recommended by USFWS, New Era conducted helicopter surveys once per month and ground transect surveys twice per month from early November 2011 to March 2012 to locate and document IEUAs (e.g., winter night roosts, communal foraging locations, potential new nest territories) that are located within two miles of the Project Footprint. Helicopter surveys were conducted on November 28, 2011, December 16, 2011, January 19, 2012 and March 1, 2012.[12] Ground transect surveys were conducted on November 29 and 30, 2011, December 8 and 13, 2011, January 6 and 20, 2012, February 10 and 14, 2012 and March 5, 2012. In a letter dated March 16, 2012, the USFWS recommended the cessation of aerial and ground transect surveys

[12] The March 1 flight was originally scheduled to occur in February but was delayed several times by weather conditions unsuitable for flying.

and a transition to spring point count surveys (*see* **Appendix H**). Aerial and ground transect surveys ceased and results were reported to the MPUC on April 17, 2012 (Docket WS-08-1233 Document No. 201124-73718-01).

Aerial surveys were flown on north-south transects one-half mile apart and covered the Project Footprint (minus the transmission line route) plus a two-mile survey buffer (**Exhibit 16**). The February and March aerial surveys were expanded to include major watercourses within 10 miles of the Project Footprint in an effort to better document the "project-area nesting population" of eagles, as defined by the USFWS. However, consistent with the March 2012 USFWS letter, this survey expansion was not intended or held out to be a comprehensive survey of every bald eagle nest within 10 miles of the Project Footprint. Ground transect surveys were conducted on a pre-defined route to further document the presence, characteristics and use of IEUAs in and within two miles of the Project Footprint (minus the transmission line route) (**Exhibit 17**). As suggested in the September 16, 2011 USFWS survey recommendation letter, data collected during ground transect surveys included:

- Areas that have open water during cold weather that could serve as foraging habitat for wintering eagles.

- Distribution of observed natural and man-made winter food sources (e.g., road kills, livestock carcass dump sites, unburied garbage, locations where promiscuous ice fishing are allowed and water bodies that stay open allowing access to fish and/or waterfowl).

- Any observed eagle flights, including movements to/from any winter night roost locations that may be found.

Bald Eagle Nests

Aerial and ground surveys conducted between November 2011 and March 2012 did not reveal any previously unknown bald eagle nests within two miles of the Project Footprint (minus the transmission line route). Three nests exist within the survey area: the Belle Creek nest, West of Goodhue nest, and Zumbro River nest, all of which were active in 2011. Of the 13 aerial or ground transect surveys conducted over the 2011-2012 winter, at least one adult bald eagle was observed at the Belle Creek nest eight times, seven times at the West of Goodhue nest, and five times at the Zumbro River nest. Because the adult birds of these nest territories have not been fitted with colored leg bands or patagial (i.e., wing) tags, there is no way to say for certain that the resident adults nesting in these territories were the birds observed (particularly in November and December when territories are less vigorously defended). However, with the warm climatic conditions over the winter keeping portions of Belle Creek open, resident breeding bald eagles likely didn't need to move to larger bodies of open water, such as the Mississippi River, to forage. Because the bald eagle breeding season starts as early as late January with nest maintenance, it is very likely that observations of adults at nests beginning in January were resident birds. Bald eagles were observed incubating at each of these nests during the final aerial transect survey on March 1, 2012.

Foraging Areas

As previously stated, a foraging area is defined by the USFWS as "…an area where eagles regularly feed during one or more seasons." A number of natural foraging areas were identified prior to and during winter surveys. Bald eagles were frequently seen along Belle Creek and the Zumbro River during both aerial and driving surveys. The reaches of these streams within two miles of the Project Footprint are considered IEUAs throughout. Bald eagles were observed on multiple occasions soaring over and hunting along these stream corridors. Bald eagles have also occasionally been observed perched and preening their feathers along Belle Creek.

The Belle Creek Watershed District reservoir in the west central part of the Project Footprint is also considered a foraging area based on activity observed during the 2011 breeding season. The reservoir was about 90 percent frozen over on November 30, 2011, was completely frozen from December 8, 2011 to February 28, 2012, and was first observed to have open water on March 2, 2012. The reservoir was observed to receive almost no foraging use during the winter of 2011-2012. Accordingly, the reservoir does not appear to serve as winter foraging habitat. No other standing water bodies in the areas covered by the aerial and ground transect surveys were observed to stay open during the winter and no "promiscuous" ice fishing was observed.[13] Also, no locations were observed to have unburied garbage that might serve as a winter food source for bald eagles.

New Era documented three other areas where bald eagles were observed foraging on more than two occasions during the winter of 2011-2012. Two were locations associated with multiple artificial food source incidents and the third was a disposal location for deer remains from the hunting season. These locations are: (1) in the northern portion of the Project Footprint on 342nd Street Way; (2) along 145th Avenue in the west central portion of the Project Footprint; and (3) along CR-50 in the southwestern portion of the Project Footprint (*see* **Exhibit 14**). These locations are described below:

<u>342nd Street Way, East of 165th Avenue</u>

A ridge parallels the south side of 342nd Street Way where bald eagles have been recorded roosting in association with an artificial food source (*see* **Exhibit 14** and Appendix A of *Fall Migration Survey Report* filed with the MPUC on January 17, 2012). Bald eagles were observed on four occasions (December 13, December 16, March 1 and March 5) foraging on cow carcasses, a relocated road-killed raccoon, and small, unidentified animal parts just north or south of 342nd Way. Twelve fetal pigs were also discovered on the north side of 342nd Street Way in this location on November 30, 2011; however, the pigs were very fresh and bald eagles had not yet begun feeding on them when they were observed. As described in Appendix A of the Fall Migration survey results filed with MPUC on January 17, 2012, feeding was observed at this location during both aerial and ground transect surveys. Where feeding was observed, there were repeated bald eagle flights from trees to the ground, squabbling and competition for food, and in all cases, more than one bald eagle foraging. When the food source was eliminated during January and February, no bald eagles were observed foraging or perching at this site. Food

[13] "Promiscuous" ice fishing was referenced in the September 16, 2011 USFWS letter and refers to situations where the Minnesota DNR allows unlimited ice fishing in lakes undergoing temporary drainage (e.g., due to outlet reconstruction, etc.) or where a winter kill event is imminent due to anoxia.

sources were visible from the road when they were present; their absence was confirmed by both the lack of bald eagles foraging and absence of observed carcasses.

145th Avenue, North of 370th Street

Prior to the winter IEUA surveys, bald eagles were observed foraging at this location numerous times during fall migration survey work (*see* **Exhibit 14** and Appendix A of *Fall Migration Survey Report* filed with the MPUC on January 17, 2012). Bald eagles were feeding on fetal pigs or pig parts (at least three separate deposition events), a raccoon, relocated road-killed deer, and the remains of hunted deer (in season). These artificial food sources were all placed in open corn fields. During the winter IEUA survey work, a relocated road-killed deer was continually picked at by bald eagles on three survey days in late November and December. This deer was not a product of deer hunting and appeared to have been moved to this location after a vehicle strike. After the deer carcass had been cleaned up by bald eagles in late December, no bald eagles were observed in this area for the remainder of the winter survey period.

County Road 50, West of CSAH 7

Bald eagles were observed foraging during three survey days in November and December on the north side of County Road 50 in the southwest portion of the Project Footprint (*see* **Exhibit 14**). Bald eagles were first observed foraging on the ground during the aerial transect survey. Upon inspection from the ground, the birds were found to be foraging on the remains of three butchered deer during and after hunting season. Because the remains represented multiple deer, it was clear that this was a disposal location where hunters had discarded deer parts by the side of the road. After these remains were consumed, there were no observations of bald eagles at this location.

Locations where livestock carcasses, relocated road kills or deer hunt remains have been deposited do not appear to be IEUAs as defined by the USFWS. Bald eagles cannot rely on these locations from day-to-day or season-to-season, as they are tied to transient, artificial food sources that could disappear at any time. As opportunistic feeders, it is common for bald eagles to forage on remains left after deer season. While deer remains from the hunting season may offer a short-term food source for a limited period in the fall, the amount, location, timing and duration of such food resources will change every year. The amount and timing of snow cover also affects the availability of hunting-related food sources. The warm climatic conditions and lack of snow cover during the winter of 2011-2012 kept these food sources available longer than they would have been during winters with normal temperatures and snowfall. Likewise, deposited livestock carcasses and domestic animal parts cannot be relied on as a consistent, dependable food source because such disposal is prohibited under Minn. Stat. 35.82 and might stop at any time.

Communal Roosts

Multiple bald eagles were observed perched in trees overlooking the above-described foraging locations at 342nd Street Way, East of 165th Avenue and 145th Avenue, North of 370th Street on five occasions each during winter ground and aerial transect surveys (*see* **Exhibit 14**). Most of these observations were early in the morning, suggesting that bald eagles spent the night in these

locations. However, in all of these cases, communal perching behavior was directly associated with the presence of artificial food sources and ceased when these food resources were exhausted. None of the behavior observed was associated with cold weather, high winds or other inclement weather conditions that might induce bald eagles to seek communal shelter. During surveys in January and February, very few bald eagles were observed over the entire survey area and no communal roosts were observed. With the exception of a few individual bald eagles perched in seemingly random locations, all bald eagles observed during six survey events during January and February were perched in or near their nest tree (i.e., within the same woodlot or group of trees). Bald eagles were not observed loafing around the Project Footprint, foraging in corn fields on dead animals, or perching at farmsteads like they were during November and December.

As with artificially-supported foraging locations, the two communal perching locations associated with artificial food sources do not appear to meet the USFWS definition of an IEUA. The presence of multiple bald eagles temporarily perched during mild weather (even for the night) overlooking an artificial food source is not true "roosting" behavior. The *2011 Draft USFWS ECP Guidance* makes clear that roosting is an activity where bald eagles "seek cover, usually during night or periods of severe weather (e.g., cold, wind, and snow)" and that "[r]oosts are usually found in protected areas, typically tree rows or trees along a river corridor." No bald eagles were observed at the above-described artificial feeding locations during periods of cold weather, high winds or other inclement weather conditions that might induce bald eagles to seek communal shelter. Again, once the artificial food source was exhausted, bald eagles ceased to gather at these locations.

On November 7, 2011, the MDNR met with landowners and conducted a field review of the Belle Creek area. From this field review, the MDNR non-game specialist for the area reported to the USFWS an eagle "roost area" in Township 111 North, Range 16 West, Section 2. She indicated that she observed "…over 12 birds in the roost area and surrounding area." The MDNR field notes for this visit did not include any information regarding the time of day or weather conditions that would clarify whether the observed "roosting" activity was associated with eagles seeking cover for the night or shelter from severe weather (e.g., cold, wind, snow). However, temperature data from the Minnesota Climatology Working Group indicate that the low and high temperatures on November 7, 2011 were 26ºF and 56ºF, respectively, ruling out severe weather as a reason for roosting activity. The MDNR-reported "roost" site is located in immediate proximity to locations where multiple artificial food source incidents were documented in 2011 and early 2012. However, the MDNR report did not indicate whether artificial food sources were observed at the time of the November 7, 2011. New Era conducted multiple observations at this location over the winter of 2011-2012 and did not observe bald eagles perched in the location reported by MDNR.

In the course of 2011-2012 surveys, New Era biologists did not record any new IEUAs that would meet the USFWS' definition. The USFWS defines foraging areas as "...an area where eagles regularly feed during one or more seasons." Similar to the observations during the fall migration survey, when artificial food sources were recorded, bald eagles were observed foraging in uncharacteristic locations such as corn fields. However, in the absence of artificial food sources, bald eagles were only observed in typical and natural locations such as nests and along stream corridors.

Helicopter flights in November and December 2011 recorded bald eagles feeding on artificial food sources in the same locations identified during the fall migration surveys and an additional location on 342nd Street Way in the northern portion of the Project Footprint (immediately adjacent to the MDNR-reported "roost"). The helicopter flight in January recorded no artificial food sources and consequently very few bald eagles. The March helicopter survey recorded eagles incubating eggs at the Belle Creek, Zumbro River and West of Goodhue nests as well as bald eagles again feeding on artificial food sources at 342nd Street Way. Note that the February survey was delayed multiple times due to unfavorable flying conditions and was therefore conducted on March 1, 2012. When artificial food sources were recorded, bald eagles were observed in uncharacteristic locations such as corn fields. However, in the absence of artificial food sources, bald eagles were only observed in typical and natural locations such as nests and along stream corridors.

9.2.2.4 2012 Bald Eagle Nest Surveys

Because bald eagles initiate nesting behavior as early as January with nest maintenance, bald eagle nest surveys were incorporated in the winter aerial and driving transect surveys within two miles of the Project Footprint (minus the transmission line route at the north end of the Project). Additionally, as previously mentioned, the January and March helicopter flights were expanded to include surveys along the major drainages within ten miles of the Project Footprint (minus the transmission line route at the north end of the Project). These surveys were not comprehensive and did not include uplands or minor drainages. These surveys enabled biologists to routinely monitor existing nests, search for new ones, and have access to those areas that may not be visible from the road, particularly along Belle Creek and the Zumbro River. No new bald eagle nests were identified within the Project Footprint (minus the transmission line route at the north end of the Project) plus a two mile buffer during this survey work.

Two new bald eagle nests were reported to New Era by citizens over the winter, both more than two miles outside the Project Footprint. The "Post" nest was reported on December 22, 2011 and the "Baker" nest was reported on January 28, 2012. The Post and Baker nests were field verified by New Era on January 19, 2012 and February 10, 2012, respectively. These citizen-reported nests are well outside the Project Footprint. The Post and Baker nests are 4.3 miles and 6.0 miles from the nearest turbine respectively. Both nests are outside the two mile survey buffer recommended by the USFWS in its September 16, 2011 survey recommendation letter. During the aerial surveys in January and March, two new nests were recorded by New Era. One nest is on the Cannon River just east of Cannon Falls and the other is on Trout Brook north of Mazeppa. The Cannon River and Mazeppa nests are 7.8 and 8.0 miles from the Project Footprint, respectively. These nests are also outside the survey area recommended by the USFWS in its September 16, 2012 survey recommendation letter.

As a result of continued citizen reports of bald eagle nests to the USFWS, MDNR, and DOC-EPP, an agency field review of alleged nest locations was conducted on March 27, 2012. A representative of USFWS (Mags Rheude), MDNR (Jaime Edwards), and DOC-EPP (Jamie MacAlister) conducted a detailed site review of locations provided to USFWS by citizens. New Era also provided the agencies with its mapping of verified bald eagle nests, as well as search routes conducted on properties where bald eagle nests had been reported but not found to be present. Bald eagle nests that had been previously verified were not visited by the agencies.

These nests were the Belle Creek, Zumbro River, Hay Creek, West of Goodhue, Southeast of Goodhue, and Post nests.

The agencies did not confirm any new bald eagle nests in the Project Footprint plus a ten mile buffer (**Exhibit 14**). One new bald eagle nest was located by USFWS (not a citizen report) along the Mississippi River in Red Wing but this nest was found to be outside the ten mile buffer. As documented by the USFWS, many of the nests reported by citizens were occupied by red-tailed hawks, great horned owl or squirrels (**Appendix J**). Due to time constraints, the agencies did not visit four citizen-reported nest locations more than two but less than ten miles from the Project Footprint. New Era conducted follow-up reviews of these locations on April 26 and 27, 2012 and determined that three were red-tailed hawk nests and the fourth is a small unoccupied likely hawk nest (probably a Cooper's hawk). The fourth nest was far too small to be a bald eagle nest. The results of this follow–up review (along with photo-documentation) were supplied to the USFWS on May 3, 2012 (**Appendix K**).

On April 19, 2012, New Era requested written concurrence from the USFWS that:

- "One verified bald eagle nest is located within the 32,000 acre Site Permit Area – the "West of Goodhue nest."

- Three verified bald eagle nests exist within two miles of the Project Footprint – the "West of Goodhue", "Belle Creek" and "Zumbro River" nests.

- No bald eagle nests other than those listed above have been verified within the Site Permit Area or within two miles of the Project Footprint.

- The number of bald eagle nests within the above-described areas has not changed since May of 2011, except that the western nest in the Zumbro River breeding territory blew down last year.

- No new bald eagle nests have been identified between 2 and 10 miles of the Project Footprint that were not already identified in Exhibit 4 of the draft eagle permit application submitted to the USFWS on February 10, 2012.

The USFWS provided concurrence on May 7, 2012, confirming that no new bald eagle nests have been verified by the USFWS within the Site Permit Area or within two miles of a proposed turbine. This also confirms that previous maps provided to the MPUC by New Era contained a complete and accurate depiction of bald eagle nests in the Site Permit Area.

On May 2, 2012, the USFWS indicated that it would include the transmission line at the north end of the Project in defining the "Project Footprint" for purposes of the eagle permit being sought by New Era. This additional area is depicted in **Exhibit 2.** As previously stated, New Era conducted an additional follow-up eagle nest field review on May 5-6, 2012 to verify the locations and activity status of previously reported bald eagle nests within 10 miles of this part of

the Project Footprint.[14] The results of the May 5-6, 2012 follow-up field review are supplied in **Appendix L.** An additional survey conducted by New Era along the Cannon River on May 9, 2012 generated another active nest 5.799 miles east of the Cannon Falls nest and 4.16 miles from the Project Footprint (Cannon River East nest). With this additional nest, a total of fifteen active bald eagle nests lie within 10 miles of the Project Footprint, as revised to include the transmission line at the north end of the Project.

9.2.2.5 2012 Spring Migration Surveys

Spring bald eagle migration surveys were initiated February 28, 2012. Similar to the 2011 fall migration surveys, six locations were monitored for 60 minutes twice a week as recommended by the USFWS. The locations for the spring migration surveys were the same as the fall migration surveys. Bald eagles observed within each 800-meter radius survey plot were spot mapped and data specific to behavior, flight type and altitude, age, and other notes were recorded. The order of survey locations was varied each day in an effort to include temporal variation at survey sites. Surveys were conducted in all weather conditions including rain, drizzle, light snow, and sunshine. Surveys were conducted on 18 survey days over nine weeks and totaled 108 survey hours. During the 2012 spring migration survey, eagle exposure minutes for 800- and 100-meter radius survey plots were quantified in the same fashion as described for the 2011 fall migration survey.

The spring migration period for bald eagles tends to be shorter than the fall migration period (Buehler 2000). Due to record-breaking warm weather, the 2012 spring bald eagle migration began and ended early. Migratory flights were observed throughout March but dropped off during the first week of April. As expected, adult bald eagles migrated early in March, followed by sub-adults later in the month and into April. By early April, resident birds were observed making local flights rather than migratory flights. This increased local flight activity corresponded with the hatch period and the need for resident adults to make more foraging flights to feed hatchlings. The peak eagle migration occurred in March during extremely favorable migration conditions; however, the migration survey extended until April 30 to document late migrants. The USFWS confirmed on May 4, 2012 that the time period from February 28 to April 30, 2012 fully encompassed the eagle spring migration period.

Many of the bald eagle flights were recorded during this survey occurred at Sites 1, 1a, and 2. These sites are on the western edge of the Project Footprint and near the Belle Creek Valley, which has previously been identified as an IEUA. Typically, bald eagles observed at these sites were engaged in migratory flights gliding on winds, thermaling, gliding between thermals, hunting or flying up from a perch at the reservoir after preening (cleaning feathers) and sunning themselves. Most of the bald eagle exposure minutes at Site 5 were recorded on a single day, as five migrating bald eagles were observed on a thermal. No golden eagles were observed during the spring migration surveys.

Bald eagles were observed within the six 800-meter radius plots 74 times for a total of 169 exposure minutes. For the smaller 100-meter radius plots, a total of 7.5 exposure minutes were

[14] Again, in its March 16, 2012 letter, the USFWS stated that "[t]he Service is not recommending Westwood embark on a detailed survey effort within a larger geographic area, rather to verify and share reports of any new eagle nests."

estimated for the 27 times eagle flights were mapped within 100 meters of a proposed turbine location. All of these numbers include all bald eagle flights observed during the 2012 spring migration.

Many of the observations at Site 3 were associated with what appeared to be a calf or deer carcass that was located within the survey plot for the first five survey days. Bald eagles and crows were actively feeding on this carcass and making flights to and from it. After the carcass was consumed, few local and low flights were observed and most recorded flights were high migratory flights.

9.2.2.6 2012 Breeding Season Surveys

Point counts for the 2012 breeding season were initiated on May 2, 2012, immediately after completion of the spring 2012 migration season surveys. Breeding season survey dates for 2012 were May 2, 4, 7, 9, 15 and 17; July 23, 27 and 31; August 1, 6, 7, 14, 16, 21, 22, 29 and 31. Due to the transition in project ownership, breeding season surveys were temporarily suspended after May 17, 2012 and reinitiated on July 23, 2012. However, for purposes of collision risk modeling, surveys performed in the 2011 provide adequate data for this part of the breeding season. The results of 2012 breeding season surveys were reported as a component of *Eagle Point Count Report: Summer 2012* compliance filing (Docket WS-08-1233, Document No. 201210-79746-01; filed October 19, 2012).

Eagle behavior and habitat used during the 2012 breeding season appeared to be similar to 2011, with the same nests occupied and no new nests having been built. Survey plots 1a and 2 had the highest number of eagle exposure minutes. Plot 1a is the plot closest to the Belle Creek nest and Plot 2 is near the west Belle Creek Watershed District reservoir. Bald eagles were observed within the six 800-meter radius plots 52 times for a total of 164 exposure minutes. For the smaller 100-meter radius plots, a total of 3.7 exposure minutes were estimated for the 4 times eagle flights were mapped within 100 meters of a proposed turbine location. All of these numbers include all bald eagle flights observed between May 2 and August 31, 2012.

9.2.2.7 Fall Migration Surveys

Fall migration surveys for 2012 were initiated on September 6, 2012 and are ongoing as of the date of this ABPP. Data from surveys conducted on September 6, 7, 12, 13, 18 and 19 were included in the *Eagle Point Count Report: Summer 2012* compliance filing (Docket WS-08-1233, Document No. 201210-79746-01; filed October 19, 2012). Additional data collected during surveys conducted on September 25 and 26 and October 3, 4, 10, 11, 16 and 19, 2012 have been included in the summary tables contained in this ABPP. Fall 2012 eagle movements and habitat use appear similar to that observed in 2011. The first migration movements were observed the first week of September and remained relatively light until September 18, when more significant migration movements began to be observed. Plots 1 and 1a experienced the eagle exposure minutes, which was expected as these plots are nearest the Belle Creek valley. Between September 6 and October 19, 2012, bald eagles were observed within the six 800-meter radius plots 73 times for a total of 334 exposure minutes.

9.2.3 Summary of Findings Based on 2011-12 Surveys

9.2.3.1 Point Count Surveys

New Era has completed more than one year of point count surveys and other bald eagle-specific work and documented bald eagle behavior, use, and flight patterns during the breeding season, migration periods, and winter in and near the Site Permit Area. Breeding bald eagles were generally observed foraging along Belle Creek, Zumbro River, and western Belle Creek Watershed District Reservoir. During migratory periods, bald eagles were observed utilizing thermals and favorable winds and generally passed over the Project Footprint unless artificial food sources were available. In instances where artificial food sources were documented, bald eagles were observed dropping directly out of thermals to the artificial food source. This behavior was not observed during the spring migration when little or no artificial food sources were observed. Instead, migrating bald eagles were observed to pass over the Project Footprint without stopping. The wintering community of bald eagles was observed to be limited to the resident eagles, with a few additional birds sometimes observed loafing around the Project Footprint.

All eagle flight data has been shared with USFWS to develop the collision risk modeling results discussed in Section 9.3. **Appendix I** includes tables presenting the eagle flight data within both the 800m and 100m survey plots, with and without the data affected by artificial food sources included.

9.2.3.2 Project-area Nesting Population

The *2011 USFWS Draft ECP Guidance* recommends that the "Project-Area Nesting Population" be estimated to facilitate impact analysis and to facilitate determinations of allowable take. The *2011 USFWS Draft ECP Guidance* defines the Project-Area Nesting Population as the number of "occupied nests of bald and golden eagles within the project footprint and within 10 miles of the perimeter of the footprint." As previously described, the Project-Area Nesting Population has been estimated at 15 active bald eagle nests based on the results of the March 27, 2012 agency field review and follow-up field surveys performed by New Era in April and May of 2012. The Project-Area Nesting Population is depicted in **Exhibit 13**.

9.2.3.3 Important Eagle Use Areas

During the course of field surveys, the following IEUAs (as defined in 50 CFR § 22.3) in and within two miles of the Project Footprint have been identified and are shown on **Exhibit 14.**

<u>Nests</u>

As shown on **Exhibits 13 and 14**, no bald eagle nests are located within the Project Footprint and one is located within the Site Permit Area. A total of three bald eagle nests, including the previously mentioned nest in the Site Permit Area, are located within two miles of the Project Footprint.

Foraging Areas

Three foraging areas were identified within the Project Footprint and a two-mile buffer. These included:

West Belle Creek Watershed District Reservoir: Bald eagles were frequently observed foraging for fish in the West Belle Creek Watershed District Reservoir throughout the summer and fall of 2011. Foraging flights were concentrated along the western side of the reservoir, which has a fringe of trees providing perches from which to feed. Most of the bald eagle movements to and from the reservoir during the breeding season appeared to be associated with the Belle Creek nest. The closest portion of the reservoir is 0.21 mile from the nearest turbine. The nearest turbines will be visible from the reservoir, but are sufficiently far away that no direct disturbance to bald eagle feeding activities is anticipated.

Belle Creek: Bald eagles have been observed foraging in many locations along Belle Creek during all seasons when open water is present. The reach of Belle Creek nearest to a turbine is 0.33 miles away. The nearest turbines will be visible from Belle Creek, but are sufficiently far away that no direct disturbance to bald eagle feeding activities is anticipated.

Zumbro River: Like Belle Creek, the Zumbro River supplies foraging habitat for bald eagles during all seasons when open water is present. The reach of the Zumbro River nearest to a turbine is 1.35 miles away. The nearest turbines will be visible from the Zumbro River, but are sufficiently far away that no direct disturbance to bald eagle feeding activities is anticipated.

Communal Roosts

A "communal roost site" under the BGEPA is "... an area where eagles gather repeatedly in the course of a season and shelter overnight and sometimes during the day in the event of inclement weather." (50 CFR §22.3). No communal roosts meeting the IEUA definition have been found to date. As discussed in Section 9.2.2.3, multiple bald eagles perching over an artificial food source during mild weather is not considered an IEUA.

9.2.4 Satellite Telemetry and Winter Golden Eagle Survey Results from Minnesota Audubon & National Eagle Center

New Era coordinated with and obtained updated data from Minnesota Audubon and the National Eagle Center regarding satellite telemetry-equipped golden eagles that are being monitored. Data on wintering golden eagles was obtained from Mark Martell, Director of Minnesota Audubon and a partner in the Golden Eagle Project on April 13, 2012. During the winter of 2011-2012, one golden eagle (radioed bird "46") was radioed and sending GPS location data via satellite during the December 2011 – March 2012 period. A second golden eagle was trapped and fitted with a radio on February 15, 2012 (radioed bird "45"); however data for this bird was not provided as it spent the remainder of the winter in Wisconsin prior to spring migration. This bird's migration to Canada began on February 18, 2012. This bird may provide winter movement data during the winter of 2012-2013.

Golden eagle "46" arrived in southern Minnesota on December 19, 2011. This bird spent much of the winter in Winona and Wabasha Counties in Minnesota and Buffalo County, Wisconsin

more than 25 miles from the Project at the closest. Data provided by Minnesota Audubon depicts nightly roost sites but not daily movements. New Era previously reported on golden eagle "42", which was accidentally trapped in 2008 and provided data for 2009 and 2010 before wintering in New York and Pennsylvania in 2011. During the fall of 2011, it became clear that this bird either dropped its radio or was deceased, as satellite signals depicting its GPS location were confined to a limited area. Therefore, no data for this bird is available for the winter of 2011-2012.

While radio telemetry data for the winter of 2011-2012 is from a single bird, it continues to show golden eagle winter use areas in the bluff lands and goat prairies of southeastern Minnesota and southwestern Wisconsin and not near the Site Permit Area (**Exhibit 18**). Likewise, no golden eagles were sighted during the 2011-12 winter aerial and ground transect surveys at the Project. As previously reported, two golden eagles were observed passing through the Project Footprint during the 2011 fall migration; however, there is no evidence that these birds wintered in the Project Footprint, and no golden eagles were observed during the 2012 Spring or Summer surveys.

New Era contacted the National Eagle Center and Minnesota Audubon, requesting raw data from the portion of the 2011-2012 annual winter golden eagle count in Goodhue County. According to Scott Mehus of the National Eagle Center and partner in the Golden Eagle Project, there are two annual golden eagle winter survey routes in Goodhue County: Route 1 and Route 2 (**Exhibit 19**). Route 1 is north of the Site Permit Area near Vasa and two golden eagles were recorded during each of the last two annual surveys. Route 2 is east of the Site Permit Area and no golden eagles have been recorded on this route during the last two surveys, although some have been observed incidentally in that area (i.e., outside the annual survey). Mr. Mehus also noted that there are no annual survey routes that overlap the Site Permit Area due to the lack of suitable wintering habitat for golden eagles (Scott Mehus, personal communication). Although, as noted during the fall 2011 migration surveys, golden eagles may pass through the general area during a migration event.

9.3 Stage 3 – Initial Fatality Prediction Stage

9.3.1 Risk Analysis

9.3.1.1 Turbine-Specific Collision Risk Factors

Appendix D of the *2011 USFWS Draft ECP Guidance* set forth a series of site-based risk factors that allow a turbine-by-turbine assessment of collision risk. **Appendix M** summarizes the turbine-by-turbine risk factor analysis prepared by New Era.

9.3.1.2 Collision Risk Modeling

Collision risk modeling (CRM) for bald eagles is being performed using two different models for the New Era Wind Project. Two models were used because the USFWS encourages developers to use multiple CRMs for purposes of comparison and evaluation between the models. The two models selected for this project are the Band et al. (2007) collision risk model and the most current version of the USFWS CRM.

The Band et al (2007) and USFWS CRMs are based on the same hypothesis but use different modeling approaches. Both models assume that bird collisions with wind turbines can be predicted based on the number eagles exposed to turbine hazards, the probability of exposed eagles being struck and a scaling factor that accounts for the relative size of the survey plots to the overall project footprint. The Band et al (2007) CRM is premised on the availability of an "avoidance factor", which is used to calibrate collision predictions to actual collisions, based on post-construction fatality monitoring. The USFWS CRM relies on an iterative analytical process that becomes more accurate as additional data is compiled and added to future model runs or simulations. Furthermore, the USFWS also acknowledged that the accuracy of its CRM is dependent on the availability of post-construction monitoring data.

Based on preliminary modeling estimates, the results of the USFWS CRM, when compared with the Band et al (2007) model, are more conservative (i.e. predicts a higher collision rate). This conservative approach is supported by the USFWS and is a result of a number of factors including:

- The USFWS CRM includes in its exposure calculations bald eagle flights below 200 meters. The Band et al. (2007) CRM only considers flights at rotor swept altitudes as representing a collision risk to eagles.

- The USFWS uses a higher collision rate probability distribution that assumes the predicted collision rate would be at or above the actual collision rate 80 percent of the time. The Band et al. (2007) model assumes the distribution of actual eagle collisions each year would fall about equally above and below the predicted collision rate.

- The USFWS CRM quantifies the percentage of eagles passing through rotor swept zone that are struck by a blade through the incorporation of post-construction fatality monitoring. Thus, where post-construction fatality data is unavailable, this percentage may be overestimated. The Band et al. (2007) CRM attempts to estimate the probability that an individual eagle exposure will actually result in a collision based on turbine characteristics, such as number and length of blades and rate of rotation.

Based on preliminary modeling runs and discussions with the USFWS regarding the USFWS CRM output, New Era expects the USFWS model will produce a predicted annual take significantly higher than the prediction using the Band et al. (2007) CRM. However, the USFWS's conservative estimate can be used as an upper limit for the range of predicted collisions. The results generated by these two CRMs should converge once post-construction fatality data can be collected from wind farms modeled using the Band et al (2007) and USFWS CRM and the models can be calibrated.

In the absence of the food resource and operational management measures proposed in this ABPP, the actual number of bald eagles that would be struck by turbines each year at the New Era Wind Farm would likely fall somewhere between predictions generated by the Band et al. (2007) and USFWS CRMs. However, it is anticipated that the implementation of the management measures described in this ABPP should result in the actual collision rate at the New Era Wind Farm being toward the lower end of this range.

9.3.2 Estimate of Annual Fatality Rate

New Era provided the USFWS with its raw point count data from the 2011 breeding season, 2011 fall migration, 2012 spring migration and 2012 summer season on September 24, 2012. On October 19, 2012, USFW requested the data be provided in a daily format, which New Era provided on October 23, 2012. The USFWS is in the process of entering that data into the USFWS CRM has committed to producing the results prior to the MPUC hearing regarding this ABPP. A copy of the USFWS' letter discussing the status of its CRM analysis is provided in **Appendix N**.

As discussed in Section 9.3.1.2, New Era used the Band et al. (2007) model to calculate the predicted annual take for bald eagles and golden eagles based on point count survey data collected from 2011-2012 in the Project Footprint. Analyzing all of the data collected, the Band et al (2007) collision risk modeling yielded a predicted take of 0.458 eagles per year (or one eagle every 2.2 years) using data from the 800 m survey plots. The results of the Band et al (2007) model are included in **Appendix O**.

Based on the collision risk analysis and input received from USFWS, New Era has applied for a programmatic non-purposeful eagle take permit for up to one (1) bald eagle per year based on the following annual fatality rate estimates:

Bald Eagles

The total annual allowable take for bald eagles in USFWS Region 3 is set forth in Appendix C of the USFWS' *Final Environmental Assessment (FEA) on the Proposal to Permit Take under the Bald and Golden Eagle Protection Act* (USFWS 2009). Table C3 of Appendix C provides a permissible annual take threshold for Region 3 of 224.39 individual bald eagles and 28.05 bald eagle territories. Region 3 encompasses the states of Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana and Ohio. Allowable take figures are based on 5 percent of projected annual production and equate to one individual eagle taken for every 15 actively breeding pairs.

New Era has requested an eagle permit with an initial term of 5 years (with a request to extend to 30 years once USFWS regulations allow it) and a conservative allowable take figure for bald eagles of one eagle per year. We believe this is a conservative figure, in that it assumes no food base management and artificial feeding activities are allowed to continue. We believe a more accurate representation of natural conditions once the Project becomes operational is the Band et al. (2007) collision risk modeling done with 100-meter turbine-centered survey plots, which yielded an estimated take of 0.078 eagles per year (or one eagle every 12.8 years).

If the USFWS determines a more conservative approach is warranted and establishes a higher take threshold based on its own CRM, this would be acceptable to New Era. However, we believe the allowable take figure in the permit would be reduced once the USFWS CRM is calibrated based on fatality monitoring data. It is important to note that the foregoing collision risk estimates assume that no Advanced Conservation Practices (ACPs) are being applied. We anticipate that the ACPs described below in Section 9.4, particularly food base management, will further reduce collision risks.

Golden Eagles

With regard to golden eagles, the USFWS states in the *FEA on the Proposal to Permit Take under the Bald and Golden Eagle Protection Act* (USFWS 2009) that:

> "… the Service will initially place a cap on permitted take...at 0% of estimated annual productivity for golden eagles. If, in the future, data and modeling suggest golden eagle populations can support take, we would begin to authorize take at no greater than 1% of annual productivity, unless information available at that time demonstrates that higher levels of take can be supported ..."

Only two golden eagles were observed during the 2011 fall migration survey, one soaring over an 800 meter radius survey plot and the other perched overlooking the remains of a raccoon carcass in an open crop field. No golden eagles were observed over the winter of 2011-2012, nor were any observed during 2012 spring migration and breeding season point count surveys. Also, no golden eagles have been observed through October 26, 2012 during the 2012 fall migration surveys. Two eagle exposure minutes were ascribed to each golden eagle observed in the fall of 2011 and one minute for each was at rotor swept height. If the Band CRM with an 800 meter radius plot size is applied to four golden eagle exposure minutes with an assumption that 50 percent of the flight time being in the RSZ (which is conservative), the predicted collision rate is 0.006 golden eagles per year or one golden eagle being struck every 167 years. Accordingly the probability of a golden eagle collision during the life of the Project appears to be negligible. Since conservative collision risk modeling predicts no golden eagle collisions within the lifespan of the Project, no permit is being requested for the non-purposeful taking of golden eagles at this time.

9.4 Stage 4 – Application of Advanced Conservation Practices (ACPs) and Compensatory Mitigation

New Era will implement the following ACPs to mitigate collision risk to eagles:

9.4.1 Pre-Construction

9.4.1.1 Turbine Siting

To the degree possible, turbines have been sited in disturbed areas such as open agricultural fields that have unobstructed views and are away from natural food sources, such as riparian corridors and streams. The number of turbines has also been reduced by 8 percent from 52 to 48. All turbines have been sited at least one-half mile from the nearest bald eagle nest.

9.4.1.2 Transmission Line Route and Design

In order to avoid and minimize impacts to eagles and other avian species, New Era designed its approximately 4-mile 69 kV transmission line to meet APLIC standards.[15] These standards focus on ensuring adequate separation between energized conductors to prevent electrocutions,

[15] http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf; http://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf

covering of other energized equipment (e.g., pole mounted transformers) and use of bird diverters to minimize bird collisions with conductors. Compliance with the APLIC standards is an ACP recommended in the *2011 USFWS Draft ECP Guidance* and also a BMP set forth in Chapter 7 of the *2012 Draft USFWS Land-Based Wind Energy Guidelines*. In addition, New Era selected a route for the transmission line that parallels an existing road right of way and existing electric distribution infrastructure.

9.4.1.3 Bird Diverters

As recommended by the *2012 USFWS Draft ECP Guidance*, bird diverters have been placed on the guy wires of the new meteorological tower locations placed within the Project Footprint to collect additional bat survey data.

9.4.1.4 Continued Bald Eagle Monitoring/Risk Modeling

Point count surveys for bald and golden eagles will be continued, and risk assessment modeling results will be updated throughout the pre-operational phase of the Project. The Band et al. (2007) CRM and the USFWS CRM will both be used for all collision risk updates. As post-construction fatality monitoring results come in, New Era will also work the USFWS to develop an avoidance factor for bald eagles specific to the USFWS CRM.

9.4.1.5 Initiation of Food Base Management

The *2011 Draft ECP Guidance* recommends a number of management practices intended to manage the availability of both artificial and natural eagle food sources within the footprints of wind power projects. New Era will pursue the following food base management measures (drawn from the *2011 USFWS Draft ECP Guidance*) in conjunction with O&M activities on the Project:

- If rodents and rabbits are attracted to project facilities, the activities that may be attracting them will be identified and eliminated.

- Vegetation or landscape management that might indirectly result in raptors being attracted to turbine locations (e.g., seeding forbs or maintaining rock piles that attract rabbits and rodents) will be avoided.

- Stored parts and equipment, which may be utilized by small mammals for cover, will be kept away from wind turbines.

- If fossorial mammals burrow near tower footprints, where feasible on a case-by-case basis, burrows will be filled and the surrounding pad covered with gravel at least 2 inches deep and out to a perimeter of at least 5 feet.

- Carcasses that have the potential to attract raptors to the Project Footprint and, in particular, turbine locations will be immediately removed.

- Responsible livestock husbandry will be encouraged among both participating landowners and neighbors (e.g., removing and properly disposing of livestock carcasses, fencing out livestock).

- Removal of artificial and/or natural habitats near turbine locations that attract prey species may be undertaken if eagles exhibit risky flight behavior after the foregoing measures are in place.

- Prey-base enhancements and/or land acquisition and management to draw eagles out of the Project Footprint may be undertaken, if eagles exhibit risky flight behavior after the foregoing measures are in place.

Exposed surface disposal of livestock carcasses is illegal in Minnesota under Minn. Stat. § 35.82, which provides that livestock carcasses must either be trucked to a rendering facility or buried out of reach of scavengers. The Board of Animal Health (BAH) is responsible for enforcing this statute. It is also an acceptable practice to fully compost livestock carcasses using a process developed and approved by the BAH. Properly composted livestock carcasses are so decomposed that they do not represent a potential food source for scavengers.

Road kills also represent a food source for bald eagles, and there is evidence that some road kills have been disposed of in one or more of the locations used for livestock carcass disposal. Eagles feed opportunistically on road kills anywhere they occur, in turn exposing the birds to the risk of being struck by vehicles. In 2008, 2009 and 2010, the Wisconsin Department of Natural Resources (Wisconsin DNR) analyzed the cases of injury or mortality for 110, 150 and 120 sick, injured, or dead eagles (Wisconsin DNR 2008, 2009 and 2010). In each of these years, the leading cause of death was collision with a vehicle. Most vehicle collisions were reported to have occurred when eagles were scavenging car-killed deer.

The *2011 USFWS Draft ECP Guidance* also recognizes vehicle collisions as a source of fatalities and recommends immediate removal of "…carcasses (other than those applicable to post-construction fatality monitoring; see below) that have the potential to attract raptors from roadways and from areas where eagles could collide with wind turbines. In the USFWS's comments on the draft eagle permit application circulated by New Era in February of 2012, the USFWS recommended that New Era initiate carcass management immediately rather than waiting until construction is complete.

New Era will undertake a multi-step process to address problems with artificial feeding of bald eagles and risks posed by eagles feeding on road kills:

- New Era will work directly with landowners who are currently known or thought to be improperly disposing of livestock carcasses, in an effort to gain voluntary compliance with Minn. Stat. § 35.82. If compliance cannot be obtained through informal coordination, the BAH will be contacted and asked to conduct necessary inspections and, if appropriate, subsequent enforcement action.

- New Era will work with the BAH, Goodhue County Agricultural Extension Service and Goodhue County law enforcement to provide educational resources to landowners regarding proper livestock carcass disposal techniques.

- New Era will fund the establishment of an appropriately sited and managed central road kill burial location that will not attract bald eagles to the Project Footprint. New Era will coordinate with USFWS and MDNR once an appropriate site has been identified to obtain concurrence on the location and burial protocol.

- The New Era project biologist and O&M staff will work with state, county and township road and law enforcement authorities to encourage and facilitate rapid pick up and proper disposal of road kills. New Era O&M staff having valid MDNR possession permits may also directly engage in the removal and disposal of road kills within the Project Footprint.

New Era is not proposing a formal program of daily inspections for carcasses by O&M personnel. Rather, in their day-to-day duties, New Era personnel working on the Project Footprint will watch for carcasses and unusual concentrations of eagles that might indicate a carcass is present. The disposition of any carcasses found will depend on the circumstances but O&M staff will place the safety of eagles first in determining how to respond. O&M staff will have access to equipment for removal of large carcasses where necessary.

Road kills will either be removed immediately by New Era O&M staff or arrangements for rapid removal and proper disposition will be made with the responsible road authority. If the incident is known to involve an improperly disposed of livestock carcass, the landowner will be contacted with a request for immediate and proper disposal. This applies to both participating and non-participating landowners. If the landowner is uncooperative and/or the request is not honored within 24 hours, the BAH will be contacted and a request made for immediate enforcement assistance. Similarly, if New Era staff observe an unusual concentration of eagles where New Era lacks access and cannot obtain landowner cooperation, the BAH will again be contacted and a request for investigation and possible enforcement assistance will be made.

If we observe any ongoing pattern of apparent intentional feeding of eagles during the operational phase of the Project, New Era staff will immediately file complaints with the appropriate enforcement authorities. All such incidents within the Project Footprint will be reported. Incidents outside the Project Footprint but within one mile from project infrastructure will also be reported. Other incidents may be reported depending on the circumstances.

Enforcement requests will be as follows:

- USFWS: Unresolved incidents that involve the apparently intentional surface disposal of livestock carcasses or relocation of road kills to locations where eagles may be harmed will be reported to the USFWS with a request for enforcement action under the BGEPA.

- BAH: Unresolved incidents involving improper livestock carcass disposal will be reported to the BAH with a request for enforcement action under Minn. Stat. § 35.82.

- MDNR: Incidents involving the relocation of road killed deer without a possession permit will be referred to the MDNR with a request for enforcement action.

9.4.2 Construction

9.4.2.1 Continued Bald Eagle Monitoring/Risk Modeling

Point count surveys for bald and golden eagles will be continued, and USFWS risk assessment modeling results will be updated throughout the construction phase of the Project.

9.4.2.2 Construction Phasing to Minimize Disturbance

All of the currently known active bald eagle nests in and around the Project Footprint are in excess of one-half mile from the nearest turbine. Accordingly, no special construction phasing measures appear to be required to avoid construction-related disturbance to eagles during the nesting period. If an eagle nest is initiated or completed within 660 feet of a location where construction activity will occur, New Era will seek a temporary disturbance permit from the USFWS. (USFWS, 2007; *National Bald Eagle Management Guidelines*, pp. 23.) As a precautionary measure, New Era will also monitor the West of Goodhue nest during construction to collect real-time data regarding whether eagles present are being disturbed during construction (as recommended on page 66 of the *2011 USFWS Draft ECP Guidance*).

9.4.2.3 Continued Food Base Management

The construction management staff will be trained to recognize likely presence of artificial food sources (e.g., concentrated eagle movements around farmsteads or locations lacking perennial water, defense of such locations against turkey vultures, etc.) and report such observations to the New Era project biologist and O&M staff. Where such activity is observed or suspected, the same resolution process described in Section 9.4.1.5 will be undertaken. Construction workers and logistics contractor drivers will also be provided instructions for immediately reporting road kills to construction management staff, who will then report them to New Era. Road kills will either be removed by New Era staff or will be reported to the appropriate road authority with a request for rapid pick up and proper disposal at the central disposal facility described above.

9.4.2.4 Road Kill Minimization in Construction Traffic Plan

New Era recently engaged in a study of road structure suitability to determine which county and township roads are best suited to handle heavy construction traffic. New Era is still in the process of working with Goodhue County and the townships to develop a plan for construction traffic routing. New Era will include road kill minimization as a factor in this traffic routing plan. The construction traffic routing plan will include conservative speed limits for all construction traffic, as well as a road kill reporting process. All construction staff and drivers of vehicles hauling equipment and turbine parts will all be provided instructions regarding the rapid

reporting of road kills. Prior to construction, on-site staff and the wildlife consultant for the Project will obtain the necessary possession permits from MDNR to facilitate the rapid removal and disposition of road kills. Road kill reporting instructions will provide contact information for these individuals. A central road kill burial site (to be identified in the construction traffic plan) will be established either within the Project Footprint or at a nearby landfill. The construction traffic plan will be submitted to the USFWS and MDNR for review prior to issuance to construction staff, the construction contractor and the logistics contractor.

9.4.3 Operational Phase

9.4.3.1 Continued Bald Eagle Monitoring/Risk Modeling

Point count surveys for bald and golden eagles will be continued, and USFWS risk assessment modeling results will be updated for two years after the Project becomes commercially operational.

9.4.3.2 Continued Food Base Management

After construction is complete, O&M staff will continue monitoring the Project Footprint for likely signs of artificial food sources and will pursue the same resolution process described in Section 9.4.1.5. New Era will continue to fund the central road kill disposal location for the life of the Project and O&M staff will continue to report road kills to the appropriate road authority with a request for rapid pick up and proper disposal at the central disposal facility described above. Where feasible and appropriate, O&M staff may pick up and dispose of road kills in the course of their duties to assist road authorities.

1. Removal of specific transitory food sources (e.g., road kills, carcass piles) that may be causing foraging flights that place eagles at risk. Specific measures to maximize the efficacy of this measure may include:

    a. Explore obtaining a permit from the USFWS to fit 3 to 6 juvenile bald eagles from the West of Goodhue, Belle Creek and Zumbro River nests with solar cell-tracking radio telemetry transmitters during the summer of 2013. This will allow real-time tracking of the movements of these birds after they fledge. Assuming some or all of these birds stay in the area during the fall of 2013 and return during the 2014 breeding season, daily tracking of their movements should facilitate the rapid discovery of new transitory food sources. Depending on the effectiveness of this technique over the first two to three years of Project operation, New Era may request that additional birds be outfitted with transmitters in future years. New Era will work cooperatively with experienced scientists from the National Eagle Center, Minnesota Audubon, and the Raptor Center or Hawk Ridge Bird Observatory in fitting the birds with transmitters.

    b. From the beginning of the deer gun season to mid-December, New Era will maintain a dumpster at the O&M facility for the free disposal of butchered deer remains and gut piles. The availability of the dumpster for this purpose will be advertised in local newspapers to maximize its use. New Era will also support a deer check station and a “Hides for Habitat” drop box at the O&M facility. Hides

for Habitat is a non-profit program that provides collection boxes for deer hide donations from hunters, with the proceeds going to habitat enhancement projects. Providing these facilities on-site would provide an additional opportunity to inform deer hunters of the dumpster's availability and also maximize communication about where gut piles have been left in the field. Any deer remains deposited in the dumpster would be taken to a landfill for burial.

c. Public roads within the Project Footprint will be patrolled frequently by a project biologist and/or O&M staff and fresh road kills will either be picked up or arrangements for rapid pickup made with the local road authority. Also, arrangements will be made for rapid pickup of any road kills reported to the O&M facility by local residents.

2. If eagles are drawn to specific farming operations, coordination with the landowner to pursue adjustments to the operation to reduce the attraction (e.g., clean up of trash disposal piles, better composting of dead livestock).

3. Pursuing location-specific habitat modification to reduce perch sites or remove woody cover for prey species in immediate proximity to the turbine or turbine cluster where collisions are predicted. Before any such habitat modifications would be undertaken, concurrence would be obtained from the USFWS and MDNR. No habitat modifications would be undertaken without agency concurrence.

4. Intensified biologist observations of turbines where collisions are predicted to obtain visual observations of eagle movements to gauge the degree to which avoidance behavior is occurring.

9.4.3.3 Turbine Curtailment Plan

If, after the implementation of the adaptive management measures described in 1-4 above, onsite field observations confirm that the collision risk to eagles has not been adequately addressed, New Era will implement the following temporary curtailment measures to reduce the collision risk to eagles and stay within the take levels authorized in the eagle take permit.

New Era proposes to implement an annual curtailment allowance of up to 1,200 megawatt hours (MWhs) each calendar year to curtail individual turbines or turbine clusters until collision risk events end naturally or are resolved. As discussed in this section, this adaptive management practice is intended as a flexible tool that allows the Project's operators, in consultation with the project's biologists, to address varying eagle risk conditions throughout the term of the eagle permit.

It is important to note that New Era does not believe that real-time turbine curtailment in response to individual bird flights is practical because the eagle flight behavior generating the risk will usually have passed by the time a given turbine can be fully shut down. Instead, this curtailment allowance provides New Era with a tool to address risky patterns of eagle flight observed during a particular period of time, or an "eagle risk event."

Curtailment Parameters and Assumptions

Eligible turbines	All 48 turbines within the Project will be eligible for curtailment, depending on observed risk conditions. However, based on observations during the 2011-12 point count surveys, New Era currently believes that adaptive management measures (including curtailment) will be most intensively focused on these turbine clusters due to their proximity to eagle habitat features or observed food sources: 1. Turbines 1-9 and 10-14, which are closest to the Belle Creek valley and Belle Creek eagle nest; 2. Turbines 16-19, which are above a ridge bald eagles followed during fall migration; 3. Turbines 35-37, which are nearest to the West of Goodhue nest; 4. Turbines 26 and 27, which are nearest to the West Belle Creek Watershed District Reservoir; Our management emphasis could shift, depending on risk observations after the Project becomes operational.
Number of turbines curtailed	The number of turbines curtailed will be based on the perceived magnitude of the risk (i.e., the number of eagles involved, the proximity of eagle movements to turbine(s) and the difficulty of ameliorating the risk). With lower risk events, only the turbine closest to the eagle movement or habitat feature will be curtailed. With higher risk events, an entire turbine cluster could potentially be curtailed.
Form of curtailment	Curtailment can take several forms: full shut down, slowing maximum rotational speed or changes in cut-in speed. The form of curtailment implemented will be based on the observed eagle behavior being addressed during the eagle risk event. For purposes of the analysis presented below, we have assumed curtailment would consist of the temporary full shut down of turbines.
Duration of curtailment	The duration of curtailment will be based on how long it takes to adequately ameliorate the observed risk. In some cases, the risk may be ameliorated through natural processes (e.g., the number of eagles migrating through the area increases and then decreases) or through adaptive management practices (e.g., removal of a transitory food source that caused communal foraging near turbine locations).

Seasons of the year	We have assumed that curtailment will not normally be necessary in the winter, as water bodies within and near the Project Footprint will typically be frozen. Bald eagles will normally be concentrated around open water locations along the Mississippi River. We acknowledge that this assumption may not be valid in years with mild climatic conditions (like 2011) and that curtailment may need to be considered under certain conditions during the winter.
Time of day of curtailment	Curtailment will not be necessary at night since eagles do not fly after dark. While bald eagle foraging flights are typically most frequent early and late in the day, curtailment actions would typically encompass the entire period of daylight hours.

Potential Collision Risk and Curtailment Scenarios

In characterizing the following likely "eagle risk events" and curtailment scenarios, we have applied the above-described assumptions to each of the listed variables:

Season	**Observed Eagle Risk Events**	**Curtailment Response**
Breeding Season	Repeated eagle movements between a nest and a natural food source bring birds within 100 meters of a turbine or turbine cluster.	• 1 turbine nearest nest shut down during each event • Shut down lasts up to 3 days • Shut down only during daylight hours
Fall and Spring Migration	Natural movements during migration periods temporarily bring significant numbers of eagles (i.e. more than 10) into close proximity of a turbine or turbine cluster	• Up to 5 turbines shut down during each event • Shut down lasts up to 7 days • Shut down only during daylight hours
All seasons	A transitory food source appears on a public road, participating land or cooperative non-participating land creating a short-term collision risk that takes up to 2 days to resolve.	• 1 turbine is shut down during each event • Shut down lasts up to 2 days • Shut down only during daylight hours
Any season	A transitory food source appears on uncooperative non-participating land, creating longer-term risk that takes up to 7 days to resolve.	• 5 turbines are shut down during the event • Shut down lasts up to 7 days • Shut down only during daylight hours

September – April	Field observations or satellite telemetry data from the Minnesota Audubon and National Eagle Center show individual golden eagles present in Project Footprint for more than three consecutive days.	• Turbine cluster nearest eagle observations are shut down during the event • Shut down lasts up to 7 days • Shut down only during daylight hours

Curtailment Implementation Procedures

New Era will rely on close coordination between its O&M team and the project's biologists to implement this curtailment plan. Throughout the operation of the Project, New Era will retain a professional project biologist to assist in implementation of the ABPP and other environmental permit conditions. The project biologist will train operations and maintenance staff to identify the above eagle collision risk events. O&M staff will be instructed to contact the project biologist and the site manager immediately upon observation of an eagle risk event. The biologists performing weekly fatality monitoring and other site studies will also be instructed to contact the site manager immediately upon observation of an eagle risk event. In consultation with the project biologist, the site manager will implement the adaptive management practices outlined in Section 9.4.3.2 of the ABPP. If, in consultation with the project biologist, the site manager determines the risk to eagles has not been sufficiently addressed through other measures, the curtailment plan outlined above will be implemented.

To implement the curtailment plan, the site manager will contact the wind farm operator and provide the wind turbine generator number and the requested duration (in minutes) of the stop for each respective turbine. The operator will then implement the turbine's soft stop procedure using the GE SCADA system, in accordance with the turbine manufacturer's warranty conditions and current industry practices. This soft stop process typically occurs in ten to sixty seconds, based on the current wind speed (the higher the wind speed the longer the shutdown).

At the conclusion of the eagle risk event, the site manager will inform the operator that the turbine can be placed back into normal service. The curtailment event, including the time, date, duration and MWhs lost, will be logged into the site operations log by the operator and the site manager. New Era will provide annual reports to the USFWS summarizing the implementation and results of the prior year's curtailment program.

Reduction in Risk Attributed to Curtailment Allowance

New Era proposes an annual curtailment allowance of 1,200 MWhs, against which actual curtailment losses would be debited. MWhs are proposed as the "allowance" units (versus days of turbine curtailment) so that debits will reflect the actual cost of curtailment to the Project. MWhs debited for a given curtailment event will be calculated based on the number of turbines involved, the duration of curtailment and power generation levels at the non-curtailed turbines during the curtailment period. If curtailment occurs during low power generation conditions, this would result in a smaller debit and more remaining MWhs available for future curtailment events.

New Era estimates that implementation of this 1,200 MWh curtailment allowance will provide sufficient flexibility to implement the curtailment plan for approximately 20 eagle risk events in any given year, assuming that each event results in the total shutdown of three turbines for an average of three days (daylight hours only). This reduction in turbine operation, particularly when focused on turbines most likely to produce eagle collision risk events, provides New Era maximum flexibility to address varying eagle risk events throughout the term of the eagle take permit. If 1,200 MWhs of total curtailment loss are reached during a given year, other adaptive management measures would be intensified but no further curtailment would occur for the remainder of that year.

Placing caps on both allowable take and annual curtailment loss will create an incentive for the permittee to maximize the efficacy of non-curtailment management measures in minimizing the potential for eagle-turbine collisions. Through New Era's annual reports, the USFWS will have multiple opportunities throughout the term of the eagle permit to evaluate the effectiveness of adaptive management measures described in this ABPP (including curtailment) and make any necessary adjustments when the permit comes up for renewal.

9.5 Stage 5 – Risk Validation

New Era will conduct post-construction fatality monitoring following the protocols discussed in Part II, Section 7.0 and will report results of its monitoring efforts in accordance with Part IV, Section 10.7 below. Additional monitoring and reporting requirements may be implemented as a result of the requirements of an eagle take permit.

PART IV ABPP IMPLEMENTATION

10.0 Training

New Era believes that employee and contractor training is an important aspect of implementing the ABPP for the Project. Consequently, New Era staff involved in the daily implementation, planning and engineering process for the Project will be trained in the specific requirements of the ABPP and in avian and bat issues that are of concern at the Project Footprint. Some staff members, particularly those implementing the ABPP, may receive external training courses on avian and bat identification, protection planning and practices to reduce collision fatality or risk of electrocutions. New Era ABPP training will include the following components:

10.1 Development Stage Environmental Training

Wind project development team members who have been involved in the design and permitting of the Project have received informal training in the avian and bat issues associated with the Project Footprint. Certain issues have arisen or evolved during the development and permitting process, making such training an ongoing, iterative process. Throughout the design and permitting processes, there has been ongoing coordination among the developer, construction contractor, project team design engineers and environmental professionals and wildlife agency staff members to ensure that avian and bat issues described in this ABPP have been properly addressed in the design of and construction planning for the Project. However, because the preparation of this ABPP is occurring near the conclusion of the Project design and permitting

processes, no formal development stage ABPP training courses have occurred or are being proposed.

10.2 Construction Stage Environmental Training

All construction staff will receive training on the environmental constraints and issues specific to the Project Footprint, including sensitive habitats to be avoided (such as buffers around raptor nests or habitat of sensitive species) and how they are marked in the field, practices to minimize impacts to wildlife (such as project-specific speed limits), and procedures for handling injured or dead birds and other wildlife. Materials to support this training will include maps showing sensitive areas to be avoided. As they are most familiar with the avian and bat issues associated with the Project Footprint, construction stage training will be provided by the wildlife biologists responsible for pre-operational surveys and studies and who prepared this ABPP. Training materials will be provided to USFWS and MDNR biologists for advance review and agency biologists will be invited to attend and participate in the construction stage training session(s). All carcass identification will be performed by trained biologists and any injured raptors that are found will be handled only by trained biologists or licensed rehabilitators.

Construction staff will be trained on other measures that must be undertaken to reduce the risk of damage to the environment. New Era's contractor will implement best management practices to maintain a safe and orderly construction area. Fire hazards from vehicles, power equipment, and open flames will be minimized through the instruction and use of best practices. Construction staff will be trained in the safe handling of toxic substances and at least one person trained in spill response will be on site at all times when construction activities are occurring. Training on invasive species prevention and control measures will occur at the initiation of construction. Moreover, construction staff will be trained on appropriate locations to dispose of garbage and other waste products.

10.3 Operations Stage Environmental Training

Training in the key components of this ABPP will be part of the training provided to each new operations staff within 90 days of hire. In addition, all operations contractor staff who operate the Project and remote operations staff will be trained as well. This training will include a general orientation to state and federal wildlife laws and procedures for handling and reporting dead or injured birds. Training in bird and bat identification will be provided, with emphasis on state and federally listed species. However, all carcass identification will be performed by trained biologists. Materials to support this training will include a flowchart showing how dead or injured birds and bats should be handled, as well as project-specific posters showing species that are of particular conservation concern or that have special status that may be present at the site. Again, operations stage training will be provided by the wildlife biologists who provided construction stage training. Again, training materials will be provided to USFWS and MDNR biologists for advance review and agency biologists will be invited to attend and participate in the operations stage training session(s).

It should be noted that all carcass identification, formal surveys, fatality monitoring and report preparation activities will be performed by trained biologists and not O&M staff. The purpose of operations stage environmental training is to facilitate proper documentation and reporting of

O&M staff observations during the day-to-day operation of the wind farm. A Special Miscellaneous Permit will be obtained from the USFWS for any staff member who will be handling the carcasses of migratory birds. Any injured raptors that are found will be handled only by trained biologists or licensed rehabilitators.

Operations staff will be trained on other measures that must be undertaken to reduce the risk of damage to the environment. Best management practices will be implemented to maintain a safe and orderly operations area. Fire hazards from vehicles, power equipment, and open flames will be minimized through the instruction and use of best practices. Operations staff will be trained in the safe handling of toxic substances and a spill response kit will be maintained on site. Operations staff will also be trained on appropriate locations to dispose of garbage and other waste products.

10.4 External Training:

O&M staff may receive future training on avian protection planning and practices or specific wildlife management techniques. Such training is offered by the Avian Power Line Interaction Committee (www.aplic.org) and occasionally by state and federal wildlife agencies. Refresher courses on bird and bat identification may also be warranted for O&M staff to ensure accurate characterization and reporting of fatality incidents.

10.5 Quality Control and Adaptive Management

10.5.1 Quality Control

Compliance with this project-specific ABPP will be reviewed and audited by New Era on an annual basis. Audit information will be supplied to MDOC-EFP and the MPUC for review and will be e-filed to the docket for the Project. Any noted deficiencies and recommendations will be addressed through corrective action plans, which will be implemented on a schedule that matches the urgency of the deficiency. A corrective action plan may be recommended by New Era based on audit results, but the decision whether such a plan is required would be made by the MPUC with MDOC-EFP input. A corrective action plan would set forth: (1) the specific actions needed to correct the identified deficiency; (2) a schedule for completing those actions; (3) the parties who would be responsible for implementing those actions; and (4) the process for confirming that the corrective action has adequately addressed the deficiency. If a corrective action plan becomes necessary, it would sent to MDOC-EFP and the MPUC for review and, after approval, progress would be reported on a quarterly basis and progress reports would be e-filed to the project docket.

Annual audits will be carried out to ensure that: (1) ABPP compliance is satisfactory; (2) O&M staff members have adequate training and training materials; (3) that avian and bat fatality incidents are being properly documented and reported. New Era will continually seek to improve plan performance, study protocols, and mitigation approaches to reduce future wind-related wildlife risks and update the ABPP to the extent necessary.

10.5.2 Adaptive Management

Adaptive management:

"…Adaptive management promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders." (*DOI Adaptive Management Technical Guide*).

Adaptive management strategies that would be pursued by New Era have been described throughout this ABPP. Specific adaptive management strategies for the species discussed in this plan are discussed in the sections applicable to each species. If adaptive management is found necessary, specific measures to be undertaken will be developed in coordination with MDOC-EFP, USFWS and MDNR and will only be implemented with agency concurrence. Also, as the process of documenting and reporting on monitoring and fatality results proceeds, New Era will continually look for ways to streamline and improve the process. If the USFWS and/or MDNR develop electronic procedures for fatality reporting, New Era will work with the agencies to adopt and implement the new reporting procedures.

10.6 Key Resources

New Era will develop a list containing names, contact information and responsibilities of key development team members and agency staff to facilitate communication and reporting throughout the life of the ABPP. This list will be distributed at least 10 days prior to at the pre-construction meeting.

10.7 Avian and Bat Reporting to Agencies

10.7.1 Survey Reporting

New Era will provide reports to MDOC-EFP, MPUC, USFWS and MDNR within 30 days of the conclusion of all site-specific avian and bat surveys. In compliance with Site Permit Section 13.1.2, a report summarizing New Era's 2012 and 2013 bat surveys will be efiled and made available to each agency no later than December 15th. Site-specific survey reports will include a summary of the survey work completed, findings and recommendations for further action, as required.

10.7.2 Informal Avian and Bat Injury Fatality Reporting

Observations of avian and bat injuries or fatalities in the normal course of O&M activities are to be reported through the informal avian and bat injury and fatality reporting procedure using the Wildlife Incident Reporting Form, which includes turbine number, date fatality or injury was

discovered, species of bird or bat involved and other relevant information (**Appendix P**). Copies if the form will also be provided to participating landowners for use if they find injured or dead birds or bats during farming activities. All informal reports will be emailed to MDOC-EFP, MPUC, USFWS and MDNR, with electronic and paper copies kept on file by the site manager and the project biologist. Individual wildlife incident reports will not be e-filed to the project docket. Such observations are separate and distinct from those collected during formal avian and bat fatality surveys. In order to ensure accurate and timely reporting of wildlife fatalities, all informal reporting will be done within 24 hours through the project wildlife consultant and New Era Site Manager. All carcass identification will be performed by trained biologists. O&M staff will not have the responsibility of definitively confirming the species of bird or bat killed and deciding the appropriate reporting time frame under the MPUC Site Permit.

There are three types of proposed reporting for avian and bat fatality: (1) 24-hour reporting of certain fatality events; (2) quarterly reporting of avian and bat fatalities observed during day-to-day O&M activities on site; and (3) reporting of fatality survey results over the first two years of operation. These reporting requirements are described in more detail as follows:

10.7.2.1 24-Hour Reporting

If any of the following occur during the course of site activities during facility operations, the occurrence will be reported to the MPUC, USFWS and MDNR within 24 hours of discovery:

- Five or more dead or injured non-protected avian or bat species within a reporting period (i.e. within a quarter);
- One or more dead or injured migratory avian or bat species (including any species of eagle);
- One or more dead or injured state threatened, endangered or special concern species; or
- One or more dead or injured federally listed species.

“Non-protected” avian species have been assumed to include non-native species such as European starlings and house sparrows and non-migratory species that are not otherwise protected as threatened or endangered (e.g. non-migratory game birds). All native migratory bird species will be treated as “protected”. The USFWS has indicated it does not need 24-hour reporting of non-protected species. Incidents involving non-protected species will be reported to USFWS quarterly.

10.7.2.2 Quarterly Fatality Reporting

Avian and bat fatalities observed by the New Era Site Manager, project biologist or O&M staff in the course of their duties on the wind farm will be reported on a quarterly basis. Again, these reports are separate from reporting of the results of more intensive fatality surveys described below. Quarterly reports on day-to-day avian and bat fatality observations are due on January 15, April 25, July 15 and October 15 of every year for the life of the Site Permit. Reports are to include species of dead or injured bird or bat species found, location of find by turbine number, date of find, potential cause of fatality and any steps taken to avoid future occurrence. Quarterly

reports will reported to the MDOC-EFP, MPUC, USFWS and MDNR by email and will be e-filed to the project docket.

10.7.3 Formal Fatality Survey Result Reporting

As described previously in this ABPP, fatality surveys will be conducted two times per week at 10 turbines for the first two years of project operation. The results of these surveys will be reported quarterly on January 15, April 25, July 15 and October 15 for the first two years of facility operation. An annual report will be also be submitted with the January 15th quarterly summary and will use the format provided in the MDNR Fatality Report Guidelines (Appendix F of Mixon et al, 2011).

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