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Public Comments Processing
Attn: FWS-R5-ES-2012-0059
Division of Policy and Directives Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, MS 2042-PDM
Arlington, VA 2203

Electronic submission: receipt verification requested

Re: Comments on the Draft EIS and HCP for the Beech Ridge Energy Wind Facility

These comments concern the Draft Environmental Impact Statement (DEIS) and the Draft Habitat Conservation Plan (DHCP) for the Beech Ridge Wind Energy Project (BRE) in Greenbrier and Nicholas Counties, West Virginia. I am submitting these comments due to concern about the environmental impacts of utility-scale wind energy development in the central Appalachian mountain region.

Because of flaws and insufficiencies in the information and analysis provided in both the DHCP and the DEIS, I recommend that the U.S. Fish and Wildlife Service (FWS) adopt Alternative 1, the "No Action" alternative presented in the DEIS. The specific reasons for this recommendation follow.

(1) Failure to evaluate project benefits.

The DEIS provides estimates and comparisons of potential electricity generation benefits associated with each of the four described alternatives (see DEIS Section 3 and Table 3-1). These estimates are apparently provided to help satisfy National Environmental Policy Act (NEPA) requirements for objective evaluation of the range of project alternatives. Both the DEIS and the DHCP, however, fail to provide any actual evaluation of project benefits other than those related to reducing adverse effects of the project.

The DHCP states that the project is designed to address climate change through production of non-polluting electrical energy for consumer use (see DHCP, Section 8.2.1). The DHCP, however, provides no analysis or quantification of this benefit. This is an omission, given published findings that wind energy projects may provide only minimal benefits with respect to offsetting carbon emissions.1

The DEIS provides no cost benefit analysis for the project or for the alternatives considered. An objective evaluation of project benefits versus costs should, at a minimum, quantify the benefits that are commonly cited for wind energy projects, including electricity generation, net reduction in greenhouse gases and other air pollutants, and net displacement of fossil fuel use. These purported benefits should be quantified for each alternative considered.

The inclusion of electricity generation estimates with the listing of alternatives suggests that the FWS does recognize that project benefits should be considered in the context of alternative evaluation (see DEIS Table 3-1). The generation estimates, however, are simply listed. They are not examined critically,

[1] National Research Council. 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press, Washington, DC.

and they are not weighed against project costs or adverse impacts. Moreover, the estimated generation values are misleading.

In Section 3 of the DEIS, the estimates of electricity generation are characterized as maximum annual generation potential, given the operating restrictions associated with the alternatives. The same estimates listed in Table 3-1 are characterized as energy capacity with curtailment. The estimates provided in both cases are substantially greater than can be expected based on actual performance of wind projects in the region.

The annual generation estimates presented in the DEIS are based on nameplate capacity times the hours of unrestricted operation per year, which both vary among the alternatives depending on the number of turbines and amount of curtailment to avoid bat mortality. These generation estimates, however, ignore the demonstrated low-performance level for wind turbines in the Appalachian Mountain region. Wind turbines in this region rarely attain a capacity factor exceeding 30%, and during peak-demand periods it is commonly much less.[2] The regional grid management organization has assigned a capacity credit of only 13% to wind generation projects.[3] Thus, a more realistic, but still overly optimistic estimate of electricity generation at the BRE facility would be calculated as nameplate capacity times hours per year times 30%, less whatever additional reduction is associated with curtailment to avoid bat mortality. This results in a much lower estimate of generation.

The following table provides a comparison of estimated generation for BRE given the alternatives presented in the DEIS versus more-realistic estimates based on observed wind project performance in the Appalachian Mountain region. As indicated, the DEIS estimates of potential electricity generation exceed performance-based estimates by 2.4 - 3.2 times. After taking curtailment into account the ratio would be even greater.

Table 1- Comparison of the DEIS and performance-based estimates of electricity generation.

Alternative	DEIA Estimates MWh/year	PerformanceBased Estimates MWh/year[1,2]	Estimate Ratio DEIS / Performance Based
1	639,000	264,224	2.4
2	1,542,000	488,808	3.2
3	1,184,000	488,808	2.4
4	832,000	264,224	3.2

[1] The Performance Based Estimates are based on an annual capacity factor of 30%
[2] The Performance Based Estimates do not take curtailment to avoid bat mortality into account. Thus actual electricity generation will be less than estimated.

[2] National Research Council. 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press, Washington, DC.
[3] PJM. 2010. Manual 21: Rules and Procedures for Determination of Generating Capacity. System Planning Department, PJM (http://www.pjm.com/~/media/documents/manuals/m21.ashx).

The evaluation of alternatives presented in the DEIS does not include explicit evaluation of project benefits versus project costs, and it does not include any determination that project benefits offset project costs. The only benefit cited in the DEIS is electricity generation, and the estimates provided are strikingly unrealistic.

(2) Failure to account for the effects of White Nose Syndrome

The DHCP and DEIS characterize the occurrence of White Nose Syndrome (WNS) as a "foreseeable changed circumstance" and suggest that BRE will confer with the FWS over potential changes to the HCP should the WNS actually result in a changed circumstance. Both the DHCP and the DEIS indicate that the criterion for a changed circumstance for WNS will be a specified percentage reduction in the populations of the Indiana bat or the Virginia big-eared bat, although no percentage reduction can now be specified. The DEIS further indicates that while WNS has been identified in nearby bat populations, it is difficult to predict at this time what the long-term effects will be on ESA listed bats or other cave dwelling bats.

At this juncture it can be concluded that the WNS is very likely to have an extreme impact on rangewide and local populations of cave dwelling bats, including the Indiana bat. The following excerpts are taken verbatim from a five-year status review for the Indiana bat.[4]

> White-Nose Syndrome is a devastating disease of hibernating bats that has caused the most precipitous decline of North American wildlife in recorded history.
>
> If current trends of mortality at affected sites and spread to additional sites continue, WNS threatens to drastically reduce the abundance of most species of hibernating bats in major regions of North America in a remarkably short period of time.
>
> WNS has infected six bat species including Indiana bat (*Myotis sodalis*), little brown bat (*M. lucifugus*), northern long-eared bat (*M. septentrionalis*), small-footed bat (*M. leibii*), tri-colored bat (formerly Eastern pipestrelle) (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*).
>
> WNS has quickly and significantly raised the degree of threat against the Indiana bat and has lowered the species overall recovery potential.
>
> WNS poses a significant new threat to the species' [Indiana bat] status and may quickly reverse recent population gains.

More recent findings are equally or even more dire.

A five-year assessment of bat mortality due to WNS at 42 sites in five eastern U.S. states revealed a decrease in the number of hibernating bats of 88% overall, and 87% in West Virginia. The investigators further found that Indiana bats decreased by 72%, little brown bats decreased by 91%, tricolored bats

[4] U.S. Fish and Wildlife Service. 2009. Indiana Bat (*Myotis sodalis*) 5-Year Review: Summary and Evaluation. Bloomington Ecological Services Field Office, Bloomington, IN.

decreased by 73%, big brown bats decreased by 41%, northern long-eared bats decreased by 98% and small-footed bats decreased by 12%.[5]

The little brown bat is one of the most common bats in North America. An analysis based on observed rates of decline, indicates that the probability of regional extinction (eastern North America) due to WNS for the little brown bat within the next 16 years is 99%, and further, that annual declines from WNS would have to ameliorate to less than 5% per year to significantly reduce the chance of extinction over 100 years.[6]

It should now be clear to both BRE and the FWS that the effect of WNS is a current and deepening crisis for populations of many bat species in the eastern U.S. and in the more-immediate BRE project area. It should also be clear that this crisis extends to ESA listed species (the Indiana bat), to species currently considered for ESA listing (the little brown bat, the northern long-eared bat, and the eastern small-footed bat), and to a number of other bat species.

The DHCP and the DEIS both tie consideration of WNS to an as-yet-undetermined percentage reduction in the population of currently listed endangered bats (Indiana bats and Virginia big-eared bats). This approach ignores the effect of WNS on other bat species and precludes effective consideration of WNS on both listed and unlisted bat species in the NEPA review process, including the identification and evaluation of alternatives in the DEIS.

WNS is not a potential "changed circumstance" that can appropriately be addressed in a context of conference and discussion at some later date after an HCP has been adopted and an ITP has been issued. The WNS is a significant current circumstance that should be addressed in the context of the NEPA review and prior to the adoption of an HCP and issuance of an ITP.

(3) Uncertainty associated with estimates of mortality and population impacts.

BRE proposes that mortality of both the Indiana and Virginia big-eared bats can be estimated through use of a surrogate approach based on the ratio of these rare bats to other bat species. This may be the best available approach given the limited available knowledge concerning both the occurrence of these species and susceptibility to collision with turbines. However, the uncertainty associated with such estimates has not been quantified. Although BRE proposes to verify mortality estimates with monitoring data collected after the turbines are operational, post-construction monitoring cannot inform development of the HCP or evaluation of alternatives addressed in the NEPA review process.

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[5] G.G. Turner, D.M. Reeder, and J.T.H. Coleman. 2011. A Five-Year Assessment of Mortality and Geographic Spread of White-Nose Syndrome in North American Bats and a Look to the Future. Bat Research News, 52(2): 13-27.

[6] W.E. Frick, J.F. Pollock, A.C. Hicks, K.E. Langwig, D.S Reynolds, G.G. Turner, C.M. Butchkoski, and T.H. Kunz. 2010. An Emerging Disease Causes Regional Population Collapse of a Common North American Bat Species. Science, 329: 679-682.

BRE proposes that the potential take of Indiana bats at the BRE facility, as well as the population-level impact of this take, can be estimated using the little brown bat as a surrogate, calculating Indiana bat mortality based on (1) the ratio of Indiana bats to little brown bats in West Virginia, (2) the number of bats killed per turbine at existing wind projects in the Indiana bat range, and (3) the percentage of total bat fatalities per turbine at existing wind projects in the Indiana bat range that are little brown bats. The calculation propagates the uncertainties associated with all these factors. Underlying this is the assumption that the little brown bat and the Indiana bat are the same with respect to behavior that results in turbine-related mortality.

Some of the uncertainties associated the use of the little brown bat as a surrogate in this fashion include:

- the ratio of Indiana bats to little brown bats observed in multiple West Virginia mist net surveys: 0 - 4.88% (see DHCP Table 4.6)
- the wide range of bat fatalities determined for wind projects in the Indiana bat range: 24.5 - 47.5, given as estimated means (see DHCP Table 4.2)
- the wide range of results relied upon to determine the percentage of little brown bats among bat fatalities at wind projects in the Indiana bat range: 0 - 14.7% (see DHCP Table 4.3)

It's also relevant that other data cited in the DHCP suggest that Indiana bat numbers are 7.4% of little brown bat numbers in West Virginia. Accounting only for the ranges in total bat mortality and ratios between numbers of Indiana bats to little brown bats, the estimates of annual Indiana bat mortality for the BRE facility range from 6.5 - 45.9, a seven-fold difference.

For the Virginia big-eared bat the surrogate approach is even more problematic given a general lack of data, and BRE proposes to rely on post-monitoring mortality data to develop a relationship between fatalities of Virginia big-eared bats and all bat species.

Added to all of this uncertainty is the major complication that is introduced by the WNS. BRE proposes that post-construction monitoring will be used to verify mortality estimates for the Indiana bat, to parameterize the surrogate approach for the Virginia big-eared bat, and to undertake adaptive management if needed. This will be impossible given crashing populations of the hibernating bats, including the Indiana bat, the little brown bat, and many of the other bats at risk of collision with BRE turbines. There is no reason to think that the previous assumptions and ratios used for BRE's surrogate approach to predictive modeling will continue to apply.

The estimates of future mortality of endangered bats at the BRE facility are unreliable given the uncertainties associated with the proposed surrogate approach. Even if these uncertainties could be resolved, the current rapid changes in bat populations and communities resulting from WNS will likely alter the critical relationships that underlie BRE's analysis. BRE's estimates of future bat mortality at its facility are unreliable.

(4) The need for a more-objective and quantitative analysis of cumulative impacts.

The discussion of cumulative impacts in the DEIS (Section 5) makes it clear that bat populations in the Mid-Appalachian region are suffering decreased reproduction and survival due to the cumulative effects of multiple stressors, and that mortality related to wind power is additive. The DEIS also cites a general concurrence that mortality related to wind power contributes to a cumulative effect at the population level. The DEIS describes uncertainty related to the magnitude of this risk, but also states that there is "a great deal of agreement that there is risk to populations [of] both tree roosting and cave dwelling bats at some level." An important aspect of this uncertainty concerns the effects of WNS on susceptible species, including whether the significance of mortality caused by wind turbines increases or decreases as species numbers decline in response to WNS. It is clear that many bats species are at high risk due to the cumulative effects of multiple factors, including both WNS and wind turbines. It is also clear that the FWS and the scientific community are unable to parse and separately quantify these risk factors.

It is evidently not known whether:

- The absolute number of bats killed by wind turbines will go down as populations decrease due to WNS.
- The risk of catastrophic bat population decline or species extinction related to WNS is made greater by the additional mortality caused by wind turbines.
- The additive effect of fatalities related to wind turbines is or will remain the same for all species affected by WNS.

It is known, however, that because of long life-spans and low recruitment rates, mortality of bat species becomes more significant as population numbers decline.

Despite this context of uncertainty and risk associated with WNS, the DHCP states:

> If the Indiana bat and Virginia big-eared bat take from the project has been negligible or the estimated take as determined by evaluation of impacts to other species is negligible, it is possible that no additional actions will be needed.

The central question, of course, is how a determination of negligible versus significant impact would be made when bat mortality is associated with both wind turbines and WNS. The DHCP is seemingly suggesting that any effect of the BRE project on species decline will be relatively small compared to the effect of WNS, and thus the BRE project does not put bat populations at risk. Following this logic, the FWS should authorize take of an endangered species by a project no matter what the status of the species – no matter how dire its circumstances – so long as the project's take is small relative to other causes of decline. This logic is inconsistent with ESA regulations and guidance.

Neither BRE nor the FWS have directly addressed this critical issue, other than to indicate that they will confer later –after the HCP has been adopted and the ITP has been issued. At that point, discussions will apparently be focused on the post-construction mortality monitoring data collected by BRE, which will

likely be rendered uninterpretable given the crash of bat populations due to the WNS. It will not be an enviable position for an agency responsible for effective implementation of the ESA.

The FWS should take a precautionary approach to protection of bat species and to effective implementation of both the ESA and NEPA. This can be achieved if the FWS applies rigorous population models to examine and project the status of both listed and unlisted bat species in the context of both the range of WNS scenarios and the range of bat mortality that may result due to the BRE project. Such models should be run on a range of geographic scales and should quantify uncertainty. The results of such analyses should then provide an objective basis for predicting how bat populations will fare given a range of project alternatives.

As published by the FWS, the DEIS does not provide the analysis nor address the deficiencies described in these comments. I therefore recommend that the FWS withdraw the published DEIS for further analysis and additional input from BRE and other stakeholders. Otherwise, the FWS should adopt Alternative 1, the "No-Action" alternative, as presented in Table 3-1 of the DEIS, which stipulates no new construction and that the existing 67 turbines will be turned off from 30 minutes before sunset to 15 minutes after sunrise from April 1 through November 15.

Thank you for consideration of my comments and recommendations.

Rick Webb
481 Ravens Run Road
Monterey, VA 24465
rwebb@virginia.edu
540-468-2881