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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. EA-2018-0202

SURREBUTTAL TESTIMONY

OF

TERRY J. VANDEWALLE

ON

BEHALF OF

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

St. Louis, Missouri
September, 2018

*****Denotes Highly Confidential Information*****

BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION

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SURREBUTTAL TESTIMONY OF TERRY J. VANDEWALLE ON BEHALF OF AMEREN MISSOURI

Q. Would you state your name please?

A. My name is Terry J. VanDeWalle. I work for Stantec Consulting Services Inc. ("Stantec"), at 2300 Swan Lake Boulevard, Suite 202, Independence, Iowa 50644. I am a Senior Biologist/Principal for Stantec.

Q. What are your duties as a Senior Biologist/Principal at Stantec?

A. As a Senior Biologist/Principal with Stantec, I manage projects; complete technical and Quality Assessment/Quality Control ("QA/QC") review of reports and studies; prepare permit applications, impact evaluations, and environmental reports for review under the Endangered Species Act ("ESA"), the Bald and Golden Eagle Protection Act ("BGEPA"), the Clean Water Act ("CWA"), and the National Environmental Policy Act ("NEPA"); design and conduct surveys for, and studies of, rare, threatened or endangered plants and animals, conduct wetland delineations, prepare wetland restoration and mitigation plans; and, complete fieldwork within my areas of expertise, such as herpetology, mammalogy, wildlife habitat analysis, wildlife population analysis, and wetlands, including wetland delineation and mitigation site searches and evaluations. I have prepared and presented numerous presentations at national scientific meetings on wildlife and wetland research I

have conducted. Additional information about my background and qualifications is contained in the attached Schedule TVW-S1.

A large part of my position at Stantec is working with clients and staff on identifying ways to avoid, minimize, and mitigate for environmental impacts on large scale and complex projects. In addition, I manage Stantec's Independence, Iowa office, including day-to-day operations and staff.

In my position at Stantec I often rely upon fieldwork, data gathering, and data analysis conducted by other qualified employees and professionals when drawing my professional opinion.

Q. What is your educational and professional background?

A. I earned an Associate of Science degree in Fisheries and Wildlife Biology from Kirkwood Community College in 1984, a Bachelor of Science in Animal Ecology from Iowa State University in 1986, and a Master of Arts in Biology from Drake University in 1993. Since the end of my formal educational career, I have also completed numerous continuing education courses in wetland ecology, along with specialized training related to the NEPA and ESA section 7 consultation. I have been conducting wildlife and other environmental studies for over 25 years and have worked closely with the U.S. Fish and Wildlife Service ("USFWS"), U.S. Army Corp of Engineers, and state resource agencies throughout the U.S. on numerous projects, which have included baseline avian and bat studies and permitting at over 100 wind projects in 17 states.

Q. On whose behalf are you offering testimony?

A. Union Electric Company d/b/a Ameren Missouri.

Q. Do you have a role with respect to the High Prairie Wind Facility project apart from providing testimony in this case?

A. Yes. I am Stantec's project manager for the High Prairie Wind project ("project") and have lead the wildlife studies and permit-related work for the project developer, Terra-Gen, since 2016. In this role, I have supervised the studies discussed later as well as work needed to follow the USFWS guidelines discussed below. Consequently, I have deep knowledge and familiarity with the project and the project area and the efforts that are underway to properly address bird and bat issues per USFWS guidelines.

Q. What is the purpose for your surrebuttal testimony?

A. The purpose of my surrebuttal testimony is to provide information concerning the field studies, agency consultation, and incidental take permitting process that are underway at the High Prairie Wind Energy Facility ("High Prairie"), and to respond to issues in rebuttal testimonies filed by Dr. Kathryn Womack, Ms. Jennifer Campbell, and Dr. Janet Haslerig from the Missouri Department of Conservation ("MDC") and Dr. Geoffrey Marke from the Office of the Public Counsel ("OPC").

Q. Has USFWS issued guidelines for addressing bird and bat concerns during wind farm development?

A. Yes, two USFWS documents specifically provide guidance to wind developers during development of a wind farm:

1. Land-Based Wind Energy Guidelines ("LWEG")[1]

   The USFWS's LWEG are a set of voluntary guidelines that provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-

[1] https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

based wind energy development. The LWEG suggest a tiered approach to assess the project's potential impacts to wildlife, including threatened and endangered species and their habitats. The objective of Tier 1 (Preliminary Site Evaluation) is a landscape-scale screening process using existing information sources to identify blocks of native habitat, ecological communities, and other areas of broad-scale wildlife value. Tier 2 (Site Characterization) focuses on site-specific natural resource information and existing information specific to the project area to evaluate potential risks to sensitive or protected natural resource features. Tier 3 (Field Studies) addresses field studies to document wildlife and habitat and predict potential impacts. Tier 4 (Post-Construction) addresses post-construction studies to estimate project impacts, and Tier 5 includes other post-construction studies (if needed).

2. Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy (ECPG)[2]

The ECPG provides specific in-depth guidance for conserving bald and golden eagles during the course of siting, constructing, and operating wind energy projects. Like the LWEG, the ECPG suggests a tiered approach to assess the project's potential impacts to eagles that fits into the LWEG framework. Stage 1 (Landscape Scale Screening) evaluates broad geographic areas to assess the relative importance of various areas to resident breeding and non-breeding eagles, and to migrant and wintering eagles. Stage 2 (Site Specific Surveys and Assessments) recommends the project developer collect quantitative data through scientifically rigorous surveys designed to assess the potential risk of the proposed project to eagles. Stage 3 (Predicting Eagle Fatalities) uses data

[2] https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

from Stage 2 in models to predict eagle risk expressed as the average number of fatalities per year extrapolated to the tenure of the permit. Stage 4 (Avoidance and Minimization of Risk and Compensatory Mitigation) uses the information gathered to determine potential conservation measures to avoid or minimize predicted risks at a given site. Stage 5 (Post-Construction Survey) includes conducting post-construction surveys to collect data that can be compared with the pre-construction risk-assessment predictions for eagle fatalities and disturbance if an eagle take permit ("ETP") is issued.

Q. Have these two guidance documents been followed during the development of the High Prairie Wind Energy Facility?

A. Yes. Stantec is preparing a Site Characterization Report that specifically describes the results of the LWEG Tier 1, Tier 2, and Tier 3 investigations conducted for the project. As part of the LWEG Tier 3 field studies, and as recommended by the ECPG (Stage 2), Stantec is conducting one year of monthly small and large bird use surveys and two years of eagle use surveys at 93 survey points located in Schuyler and Adair counties. The eagle use surveys specifically target eagles and collect data that will be used to predict eagle fatalities as per the ECPG Stage 3. A raptor nest search, focusing on eagle nests, was also completed within the project boundary and in a 10-mile buffer around the project as recommended by the ECPG.

In addition to avian studies, Stantec is conducting extensive field studies for bats in the project area. The field studies have included habitat assessments, acoustic surveys, and mist-netting surveys, all of which were completed using methods from the USFWS Range-wide Indiana Bat Survey Guidelines and under a USFWS-approved study plan. As per the guidelines, the protocols can also be used for northern long-eared bat presence/absence

surveys and are appropriate for other bat species as well. Surveys are led by Stantec bat biologists that hold the appropriate permits from both the USFWS and MDC. Surveys were conducted in Schuyler County in 2016 and in Adair County in 2018. The 2016 results have been provided to both USFWS and MDC. The 2018 results are currently being analyzed and will be provided to the agencies when complete.

The LWEG recommend that project developers prepare a Bird and Bat Conservation Strategy ("BBCS"). A BBCS is a document that outlines the measures the project will implement to avoid and minimize impacts to birds and bats and describes the steps the developer has taken to apply the LWEG. Stantec is currently preparing a BBCS for the High Prairie project that will specify measures to be implemented by the High Prairie project to minimize impacts to birds in general, and to eagles, bats, state-listed species, and state species of concern.

Q. Can you explain the federal threatened and endangered species incidental take permitting process?

A. Yes. Take (harm or harassment) of federally threatened and endangered species is prohibited under section 9 of the ESA. Incidental take (i.e., take that is not the purpose of and is incidental to an otherwise lawful activity [here, operation of a wind facility]) can be permitted under section 10 of the ESA. An incidental take permit (ITP) is required when non-Federal activities will result in take of threatened or endangered species. A habitat conservation plan ("HCP") must accompany an application for an ITP. The HCP associated with the permit ensures that the effects of the authorized incidental take are adequately

minimized and mitigated. In order to meet the permit issuance criteria of section 10(a)(2)(B) of the ESA,[3] an applicant must submit an HCP demonstrating that:

1. Taking will be incidental;
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
3. The applicant will ensure that adequate funding for the plan will be provided;
4. Taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and,
5. Other measures, as required by the Secretary, will be met.

An HCP must include:[4]

1. An assessment of impacts likely to result from the taking of federally listed species;
2. Measures the applicant will undertake to monitor, minimize, and mitigate for impacts, the funding available to implement such measures, and the procedures to deal with unforeseen or extraordinary circumstances;
3. Alternative actions to the taking that the applicant analyzed, and the reasons why the applicant did not adopt such alternatives; and,
4. Additional measures that the USFWS may require.

The most recent HCP Conservation Planning Handbook[5] incorporates the Five Points Policy, which requires the following:

1. Biological goals and objectives, which define the expected biological outcome for each species covered by the HCP;

[3] https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf
[4] Ibid
[5] Ibid

2. Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to biological goals and objectives;
3. Monitoring for compliance, effectiveness, and effects;
4. Permit duration which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty; and,
5. Public participation according to the NEPA.

Q. Has Terra-Gen initiated consultation with the USFWS regarding an incidental take permit?

A. Yes. Representatives from Terra-Gen and Stantec first met with USFWS staff at the Columbia Field Office in Columbia, Missouri on May 3, 2016 to discuss the High Prairie Wind project, the ITP process, and how best to proceed with preparation of an updated HCP. A draft HCP had been prepared for a much smaller project in the general location of the current High Prairie project in 2010 by a previous developer. At this meeting, discussion was held concerning additional, updated bat surveys (which led to the 2016 bat surveys), eagle use surveys (which began in May 2016), and that a new HCP needed to be developed. Terra-Gen has been consulting with USFWS regularly since that meeting regarding avian and bat surveys and development of an HCP, both through in-person meetings in Columbia, Missouri, and through regular email and phone communication between Terra-Gen, USFWS, MDC, and Stantec.

Q. In Dr. Womack's rebuttal testimony, she states that MDC has had limited involvement in the HCP process and that comments have been limited to survey locations and known bat resources, and she goes on to claim that MDC does not have an official role in the HCP process. Do you agree with this characterization of MDC involvement?

A. No. I cannot say exactly what Dr. Womack intended by her use of the word "official," but based on my involvement with HCPs in six other states, state conservation agencies do have a role in the HCP/ITP process. The USFWS HCP Handbook[6] recommends the appropriate State agency or agencies be involved early in the process to facilitate and streamline coordination and information exchange, and that USFWS should discuss this partnership with prospective applicants and strive to accommodate State requirements in the development of HCPs. In addition, on February 22, 2016 the USFWS and National Marine Fisheries Service published a Revised Interagency Cooperative Policy Regarding the Role of State Agencies in the ESA.[7] Regarding habitat conservation planning, the revised policy lists the following:

1. Use the expertise and solicit the information and participation of State agencies in all aspects of the habitat conservation planning process.
2. Work collaboratively with State agencies to the maximum extent practicable to advance efficiency and avoid duplication of effort when the Services and the States

[6] https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf

[7] https://www.gpo.gov/fdsys/pkg/FR-2016-02-22/pdf/2016-03541.pdf. This Revised Interagency Cooperative Policy Regarding the Role of State Agencies was developed under section 6 of the ESA which provides, among other things, that the Secretary (i.e., USFWS) is to "cooperate to the maximum extent practicable with the states" when USFWS is carrying out its duties under the ESA. See also USFWS *Laws & Policies Regulations and Policies Interagency Policy Regarding the Role of State Agencies in ESA Activities.* https://www.fws.gov/endangered/laws-policies/revised-policy-state-agencies.html

both have similar authority for permitting activities related to threatened and endangered species.

With regards to the High Prairie project, USFWS, at the first meeting on May 3, 2016, recommended that Terra-Gen contact MDC and that MDC be involved in development of the HCP as recommended by the HCP Handbook and the Interagency Cooperative Policy. Terra-Gen subsequently contacted MDC, and MDC staff has been invited and attended, either in person or by phone, every project meeting held since they were at the Columbia Field Office. Some combination of Dr. Womack, Ms. Campbell, Dr. Haslerig, and/or other MDC staff has attended all meetings regarding the HCP held with the USFWS. In addition, email and phone correspondence between Terra-Gen and Stantec staff and MDC has occurred and Stantec has responded to information requests from MDC, including Dr. Womack. Ms. Campbell provided Stantec with Natural Heritage Data dated November 22, 2017 at one of the in-person meetings in December 2017. MDC has been provided drafts of the High Prairie HCP Concept for review and comment.

Q. Has MDC staff communicated the kinds of concerns outlined in their testimonies filed in this case during meetings held to discuss the HCP?

A. While MDC has expressed some concern regarding wind development and impacts on bats and eagles within the state, it has not been to the extent or specificity as in the testimonies. During project meetings held with USFWS, Terra-Gen, MDC, and Stantec, MDC staff has remained relatively quiet. To that extent, Dr. Womack is correct that MDC's comments have primarily been limited to survey locations and known bat resources, along with clarifying questions regarding the HCP process and avian and bat surveys conducted at the site. If MDC staff has had other questions, comments or concerns, they have not raised

them in my presence. MDC's failure to engage more in these meetings is not because they have not been asked or allowed to participate or given the opportunity to provide additional comments; in fact, in these meetings all participants are asked if they have any input they wish to offer. As the lead of the HCP team, I can say we would have welcomed (and still would) any input MDC would like to provide. It is true that it is ultimately up to the USFWS to decide on the conditions of the ITP and we may not agree with all of MDC's input, but there is nothing stopping MDC from providing that input and from advocating for its position with the USFWS.

Q. Has a draft HCP been prepared for the project?

A. A full draft HCP has not been prepared at this time. In consultation with USFWS, Terra-Gen and Stantec have been working on an HCP Concept for a limited term (6 year) HCP covering the Indiana bat (Federally Endangered), northern long-eared bat (Federally Threatened), little brown bat (none listed), and tri-colored bat (none listed). Terra-Gen and Stantec are currently working with USFWS to finalize the concept. Drafts of the concept have been provided to MDC for comment as well, and MDC has been present at the meetings related to this concept. A full draft HCP is anticipated by the end of 2018. The USFWS is working with a third-party contractor to prepare an environmental assessment ("EA") under the NEPA. Both documents are anticipated to be available for public comment in 2019.

Q. Are there other noteworthy aspects of the HCP/ITP process about which the Commission should be aware?

A. Yes. The ITP issuance criteria under section 10(a)(2)(B) of the ESA require that the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of

the taking. That standard in turn establishes the level of minimization and mitigation that an ITP applicant must achieve to obtain the ITP. The USFWS's HCP Handbook states that to fully offset the impacts of take means "the biological value that will be lost from the incidental take will be fully replaced through mitigation with equivalent biological values."[8] When preparing an HCP, the applicant should strive to establish a net benefit goal or, at a minimum, a no net loss.[9] The HCP must describe the net effect on the species under the HCP compared to the baseline of no take. The "net effects" are effects that remain after balancing the negative effects of incidental take and the positive effects of minimization and mitigation. In order to obtain an ITP, the USFWS usually ensures that all practicable measures to minimize negative effects to covered species are considered before mitigation. To the extent negative impacts remain (e.g., there will be some take of listed species), the applicant will have to mitigate the impact by, for example, acquiring suitable habitat at an alternative site. Mitigation will be required for the High Prairie project and Terra-Gen is currently working on a mitigation plan that will be included in the HCP. The current High Prairie HCP Concept proposes to mitigate for take of all four covered species; however, it should be noted that the conservation benefits extend beyond the covered species to include other bats as well, including those listed by MDC as Species of Conservation Concern ("SOCC"). Mitigation requirements are being determined using Resource Equivalency Analysis ("REA") models developed by USFWS for the Indiana bat, northern long-eared bat, and little brown bat. No REA model is currently available for tri-colored bat.

[8] https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf
[9] Ibid

Q. Can you explain the federal eagle incidental take permitting process?

A. Yes. In 2007, the bald eagle was removed from the Federal List of Endangered and Threatened Wildlife in the lower 48 states (72 FR 37346-37372). The bald eagle remains protected under the BGEPA. Take, defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest, or disturb," is prohibited under BGEPA. The USFWS published a final rule (Eagle Permit Rule) on September 11, 2009 under the BGEPA (50 C.F.R. 22.26) authorizing limited issuance of permits to take bald eagles and golden eagles. A permit would authorize the take of bald eagles and golden eagles where the take is compatible with the preservation of the bald eagle and the golden eagle; necessary to protect an interest in a particular locality; associated with, but not the purpose of the otherwise lawful activity (e.g., operation of a wind facility); and

1. for individual incidences of take: the take cannot be practicably avoided; and,
2. for programmatic take: the take is unavoidable even though advanced conservation practices are being implemented.

This rule was revised and finalized on December 16, 2016 (81 FR 91494-91554). Revisions included changes to permit issuance criteria and duration, definitions, compensatory mitigation standards, criteria for eagle nest removal permits, permit application requirements, and fees. An eagle conservation plan ("ECP") must accompany an application for an ETP. The ECP associated with the permit ensures that the effects of the authorized incidental take are adequately minimized and mitigated if required.

Q. Has Terra-Gen initiated consultation with the USFWS regarding an eagle take permit?

A. Yes. The need for eagle use surveys and an eagle nest search were discussed at the first USFWS meeting on May 3, 2016. Terra-Gen has discussed its intent to prepare an ECP and pursue an ETP with the USFWS on several occasions, including an in-person meeting with Ryan Anthony, the USFWS eagle biologist covering Missouri. Stantec has provided preliminary survey results to USFWS and MDC at project meetings.

Q. Has a draft ECP been prepared for the project?

A. No. The Final Eagle Rule requires the completion of 2 years of pre-construction eagle use surveys for use in preparing an ECP in support of an application for the ETP. Based on the current schedule, two years of survey at all the eagle survey points will not be complete until October 2019. Stantec will begin working on the ECP in early 2019 so that it can be quickly finalized once the surveys are complete. The ECP and ETP application are scheduled to be submitted in Q4 2019.

Q. Dr. Womack, Ms. Campbell, and Dr. Haslerig all expressed concern in their testimonies that, because an HCP and an ECP has not been issued, and will not be issued until after the Certificate of Public Convenience and Necessity case is concluded, the terms and conditions are unknown, and that it is possible that Ameren Missouri will decide to not pursue an HCP or ECP if they are unable to agree upon terms for the HCP and ECP with the USFWS. Do you have an opinion on the likelihood that an ITP or ETP will not be pursued and obtained?

A. Yes. The ITP and ETP are currently being pursued, and it is my opinion that the likelihood of obtaining the permits is high for several reasons. First, based on previous surveys in the

area and the surveys completed by Stantec in 2016 and 2018, the presence of Indiana bats, northern long-eared bats, and bald eagles in the project area is well documented; therefore, there is risk of incidental take of these species. An ESA section 10 ITP and BGEPA ETP are specifically designed to provide take coverage for projects like High Prairie; that is, a non-federal activity that has the potential to result in incidental take of threatened or endangered species or an eagle. Terra-Gen has made it clear from the first meeting with USFWS on May 3, 2016 that it is their intent to prepare an HCP and pursue an ITP, and has subsequently stated its intent to pursue an ETP. In addition, Terra-Gen has been conducting field studies for the past three years to collect data for use in an HCP and ECP. During that same time period, Terra-Gen has been in regular contact with USFWS and has held a series of meetings with USFWS and MDC to discuss the development of an HCP and has met with USFWS to discuss development of an ECP. A draft High Prairie HCP Concept has been prepared and submitted to both USFWS and MDC for review and comment. Therefore, MDC is aware of the proposed conservation measures in the HCP and the direction the HCP is headed. Terra-Gen is currently finalizing the High Prairie HCP Concept and stated at a September 4, 2018 meeting at the USFWS Columbia Field Office, with the USFWS staff, Dr. Womack and Ms. Campbell in attendance, their intent to provide a full draft of the HCP by the end of 2018. In addition, Terra-Gen has contracted with Stantec's Topsham, Maine office to prepare an EA under the NEPA. Staff in that office are currently working as a third-party contractor directly with USFWS staff to prepare the EA. As the HCP team lead, and as the HCP team lead for four of the five ITPs that have been issued in USFWS Region 3 (Minnesota, Iowa, Missouri, Illinois, Wisconsin, Indiana, Michigan, and Ohio), I see no indication this HCP will not go forward.

In addition, although I am not privy to all the details, based on discussions with Terra-Gen and Ameren Missouri, ***[redacted]***, and if an ITP is not obtained, there are significant financial ramifications for Terra-Gen. It is both the risk of incidental take and this contractual requirement that are driving the HCP schedule and it is my professional opinion that the HCP and ECP will be finalized and applications for both an ITP and ETP will be submitted.

Q. Dr. Womack states several times in her testimony that MDC is not aware of any operating wind facilities with known Indiana bat maternity colonies and to her knowledge there has never been a take permit issued by the USFWS where there are known Indiana bat maternity colonies and documented roost trees within the proposed project area. Are you aware of wind projects with known maternity colonies, and if so, has USFWS issued an incidental take permit for any of the projects?

A. Yes. Although not yet operating, in July 2013 the USFWS issued an ITP to the Buckeye Wind Farm in Ohio, which had documented maternity colonies within the project area and an estimated summer population of 10.1 to 2,271.4 Indiana bats,[10] ITPs have been issued for other projects where known Indiana bat maternity colonies are located adjacent to the project area and where the original project area had been revised to not include the maternity colony. In addition, there are numerous wind farms located in suitable habitat within the range of the Indiana bat. There are three publicly available records of Indiana

[10] https://www.fws.gov/Midwest/endangered/permits/hcp/buckeyewind/pdf/finalhcpeis/BuckeyeFinalHCP25March2013.pdf;

bats being killed at wind projects during the summer maternity season (one each in Indiana and West Virginia[11] and one in Iowa).[12] At least one of these projects is currently seeking an ITP.[13] This clearly demonstrates there are operating wind farms with summer risks to Indiana bats.

Q. Dr. Womack states in her testimony that because the HCP is a federal process, it will not address the SOCC that MDC has identified as being potentially impacted by the project, such as the silver-haired bats, little brown bats, tri-colored bats and hoary bats. Do you agree with this conclusion?

A. No. Although not federally-listed, the little brown bat and tri-colored bat are listed as covered species in the High Prairie HCP Concept and Terra-Gen intends to seek take coverage for them as part of the USFWS ITP; therefore, the HCP does directly address both species despite neither species currently being protected under the ESA. Regarding other species, such as the silver-haired bat and hoary bat that are not specifically included as covered species in the HCP, the minimization measures proposed in the HCP for the covered species (i.e., a raised cut-in speed) are effective at reducing all bat mortality, including mortality of species listed as SOCC concern. Therefore, although not specifically listed as covered species, species such as the silver-haired bat and hoary bat are indirectly addressed by the terms of the HCP. Mortality of all bat species will be monitored through post-construction monitoring and impacts to SOCC will be addressed in the NEPA analysis associated with ITP issuance, as well as in the project's BBCS. The HCP will include a

[11] https://www.fws.gov/midwest/wind/wildlifeimpacts/inbafatalities.html
[12] https://www.fws.gov/midwest/rockisland/te/MidAmericanHCP.html
[13] Ibid

changed circumstance covering the listing of new species should any other species become federally-listed during the permit term.

Q. Dr. Womack states in her testimony that only federally protected bats are considered in the current draft HCP for the project. Is this statement correct?

A. No. As just noted, although not federally-listed, the little brown bat and tri-colored bat are listed as covered species in the High Prairie HCP Concept and Terra-Gen intends to seek take coverage for them; therefore, the HCP directly considers two species that are not federally protected. Dr. Womack seems to acknowledge this in her testimony by stating, "The draft HCP estimates the annual take of the project to be ***[redacted]***"

Q. Dr. Womack states in her testimony that intensive monitoring is important for all bat species, not just those required through the HCP. Do you agree with this statement?

A. Yes. Post-construction monitoring as proposed in the HCP will address all bat fatalities, not just those of the listed species. In fact, due to the low probability of finding a rare bat, it is vitally important that data be collected on mortality of all bat species in order to estimate mortality of the rare species. This is precisely why a robust post-construction monitoring plan using the Evidence of Absence ("EoA") software[14] as a guide to achieve the desired detection probability is included in the HCP.

Q. Can you describe the Evidence of Absence Software and how it is used?

A. EoA is a software tool that was created by the U.S. Geological Survey ("USGS") in cooperation with the USFWS to help design post-construction monitoring protocols and to

[14] Dalthorp, D., M. Huso, and D. Dail. 2017. Evidence of absence (v2.0) software user guide: U.S. Geological Survey Data Series 1055, 122 p., https://pubs.usgs.gov/ds/1055/ds1055.pdf.

evaluate take levels for rare events (i.e., take of a listed species). To my knowledge, USFWS Region 3 is now requesting that all HCPs use this robust statistical model to ensure permit compliance for ITPs and to evaluate the rigor of post-construction monitoring protocols. From the software's website:[15]

> Evidence of Absence software (EoA) is a user-friendly software application for estimating bird and bat fatalities at wind farms and for designing search protocols. The software is particularly useful in addressing whether the number of fatalities is below a given threshold and what search parameters are needed to give assurance that thresholds were not exceeded. The software also includes tools (1) for estimating carcass persistence distributions and searcher efficiency parameters (p and k) from field trials, (2) for projecting future mortality based on past monitoring data, and (3) for exploring the potential consequences of various choices in the design of long-term incidental take permits for protected species. The software was designed specifically for cases where tolerance for mortality is low and carcass counts are small or even 0, but the tools also may be used for mortality estimates when carcass counts are large.

For the High Prairie project, EoA has been used to develop the post-construction monitoring plan outlined in the current HCP Concept and is proposed to be used to ensure permit compliance and for adaptive management. The current High Prairie HCP Concept proposes a post-construction monitoring plan that would result in an overall detection probability (g) of 0.15 to 0.30 (i.e., 15%-30%). In other words, if an individual of a certain species were killed at the site, there would be a 15% to 30% chance of it being found during each of the weekly surveys. While this may not seem like a high probability, the EoA tool was designed to be used across multiple years, which means that the confidence level in the take estimate will build over time as monitoring continues and data accumulate throughout the life of the permit. Based upon how many carcasses of each species are found, how hard the area is being searched, and how many years of searches have been

[15] Ibid

conducted, EoA can be used to estimate the number of a certain species that have been killed and the average annual take rate of that species at a certain confidence level. In addition, even within a single year, because more than one of each species is predicted to be killed annually at the project, the probability of missing all fatalities is significantly lower than the probability of missing any single fatality (e.g., at a take of 10 per year, there would be just a 10% chance that searchers would miss all 10 Indiana bat fatalities.)[16] When this is extrapolated across multiple years (e.g., the 6-year permit term), the chance of missing all carcasses becomes increasingly small over time (just 0.00012%).[17]

Q. Dr. Womack states in her testimony that it is unclear what would happen if the project were to exceed its take limit. Do you have an opinion as to what would happen if the take limit in the ITP is exceeded?

A. Yes. First, based on my experience working on HCPs for the past nine years, exceeding the take limit in an ITP is something that both USFWS and the applicant need to avoid. Adaptive management, a required element of an HCP, is the mechanism used to do this and a lot of effort goes into developing an adaptive management strategy in the HCP designed to avoid exceeding the take limit. Adaptive management is a process that will allow High Prairie to adjust its actions to reflect new information or changing conditions in order to keep the take of covered species below the permitted level. In other words, if take is higher than expected, it will trigger a response (e.g., cut-in speed, deployment of deterrents if available, etc.) designed to further minimize take in order to prevent exceeding

[16] If the probability of finding a carcass is 20.3%, then the probability of not finding that carcass is 79.7% (1-0.203). If 10 Indiana bats were killed at the project, the probability of not finding all 10 would be 0.797^10, or 10.3%.
[17] If the probability of not finding all 10 carcasses in a given year is 10.3%, then the probability of not finding 10 carcasses per year for all six years of the permit term would be 0.103^6, or 0.00012%.

the take limit. The High Prairie HCP will include adaptive management. The section is currently being developed in consultation with USFWS using strategies consistent with other HCPs in the region. Post-construction monitoring will provide a measure of the effectiveness of the minimization measures implemented, as well as a measure of whether the project is operating in compliance with the ITP take limits. Adaptive management provides a mechanism to respond to changes in the fatality rates of the covered species, ensuring that ineffectiveness of minimization or changes in other conditions will not result in take above the permitted levels. The HCP will also include changed and unforeseen circumstances to ensure that appropriate measures are taken if such circumstances occur. The annual take estimate and annual take rate numbers will be used to trigger adaptive management to prevent the cumulative take estimate from ever exceeding the take limits of any of the covered species. If the annual take estimate or the annual take rate are above the values predicted in the HCP and the project is at risk of exceeding the take authorized by the ITP, then an adaptive management response will be implemented. If, at some point, the cumulative take estimate does approach or reach the permitted level of take for a covered species, the project will implement avoidance measures to avoid any future take (e.g., raising to a cut-in speed of 6.9 m/s at night or shut-down of turbines at night, etc.); thereby, keeping take at or below the authorized limit.

Q. Are you familiar with the Beech Ridge Wind Project and, if so, could you briefly explain the problems encountered by that project regarding listed bat species and your opinion as to whether the High Prairie project could face a similar problem?

A. I did not work on the Beech Ridge Project, but yes, I am generally familiar with it. Beech Ridge involved a wind project where the developer failed to pursue an ITP or propose to

operate in a way that would avoid or minimize impacts even though there was substantial evidence of a risk to Indiana bats in the project area and where the developer had been advised by USFWS that avoidance and/or minimization measures should be taken. Plaintiffs sued the Beech Ridge Wind Farm, located in West Virginia, under the citizen suit clause of the ESA, which authorizes citizens to enforce compliance with any provision of the ESA (16 USC § 1540(g)), claiming violation of section 9 of the ESA. As mentioned previously, take (harm or harassment) of federally threatened and endangered species is prohibited under section 9. At the time of the trial, the owner was completing foundations for 67 turbines, stringing transmission lines in agreed upon areas, and installing 40 turbines. After a period of lengthy litigation, the judge ruled that, "the ITP process is available to Defendants to insulate themselves from liability under the ESA and, while this Court cannot require them to apply for or obtain such a permit, it is the only way in which the Court will allow the Beech Ridge Project to continue."[18] The Court allowed the completion of construction of the 40 turbines already under construction at the time but halted the construction of additional turbines unless and until an ITP has been obtained. The Court did not completely prohibit the operation of those wind turbines under construction at the time once they were completed. However, the Court did find that operation could only occur during the periods of time when Indiana bats are in hibernation. The opinion of the Court was that there was "a virtual certainty that Indiana bats will be harmed, wounded, or killed imminently by the Beech Ridge Project."[19] In the final ruling, the judge concluded that, "… Defendants disregarded not only repeated advice from the FWS but also failed to

[18] https://www.courtlistener.com/opinion/1638483/animal-welfare-institute-v-beech-ridge-energy-llc/
[19] Ibid

take advantage of a specific mechanism, the ITP process, established by federal law to allow their project to proceed in harmony with the goal of avoidance of harm to endangered species."[20]

The High Prairie project bears no resemblance to the clear mistakes made at Beech Ridge. In contrast to that project, Terra-Gen recognized the risk of take of the Indiana bat and northern long-eared bat early in the development of the High Prairie project and has been working closely with USFWS (and MDC) since May 2016 to obtain an ITP for listed bat species at risk from the project. Therefore, in my opinion, the High Prairie project is not in danger of encountering the same problem as the Beech Ridge Project. In fact, Terra-Gen is, and has been, doing exactly what the judge concluded Beech Ridge had not been doing (i.e., pursuing an ITP).

Due to the risk of take of the Indiana bat and northern long-eared bat, the practical options available to Terra-Gen for operation of the project are 1) to obtain an ITP for the covered bat species, or 2) to avoid take of the listed bat species by operating at a cut-in speed of 6.9 m/s at night during the bat active season (April – October). Thus, take will either be avoided, or will be permitted through an ITP. I am not aware of any project that has been shut-down for issues related to threatened or endangered bat species that was operating at avoidance (6.9 m/s) or that had an ITP in place.

Q. Dr. Womack states in her testimony that, because Indiana bats were captured more than three times as often as little brown bats, that the take estimate for Indiana bats and little brown bats should not be the same. Do you agree with this conclusion?

[20] Ibid

A. No. While Indiana bats were captured more frequently during mist-net surveys in the project area in 2016, the take estimate is based upon both the species' capture rate as well as an adjustment ratio based upon data from other facilities comparing capture rates of various Myotis species (i.e., group of insect-eating bats including Indiana, northern long-eared, and little brown bats) with fatality rates. Therefore, while Indiana bats were captured more often at the site, a comparison of mist-net data and post-construction mortality data for wind projects with known Myotis presence, and a comparison of behavioral differences between Myotis species, suggests that Indiana bats are likely less prone to collision with wind turbines than little brown bats. Simply stated, just because there are more Indiana bats in the area than there are little brown bats, does not mean one would expect more Indiana bats to be taken. Little brown bats are known to roost in structures and areas away from woodlands, and to forage further from wooded areas[21] (i.e., in open, non-wooded areas where turbines are located); whereas, Indiana bats are generally thought to fly below 100 feet while foraging,[22,23,24] and to stay within 1,000 feet of suitable habitat.[25] These behavioral differences between the two species further support the conclusion in the High Prairie HCP Concept that, while Indiana bats were captured more frequently, their risk is not proportional to their mist-net captures.

[21] Reynolds, D.S. and J. Veilleux. 2008. Phase I Bat Risk Assessment: Mount Wachusett Community College Wind Energy Project, Worcester County, Massachusetts. Prepared for Mount Wachusett Community College. December 5, 2008. http://mwcc.edu/wp-content/uploads/blogs.dir/33/files/2012/01/BatRiskAssessment.pdf

[22] LaVal, R. K., R. L. Clawson, W. Caire, L. R. Wingate, and M. L. LaVal. 1976. An evaluation of the status of myotine bats in the proposed Meramec Park Lake and Union Lake project areas, Missouri. U.S. Army Corps of Engineers, St. Louis, USA.

[23] Humphrey, S. R., A. R. Richter, and J. B. Cope. 1977. Summer habitat and ecology of the endangered Indiana bat, Myotis sodalis. Journal of Mammalogy 58:334-346.

[24] Russell, A. L., C. M. Butchkoski, L. Saidak, and G. F. McCracken. 2008. Road-killed bats, highway design and the commuting ecology of bats. Endangered Species Research. DOI: 10.3354/esr00121.

[25] USFWS. 2014. Northern Long-eared Bat Interim conference and Planning Guidance. U.S. Fish and Wildlife Service Regions 2, 3, 4, 5, and 6. 6 January 2014.

Q. Dr. Womack in her testimony states that the HCP uses a cut-in speed of 5.0 m/s resulting in a 62% reduction in bat mortality, while the average range is 55-62% and Fowler Ridge (the closest wind facility) only documented a 50% reduction. She believes that the minimization effects of 5.0 m/s are being overstated, and actual fatalities are likely to be higher than predicted. Do you agree with this conclusion?

A. No. The 55% average reduction is only when including studies from USFWS Region 8 (California and Nevada), an area with Brazilian free-tailed bats, a species not found in the High Prairie project area and known to be active at higher wind speeds (and thus at greater risk of collision) compared to the typical suite of species in Missouri (including the four species covered by the HCP). Therefore, those studies were excluded, which results in an average reduction of 62%. The 50% reduction seen at Fowler Ridge did not include feathering below cut-in speed (i.e., preventing the blades from turning until the proper cut-in speed is reached), which the current High Prairie HCP Concept proposes, which would increase the effectiveness of curtailment. Additionally, as stated in the High Prairie HCP Concept, the reduction is likely even higher for Myotis species (i.e., Indiana bat, northern long-eared bat, little brown bat), which are adapted for foraging over water or near vegetation, rather than the open-air aerial hawking used by migratory tree bats (e.g., silver-haired bats, hoary bat, eastern red bat).[26] Curtailment above even 4.0 m/s has been shown to reduce Myotis fatalities by over 90%,[27] leading to the reasonable conclusion that curtailment at 5.0 m/s would be even more protective. To be conservative, High Prairie

[26] Norberg, U.M. and Rayner, J.M., 1987. Ecological morphology and flight in bats (Mammalia; Chiroptera): wing adaptations, flight performance, foraging strategy and echolocation. Phil. Trans. R. Soc. Lond. B, 316(1179), pp.335-427.

[27] Gruver, J. and L. Bishop-Boros. 2015. Summary and Synthesis of Myotis Fatalities at Wind Facilities with a Focus on Northeastern North America. Prepared for EDP Renewables. Prepared by Western EcoSystems Technology, Inc. April 13, 2015.

proposes to assume a 62% reduction for all take calculations, despite the likelihood that actual reductions will be higher.

As stated in the High Prairie HCP Concept, post-construction monitoring will provide a measure of the effectiveness of the minimization measures implemented, as well as a measure of whether the project is operating in compliance with the ITP take limits. Adaptive management will provide a measure to respond to changes in the fatality rates of the species covered by the HCP should they occur, ensuring that ineffectiveness of minimization or changes in other conditions will not result in take above the permitted levels. Operational adjustments made through adaptive management will also reduce fatality of other non-covered species.

Q. Dr. Womack in her testimony states that curtailment (i.e., raising the cut-in speed) could greatly reduce bat mortality from collision with turbine blades and that several strategies to reduce impacts on bats and other wildlife are under development, including detect-and-curtail approaches, detect-and-deter approaches, operational curtailment, seasonal curtailment, blade-painting schemes, deterrents, and wind turbine design modifications. Do you agree with these statements?

A. Yes. Research has shown that there is an inverse relationship between bat activity and wind speed, and we are proposing a raised cut-in speed for that very reason. As wind speed increases, bat activity decreases. As described in the High Prairie HCP Concept (and reproduced on page 49 of Dr. Womack's testimony), post-construction data demonstrate that raising the cut-in speed of a turbine (i.e., the wind speed at which turbine blades begin spinning and generating power) can reduce overall bat mortality. To my knowledge, aside from shutting down the turbines, raising the cut-in speed is currently the only proven

effective way to reduce bat fatalities. As such, operational adjustment is the primary minimization method proposed in the High Prairie HCP Concept. High Prairie proposes to raise the cut-in speed of turbines to 5.0 m/s, resulting in an estimated 62% reduction in overall bat fatalities which, as earlier noted, likely understates the actual reduction for Indiana bats, northern long-eared bats, and little brown bats.

I agree that a number of potential methods for reducing bat fatalities at wind projects, including those listed by Dr. Womack, are under development and in some cases research into the effectiveness of the methods is underway. However, to my knowledge, most other methods are not commercially available at this time. The final High Prairie HCP will include a changed circumstance addressing new technology. If new technology for reducing bat fatalities becomes available during the ITP permit term, and the technology is approved by USFWS, High Prairie will have the option to implement it as a minimization measure.

Q. Dr. Womack in her testimony states that estimates of take for all species are based on studies not in the region and are often based on the specific bat community within or surrounding wind facilities. She goes on to say that there are no known wind facilities with the same bat community and numbers of individuals (as High Prairie) in operation and that the (High Prairie) project area is unique. Do you agree with these statements?

A. Yes. Dr. Womack is correct that the habitat and bat community at an individual wind facility are unique and that take estimates are best when they are based on site-specific mortality data. It is not possible to have site-specific mortality data for a site where a wind facility does not currently exist. Therefore, we must rely on data from other facilities where

data does exist. While High Prairie has attempted to use the best available science, including site-specific mist-net data, in calculating the take estimates, it is because of this precise situation (i.e., no site-specific mortality data) that High Prairie is proposing a short-term ITP (i.e., six years). The advantage of a short-term ITP is that it allows for collection of site-specific mortality data over a short time frame while testing the effectiveness of the minimization measures. If the minimization measures are less effective, or if take is higher than estimated, changes can be made through adaptive management. At the end of the six-year permit term, High Prairie will have site-specific mortality data, along with data on the effectiveness of the minimization measures and post-construction monitoring, from which more accurate take estimates can be derived for use in a long-term HCP/ITP. In my professional opinion, the short-term ITP is the best approach to addressing Dr. Womack's concerns, while at the same time providing High Prairie with take coverage and not locking either the applicant or the USFWS into long-term commitments (e.g., minimization measures, mitigation requirements) given that site-specific mortality data is not available since there is no existing wind facility in the area.

Q. Dr. Womack in her testimony references a 2017 paper by Frick et al. that estimated an up to a 90 percent decline in hoary bat populations in the next 50 years due to wind turbine strikes. Are you familiar with the paper, and if so, are there other noteworthy aspects of this paper about which the Commission should be aware?

A. Yes, I am familiar with the paper. Frick et al. (2017)[28] looked at a variety of different potential population estimates for the hoary bat, from less than 2.5 million to 10 million,

[28] Frick, W.F., E.F. Baerwald, J.F. Pollock, R.M.R. Barclay, J.A. Szymanski, T.J. Weller, A.L. Russell, S.C. Loeb, R.A. Medellin, L.P. McGuire. 2017. Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation 209 (2017) 172-177.

and at a variety of estimates of population growth. While the paper did conclude that up to a 90% decline may be possible due to fatalities from wind energy, the paper also stated that current population sizes and population growth rates are unknown; thereby, adding substantial uncertainty to the estimate.

In addition, as stated in the Frick et al. paper, the American Wind Energy Association ("AWEA") has recently adopted policies to limit blade movement during low wind speeds as a voluntary measure to reduce fatalities, which would lessen the impact of wind on all species of bats, including the hoary bat. For the purposes of estimating fatality, Frick et al. assumed no curtailment actions at wind turbines; however, many existing projects, along with many currently in development, are voluntarily feathering below manufacturer's cut-in speed per AWEA recommendations or seeking ITPs or Technical Assistance Letters ("TAL") which include raised cut-in speeds, all of which would result in decreased mortality of all bat species, including hoary bats. This will be true of the High Prairie project as well. Research is also ongoing into deterrents, smart curtailment, and other ways of decreasing bat fatalities (as noted in Dr. Womack's testimony), which are likely to become commercially available in the future and will also decrease impacts to all bat species over the next 50 years.

While Frick et al. paper states that hoary bats are the most frequently killed bat at wind facilities in North America, based on publicly-available post-construction monitoring data,[29] hoary bats make up 26.1% of all bat fatalities at wind energy facilities in the Midwest, and only 34.2% of fatalities within Missouri (eastern red bats are more frequently

[29] USFWS. 2016i. Midwest Wind Energy Multi-Species Habitat Conservation Plan. Public Review Draft. U.S. Fish and Wildlife Service Midwest Region, in collaboration with the States of Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, and Wisconsin and the American Wind Energy Association. April 2016.

killed in both areas). The current High Prairie HCP Concept proposes a cut-in speed of 5.0 m/s from sunset to sunrise from April 1 – October 31 when air temperature is above 50^0F. This is expected to yield an average reduction of 62% for all bat species,[30,31,32,33,34] including the hoary bat.

Q. Dr. Womack in her testimony makes the following recommendation. Conduct a minimum of one-year full active season (March 15- October 31) pre-construction monitoring for all bats, including both acoustic and mist net surveys with radio telemetry to find roost trees for Indiana bats and northern long-eared bats. Do you have a response to this recommendation?

A. These activities have either been completed or are nearing completion. High Prairie conducted acoustic presence/absence surveys at 70 sites in Schuyler County in 2016 and at an additional 65 sites in Adair County 2018. These surveys were accompanied by mist-net surveys at 33 sites in each county (66 sites total). Indiana bats and little brown bats were radio-tagged and tracked to roost trees; no northern long-eared bats were radio-tagged as only one individual was captured, and it escaped the net prior to tagging. In addition, a

[30] Arnett, E.B., M.M.P. Huso, M.R. Schirmacher, and J.P. Hayes. 2011. Altering turbine speed reduces vat mortality at wind-energy faciltiies. Frontiers in Ecology and the Environment. 9(4): 209-214.
[31] Good, R.E., W. Erickson, A. Merrill, S. Simon, K. Murray, K. Bay, and C. Fritchman. 2011. Bat Monitoring Studies at the Fowler Ridge Wind Energy Facility, Benton County, Indiana, April 13 – October 15, 2010. Prepared for Fowler Ridge Wind Farm. Prepared by Western EcoSystems Technology, Inc. 28 January 2011.
[32] Hein, C.D., A. Prichard, T. Mabee, and M.R. Schirmacher. 2013. Effectiveness of an Operational Mitigation Experiment to Reduce Bat Fatalities at the Pinnacle Wind Farm, Mineral County, West Virginia, 2012. An annual report submitted to Edison Mission Energy and the Bats and Wind Energy Wind Cooperative. Bat Conservation International. Austin, Texas, USA.
[33] Hein, C.D., A. Prichard, T. Mabee, and M.R. Shirmacher. 2014. Efficacy of an operational minimization experiment to reduce bat fatalities at the Pinnacle Wind Farm, Mineral County, West Virginia, 2013. An annual report submitted to Edison Mission Energy and the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.
[34] Young, D., C. Nations, M. Lout, and K. Bay. 2013. 2012 Post-Construction Monitoring Study, Criterion Wind Project, Garret County, Maryland, April – November 2012. Prepared for Criterion Power Partners, LLC. Prepared by Western EcoSystems Technology, Inc. 15 January 2013.

full active season acoustic study is underway in 2018, monitoring bat activity at 5 meteorological towers and 1 woodland control site associated with each tower within the High Prairie project area.

Q. Dr. Womack in her testimony makes the following recommendation. Submit a Natural Heritage Review Request ("NHRR") to the Department of Conservation for the project area. Do you have a response to this recommendation?

A. Yes, we have received the information. Ms. Campbell provided Stantec with the results of an NHRR dated November 22, 2017 at an in-person meeting held at the USFWS Columbia Field Office on December 11, 2017.

Q. Dr. Womack in her testimony makes the following recommendation. Site turbines greater than 1,000 feet from known maternity roost trees and capture locations for federally listed species. Do you have a response to this recommendation?

A. Stantec provided the locations of the maternity roosts identified during the 2018 bat survey along with those identified in 2016 to Terra-Gen on September 17, 2018. Terra-Gen is currently evaluating the location of the turbines in relation to known maternity roosts to determine if any conflicts exist. The HCP will address this issue.

Q. Dr. Womack in her testimony makes the following recommendation. Avoid tree removal that would fragment the landscape. Do you have a response to this recommendation?

A. Terra-Gen is currently in the process of determining the extent of tree clearing that will be required and has indicated to USFWS their intent to minimize tree clearing to the maximum extent possible. The HCP will address this issue.

Q. Dr. Womack in her testimony makes the following recommendation. Avoid tree clearing and fragmentation of habitat where possible. Any tree clearing associated with construction should occur outside the active season for bats (March 15– October 31). No known maternity trees identified during pre-construction surveys or by the NHRR should be cleared during construction of the project. Do you have a response to this recommendation?

A. Stantec provided the locations of the maternity roosts identified during the 2018 bat survey along with those identified in 2016 to Terra-Gen on September 17, 2018. Terra-Gen is currently evaluating the location of the turbines in relation to known maternity roosts to determine if any conflicts exist. Terra-Gen is currently in the process of determining the extent of tree clearing that will be required and has indicated to USFWS their intent to minimize tree clearing to the extent possible. Terra-Gen is reviewing the construction schedule to determine the feasibility of clearing during the winter. All of these matters will be addressed in the HCP which, as noted, will provide the basis for the ITP.

Q. Dr. Womack in her testimony makes the following recommendation. Curtailment (cut-in speed) to 6.9 m/s wind speed should be fully implemented during the active season whenever temperatures are above 50 degrees Fahrenheit from 30 minutes before sunset until 30 minutes after dawn. This could potentially reduce bat mortality between 73 and 89 percent. Do you have a response to this recommendation?

A. The recommendation goes too far. The USFWS considers a cut-in speed of 6.9 m/s to be full avoidance for the Indiana bat and northern-long-eared bat.[35] Therefore, if the project

[35]See, e.g., Northern Long-eared Bat Interim Conference and Planning Guidance, USFWS Regions 2, 3, 4, 5 and 6 (Jan. 2016).

operates at that cut-in speed an HCP would not be prepared, and an ITP would not be necessary. If no HCP is prepared, the four species that would otherwise be covered would not have the protections or the conservation benefits (e.g., mitigation) afforded to them through development and implementation of an HCP. For projects where incidental take of listed species may occur, preparing an HCP which minimizes the take to the maximum extent practicable and applying for an ITP is the correct course of action.

High Prairie has proposed a cut-in speed of 5.0 m/s from sunset to sunrise from April 1 – October 31 when air temperature is above 50^0 F, which is expected to yield an average reduction of 62% for all bat species. This reduction is likely even higher for Myotis species (i.e., Indiana bat, northern-long-eared bat, little brown bat), which are adapted for foraging over water or near vegetation, rather than the open-air aerial hawking used by migratory tree bats. Curtailment above even 4.0 m/s has been shown to reduce Myotis fatalities by over 90%,[36] leading to the reasonable conclusion that curtailment at 5.0 m/s would be even more protective.

Q. Dr. Womack in her testimony makes the following recommendation. Turbine blades should be feathered during maternity colony break up and fall migration (August 1 through October 31) in addition to the 6.9 m/s curtailment to further reduce collision risk. Do you have a response to this recommendation?

A. Yes. The High Prairie HCP Concept states that below the cut-in speed, turbine blades will be feathered so that they do not spin until a designated cut-in speed is reached, which has been shown to further reduce bat mortality.

[36] Gruver, J. and L. Bishop-Boros. 2015. Summary and Synthesis of Myotis Fatalities at Wind Facilities with a Focus on Northeastern North America. Prepared for EDP Renewables. Prepared by Western EcoSystems Technology, Inc. April 13, 2015.

Q. Dr. Womack in her testimony makes the following recommendation. For the first year of the project, conduct carcass persistence study during the active season (March 15-October 31). A carcass persistence study is when carcasses are left on the landscape and monitored daily or at a certain time interval to determine how quickly scavengers will find and remove carcasses. Ameren Missouri should search 100 percent of a mowed radius around each turbine daily to estimate carcass persistence and searcher efficiency at each turbine location. The search area should be a mowed 90-m radius around the turbine. Do you have a response to this recommendation?

A. I agree that searcher efficiency and carcass persistence need to be measured; however, the method suggested by Dr. Womack is not the industry standard for how carcass persistence and searcher efficiency are measured. Both are done through controlled trials, during which carcasses are randomly placed within survey plots at varying times during the search seasons. Carcasses are placed at least once during each season, thereby spreading the trials throughout the survey period to incorporate the effects of varying weather, climatic and vegetation conditions, and scavenger types and densities. Carcass persistence trials are completed concurrent with searcher efficiency trials using the same test carcasses as used in searcher efficiency trials. Observers conducting carcass searches monitor the trial carcasses over a period of time (typically 30 days). At each visit, the observer notes the condition of the carcass (e.g., intact, scavenged, complete). Trial carcasses are left at the location until the end of the trial or until the carcass is removed entirely by scavengers.

A weekly search interval for fatality monitoring has been determined to be adequate[37] and studies have demonstrated that a weekly search interval provides effective mortality monitoring and adequately estimates impacts from wind energy facilities,[38, 39] such that the added effort associated with more frequent intervals (e.g., the seven times as frequent interval suggested by Dr. Womack) is not warranted. The LWEG recommend that "carcass searching protocol should be adequate to answer applicable…questions at an appropriate level of precision to make general conclusions about the project." The current High Prairie HCP Concept proposes a weekly search interval but allows for the interval to be adjusted as necessary based on the results of the carcass persistence trials (e.g., if carcass persistence is less than seven days on average, the search interval may be shortened if necessary to achieve the desired overall detection probability of 20-30% based on EoA [see previous response]).

A 40-m radius search plot is currently proposed in the High Prairie HCP Concept, and all full plots will be cleared (e.g., mowed) as frequently as necessary to maintain ground surface visibility. The unsearched areas at each turbine will be accounted for through the use of an area adjustment in the data analysis. The methods proposed in the High Prairie HCP Concept are consistent with industry standards and have been accepted by the USFWS and state resource agencies throughout the Midwest.

[37] Kunz, T. H., Arnett, E. B., Cooper, B. M., Erickson, W. P., Larkin, R. P., Mabee, T., Morrison, M. L., Strickland, M. D., and J. M. Szewczak. 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71(8): 2449-2486.
[38] Gruver, J., Sonnenburg, M., Bay, K., and W. Erickson. 2009. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond du Lac County, Wisconsin. July 21, 2008-October 31, 2008 and March 15, 2009-June 4, 2009. 104pp.
[39] Young, D.P., Erickson, W.P., Bay, K., Nomani, S., and W. Tidbar. 2009. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring. July-October 2008. Prepared for NedPower Mount Storm, LLC. 54 pp.

Q. Dr. Womack in her testimony makes the following recommendation: For six years following construction, Ameren Missouri should conduct operational monitoring by the evidence of absence approach at G-level of 0.3. Monitoring should be conducted during the entire active season (March 15 to October 31) as follows. Mow a 90-m radius search area around each turbine every two weeks from April 1 to August 31. Do you have a response to this recommendation?

A. In my opinion, the recommendation goes too far with regard to the size of the search area, but in any event, this will be subject to agreement with USFWS as part of the HCP/ITP process. Although still being negotiated with USFWS, in the High Prairie HCP Concept, High Prairie proposes to conduct post-construction monitoring annually from April 1 – October 31 for the life of the permit. High Prairie used the EoA Software[40] (see previous response concerning EoA) to evaluate post-construction monitoring protocols for the project. EoA relies upon observed carcasses of rare species (such as the covered species) to determine the likelihood that actual mortality of those species has not exceeded the authorized amount. The model can also be used to develop post-construction monitoring plans to increase the likelihood of detecting a rare event, such as detecting the carcass of a threatened or endangered species. Based upon a desired probability of detection (g) for the High Prairie project of between 0.15 and 0.30 for robust monitoring, a weekly search interval with 70% of the turbines being searched on the roads and pads and 30% of the turbines having 40-meter circular cleared plots was chosen for the High Prairie HCP Concept, which results in a probability of detection (g) of 0.203. The size of the full plots

[40] Dalthorp, D., M. Huso, and D. Dail. 2017. Evidence of absence (v2.0) software user guide: U.S. Geological Survey Data Series 1055, 122 p., https://pubs.usgs.gov/ds/1055/ds1055.pdf.

proposed in the High Prairie HCP Concept (40-meter circular cleared plots) was chosen based on carcass distribution data from operating wind farms and other variables that influence the g-value (e.g., search efficiency, search interval, carcass persistence). As stated in the High Prairie HCP Concept, carcass distribution data from other wind farms has shown that 71% of all carcasses fall within 40-m of the turbine base; therefore, a 40-m radius circular plot will target the majority of all fatalities, and the post-construction data analysis will take into account the 29% of carcasses that are assumed to fall outside of this area. All full plots will be cleared (e.g., mowed) as frequently as necessary to maintain ground surface visibility.

Q. Dr. Womack in her testimony makes the following recommendation: If additional species are federally listed during the life of the project, an additional two years of monitoring should occur from listing date for that species. Do you have a response to this recommendation?

A. The HCP will include a changed circumstance for listing of a new species to ensure that appropriate measures are taken if such a circumstance were to occur. Any data collected during post-construction monitoring prior to a new listing would include data on all species found, regardless of listing status. Thus, even if a species is not listed until later in the life of the project, the project would have pre-listing post-construction monitoring data on the species to rely on. In addition, the project will have some level of post-construction monitoring each year of the permit; therefore, if listing occurs during the permit term, monitoring will take place. I would note that the High Prairie HCP Concept covers two species (little brown bat and tri-colored bat) that are not listed at the present time, but which

there is some expectation will become listed in the future. Consequently, Terra-Gen has already acted proactively in this area.

Q. Dr. Womack in her testimony makes the following recommendation: Ameren Missouri should monitor existing bat colonies within the project area during the life of the project to detect impacts. Monitoring should include radio tracking, migration work, and emergence counts of roost trees during the maternity season (March 15-August 15). Do you have a response to this recommendation?

A. This recommendation is unnecessary and has no relevance to ITP permit compliance. Local bat populations could decline for reasons completely unrelated to the High Prairie project, most notably the fungal disease White-nose Syndrome that is killing millions of cave hibernating bats and is known to be present in Missouri. It is possible that the High Prairie project could never kill an Indiana bat, and yet Indiana bats could disappear from the project area.

As per the permit issuance criteria of section 10(a)(2)(B) of the ESA, the permitted take must not appreciably reduce the likelihood of the survival and recovery of the species in the wild and take limits in an ITP are set to achieve that goal. Post-construction mortality monitoring is the appropriate mechanism to determine the effectiveness of the minimization measures and permit compliance (i.e., take remains below permitted levels). The High Prairie HCP Concept includes a robust post-construction monitoring plan designed to monitor permit compliance, and an adaptive management plan to ensure take remains below permitted levels. Radio tracking, migration work, and emergence counts of roost trees, while providing presence/absence and other life history information, do not provide data that can be used to evaluate mortality caused by a wind farm.

Q. Dr. Womack in her testimony makes the following recommendation: Report all bat mortalities to MDC. Do you have a response to this recommendation?

A. The recommended reporting will occur. The post-construction monitoring annual report, including a summary of all bat carcasses found during the year, will be submitted to both USFWS and MDC.

Q. Dr. Haslerig in her testimony makes the following recommendation: Require Ameren Missouri to conduct post-construction monitoring of eagle fatality and disturbances in accordance in USFWS Guidance. Do you have a response to this recommendation?

A. The recommended reporting will occur. Post construction monitoring is a required element in an ECP and will be included in the High Prairie ECP.

Q. Dr. Haslerig in her testimony makes the following recommendation: Ensure a two-mile buffer around known (present and future) eagle nests within the project area where turbines cannot be constructed, or if already constructed, cannot operate. Two miles is necessary to protect the adjacent foraging area. Do you have a response to this recommendation?

A. The specifics around these topics will be determined in consultation with USFWS during development of the ECP; however, a two-mile buffer to protect adjacent foraging area is not warranted. Eagles are unlikely to be disturbed by routine use of roads and other facilities.[41] Although foraging by eagles may decrease in the vicinity of turbines, similar foraging habitat is widely available throughout Schuyler and Adair counties and eagles are a highly mobile species with large home ranges. Additionally, several studies of various

[41] USFWS. 2007. National Bald Eagle Management Guidelines. U.S. Fish and Wildlife Service, May 2007. 25 pp.

upland raptors have found most species to have a low sensitivity for displacement or disturbance at operating wind energy facilities.[42]

Q. Dr. Haslerig in her testimony made several recommendations regarding reporting mortality of eagles, SOCC, and other bird species. Do you have a response to these recommendations?

A. Yes. Post-construction monitoring annual reports, including a summary of all bird carcasses found during the year, will be submitted to both USFWS and MDC.

Q. Dr. Marke in his testimony references a 2016 paper by Lintott et al. that concludes risk to bats posed by wind farms is not accurately predicted. Are you familiar with the paper, and if so, is there other noteworthy information concerning this conclusion in regard to the High Prairie project the Commission should be aware of?

A. Yes, I am familiar with the paper. Lintott et al.[43] references "Environmental Impact Assessments" and "Ecological Impact Assessments," and focused on studies conducted in the United Kingdom, which do not necessarily conform with the same requirements or recommendations followed in the U.S. (e.g., LWEG, ECPG). It is understood among resource agencies and wind developers that pre-construction bat activity surveys (conducted primarily with acoustics, as noted by Lintott et al.) do not adequately predict bat risk at a site.[44] In other words, a site with high pre-construction bat activity could have low post-construction mortality, and vice versa. Because pre-construction activity cannot

[42] As cited in: Whitfield, D.P., and M. Madders. 2006. A review of the impacts of wind farms on hen harriers (*Circus cyaneus*) and an estimation of collision avoidance rates. Natural Research Information Note 1 (Revised). Natural Research, LTD. Banchory, Aberdeenshire, UK. August.

[43] Lintott, P.R., Richardson, S.M., Hosken, D.J., Fensome, S.A. and Mathews, F., 2016. Ecological impact assessments fail to reduce risk of bat casualties at wind farms. Current Biology, 26(21), pp.R1135-R1136

[44] C.D. Hein, J. Gruver, E.B. Arnett. 2013. Relating pre-construction bat activity and postconstruction bat fatality to predict risk at wind energy facilities: a synthesis. A report submitted to the National Renewable Energy Laboratory Bat Conservation International, Austin, TX, USA.

be used to accurately predict risk to bats at a site, the High Prairie HCP Concept also uses post-construction mortality data from operational wind farms to better estimate take of bats at High Prairie.

In addition to concluding that risk to bats is not adequately predicted, Lintott et al. also conclude that the mitigation (what we would refer to as minimization) is then not adequate. The Lintott et al. paper goes on to state, as noted in Dr. Marke's testimony, that greater emphasis should be placed on assessing the actual impacts post-construction and on developing effective minimization strategies. This is precisely what is required of an HCP developed for ITP issuance and what is included in the High Prairie HCP Concept - post-construction monitoring and adaptive management. Post-construction monitoring is used to confirm that take is at or below permitted levels and if the minimization measures are not as effective, or if take is higher than estimated, changes to the minimization measures can be made through adaptive management. Adaptive management, a required element of an HCP, includes methods for addressing uncertainty and is the hedge against the uncertainly related to estimating take at sites without site-specific mortality data.

In addition, because of the difficulties inherent in predicting take of bats at a project that has not yet been built, High Prairie is proposing a short-term ITP (i.e., six years). The short-term ITP will allow for collection of site-specific mortality data over a short time frame while testing the effectiveness of the minimization measures. At the end of the 6-year permit term, High Prairie will have site-specific mortality data, along with data on the effectiveness of the minimization measures and post-construction monitoring, from which more accurate take estimates can be derived for use in a long-term HCP/ITP; thereby, doing

precisely what was recommended by Lintott et al. and addressing Dr. Womack's concerns related to not using site-specific mortality data.

Q. Does this complete your surrebuttal testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval and a Certificate of Public Convenience and Necessity Authorizing it to Construct a Wind Generation Facility.	)))))	File No. EA-2018-0202

AFFIDAVIT OF TERRY VANDEWALLE

STATE OF Iowa)
) ss
COUNTY OF Buchanan)

Terry VanDeWalle, being first duly sworn on his oath, states:

1. My name is Terry VanDeWalle. I work in the City of Independence, IA, and I am employed by Stantec Consulting Services Inc. as a Senior Biologist.

2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony on behalf of Union Electric Company d/b/a Ameren Missouri consisting of 42 pages and Schedule(s) TVW-S1, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

T. VanDeWalle
TERRY VANDEWALLE

Subscribed and sworn to before me this 26 day of September, 2018.

Kim Steenstra
Notary Public

My commission expires:

April 28, 2021

NOTARIAL SEAL IOWA
KIM STEENSTRA
Commission Number 758075
My Commission Expires
April 28, 2021

Terry J. VanDeWalle

Senior Biologist/Principal

Mr. VanDeWalle is a Senior Biologist with over 25 years of experience specializing in animal and natural areas surveys, herpetology, threatened and endangered species surveys, ESA Section 7 and Section 10 consultation, wetland delineation and permitting, wetland mitigation design and monitoring, and coordination of environmental impact statements and assessments. Terry specializes in herpetology and is a recognized expert in the Midwest and has authored and co-authored peer-reviewed papers and regional herpetological guides. In addition, he has been involved with wildlife rehabilitation in the Midwest for over 30 years and currently serves on the Board of Directors of the Iowa Wildlife Center and is an Adjunct Professor at Hawkeye Community College where he teaches a course on Wildlife Ecology.

At Stantec, he is responsible for managing Stantec's Independence, Iowa office and designing and managing natural resource studies in support of regulatory compliance and permitting for clients in the energy, transportation, governmental and private sectors.

EDUCATION

AA, Fisheries & Wildlife Biology, Kirkwood Community College, Cedar Rapids, Iowa, 1984

BS, Animal Ecology, Iowa State University, Ames, Iowa, 1986

MA, Biology, Drake University, Des Moines, Iowa, 1993

Butler's Garter Snake Training, Wisconsin Department of Natural Resources, Milwaukee, Wisconsin, 2007

Endangered Species Act Section 7 Consultation, Federal Highway Administration, Ames, Iowa, 2008

USDA Hydric Soils for Wetland Delineation, Natural Resources Conservation Service, Ames, Iowa, 2001

Basic Processes in Hydric Soils, North Carolina State University, Raleigh, North Carolina, 2000

Wetland Plant Identification (Fall) - Robert Mohlenbrock Instructor, Iowa Department of Transportation, Ames, Iowa, 2001

Wetland Plant Identification (Spring) - Robert Mohlenbrock Instructor, Iowa Department of Transportation, Ames, Iowa, 2000

NEPA Practitioners Conference, Iowa Department of Transportation, Ames, Iowa, 2004

Wetland Construction and Restoration, Wetland Training Institute, Madison, Wisconsin, 1998

Wetland Delineation Training, Environmental Technology Center, Chicago, Illinois, 1997

MEMBERSHIPS

Member, Society for the Study of Amphibians and Reptiles

Member Representative, Society of American Military Engineers, Rock Island Post

Member, Iowa Ornithologists' Union

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

PROJECT EXPERIENCE

Wind Power

WEBAT Bat Data Analysis, Various Locations (Project Manager)

Coordinated the analysis and provided technical review and QA/QC for an analysis of correlations between bat activity and temperature from 25 site-years of bat acoustic data collected at various sites across the eastern U.S. to determine temperature thresholds for activity.

Iowa

MidAmerican Energy Company/ U.S. Fish and Wildlife Service, Wind Fleet Programmatic EIS, Iowa

Environmental Impact Statement Manager responsible for overseeing the preparation of an Environmental Impact Statement for the issuance of an incidental take permit (ITP) for MidAmerican's wind facility fleet in Iowa for the endangered Indiana bat, threatened northern long-eared bat, little brown bat, and bald eagle. Coordinated and attended two public scoping meetings and a public hearing, maintained the project's administrative record, and coordinated a multi-person team for document preparation.

Confidential Wind Client. Eagle Conservation Plan, Iowa (Project Manager)

Preparation of an eagle conservation plan (ECP) for the bald eagle, including utilizing the USFWS collision risk model to calculate a take estimate and development of advanced conservation practices (ACPs) and mitigation options.

Invenergy LLC, Ida Grove Wind Farm I and II, Ida and Sac Counties, Iowa (Project Manager)

Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, noise and shadow studies, cultural resource surveys, wetland delineation, and Phase I ESA at the proposed wind farm; Prepared County CUP application; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

MidAmerican Energy Company, Beaver Creek I and II Wind Farms, Boone and Greene Counties, Iowa (Project Manager)

Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, noise and shadow studies, cultural resource surveys, wetland delineation, and Phase I ESA at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

** denotes projects completed with other firms*

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Senior Biologist/Principal

MidAmerican Energy Company, Arbor Hill Wind Farm, Adair County, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, noise and shadow studies, cultural resource surveys, wetland delineation, and Phase I ESA at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

Invenergy, LLC, Brush Creek Wind Farm, Fayette and Buchanan Counties, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, cultural resource surveys, and wetland delineation at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

Wind Capital Group, Salt Creek Wind Farm, Tama County, Iowa (Project Manager)
Conducted a pre-construction acoustic bat survey using full-spectrum detectors, avian use survey, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic and avian data, wrote reports describing results of the surveys.

Invenergy, LLC, Chickasaw Wind Farm, Chickasaw County, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

RPM Access, Saratoga Wind Farm, Howard County, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, cultural resource surveys at the proposed wind farm; prepared a BBCS; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

RPM Access, Washburn Wind Farm, Black Hawk County, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

RPM Access, Parnell Wind Farm, Iowa County, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

MidAmerican Energy Company, Plum Creek Wind Farm, Kossuth and Hancock Counties, Iowa (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

RPM Access LLC, Prairie Wind Farm, Mahaska County, Iowa (Project Manager)
Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model, wrote reports describing results of the surveys.

EcoEnergy, EcoVista Wind Farm, Howard and Mitchell Counties, Iowa
Analyzed acoustic data collected using ANABAT detectors during pre-construction bat surveys at the proposed wind farm.

JW Prairie Wind Power, Ridgeport Wind Farm, Boone County, Iowa (Project Manager)
Conducted a wetland delineation, threatened and endangered species screening, hazardous materials screening, and pre-construction acoustic bat survey using Anabat detectors at the site of a 120 MW wind farm. Wetlands were delineated using both the Food Securities Act and 1987 COE Manual methods. Mapped wetlands using a GPS system and wrote reports describing findings. Pre-construction bat surveys utilized ANABAT equipment.

Wind Capital Group, Salt Creek Wind Farm, Tama County, Iowa (Project Manager)
Conducted a pre-construction acoustic bat survey using full-spectrum detectors, avian use survey, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic and avian data, wrote reports describing results of the surveys.

RPM Access LLC, Adams Wind Farm, Adams County, Iowa (Project Manager)
Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model, wrote reports describing results of the surveys.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Wind Capital Group, Buffalo Creek Wind Farm, Franklin County, Iowa (Project Manager)
Conducted a wetland delineation and habitat assessments for three state-listed species at the site of a proposed 13,000-acre, 210 MW wind farm. Wetlands were delineated using both the Food Securities Act and 1987 COE Manual methods. Mapped wetlands using a GPS system and wrote report describing findings. Conducted a separate avian/bat screening analysis to determine potential risk of avian/bat mortality as a result of the project. Prepared separate habitat evaluation and avian/bat risk screening analysis reports.

MidAmerican Energy, Yellow Springs Wind Farm, Louisa County, Iowa (Project Manager)
Oversaw and provided technical review and QA/QC of an analysis of eagle use data using methods set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model.

RPM Access LLC, Independence Wind Farm, Buchanan and Delaware Counties, Iowa (Project Manager)
Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model, wrote reports describing results of the surveys.

Invenergy LLC, Highland Wind Farm, O'Brien County, Iowa (Project Manager)
Conducted a wetland delineation, threatened and endangered species screening, pre-construction acoustic bat survey using Anabat detectors, avian point count survey, eagle use survey, and raptor nest search. Prepared reports describing results of the surveys.

Volkswind, Scranton Wind Farm, Greene County, Iowa (Project Manager)
Collected pre-construction acoustic bat data using Anabat detectors within the project area and a single season (fall) of bat activity data at a reference site along the North Raccoon River near the proposed project area. Conducted a raptor nest search within the project area and a 10-mile buffer, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed acoustic data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model, wrote reports describing results of the surveys. Conducted a desktop wetland determination and field review.

Illinois

Midwest Wind Energy, Walnut Ridge Wind Energy Project, Bureau County, Illinois (Project Manager)
Conducted a wetland delineation and habitat assessment for state and federally-listed species at the site of a proposed 235 MW wind farm. Wetlands were delineated using both the Food Securities Act and 1987 COE Manual methods. Mapped wetlands using a GPS system and prepared reports describing the findings.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Midwest Wind Energy, Big Sky Wind Farm, Lee and Bureau Counties, Illinois (Project Manager)
The project included consultation with the Illinois DNR and preparation of a conservation plan for the state-listed Blanding's turtle, Illinois mud turtle, western hognose snake and regal fritillary butterfly as part of an application for an incidental take authorization. The plan included a description of the proposed wind farm project, an assessment of the impacts to the target species and measures to minimize and/or mitigate impacts. In addition, a public notice for the project was prepared for publication in local and statewide newspapers. Wetland delineation and threatened and endangered species surveys for a 13,000 acre wind farm and 15-mile transmission line corridor. Delineated wetlands using a GPS system and prepared two separate reports describing findings. Coordinated with USACE on permitting.

Apex Clean Energy, Ford Ridge Wind Farm, Ford County, Illinois (Project Manager)
Conducted an acoustic presence-absence survey for the northern long-eared bat using full spectrum detectors at the site of the proposed wind farm, analyzed data, and prepared a technical memorandum describing the results of the survey.

Gamesa, Whispering Prairie Wind Farm, Winnebago County, Illinois (Project Manager)
Conducted a wetland delineation using both the Food Securities Act and 1987 COE Manual methods. Mapped wetlands using a GPS system and prepared report describing findings.

E.ON Climate and Renewables, Pioneer Trail Wind Farm, Iroquois and Ford Counties, Illinois (Project Manager)
Conducted pre-construction acoustic bat surveys using Anabat detectors at the proposed 150 MW wind farm, analyzed acoustic data, wrote report describing results of the survey. Prepared and Avian and Bat Protection Plan for the project. Prepared a Habitat Conservation Plan (HCP) in support of an ESA Section 10 Incidental Take Permit application for the endangered Indiana bat and proposed endangered northern long-eared bat, including calculating an estimate of take, impacts of minimization measures, and utilization of the Resource Equivalency Analysis (REA) model for impact of take and mitigation calculations. Assisted owner with development of mitigation options and consultation with the USFWS.

Invenergy LLC, California Ridge II Wind Energy Facility, Vermillion County, Illinois (Project Manager)
Coordinated the development of a Bird and Bat Conservation Strategy (BBCS) for the proposed wind farm project and provided technical review and QA/QC of the BBCS.

E.ON Climate and Renewables, Settler's Trail Wind Farm, Iroquois County, Illinois (Project Manager)
Conducted pre-construction acoustic bat surveys using Anabat detectors at the proposed 150 MW wind farm, analyzed acoustic data, prepared report describing results of the survey.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Apex Clean Energy, Hoopeston Wind Farm, Vermillion County, Illinois (Project Manager)
Conducted a fall migration acoustic bat survey using full spectrum detectors at the site of the proposed wind farm, analyzed data and wrote a technical memorandum describing the results of the survey. Prepared a Habitat Conservation Plan (HCP) in support of an ESA Section 10 Incidental Take Permit application for the endangered Indiana bat and proposed endangered northern long-eared bat, including calculating an estimate of take, impacts of minimization measures and mitigation options.

Midwest Wind Energy, Blue Ridge Wind Farm, Champaign, McLean and Piatt Counties, Illinois (Project Manager)
Conducted a preliminary desktop and windshield assessment of potential wetlands within the proposed study area. Prepared report describing findings and provided mapping for planning purposes. Conducted a pre-construction acoustic bat survey using Anabat detectors within the limits of the proposed wind farm. Prepared final reports describing the findings.

Invenergy LLC, Pleasant Ridge Wind Farm, Livingston County, Illinois (Project Manager)
Conducted an aerial raptor nest search with emphasis on eagle nests within the project boundary of the proposed wind farm and a 10-mile buffer and provided technical review and QA/QC of the final report. Oversaw the preparation of a Bird and Bat Conservation Strategy (BBCS) for the wind project and provided technical review and QA/QC of the BBCS. Assisted the owner with agency consultation. Provided expert witness testimony and county CUP hearing.

Capital Power, Cardinal Point Wind Energy Project, Henderson, Warren, McDonough Counties, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, avian use survey, raptor nest search, eagle use surveys, threatened and endangered species habitat assessment, noise and shadow studies, cultural resource surveys, wetland delineation, and Phase I ESA at the proposed wind farm; analyzed acoustic and avian data, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

EcoEnergy, EcoGrove Wind Farm, Stephenson County, Illinois
Oversaw and coordinated a pre-construction avian point count survey, analyzed data, and prepared the final report. Analyzed acoustic data collected using ANABAT detectors during pre-construction bat surveys at the proposed wind farm.

Midwest Wind Energy, Crescent Ridge II Wind Energy Project, Bureau County, Illinois (Project Manager)
Conducted a desktop habitat assessment for the federally endangered Indiana bat at the site of a proposed wind farm. Prepared report describing findings.

Algonquin Power, Shady Oaks Wind Farm, Lee County, Illinois (Project Manager)
Conducted avian and eagle use surveys following the USFWS Eagle Conservation Plan Guidance.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Iberdrola Renewables, LLC, Otter Creek Wind Farm, LaSalle County, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction acoustic bat survey, breeding bird survey, and American Golden Plover surveys at the proposed wind farm; analyzed acoustic and avian data, and prepared reports describing results of the surveys and studies; prepared BBCS.

UKA North America LLC, Imperial Valley Wind Farm, Tazewell County, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction avian use survey, raptor nest search, eagle use surveys; analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

UKA North America LLC, Grand Prairie Wind Farm, Sangamon County, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction avian use survey, raptor nest search, eagle use surveys; analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

UKA North America LLC, Granville Wind Farm, Putnam and LaSalle Counties, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction avian use survey, raptor nest search, eagle use surveys; analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies.

Leeward Renewable Energy Development LLC, Mendota Hills Wind Farm Repowering, Lee County, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction threatened and endangered species habitat assessment, wetland delineation, and Phase I ESA at the proposed wind farm; prepared BBCS; provided expert witness testimony at county zoning hearing.

Leeward Renewable Energy Development LLC, Lone Tree Wind Farm Repowering, Bureau County, Illinois (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted a pre-construction avian use survey, eagle use surveys, and wetland delineation; analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies; provided expert witness testimony at county zoning hearing.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Indiana

BP Wind, Fowler Ridge Wind Farm, Benton County, Indiana

Environmental Impact Statement Manager responsible for overseeing preparation of an EIS to address the effects of a proposed Habitat Conservation Plan on the Indiana bat. The EIS reviews the effects associated with constructing up to 94 additional turbines at an existing 355- turbine wind project. Responsible for coordination with the USFWS, preparation of the NOI and NOA, authoring sections of the EIS, editing the EIS, alternatives analysis, attendance at public meetings, preparing responses to public comments, management of Stantec staff conducting noise analysis, wetland determinations, cultural resources evaluations and preparing photosimulations for the project. Developed and prepared a Bird and Bat Conservation Strategy (BBCS) for the project.

E.ON Climate and Renewables, Wildcat Wind Farm, Tipton & Madison County, Indiana (Project Manager)

Conducted two seasons of pre-construction acoustic bat surveys using full spectrum detectors and two Indiana bat mist-netting surveys at the proposed 300 MW wind farm, analyzed data acoustic data, prepared reports describing results of the surveys.

Prepared a Habitat Conservation Plan (HCP) in support of an ESA Section 10 Incidental Take Permit application for the endangered Indiana bat and proposed endangered northern long-eared bat, including calculating an estimate of take, impacts of minimization measures, and utilization of the Resource Equivalency Analysis (REA) model for impact of take and mitigation calculations. Assisted owner with development of mitigation options and consultation with the USFWS. Conducted 3 years of post-construction mortality monitoring at the site. Oversaw the data analysis including an estimate of take, searcher efficiency, and carcass removal rates utilizing data collected during spring and fall post-construction mortality studies. Provided technical review and QA/QC of the annual reports.

Kansas

RPM Access, Marshall County Wind Farm, Marshall County, Kansas (Project Manager)

Prepared a site-specific Bird and Bat Conservation Strategy (BBCS) demonstrating measures taken to reduce impact to birds and bats from construction, operation, and decommissioning of the project.

Confidential Wind Client, Neosho Ridge Wind Farm, Neosho County, Kansas (Project manager)

Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

Michigan

Tradewind Energy, LLC, Red Fox Wind Farm, St. Clair County, Michigan (Project Manager)

Prepared a Site Characterization Report based on the USFWS Land-based Wind Energy Guidelines.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Invenergy LLC, Gratiot County Wind Farm, Gratiot County, Michigan (Project Manager)
Conducted one year of post-construction mortality monitoring at the site. Oversaw the data analysis including an estimate of take, searcher efficiency, and carcass removal rates utilizing data collected during spring and fall post-construction mortality studies. Provided technical review and QA/QC of the final report.

Duke Energy Renewables, Hillsdale Wind Farm, Hillsdale County, Michigan
Conducted pre-construction acoustic bat survey using full spectrum detectors and oversaw an Indiana bat mist-netting survey at the proposed 100 MW wind farm, analyzed data acoustic data and prepared report describing results of the survey, provided technical review and QA/QC of the final mist-netting report.

Invenergy LLC, Sanilac Wind Farm I and II, Sanilac County, Michigan (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; conducted pre-construction acoustic bat and mist-netting surveys, analyzed acoustic data, wrote report describing results of the surveys. Conducted a raptor nest search within the project areas and a 10-mile buffer, eagle use surveys, and threatened and endangered species habitat assessment at the proposed wind farm, analyzed eagle use data following guidelines set forth in the USFWS Eagle Conservation Plan Guidance and the USFWS 2013 predictive model, wrote reports describing results of the surveys.

Tradewind Energy, LLC, Muskegon Green Wind Farm, Muskegon County, Michigan (Project Manager)
Prepared a Site Characterization Report based on the USFWS Land-based Wind Energy Guidelines.

Confidential Wind Client, Deerfield Wind Farm, Huron County, Michigan (Project manager)
Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

Confidential Wind Client, Apple Blossom Wind Farm, Huron County, Michigan (Project manager)
Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

Leeward Renewables, Tupper Lake Wind Farm, Ionia County, Michigan (Project Manager)
Prepared a Site Characterization Report based on the USFWS Land-based Wind Energy Guidelines; conducted a raptor nest search within the project area and a 10-mile buffer and avian and eagle use surveys following the USFWS Eagle Conservation Plan Guidance; and conducted bat acoustic presence/absence and mist-netting surveys.

Minnesota

EcoEnergy, EcoHarmony Wind Farm, Fillmore County, Minnesota
Analyzed acoustic data collected using Anabat detectors during pre-construction bat surveys at the proposed wind farm.

Confidential Wind Client, Odell Wind Farm, Cottonwood, Jackson, Martin, and Watonwon Counties, Minnesota (Project Manager)
Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

** denotes projects completed with other firms*

Terry J. VanDeWalle

Senior Biologist/Principal

Wind Capital Group, Bent Tree Wind Farm, Freeborn County, Minnesota (Project Manager)
Wetland delineation and threatened and endangered species surveys for a 19,000 acre, 300 MW wind farm. Wetlands were delineated using both the Food Securities Act and 1987 COE Manual methods. Mapped wetlands using a GPS system and wrote two separate reports describing findings. Conducted a separate avian/bat screening analysis to determine potential risk of avian/bat mortality as a result of the project. Conducted pre-construction bird surveys in the project area and prepared final report.

Missouri

Terra-Gen Development Company, High Prairie Wind Farm, Schuyler and Adair Counties, Missouri (Project Manager)
Prepared a site characterization report based on the USFWS Land-based Wind Energy Guidelines; Conducted pre-construction acoustic presence/probable absence surveys for the Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat; mist-net surveys, radio-telemetry and emergence counts for the four target bats; avian use survey; raptor nest search; eagle use surveys, and MET tower acoustic bat survey at the proposed 400 MW wind farm. Analyzed acoustic and avian data, analyzed eagle use data following guidelines in the USFWS Eagle Conservation Plan Guidance, and prepared reports describing results of the surveys and studies. Prepared a project BBCS.

Prepared a Habitat Conservation Plan (HCP) in support of an ESA Section 10 Incidental Take Permit application for the Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat, including calculating an estimate of take, impacts of minimization measures, and utilization of the Resource Equivalency Analysis (REA) model for impact of take and mitigation calculations. Assisted owner with development of mitigation options and consultation with the USFWS and Missouri Department of Conservation.

Wind Capital Group, King Lake Wind Farm, DeKalb County, Missouri (Project Manager)
Conducted a habitat evaluation for the federally-listed Indiana bat within the limits of the proposed wind farm. Prepared report describing findings.

Wind Capital Group, High Prairie Wind Farm, Schuyler County, Missouri (Project Manager)
Conducted a threatened and endangered species, bird, and bat screening analysis to assess the potential risk posed to these species as a result of the proposed 50 MW wind facility. Conducted a separate Indiana bat habitat assessment for the project to assess potential impacts to the federally-listed Indiana bat. Prepared reports describing results of the studies.

Wind Capital Group, Northwest Wind Energy Facility, Nodaway County, Missouri (Project Manager)
Conducted a habitat evaluation for the federally-listed Indiana bat within the project limits of the proposed wind farm. Prepared report describing findings.

** denotes projects completed with other firms*

Iberdrola Renewables, LLC, Farmers City Wind Farm, Atchison County, Missouri (Project Manager)
Conducted a threatened and endangered species, bird, and bat screening analysis to assess the potential risk posed to these species as a result of the proposed 50 MW wind facility. Conducted a separate Indiana bat habitat assessment for the project to assess potential impacts to the federally-listed Indiana bat. Prepared reports describing results of the studies. Conducted a wetland delineation for the 19,000-acre wind farm. Wetlands were both aerially and field delineated. Mapped wetlands using a GPS system and prepared report describing findings.

Wind Capital Group, Lost Creek Wind Farm, DeKalb County, Missouri (Project Manager)
Conducted a threatened and endangered species, bird and bat screening analysis and pre-construction bird survey to assess the potential risk posed to these species as a result of the proposed 200 MW wind facility. Authored a biological assessment under Section 7 of the Endangered Species Act assessing impacts to federally listed species with emphasis on the federally endangered Indiana bat. Conducted 1 year of post-construction mortality monitoring at the site including an acoustic bat survey using full spectrum detectors. Oversaw the data analysis including an estimate of take, searcher efficiency, and carcass removal rates utilizing data collected during spring, summer, and fall post-construction mortality studies. Prepared the annual report.

GE Energy LLC, Greenfield Wind Farm, Clinton County, Missouri (Project Manager)
Conducted pre-construction acoustic bat surveys using full spectrum detectors, avian use survey, threatened and endangered species surveys and wetland delineations at the proposed 90 MW wind farm, analyzed acoustic and avian data, prepared reports describing results of the surveys.

Montana

Invenergy LLC, Judith Gap Wind Farm, Wheatland County, Montana (Project Manager)
Prepared a site-specific Bird and Bat Conservation Strategy (BBCS) demonstrating measures taken to reduce impact to birds and bats from construction, operation, and decommissioning of the project.

Nebraska

Midwest Wind Energy, Elkhorn Ridge Wind Farm, Knox County, Nebraska (Project Manager)
Oversaw the preparation of an office determination of wetlands on agricultural lands and a field delineation of wetlands at the site of a proposed wind farm. Provided technical review and QA/QC of the final report.

Invenergy LLC, Prairie Breeze Wind Farm, Antelope and Boone Counties, Nebraska (Project Manager)
Prepared a site-specific Bird and Bat Conservation Strategy (BBCS) demonstrating measures taken to reduce impact to birds and bats from construction, operation, and decommissioning of the project.

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Terry J. VanDeWalle

Senior Biologist/Principal

Geronimo Energy/Western Area Power Administration, Grande Prairie Wind Farm, Holt County, Nebraska
Environmental Impact Statement Manager responsible for overseeing preparation of an EIS to address the effects of a 266-turbine wind project interconnecting with a Western Area Power Administration transmission line. Responsible for coordination with Western Area Power Administration and the project proponent, facilitation of bi-weekly project calls, authoring sections of the EIS, editing the EIS, facilitation and attendance at public meetings, and preparation of an ESA Section 7 Biological Assessment. Developed and prepared a Wildlife Conservation Strategy (WCS) for the project.

Midwest Wind Energy, Broken Bow Wind Farm, Custer County, Nebraska (Project Manager)
Conducted a literature and database review to identify bat species known to occur within the project area and prepared a preliminary bat screening assessment to assess the general risk to bat species as a result of the proposed project.

Confidential Wind Client, Grande Prairie Wind Farm, Holt County, Nebraska (Project Manager)
Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

Lincoln Clean Energy, LLC, Plum Creek Wind Farm, Wayne and Stanton Counties, Nebraska (Project Manager)
Conducted a raptor nest search within the project area and a 10-mile buffer following the USFWS Eagle Conservation Plan Guidance.

North Dakota

Confidential Wind Client, Courtenay Wind Farm, Stutsman County, North Dakota (Project Manager)
Completed an environmental due diligence review for a prospective buyer of the proposed wind farm, including review of eagle risk and the eagle take permitting process.

Capital Power, New Frontier Wind Farm, McHenry County, North Dakota (Project Manager)
Prepared a Site Characterization Report based on the USFWS Land-based Wind Energy Guidelines. Coordinated and facilitated meetings with the USFWS.

Ohio

EDP Renewables, Timber Road Wind Farm, Paulding County, Ohio
Environmental Assessment Manager and lead author responsible for overseeing preparation of an Environmental Assessment under NEPA to address the effects of a proposed Habitat Conservation Plan and issuance of an Incidental Take Permit for the Indiana and northern long-eared bat. Responsible for coordination with the USFWS, authoring sections of the EA, editing the EA, alternatives analysis, preparing responses to public comments, and management of Stantec staff.

Everpower Wind Holdings, Scioto Ridge Wind Farm, Hardin County, Ohio
Coordinated eagle use surveys at the site. Provided technical review and QA/QC of modeling to predict potential eagle fatalities at the proposed wind farm using the results of an eagle use survey at the project site and following guidelines set forth in the U.S. Fish and Wildlife Service's Eagle Conservation Plan Guidance and the USFWS 2013 predictive model.

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Terry J. VanDeWalle

Senior Biologist/Principal

Everpower Wind Holdings, Buckeye Wind Farm, Champaign County, Ohio
Project manager and technical advisor for the preparation of a Prepared a Habitat Conservation Plan (HCP) in support of an ESA Section 10 Incidental Take Permit application for the federally endangered Indiana bat. Participated in project meetings and agency coordination during preparation of the HCP. Provided expert witness testimony on avian and bat issues for the Ohio Power Siting Board Hearing.

Invenergy LLC, Hardin Wind Farm, Hardin County, Ohio (Project Manager)
Conducted an aerial raptor nest search with emphasis on eagle nests within the project boundary of the proposed wind farm and a 10-mile buffer. Provided technical review and QA/QC of the final report.

E.ON Climate and Renewables, Glacier Ridge Wind Farm, Hardin and Logan Counties, Ohio (Project Manager)
Conducted pre-construction acoustic bat surveys using full spectrum detectors at the proposed 200 MW wind farm, analyzed acoustic data, prepared report describing results of the survey.

Oklahoma

Wind Capital Group, Osage County Wind Farm, Osage County, Oklahoma (Project Manager)
Conducted a threatened and endangered species, bird, and bat screening analysis to assess the potential risk posed to these species as a result of the proposed 200 MW wind facility.

Pennsylvania

Duke Energy Renewables, North Allegheny Wind Farm, Blair and Cambria Counties, Pennsylvania
Environmental Assessment Manager and lead author responsible for overseeing preparation of an Environmental Assessment under NEPA to address the effects of a proposed Habitat Conservation Plan and issuance of an Incidental Take Permit on the Indiana and northern long-eared bat. Responsible for coordination with the USFWS, preparation of the NOI and NOA, authoring sections of the EA, editing the EA, alternatives analysis, preparing responses to public comments, and management of Stantec staff.

Duke Energy Renewables/U.S. Fish and Wildlife Service, Laurel Hill Wind Facility, Lycoming County, Pennsylvania
Environmental Assessment Manager and lead author responsible for overseeing preparation of an Environmental Assessment under NEPA to address the effects of a proposed Habitat Conservation Plan on the Indiana and northern long-eared bat. Responsible for coordination with the USFWS, preparation of the NOI and NOA, authoring sections of the EA, editing the EA, alternatives analysis, attendance at public meetings, preparing responses to public comments, and management of Stantec staff.

Algonquin Power, Sandy Ridge Wind Farm, Blair and Centre Counties, Pennsylvania (Project Manager)
Conducted avian and eagle use surveys following the USFWS Eagle Conservation Plan Guidance.

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Terry J. VanDeWalle

Senior Biologist/Principal

Algonquin Power, Broad Mountain Wind Farm, Shuylkill and Carbon Counties, Pennsylvania (Project Manager)
Conducted avian and eagle use surveys following the USFWS Eagle Conservation Plan Guidance.

South Dakota

OwnEnergy, Inc., SummitWind Farm, Grant County, South Dakota (Project Manager)
Oversaw the preparation of noise and shadow models for the proposed wind farm, provided technical review and QA/QC of the final report.

Tennessee

Confidential Wind Client, Grundy County Wind Farm, Grundy County, Tennessee (Project Manager)
Conducted a critical issues analysis for the proposed wind farm including a threatened and endangered species, bird, and bat screening, and preparation of a map set displaying existing GIS reference data layers showing pertinent natural resource and civil features, including but not limited to, roads, political boundaries, orthophotography, wetlands, soils, hydrography, and railroads. Prepared report describing results of the analysis.

Texas

Duke Energy Renewables, Los Vientos Wind Farm, Willacy and Cameron Counties, Texas (Project Manager)
Conducted mobile pre-construction bat surveys at the proposed wind farm, analyzed data acoustic data, prepared report describing results of the surveys.

Wind Capital Group, Spur Ridge Wind Farm, Dickens County, Texas (Project Manager)
Conducted a desktop assessment of potential wetlands within the project limits. Wrote report describing findings.

Invenergy LLC, Goldwaithe Wind Farm, Mills County, Texas (Project Manager)
Prepared a site-specific Bird and Bat Conservation Strategy (BBCS) demonstrating measures taken to reduce impact to birds and bats from construction, operation, and decommissioning of the project.

Wisconsin

Invenergy LLC, Red Oak Wind Farm, Grant County, Wisconsin
Conducted a stationary and mobile acoustic bat survey using Anabat detectors at the site of the proposed wind farm, analyzed data, and prepared a final report describing the results of the survey.

Element Power/Capital Power, Tisch Mills Wind Farm, Manitowoc and Kewaunee Counties, Wisconsin
Analyzed acoustic data collected using Anabat detectors during pre-construction bat surveys at the proposed wind farm, assisted with preparation of the final report. Wildlife technical lead for the project, coordinated with USFWS and WDNR.

Wind Capital Group, Arlington Wind Farm, Columbia County, Wisconsin (Project Manager)
Conducted an office determination of wetlands on agricultural lands and prepared a preliminary report describing wetland findings. Conducted field delineation of wetlands and waterways at collector routes, access roads and turbine locations. Prepared final report describing findings.

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Terry J. VanDeWalle

Senior Biologist/Principal

Wind Capital Group, White Oak Wind Farm, Grant County, Wisconsin (Project Manager)
Conducted a wetland delineation, threatened and endangered species, bird, and bat screening analysis, threatened and endangered species surveys, and pre-construction bird surveys at the site of the proposed 100 MW wind facility to assess the potential risk posed to these species as a result of the proposed wind facility. Provided technical review and QA/QC of the final reports.

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