Fredrikson
& BYRON, P.A.

January 24, 2012

**VIA EMAIL**

Jamie MacAlister
Energy Facility Planning Staff
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Ms. MacAlister:

Enclosed with this letter are AWA Goodhue LLC's responses to the respective letters submitted by Tony Sullins, US Fish and Wildlife Services, and Jamie Schrenzel, Minnesota Department of Natural Resources, on January 12, 2012 commenting on AWA Goodhue's Avian and Bat Protection Plan (ABPP).

AWA Goodhue is committed to crafting and implementing a comprehensive ABPP that will serve as a resource for project personnel throughout the construction and operation of the project. As you are aware, AWA Goodhue engaged in extensive agency coordination to draft this ABPP, meeting with the DOC, USFWS and MDNR on numerous occasions over the last six months. Prior to the December 15, 2011 filing, the Permittee made significant changes to the document in response to earlier rounds of agency comment. AWA Goodhue appreciates the continued agency coordination and input.

In an attempt to narrow any remaining issues, AWA Goodhue is providing the attached responses and a revised version of the ABPP that address the January 12th agency comments. The following sections of the ABPP were modified in response to these comments:

| | | |
|---|---|---|
| Section 2.0 | Section 8.1.2.1 | Section 9.1.2 |
| Section 5.1.1 | Section 8.2.1.1 | Section 9.1.3 |
| Section 5.1.2 | Section 8.2.1.2 | Section 9.2.3.5 |
| Section 5.1.3.1 | Section 8.2.1.3 | Section 11.0 |
| Section 5.1.3.2 | Section 8.2.2.2 | Appendix C |
| Section 5.3 | Section 8.2.3.3 | Appendix H |
| Section 6.3 | Section 8.5 | Figure 3 |
| Section 7.1 | Section 8.6.1 | Figure 9 |
| Section 7.2 | Section 8.6.2 | |

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In addition, we have attached marked copies of the changed pages and one clean copy of the revised ABPP.

Please feel free to contact me with any questions.

Sincerely,

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Enclosures

c: Tony Sullins, USFWS
Mags Rhuede, USFWS
Rich Davis, USFWS
Jamie Schrenzel, MDNR

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January 24, 2012

**VIA EMAIL AND U.S. MAIL**

Mr. Tony Sullins
U. S. Fish & Wildlife Service
Twin Cities Field Office
8101 American Boulevard East
Bloomington, MN 55425-1665

**Re: Responses to USFWS Comments**
**Avian and Bat Protection Plan Review**
AWA Goodhue Wind Farm
Goodhue County, Minnesota
File No. 20081147
PUC Docket No. IP-6701/WS-08-1233
FWS TAILS #32410-2009-FA-0173

Dear Tony,

This letter responds to your January 12, 2012 letter commenting on the Avian and Bat Protection Plan for the AWA Goodhue Wind Project. Our responses are as follows:

## USFWS GENERAL COMMENTS

Non-intentional Eagle Take Permit (50 CFR 22.26)

**USFWS Comment 1:** AWA Wind has indicated its intention to apply for an eagle take permit. The Service would like to see an anticipated timeline as part of the ABPP.

**Response 1:** We do not feel it is necessary to include an ITP schedule in the ABPP, as the federal ITP process is completely separate from the state ABPP approval process. However, AWA Goodhue offers the following suggested ITP schedule to the USFWS for consideration:

Submit draft ITP application for internal USFWS review: January 26, 2012
Meet with USFWS Region 3 staff to discuss ITP and NEPA Processes: January 26, 2012
Submit Final ITP application: February 15, 2012
Submit Draft Environmental Assessment for USFWS review/approval: March 1, 2012
Submit Final EA: March15, 2012
USFWS issues Final EA for 30-day Comment Period: April 1, 2012
Submit draft Comment Responses and FONSI to USFWS: June 1, 2012

USFWS issues revised/finalized Comment Responses and FONSI: June 15, 2012

Post-construction Monitoring

**USFWS Comment 2:** "AWA Wind has stated plans for surveying and mortality monitoring for two years post construction. Please note that if AWA Wind applied for a programmatic eagle take permit, monitoring and adaptive management will likely be recommended for the life of the project."

**Response 2:** AWA Goodhue acknowledges that additional monitoring and adaptive management may potentially be required as conditions of an ITP and that this will be discussed with the USFWS during the ITP process.

Non-Eagle Migratory Bird Protection

**USFWS Comment 3:** "The Service recommends that management measures such as seasonal or daily turbine shutdowns be considered if post-construction monitoring indicates avian mortality trends occurring at specific turbines or clusters of turbines."

**Response 3:** The USFWS is unclear as to what avian mortality trends it would consider sufficiently serious to warrant a seasonal or daily turbine shutdown or how it would be determined whether one or more turbines are shut down. AWA Goodhue believes the language in Chapter 8 of the ABPP is sufficient to address any serious negative trends in avian mortality.

**SPECIFIC COMMENTS:**

**USFWS Comment 4:** "Page 6, 5.1.1: 'The new nest is slightly farther from the project footprint than the previously documented nest that was active in 2010 (but found to be inactive in 2011).' Service Comments: Inactive nests are still protected under the BGEPA."

**Response 4:** The quoted language from the ABPP was not intended to suggest that inactive eagle nests have any less regulatory protection than active ones. AWA Goodhue acknowledges that inactive eagle nests are protected under the BGEPA, and the ABPP has been revised to indicate this.

**USFWS Comment 5a:** "Page 8, 5.1.2: Monitoring Bald Eagle Movements. Even though flights in the Rotor Swept Zone (RS[Z]) (sic) did not always overlap proposed turbine sites, because of the number of eagles in the area, future flights could easily be in the RSZ of [the] turbine."

**Response 5a:** AWA Goodhue acknowledges that future flights may differ from those observed during the point count surveys. However, AWA Goodhue is only able to observe flights that occur during the survey period. The collision risk model is the tool used to calculate the risk of future collisions. AWA Goodhue followed the point count survey methodology recommended by the USFWS to populate the collision risk model. If the USFWS would like us to use a different methodology to predict likely future eagle movement patterns, other than calculating the risk using data from observations of current eagle behavior, we would appreciate any additional recommendations the USFWS may have in this regard.

**USFWS Comment 5b:** "The ABPP indicates that eagle movement within the RSZ (Rotor Swept Zone) and within 10 meters of the turbine was quantified. In latter sections of the report it is stated as within the RSZ and within 100 meters of the turbine location. The Service would like clarification that this is a typo, or an explanation as to why the distance from the turbine location varies."

**Response 5b:** The correct distance is 100 meters. The ABPP has been revised to correct this typo.

**USFWS Comment 6:** "Page 10, Section 5.1.3.1, Migration and Breeding Period. "Point count surveys conducted to date during the fall of 2011 have been seriously compromised by an active baiting program being conducted by project opponents." Service Comments: The Service neither agrees nor disagrees with the allegation of an active baiting campaign conducted by county residents. To date, AWA Wind has filed complaints with the Board of Animal Health (BAH). The BAH has confirmed that there have been several instances in Goodhue County of improper carcass disposal, one instance of coyote baiting, and one incident that appears to be 'dumping for purposes other than disposal.' At present, no landowner has been cited for illegal dumping, and the BAH has not drawn any correlation between carcass disposal and eagles. The Service acknowledges that baiting activities may influence point count data, but to state that it has seriously compromised survey data would imply that there is baseline data collected during previous fall seasons. To date, the Service has not been provided with previous fall data, and if such information is available, the project proponent should provide this information for review. The Service recommends AWA Wind analyzes [sic] the data they have collected, rather than attempt to extrapolate potential data."

**Response 6:** As recommended by the USFWS, we have utilized all of the data collected during our fall surveys in our collision risk modeling, and we anticipate that the allowable take to be requested in our ITP application will be based on this data. However, we would remiss if we did not provide the USFWS information on which portions of our data were significantly influenced by artificial feeding activity. We stand by the statement in the ABPP. We have supplied substantial documentation of artificial feeding in the 2011 Fall Migration Season Survey Report filed with the Minnesota Public Utilities Commission

(MPUC) on January 17, 2012, a portion of which was supplied to the USFWS at our meeting in December of 2011.

**USFWS Comment 7:** "Page 11, 5.1.3.1: 'The Minnesota Board of Animal Health (BAH) has confirmed that baiting with livestock carcasses is occurring'. Service Comments: See Service comment on p. 10: 5.1.3 (above)."

**Response 7:** The ABPP has been revised to indicate that the BAH has confirmed multiple incidents of improper livestock disposal, one of which was confirmed after its December 16, 2011 letter.

**USFWS Comment 8:** " Page 11, 5.1.3.1: 'It is anticipated that by the 2012 breeding season, road kill clean up and artificial feeding activity on and around the Project Area will be much better controlled as of the date of this plan.' Service Comment: The Service encourages AWA Wind to establish a protocol for the scenario where either artificial food sources are not diminished or diminished food resources do not lead to a drop in eagle numbers."

**Response 8:** This scenario has already been addressed in the ABPP. Note that the objective of food base management is not to lower eagle numbers but rather to minimize the potential for eagle collisions. If it becomes apparent that an ITP take threshold might be exceeded in spite of food base management, the series of measures listed in Section 7.2 of the ABPP would be undertaken.

**USFWS Comment 9: "**Page 11, 5.1.3.2: '…helicopter surveys will be conducted once per month'. Service Comments: Based on the meeting held between MN DOC, AWA Wind, and the Service (December 22, 2011), the Service encourages AWA Wind to reevaluate helicopter flight in order not disturb nesting eagles, livestock or residences. The Service does not recommend that helicopters hover close to the canopy or round for any reason."

**Response 9:** AWA Goodhue has revised the eagle survey flight protocol to maintain an altitude of 500 feet, which still falls within the 200 to 700 foot altitude range set forth in USFWS guidance. Direct overflights of nests are also being avoided.

**USFWS Comment 10:** "Page 11, Section 5.1.3.2: Winter Aerial Surveys. 'The March aerial survey will be expanded to serve as the 2012 leaf-off aerial survey for the nests of eagles, other raptors and colony nesting birds.' Service Comments: The FWS would like elaboration on this statement. Does this mean expansion of the type/scope of the survey, or expansion of the distance from the project footprint? The distance outside the proposed project that aerial surveys will be completed should be specified. For example great blue herons can fly eight plus miles from their rookeries to foraging sites; are these aerial surveys intended to identify colony nesting areas at this distance from the proposed project site?"

**Response 10:** The ABPP has been revised to clarify the approach to the March 2012 raptor nest survey. Because AWA Goodhue has found it necessary to maintain a minimum flight altitude of 500 feet to avoid citizen complaints, it will not be possible to conduct the March 2012 raptor nest survey from the air. The nests of raptors other than eagles (e.g. red-tailed hawks, great-horned owls, etc.) are too small to be effectively identified from that altitude. As was done in 2011, the March 2012 raptor survey will now be conducted from the ground. The March raptor nest survey will not be expanded geographically beyond the scope of the aerial eagle surveys. Per the USFWS recommendations provided on September 16, 2011, the geographic scope will continue to be the operational project area plus a two-mile buffer. The geographic scope of surveys for heron rookeries and other types of colonial nesting features will also continue to be the operational project area plus a two-mile buffer.

**USFWS Comment 11:** "Page 11, 5.1.3.2: Night Roosts. Service Comments: The Minnesota DNR has given the Service information of a possible eagle night roost within the project site. This information will be passed on to AWA Wind (if they do not have it already), and is included with this letter (attachment 1 and 2)."

**Response 11:** Based on the general nature of the information provided, it is unclear whether the DNR report is duplicative or additive of the information AWA Goodhue has already collected through its surveys. As described in the 2011 Fall Eagle Survey Report, we have observed eagles roosting for the night in trees overlooking this site, but only when artificial food sources were present.

The third of six aerial eagle IEUA surveys was conducted on January 19, 2012 and the cited location was checked twice from the air for the presence of roosting eagles. The second overflight was done at 4:15 pm, just before sundown. Follow-up visits were conducted on the ground at 7:30 am and 4:15 pm on January 20, 2012. Again, no eagles were observed at this location during these visits and no evidence of any feeding activity was apparent. These observations were made during some of the first sub-zero weather conditions of the winter (i.e. -9 F º the evening of January 19th), which are ideal conditions for observing normal winter night roosting behavior.

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). To date, there is no evidence that this location receives consistent seasonal use or has been sought out by eagles as a protective location during inclement weather. Accordingly, we cannot consider this location a communal roost site based on the currently available data. However, we have sought additional information from MDNR and will continue to check this location for winter night roosting activity during future surveys.

**USFWS Comment 12:** "Page 12, 5.1.3.5: Winter Ground Transect Surveys. Service Comments: Due to the unusually mild winter (2011-2012), winter survey data gathered

this winter may not be indicative of normal winter activity for eagles. Currently, there is much more open water and available food sources than in a normal winter. Eagle numbers and eagle movement patterns may be different in subsequent years. The Service recommends additional winter surveys be completed in 2012-2013.

**Response 12:** During the ITP process we will coordinate with the USFWS regarding the potential need for and scope of winter 2012-2013 surveys. It should be noted that the AWA Goodhue project is expected to be operational by the winter of 2012-2013, so this should be considered in determining what surveys should be conducted then.

**USFWS Comment 13a:** "Page 21, Section 6.2: Fatality Monitoring Protocol. 'Per recommendations from the MDNR…for a moderate risk site.' Service Comments: The Service requests justification why the proposed project site should be considered a moderate rather than a high risk site, based on the presence of a high number of nesting bald eagles.

**Response 13a:** The characterization of the site as moderate risk for avian fatalities was contained in a MDNR comment letter dated September 12, 2011, which provided concurrence on the proposed frequency of fatality monitoring events. The moderate risk characterization relates to avian mortality overall rather than with regard to any single species. AWA Goodhue based its fatality monitoring protocols for all species on this characterization. With regard to bald eagles, AWA Goodhue has indicated its intent to apply for an ITP and can coordinate directly with the USFWS as to the whether any supplemental monitoring for bald eagle fatalities would be warranted.

**USFWS Comment 13b:** "The Service would also like to see more detail on carcass identification training for Operations and Maintenance (O & M) personnel. The Service recommends that O & M personnel not be tasked with identifying bat and many migratory birds, as these identifications can often be difficult, especially if carcasses are incomplete or decomposed. The Service recommends instead that all carcasses be collected with a marked location and other information, bagged and frozen and identified by a specialist."

**Response 13b:** AWA Goodhue agrees with the procedure recommended by the USFWS and has revised the ABPP accordingly. By making this revision to the ABPP, additional detail on bird identification training for O & M staff should not be necessary.

**USFWS Comment 14:** "Page 22, 7.1: "…the most common passerine fatalities tend to be common species…" Service Comments: All migratory species are protected under the MBTA, regardless of their population size. Take of any migratory bird without a permit is a violation of the MBTA."

**Response 14:** The quoted statement was not intended to suggest that common migratory species have any less regulatory protection than less common species. To remove the USFWS concern, the quoted statement has been deleted from the ABPP.

**USFWS Comment 15:** Page 24, 7.2: " 'After studying the draft USFWS model in detail, we have concluded that it would be more appropriate to apply the Band et al. (2007) collision risk model to dat[a] (sic) from the AWA Goodhue Wind Project.' Service Comments: AWA Wind is encouraged to analyze their data under multiple models. However, the Service would like to see the results of their survey when analyzed under the Service collision risk model, in addition to any other models AWA Wind chooses. In a letter from Westwood Professional Services to the Service dated December 21, [2011] an analysis of data from the Service model was compared to the Band et al. model. Service would like to see the comparison of both models of collision risk assessment to eagles in the final ABPP.

**Response 15:** Westwood used the Band et al. (2007) collision risk model in the ABPP. This model is a well-accepted, independently peer-reviewed model that has been in use internationally for over a decade. The Band model has also been calibrated for a number of species, including golden eagles, through the development of "avoidance factors" which are based on fatality monitoring data collected in the field. To our knowledge, this is the only collision risk model which has been so calibrated. Accordingly, we are limiting the collision risk modeling on the ABPP to the Band model. As we have discussed throughout our agency coordination, we will, however, be happy to work with the USFWS on refinements to its draft generic model within the context of the ITP process.

**USFWS Comment 16:** "Page 25: '… the fall migration data has been seriously compromised by an ongoing, organized eagle baiting program.' Service Comments: Please see Service comments from p. 10: 5.1.3 (above)."

**Response 16:** The documentation provided to the MPUC in the 2011 Fall Migration Eagle Survey Report supports the statement in the ABPP, and we stand by that statement. However, as previously stated, we have utilized all of the data collected in the fall of 2011 in the collision risk modeling provided in the ABPP.

**USFWS Comment 17:** " Page 26: 'This reduction [in the collision risk to eagles] should be reflected in point count data and CRM output generated after the food base management program becomes operational in 2012.' Service Comments: Please see Service comments from p. 11: 5.1.3.1 (above)."

**Response 17:** See Response 8.

**USFWS Comment 18:** "Page 26, Section 7.2: Bald and Golden Eagles. Service Comments: Adaptive management measures should be clarified, so that if necessary, full turbine curtailment and shut down is an alternative. Alternatively, AWA Wind should clearly establish why full curtailment and shutdown is impracticable."

**Response 18:** Adaptive management measure 8 on page 26 of the ABPP has been revised to clarify that a temporary shutdown of a turbine or turbines would be the final step in the stepwise expansion of curtailment and would be undertaken subject to the limits and conditions established within an ITP if continued risky flight behavior is observed even after all other measures, including partial curtailment, had been implemented.

**USFWS Comment 19:** "Page 27: 'As compared to bald eagles, the relative collision risk to golden eagles should be lower…' Service Comments: The collision risk to Golden Eagles is substantially higher than for bald eagles due to their foraging behavior. Despite the lower numbers of golden eagles around this project site, golden eagles are vulnerable to turbine collisions, the risk of this project to Golden Eagles should not be discounted (Hunt *et al.* 1999, 2002)[1] Additionally, no take permits for the eastern population of golden eagles are available. Minimizing take to golden eagles should be included in AWA Wind's adaptive management strategy.

**Response 19:** The statement in the ABPP is with regard to the cumulative collision risk to golden eagles versus bald eagles -- not the risk to an individual golden eagle. We have clarified this point in the ABPP. We acknowledge that the much higher number of golden eagle collisions across the country suggests that individuals of this species may be more vulnerable to collisions than bald eagles, possibly due in part to differences in foraging behavior. However, the data and collision risk modeling presented in the 2011 Fall Migration Eagle Survey report corroborate the statement in the ABPP. Only two golden eagles were observed over 2.5 months in the fall migration period. Collision risk modeling performed on the fall 2011 migration period data predicted one golden eagle collision every 167 years. This is a conservative prediction, as the collision risk modeling output extrapolates the fall data to the entire year, even though golden eagles are not present in the state for a significant proportion of the year. Given the extremely low risk of a golden eagle collision, we believe that the adaptive management measures in the ABPP are sufficient for this species.

**USFWS Comment 20:** "Page 32, Section 7.5.1: White-Nose Syndrome. Service Comments: The ABPP states that, 'the fatal effect of this disease on bats has alarmed biologists and exacerbated concerns regarding potential effects of wind energy on bat populations.' There is available scientific data that indicates that wind power projects pose a threat to bats."

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[1] Hunt, W.G., R.E. Jackman, T.L. Brown, and L. Culp. 1999. A population study of golden eagles in the Altamont Pass Wind Resource Area: population trend analysis 1994-1997. Report to National Renewable Energy Laboratory, Subcontracts XAT-5-15174-01, XAT-6-16459-01. Predatory Bird Research Group, University of California, Santa Cruz, California, USA.

Hunt. G. 2002. Golden eagles in a perilous landscape: predicting the effects of mitigation for wind turbine bladestrike mortality. California Energy Commission Report P500-02-043F. Sacramento, California, USA.

**Response 20:** The statement in the ABPP acknowledges that wind projects have been documented to kill bats and simply goes on to state that bat mortality associated with white-nose syndrome has exacerbated concerns about population-level impacts.

**USFWS Comment 21a:** "Page 33, 8.1.2.1: Minimizing Construction Disturbance. Service Comments: If any bald eagle nest (current or future) is within 660 feet of any turbine, road construction, power line construction, or near any potentially disruptive activity associated with the construction of Goodhue Wind, the Service will recommend an eagle disturbance permit if this activity occurs during the eagle breeding season (February-August), or if this construction activity significantly alters the landscape within 660 feet of an eagle nest (regardless of season).

**Response 21a:** At present, the construction activity for the AWA Goodhue project that will be nearest an eagle nest will be just under 0.86 mile (about 4,541 feet away). If an eagle nest is initiated or completed within 660 feet of a location where construction activity or significant landscape alteration will occur, a permit for temporary disturbance will be sought from the USFWS.

**USFWS Comment 21b**: "The ABPP states that native seed mixes will be emphasized to limit the introduction and spread of invasive species. For this to be as successful as possible the Service recommends the ABPP state that native seed mixes will be used."

**Response 21b:** The ABPP has been revised to include a reference to the native seed mixes AWA Goodhue intends to utilize.

**USFWS Comment 22**: "Page 35, 8.1.3.2: Follow APLIC Guidelines for Transmission Lines. Service Comments: Please address if AWA Wind plans to do carcass searches under newly built transmission line for avian collisions. If so, include information on methods and duration of monitoring.

**Response 22:** The AWA Goodhue project will include 3.1 miles of new 69 kV transmission line following existing road right of way. No carcass searches are planned in association with this element of project infrastructure.

**USFWS Comment 23:** "Page 36, Section 8.2.1.1 Turbine Siting: 'Neither the current USFWS ECP guidelines nor the 2003 Service Interim Guidelines for Avoiding and Minimizing Impacts from Wind Turbines contain any recommendations for spatial buffer distance from bald eagle nests.' Service Comments: The 2003 Service Interim Guidance provides a recommendation to site potentially lethal infrastructure, including wind turbines, a minimum of two miles from bald eagle nests. Additionally, the National Bald Eagle Management Guidelines (USFWS 2007) contains explicit spatial buffer recommendations for avoiding disturbance around eagle nests and Important Eagle Use Areas. The literature cited of this ABPP does not reflect that AWA Wind included this document in their plan development. The Management Guidelines can be found:

http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf. This document should also be consulted for any where construction may impact bald eagles, such as road construction, turbine construction, and transmission line placement.

**Response 23:** As confirmed by Ms. Mags Rheude via email on January 23, 2012, the 2003 Service Interim Guidelines for Avoiding and Minimizing Impacts from Wind Turbines does not contain a recommendation for a specific spatial buffer from eagles nests. However, to avoid unnecessary confusion regarding this issue, the ABPP has been revised to remove this sentence.

Regarding buffers for construction activity, we have revised Section 8.2.2.2 of the ABPP to include a reference to the construction buffers recommended in the 2007 National Bald Eagle Management Guidelines.

**USFWS Comment 24:** "Page 36, Section 8.2.1.2 Continued Bald Eagle Monitoring/Risk Modeling. Service Comments: This section of the ABPP states that the USFWS risk assessment modeling results will be updated throughout the pre-operational phase of the Project. On page 24 of the ABPP it was stated that the Band et al. (2007) collision risk model was being utilized as opposed to the USFWS risk assessment risk assessment model. The Service recommends clarification throughout the ABPP as to which collision risk model(s) is/are being utilized. As stated above, the Service wishes to see collision risk assessment modeling for both the Band et al. model and the FWS model."

**Response 24:** The ABPP has been revised to clarify that the Band et al. (2007) collision risk model is being used for all updates to the collision risk modeling provided in the ABPP. See also response 15.

**USFWS Comment 25:** "Page 36, 8.2.1.3: ' Carcasses that have the potential to attract raptors to the Project Area and, in particular, turbine locations, will be immediately removed.' Service comments: When feasible, the Service would like more details on this plan for immediate carcass removal. Will this include daily inspections by O & M personnel? Will they be equipped to handle moving large carcasses? Will any of this be done on private land?

**Response 25:** The ABPP has been revised to provide more detail on plans for carcass removal. AWA Goodhue is not proposing a formal program of daily inspections for carcasses by O & M personnel. Rather, in their day-to-day duties, AWA Goodhue personnel working on the project area 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 AWA Goodhue 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 AWA Goodhue staff observe an unusual concentration of eagles where AWA Goodhue 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, AWA Goodhue staff will immediately file complaints with the appropriate enforcement authorities. All such incidents within the Operational Project Area will be reported. Incidents outside the Operational Project Area 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.

**USFWS Comment 26:** "Page 37: Section 8.2.1.3: Initiation of Food Base Management. Service Comments: The ABPP cites the USFWS Draft ECP Guidance recommending against the improper disposal of livestock carcasses when it recommends '…responsible livestock husbandry (e.g. removing carcasses, fencing out livestock)…if grazing occurs around turbines." The Service would like this removed from the ABPP as it is taken out of context. This section of the USFWS ECP guidance is referring to grazing activities around wind turbines, the removal of still born livestock, or livestock that may die of natural causes in close proximity to a wind turbine, which may attract foraging eagles. This section of the USFWS ECP Guidance is not intended for application to baiting activities."

**Response 26:** We respectfully disagree with the USFWS and are deeply concerned that the USFWS comment unintentionally encourages the intentional feeding of eagles (the

intentional feeding of eagles is expressly discouraged on page 15 of the 2007 National Bald Eagle Guidelines). Nothing in the language drawn from the Draft ECP Guidance suggests that it would not apply equally to intentional versus unintentional improper disposal of livestock carcasses. It is unclear how not cleaning up the carcasses of still-born livestock dropped by their mothers in a pasture would be poor animal husbandry while the intentional deposition of such carcasses in the same pasture would not be. However, to address this concern, we deleted this reference and instead quoted from the preceding clause of the Draft ECP that recommends, "immediate removal of carcasses…that have the potential to attract raptors from roadways and from areas where eagles could collide with wind turbines."

**USFWS Comment 27a:** "Page 37: 8.2.1.3: '6. Responsible livestock husbandry will be encouraged among participating landowners and neighbors.' Service Comments: The Service encourages AWA Wind to develop good relationships with all landowners in the project footprint to ensure that carcasses are removed in a timely manner."

**Response 27a:** AWA Goodhue agrees with this statement and will continue to develop and maintain relationships with all landowners in and around the project area.

**USFWS Comment 27b:** " '7. 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.' Service Comments: This statement is unclear and needs further explanation.

**Response 27b:** The language in the ABPP has been clarified by adding the words "Removal of" at the beginning of the sentence. This measure is an Advanced Conservation Practice (ACP) quoted verbatim from page 69 of the 2011 USFWS Draft Eagle Conservation Plan Guidance.

**USFWS Comment 27c:** " '8. Prey-based enhancement and/or land acquisition and management to draw eagles out of a project footprint may be undertaken…' Service Comments: This measure has been suggested by AWA Wind in previous ABPP drafts and the Service has discouraged such action (September 23, 2011, Service letter to Westwood). Please refer to this letter for the Service's rationale for not wanting such a measure included in the ABPP.

**Response 27c:** The language the USFWS wants deleted from the ABPP is an ACP quoted verbatim from page 69 of the 2011 USFWS Draft Eagle Conservation Plan Guidance. Accordingly, it seems appropriate to retain this measure in the ABPP.

**USFWS Comment 27d:** " 'Both of the two new bald eagle nests identified in 2011 were directly associated with artificial feeding activities involving the disposal of livestock carcasses.' Service Comments: As stated in previous letters (September 23, 2011, Service letter to Westwood), the Service does not believe that the new eagle nests are

directly correlated with carcass dumps. Eagles require more than just food sources for breeding habitat; eagles were mostly likely already present in the area and opportunistically nested near food sources. Additionally, landowners have by law 72 hours to dispose of carcasses. Due to the large number of eagles already present in the area, it is likely eagles will discover carcasses quickly. Therefore, eagles feeding on carcasses will likely be a long-term issue for AWA Wind."

**Response 27d:** We concur with the USFWS that eagles were already in the area and nested opportunistically near food sources. However, given the immediate availability of livestock carcasses and the limited natural food sources in the areas immediately surrounding the two new nests, it appears to be artificial food sources they nested opportunistically near. The ABPP acknowledges that eagles feeding on carcasses will likely be a long-term issue. A food base management program has been included in the ABPP for this reason.

**USFWS Comment 27e:** "Although Service Eagle Guidelines (2007) discourages artificial feeding of eagles, there is no federal law which prohibits such feeding, unless it results in the take of an eagle. The Service recommends AWA Wind resolve this matter through cooperative efforts with landowners."

**Response 27e:** We appreciate the USFWS acknowledging that it discourages the artificial feeding of eagles. AWA Goodhue has and will continue to work cooperatively with landowners to discourage the artificial feeding of eagles. However, after the project becomes operational, any incidents of artificial feeding of eagles that cannot be resolved cooperatively and puts eagles at risk of a turbine collision will be referred to the USFWS with a request for enforcement action under the BGEPA.

**USFWS Comment 28:** "Page 38, 8.2.2.2, Construction phasing to minimize disturbance. Service Comments: Please see comment for section p. 33: 8.1.2.1."

**Response 28**: See Response 21a.

**USFWS Comment 29:** " 'AWA Goodhue will fund the establishment of an appropriately sited and managed central road kill disposal location…' Service Comments: The Service requests more information on this disposal area, such as location, and how its potential impacts to eagles and other. [sic]

**Response 29:** A specific location has not yet been selected but the MDNR and USFWS will be notified and input solicited when a suitable site has been identified. However, regardless of its location, the site will be managed in a fashion that precludes any adverse impacts to eagles or other wildlife. Carcasses will be either be buried at the selected site or stored in a dumpster at the site for periodic delivery to a landfill for burial.

**USFWS Comment 30:** "Page 39, 8.2.3.1: '…USFWS risk assessment modeling results will be updated for two years…' Service Comments: Elsewhere in this ABPP, AWA Wind has indicated they will be using the Band et al. model for collision risk assessment. Please also see earlier comments on p. 24: 7.2 where the Service encourages AWA Wind to analyze eagle data through the FWS model, in addition to any other model they choose. Please note also that monitoring associated with an eagle take permit may require more than two years of risk assessment modeling.

**Response 30:** See Response 15 regarding collision risk modeling. AWA Goodhue acknowledges that monitoring associated with an ITP may differ from what is provided for in the ABPP.

**USFWS Comment 31**: "Page 40, 8.2.3.3: Curtailment: 'An internet search revealed only one incident of bald eagle mortality at a wind project in North America…USFWS staff members have suggested as many as five bald eagle fatalities associated with North American wind farms…USFWS indicated that it was unable to supply the requested documentation.' Service Comments: To date, the Service has documented 5 bald eagle takes at North American wind farms (4 mortalities and one injury). These results are currently being compiled for publication and will be available for public review once published. Additionally, many of these cases are active law enforcement investigations; sharing information on these incidents may compromise the investigation."

**Response 31:** The ABPP has been revised to reflect the information supplied in the comment.

**USFWS Comment 32a:** "Pages 41 and 42, Section 8.2.3.3: Curtailment. Service Comments: Barrier effect is acknowledged by the Service, but not as a mitigation measure as the ABPP is implying. The Service recommends projects minimize or avoid creating barrier effect. Barrier effect is thought to increase energy expenditure of individual birds as they will have to fly further to avoid and move around obstacles within their flight path. Barrier effect can also cause birds to abandon the use of foraging habitats or nesting areas. Clustering of turbines providing flight pathways for migratory birds is an approach preferred by the Service. Implementation of this mitigation measure should be established based on siting turbines away from flight pathways as opposed to creating flight pathways, or making the assumption that migratory birds will adjust to the new landscape modified by wind turbine placement.

**Response 32a:** Clustering of turbines is recommended on Page 2 of the 2003 Service Interim Guidelines for Avoiding and Minimizing Impacts from Wind Turbines as a measure for minimizing the potential for bird collisions:

> "Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of

> turbines parallel to known bird movements, thereby decreasing the potential for bird strikes."

The barrier effect is not being cited as a mitigation measure. Rather we are pointing out the clustering of turbines encourages eagles to remain on their normal paths. Based on the eagle flight data collected during the 2011 breeding season and fall migration season, the turbine cluster locations selected by AWA Goodhue are generally away from eagle flight pathways. During the breeding season, 98.85 percent of the flights observed during point count surveys were more than 100 meters from a proposed turbine location (see 2011 Breeding Bald Eagle Flight Calculations in Appendix G of the ABPP). During the 2011 fall migration, more than 90 percent of the eagle flights observed within the six 800 meter radius survey plots were more than 100 meters from a turbine (compare Table 1 to Table 2 and Table 3 to Table 4 of the 2011 Fall Migration Eagle Survey Report). Accordingly, the turbine cluster locations selected by AWA Goodhue are not anticipated to create new flight paths but rather will reinforce existing natural flight paths.

**USFWS Comment 32b:** " The curtailment scenario provided on page 42 of the ABPP would not be a curtailment alternative the Service would be considering or recommending. Eagle activity has already been confirmed within the proposed project site, so if the curtailment alternative outlined in the ABPP was utilized the turbines would realistically be shut down all the time. The Service recommends that seasonal and/or temporary curtailment and full shut down of turbines within two miles of bald eagle nests be considered as a legitimate risk avoidance measure.

**Response 32b**: This comment runs counter to the adaptive management approach the USFWS recommends in its 2011 Draft ECP Guidance. A "seasonal and/or temporary curtailment and full shut down of turbines" should only occur after other mitigation measures have first been tried and found ineffective. We respectfully disagree that the mere presence of eagle activity within the project site would mean that turbines would "realistically be shut down all the time" under the curtailment scenario presented in the ABPP. The ABPP provides a series of adaptive management steps that would lead to temporary curtailment if other measures are ineffective in minimizing or eliminating risky eagle flight behavior near turbines. We acknowledge that unique circumstances could arise where temporary shutdowns could occur. However, it is not reasonable to expect turbines to be shut down during periods when risky flight behavior is not being observed or has been reduced to the point that collision risk low enough to indicate that the allowable take threshold in the ITP being sought would not be exceeded. AWA Goodhue expects that further discussion regarding the implementation, limits and conditions surrounding use of curtailment alternatives will be developed with the USFWS in the context of an ITP application.

**USWFS Comment 32c:** "The Service requests citations from AWA Wind to provide evidence that slowing down (rather than halting) turbines provide a greater protection to eagles against collision."

**Response 32c:** The slower a turbine turns, the more time an eagle has to traverse empty airspace within the RSZ without being struck. Turbine rotational speed is a factor used in calculating collision risk in Stage 2 of the Band et al. (2007) model:

"The probability of a bird flying through a rotor being hit is calculated next under Stage 2 of the Band model. The probability depends on the size of the bird (both length and wingspan), the breadth and width of the turbine blades, the rotation speed of the turbine, and of course the flight speed of the bird" (see page 266; emphasis supplied).

Band, W., M. Madders & D.P. Whitfield. 2007. Developing field and analytical methods to assess avian collision risk at wind farms. In: De Lucas, M., Janss G.F.E. & Ferrer, M., eds. Birds and Wind Farms - Risk Assessment and Mitigation. Servicios Informativos Ambientales/Quercus, Madrid. Pp. 259-275.

Within the context of an adaptive management strategy, reducing rotor speed is a reasonable precursor to a temporary turbine shutdown.

**USFWS Comment 33:** "Page 42, Curtailment: 8.2.3.3: 'Artificial baiting of eagles in the Project Area (which has been documented in multiple locations and is ongoing)…' Service Comments: Please see Service comments on p. 10: 5.1.3 (above) regarding artificial baiting.

**Response 33:** See Response 6.

**USFWS Comment 34:** "Page 48, Section 8.5: Trumpeter Swan. Service Comments: If adaptive management measure item six is to be employed, turbines in the immediate vicinity of the proposed bird diversion activities must be shut down prior to undertaking the diversion activities."

**Response 34:** The ABPP has been revised to clarify that, if adaptive management measure item six is employed, turbines in the immediate vicinity of the proposed bird diversion activities will be shut down in advance.

**USFWS Comment 35:** "Pages 48 and 49, Sections 8.6.1: Pre-Construction and Section 8.6.2 Construction. Service Comments: Sentence two of Section 8.6.1 Pre-Construction states that all proposed turbine locations are more than 0.25 mile of raptor nests.[sic] Sentence two of Section 8.6.2: Construction states that three turbines are planned within 0.25 mile of possible raptor nests. The Service recommends that this be clarified in the ABPP.

**Response 35:** The ABPP has been revised to clarify that all turbines are more than 0.25 mile from the nearest raptor nest.

**USFWS Comment 36:** "Page 48: 8.6.1: 'If suitable habitat exists around the turbine such that foraging raptors may be attracted to it, AWA Goodhue may pursue habitat modification to minimize its attractiveness to prey species.' Service Comments: Please provide more detail as to the kind and amount of habitat modification AWA is proposing. In past ABPP drafts, AWA Wind has suggested to remove perching trees in the project area to prevent raptor roosting and nesting. The Service has previously advised against such action. Details for Service stance against large-scale tree removal can be found in FWS comments on earlier drafts of the ABPP to Westwood, in a September 23, 2011, letter.

**Response 36:** The ABPP has been revised to clarify that such activities would only be undertaken in consultation with USFWS and MDNR.

**USFWS Comment 37:** "Page 51, 9.1.2: Construction Stage Environmental Training. Service Comments: Please see Service comments on p. 21: 6.2: Fatality Monitoring Protocol, regarding bat and avian carcass identification. Additionally, the Service recommends that O&M personnel do not attempt to handle any injured raptor, including eagles. Only biologists or licensed rehabilitators trained in raptor handling and transport should handle injured raptors. Inexperience with handling raptors can lead to further raptor injury or death, as well as injury to the handler.

**Response 37:** AWA Goodhue concurs and has revised the ABPP to indicate that all carcass identification will be performed by trained biologists and that any injured raptors that are found will be handled only by trained biologists or licensed rehabilitators.

**USFWS Comment 38:** "Page 53, 9.2.2: Adaptive Management: 'If the USFWS and/or MNDNR develop electronic procedures for fatality reporting, AWA Goodhue Wind will work with agencies to adopt and implement the new reporting procedures.' Service Comments: The Service currently has an on-line reporting system for avian powerline collisions: https://birdreport.fws.gov/BirdReportHomePage.cfm. Xcel Energy also has an on-line system for powerline collision reporting (contact Xcel Energy for website). Once an on-line reporting system becomes available for wind turbine collision reporting, the Service will share this with AWA Wind."

**Response 38:** AWA Goodhue will report avian fatalities using the available on-line reporting systems as they become available.

**USFWS Comment 39:** "Page 55, Section 9.2.3.5: Informal Avian and Bat Injury Fatality Reporting, 24 Hour Reporting. Service Comments: The Service does not need to be notified within 24 hours of discovery of 5 or more dead or injured non-protected avian or bat species. This information could be provided to the Service in the form of quarterly or annual reports.

**Response 39:** AWA Goodhue will report dead or injured non-protected avian or bat species to the USFWS in its quarterly and annual reports.

**USFWS Comment 40:** "General Appendices. Service Comments: The Project Area outlined in Exhibit 1, 3, 9, 12 and 16 are different from the identified Operational Project Boundary outline in Exhibit 2, 10 & 11. When referring to the footprint of the project, AWA Wind should indicate to which boundary they refer. As these outlines are different sizes, they affect the size of recommended buffer distances outlined in Service recommendations."

**Response 40:** The project boundary depicted in Exhibits 1, 3, 9, 12 and 11 is the boundary covered by the Site Permit. The Operational Project Boundary is depicted in Exhibit 2, 10 and 11. As stated in the ABPP, once the project has been constructed, the Operational Project Boundary will become the only project boundary. The Site Permit will be modified so the only project boundary is the Operational Project Boundary. Accordingly, the Operational Project Boundary is the boundary that should be used by the USFWS.

**USFWS Comment 41:** "Appendix C: Bald and Golden Eagle Protection Act (BGEPA): 'If the USFWS determines that take is not likely to occur, they may issue the permit if specific permit issuance criteria are met.' Service Comment: As stated in the September 23, 2011, Service letter to Westwood, the Service will not recommend permits where take is unlikely. Permits are recommended when take is likely. Permits include avoidance and minimization measures to reduce the take to an acceptable level.

**Response 41:** The ABPP has been revised to remove the language of concern.

**USFWS Comment 42**: "Appendix E: Summary of Agency Coordination to Date: 'Over the summer and fall of 2010, Westwood prepared a pre-construction avian survey and risk assessment report…which were provided to USFWS and MDNR on October 10, 2010.' Service Comments: The avian risk assessment report was provided to the Service in October 2010; however, survey work is documented as occurring in April and May of 2010. The report provided to the Service was dated July 19, 2010."

**Response 42:** The USFWS comment does not indicate any error in the language contained in the ABPP.

**USFWS Comment 43:** "Appendix F: Minnesota DNR Fatality Monitoring Report Forms. Service Comments: Forms should also include injuries, as well as fatalities. Please also include date of Service notification on the forms. The Service also recommends providing copies of the Wildlife Incident Reporting Form (Appendix H) to interested landowners; many landowners will likely perform their own carcass searches, and using the same form will help to keep data consistent."

**Response 43:** The report forms supplied in Appendix F of the ABPP are MDNR forms. Rather than modify the forms, we have added language in the ABPP indicating that these forms will be used to report injuries as well as fatalities. The Wildlife Incident Reporting Form already covers fatalities and injuries and has been modified to include a blank for USFWS date of notification. The ABPP has also been revised to indicate that participating landowners will be provided copies of the Wildlife Incident Reporting Form for submission to AWA Goodhue if fatalities or injuries are observed.

**USFWS Comment 44:** Appendix G: Eagle Collision Risk Modeling – 2011 Breeding Season Data. Service Comments: Please see comments on p. 24: 7.2, where the Service requests that FWS collision model data also be included.

**Response 44:** See Response 15.

**USFWS Comment 45:** "Finally, please note that the State's approval and implementation of the project proponent's ABPP shall not limit potential conditions, Best Management Practices (BMPs), and/or Reasonable and Prudent Measures (RPMs) to be utilized in future eagle or any federally listed species Incidental Take Permits."

**Response 45:** The ABPP has been revised to state that MPUC approval of the ABPP under state law does not constrain the USFWS from adding different conditions to an ITP.

We hope the foregoing discussion resolves the comments submitted by the USFWS and look forward to ongoing coordination during the ITP process for the AWA Goodhue wind project.

Best regards,

WESTWOOD PROFESSIONAL SERVICES

Ronald P. Peterson, JD
Technical Director, Environmental Services

cc. Jamie MacAlister - DOC-EFP
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January 24, 2012

**VIA EMAIL AND U.S. MAIL**

Ms. Jamie Schrenzel
Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155

**Re: Responses to MDNR Comments**
**Avian and Bat Protection Plan & Acoustic Bat Monitoring**
AWA Goodhue Wind Farm
Goodhue County, Minnesota
File No. 20081147
PUC Docket No. IP-6701/WS-08-1233

Dear Jamie,

This letter responds to your January 12, 2012 letter commenting on the Avian and Bat Protection Plan and Acoustic Bat Monitoring for the AWA Goodhue Wind Project. Our responses are as follows:

**MDNR Comment 1:** "3.1.4 Bat Special Condition: As detailed in the ABPP and the Bat Monitoring Report, the Site Permit Section 13.1.2 states "The Permittee shall install a minimum of two Anabat detectors on each temporary or permanent meteorological tower…One Anabat detector on each meteorological tower shall be mounted at 5 meters,…one at rotor swept area." The DNR understand that currently there is one temporary meteorological tower within the project boundary which is why two Anabat detectors were used in the 2011 bat surveys. However, page 54, Section 9.2.3.2 Bats, states that "Anabat data collection will occur…on one or two permanent met towers from May 1 to November 15, 2012." AWA Goodhue, LLC proposes to construct two permanent meteorological towers (Section 1.1). According to permit language, the Anabat detectors for the 2012 bat survey season should be placed on both permanent meteorological towers and temporary meteorological towers. The DNR further suggests that if feasible, the temporary meteorological tower be placed in an area that is more representative of bat habitat. In addition to adhering to the Site Permit, having multiple Anabat detectors would reduce the chance of completely losing blocks of recording time due to equipment malfunctions."

**Response 1:** As stated in the ABPP, there will be one or two permanent meteorological towers installed on the project site. At the time the permanent towers are installed, the temporary tower will be removed. The number of Anabat detectors installed for the

duration of the May 1 to November 15, 2012 survey period will depend on the construction schedule. However, AWA Goodhue will install two Anabat detectors on each permanent meteorological tower constructed on the site. AWA Goodhue will endeavor to ensure that consistent data is collected throughout the survey period, acknowledging that the temporary meteorological tower may need to be removed after installation of the permanent towers, even if this occurs prior to the November 15, 2012.

**MDNR Comment 2:** "The 2011 bat survey data resulted in a total of 2,188 bat passes, 33.18% of which were unknown calls that were excluded from the species composition results. Removing these calls from the species composition results is misleading. The unknown calls should be included in the analysis: however, the ABPP and Bat Monitoring Report should include a discussion on why there was such a high number of unknown calls and how the 33.18% of unknowns affects the interpretation of the results. The height the majority of the unknown calls occurred at is also unclear. It is also important to note that this information was not included in the Executive Summary of the Bat Monitoring Report in the summary of the species composition results which are presented in table format."

**Response 2:** We excluded the unknown calls from the species composition results because their species composition was unknown. Response 3 below shows how the scientific literature (Betts (1998)) validates the approach used in disclosing unknown bat calls recorded at the project site.

Note that unknown calls were included in the bat report and the overall analysis and were excluded only from the species composition analysis. Table 3 on page 19 of the 2011 Pre-Construction Acoustic Bat Monitoring report, filed on the MPUC docket on December 15, 2011, shows that unknowns included 106 of 392 (27.04%) calls recorded at 45 m, 620 of 1,796 (34.52%) calls at 5 m, and 726 of 2,188 (33.18%) calls overall. As clearly shown, the majority of unknown calls occurred at 5m.

The 2011 Pre-Construction Acoustic Bat Monitoring report also discussed the occurrence of unknown calls on pages 8-9:

> "Calls classified as unknown included fragmentary calls and files with solely non-search phase calls. Unknown bat calls occur in every acoustic study of bats, but they often are not reported. Such unknown calls are typically excluded from analysis in the scientific literature because they cannot be effectively analyzed (Britzke et al. 2011; Gruver et al. 2010). However, they are included here in the interest of full disclosure because they provide an indication of bat activity. In the results that follow, relative proportions of species and species groups are based on the bat passes that were classified to species and species groups."

**MDNR Comment 3:** "It is difficult to distinguish between silver-haired bats and big brown bats and between northern long-eared bats and little brown bats, yet bat passes are

positively identified to each of these four species. The document(s) should provide some justification for these positive ids. In particular, it is notable that there are a low number of big brown bats compared to silver haired bats. Big brown bats are much more numerous in Minnesota: it is likely that the silver-haired bats were misidentified unless the met tower was located in a flyway corridor."

**Response 3:** Bat species typically have some unique echolocation calls and some echolocation calls that overlap in characteristics with other species, depending on their environment, behavior in pursuit of prey, and other factors. As stated on page 7 of the Pre-Construction Acoustic Bat Monitoring report:

> "Some bat passes were classified as unidentified. Unidentified bat passes include files with fragmentary calls and files with solely non-search phase calls (i.e., approach, feeding buzz, social). Unidentified calls can occur frequently as a result of bats of different species that have similar body sizes and call characteristics (Jones 1999), and bats of a single species whose call characteristics vary with their behavior (Hayes 2000). Furthermore, echolocation calls of bats differ from bird songs in that bats have similar calls to detect prey, whereas birds have diverse calls for courtship and breeding purposes (Barclay 1999). Thus, similar calls exist for similar sized bats active in similar environments. For example, a bat pass composed of 2 call pulses could be produced by 4 or more species. One such fragmentary bat pass around 40 kilohertz could be produced by many Myotis species, tri-colored bats (Perimyotis subflavus), or eastern red bats."

Overlap in echolocation call characteristics of Big Brown and Silver-haired bats is well documented (see Betts, B.J. 1998). Effects of Interindividual Variation in Echolocation Calls on Identification of Big Brown and Silver-Haired Bats. J. Wildlife Management. 62(3):1003-1010). Betts (1998) stated that:

> "Intraspecific variation in search-phase echolocation calls has been documented in several species and related to differences in age, sex, location, habitat, and social context… My data on the amount of overlap in the parameters of 2 supposedly distinguishable species suggest attempting to identify every call sequence probably introduces error. Researchers need to report information on numbers of call sequences left unidentified so that readers can properly evaluate reported data."

Acoustic echolocation call analysis for Goodhue was provided by Rogelio (Roger) Rodriguez. Roger has 14 years of experience conducting ecological studies of bats throughout the United States, Canada, Central America, South America, and Micronesia (Mariana Islands). He has extensive experience in developing and implementing bat monitoring plans using live capture, acoustic monitoring, and telemetry methods.

**MDNR Comment 4:** "The missing bat survey data from late August through September is unfortunate. The DNR recommended dates for monitoring are July 1st through October 15th. The majority of season in which ideal monitoring results could have collected was missed. The 2012 proposed bat survey is proposed to occur May 1st through November 15th which will capture that time period; however comparative data between the years will be lacking."

**Response 4:** We agree that the problems with Anabat units writing data to the CF memory cards are unfortunate. However, the Anabat units recorded bat data at 45m during August 31-September 17 and at 5m during August 1-September 2 and again during September 16-30. As stated in the 2011 Pre-Construction Acoustic Bat Monitoring report:

> "The Anabat unit was unable to write bat data to CF memory cards during the first three of the four problem periods. Westwood and ZotzEco coordinated with Titley Scientific to diagnose this and related data issues on similar projects. Titley staff indicated a new, more robust version of firmware is expected to resolve data writing problems in the future."

**MDNR Comment 5:** "5.1 Bald Eagles: The ABPP acknowledges additional reports of eagles nests and includes additional locations of nests. The DNR has received reports from local citizens of additional nests and citizen reports indicate a possibility of 6-7 nests producing fledglings. The ABPP includes a report of one nest in the footprint being active, and two in the buffer, and does not include information on whether nestlings were fledges. The DNR encourages the Department of Commerce, Energy Facility Permitting (EFP) to coordinate with the United State Fish and Wildlife Services (USFWS) regarding these varied reports."

**Response 5:** AWA Goodhue has not received any information from the MDNR regarding the citizen reports cited in the comment and requests that the MDNR supply that information. We also request that the MDNR consider this request as ongoing so that all future reports of eagle nests near the AWA Goodhue project area are passed on to us in a timely fashion. On January 16, 2012, an email was sent to the USFWS and MDNR with a map depicting known and reported nests within 10 miles of the Operational Project Area. The USFWS has confirmed that they are not aware of any nests that are not depicted on the map we supplied. To date, we have not received any replies from MDNR staff.

The survey protocol, which was recommended by the USFWS, did not include determining how many young fledged from each active nest. However, we will include this information in our 2012 breeding season survey report.

**MDNR Comment 6:** "The ABPP indicates that the eagle nest in T11, R15, S27 is inactive, yet it is also states this nest was built in 2011. It is unclear how a nest can be designated as inactive in the same year it was built. This statement should be corrected or clarified."

**Response 6:** The statement is correct, and the situation at this nest is described in detail on pages 7 and 8 of the ABPP. As described in the ABPP, two adults were engaged in nest building activity early in the breeding season but they subsequently stopped attending the nest. No eggs were laid. The USFWS defines an inactive nest as "…a bald eagle or golden eagle nest that is not currently being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days immediately prior to, and including, at present" (50 CFR §22.3). The nest southeast of Goodhue met this definition in 2011.

**MDNR Comment 7:** DNR staff observed an adult eagle sitting in a nest located off 215th Ave (T111, R15, S27) during a site visit on December 29, 2011. The nest was reported as inactive by Westwood.

**Response 7:** As stated in Response 6, the adult eagles observed during the summer of 2011 ceased nest building activities, stopped attending the nest and laid no eggs. MDNR's observations on December 29, 2011 were well after the end of the 2011 breeding season. While the 2012 breeding season has not yet begun, we have been observing eagles attending nests around the project area throughout the fall and into the winter. This may be due to the mild winter (to date) and the ready availability of food resources. We will check on the status of this nest in the spring of 2012. It should be noted that this nest lies outside the eagle survey area recommended by the USFWS, which is the Operational Project Area plus a two mile buffer.

**MDNR Comment 8:** "5.1.2 Eagle Movements: The DNR encourages discussion of flight paths in project planning for wind energy projects. It should be noted, however, for Exhibits 5-8, information such as eagle heights and coverage in the detail shown is questionable without the use of monitoring device. For example, it would be difficult for an observer to determine the reliable accuracy whether a bald eagle was flying within 100 meters of a turbine within the rotor swept zone without a reference point marking the turbine locations. It would also be difficult to accurately observe and report from a roadside point in rolling terrain for flights as far as ¾ miles away. The report included a note on these exhibits and rightly indicated caution in interpretation. Though a discussion of estimated flight paths is helpful, these practical limitations should be considered and included with the results discussions.

**Response 8:** The survey methods used were those recommended by the USFWS and are standard practice in the industry. Other than radio telemetry equipment, we are not aware of any monitoring device that would facilitate the tracking of eagles. We offered to radio tag some of the resident breeding eagles to better track their movements but this suggestion was not accepted by the USFWS. We believe the cautionary notes on the exhibits are sufficient to indicate that all mapped horizontal and vertical positions of flying eagles are estimates.

**MDNR Comment 9:** "5.1.3.1. Migration/Breeding Surveys: This section indicated the point count surveys were compromised by a baiting program. Documentation from the Board of Animal Health (BAH) or from the DNR indicating a baiting program has not been included in the report. Staff discussions with conservation officers in the area indicate that there is no known movement of deer carcasses for the purpose of baiting eagles occurring within the project footprint. It is also notable that if baiting were occurring, there is no specific regulation DNR reviewer have been able to identify disallowing eagle baiting specifically, though there may be applicable regulations related to disposal of farm animals. Minnesota baiting laws refer primarily to baiting game species. Also, the understood purpose of surveying for avian activity is to determine species presence and level of activity. Results should be reported for agency review regardless of the reason a species is present. In addition, if the presence of a road kill or properly or improperly handled deceased farm animal is affecting data, this should be documented and noted within the presentation of all data.

**Response 9:** Detailed documentation of baiting activity was supplied in the 2011 Fall Migration Survey report, filed with the MPUC on January 17, 2012. We are concerned that this comment unintentionally encourages the artificial feeding of eagles, which is discouraged by the 2007 USFWS Bald Eagle Management Plan. Conservation Officer Tyler Quandt was contacted several times by email and provided evidence of road killed deer being relocated without a permit. We also had a telephone conversation with him but, to our knowledge, the matter was not investigated by the MDNR. It is our understanding that picking up and moving a road killed deer requires a possession permit from the MDNR. While the MDNR may not have any regulations prohibiting the artificial feeding, the agency does have regulations regarding the possession of road killed deer carcasses. As recommended by the MDNR, all eagle flight data has been reported and utilized in eagle collision risk modeling. For comparison purposes, collision risk modeling has been done with data affected by artificial feeding activities omitted.

**MDNR Comment 10:** "5.1.3.2 Winter Aerial Surveys: Westwood indicated they will follow USFWS survey protocol including a minimum helicopter flight heights. The DNR has received reports from citizens that helicopters may be flying lower than what is recommended by USFWS survey protocol. It is understood that the Federal Aviation Administration has been informed of the possibility of lower than recommended or required flight heights. This information is being provided to inform other necessary agency coordination or action, as this topic is not within the jurisdiction of the DNR.

**Response 10:** During helicopter surveys in November and December, an altitude range between 200 and 700 feet was maintained in accordance with USFWS survey protocols. The helicopter only dropped below 200 feet where necessary to confirm the presence of artificial feeding. At no time did the helicopter drop below 200 feet in the vicinity of farmsteads or livestock enclosures. We are aware of no complaints from the November flight but a number of complaints were filed after the December flight. The flight protocol was modified in January to maintain a minimum altitude of 500 feet. We are aware of no

complaints being filed after the January flight. Please note that the FAA has no altitude minimum for helicopters.

**MDNR Comment 11:** "No data has been submitted to date for flights that were to occur in November 2011. This data may inform the ABPP or coordination between the company and the USFWS. The DNR would also appreciate the opportunity to review avian survey data."

**Response 11:** The 2011 Fall Migration Survey report was filed with the MPUC on January 17, 2012.

**MDNR Comment 12:** "5.1.3.3 Winter Ground Surveys: The ABPP seems to communicate that eagles are using the project area primarily due to carcass dump sites, garbage dumps, and promiscuous ice fishing. Though this information is notable because it may explain certain use areas within the project area, it should not be considered a reason for disregarding eagle activity data. It appears that eagles are present in the project footprint and they are actively using a large portion of the area. The focus should be on applicable federal protections and minimization of impacts."

**Response 12:** We acknowledge that eagles use the project area under natural conditions. However, the degree of artificial feeding observed was sufficient to affect their movement patterns, particularly during the fall migration. We would be remiss if we had not documented this activity and endeavored to determine how our data was being affected. As stated in Response 9, all eagle flight data has been used in our collision risk calculations, regardless of whether artificial feeding was involved. However, for comparison purposes, we did run the collision risk model with the bait-affected data removed.

**MDNR Comment 13:** "5.3 Trumpeter Swans: It should be noted that the trumpeter swan nest is located within the 2 mile buffer of the project footprint. The ABPP indicated that this nest will be observed in the spring of 2012 to check for activity, and if there is activity Westwood will monitor the nest up to 4 times during the breeding season to document bird movements. Swans will not likely move substantially during the breeding season. The most appropriate time to conduct swan observations would be over each of the seasons including breeding, summer post fledgling, and fall migration to understand swan movements. This would provide a better understanding of swan usage of the area. Usage information collected should be relative distance from the nest site as identified by landowner property being used, type of habitat being used and time of year."

**Response 13:** The ABPP has been revised to add that surveyors engaged in point count surveys will document any observed trumpeter swan movements during other seasons of the year. During 2011 fall migration point counts, no trumpeter swans were observed at the turbine cluster closest to the documented swan nest.

**MDNR Comment 14:** "6.1 Number/Selection of Turbines for Monitoring: The project developer is proposing to conduct fatality monitoring on turbines in closest proximity to woodlands and/or wetlands for the most suitable avian and bat habitat. A discussion of how this data could be compared to pre-construction bat data should be included."

**Response 14:** The ABPP has been revised to indicate that the results of bat fatality monitoring will be compared to bat numbers and species documented during pre-construction surveys.

**MDNR Comment 15:** "7.2 Bald Eagle, Page 25: Westwood indicates they cannot predict the collision risk for bald eagles using the USFWS recommended model because of the eagle baiting program. As mentioned before, there does not seem to be documentation that the incidences of carcass presence in the project area or the removal of a road kill to a ditch constitutes an intended baiting program by residents. It is currently unclear if anything improper has occurred because there is no documentation of any violation of regulations. It is also unclear whether, if there was documentation of any improper handling of carcasses, that this activity should be interpreted as an organized program to bait eagles. DNR staff familiar with the Goodhue Wind Project area indicated that if carcasses were regularly left in fields, it would likely not draw birds from a significant distance, but may concentrate local birds in areas within the project footprint instead of being dispersed in the project footprint. The extent or reality of any baiting seems unconfirmed and the relevance to federal laws regarding a possible eagle take seems questionable. Therefore the DNR recommends that any collision modeling requested by the USFWS be completed and results provided to reviewing agencies."

**Response 15:** The 2011 Eagle Fall Migration Survey Report, filed with the MPUC on January 17, 2012 provides: (1) detailed documentation of the observed baiting activity; (2) eagle flight survey results both with and without baiting-affected data and (3) collision risk modeling both with and without baiting-affected data.

**MDNR Comment 16:** "As wind projects are developed in Minnesota and eagle populations recover, the possibility for eagle presence at sites with farming activities, ice fishing, or occasionally presence of road kill carcasses seems likely to be a relatively common situation. Recent review efforts for projects with eagle presence tended to focus on verifying species presences, observing behavior and discussing impact minimizing efforts. Any precedence set of reviewing minimization or mitigation proposals differently because of farming activities, ice fishing, or road kill may be a difficult approach to take consistently in Minnesota."

**Response 16**: See Response 15.

**MDNR Comment 17:** "The DNR does not recommend the removal of perches or woody cover to reduce prey. The DNR also does not recommend altering the local habitat features to reduce use by one species. In order to significantly reduce usage by area

wildlife, substantial habitat alteration may be necessary, which is not recommended. It is also unclear if measures are proposed for the life of the project."

**Response 17:** This adaptive management measure is based on the 2011 USFWS Draft ECP Guidelines, which on page 69 includes the "[r]emoval of artificial and/or natural habitats attracting prey" as an advanced conservation practice (ACP) to minimize the potential eagle collisions. It is very unlikely that AWA Goodhue would ever employ this measure, but it has been included in the ABPP so that all possible ACPs are available should they ever be needed.

**MDNR Comment 18:** "Curtailment should allow for the option of complete shutdown of a turbine if deemed necessary by the Department of Commerce, considering review of wildlife agencies."

**Response 18:** The ABPP has been revised to clarify that a turbine curtailment, subject to the limits and conditions within an ITP, is an option if other adaptive management measures are found ineffective.

**MDNR Comment 19**: "7.3 Loggerhead Shrikes: The DNR appreciates efforts made to avoid quality loggerhead shrike habitat. If there are any changes to turbine layouts, these should be reviewed by wildlife agencies to discuss continued efforts to avoid loggerhead shrike habitat."

**Response 19:** While no further changes to turbine locations are anticipated, if any do become necessary, we will confirm with the MDNR that loggerhead shrike habitat will not be adversely affected.

**MDNR Comment 20:** "Section 7.3 states: 'The AWA Goodhue team found no literature or documentation supporting the assertion that shrikes will avoid wind turbines, resulting in displacement of shrikes from suitable habitats.' Though this statement, taken literally, seems accurate, it could be misleading because it may imply that a body of research exists regarding avoidance of turbines by loggerhead shrikes. It is the understanding of the DNR staff that this is a new area of research. DNR recommendations regarding this state-listed threatened species have been relatively precautionary due to the lack of existing data regarding wind energy impacts on loggerhead shrikes and due to the rare status of the species.

**Response 20:** We acknowledge that there is no research on how loggerhead shrikes respond to the presence of wind turbines and believe this statement remains accurate.

**MDNR Comment 21:** "7.5 Bats: The report states that AWA minimize potential effects on bats by siting turbines away for woodlands wherever practical. Though any avoidance measures taken during site planning are appreciated and encouraged, for this site, turbines are currently planned to be located next to a large wooded area. Turbines 1-9 are located

about 200 meters or less with some turbines along the wood line. This wooded area was discussed in a DNR comment letter dated October 24, 2008 as an area that "may have conservation value at the local level as habitat for native plants and animals…" and should be considered during project design and implementation.

**Response 21:** The AWA Goodhue project is subject to many constraints that limit the number of potential turbine locations within the project area. Turbine siting has been done in a fashion that avoids large wooded areas to the extent practicable. Turbines 1-9 have been placed as far from the cited wooded area as other constraints will allow.

**MDNR Comment 22:** "8.1.2 Construction: Though the DNR has no specific comments on this topic, reviewers note that the report does not acknowledge any potential impacts to NRCS/SWCD structures (retention ponds, grassed waterways, terraces, etc) know to occur in the project vicinity with turbine or road access placement. These structures were put in place with federal funds and have protection on them in the sense that the landowner is liable for any action that may damage or compromise the effectiveness of these structures. This information may be useful for the EFP staff or the project developer when ensuring compliance with various regulations."

**Response 22:** The AWA Goodhue project has been designed to avoid adverse impacts to the functions served by NRCS/SWCD funded structures. Coordination will be undertaken with each agency prior to construction to ensure that soil and water conservation structures have been adequately protected in the project design.

**MDNR Comment 23:** "8.2.1.1 Turbine Siting: some uncertainty regarding the number of active bald eagle nest seems apparent. Therefore, it is not currently clear if all active bald eagle nests have been avoided. The project developers state that a 1 mile setback from eagle nests will be included in project planning. It appears that one active nest in the footprint is within one mile of a turbine (turbine 37). This comment applies to Section 8.2.2.2 language used as well. It also appears that there are two eagle nests within 1 mile of turbines 26, 27, 29, 30, A52 as depicted on the provided Exhibits. If the two red dots, named alleged eagle nests on the western side of the footprint (Exhibit 3) are actually active eagle nests, they are well within 1 mile of a turbine (turbines 26, 27, 29, 30, A52).

**Response 23:** There is no uncertainty regarding the number of active bald eagle nests. The ABPP incorrectly stated that no nests were within one mile of a turbine and an errata statement was filed with the MPUC on December 28, 2011 indicating that the correct distance was 0.86 mile. All other nests are more than one mile from the nearest turbine. The red dots on the map were nest locations alleged by citizens but were found not have a nest when investigated in the field. The Operational Project Area and a two-mile buffer around it have been surveyed from the air in November and December of 2011 and January 2012. No new nests have been observed within the Operational Project Area, including in the locations marked by red dots on the map.

**MDNR Comment 24:** "8.2.1.3 Food Base Management: The ABPP states that the USFWS recommended food base management. It is not clear if this recommendation is an option included in guidance documents or a specific recommendation for this site. The DNR has concerns regarding the impact of food based management on other species, including the state-listed threatened loggerhead shrike. Prey for the loggerhead shrike includes rodents. Activities that might reduce rodent presence could negatively impact food sources for shrikes.

**Response 24**: Various elements of food base management are included as ACPs in the 2011 Draft USFWS ECP Guidelines and have been included as options in the ABPP. However, the primary focus of AWA Goodhue's food base management program is controlling the artificial feeding of eagles and rapidly removing other food sources that put eagles at risk of a collision. For example, rapid removal of road kills within the Operational Project Area would benefit eagles by reducing the potential for turbine and vehicle collisions.

**MDNR Comment 25:** "Species of Greatest Conservation Need have also been observed within the project footprint. A plan to restore native habitat could affect these other species."

**Response 25:** This comment is unclear, as the species of concern are not named. Accordingly, we cannot assess how activities associated with the AWA Goodhue project might relate to such species.

**MDNR Comment 26:** "Nesting platforms have not been found by DNR staff to be successful for eagle in southeastern Minnesota. Construction of these nest structures requires monitoring and maintenance. If this mitigation were to be used, this monitoring and maintenance should be described."

**Response 26:** This comment is a holdover from an earlier draft of the ABPP. Nesting platforms for bald eagles are no longer included as a management measures in the ABPP.

**MDNR Comment 27:** "8.4.1.1 Turbine layout revisions: Text indicated turbine 16 was eliminated, but the numbered bullet points to not concur that this turbine was eliminated, nor does the map in Exhibit 12. The more detailed maps show elimination of Turbines 16 and 28, but don't show movement of Turbine 6. Maps should be reviewed for accuracy and to ensure compliance with permit conditions regarding avoidance of loggerhead shrike habitat."

**Response 27:** As shown on Exhibit 13 of the ABPP, Turbine 16 was dropped to avoid loggerhead shrike habitat. Turbine 6 was moved for the same reason. The source of confusion may be that, once the turbine layout was finalized, the turbines were re-numbered at the request of DOC-EFP staff.

**MDNR Comment 28:** 8.6.1 Raptor Nests: As discussed above, the DNR does not support habitat modification as a mitigation method to minimize an area's attractiveness for nesting.

**Response 28:** As stated in the ABPP, coordination will be undertaken with USFWS and MDNR to determine the best approach to protecting raptors that may establish new nests in close proximity to turbines. No habitat modification would be undertaken unless it was deemed acceptable by the agencies during this coordination.

**MDNR Comment 29:** "8.7.1 Bats: The ABPP includes an assessment that woods in the project vicinity are not large enough to appear on land cover mapping. This assessment seems incorrect. Exhibit 16 is a USGS cover map and it shows forested cover. Though forested blocks are relatively small, they still provide important wildlife habitat. More discussion of why avoiding forested blocks was not practical should be included, particularly for Turbines 1-9."

**Response 29:** The point being made in the statement in section 8.7.1 is that the percentage of the project area that has forest cover is slightly larger than 4 percent. It is not being suggested that smaller wooded areas are not being avoided to the extent possible. With regard to the forested area near Turbines 1-9, see Response 21.

We hope the foregoing discussion resolves the comments submitted by the MDNR regarding the ABPP and acoustic bat monitoring for the AWA Goodhue wind project.

Best regards,

WESTWOOD PROFESSIONAL SERVICES

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# Avian and Bat Protection Plan

## AWA Goodhue Wind Project

Goodhue County, Minnesota

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Submitted in compliance with the
Minnesota Public Utilities Commission
Site Permit for AWA Goodhue, LLC
PUC Docket No. IP-6701/WS-08-1233
Permit Section 6.7 and Special Condition 13.1

~~December 15, 2011~~

Revised January 24, 2012

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# CONTENTS

## TABLES



## EXHIBITS

# APPENDICES

Appendix A: Site Selection Factors
Appendix B: Acronyms and Abbreviations Used in ABPP
Appendix C: Applicable Wildlife Laws
Appendix D: Biological Inventories
Appendix E: Summary of Agency Coordination to Date
Appendix F: Minnesota DNR Fatality Monitoring Report Forms
Appendix G: Eagle Collision Risk Modeling – 2011 Breeding Season Data
Appendix H: Wildlife Incident Reporting Form

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# 1.0 OVERVIEW

## 1.1 Project Description

AWA Goodhue, LLC (AWA Goodhue) received a site permit from the Minnesota Public Utilities Commission (MPUC) on August 23, 2011 to construct a 78 MW large wind energy conversion system in Goodhue County, Minnesota. The Project Area approved under the Site Permit covers approximately 32,684 acres (51 square miles) (**Exhibit 1**), which is mostly agricultural land. Upon completion of construction, the MPUC will amend the Project Area approved in the Site Permit to cover only the properties necessary for the efficient operation of the project. In this ABPP, we have referred to this final Project Area as the "Operational Project Area" for purposes of the ongoing wildlife survey work. The approximate boundary of the Operational Project Area plus a two mile buffer is depicted in **Exhibit 2**.

The Project has been revised to 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, 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 proposed has been reduced by shifting entirely to 1.6 MW machines. The four alternate turbine locations exist in case any proposed turbine locations are eliminated due to unforeseen constraints. The factors relied upon in selecting the site for the Project and developing the turbine layout are discussed in **Appendix A**.

## 1.2 Purpose of Avian and Bat Protection Plan (ABPP)

AWA Goodhue, LLC is committed to being a good steward of the environment and adhering to the law. As part of this commitment, AWA Goodhue has developed an Avian and Bat Protection Plan (ABPP) for the AWA Goodhue Wind Project. This ABPP is the culmination of over three years of coordination between AWA Goodhue, DOC-EFP, MDNR and USFWS to adequately address wildlife issues. This coordination included ongoing telephone and email coordination, several comment letters and multiple meetings and/or conference calls.

The purpose of the AWA Goodhue ABPP is to provide a framework for fulfilling the conditions set forth under Section III.C.2 of the project MPUC Site Permit and for complying with other applicable federal and state laws. Specific objectives are to ensure that:

1. Avian and bat fatalities and secondary effects on wildlife are minimized at the AWA Goodhue Wind Project;
2. Project-related actions comply with federal and state wildlife regulations;
3. The wildlife-related conditions contained in the MPUC Site Permit (i.e. Sections 6.1, 6.7 and 13.1) for the Project are fulfilled;

4. Bird and bat injuries and fatalities are effectively documented, so as to provide the basis of ongoing development of avian protection procedures;
5. Ongoing surveys, monitoring and management efforts are undertaken to avoid and minimize adverse wildlife impacts throughout all phases of the project;
6. Adequate ABPP implementation training is provided to the Construction Contractor and Operations and Maintenance staff;
7. Coordination between AWA Goodhue, wildlife agencies, DOC-EFP and the MPUC is continuous and understanding is maximized.
8. Extensive, detailed records on pre- and post-operational eagle movements are compiled to inform future management decisions on the Project and facilitate the future refinement and validation of the USFWS draft risk assessment model for eagles.

### 1.3 ABPP Content

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

1. A white paper prepared by the U.S. Fish and Wildlife Service (USFWS 2010a);
2. Recommendations prepared by the Wind Turbine Guidelines Advisory Committee (WTGAC 2008a);
3. ABPPs prepared across the United States for other wind power projects;
4. Specific requirements set forth in the MPUC Site Permit;
5. Draft Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems issued by the MDNR;
6. Bald Eagle Conservation Plan Guidance issued by the USFWS; and
7. Extensive input and feedback obtained from the USFWS, MDNR and DOC-EFP through a series of written reviews and coordination meetings.

### 1.4 Acronyms and Abbreviations used in the Plan

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 B**.

## 2.0 APPLICABLE WILDLIFE LAWS AND GUIDANCE

A number of federal and state wildlife laws apply to the AWA Goodhue Wind Project and guided various aspects of this ABPP. These laws are summarized in **Appendix C**. Because the

MPUC Site Permit for the Project contains very specific conditions that are to be addressed in this ABPP, those conditions are set forth in detail in the next section. Also, the USFWS has recommended that AWA Goodhue apply for an Incidental Take Permit (ITP) under the Bald and Golden Eagle Protection Act (BGEPA). AWA Goodhue accepts this recommendation and will submit an ITP application after approval of this ABPP. The ITP process is discussed in **Appendix C**. AWA Goodhue will work with the USFWS to develop the appropriate terms of 111 the ITP and quantify the allowable take. AWA Goodhue acknowledges that approval of this ABPP by the MPUC does not constrain the USFWS from adding different conditions to an ITP.

# 3.0 MPUC SITE PERMIT COMPLIANCE

## 3.1 Site Permit Conditions Relevant to ABPP

### 3.1.1 Biological and Natural Resource Inventories

Section 6.1 of the Site Permit issued for the Project on August 23, 2011 requires that AWA Goodhue, in consultation with the MPUC and MDNR, design and conduct pre-construction desktop and field inventories to identify potentially affected native prairies, wetlands, and other biologically sensitive areas within the project area, and assess the presence of state and federal threatened, endangered, or special concern species. AWA Goodhue conducted a series of investigations that collectively represent a comprehensive inventory of the biological and natural resources in the project area. These investigations are summarized in **Appendix D**.

### 3.1.2 ABPP Preparation and Approval

Section 6.7 of the Site Permit requires that AWA Goodhue prepare an ABPP and obtain MPUC approval of the document prior to construction. Section 13.1 of the Site Permit sets forth ABPP Special Conditions relating to eagles, bats and loggerhead shrikes (described in more detail below). This ABPP has been prepared to address these permit conditions and respond to the significant input and feedback received from the USFWS and MDNR during the development and review of this document. The details of these conditions and the manner in which compliance will be achieved are discussed in more detail below.

### 3.1.3 Eagle Special Condition

Site Permit Section 13.1.1 states:

> "The Permittee shall develop a plan for monitoring Bald and Golden Eagle nest[1] sites near turbine locations and shall develop protocol to identify proposed point count locations, suggested count duration and

[1] Golden eagles do not nest in Minnesota (Mark Martell, Minnesota Audubon, Pers. Comm.)

> 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."

This ABPP sets forth the proposed protocol for conducting eagle point counts which are: (1) consistent with the project-specific input received from the USFWS; (2) exceed the recommendations set forth in the Draft Eagle Conservation Plan Guidance (USFWS 2011); and (3) comply with this special condition of the Site Permit. AWA Goodhue has initiated additional surveys recommended in supplemental recommendations provided by the USFWS in a letter dated September 16, 2011. These additional surveys include: (1) point count surveys conducted during the fall 2011 and spring 2012 migration periods; (2) monthly aerial surveys during the winter of 2011-2012 to search for Important Eagle Use Areas (IEUAs) and raptor nests and (3) bi-weekly driving surveys during the winter of 2011-2012 to search for and verify IEUAs. These additional surveys are described in more detail in Section 5.13. Seasonal and annual survey results will be reported to the MPUC and USFWS within one month of the completion of each round of surveys.

### 3.1.4 Bat Special Condition

Site Permit Section 13.1.2 states:

> "The Permittee shall install a minimum of two Anabat detectors on each temporary or permanent meteorological tower. Data should be collected, at a minimum, from July 15 to November 15, 2011, and May 1 to November 15, 2012. One Anabat detector on each meteorological tower shall be mounted at 5 meters above ground, and one shall be mounted as close to the rotor-swept area as possible. Additional monitoring or mitigation measures may be imposed based on results obtained from bat surveys. The Permittee shall submit the results of the 2011 monitoring by December 15, 2011 and the 2012 monitoring by December 15, 2012. Each report shall include an update on the status of the U.S. Fish and Wildlife Service potential listing of the Northern long-eared bat."

As described in Section 5.5 of this ABPP, two Anabat detectors were installed on a temporary met tower on site on July 22, 2011. Given that the Anabat permit

condition only became known on June 30, 2011, it was not possible to acquire the necessary equipment from Titley Scientific and have it installed and operational by July 15, 2011. To compensate for the seven day deficit at the beginning of the monitoring period, AWA Goodhue added seven days at the end of the period. Accordingly, these Anabat units will be monitored through November 22, 2011 and again from May 1 to November 15, 2012. Survey results will be submitted by the dates specified in this special condition and will include updates on the federal listing status of the Northern Long-eared Bat.

### 3.1.5 Loggerhead Shrike Special Condition

Site Permit Section 13.1.3 states as follows:

> "The Permittee shall avoid placement of turbines in areas identified as highly suitable or very highly suitable loggerhead shrike habitat. Alternate turbine sites are to be considered the primary avoidance strategy. If alternate sites cannot be utilized, the Permittee shall provide the Commission and DNR with a Loggerhead Shrike Protection Plan for approval by the Commission detailing why avoidance is not possible, outlining strategies to minimize effects to Loggerhead Shrike, and providing mitigation measures for impacts. Permittee shall conduct two years of post-construction fatality monitoring to evaluate the impacts of wind turbines sited in loggerhead shrike habitat determined to be highly to very highly suitable."

The turbine layout has been modified so that all 48 proposed turbine locations and all 4 alternates are in locations that the MDNR concurs are not of concern with regard to loggerhead shrike habitat. In comments dated September 21, 2011, the MDNR indicated as follows:

> "DNR staff have reviewed AWA Goodhue 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 and included in the ABPP and associated aerial photography dated August 19, 2011 address DNR concerns regarding the location of turbines in highly suitable and very highly suitable habitat."

Based upon the above-quoted MDNR concurrence, AWA Goodhue has complied with Site Permit Section 13.1.3 in the siting of turbines and a formal, separate Loggerhead Shrike Protection Plan should not be required. However, two years of post-construction fatality monitoring will still be carried out for all avian and bat species, including loggerhead shrikes. Also, as requested by the MDNR in their September 21, 2011 comments, we have reviewed the current site plan to determine

which elements of project infrastructure aside from turbines would lie in highly suitable or very highly suitable loggerhead shrike habitat. The purpose of this review was to identify areas where construction is to be staged to avoid the shrike breeding period. The locations where shrike-specific construction staging applies are discussed in Section 8.4.2.

# 4.0 WILDLIFE AGENCY CONSULTATION AND INFORMATION SHARING

## 4.1 Consultation Efforts to Date

The current Project layout and this ABPP are products of a lengthy and involved agency coordination process. Consultation efforts to date are summarized in **Appendix E**.

## 4.2 Plan for Consultation, Information Sharing, and Reporting

AWA Goodhue will continue to work cooperatively with the USFWS and the MDNR during implementation of the ABPP, including sharing relevant, non-proprietary site data and pre- and post-construction study results. Specific reporting benchmarks and time frames are set forth in the ABPP implementation schedule provided in Section 9.0.

# 5.0 2011-2012 AVIAN AND BAT FIELD STUDIES

To provide context for the proposed field studies described in this ABPP, the following sections discuss surveys conducted earlier in 2011.

## 5.1 Bald Eagles

### 5.1.1 2011 Monitoring of New Eagle Nests

On May 2, 2011, Westwood received notification from interested parties of new bald eagle nests within or near the project footprint. On May 6, 2011, Westwood met with those parties in the field and confirmed these new nest sites. These additional nests are described as follows:

One new active nest was observed within the previously documented nesting territory about one mile south of the AWA Goodhue footprint on the North Fork of the Zumbro River in Section 23, Township 110, Range 16. The new nest is slightly farther from the project footprint than the previously documented nest that was active in 2010 (but found to be inactive in 2011).

One new active nest in a small woodlot in the northwest quarter of Section 30, Township 111, Range 15, about 1.25 mile west of the City of Goodhue. This woodlot was surveyed for raptor nests in 2010 and did not contain an eagle nest at that time; hence, this is a new nest that was established since 2010. The landowner was

contacted and he confirmed that this nest had been built in 2011. The nest is within the project footprint and about one mile northeast of the nearest proposed turbine;

One new nest in a narrow tree line in Section 27, Township 111, Range 15, about 3/4 mile southeast of the City of Goodhue. This nest is about 2.5 miles east of the project footprint and over 3.5 miles from the nearest proposed turbine. The landowner was contacted, and he confirmed that this nest had been built in 2011. As discussed below, this nest was under construction in 2011 but was later found to be inactive (i.e. 112 the birds building the nest subsequently abandoned it and no young were produced).[1]

On June 1, 2011, interested parties indicated by email as many as 12 alleged nests in and around the project footprint. A second field review was conducted with those parties on June 8, 2011 to confirm the reported nests but no additional nests were observed. Confirmed and reported but unconfirmed eagle nests are depicted Exhibit 113 3. As shown on **Exhibit 3**, there are currently four bald eagle nests within the Operational Project Area plus two miles. Three of these nests are active, and the fourth is inactive. **Exhibit 3** also shows the locations of two additional identified nests (one active and one inactive) that are more than two miles from the Operational Project Area.

On May 20, 2011, Westwood initiated nest monitoring at the two new bald eagle nests using the same techniques as for earlier nests. A total of 12.5 and 13 hours of observations were made at the nests west and southeast of Goodhue, respectively. The results of this monitoring are as follows:

#### 5.1.1.1 Nest West of Goodhue

During 12.5 hours of observation, 17 bald eagle flights were observed. Of these, 6 were short flights from the nest to a food source on ground about 20 yards from the nest (later confirmed to be a livestock carcass dump from an adjacent calving operation). The remaining flights were exercise flights, territory defenses, local flights between perches or likely trips to a natural food source to the south (e.g. the North Fork of the Zumbro River). Most of these movements were local flights within about ½ mile of the woodlot in which the nest was built and did not pass through any proposed turbine clusters. Three flights were observed where the eagle rode thermals to gain altitude and soared to the south or southeast. One of these soaring flights overflew the location of the proposed turbine cluster to the southwest but the eagle was well above the rotor swept zone during this overflight.

#### 5.1.1.2 Nest Southeast of Goodhue

During 13 hours of observation, 11 bald eagle flights were observed. Of these, four were short flights to or from the nest to a perch site behind the farmstead

[1] Note that both active and inactive nests are protected under the Bald and Golden Eagle Protection Act.

immediately to the east. This perch site overlooked a cattle yard and calving operation. The remaining flights were either exercise flights or likely trips to a natural food source along the Zumbro River. All but one of these flights were directly to the east or south and none were observed to be in the direction of the project footprint. During the initial observations on May 27, 2011, the birds were observed bringing in nest material. This would not be occurring if the birds were incubating eggs or tending to hatchlings. As of June 3, 2011, the birds were not observed during 7 hours of nest observations. We contacted the landowner, who said he had not seen the eagles in a week. When asked about the eagle's interest in his livestock operation, he indicated that he composted dead livestock and then spread the remains with his manure spreader. No eagles were observed during a follow up site visit June 8, 2011.

### 5.1.2 2011 Monitoring of Eagle Movements

On June 9, 2011, AWA Goodhue and Westwood participated in a meeting and conference call with staff from the DOC- 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 turbine cluster locations nearest to: (1) the Belle Creek nest; (2) the nest on the North Branch of the Zumbro River; (3) the nest west of Goodhue; and (4) a reservoir near the western edge of the project footprint (see Exhibit 3).

On July 29, 2011, the 2011 eagle monitoring data was discussed at a meeting between AWA Goodhue representatives, Westwood and staff from DOC-EFP, USFWS and MDNR. Based on the results through that date, the USFWS recommended that one monitoring location be shifted to the northwestern-most turbine cluster to determine whether eagles using the Belle Creek nest were flying through that area. Since July 29, 2011, 58 additional hours of bald eagle monitoring were performed, including 14.5 hours at this location.

Through 210 hours of eagle flight path monitoring at turbine clusters, there were no consistent flight patterns through the project area. Rather, eagles of the breeding community in the vicinity of the Project were observed in response to natural and likely artificial food sources within about half mile from proposed turbines, particularly at Clusters 2 and 3. As a function of minutes observed, this accounts for 0.08% of our total observation time (i.e. 0.0008 x total observation time), which assumes 210 observation hours or 12,600 minutes and a conservative 10-minutes of eagle movement in the RSZ and within ~~10~~100 meters of a turbine location. Generally, as the summer went on and breeding territories loosened after juveniles left the nest, we observed eagles more frequently at all turbine clusters, which was expected based on eagle breeding ecology.

#### 5.1.2.1 Turbine Cluster 1

During the 32 hours of monitoring in Cluster 1 June and July 2011, one eagle flight was observed. This observation was of an immature (2nd or 3rd year bird) riding thermals very high with a pair of Red-tailed Hawks (**Exhibit 4**). There were no flights below or within the RSH observed at this location. Additionally, the observed flight did not overlap the proposed turbine cluster.

#### 5.1.2.2 Turbine Cluster 1A

During 14.5 hours of monitoring in Cluster 1A in August 2011, four eagle flights were observed that included two adults and two juveniles (i.e., young of the year) (**Exhibit 5**). A portion of one flight was within the RSH and 100-meters of a turbine as a juvenile circled to gain altitude and lasted only a few minutes. As a function of approximate eagle flight distance, about 1.2% of observed eagle flights at this cluster were both within the RSH and 100-m of a turbine. Generally, eagles were observed riding thermals and soaring very high at this location.

#### 5.1.2.3 Turbine Cluster 2

Cluster 2 was monitored for 58.5 hours during June – August 2011. Fifteen flights were observed, all of which were adults (**Exhibit 6**). A portion of four flights was within the RSH while eagles gained altitude either to or from the reservoir. However, no observed flights at any altitude overlapped turbine clusters. Eagles were routinely observed flying to and from the Belle Creek Watershed reservoir from the north and are likely the Belle Creek nest pair. The Belle Creek Watershed reservoir is an entirely open water body with no emergent wetland fringe. The reservoir does contain fish and bald eagles have been observed capturing fish during low flights from various perches on the reservoir tree line. To date, none of the observed eagle movements associated with foraging at the reservoir were within 100 m of turbine locations to the west. The observed movements that were within the RSZ were associated with forested areas and ridges north of the Project Area between the nest and the reservoir and away from the nearest turbine locations, which are in crop fields to the east.

#### 5.1.2.4 Turbine Cluster 3

During 54.5 hours of monitoring in June – August 2011, 29 flights were observed around Cluster 3, including 26 by adults and 3 by juveniles (**Exhibit 7**). A portion of four flights were within the RSH as eagles gained altitude; however, none of these were within 100 meters of a turbine. As a function of flight distance, these flights represented about 9.7 percent of the observed eagle flights at this cluster. Portions of three low and direct flights overlapped the 100-meter radius of turbines but were below RSH. Generally, observed flights

at this cluster were low and local flights in the vicinity of a farmstead on the east side of 180th Avenue.

#### 5.1.2.5 Cluster 4

Cluster 4 was monitored for 50.5 hours during June – August 2011. Five flights of four adults and one juvenile were recorded (**Exhibit 8**). A portion of one eagle flight was within the RSH and 100-meter buffer of turbines while gaining altitude after harassing a Red-tailed Hawk. As a function of approximate eagle flight distance, about 0.89% of observed eagle flights at this cluster were both within the RSH and 100-meters of a turbine. Generally, observed flights at this location were very high soaring flights where the adults would drift north after gaining altitude over the North Fork of the Zumbro River (and out of our monitoring map extent).

### 5.1.3 Proposed 2011-2012 Bald and Golden Eagle Surveys

Based on the eagle nest and flight information collected during earlier survey work, and in compliance with Special Condition 13.1.1 in the MPUC site permit, AWA Goodhue has prepared an Eagle Conservation Plan as part of this ABPP. This ECP follows the recommendations presented in the USFWS 2011 Draft ECP Guidance and expanded upon in survey recommendations provided by USFWS in a letter dated September 16, 2011. The surveys being conducted are described below:

#### 5.1.3.1 Migration and Breeding Period Surveys

As recommended by USFWS, sixty minute point counts have been conducted 2 times per week during the fall 2011 migration period and will resume during the spring 2012 migration periods at five previously established survey locations plus a sixth location in the northeast corner of the Operational Project Area (**Exhibit 9**). In order to capture the migration periods for both bald and golden eagles, the survey periods will be from September 15 to December 15, 2011 and from February 1 to April 30, 2012. Coordination will be maintained with Hawk Ridge Environmental Center and the National Eagle Center to refine these date ranges according to actual conditions.

Point counts are being conducted in the same manner as earlier counts in 2011, except that surveyors are recording the amount of time spent by eagles along flight tracks within 800 meters of the observation point and up to 175 meters in altitude. Flight tracks are being broken out into segments observed to be below, within or above the RSZ. This will facilitate the application of an appropriate collision risk model. Flight tracks are being mapped on aerial photographs.

Point count surveys conducted to date during the fall of 2011 have been seriously compromised by an active baiting program being conducted by project

opponents. The full extent of the baiting program is unknown but data from at least two of the six observation points has been compromised by baiting activity. Both livestock carcasses and relocated road killed wildlife have been used in this effort. The Minnesota Board and Animal Health (BAH) has confirmed ~~that baiting with~~multiple incidences of improper livestock ~~carcasses is occurring~~disposal. BAH is continuing to investigate and may initiate enforcement action. The MDNR enforcement division has also been contacted regarding the relocation of road killed deer without a possession permit.

Point count surveys will be extended through the summer 2012 breeding season (i.e. until the end of July 2012) to cover movements associated with bald eagle nests active in 2012. It is anticipated that by the 2012 breeding season, road kill clean up and artificial feeding activity on and around the Project Area will be much better controlled than as of the date of this plan. Ongoing point counts will assist in evaluating the effectiveness of food base management measures in reducing eagle movements in close proximity to turbines.

#### 5.1.3.2 Winter Aerial Surveys

As recommended by USFWS, helicopter surveys will be conducted once per month from early November 2011 to early April 2012 to locate and document Important Eagle Use Areas (IEUAs; e.g. winter night roosts, communal foraging locations, nest territories) that might be located within or near the Project Area. The area to be surveyed will consist of the Operational Project Area plus a two-mile buffer. The March aerial survey ~~will be~~was to have been expanded to serve as the spring 2012 leaf-off survey for the nests of eagles, other raptors and colony nesting waterbirds (e.g. herons, egrets and cormorants). However, due to complaints filed by residents, survey flights are now being flown at an altitude of 500 feet or higher (see discussion of flight protocol below).

Because AWA Goodhue has found it necessary to maintain a minimum flight altitude of 500 feet to avoid citizen complaints, it will not be possible to conduct the March 2012 raptor nest survey from the air. The nests of raptors other than eagles (e.g. red-tailed hawks, great-horned owls, etc.) are too small to be effectively identified from that altitude. As was done in 2011, the March 2012 raptor survey will now be conducted from the ground. The March raptor nest survey will not be expanded geographically beyond the scope of the aerial eagle surveys. No heron or cormorant rookeries have been identified to date within or near the Project Area; the absence of such rookeries will be re-confirmed during ~~the~~ground and aerial surveys conducted in March and April 2012.

To avoid disturbance to nesting birds, aerial survey techniques will follow the USFWS Draft Eagle Conservation Plan Guidelines (2010) and the Post-Delisting Monitoring Plan for the Bald Eagle (2009). The helicopter will fly 18 north-south transects spaced ½ mile apart to allow each of two observers to observe a ¼ mile strip on each side of the aircraft (**Exhibit 10**). The helicopter

would fly at an altitude between 200 and 700 feet above ground level (AGL) and at a speed of 100 miles per hour or less. As stated above, a minimum flight altitude of 500 feet is now being maintained to avoid citizen complaints about low-flying aircraft. When nests or IUEAs are found, the helicopter will circle back and hover at an altitude high enough to minimize disturbance to any birds that may be present and the feature will be located with a sub-meter GPS unit deployed within the helicopter.

Data collected at each feature will include:

1. Type of feature (e.g. winter night roost, communal foraging location, nest);
2. If winter night roosts or communal foraging locations are found, the species of eagle (bald or golden), number, distribution and age classes of eagles observed;
3. For nests, occupied versus inactive, incubation and feeding activity of adults, number of eggs or eaglets; and
4. Any eagle flights observed to or from the feature.

#### 5.1.3.3 Winter Ground Transect Surveys

As recommended by USFWS, driving surveys are being carried out to further document the presence, characteristics and use of IEUAs in and within two miles of project area two times per month from early November 2011 to early April 2012. If wintering eagles are observed to have dispersed due to ice break up or an early spring, driving surveys may be ended before the first week of April. These surveys will conducted along a pre-defined route that covers the Operational Project Area plus a two mile buffer (**Exhibit 11**). Data to be collected during driving surveys will include:

1. Areas that have open water during cold weather that could serve as foraging habitat for wintering eagles.
2. 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).
3. Any observed eagle flights, including movements to/from any winter night roost locations that may be found.

#### 5.1.3.4 Monitor Satellite Telemetry and Winter Golden Eagle Survey Results from Minnesota Audubon & National Eagle Center

AWA Goodhue will continue to coordinate with and obtain updated data from the Minnesota Audubon and the National Eagle Center regarding golden eagles

that have been fitted with satellite telemetry equipment and are being monitored. Annual golden eagle survey results will also be obtained from the same sources. Any data that is relevant the Operational Project Area will be included with reports for AWA Goodhue's eagle monitoring and surveying activities.

## 5.2 Loggerhead Shrikes

Loggerhead shrikes are a state-threatened bird in Minnesota, a USFWS Region 3 Species of Concern, and are known to occur in Goodhue County. As part of its wind turbine siting process, AWA Goodhue designed and conducted a comprehensive loggerhead shrike habitat assessment, coordinated with wildlife agency personnel, and conducted multiple field investigations to identify, avoid and minimize impacts to loggerhead shrike habitat with its final turbine layout. As described below, a "coarse filter" habitat assessment was initially applied to rank each quarter section within the project area as to its suitability as habitat for breeding loggerhead shrikes. The classifications used were "Unsuitable", "Slightly Suitable", "Moderately Suitable", "Highly Suitable" and "Very Highly Suitable". Individual turbine locations were then subjected to a more refined "turbine-centered" habitat model and site-specific aerial photo analysis in coordination with MDNR. In some cases, individual turbine locations were also visited in the field with MDNR staff to confirm the presence/absence of shrike habitat components and ensure adequate separation between turbines and any such components. Consistent with MPUC site permit condition 13.1.3, AWA Goodhue has not sited any turbines in areas determined to be "Highly" or "Very Highly" suitable shrike habitat, as identified through the above-described iterative habitat assessment process.

### 5.2.1 Agency Coordination and Field Investigation

The AWA Goodhue project team coordinated with the MDNR to refine the turbine layout and avoid and minimize potential effects on loggerhead shrikes and their habitat. The AWA Goodhue team met with the MDNR and USFWS on February 2, 2010 to discuss the loggerhead shrike habitat assessment and other avian issues. The Loggerhead Shrike Habitat Assessment (Westwood Professional Services 2009) was submitted to the MDNR, USFWS, MDOC, and MPUC on October 10, 2010.

The AWA Goodhue team met with MDNR and MDOC staff on November 17, 2010 to address agency questions and concerns related to the results of the Loggerhead Shrike Habitat Assessment. The Goodhue team provided the MDNR with two handouts at this meeting: (1) quarter-section aerial photographs showing locations of turbines proposed in habitats ranked 3-5 (Suitable, Highly Suitable and Very Highly Suitable), and (2) a summary of the spatial habitat model, turbine siting, potential effects, and compatibility of wind energy with loggerhead shrikes. Discussion at this meeting focused on turbine locations, loggerhead shrike habitat, the availability of suitable unoccupied shrike habitat in Minnesota, and MDNR recommendations to MDOC regarding potential site permit conditions relating to loggerhead shrikes.

The MDNR team found the 1"=400' scale quarter-section aerial photographs showing turbine locations very helpful and agreed that most turbines in highly suitable quarter sections avoided high-value habitat components. The MDNR's concerns were narrowed to two turbines located in grassland within quarter sections ranked highly suitable for shrikes. The meeting attendees agreed to put the shrike discussion on hold and take no action related to shrikes until after the MPUC hearing on November 23, 2010.

Biologists from the AWA Goodhue team reviewed areas of highly suitable shrike habitat and proposed turbine locations in the field with the MDNR and USFWS on June 13, 2011. The biologists first reviewed a shrike siting location from the Minnesota Natural Heritage Program database. This sighting was recorded in 1996, was situated along a fence line in a pasture, and involved a shrike observed during the breeding season, but not nesting.

The biologists then reviewed turbine locations proposed in quarter sections ranked very highly suitable for shrikes and discussed potential effects on shrikes. MDNR staff indicated concern about turbines sited in grassland within highly ranked quarter sections, but had less concern regarding turbine locations surrounded by cropland within highly ranked quarter sections.

As an example, **Exhibits 12-15** shows a turbine cluster located in a quarter-section ranked "Very Highly" suitable. Turbine 16 was located in grassland, while Turbines 17 and 18 were located in cropland. During the field visit, MDNR staff continued to express concern regarding Turbine 16, but expressed no concern regarding the locations of Turbines 17 and 18.

During the field investigation, MDNR staff were primarily concerned about displacement of shrikes that may be caused by shrikes avoiding otherwise suitable habitat due to the presence of wind turbines. The AWA Goodhue team stated that available suitable habitat is not limiting shrikes in Minnesota, that there appears to be abundant suitable habitat in the project area that is not occupied by shrikes, and that the technical wildlife literature provides no direct evidence indicating that shrikes will avoid turbines in locations with suitable grassland, nest sites, and perch sites. The potential for shrike displacement from suitable habitats is discussed in more detail under the risk assessment (section 7.3).

After the field investigation, the MDNR conservatively advocated moving two proposed turbine locations out of high quality shrike habitat. As discussed under section 8.4.1.1, consistent with its efforts to avoid loggerhead shrike impacts, AWA Goodhue subsequently eliminated both of these turbine locations from its layout.

The June 13, 2011 field review demonstrated an inherent limitation in the quarter-section coarse filter habitat model. Although the model functions well for an initial

review, highly suitable quarter sections may contain as little as 50 acres of grassland that provides suitable shrike habitat, and up to 110 acres of annually-tilled cropland and woodland that is not suitable for loggerhead shrikes. Consequently, the review of individual turbine locations revealed that a more detailed turbine-centered habitat assessment was warranted.

#### 5.2.1.1 Turbine-Centered Habitat Model

AWA Goodhue discussed the development of a turbine-centered habitat model with MDNR endangered species permit coordinator Rich Baker on August 8, 2011 and presented a working draft of this model during a meeting with MDOC and MDNR on August 18, 2011. The draft turbine-centered habitat model applies rankings based on the proportion of grassland, proportion of cropland, and available perch sites and nest sites within 40-m radius (0.5 ha, 1.25 ac) circles and 200-m radius (12.6 ha, 31 ac) circles centered on proposed turbine locations. These circles correspond to the size of the rotor diameter of project wind turbines and large loggerhead shrike breeding territories, respectively.

The draft turbine-centered model was applied to the project layout on August 18, 2011, resulting in low loggerhead shrike habitat rankings for all but one turbine. This single turbine was eliminated from the project layout on August 19, 2011.

Following AWA Goodhue's August 18, 2011 meeting with MDNR, AWA Goodhue eliminated one additional alternate location that ranked as highly suitable habitat using the turbine-centered model. In addition, at MDNR's request, AWA Goodhue shifted the location of Turbine 6 to provide additional distance between the turbine and adjacent grassland.

In addition to reviewing the draft turbine-centered habitat model, the MDNR requested detailed aerial photography showing the location of all proposed turbines. AWA Goodhue provided the requested aerial photography showing proposed turbine locations to the MDNR and MDOC on August 21, 2011. The MDNR reviewed the revised layout and in its comments dated September 21, 2011, the MDNR indicated that AWA Goodhue's turbine re-siting efforts had addressed its concerns regarding shrike breeding habitat:

> "DNR staff have reviewed AWA Goodhue 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."

### 5.2.2 Inclusion of Loggerhead Shrikes in Point Count Surveys

Westwood will document all loggerhead shrikes observed during the 60-minute point counts and driving surveys conducted for eagles during 2011-2012. If loggerhead shrikes are observed during these point counts, they will be documented and reported.

### 5.2.3 Reporting Loggerhead Shrike Nesting Activity

If loggerhead shrikes are observed during any other surveys conducted during the breeding season, an effort will be made to locate and document the nesting territory associated with the observation. Loggerhead shrike observations that may occur incidentally during post-construction fatality monitoring will also be recorded and reported.

## 5.3 Trumpeter Swans

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 project footprint in Township 110 North, Range 16 West, NW ¼ of Section 8 (see Exhibit 9). This nest site is within the cattail fringe that surrounds this pond. On October 4, 2011, the MDNR reported that a dead trumpeter swan had been found near the Project Area 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.

The AWA Goodhue Project Area appears to encompass very little habitat potentially suitable for nesting trumpeter swans. Section 8.5 discusses typical trumpeter swan habitat and evaluates whether suitable trumpeter swan habitat characteristics exist within the site.

In conjunction with other surveys being done in the area, Westwood will visit this nest site early in the 2012 breeding season to determine whether this reservoir is used again for nesting. If so, Westwood staff will visit the site up to four times during the nesting season and spend one hour per visit to observe and document the movements of the adult birds. In addition, the eagle point count survey location south of Turbine 34 is in relatively close proximity to the confirmed nest location, and surveyors will note any flights from the nest into the project area observed from this or any other point count location throughout the year. Observations will be reported to the DOC-EFP, MDNR and USFWS at the end of the observation period.

127

## 5.4 Updated 2012 Raptor Nest Survey

An aerial leaf-off nest survey for bald eagles and other raptors will be conducted in March of 2012 in conjunction with winter aerial surveys for bald eagles.

## 5.5 Acoustic Bat Monitoring

MPUC Site Permit condition 13.1.2 requires the installation and monitoring of two Anabat® acoustic bat detectors (Titley Scientific Ltd.) on each meteorological (met) tower installed in the project area. These detectors are to be mounted at heights of 5 and 45 meters (the latter to detect bats in the RSH) and monitored from June 15 to November 15, 2011, and from May 1 to November 15, 2012. Due to the logistics involved in ordering and shipping the Anabat bat detectors from Titley Scientific following the June 30, 2011 MPUC hearing, it was not possible to acquire and install Anabat equipment by July 15. AWA Goodhue installed bat detectors and began monitoring shortly thereafter on July 22, 2011. Bat monitoring continued until November 22, 2011.

### 5.5.1 Bat Detector Installation

Two Anabat bat detectors were installed on a 60-meter tall temporary met tower in the northeastern part of the project area on July 22, 2011 (**Exhibit 16**). In 2012, Anabat equipment will be installed in April to allow monitoring for the full field season. It is anticipated that the temporary met tower will be replaced with a permanent met tower during 2012 construction. Once constructed, the permanent met tower will be outfitted with Anabat acoustic monitoring systems and the temporary met tower will be removed.

The Anabat units are connected to Anabat microphones that are installed on the met towers at heights of 5 and 45 meters with cable-pulley systems. The microphones are encased in "bat hats" that are fabricated from PVC pipe and other materials to protect them from inclement weather (Arnett et al. 2006). Anabat units, batteries, and memory cards are stored approximately 4 feet above ground level inside weather-tight containers.

Acoustic monitoring is being conducted from July 22 to November 22, 2011 to cover the late summer resident period and the full fall migration period. Acoustic monitoring will be conducted from May 1 to November 15, 2012 to cover the spring migration, summer resident, and fall migration periods. Anabat units are programmed to turn on each night approximately a half-hour before sunset and turn off each morning approximately a half-hour after sunrise. The Anabat detectors are adjusted to a sensitivity level between 6 and 7 to reduce interference from other sources of ultrasonic noise such as insects and raindrops.

A technician visited the Anabat systems once approximately every two weeks during the monitoring period to change out batteries and retrieve and replace memory data cards. Batteries and memory cards were replaced weekly during the first four weeks of bat monitoring to help ensure quality control and equipment performance. The recorded data are being downloaded from the memory cards, processed with Anabat software, and uploaded to an FTP site, from which a bat ecologist retrieves and

analyzes the data. The Anabat systems and related monitoring equipment were taken down and retrieved at the end of the monitoring season to protect it from winter weather.

### 5.5.2 Anabat Data Analysis and Report Preparation

Anabat call files are typically grouped by spring migration, summer resident, and fall migration periods, and analyzed with Analook software. Audio files are visually screened to remove files of non-bat calls so that only suitable bat calls remain. Call files are then examined visually and assigned to species or species-group categories based on comparisons to libraries of known bat reference calls.

The number of bat passes is used as an index of bat activity (Hayes 1997). A bat pass is defined as a series of echolocation calls by an individual bat, which consists of a series of more than two call notes with no pauses longer than one second between call notes (White and Gehrt 2001, Gannon et al. 2003). The number of echolocation passes is tallied to determine the number of bat passes. The total number of bat calls in a given time period and the mean number of bat passes per detector-night will be used as indices of bat activity for comparisons among detectors and to other studies. Bat calls may be grouped by high (≥35 kHz) and low (<35 kHz) frequency, which generally correspond to small bats (e.g., Myotis spp.) versus larger bats (e.g., big brown bat, silver-haired bat, and hoary bat). A written report will summarize the detected call rates by species and include related results and conclusions.

### 5.5.3 Bat Monitoring Report

The purpose of this study was to survey bat activity during the 2011 late summer resident and fall migratory periods within the wind development area. At the request of AWA Goodhue, Zotz Ecological Solutions provided this summary of acoustic bat data especially in reference to activity by the northern long-eared bat (*Myotis septentrionalis*). Because the northern long-eared bat overlaps in call characteristics with the little brown bat (*Myotis lucifugus*), 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 tower where the bat monitoring data was collected is 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.

#### Methods

Qualitative analysis of acoustic data was performed using the latest Anabat software for call analysis, Analook version 3.7w (Corben 2009). Call files were visually

screened to remove files of non-bat calls (e.g., wind noise, insects), so that only suitable bat calls remained. Files with suitable bat calls were examined visually and identified to species based on comparison to libraries of known bat reference calls. Identification to species was possible only when clear calls were recorded and only for certain species. In the event that a call was not identifiable to species, the call was assigned to a species group category (**Table 5.1**). 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. The occurrence and relative frequency of each species and/or species groups were described for each Anabat microphone height (5 m and 45 m).

**Table 5.1. Bat Species and Species Groups used to Categorize Acoustic Data**

| Species/Species Group | Description |
|---|---|
| EPFULANO | Big Brown (*Eptesicus fuscus*)/Silver-haired (*Lasionycteris noctivagans*) bat group |
| EPLNLA | Big Brown/Silver-haired/Hoary (*Lasiurus cinereus*) bat group |
| LABO | Eastern Red bat (*Lasiurus borealis*) |
| LABOPESU | Eastern Red bat/Tri-colored bat (*Perimyotis subflavus*) |
| LACI | Hoary bat |
| LACILANO | Hoary/Silver-haired bat group |
| LANO | Silver-haired bat |
| MYLU | Little Brown bat (*Myotis lucifugus*) |
| MYSE | Northern Long-eared bat (*Myotis septentrionalis*) |
| MYOTIS | Little Brown bat/Northern Long-eared bat group |
| PESU | Tri-colored bat |
| UNKNOWN | Includes files with fragmentary calls and files with solely non-search phase calls (i.e., approach, feeding buzz, social) |

## Results

A total of 2,188 bat passes were recorded during July 22-November 22, 2011, with 392 bat passes detected at 45 m and 1,796 bat passes detected at 5 m. At 45m, average nightly activity resulted in 4.13 ± 0.80 bat passes/night and the hoary bat was the most commonly detected species. At 5 m, average nightly activity resulted in 22.45 ± 2.88 bat passes/night and the little brown bat was the most commonly detected species. The overall composition of bat passes classified to species or species groups is summarized in **Table 5.2** below.

**Table 5.2. Bat Species Recorded during July 22-November 22, 2011**

| Species/Species Group | % Composition | |
|---|---|---|
| | 5 meters | 45 meters |
| Hoary bat | 10.03 | 52.45 |
| Little brown/northern long-eared bat group (MYOTIS) | 25.09 | 3.15 |
| Little brown bat | 16.84 | 1.75 |
| Big brown/silver-haired bat group (EPFULANO) | 16.75 | 3.50 |
| Big brown/silver-haired/hoary bat group (EPLNLA) | 11.82 | 15.38 |
| Eastern red bat | 6.97 | 9.44 |
| Hoary/silver-haired bat group (LACILANO) | 1.45 | 8.39 |
| Silver-haired bat | 3.83 | 4.90 |
| Eastern red/tri-colored bat group (LABOPESU) | 2.38 | 1.05 |
| Tri-colored bat | 3.06 | 0.00 |
| Northern long-eared bat | 1.02 | 0.00 |
| Big brown bat | 0.77 | 0.00 |
| Total | 100.00 | 100.00 |

Relative proportions of species and species groups were based on the bat passes that were classified to species and species groups. Unknown bat calls accounted for 33.18% of the 2,188 bat passes detected and these unknown calls were excluded from the species composition results. Unknown bat calls included fragmentary calls and files with solely non-search phase calls (see Table 5.1). Unknown calls occur in every acoustic study of bats, but they often are not reported. Such unknown calls are typically excluded from analysis in the scientific literature because they cannot be effectively analyzed (Britzke et al. 2011, Gruver et al. 2010). However, they are included here in the interest of full discloser because they provide indication of bat activity. The analysis that follows focuses on the relative proportions of bat calls that could be classified to species or species groups.

Nightly activity was greatest during July 22 through early September 2011 at both 5 m and 45 m. Hourly bat activity was relatively different between the two heights. At 45 m, activity appeared bimodal with greatest activity earlier in the night (2100-0000 hrs or 9:00 PM-12:00 AM), and was largely attributed to the hoary bat. At 5 m, activity appeared unimodal with greatest activity in the middle of the night (2300-0100 hrs or 11:00 PM-1:00 AM), and 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 was significantly lower at the 45 m height than the 5 m height. Bat activity at 45 m averaged 81.60% less than at 5 m.

Bat passes assigned to the big brown, northern long-eared, and tri-colored bats were only detected at 5 m, yet these species may have been detected at 45 m based on bat

passes identified to species groups (i.e., EPFULANO, EPLNLA, MYOTIS, and LABOPESU). Activity by the eastern red, silver-haired, and little brown bats was significantly higher at the height of 5 m than at 45 m. Yet, bat activity identified as hoary bats did not differ significantly between 5 and 45 m.

The hoary bat, a migratory tree-roosting species, was the species most detected, followed by the little brown bat. The northern long-eared bat and tri-colored bat, both Minnesota Species of Special Concern, were detected during this study. Although no federally threatened or endangered bat species were detected, the northern long-eared bat is being considered for listing under the Endangered Species Act. As of December 13, 2011, the U.S. Fish and Wildlife Service had not yet determined whether it will be listed. Both the northern long-eared bat and tri-colored bat were detected only near ground level. It is possible that the northern long-eared bat was detected at 45 m, but overlapping call characteristics with the little brown bat made it difficult to distinguish between the two species. Nonetheless, only 3.15% (n=9) of the identified calls recorded at 45 m were assigned to the little brown/northern long-eared bat group.

Given that the bat detectors were located on a met tower in an open field 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 MYOTIS group calls 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).

# 6.0 POST-CONSTRUCTION AVIAN AND BAT FATALITY MONITORING

## 6.1 Number and Selection of Turbines for Monitoring

AWA Goodhue proposes to conduct post-construction fatality monitoring at 10 turbines, which represents 21 percent of the total number of turbines. This is considered adequate coverage, as it provides monitoring of one turbine from each of the seven turbine clusters plus three additional turbines. 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 9.

## 6.2 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. In accordance with that guidance, AWA Goodhue proposes 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 160x160 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. MDNR datasheets 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, it will be prudent to implement vegetative control 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 17** 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 DNR protocols, except that data recording and reporting may be digitally customized and optimized. AWA Goodhue will obtain the necessary DNR salvage permit and USFWS migratory bird permit prior to commencing fatality monitoring.

## 6.3 Fatality Reporting

Fatality monitoring results will be reported to DOC-EFP, USFWS and MDNR using the MDNR forms and reporting guidelines contained in Appendix F and according to the schedule described in section 9.0. Fatality monitoring results will be compared to pre-construction acoustic bat survey results. This will be done to determine if the relative abundance of species documented during acoustic surveys is consistent with the observed fatalities.

# 7.0 RISK ASSESSMENT

## 7.1 Overall Avian Community

Overall, avian fatalities at the project are not expected to be a substantial source of avian mortality in comparison to other 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.

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). ~~Most birds killed are passerines and the most common passerine fatalities tend to be common species (Poulton 2010).~~

As discussed below under Section 7.3, 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 habitats that do not exist at Goodhue. AWA Goodhue's siting of most turbines in agricultural fields is expected to help minimize avian fatalities.

## 7.2 Bald and Golden Eagles

The bald eagle is rapidly becoming a relatively common wildlife species in Minnesota and is not in danger of decline. U.S. Fish and Wildlife Service data indicates that bald eagle populations increased approximately 20-fold in the lower 48 states between 1963 and 2005[2]. In Minnesota, the bald eagle breeding population in 2005 was approximately triple that in 1990[3]. Bald eagles populations have increased so significantly over the last four decides that the species was removed from the federal list of threatened and endangered species on June 28, 2007[4]. Bald eagles have since been removed from the Minnesota Department of Natural Resources list of threatened and endangered species and re-classified as "special concern"[5]. As of 2007, the MDNR estimated that Minnesota had approximately 2,300 breeding pairs of bald eagles. Formal surveys of breeding bald eagles were discontinued after 2005[6] so the current breeding bald eagle population is unknown. However, if previously documented rate of increase has continued (i.e. about 100 percent

[2] http://www.fws.gov/midwest/eagle/population/chtofprs.html
[3] http://www.fws.gov/midwest/eagle/population/nos_state_tbl.html
[4] http://www.fws.gov/midwest/eagle/1999prop/index.html
[5] Species of special concern are not protected by Minnesota's Endangered Species Statute or the associated Rules.
[6] http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNKC10010

increase every 5 years), the current breeding population should be in excess of 4,000 breeding pairs.

As described in Section 8.2.3.3, there has been one documented bald eagle fatality associated with a wind turbine in North America and four other reported but undocumented reports of fatalities in the United States. Given that the United States alone has about 43,461 MW of operating wind power facilities[7] (which equates to over 25,000 operating turbines, if the average turbine is 1.5 MW nameplate capacity), this is an extremely small amount of mortality. One of the primary causes of bald eagle mortality is vehicle collisions associated with the birds feeding on road-killed deer. In 2008, the Wisconsin DNR reported recovering about 110 sick, injured, or dead eagles and determined that "…the leading cause of death was collision with a vehicle. Most vehicle collisions occurred when eagles were scavenging car-killed deer. Other common causes of eagle mortality include lead poisoning, electrocution, eagle versus eagle territorial fights, and unspecified wing injuries."[8] In 2009, the USFWS established an Incidental Take Permit (ITP) program under the BGEPA. This program was adopted in recognition that eagle "takes" would inevitably increase with a rapidly expanding eagle population and a continuously developing landscape.

The USFWS provided Westwood with a draft eagle collision risk model (CRM) in Excel spreadsheet format as a tool to assist in evaluating potential collision risks to bald and golden eagles at the site. The formulas in this spreadsheet appear to be based on the collision risk modeling method described in Appendix D of the USFWS Eagle Conservation Plan Guidance. After studying the draft USFWS model in detail, we have concluded that it would be more appropriate to apply the Band et al. (2007) collision risk model to data from the AWA Goodhue project. The primary reason for using the Band et al. (2007) model is that it has been calibrated through the development of "avoidance rates" for a number of species while the USFWS draft model has not. Avoidance rates are calculated by comparing collisions predicted by a CRM to actual collisions documented through post-operational fatality monitoring. Whitfield (2009) developed an avoidance rate for golden eagles by comparing Band et al. (2007) CRM results at four U. S. wind farms to actual injuries and fatalities documented at each. It appears that the draft USFWS model applies the Whitfield (2009) avoidance factor for golden eagles. However, because the Whitfield (2009) avoidance factor was based on et al. (2007) CRM output, it would generate incorrect answers if applied to output from a different model. Whitfield (2009) states:

> "The present study suggests that a 99.0% collision avoidance rate for the golden eagle is a precautionary estimate, under the CRM of Band et al. (2007). This rate is not transferable to other CRMs, as noted by Madders & Whitfield (2006), since other CRMs may involve different assumptions…"

To date, no one has published an avoidance rate for bald eagles, most likely because so few collisions have been documented. By using the Band et al. (2007) CRM on the AWA

[7] http://www.awea.org/learnabout/industry_stats/index.cfm
[8] http://www.dnr.state.wi.us/org/land/wildlife/harvest/reports/eagleospreysurv08.pdf

Goodhue project, it will allow an avoidance rate for bald eagles to be developed for the first time.

Two initial applications of the Band et al. (2007) model were run on the 2011 breeding season data collected on the AWA Goodhue project site (**Appendix G**). The first application used eagle flight observations within five 800 meter radius sample plots centered on selected observation points. The second application used eagle flight observations that occurred within 100 meters of the 18 proposed turbine locations that fell within the five 800 meter radius sample plots. Given that turbine locations are known and eagle movements in and around the project area are not random (i.e. many movements are driven by food sources and habitat features), the smaller turbine-specific sample plots should yield more accurate results than the generic 800 meter radius plots. For example, many of the eagle movements associated with foraging at the western Belle Creek Watershed District reservoir were within the 800 meter radius sample plot but never approached a proposed turbine location.

Based on the more conservative 800 meter radius sample plots, the Band et al. (2007) model yielded a result of 0.13 collisions per year, which equates to 1 collision every 7.3 years. Based on the more accurate 100 meter turbine-specific sample plots, the Band et al. (2007) model yielded a result of 0.02 collisions per year, which equates to 1 collision every 43 years. As discussed above, we believe that the latter estimate would be more accurate for the breeding season, as it incorporates actual turbine locations and habitat features. We acknowledge that the breeding season data will not be representative of the remainder of the year and that we will likely see higher predicted collision rates once we have completed the collection and analysis of fall migration data. As discussed elsewhere in this ABPP, the fall migration period data has been seriously compromised by an ongoing, organized eagle baiting program. Coordination will be undertaken with the USFWS as part of the ITP process to determine the most appropriate way to deal with this factor in fall migration season collision rate modeling.

To provide additional context for the above-described breeding season CRM results, we reviewed the magnitude of predicted collisions to the allowable take in USFWS Region 3, as 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. As of 2007, the USFWS determined that Minnesota had 1,312 of the 3,475 breeding pairs of bald eagles in Region 3 (37.76 percent). If this percentage is applied to the allowable take established for the region forth in Appendix C of the Final EA, the proportion of the allowable annual take attributable to Minnesota would be 87.73 individual eagles and 10.59 bald eagle territories.

If the collision risks predicted above using the Band et al. (2007) model to breeding season data reasonably represents future breeding season fatalities, the predicted number of collisions at the AWA Goodhue Wind Project would represent a minute proportion of the

take allowable for Region 3 and Minnesota's pro rata portion of that allowable take. The more conservative prediction of 0.13 collisions per year would represent 0.06 percent (i.e. 0.0006) of the allowable annual take for Region 3 and 0.15 percent (i.e. 0.0015) of Minnesota's pro rata portion. If additional eagle flight data at the site continues to show a reasonable predicted percentage of the annual allowable take for bald eagles, the AWA Goodhue Wind Project appears to be a suitable candidate for a programmatic incidental take permit (ITP) under the BGEPA.

It should be noted that collision risk modeling based on field data collected during the 2011 fall migration season cannot fully correct for the above-described eagle baiting program. It is likely that fall migration period survey results from baited areas will overestimate the actual collision risk, as compared to the normal, unbaited condition. In analyzing collision risks based on fall 2011 migration period data, we will apply the Band et al. (2007) CRM to the full data set and to a refined data set that omits data associated with obvious baiting activity.

As previously described, Westwood will continue to refine our initial assessments of eagle collision risk by continuing to apply the Band et al. (2007) model to the results of future point count data to be collected in 2012. We anticipate that the food base management program proposed in this ABPP will reduce the collision risk below normal, unbaited circumstances. This reduction should be reflected in point count data collected and CRM output generated after the food base management program becomes operational in 2012.

Risk assessment model output will be summarized after each season's data is collected and a cumulative collision prediction will be generated for the survey period. Risk assessment results will be reported to the MPUC, USFWS and MDNR at the completion of survey period. As stated previously, we will also provide input to the USFWS regarding how the data collected might contribute to the refinement and validation of collision risk modeling. As additional data is collected, AWA Goodhue will continue to coordinate with the USFWS regarding an ITP application and the appropriate magnitude of the allowable take.

Collision modeling results will be used to identify specific turbines or turbine clusters where additional adaptive management measures may be required. Such measures may include:

1. Removal of specific transitory food sources (e.g. road kills, carcass piles) that may be causing foraging flights that place eagles at risk.
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.
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.

5. The use of non-moving pylons to simulate the outer edge of a turbine cluster. Such pylons would need to be designed not to serve as perch sites.
6. If the foregoing measures do not adequately resolve a collision risk predicted by modeling, temporary curtailment of the nearest turbine in the nearest cluster to the problematic movement pattern would be undertaken. To avoid diminishing the barrier effect, this turbine would be slowed rather than shut down.
7. Based on continued biologist observations, such curtailment would cease when the problematic movements have been resolved.
8. Stepwise expansion of curtailment (up to and including temporary turbine shutdown) would only be undertaken subject to the limits and conditions established within an ITP if continued risky flight behavior is observed to be continuing even after all other measures, including partial curtailment, have been implemented.

Since golden eagles winter but do not breed in Minnesota, the breeding season eagle monitoring data does not include any golden eagle observations. During 72 hours of point counts in October and November 2011, two golden eagles were observed. One golden eagle was soaring, exhibiting normal migratory behavior. The other was attracted to an active baiting location. These movements, along with any others observed in December 2011, will be analyzed in the same fashion as bald eagles to generate a collision risk prediction.

~~The~~Overall collision risk to golden eagles is anticipated to be lower than for bald eagles for a number of reasons. ~~First~~While golden eagles may individually be more vulnerable to collisions than bald eagles, there are far fewer golden eagles than bald eagles using the area around the AWA Goodhue project. Based on golden eagle winter surveys, a population of about 60 birds is known to winter in southeastern Minnesota and southwestern Wisconsin[1] while, as of 2007, Minnesota had about 2,300 breeding pairs of bald eagles[2]
~~. Second~~.[2]
In addition, golden eagles winter in Minnesota and do not breed here. Green and Janssen (1975), indicate that, at the most, golden eagles spend up to 7 of 12 months in Minnesota (i.e. mid-September to mid-April). This is corroborated by data from the two golden eagles being tracked by satellite telemetry by Minnesota Audubon and the National Eagle Center. Third, wintering golden eagles appear to spend much of their time in goat prairies and timbered rather than on agricultural land. In contrast, bald eagles breed in Minnesota and are typically present from mid-February through late December, with some birds staying year round to winter in open portions of the Mississippi River. As demonstrated by the nest observations and point count data collected to date for the AWA Goodhue project, breeding eagles will use agricultural land if food resources and nest sites are available. As compared to bald eagles, the relative collision risk to golden eagles should be lower because golden eagles: (1) are less common; (2) do not breed in Minnesota; (3) are present

[1] http://www.dnr.state.mn.us/eco/nongame/projects/golden_eagle_tracking.html
~~[2] http://www.dnr.state.mn.us/birds/baldeagle.html~~
[2] http://www.dnr.state.mn.us/birds/baldeagle.html

in the state for about 3.5 to 4 fewer months each year than bald eagles; and (4) focus their wintering activities in habitat types that are limited in the Project Area.

~~However, again, the ultimate collision~~The conclusions reached above have been corroborated by data collected during 2011 fall migration period eagle surveys. Only two golden eagles were observed over a period of 2.5 months and collision risk modeling results indicated an extremely low predicted collision rate. Collision risk to golden eagles will ~~estimated~~continue to be updated based on field data and ongoing modeling results. If adaptive management measures are found necessary to address problematic gold eagle movements, they would be the same measures used for bald eagles.

## 7.3 Loggerhead Shrikes

Based on the shrike habitat avoidance strategies employed by AWA Goodhue in designing its turbine layout, and a review of available loggerhead shrike literature, the potential for loggerhead shrike collisions with wind turbines on this project is expected to be 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 may not have a substantial effect on loggerhead shrikes include:

1. Loggerhead shrikes 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 1.2-6m above the ground (INHS 2010, Lee 2001). Keinath and Schneider (2005) indicated most foraging flights are within 10m of elevated perches, which suggests that most local flights of shrikes are at 16m or below. Conversely, the rotor-swept height of wind turbines at Goodhue Wind Project will extend from 38.8 to 121.3m.
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, suggesting that shrikes

> will have adequate suitable habitat even if wind turbines displace shrikes from some suitable habitat. 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 project 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 project area. Alternatively, a reasonable habitat-based population potential for the project 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. This suggests that the project area could include 80.4 suitable unoccupied 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 fences, roads, power lines, and buildings. The AWA Goodhue team found no literature or documentation supporting the assertion that shrikes will avoid wind turbines, resulting in displacement of shrikes from suitable habitats. 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 found small-scale displacement of about 80-100m (Leddy et al. 1999, Johnson et al. 2000).

The low flights of loggerhead shrikes may reduce the potential for shrike fatalities due to 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. indicated he did not recall any loggerhead shrike fatalities during post-construction fatality monitoring studies (Thompson 2011).

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 project 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 project 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 project area.

AWA Goodhue has avoided 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, AWA Goodhue 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 AWA Goodhue's expectation that the potential for loggerhead shrike collisions with wind turbines on this project is low.

## 7.4 Trumpeter Swans

The recently discovered trumpeter swan nest location is within an impounded farm pond about 1.8 miles southwest of the nearest proposed wind turbine. 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. The following discussion summarizes the habitat preferences of trumpeter swans, the availability of suitable habitat within and near the Project Area and the potential risk to swans of turbine collisions.

### 7.4.1 Trumpeter Swan Habitat Preferences

Trumpeter swans nest in clear, quiet, ponded water bodies (e.g., ponds, lakes, marshes, sloughs) with relatively static levels, no obvious currents or constant wave action, and shallow margins that facilitate digging and foraging for the roots and tubers of aquatic plants (Travsky and Beauvais, 2004). In Montana, trumpeter swans were observed to nest in extensive beds of marsh vegetation such as sedges, bulrushes, cattails and Juncus (Belrose, 1978). In Alaska, sedges (Carex spp.) and horsetails (Equisetum spp.) dominate nesting marshes. Isolation from humans has been cited as an important factor in nest site selection (Hansen et al. 1971). Trumpeter swans avoid acidic, stagnant, or eutrophic waters (Mitchell 1994). In North Dakota, foraging trumpeter swans strongly preferred wetlands with sago pondweed (Earnst 1994).

Open flight lanes of at least 100 meters are needed for takeoff and landing, making small water bodies and forested wetlands unsuitable for nesting habitat (Travsky and Beauvais, 2004). Nest territory sizes range from 6 to 150 acres (Hansen et al. 1971). Trumpeter swans build their nests on top of emergent vegetation or small islands, usually in water less than 1 meter deep. Muskrat (Ondatra zibethicus) and beaver (Castor canadensis) lodges are often used as nest substrate (Banko 1960; Alaska Department of Fish and Game 1986; Henderson 1981; Earnst 1994). Non-breeding birds (typically less than 4 years old) usually gather in small flocks and remain together throughout the summer on water bodies not occupied by breeding pairs.

The AWA Goodhue Project Area appears to encompass very little habitat potentially suitable for nesting trumpeter swans. The Project Area does encompass a number of small impounded farm ponds but most appear unsuitable for trumpeter swan nesting because they are too small for cygnets to take flight and/or lack emergent vegetation. These ponds differ from the pond on which the new nest is located. The pond with the nest is slightly larger, has a fringe of emergent aquatic vegetation and has sufficient open water (i.e. 1.8 acre) for swans to take flight. The Project Area also encompasses two larger reservoirs that have sufficient size and open water to support use by breeding swans but have minimal emergent vegetation for potential nest sites. There is another reservoir and a farm pond ¼ to ½ mile west of the northwest corner of the Project Area that could provide suitable nesting habitat for 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 Project 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 nesting for foraging.

Muskrat houses and beaver lodges that might provide nest sites are similarly scarce. Due to the paucity of flooded emergent vegetation from which to build houses, muskrats in the Project Area typically utilize burrows in the banks of water bodies. Beaver lodges are built from peeled sticks and mud. No beaver lodges have been observed in open water within the Project Area but lodges likely exist along and within the banks of the larger reservoirs. It is possible that beaver bank lodges could be used as swan nest sites but, due to their exposure to predators, would be less suitable than beaver lodges located in open water away from shore.

During migration trumpeter swans stopover habitat consists of freshwater marshes, ponds, lakes, rivers, and brackish estuaries (Gale et al. 1987, Lockman et al. 1987, Bailey et al. 1990). They travel in family groups, and high-quality resting and feeding sites are especially critical to young birds which cannot travel as far as adults. Stopover use is limited by ice, forage availability, and disturbances. It is possible that migrating trumpeter swans could utilize the reservoirs and larger farm ponds as migration stopover habitat but such use has not been documented in the Project Area to date. If trumpeter swans are observed moving through the Project Area during migration period field surveys, we will document any observed flight paths and attempt to determine whether the swans utilize water bodies or cropland in the area.

Good winter habitat is characterized by open water bordered by level and open terrain, such as unobstructed snowfields or meadows, which does not impair the vision or mobility of resting swans (Travsky and Beauvais 2004). Level terrain is especially important next to smaller water bodies because trumpeter swans need long, open air lanes for takeoff and landings. During the mild weather of early winter swans may be widely dispersed, feeding in various water bodies, wetlands, and flooded agricultural fields. Potential wintering habitat within and near the Project Area appears to be negligible due to the lack of open water and exposed crop residue during winter.

### 7.4.2 Collision Risk to Trumpeter Swans

The risk of a trumpeter swan collision with a wind turbine appears low. The recently documented nest site 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 Area. It is possible that swans may fly through the Project Area during migration periods. However, the only specific landscape features that appear to afford potential stopover

habitat are the reservoirs in and adjacent to the northwestern corner of the Project Area. 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 planted and harvest dates vary from year to year and such fields are the predominant landscape feature in an around the Project Area. Which crop fields might receive use by swans (if any) would depend on conditions on the specific dates that swans might move through the area.

Assuming the swan nest is active in 2012, the potential collision risk to breeding swans will be re-assessed after nesting season observations have been completed. In addition, any observed movements and habitat use of swans during fall, winter and spring survey periods will be documented and included in the re-assessment of collision risk.

## 7.5 Bats

AWA Goodhue has minimized the potential for effects on bats by siting wind turbines away from woodlands wherever practicable. The primary bat species of concern identified by the USFWS during a telephone conference on June 9, 2011 is the northern long-eared bat. On January 21, 2010, the Center for Biological Diversity submitted a petition to the U.S. Secretary of the Interior to list the eastern small-footed bat (*Myotis leibii*) and northern long-eared bat (*Myotis septentrionalis*) as threatened or endangered under the Endangered Species Act (Center for Biological Diversity 2010). The petition identified threats to these species consisting of white-nose syndrome; agricultural and residential development; logging; oil, gas, and mineral development; wind energy development; and mine closures.

### 7.5.1 White-Nose Syndrome

White-nose syndrome has no direct relationship to wind power, but the fatal effects of this disease on bats has alarmed biologists and exacerbated concerns regarding potential effects of wind energy on bat populations. White-nose syndrome is a fungus that grows on the muzzles and wings of affected bats while they hibernate in caves. It was first discovered in New York State during the winter of 2006-2007. In five years it has affected nine species of bats, killed more than a million bats of six species, spread into more than 17 states, and moved as far west as Indiana, Missouri, and Oklahoma (Bat Conservation International 2011a, 2011b). The potential for white-nose syndrome to reach Minnesota may be limited because bat hibernacula are more widely dispersed in the Upper Midwest than they are to the south and southeast. Species with potential to occur in the project area and affected by white-nose syndrome in include the big brown bat, tri-colored bat, little brown bat, and northern long-eared bat. Wildlife mortality factors such as white-nose syndrome and collisions with wind turbines can be either compensatory or cumulative. Because bats have relatively few offspring and long lives, many biologists suspect that bat mortality factors are likely to be cumulative or additive rather than compensatory.

### 7.5.2 Risk of Turbine-Related Bat Fatality

Although some bat fatality is expected to result from collisions with turbines at the project, review of pertinent bat fatality monitoring studies does not allow prediction of the precise extent of bat fatality anticipated. Baerwald et al. (2008) suggested that more bat fatality is caused by barotrauma, a result of air pressure changes around turbine blades, than collision with turbines.

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 have 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.

The perceived fatality rate of bats at wind farms has increased as more studies are published. Prior to 2007, the overall average 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).

Recent studies 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 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).

The annual peak of bat fatalities at wind projects is correlated with the fall migration period. 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 5.6.3, all three of these species were detected in the project area during the initial month on acoustic monitoring. 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). Conversely, the other four species of bats detected in the project area are susceptible to white-nose syndrome.

# 8.0 IMPACT AVOIDANCE AND MINIMIZATION

## 8.1 Overall Avian Community

### 8.1.1 Pre-Construction

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 been sited to maximize distances to high quality habitats and likely flight corridors. 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 sections 3.1.1 and 5.0 of this ABPP.

### 8.1.2 Construction

#### 8.1.2.1 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 9.1.2). AWA Goodhue 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. Wildfire is a potential threat that can affect bird and bat habitat. 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. 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

#### 8.1.2.2 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) so that temporary disturbance areas do not provide attractive nesting cover.

#### 8.1.2.3 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.

### 8.1.3 Post-Construction

#### 8.1.3.1 Minimize Turbine and Facility Lighting

AWA Goodhue 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) on a previous wind project and the Federal Aviation Administration (FAA) lists these lights as an option for wind turbines. However, AWA Goodhue 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:

1. synchronized flashing red lights (L864);
2. perimeter lighting that defines the periphery of the project with gaps of no more than 0.5 mile (0.8 km) between lights;
3. 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
4. lighting of isolated turbines that are distant from cluster groups.

The Goodhue project lighting plan is under review by the FAA and is consistent with several of the USFWS recommendations. The 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.

#### 8.1.3.2 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). AWA Goodhue 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.

## 8.2 Bald Eagles

### 8.2.1 Pre-Construction

#### 8.2.1.1 Turbine Siting

To the degree possible, turbines have been sited in 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. ~~Neither the current USFWS ECP guidelines nor the 2003 Service Interim Guidance for Avoiding and Minimizing Impacts from Wind Turbines contain any recommendation for a spatial buffer distance from bald eagle nests.~~

### 8.2.1.2 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 pre-operational phase of the Project. The Band et al. (2007) collision risk model will be used for all collision risk updates.

### 8.2.1.3 Initiation of Food Base Management

The January 2011 Draft Eagle Conservation Plan 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. AWA Goodhue will pursue the following ~~USFWS recommended~~ food base management measures (drawn from the 2011 USFWS Draft ECP Guidelines) in conjunction with O & M activities on the Project:

1. If rodents and rabbits are attracted to project facilities, the activities that may be attracting them will be identified and eliminated.
2. 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.
3. Stored parts and equipment, which may be utilized by small mammals for cover, will be kept away from wind turbines.
4. 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.
5. Carcasses that have the potential to attract raptors to the Project Area and, in particular, turbine locations will be immediately removed.
6. Responsible livestock husbandry will be encouraged among both participating landowners and neighbors (e.g. removing and properly disposing of livestock carcasses, fencing out livestock).
7. ~~Artificial~~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 forgoing measures are in place.
8. Prey-base enhancements and/or land acquisition and management to draw eagles out of a project footprint may be undertaken, if eagles exhibit risky flight behavior after the foregoing measures are in place.

Both of the two new bald eagle nests identified in 2011 were directly associated with artificial feeding activities involving the disposal of livestock carcasses. Both new nesting locations are unusual and appear sub-optimal due to their minimal forest cover, the predominance of surrounding cropland and their substantial distances to perennial water (and hence, natural food) sources.

Regardless of whether eagles would have nested in these locations naturally, artificial feeding activity encourages bald eagles to forage and nest in locations that might otherwise be sub-optimal or unsuitable eagle habitat. It is inappropriate to encourage bald eagles to become dependent on an artificial food source that might be discontinued at a critical point in their life cycle. As stated above, the USFWS Draft ECP Guidance recommends ~~against the improper disposal of livestock carcasses when it recommends "…responsible livestock husbandry (e.g. removing carcasses, fencing out livestock)… if grazing occurs around turbines."~~that measures be taken to "immediately remove 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." (Page 67-68 of the USFWS Draft ECP Guidelines).

Exposed surface disposal of livestock carcasses is also 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 DNR analyzed the cases of injury or mortality for 110, 150 and 120 sick, injured, or dead eagles (Wisconsin Department of Natural Resources 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 Eagle Conservation Plan 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. AWA Goodhue will undertake a multi-step process to address problems with artificial feeding of bald eagles and risks posed by eagles feeding on road kills:

1. AWA Goodhue 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.

2. AWA Goodhue 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.

3. AWA Goodhue will fund the establishment of an appropriately sited and managed central road kill ~~disposal~~burial location that will not attract bald eagles to the project footprint. AWA Goodhue will coordinate with USFWS and MDNR once an appropriate site has been identified to obtain concurrence on the location and burial protocol. 164 - 165 166

4. AWA Goodhue 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. AWA Goodhue O & M staff having valid MDNR possession permits may also directly engage in the removal and disposal of road kills within the Project Area.

167 AWA Goodhue is not proposing a formal program of daily inspections for carcasses by O & M personnel. Rather, in their day-to-day duties, AWA Goodhue personnel working on the project area 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.

168 Road kills will either be removed immediately by AWA Goodhue 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 AWA Goodhue staff observe an unusual concentration of eagles where AWA Goodhue 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.

169 If we observe any ongoing pattern of apparent intentional feeding of eagles during the operational phase of the project, AWA Goodhue staff will immediately file complaints with the appropriate enforcement authorities. All such incidents within the Operational Project Area will be reported. Incidents outside the Operational Project Area 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.

### 8.2.2 Construction

#### 8.2.2.1 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.

#### 8.2.2.2 Construction Phasing to Minimize Disturbance

All of the currently known active bald eagle nests in and around the Project Area 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 eagles nest is initiated or completed within 660 feet of a location where construction activity will occur, AWA Goodhue will seek a temporary disturbance permit from the USFWS. (USFWS. 2007. National Bald Eagle Management Guidelines. 23 pp.)

#### 8.2.2.3 Continued Food Base Management

The construction management staff for the project will be trained to recognize likely signs of artificial feeding activity of eagles (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 AWA Goodhue. Where such activity is observed or suspected, the same resolution process described in Section 8.2.1.2 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 AWA Goodhue. Road kills will either be removed by AWA

Goodhue 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.

#### 8.2.2.4 Road Kill Minimization in Construction Traffic Plan

AWA Goodhue recently engaged in a study of road structure suitability to determine which county and township roads are best suited to handle heavy construction traffic. AWA Goodhue is now in the process of working with Goodhue County and the townships to develop a plan for construction traffic routing. AWA Goodhue 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 Area 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.

### 8.2.3 Post-Construction

#### 8.2.3.1 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.

#### 8.2.3.2 Continued Food Base Management

After construction is complete, O & M staff will continue monitoring the project area for likely signs of artificial feeding activity of eagles and will pursue the same resolution process described in Section 8.2.12. AWA Goodhue 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.

### 8.2.3.3 Curtailment

180 - 181 Curtailment of wind turbine operation ~~by~~, including a series of progressive operational controls ranging from adjustments to cut-in speeds, restrictions in diurnal or seasonal operating profile, and idling or braking turbines to prevent 182 blades from spinning, has been suggested as a possible mitigation measure to minimize or avoid impacts to eagles. For the reasons set forth below, curtailment is considered a last resort measure for reducing turbine collision risks for bald eagles.

Curtailment as a mitigation tool is typically applied to sites where large-scale bird activity has been previously identified. A literature and internet search found no instances where curtailment was targeted specifically towards bald eagles or any other large avian species in the United States. Examples of sites in the United States where curtailment is being used include Penascal and Gulf Wind I Wind Farms, both of which are in the gulf coast in Texas. These locations have been identified as having high risk of avian mortality due to their proximity to major avian migration corridors or landscape features that act to concentrate large numbers of birds during certain weather events or periods of broad-front migration. These locations are at the south end of the central flyway and see flocks of thousands of migrating birds. These large flocks are particularly at risk when migration flights occur at night or during periods when poor weather limits visibility. The AWA Goodhue project area does not experience concentrated bird migration movements that approach the magnitude occurring at these coastal sites.

The USFWS Draft Eagle Conservation Plan (USFWS 2011, page 7) states that significant numbers of bald eagles have not been documented at U.S. wind projects. An internet search revealed only one incident of bald eagle mortality at a wind project in North America – at the Erie Shores facility in Ontario, Canada. Turbines in this facility are sited in strings rather than clusters and are oriented parallel to and within 0.25 mile of the Lake Erie shoreline – a landscape feature that attracts foraging and nesting eagles and funnels their movements during migration periods. This situation starkly contrasts with turbines sited in clusters on an agricultural landscape.

183 - 185 ~~More recently,~~ USFWS staff members have ~~suggested as many as five~~indicated 186 that the USFWS Service has documented 5 bald eagle ~~fatalities associated~~ 187 - 188 ~~with~~takes at North American wind farms~~. Documentation regarding these reported fatalities was requested from the USFWS to facilitate comparison with the circumstances at the AWA Goodhue project site. The information requested included: (a) which wind projects were involved; (b) at what time of year did the alleged fatality occur; (c) how close was the collision site to the nearest eagle nest or other important eagle use area; and (d) contact information for the developers of these wind farms or their consultants. The USFWS indicated that it was unable to supply the requested documentation. Accordingly, other than~~

~~the Erie Shores fatality, these reports must still be considered anecdotal and unverified. Even if~~ (4 mortalities and one injury). Assuming the correct number 189 190 of documented bald eagle fatalities is five, this is ~~still~~ an extremely low number given that more than 45,000 MW of wind power is currently operational in North America. It is possible that the extremely low number of bald eagle fatalities is partially a result of avoidance behavior, described in more detail below.

An important factor that needs to be considered in any decision to curtail turbines is the fact that some bird species, including bald eagles, appear to actively avoid moving turbines. This "barrier effect" has been documented in a number of avian studies around the world (particularly off-shore wind developments) and is a phenomenon acknowledged by the USFWS.[2] Bald eagles displayed avoidance behavior after the construction and operation of a 3-turbine wind facility in Pillar, Alaska (Kodiak Island), where eagles discontinued use of previously utilized areas of the mountain ridge in order to avoid crossing the ridge among the turbines (Sharp et al. 2010). Presumably, the barrier effect observed around a cluster of turbines would be at least as great as for three turbines along a ridge. If turbines are shut down, then it is questionable whether the barrier effect will fade and eagles would start moving through a turbine cluster they might otherwise avoid. If curtailment is applied to address a specific movement pattern in a given location, it may be most prudent to curtail only the turbine nearest the movement rather than the entire cluster. This would have a similar effect to pylons, which are discussed on page 66 of the USFWS Draft Eagle Conservation Plan Guidance[3], while maintaining motion to preserve the barrier effect. Pylons could be used prior to undertaking partial curtailment, in an effort to create the perception of a different turbine cluster boundary and encourage avoidance behavior. However, the pylons would need to be designed so as not serve as perches.

For the AWA Goodhue Wind Project it is expected that foraging activities would represent the largest risk for bald eagles and other raptor species. Food base management that would remove incentives for eagles to approach or enter turbine clusters seems to represent the best day-to-day option for collision prevention. Some food sources are landscape features that cannot be moved while others are temporary and highly transitory. With food sources that are immobile, flight patterns are likely to be relatively consistent and siting turbines away from known movement corridors is the probably the most effective impact avoidance approach. Using the locations of nests and fixed food sources known data collected on nest locations AWA Goodhue has done this to the extent practicable based on applicable turbine setbacks, locations of known nests and fixed food sources (e.g. the Belle Creek Watershed District Reservoir) and eagle movement data collected during the breeding season.

[2]http://www.fws.gov/windenergy/docs/Barrier_Effect.pdf

[3]The USFWS recommend that developers "[c]onsider using pylons at the ends of turbine rows, place pylons in ridge dips or leave dips undeveloped."

With transitory food sources, neither turbine siting nor curtailment offers a practical approach to preventing collisions. Artificial baiting of eagles in the Project Area (which has been documented in multiple locations and is ongoing) and the unpredictable timing and distribution of road kills make it impossible to predict which turbines would most put eagles at risk on any given day. Because they are opportunistic feeders, eagle flight patterns will change every time a food source is introduced or removed. Focusing on the removal of these food sources would be more effective in preventing collisions than curtailing specific turbines that may or may not represent a risk. Because flights related to transitory food sources are unpredictable, curtailment is not a valid mitigation measure to address them. Effective use of a curtailment program to address these flights would require real-time knowledge of an individual bird or flock's location, flight height, flight speed, flight direction, and a systematic approach to determine potential for collision with an operational wind turbine.

Avian radar systems are being used at the Penescal and Gulf Wind I Wind Farms (mentioned above) to curtail turbines when a large number of birds are identified during broad-front migratory events occurring and weather conditions impair visibility or concentrate avian activities in high risk areas. While radar systems have been effective in these types of applications, the technology does not allow for the identification of a target species and is not an effective mitigation tool for large raptors, including eagles. Other large avian species, such as turkey vultures, can and do occur in areas with bald eagles, and current radar system technology cannot accurately differentiate the reflective signatures produced by these species. Radar could not be practicably used to inform curtailment decisions in response to eagle movements.

As described in Section 7.2, AWA Goodhue proposes to use curtailment as a last resort measure in specific instances when a collision risk identified through modeling or field observations cannot otherwise be satisfactorily resolved. Curtailment would be pursued if: (1) field survey and/or collision modeling results indicate a collision risk problem that would cause AWA Goodhue to potentially exceed a take threshold set forth in an ITP and (2) all other measures listed in Section 7.2 fail to reduce the predicted collision risk below that threshold. After all other measures have failed to resolve a turbine-specific collision risk, temporary curtailment of the nearest turbine in the nearest cluster to the problematic movement pattern would be undertaken subject to the conditions and limits established within an ITP. To avoid diminishing the barrier effect, this turbine would be preferably slowed rather than totally shut down. Based on continued biologist observations, such curtailment would cease when the problematic movements have been resolved. Stepwise expansion of curtailment would only be undertaken, again subject to the limits and conditions established within an ITP, if ongoing surveys or collision risk modeling continues to indicate a collision risk that would cause an ITP threshold to be exceeded. Ongoing coordination will be maintained with the USFWS regarding

updated survey and modeling results and measures being taken to avoid exceeding a take threshold.

## 8.3 Golden Eagles

The impact avoidance, minimization and adaptive management measures applicable to bald eagles will apply to golden eagles as well. These are described in Sections 7.2 and 8.2.3. Through ongoing pre-operational point counts, we will develop a better picture of the collision risk to golden eagles. Westwood will also maintain ongoing coordination with Minnesota Audubon and the National Eagle Center to obtain and analyze the satellite telemetry data being collected of radio-tagged golden eagles. If any radio-tagged golden eagles utilize the project footprint, information will be assessed and included in the monthly monitoring reports. Like bald eagles, golden eagles will scavenge livestock carcasses and road kills. Accordingly, the prey-base management measures described for bald eagles would apply equally to golden eagles. These measures are intended to foster reliance on natural food sources, which in turn would be associated with higher quality habitats away from proposed turbine locations.

## 8.4 Loggerhead Shrikes

### 8.4.1 Pre-Construction

Throughout the site permit process, AWA Goodhue revised its turbine layout a number of times to reduce potential environmental and human impacts associated with the project. In addition to moving individual turbine locations to avoid and minimize impacts, AWA Goodhue also reduced the overall number of proposed turbine locations from 52 to 48 by switching from the GE 1.5 MW turbine model to the GE 1.6 MW turbine.

AWA Goodhue's primary strategy for protecting loggerhead shrikes was to avoid highly and very highly suitable shrike habitat through its micro-siting process. Given the connected nature of wind energy infrastructure (turbine arrays, access roads, cable routes, crane paths), some minor effects on potential shrike habitats are expected. Implementation of mitigation measures is expected to aid in minimizing potential effects on shrikes.

#### 8.4.1.1 Turbine Layout Revisions to Minimize Effects

A proactive approach to siting turbines and related improvements increased the compatibility of the project with loggerhead shrike habitat. AWA Goodhue adjusted turbine locations to avoid highly suitable and very highly suitable loggerhead shrike habitat. 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 these other constraints, only three turbine locations are in highly or very highly suitable habitat based on the coarse filter habitat model. Closer review using a turbine-centered habitat model indicates that all three of these turbines are sited in cropland. None of the turbines meet the criteria of the turbine-centered model for highly suitable shrike habitat, which include:

1. area within a 40-meter radius is dominated by grassland,
2. area within a 200-meter radius is over 40% grassland, and
3. perches exist on over 40% of the area within a 200-meter radius.

The following is a summary of recent additional layout changes designed to avoid quality shrike habitat.

After the June 13, 2011 field investigation, the following turbines were eliminated or moved to minimize potential effects on loggerhead shrikes: Turbine 16 was eliminated from the layout because it was located in grassland within a quarter section ranked very highly suitable for loggerhead shrikes. Turbine 28 was renamed Alt-28 and moved 1,025 feet south-southeast to a location of disturbed land along a field road because it was located in grassland within a quarter section ranked very highly suitable for loggerhead shrikes.

After meeting with the MDNR and MDOC on August 18, 2011, the following turbine location adjustments were made to minimize potential effects on loggerhead shrikes:

1. Turbine Alt-28 was eliminated because it was located in an area of grazed grassland within a quarter section ranked very highly suitable for loggerhead shrikes.
2. Turbine 6 was moved 735 feet south-southeast, increasing the distance from a 15-acre grassland within an unsuitable ranked quarter section from 60 feet to 340 feet.

### 8.4.2 Construction

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

If construction activities will occur between April and July within 200 meters of habitat considered "Highly Suitable" or "Very Highly Suitable" by the MDNR, pre-construction loggerhead shrike surveys will be conducted in those areas to determine whether breeding shrikes are present. Based on a review of the turbine layout and shrike habitat rankings, only turbines 17 and 18 lie within areas ranked "Highly Suitable" or "Very Highly Suitable" for shrikes and appear to be within 200 meters of the habitat that generated these rankings. Turbines 25, 26 and A52 lie within areas ranked "Highly Suitable" or "Very Highly Suitable" for shrikes but appear to be more than 200 meters of the habitat that generated these rankings.

Construction activities will be staged to avoid causing a potential disturbance-related "take" of loggerhead shrikes. Coordination will be undertaken 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 will obtain concurrence on site specific activities and time periods that must be avoided 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 possible, 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 be commenced until it has been confirmed that breeding shrikes are not present.

### 8.4.3 Post-Construction

AWA Goodhue avoided effects on loggerhead shrikes through siting turbines almost exclusively in crop fields and away from highly suitable shrike habitat. The turbine layout has been modified multiple times in response to MDNR input and the MDNR has formally concurred that all turbines are sited in a manner that avoids highly and very highly suitable shrike habitat. Accordingly, the implementation of additional mitigation measures will be balanced with other ecological mitigation measures discussed in this plan.

AWA Goodhue 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 area.

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: periodic burning or mowing of ungrazed grasslands to discourage succession to woodland and maintain open grassland with scattered small trees and shrubs; rest-rotation grazing to provide preferred habitat by shortening tall grasslands; tree and shrub nest site and perch site protection from grazing and rubbing by livestock; use of fencing or other methods to protect old shelterbelts and nest trees from cattle; planting or protecting low shrubs and trees along fences and in otherwise open pastures and fields; maintaining and diversifying shelterbelts adjacent to grassland by incorporating thorny trees and shrubs; and avoiding creation of continuous linear strips of woody vegetation.

## 8.5 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. However, continued threats to the trumpeter swan population 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).

At this time, the potential for construction disturbance or turbine collision risk to trumpeter swans from the AWA Goodhue Wind Project is considered low, given that; (1) only one breeding pair has been documented in the general area; (2) the nest site is outside the Project Area and is 1.8 miles from the nearest turbine; and (3) no proposed turbine locations lie between the nest site and other potentially suitable aquatic foraging habitat.

The MDNR species profile for trumpeter swans describes their nesting habitat as follows:

> "During the breeding season, trumpeter swans select small ponds and lakes or bays on larger water bodies with extensive beds of cattails, bulrush,

> sedges, and/or horsetail. Ideal habitat includes about 100 m (328 ft.) of open water for take-off, stable levels of unpolluted, fresh water, emergent vegetation, low levels of human disturbance, and the presence of muskrat (*Ondatra zibethicus*) houses and American beaver (*Castor canadensis*) lodges for use as nesting platforms."
>
> http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNJB02030

No suitable trumpeter swan nesting habitat, as described by the MDNR, has been observed within the AWA Goodhue Project Area. Potential breeding season foraging habitat for trumpeter swans is likewise extremely limited within the Project Area. The only water body observed within the project area that might offer swans a foraging opportunity is the reservoir in the northwest part of the Project Area. However, this water body lacks emergent vegetation and does not appear to offer any suitable nesting opportunities for trumpeter swans. Trumpeter swans do forage in crop fields during the migration periods. Row crops are the predominant land cover in and around the Project Area and crops change from year-to-year. Accordingly, while it is possible that the swans utilizing the recently documented nest site could utilize the Project Area for foraging, it is not possible to predict what areas they might use or during what time periods. If crops fields within the Project Area 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 specific to swans will be necessary. However, this conclusion will be re-visited during the spring and fall of 2012 after more data has been collected on the movements of nesting and migrating swans (assuming they return to nest in the same area). If that data suggests that impact avoidance, minimization or adaptive management measures might be warranted, such measures will be explored in coordination with MDNR. Specific examples of impact avoidance, minimization or adaptive management measures that might be explored under such circumstances are:

1. If the nest is active in 2012, route construction traffic away from roads nearest the nest location;
2. If the nest is active in 2012, stage construction activity in the southwest corner of the Project Area to avoid the trumpeter swan nesting period;
3. Install bird diverters on the interconnection transmission line at the north end of the Project Area. While this will not traverse any potentially suitable aquatic habitat, foraging or migrating 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 AWA Goodhue Wind 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 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 swans from crop fields near turbines, USFWS will be contacted in advance to obtain any necessary depredation permit. For the reasons set forth in Section 8.2.2.3 with regard to bald eagles, curtailment is not considered a practicable adaptive management with regard to trumpeter swans.

## 8.6 Raptor Nests

### 8.6.1 Pre-Construction

Throughout the design of the Project, efforts have been made to site turbines 0.25 mile or more from active raptor nests. With the current turbine layout, all proposed turbine locations are more than 0.25 mile of raptor nests. The raptor nest nearest to a turbine is 0.37 mile away. During the March 2012 ~~aerial~~ raptor nest survey, we will determine if any new nests have been built closer than 0.25 mile from a turbine. If any such nests are found, Westwood will coordinate with USFWS and MDNR to discuss whether the birds using the nest appear to be at risk and, if so, the best management approach. If the habitat between the nest and the turbine consists entirely of cropland, no management may be necessary. If suitable habitat exists around the turbine such that foraging raptors may be attracted to it, AWA Goodhue 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 Guidelines.

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, AWA Goodhue would coordinate with the USFWS and MDNR to develop the least intrusive measures possible. No habitat modifications for this purpose would be undertaken without USFWS and MDNR concurrence. As a last resort, removal of such nests at a time when they are inactive may encourage any returning raptors to build in locations farther from the turbine. Again, this measure would not be undertaken without prior USFWS and MDNR concurrence.

### 8.6.2 Construction

~~No construction-related impact avoidance or minimization measures are~~All proposed ~~for~~ turbines will be located more than 0.25 mile from the nearest raptor nest. ~~For the three turbines that lie~~If in the future any new raptor nests are established within 0.25 mile of ~~possible raptor nests, if nests are left in place~~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:

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

### 8.6.3 Post-Construction

After construction is complete, O & M personnel will monitor the area around each turbine and document any 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 that 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.

## 8.7 Bats

### 8.7.1 Pre-Construction

AWA Goodhue 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 project area is only about 4% forested. Although turbine siting avoids woodlands, 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.

### 8.7.2 Construction

Project construction will avoid and minimize disturbance of preferred bat habitats and roost sites such as woodlands, water bodies, wetlands, caves, and rock formations. Because turbines are sited in open areas and primarily in cropland, woodlands will be disturbed only where necessary for construction of access roads and electrical collection cables.

### 8.7.3 Post-Construction

AWA Goodhue 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 fatalities will help expand understanding concerning the variability of bat fatalities at wind projects and assess the potential need for post-construction impact minimization practices.

### 8.7.4 Potential Federal Listing of Northern Long-eared Bat

Westwood will contact the Twin Cities Field Office of the USFWS on a monthly basis to obtain updates on the federal listing status of the Northern Long-eared Bat. The Federal Register and USFWS Region 3 web-site will also be monitored regularly for updates. If this species is listed under the Endangered Species Act (ESA), we anticipate that it would occur after all required permits in place and the project is either under construction or built and operational. If listing occurs, AWA Goodhue would undertake informal coordination with the USFWS to discuss the perceived risk of a "take" of this species and whether a Habitat Conservation Plan and ESA Incidental Take Permit (ITP) are warranted. Because the AWA Goodhue project would not involve a federal action, we do not see any basis for Section 7 consultation under the Endangered Species Act.

If the Northern Long-eared Bat becomes federally listed, additional surveys would be needed to determine which portions of the project area are being used by this species. Potential adaptive management strategies will be developed on a turbine-by-turbine basis. Surveys would likely include mist netting and additional Anabat monitoring. Potential adaptive management strategies would be developed through coordination with the USFWS and could include: (1) enhancement and/or preservation of roosting and foraging habitat in parts of the project site away from turbines; (2) identification and preservation of potential hibernacula in the area; and (3) turbine-specific operational measures, such as increasing turbine cut-in speed in higher risk locations (i.e. where surveys indicate bats are present and foraging in the RSZ) during higher risk conditions (i.e. during night time hours, temperatures above 50 degrees, high humidity and low wind). If operational mitigation measures are found necessary, they would be subject to periodic adjustment based on fatality monitoring results and coordination with the USFWS.

# 9.0 ABPP IMPLEMENTATION

## 9.1 Training

AWA Goodhue believes that employee and contractor training is an important aspect of implementing the ABPP for the Project. Consequently, AWA Goodhue 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 on the AWA Goodhue Project site. 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. AWA Goodhue ABPP training will include the following components:

### 9.1.1 Development Stage Environmental Training

Wind project development team members who have been involved in the design and permitting of the AWA Goodhue Wind Project have received informal training in the avian and bat issues associated with the Project Area. 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.

### 9.1.2 Construction Stage Environmental Training

All construction staff will receive training on the environmental constraints and issues specific to the site, 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 Area, 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

207

injured raptors that are found will be handled only by trained biologists or licensed rehabilitators.

### 9.1.3 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 AWA Goodhue Wind 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.

### 9.1.4 External Training:

Operations and Maintenance (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.

## 9.2 Quality Control and Adaptive Management

### 9.2.1 Quality Control

Compliance with this project-specific ABPP will be reviewed and audited by AWA Goodhue on an annual basis. Audit information will be supplied to DOC-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 AWA Goodhue based on audit results but the decision whether such a plan is required would be made by the MPUC with DOC-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 DOC-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. AWA Goodhue 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.

### 9.2.2 Adaptive Management

Adaptive management:

> "… involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions. Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stake-holders who learn together how to create and maintain sustainable resource systems." (USDOI, 2009)

Adaptive management strategies that would be pursued by AWA Goodhue 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 (e.g. collision risk modeling predicts more eagle fatalities than allowed under an ITP), specific measures to be undertaken will be developed in coordination with DOC-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, AWA Goodhue will continually

look for ways to streamline and improve the process. If the USFWS and/or MDNR develop electronic procedures for fatality reporting, AWA Goodhue will work with the agencies to adopt and implement the new reporting procedures.

### 9.2.3 Avian and Bat Reporting to MPUC, DOC-EFP, USFWS and MDNR

#### 9.2.3.1 Eagles

The results of spring, summer, fall, and winter eagle point count surveys will be reported quarterly within one month after the end of each season for two years. The activity status of each bald eagle nest identified in or within two miles of the Project Area will be reported in the spring report for two years.

#### 9.2.3.2 Bats

Anabat data collection will occur on one temporary met tower from July 22 to November 22, 2011 and on one or two permanent met towers from May 1 to November 15, 2012. The results of the 2011 and 2012 Anabat monitoring and federal listing status of Northern Long-eared Bat must be submitted to MPUC by December 15, 2011 and 2012, respectively.

#### 9.2.3.3 Loggerhead Shrike

Because all turbines have been sited in locations that do not constitute highly or very highly suitable loggerhead shrike habitat, no Loggerhead Shrike Protection Plan is required. If any loggerhead shrike fatalities are found during post-construction fatality surveys or during the course of O & M activities, it will be reported to the MPUC, USFWS and MDNR within 24 hours of discovery (as required by the Site Permit).

#### 9.2.3.4 Trumpeter Swans

If any trumpeter swans fatalities are found during post-construction fatality surveys or during the course of O & M activities, it will be reported to the DOC-EFP, MPUC, USFWS and MDNR within 24 hours of discovery (as required by the Site Permit).

#### 9.2.3.5 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 H**). 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

212

be emailed to DOC-EFP, MPUC, USFWS and MDNR, with electronic and paper copies kept on file by the site manager and the project wildlife consultant. 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 AWA Goodhue Site Manager. All carcass identification will be performed by trained biologists. O & M staff will ~~thus be relieved of~~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:

**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:

1. Five or more dead or injured non-protected avian or bat species within a reporting period (i.e. within a quarter);
2. One or more dead or injured migratory avian or bat species (including any species of eagle);
3. One or more dead or injured state threatened, endangered or special concern species; or
4. 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.

**Quarterly Fatality Reporting**

Avian and bat fatalities observed by the AWA Goodhue Site Manager or O & M staff in the course of their duties on the wind farm must 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 DOC-EFP, MPUC, USFWS and MDNR by email and will be e-filed to the project docket.

#### 9.2.3.6 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).

### 9.3 Key Resources

AWA Goodhue 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.

## 10.0 PROJECT DECOMMISSIONING

Prior to commercial operation, AWA Goodhue will submit a Decommissioning Plan to the MPUC that documents the manner in which AWA Goodhue anticipates decommissioning the project in accordance with Minn. Rules Part 7854.0500, subp.13. AWA Goodhue 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, whichever occurs earlier, AWA Goodhue will dismantle and remove from the site 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. 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.

AWA Goodhue will restore and reclaim the site to its pre-project topography and topsoil quality using BMPs consistent with those outlined by the Wind Turbine Guidelines Advisory Committee (WTGAC 2010). The goal of decommissioning will be to restore natural hydrology and plant communities to the greatest extent practical while minimizing new site disturbance and removal of native vegetation.

Some of the decommissioning BMPs that will be employed on the project to the extent practicable with the intent of meeting this goal include:

1. restore topsoil to assist in establishing and maintaining preconstruction native plant communities to the extent possible;
2. vegetate exposed soils, that are not agricultural land, with native plants appropriate for the soil conditions and adjacent habitat using local seed sources;
3. restore surface water flows to pre-disturbance conditions, including removal of stream crossings, roads, and pads, consistent with storm water management objectives and requirements;
4. install erosion control measures, following decommissioning, within disturbance areas with potential for erosion, consistent with storm water management requirements; and

5. remove fencing installed for the project unless pertinent to existing landowner operations.

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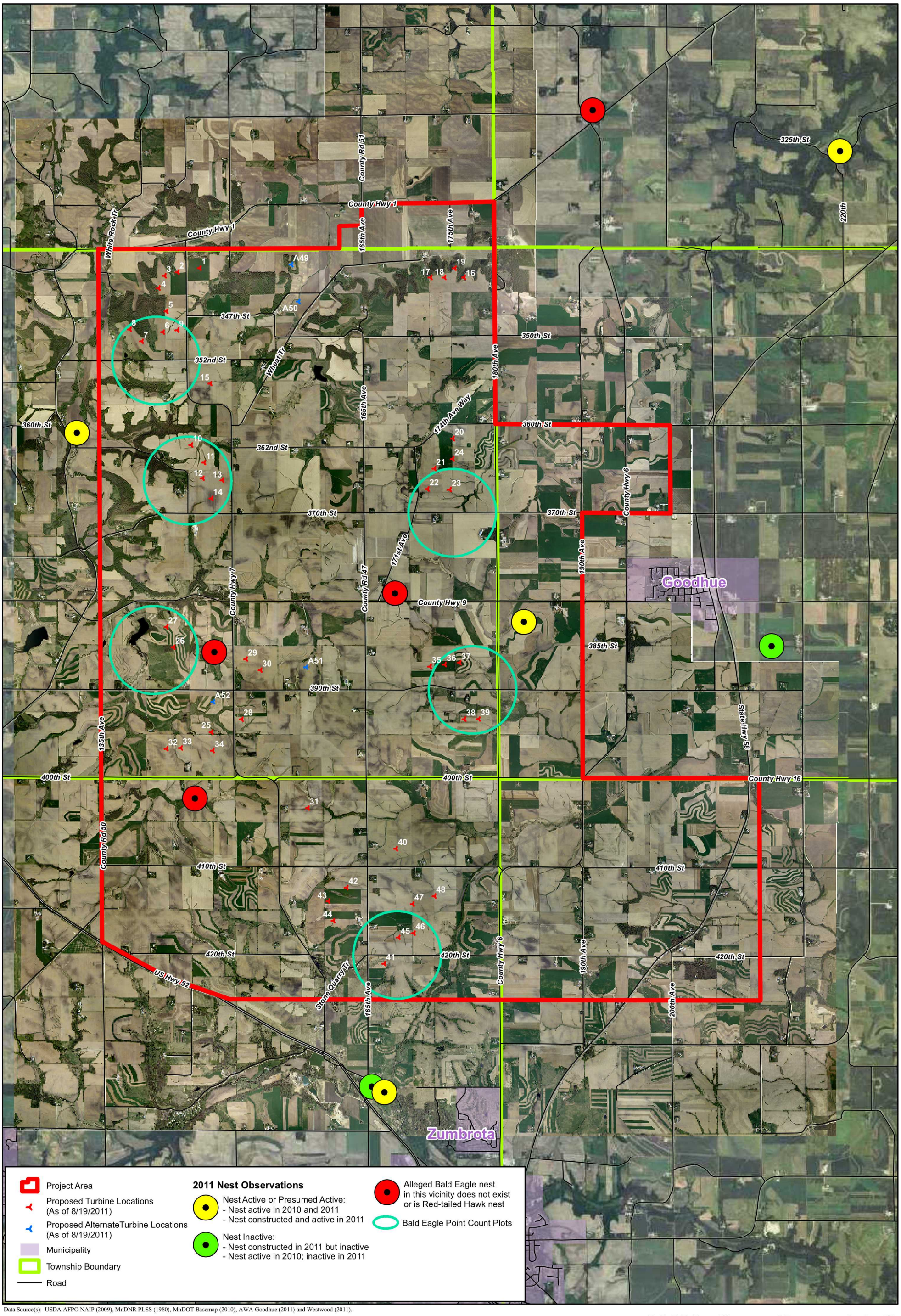


Data Source(s): USDA AFPO NAIP (2009), MnDNR PLSS (1980), MnDOT Basemap (2010), AWA Goodhue (2011) and Westwood (2011).

# AWA Goodhue, LLC

Goodhue County, Minnesota

## Bald Eagle Nests and Monitoring Clusters

Exhibit 3

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

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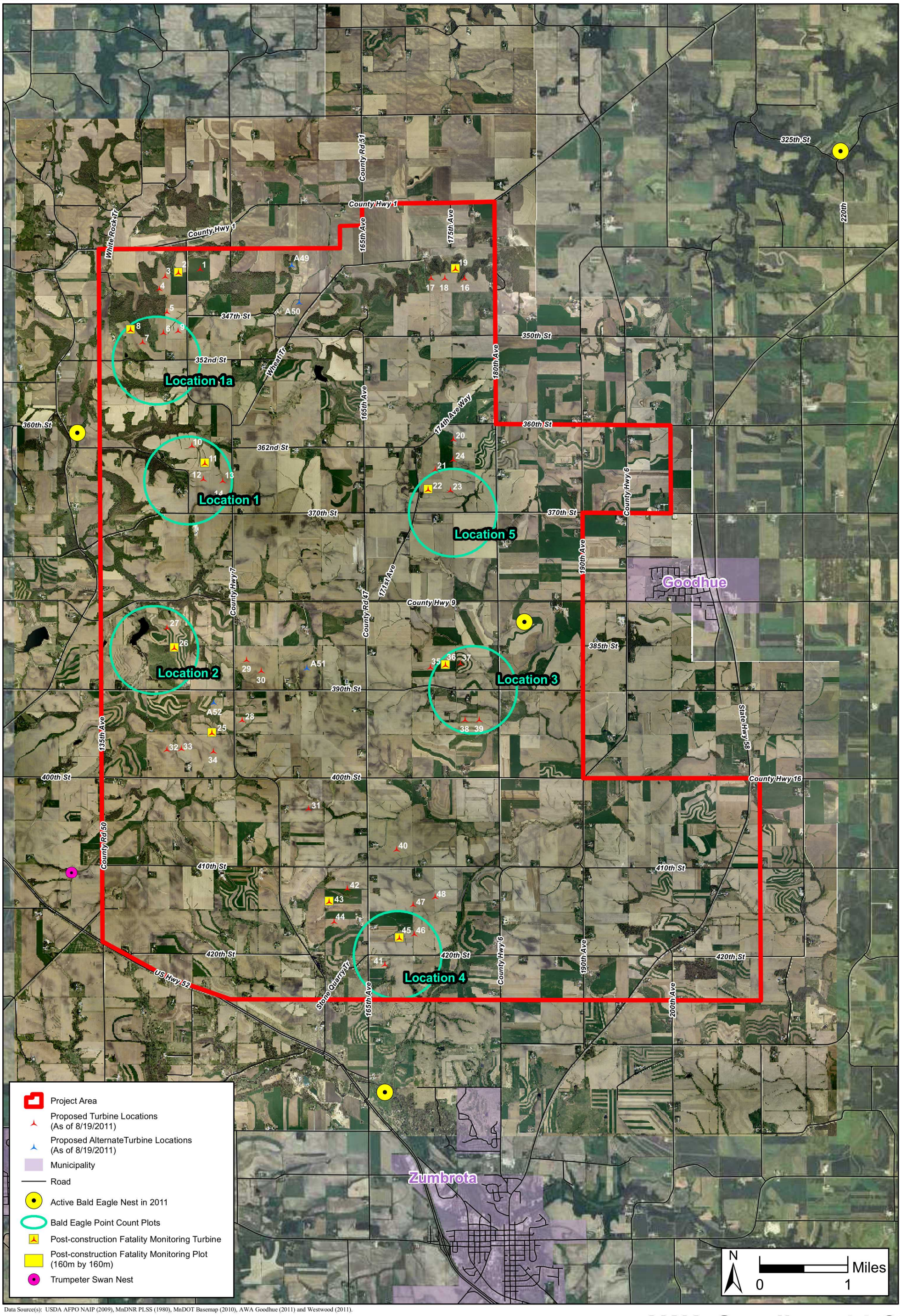


Data Source(s): USDA AFPO NAIP (2009), MnDNR PLSS (1980), MnDOT Basemap (2010), AWA Goodhue (2011) and Westwood (2011).

# AWA Goodhue, LLC

Goodhue County, Minnesota

Bald Eagle Point Count Plots, Post-construction Fatality Monitoring Turbines, and Trumpeter Swan Nesting Site

Exhibit 9

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Conservation Plans (ECP) can be developed in five stages, with each of the stages building upon the previous. The process provides an increasingly intensive evaluation of the likely effects of the configuration, development, and operation of a particular wind project site on eagles (USFWS 2011).

## Evolving USFWS Bald and Golden Eagle Conservation Plan (ECP) Guidance

The USFWS Draft ECP Guidance continues to evolve, and is part of the Department of the Interior's ongoing efforts to improve siting and permitting of renewable energy projects. The guidelines were officially published in the Federal Register on February 18, 2011, and were open for public comment for 90 days ending May 19, 2011. A total of 124 individuals, companies, agencies, and organizations, including the American Wind Energy Association (AWEA), submitted written comments on the Draft ECP Guidance. The USFWS has not announced formal revisions to the Draft ECP Guidance.

Effective November 10, 2009, the USFWS adopted rules establishing an incidental take permit process under the BGEPA, and has prepared Implementation Guidance for Eagle Take Permits (USFWS 2010b). To apply for a taking under the BGEPA, the applicant must complete permit application Form 3-200-71, which requires information such as: 1) a detailed description of the activity that will cause the disturbance or take of eagles; 2) the species and number of eagles that will be taken and the likely means by which they would be taken; 3) and an explanation of why avoidance of the take is not possible (USFWS 50 CFR Parts 13 and 22).

The USFWS reviews the taking applications and makes a determination as to whether a taking is or is not likely to occur under the circumstances described. If the USFWS determines that take is ~~not~~ likely ~~to occur, they may issue the~~but unavoidable, a permit may be issued if specific ~~permit issuance~~ criteria are met. The mission of the USFWS is to reduce the possibility of eagle take, and to only issue permits when taking is likely and cannot be avoided with practicable means (USFWS 50 CFR Parts 13 and 22).

## Minnesota Endangered Species Act (MESA)

The Minnesota Endangered Species Act (Minn. Stat. 84.0895) states that:

> "[n]otwithstanding any other law, a person may not take, import, transport, or sell any portion of an endangered species of wild animal or plant, or sell or possess with intent to sell an article made with any part of the skin, hide, or parts of an endangered species of wild animal or plant, except as provided in subdivisions 2 and 7 [of this Chapter]."

The Minnesota ESA requires the Commissioner of the DNR to develop lists of species that are: (1) endangered, if the species is threatened with extinction throughout all or a significant portion of its range; (2) threatened, if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range; and (3) species of special concern, if although the species is not endangered or threatened, it is extremely uncommon in this state, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included as

## SECTION NO. 3 - WILDLIFE IDENTIFICATION

Species:

_____

(If known, write the species. If not sure, write Unidentified.)

Field marks used: _____

(Identification marks that helped you determine the species of the bird, if you are not sure and have an educated guess, put it here. For example, red tail and white chest)

Number of Photos Attached: _____

(Print digital photos and attach to Wildlife Incident Reporting Form – include both in situ and close up photos that allow confirmation of diagnostic characteristics).

## SECTION NO. 4 – OBSERVATIONAL DATA

Physical condition:

_____

_____

_____

(Describe the physical condition at the time of discovery, including broken wings, all appendages attached?, all pieces found?, skeleton visible?, infested with anything?, etc)

Estimated Time since Death or Injury (days): _____ (<1, <4, <7, <14, <30, >30)

(Use your best judgment. Carcasses less than a few days old will have round, fluid filled eyes and will lack insect infestation. Carcasses with maggots are probably one to two weeks old. If bones are visible, the carcass is probably over 30 days old. Bones visible indicate over 30 days. Keep in mind that in cold weather carcasses will look fresh for much longer than in warmer weather.)

Other Field Notes:

_____

(Note anything else relevant to incident such as presence of other fatalities in the area, evidence of electrocution details, extreme weather conditions, or other details).

Ultimate Disposition of the Bird or Bat:

_____

(Taken to rehab center, Left in the field, or Placed in avian freezer)

## SECTION NO. 5 - RESPONDENT

Respondent Name: _____ Date_____

Signature: _____Date_____

All Wildlife Incident Reporting Forms should be sent to Wildlife Consultant and AWA Goodhue Site Manager at the end of each calendar year.

## SECTION NO. 6 – REPORTING TO USFWS

Date of Submission to USFWS: _____