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Comments on Draft EIS and Draft HCP for Buckeye Wind Facility

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Public Comments Processing
Attn: FWS–R3–ES–2012–0036
Division of Policy and Directives Management
U.S. Fish and Wildlife Service;
4401 N. Fairfax Drive, MS 2042–PDM
Arlington, VA 22203

Electronic submission: (receipt verification requested);

Dear Ms. Seymour and Mr. Amidon:

We offer these comments on both the Draft National Environmental Policy Act Environmental Impact Statement ("DEIS") and the Draft Habitat Conservation Plan ("DHCP") for the Buckeye Wind Facility project (the "Project") in Champaign County, Ohio.[1] The Conservation Law Center is a nonprofit public interest law firm located in Bloomington, Indiana. Our mission is to help clients solve natural resources conservation problems, to work to improve the body of conservation law and policy, and to educate law students.

The comments below are organized as follows. We have grouped our comments into 7 sections reflecting main topics. Within each topic section, we provide comments on the DEIS, if applicable, and on the DHCP separately, if applicable, taking care to avoid duplication. For some topic sections, comments may refer to only the DEIS or only the DHCP.

[1] 77 Fed. Reg. 38819 (June 29, 2012).

1
DELINEATION OF ACTION AREA

DHCP/ESA

COMMENT 1.1. THE EXPLANATION OF THE "ACTION AREA" OF THE PROJECT IS INADEQUATE.

The DHCP does not clearly explain how the proposed action area was determined. The action area should be delineated based on potential impacts to the Indiana bat (and possibly other species of concern). Determining the scope of an action area requires application of scientific methodology and the agency must explain the "scientific methodology, relevant facts, or rational connections linking the project's potential impacts" to the action area boundaries to enable a reviewing court to determine whether the action area was properly conceived.[2] The DHCP's explanation of how the action area was delineated is scattered throughout the document and is described in vague language. Thus, it is difficult to determine whether the delineation is consistent with ESA regulations.

The DHCP describes the action area of the Project as follows (emphasis added):

> [Page 1:] The Project will be situated within an approximately 32,395 hectares (ha; 80,051 acres [ac]) area that includes portions of Union, Wayne, Urbana, Salem, Rush, and Goshen Townships in Champaign County, OH (referred to hereafter as the Action Area; Figure 1-1). Within the Action Area, the permanent footprint (the area of permanent disturbance) for the entire Project will be no more than 52.5 ha (129.8 ac), or 0.16% of the total Action Area. Development of the Project will include installation of up to 100 wind turbine generators (turbines), each with a nameplate capacity rating of 1.6 megawatt (MW) to 2.5 MW, resulting in a total generating capacity of up to 250 MW. The Project will also include development of service roads, electricity collection lines, staging areas, and an operations and maintenance (O&M) facility.
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> While only 52 turbine locations are known at this time, the HCP will address impacts to Indiana bats from the construction and operation of the full 100-turbine Project with expected lifespan of 30 years from construction through decommissioning (ITP Term; see Section 2.4 – ITP Duration). The location of the additional 48 turbines will not significantly change the net effect on the species and the level of authorized take described in this HCP will not be greater.

[2] Native Ecosystems Council v. Dombeck, 304 F.3d 886, 902 (9th Cir. 2002).

> [Page 4:] Though no known Indiana bat hibernacula are located within the Action Area, summer resident Indiana bats are known to occur within the Action Area and vicinity. Bat mist-netting surveys were conducted in the summer of 2008 within an area that included the current Action Area in Champaign County and an area to the north extending into Logan County ("initial study area"; see Figure 1-2). These surveys documented the presence of Indiana bats approximately 7.8 km (4.8 mi) to the north of the current Action Area. Two reproductive adult female and 1 non-reproductive adult male Indiana bats were captured as part of the 2008 survey. *The initial study area was revised to be at least 8 km (5 mi) from the 2008 Indiana bat capture and roost locations and then further expanded, creating the current Action Area.* The current Action Area also avoids caves supporting other species of bats (not Indiana bats) during hibernation (see Section 3.2.3 – Pre-Construction Bat Surveys Conducted).
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> [Pages 165-166:] In the summer of 2008, during Tier 3 studies, a new summer colony of Indiana bats was discovered in the initial study area in Logan County. Based on this finding, in consultation with the USFWS, *Buckeye Wind reduced the area of proposed turbine development to avoid potential impacts to Indiana bats (see Section 1.1 – Overview and Purpose of the HCP and Figure 1-2), resulting in the current Action Area.* Because the Action Area was more than 8 km (5 mi) away from the nearest capture site for Indiana bats, it appeared that impacts to Indiana bats were sufficiently avoided and Buckeye Wind, in consultation with the USFWS and ODNR, made a decision to proceed with the Project within the current Action Area. Buckeye Wind then proceeded to develop an application for a CECPN for approval through the OPSB in 2008-2009.
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> Despite thorough pre-planning, prior bat surveys within the Action Area that did not detect Indiana bats, due diligence, and ongoing consultation with the USFWS and the ODNR DOW, *Indiana bats were unexpectedly discovered in the Action Area in summer 2009. The discoveries were made in the northern part of the Action Area* during mist-netting surveys conducted by another entity as part of site evaluations for an unrelated wind project. *Due to these discoveries, Buckeye Wind determined that it was appropriate to enter into discussions with the USFWS to seek an ITP under Section 10 of the ESA.* Furthermore, research (Arnett et al. 2010, Baerwald et al. 2009 and Good et al. 2011; see Table 6-1) indicates that specific avoidance and minimization methodologies are effective in reducing direct and indirect impacts to bats from wind projects, making it likely that an HCP could be developed that would allow the Project to be built while avoiding and minimizing impacts to Indiana bat populations. The following sections describe additional measures that will be taken by Buckeye Wind to avoid impacts to Indiana bats and where those impacts cannot be avoided, how they will be minimized and mitigated, to the maximum extent practicable.

The DHCP should have a separate section titled "Action Area." Within this new section the DHCP should explain, among other things, that the northern boundary of the action area was

drawn to be at least 5 miles from the 2008 bat capture and roost sites. The DHCP should also explain whether and how the proposed turbine locations, and the action area boundary in relation to the turbine locations, were re-adjusted based on the 2009 observations. The appropriate response to the capture and roost location data is to adjust the location of the turbine locations. Simply contracting the action area boundaries, without moving the locations of the turbines, is inconsistent with the definition of an action area. The DHCP should clarify how and whether the project footprint and turbine locations were adjusted in relation to the action area boundary in response to the data.

COMMENT 1.2. THE APPARENT DELINEATION OF THE "ACTION AREA" OF THE PROJECT IS INADEQUATE.

A. Background

ESA regulations define the term "action area" as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."[3] The action area is not limited to the footprint of the action nor is it limited by the Federal agency's authority. Rather, it is a biological determination of the reach of the proposed action on listed species. Careful delineation and explanation of the chosen action area is important because the determination of the environmental baseline and cumulative effects are tied to the action area.[4]

B. The Action Area Must, But Apparently Does Not, Include All Potential Impacts of the Project.

The action area must be delineated such that it contains all of the direct and indirect effects of the proposed Project on Indiana bats. In other words, the action area is the entire area within which project-associated environmental effects are anticipated to occur; for instance, earth disturbance, habitat alterations, noise, flight path disruption, and physical harm. When delineating the action area of the Project, the movement patterns of Indiana bats must be considered. With respect to physical harm and disruption of the flight path, Indiana bats may travel 5 miles or more between roosts and foraging areas, depending on habitat, prey availability,

[3] 50 C.F.R. § 402.02. Section 7 of the ESA applies to the USFWS issuance of an ITP. *See* USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996), pp. 6-12 to 6-14.
[4] Defenders of Wildlife v. Babbitt, 130 F.Supp.2d 121, 129 (D.D.C. 2001).

and other factors, and may forage across several miles.[5] Thus, roosting bats found less than 5 miles from the Project's turbines potentially will be impacted by those turbines during foraging and other movements.

USFWS recommends in its 2011 Wind Energy Projects Guidance that the home range of an Indiana bat be delineated to include all suitable habitat within 5 miles of a capture location if only capture data are available; all suitable habitat within at least 2.5 miles of a single documented maternity roost tree; all suitable habitat within at least 2.5 miles of the line drawn between the two documented roost trees; and all suitable habitat within at least 2.5 miles of the center of the polygon created by connecting three or more documented roost trees.[6] To avoid and minimize incidental take, the applicant should seek to locate turbines and the remaining facility footprint outside of the home ranges of Indiana bats. If, however, any Indiana bat home ranges will intersect with turbine locations, if changes in habitat or habitat use may shift existing home ranges to intersect with turbine locations, or if new roost trees or colonies are likely to be discovered in the vicinity, the action area should be delineated to include those existing or potential home ranges. In short, using USFWS's recommended distances, while turbines should be located as far from roosts as possible, the action area should embrace any potential or observed roosts or capture sites within 2.5 or 5 miles, respectively, of a turbine because bats may be impacted by that turbine.

The DHCP provides no indication of the biological significance of the action area boundaries and no indication that this significance was considered. For example, from Figure 1-1 in the DHCP it appears that some turbines will be located less than 2.5 miles from the boundary of the action area.[7] The action area boundary should be at least 5 miles from any turbine. If any maternity colonies or roost trees exist (potentially undetected) just across the boundary of the proposed action area and the home ranges of bats from those roosts or colonies overlap with turbines, then those bats, during their nightly activities, may be taken by those

[5] USFWS, *Indiana Bat Draft Recovery Plan* (April 2007).
[6] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), pp. 8–13, *available at* http://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inbaS7and10WindGuidanceFinal26Oct2011.pdf.
[7] *See id*. at 8–13.

turbines (by physical harm, flight path disruption, noise harassment, etc.).[8] In fact, a roost tree found 1.5 miles outside of the proposed action area boundary in 2009 was the source of an adult female that was captured in the central portion of the action area.[9] If there is any chance that a colony or roost is less than 2.5 miles (or a bat capture less than 5 miles) from a turbine, that location must be included in the final action area.[10] Moreover, the integrity of any maternity colony across the proposed boundary but within 2.5 miles of a turbine may be affected by taking of bats that are sourced at that colony. A delineation of the action area that does not include observed or potential capture locations within 5 miles of a turbine, or colony or roost locations within 2.5 miles of a turbine, is not consistent with the regulatory definition of an action area.

The Project should first seek to avoid impacts to Indiana bats to the maximum extent practicable by locating the Project outside of the home ranges of bats. The action area should then be delineated to include those impacts to bats that cannot be avoided by such siting considerations. The HCP should evaluate the extent and timing of bat foraging, gathering, migration, and dispersal movements and should analyze how such movements influence the scope of Project impact and thus the delineation of an action area for the Project, as required by ESA regulations.

[8] USFWS has stated that most Indiana bat maternity colonies are unknown. USFWS, *Revised Programmatic Biological Opinion on the Proposed Construction, Operation, and Maintenance of Alternative 3C of Interstate I-69 from Evansville to Indianapolis* (Aug. 24, 2006), pp. 46–47.

[9] *See* DHCP, p. 6 ("An additional adult female was captured in summer 2009 in the central portion of the Action Area and was tracked to her roost tree located outside of the Action Area, approximately 2.3 km (1.5 mi) to the east of the eastern boundary.").

[10] The same consideration should be given to other forms of taking, such as noise from project facilities other than turbines.

2
BIOLOGICAL GOALS AND OBJECTIVES

DHCP/ESA

COMMENT 2.1. THE FIRST AND SECOND OBJECTIVES OF THE DHCP REFLECT CIRCULAR REASONING.

A. Background

The DHCP states the biological goal as follows: "The biological goals of this HCP are to minimize take of Indiana bats to the maximum extent practicable and to promote the health and viability of Indiana bat populations both locally and in the Midwest Recovery Unit (RU)."[11] The following comments refer to this draft goal regardless of its validity.

USFWS's 5-Point Policy states, "In the context of HCPs, biological goals are the broad, guiding principles for the operating conservation program of the HCP. They are the rationale behind the minimization and mitigation strategies. For more complex HCPs, biological objectives can be used to step down the biological goals into manageable, and, therefore, more understandable units."[12]

B. The Draft "Objectives" Are Inconsistent With USFWS Guidance.

The first "objective" in the DHCP is to "[i]mplement an operational feathering strategy that will limit mortality of Indiana bats due to collision with turbines or barotrauma resulting from near collisions with moving blades to no more than 26 Indiana bats over any 5-year period beginning in any year in which more than the Expected Average Mortality of 5.2 Indiana bats is estimated, and not more than 130.0 Indiana bats over the 30-year ITP Term."[13] This statement is not a biological objective; rather, it is a restatement of the proposed alternative and, thus, reflects circular reasoning.

According to USFWS's 5-Point Policy, "Conservation measures identified in an HCP, its accompanying incidental take permit, and/or IA, if used, provide the means for achieving the biological goals and objectives. . . . Biological objectives are the different components needed to

[11] DHCP, p. 9.
[12] USFWS, *Addendum to the HCP/ITP Handbook* (June 2000).
[13] DHCP, p. 9.

achieve the biological goal such as preserving sufficient habitat, managing the habitat to meet certain criteria, or ensuring the persistence of a specific minimum number of individuals. The specifics of the operating conservation program are the actions anticipated to obtain the biological objectives[.]"[14]

It is no surprise that the DHCP claims that the proposed alternative meets the first objective – the alternative and the objective have been entirely conflated. The proposed alternative to take no more than 26 bats in a 5-year period is not a "biological" objective. Rather, it is a "management" objective. The first objective is not, but should be, based on the needs of the Indiana bat and requirements for population persistence. The second objective, which sets forth the mitigation plan, suffers from the same infirmity.

Moreover, as will be discussed more fully in the comments below, the DHCP presents no evidence that the first objective (i.e., the proposed alternative) meets the goal of minimizing take of Indiana bats to the "maximum extent practicable" and promoting the health and viability of Indiana bat populations.

If the HCP's biological goals are to be stepped down to biological objectives, the HCP must, but does not currently, present valid biological objectives based on the needs of the Indiana bat and requirements for population persistence. The biological objectives must be, but are not currently, differentiated from alternatives and management measures proposed as means to meet biological goals and objectives. In addition, the final choice of valid goals and objectives must be based on evidence referenced or explained in the HCP.

COMMENT 2.2. THE FOURTH DRAFT OBJECTIVE REFLECTS UNSUPPORTED CONJECTURE.

The fourth "objective" of the DHCP is to "maximize operational output of the project, such that the environmental benefits of wind energy are maximized, thereby reducing potentially harmful effects of other energy projects."[15] This "objective" has three major flaws.

First, any suggested link between maximizing operational output of the Project and "maximizing the environmental benefits of wind energy" or "reducing potentially harmful effects of other energy projects" is entirely unsupported conjecture. The DHCP presents

[14] USFWS, *Addendum to the HCP/ITP Handbook* (June 2000).
[15] DHCP, pp. 9–10.

absolutely no evidence or reasoning that maximizing output from this particular project will maximize the benefits of wind energy or lead to any reduction in energy production that causes climate change. That link depends on a multitude of economic and political factors at both a national and state scale that are highly uncertain.

Second, this draft objective has the same infirmity discussed above – "maximizing operational output of the project" is not a "biological" objective but rather a "management" objective.

Third, the DHCP presents no evidence that maximizing operational output meets the stated goal of minimizing take of Indiana bats to the "maximum extent practicable" and promoting the health and viability of Indiana bat populations.

3
CALCULATION OF TAKE AND ITS EFFECTS

DHCP/ESA

COMMENT 3.1. THE DRAFT ESTIMATE OF BASELINE TAKE OF INDIANA BATS IGNORES THE FORMAL UNCERTAINTY ANALYSIS OF THE RISK MODEL.

Generally, incidental take is expressed as the number of individuals reasonably likely to be taken.[16] The DHCP's estimate of baseline anticipated take does not accurately reflect the results of the Bat Collision Risk Model ("Risk Model").[17] The real strength of the Risk Model, as discussed in Appendix A of the DHCP, is that it formally incorporates and considers uncertainty. As the authors indicate, the behaviors and risks that were sought to be captured in the Risk Model are highly uncertain. To reflect this high level of uncertainty, the modelers used a relatively simple model with ranges or distributions of parameter values. In describing the model approach, the authors state, "A probabilistic approach was used in this collision risk model that relied on either a range of values, or on a formal distribution for each model input,

[16] USFWS & NMFS, *Endangered Species Consultation Handbook* (Mar. 1998), p. 4-50.
[17] DHCP, App. A. The estimate also oversimplifies the studies on the effects of modifying cut-in speed cited in the DHCP.

rather than a deterministic approach based on single-point estimates."[18] The authors further describe in the discussion their approach to incorporating uncertainty in the model:

> The range of estimated mortality of Indiana bats reflects uncertainty around each of the model inputs: population size; flight height; the effect of temperature and wind speed on nightly activity; movements within the turbine array; and factors that lead to survival or mortality (e.g., avoidance or attraction). This uncertainty is evident in the disparity of values at the upper and lower edges of estimated mortality distributions (i.e., the 30th and 70th percentiles). A probabilistic approach was chosen for this model, using distributions for each model input derived from empirical data, derived data, or professional opinion to account for this uncertainty. This was preferred over using single-point estimates for each of the input parameters, which would have resulted in less variability, but also less confidence, in the model results.[19]

As the authors recognize, this formal incorporation of uncertainty is the real strength of the model given the high level of uncertainty regarding the model inputs:

> The probabilistic approach used in this collision risk model represented a unique way of adapting the existing Bolker et al. (2006) model to fit the needs of a species whose behavior did not match that of migratory or nesting bird species. For each individual simulation (out of 100,000), the calculation of collision risk combined the average number turbine encounters for all possible flight directions and all possible flight heights (weighted by probability), along with a randomly-selected survival probability between 0 and 1 that varied among survival scenarios. By using distributions whose shapes were derived from available data on bats, Myotis species, or Indiana bats specifically, *a reasonable range of uncertainty was encapsulated during each simulation, which likely captured the expected amount of mortality that would result from the proposed Project*.[20]

Thus, as stated by the authors in the last sentence above, the model results likely "capture" the expected amount of bat fatalities due to the Project, similar to how a confidence interval is said to capture the actual parameter value.

Importantly, the modelers do not know which of the three survival scenarios modeled are more or less likely than the others. Each survival scenario represents a distribution of probabilities that a bat survives an imminent collision with a turbine rotor.[21] The authors state that "the actual chance of survival if an Indiana bat flies into the rotor swept zone of a turbine is

[18] DHCP, App. A, p. 2.
[19] DHCP, App. A, p. 44.
[20] DHCP, App. A., p. 45 (emphasis added).
[21] DHCP, App. A., pp. 32–33.

unknown. . . . Three potential survival scenarios were created to both reflect uncertainty and to test the sensitivity of the model outcome . . . . It is important to reemphasize that factors leading to an Indiana bat surviving an encounter with a turbine (e.g., avoidance) are very poorly understood . . . . By incorporating a distribution of survival probabilities over 3 different scenarios, it is expected that this method provides a reasonable and conservative estimation of the survival probability."[22]

Although the modelers have more information on flight heights and may be able to reasonably surmise that the low flight height scenario is more likely than the high flight height scenario, there is still a large amount of uncertainty regarding flight height, particularly of migrating Indiana bats.[23]

Accordingly, the model results are expressed not as a deterministic estimate of bat fatality but rather as distributions of results, primarily for different scenarios of flight height and survival in different seasons. From these distributions, model results are summarized in terms of the median (i.e., 50th percentile), the 30th percentile, and the 70th percentile.[24] The Risk Model results show that the median annual number of fatalities ranges from 3.46 to 36.82, depending on survival scenario and flight height scenario. The range of model results between the 30th and 70th percentiles, however, to a large extent "captures" the expected amount of bat fatalities due to the Project. This output of the Risk Model is presented in the DHCP as the best available science.

Yet, despite the high level of uncertainty in collision risk and fatalities for Indiana bats, despite the authors' belief that the Risk Model provides a reasonable and conservative estimation of the survival probability based on its incorporation of a distribution of probabilities over different scenarios, despite the formal treatment of uncertainty in the Risk Model inputs and results, and despite the fact that this formal incorporation of uncertainty is the main strength of the Risk Model, the DHCP collapses all of the information about uncertainty contained in the results – information that was deemed essential to the modeling exercise – into a single average number (16.3 bats per year), which is then used to calculate expected annual take of Indiana bats by the Project.[25] This average is then reduced by another average calculated over the ranges of benefits of increasing cut-in speed found in three studies, to get a take estimate of 5.2 bats per

[22] DHCP, App. A., pp. 32–33.
[23] DHCP, App. A., pp. 27–32.
[24] DHCP, App. A., pp. 41–43.
[25] *See* DHCP, pp. 121–125.

year. This averaged result, or a number near to this result, could have been arrived at by selecting a deterministic model with deterministic input that represents the average of the input scenarios and values. The modelers chose to use a probabilistic model to incorporate the large amount of uncertainty and generate a range of results, and the authors of the DHCP then chose to ignore the important information in those results.

It has been well recognized for many years that models that incorporate uncertainty provide more and better information in cases where uncertainty is pronounced, and many have called for the use of such models. The more difficult task is using the model output effectively to make decisions. When the inputs to a model are highly uncertain, as in this case, the best practice is to recognize and use the uncertainty in the resulting outputs.

Why does ignoring the uncertainty in the results of the Risk Model matter for estimating baseline take of Indiana bats by the Project? First, the HCP's avoidance and minimization measures must be commensurate with the level of impacts indicated by the best available science. If the estimated impact does not reflect the best available science then the degree of avoidance and minimization initially required of the permittee may be insufficient to satisfy the permit issuance criteria in the ESA regulations. Second, if the estimated impact does not reflect the best available science then the estimated impacts of the Project on the viability of local maternity colonies and the Midwest RU population may be unrealistic.[26] An accurate picture of the Project's impacts on population viability is essential for an accurate determination of whether the taking will appreciably reduce the likelihood of the survival and recovery of the species in the wild.

Although the averaged estimated annual take of 5.2 bats per year may be a reasonable trigger point for adaptive management (the 30th percentile estimated take may be better for that purpose), the average of the Risk Model's 70th percentile results for annual fatalities of 38 bats per year[27] is a conservative but reasonable value to use for determining jeopardy and setting minimization and mitigation measures.[28] Use of the 70th percentile results is a simple way to use at least some of the information produced by this probabilistic model and capture a range of most likely outcomes.

[26] *See* DHCP, pp. 130–145.
[27] *See* DHCP, Sections 4.2–4.4 in App. A.
[28] The Risk Model's 70th percentile result for annual fatalities for the high flight scenario is 60 bats per year.

COMMENT 3.2. THE DHCP'S EVALUATION OF THE IMPLICATIONS UNDER THE ESA OF A RAPIDLY DECLINING POPULATION INFECTED WITH WHITE-NOSE SYNDROME IS UNSUPPORTED.

A. Background

To issue an ITP, USFWS must find that a project's applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking.[29] This is also part of the goal stated in Section 1.2 of the DHCP. An applicant for an ITP must first minimize take to the maximum extent practicable before it mitigates the remaining take to the maximum extent practicable.[30]

"Jeopardize the continued existence of" means to engage in an action that "reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."[31] Typically, a jeopardy opinion is rendered "when the total of the species' status, environmental baseline, effects of the proposed action, and cumulative effects lead to the conclusion that the proposed action is likely to jeopardize the continued existence of the entire species, subspecies, or vertebrate population as listed."[32]

USFWS's 2011 Wind Energy Projects Guidance discusses the analytical framework for jeopardy analysis, reproduced in part below:

> The definition [of jeopardy] directs us to evaluate whether a reduction in the likelihood of survival and recovery is expected. Reduction embodies the concept of a change, more specifically, a decrease. Likelihood implies a chance or probability of some event. Thus, we are directed to assess whether a decrease in the probability of survival and recovery is expected. Further, it is not just whether any decrease will occur; we must evaluate whether the magnitude of the anticipated decrease is "appreciable." Appreciable means noticeable, perceivable, or measureable. In pulling these three concepts together, our jeopardy analyses is then determining whether the anticipated reductions in the species' reproduction, numbers, or distribution (RND) would reasonably be expected to noticeably, perceivably, or measurably decrease the species' probability of survival and recovery.

[29] 16 U.S.C. § 1539(a)(2)(B); 50 C.F.R. §17.22 (b); USFWS & NMFS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Dec. 4, 1996), pp. 3-15; 7-3 to 7-4.
[30] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), p. 47 ("68. Is it allowable for an applicant to mitigate in lieu of minimization measures, or must the applicant first minimize if possible? Response: An applicant must first minimize to the maximum extent practicable.").
[31] 50 C.F.R. § 402.02.
[32] USFWS & NMFS, *Endangered Species Consultation Handbook* (Mar. 1998), pp. 4-37 to 4-38.

Analytical Framework for Jeopardy Analyses
* * *
The end product of a section 7 effects analysis is a description of the type and magnitude of response bats will exhibit upon exposure to an action and any associated environmental stressors. Among others, biological responses include startle, alarm, flee, avoid, abandon/ displacement, reduced feeding success, reduced growth, reduced reproductive success, reproductive failure, and mortality. Once the anticipated response is determined, we are poised to assess the consequences such responses pose for the species, i.e., complete a jeopardy analysis. The framework below describes a sequential process for conducting jeopardy analyses.

First, we evaluate how the individual responses will affect the fitness of those individuals (Step 1 in the schematic below). The fitness of an individual is measured by its annual and lifetime reproductive success and its survival likelihood. For example, if we determined that Indiana bats are likely to abandon a foraging area upon exposure to the proposed action, we must determine how such a response affects the lifetime reproductive success and survival likelihood of the individuals exposed. If no reductions in individual fitness are anticipated, then the analysis is complete and the action agency has insured that its action is not likely to jeopardize the continued existence of the Indiana bat.

If reductions in fitness are anticipated, in the next step (Step 2) we evaluate how changes in the fitness of the individuals affect the fitness of the population to which those individuals belong. The fitness of a population (i.e., its reproductive success and survival probability) is a compilation of the fitness of each of the individuals and the number of individuals comprising the population1. For the Indiana bat, a "population" is typically a maternity colony, a congregation of swarming bats, or a congregation of bats in a hibernaculum, and hence, we are evaluating how the fitness of the maternity/swarming/winter colony will be affected by the collective reduction in survivorship and reproduction of the individuals exposed to the proposed action. Specifically, we are analyzing how the reductions in individual fitness affect the population's abundance, reproduction, growth rates, or variance in these measures to make inferences about the population's future reproductive success (if applicable) and its viability. If no reductions in the maternity/swarming/winter colony fitness are anticipated, we conclude that the agency has insured that their action is not likely to jeopardize the continued existence of the Indiana bat and our analysis is completed. If, however, we cannot show that reductions in the population's fitness are unlikely to occur, we evaluate the impact of such reductions in population fitness will reduce the likelihood of both survival and recovery of Indiana bat rangewide by impacting its RND. As the recovery plan designates recovery units (RUs), this next step (Step 3) looks at how the reductions in population fitness affects RND of Indiana bats within the affected RU and how these effects on RND affect the likelihood of both survival and recovery of Indiana bats in the RU.

> To understand the consequences of population-level reductions in fitness, we need to identify the RND needs of Indiana bat at the RU level, i.e., what is needed in terms of RND to ensure the species is no longer in danger of extinction or to become endangered within the foreseeable future in the RU (henceforth, referred to as conservation needs). . . . Our analysis in this step evaluates how the population-level effects influence the likelihood of progressing towards or maintaining the conservation needs.2 If the population-level risks do not noticeably, detectably, or perceivably reduce the likelihood of progressing towards or maintaining one or more of the conservation needs, then the action is not likely to appreciably reduce the likelihood of both survival and recovery of Indiana bat within the affected RU(s), and our analysis is completed. If population-level risks appreciably reduce the likelihood of progressing towards or maintaining these conservation needs in the RU, then the likelihood of both survival and recovery of Indiana bats in the RU will likely be appreciably reduced, and we need to complete a fourth and final analysis.
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> In Step 4, we evaluate whether such reductions in RND within the RU will reduce appreciably the likelihood of both survival and recovery of Indiana bat rangewide. As explained in the recovery plan, the RUs are designed to preserve sufficient representation, redundancy, and resiliency to ensure the long-term persistence of Indiana bat. It then follows that an appreciable reduction in the likelihood of both survival and recovery of Indiana bats in any one RU will reduce the representation, redundancy, and resiliency of the species rangewide and will therefore inherently cause an appreciable reduction in the likelihood of survival and recovery of the Indiana bat rangewide.[33]

B. The DHCP's Conclusion That the Project Cannot Jeopardize the Indiana Bat No Matter How Dire the Circumstances and the DHCP's Response to White-Nose Syndrome Are Inconsistent with the ESA.

The DHCP discounts the possibility that the Project could jeopardize the Indiana bat – that is, reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild – even in dire circumstances of a rapid decline toward extinction caused by an outbreak of White-Nose Syndrome ("WNS").[34] The results of the Leslie Matrix model show that the combined impacts to the Midwest RU population of the Project and WNS together drive the population to near extinction within 25 years.[35] According to the DHCP's logic, the incremental effect of the Project on the species' decline would be relatively small compared to the large

[33] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), pp. 50-51.
[34] DHCP, pp. 141-142.
[35] DHCP, p. 141, Figure 5-4.

effect of WNS, so the Project cannot jeopardize the population: "Based on these modeling results, Indiana bat populations at both the maternity colony and Midwest RU levels will not be reduced to low or non-viable levels appreciably sooner with impacts from Project-related take than without it . . . ."[36] The DHCP then commits to reducing requested take by 50% if the Indiana bat population is reduced to 50% of pre-WNS levels.[37]

There are two problems with the DHCP's analysis. First, according to the DHCP's logic, USFWS would and 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 on jeopardy. This logic is also inconsistent with statements in other parts of the DEIS and DHCP, which correctly point out that the significance of take increases as the status of the species becomes increasingly dire. The DHCP states, "[A]s the population declines, each individual *becomes more valuable to the population as a whole*."[38] Similarly, the DEIS states, "Although population numbers in this RU are still seemingly high, given the extremely rapid rate at which WNS has spread over just 3 years, and the high mortality rates observed in the Northeast RU, population reductions of all cave bat species as a result of WNS in the Midwest RU are expected to increase . . . *which makes additional mortality from other sources (i.e. wind power) even more significant*."[39] The DEIS also states, "If the Midwest RU Indiana bat population or other cave bat populations were substantially reduced as a result of WNS or other causes, the projected level of mortality resulting from wind turbines *could have greater implications for the viability of the population and the cumulative effects of this Project and past, present, and reasonably foreseeable actions considered in this analysis could result in significant effects to the Indiana bat or other cave bat population size or distribution*."[40] When a species is spiraling toward extinction, the loss of even a single individual may be highly

[36] DHCP, p. 142.
[37] DHCP, p. 142.
[38] DHCP, p. 141 (emphasis added).
[39] DEIS, p. 5-188 (emphasis added).
[40] DEIS, p. 5-189 (emphasis added).

significant.[41] Moreover, the application of the word "appreciably" in the regulatory definition of jeopardy depends on the status of the species or population.[42]

The DHCP, however, ignores the possibility that this Project's take could "reduce appreciably" the likelihood of both the survival and recovery of the Indiana bat if the population was headed for extinction within a matter of two or three decades. The DHCP's apparent conclusion is that because the Midwest RU population would be rapidly heading for extinction without the Project, then USFWS may as well authorize take from the declining population. Of course, most every other project in the Midwest RU could and would make the same claim. It would be more reasonable to conclude that under such dire circumstances USFWS would find that the level of take proposed in the DHCP, and the resulting downward trajectory of the Midwest RU,[43] would indeed "appreciably" reduce the likelihood of both the survival and recovery of the Indiana bat. At a minimum, the DHCP should take a hard look at this issue and make a reasoned assessment rather than blithely assume that the status of the Midwest RU would have no effect on the jeopardy analysis for the Project.

Second, the DHCP's plan is to reduce the requested take of Indiana bats by the same percentage of the population decline due to WNS – i.e., a 50% decline in the Midwest RU would trigger a 50% reduction in requested take. This is an overly-simplistic response, which is not consistent with the justification for the response stated in the DHCP – i.e., that 50% fewer Indiana bats will be exposed to risk because of the assumed linear relationship between overall population decline and the number of bats exposed to wind turbines in this particular action area; that the adaptive management plan will kick in if that assumption is determined to be wrong; and that "each individual becomes more valuable to the population as a whole."[44] In the absence of the last factor, the 50% reduction in requested take might be a reasonable response to a 50% drop in the Midwest RU population, if the simplistic assumption used – that reductions in bats at the hibernacula have a uniform effect on all maternity colonies and all summer use areas – holds up to evidence. But the DEIS and DHCP repeatedly and correctly point out that the significance of

[41] For example, the loss of even one Whooping Crane is significant given their low numbers. *See* USFWS, *Whooping Cranes and Wind Development – An Issue Paper* (Apr. 2009), *available at* ftp://wiley.kars.ku.edu/windresource/Whooping_Crane_and_Wind_Development_FWS_%20April%202009.pdf.
[42] *See* USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), pp. 50–51.
[43] DHCP, p. 138, Figure 5-2. The DHCP presents Leslie Matrix modeling results that show that the proposed baseline take of Indiana bats causes the population to decline.
[44] DHCP, p. 141.

take increases as the status of the species becomes increasingly dire.[45] Thus, a 50% reduction in the Midwest RU population should trigger not only a reduced request of the take limit (due to fewer bats encountering turbines) but also additional minimization and mitigation measures to account for the increased significance of the remaining population and of take from that population. This consideration should be, but has not been, considered or discussed in the DHCP. This issue is discussed in Section 7 below in the context of adaptive management.

4
ALTERNATIVES

DEIS/NEPA

COMMENT 4.1. THE ALTERNATIVES STUDIED IN THE DEIS DO NOT CONSTITUTE A REASONABLE RANGE OF ALTERNATIVES.

A. Background

The EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[46] Consideration of alternatives is "the heart of the environmental impact statement."[47] The stated goal of a project dictates the range of "reasonable" alternatives and an agency cannot define its objectives in unreasonably narrow terms. Project alternatives derive from an EIS's Purpose and Need section. Thus, courts begin their evaluation of the alternatives by determining whether or not the Purpose and Need Statement is reasonable and then evaluate whether the range of alternatives based on the purposes and needs is reasonable.[48]

Courts review an EIS's range of alternatives under the "rule of reason." Under the rule of reason, the EIS need not consider an infinite range of alternatives, nor is the agency required to undertake a separate analysis of alternatives which are not significantly distinguishable from alternatives actually considered or that have substantially similar consequences, nor must the agency analyze remote and speculative alternatives. But the EIS must consider reasonable or

[45] DEIS, p. 5-188 & 5-189; DHCP, p. 141.
[46] 40 C.F.R. § 1502.14(a).
[47] 40 C.F.R. § 1502.14.
[48] Westlands Water Dist. v. U.S. Dept. of Interior, 376 F.3d 853, 865 (9th Cir. 2004); Simmons v. U.S. Army Corps of Engineers, 120 F.3d 664, 666, 670 (7th Cir. 1997).

feasible, and non-duplicative alternatives. The existence of a viable but unexamined alternative renders an environmental impact statement inadequate.[49] The agency has a duty to study all alternatives that appear reasonable and appropriate for study, as well as significant alternatives suggested by other agencies or the public during the comment period.[50] The touchstone for the inquiry into the range of alternatives is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation.[51]

B. The DEIS Does Not Consider a Reasonable Range of Alternatives.

USFWS determined that an EIS is necessary to evaluate the Applicant's Project for two reasons. First, the Project's effects are uncertain and require more thorough analysis, including the impact to federally listed species. Second, the Project will receive one of the first ITPs for Indiana bats associated with a wind facility.[52] The implications, therefore, of granting the ITP and approving the Applicant's HCP are significant for future wind project development. This HCP could potentially set the standard for avoidance, mitigation, and monitoring techniques as well as provide an opportunity to improve research and data collection on bat, bird, and wind turbine interactions.

Under NEPA, an agency's statement of "purpose and needs"[53] is important both for context and "to provide the framework in which 'reasonable alternatives' to the proposed action will be identified."[54] USFWS's guidelines define purpose as "a goal or end to be obtained" and needs as "a lack of something required, desirable, or useful."[55] The definition of needs further elaborates that "[n]eeds help define and design alternatives."[56] With respect to the proposed Project, the DEIS states the purposes of the action as follows:

> The purposes for the proposed action and preparing this DEIS are to:
>
> - Respond to Buckeye Wind's application for an ITP for the federally endangered Indiana bat related to Project activities that have the potential to result in take, pursuant to the provisions of section 10(a)(1)(B) of the

[49] *Westlands Water Dist.*, 376 F.3d at 868; Dubois v. U.S. Dept. of Agriculture, 102 F.3d 1273, 1287 (1st Cir. 1996).
[50] *Dubois*, 102 F.3d at 1287.
[51] *Westlands Water Dist.*, 376 F.3d at 868.
[52] DEIS, p. 1-9.
[53] 40 C.F.R. § 1502.13.
[54] CEQ, *Exchange of Letters with Secretary of Transportation: Purpose and Need*, May 2003, Part 2, *available at* http://ceq.hss.doe.gov/nepa/regs/CEQPurpose2.pdf.
[55] USFWS, *Draft Fish and Wildlife Service Manual*, 550 FW 2.4(A)(1), *available at* http://www.fws.gov/r9esnepa/550FW/550-final.fwm.pdf.
[56] *Id*. at 550 FW 2.4(A)(2).

> ESA, as amended, and its implementing regulations (50 C.F.R. part 17.22(b)(1)) and policies.
> - Protect, conserve and enhance the Indiana bat and its habitat for the continuing benefit of the people of the United States (U.S.).
> - Provide a means and take steps to conserve the ecosystems depended on by the Indiana bat.
> - Ensure the long-term survival of the Indiana bat through protection and management of the species and their habitat;
> - Ensure compliance with the ESA, NEPA, and other applicable Federal laws and regulations.[57]

The DEIS's statement of need provides in relevant part as follows:

> Commercial wind facilities have been shown to cause high numbers of bat fatalities in many locations. There is a need to ensure that take of Indiana bats is *avoided and minimized to the maximum extent practicable* and to ensure that *the impact of any remaining take is fully mitigated*. There is also a need to protect the habitat of Indiana bats including their maternity trees, swarming areas near hibernacula, and nearby foraging and roosting habitat.[58]

The goals of the DEIS are thus two-fold: to minimize take of Indiana bats to the maximum extent practicable and to protect the habitat of Indiana bats. Given that the "stated goal of a project necessarily dictates the range of 'reasonable' alternatives,"[59] the DEIS's broad statement of purpose and need allows for the consideration of a wide range of alternative project designs, siting, and operations, mitigation schemes, and adaptive management programs.

That said, there are three fatal problems with the range of alternatives considered by USFWS in the DEIS. First, USFWS chose to focus on a set of alternatives rooted in operational adjustments only. Second, reasonable alternative siting schemes for the wind turbines, such as omitting turbines from Category 1 habitat, were not analyzed. Third, as will be discussed in greater detail in Section 5 in the context of the DHCP, even the set of operational alternatives that is considered is not a reasonable range of alternatives; the considered set omits reasonable and feasible alternatives that the best available science shows can better meet the DEIS's purposes and needs.

These flaws in the alternatives analysis are especially egregious given that this EIS is in the context of ITP approval. CEQ guidelines state that for an EIS prepared in connection with an

[57] DEIS, p. 1-5.
[58] DEIS, p. 1-6 (emphasis added).
[59] City of Carmel-by-the-Sea v. U.S. Dept. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997).

application for a federal permit or approval, "the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative."[60]

USFWS's guidance on NEPA states that "the EIS . . . shall include an alternative comprising the proposed action, a no action alternative, and reasonable alternatives that satisfy the purpose and need(s), to the extent practicable."[61] The alternatives chosen for detailed study must therefore represent a range of options that satisfy, to varying degrees, the purpose and need of USFWS: protection of the Indiana bat and the Indiana bat's habitat. Although the number of options the agency must consider is "bounded by some notion of feasibility,"[62] it "may not limit itself to only one end of the spectrum of possibilities."[63] Courts have held that "the evaluation of alternatives is to be an evaluation of alternative means to accomplish the general goal of an action."[64] In the context of species protection, a number of possibilities exist, including administrative or regulatory means, project siting changes, operational adjustments, and mitigation and adaptive management schemes. Each category may then be further expanded upon, and every option identified will have its own advantages and disadvantages. It is the purpose of the EIS to highlight the environmental advantages and risks of a given project and evaluate them objectively to best determine which meets the needs of the agency, as written in its purpose and need statement.[65]

[60] CEQ, *Forty Most Asked Questions Guidelines Concerning CEQ's NEPA Regulations*, Question 2a (Mar. 23, 1981), *available at* http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm.
[61] USFWS, *Draft Fish and Wildlife Service Manual*, 550 FW 2.4(A)(4).
[62] Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 551 (1978).
[63] Oceana, Inc. v. Evans, 384 F. Supp. 2d 203, 240 (D.D.C. 2005); *see also* Sierra Club v. Watkins, 808 F. Supp. 852, 872 (D.D.C. 1991); 46 Fed. Reg. 18026 (1981) (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations).
[64] Simmons v. U.S. Army Corps of Engineers, 120 F.3d 664, 669 (7th Cir. 1997) (quoting Van Abbema v. Fornell, 807 F.3d 633, 638 (7th Cir. 1986)).
[65] *See* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 351 (1989) ("One important ingredient of an EIS is the discussion of steps that can be taken to mitigate adverse environmental consequences."); Dubois v. United States Dept. of Agriculture, 102 F.3d 1273, 1286 (1st Cir. 1996) ("The consideration of alternatives is 'the heart of the environmental impact statement.'") (citation omitted).

C. The DEIS's Rejection of Reasonable Alternatives from Detailed Study Is Unjustified.

Rather than compare and contrast alternate means of accomplishing the agency's objectives of protecting the Indiana bat through avoidance, minimization, and mitigation, USFWS narrows its analysis to one type of potential measure – operational adjustments. This does not represent a selection of reasonable and feasible alternatives from which the agency can thoroughly examine the environmental risks of the Project.

USFWS identified several categories within which alternatives could be created but chose to pursue operational adjustments only. Although the DEIS briefly discusses the elimination of the other categories of potential alternatives from detailed study, it does not offer explanations why those would not meet the *agency's* goals, rather than the Applicant's goals. An "agency cannot restrict its analysis to those 'alternative means by which a particular applicant can reach his goals.'"[66] CEQ guidelines state that for an EIS prepared in connection with an application for a federal permit or approval, "the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative."[67] Furthermore, "[n]either NEPA nor the CEQ regulations make a distinction between actions initiated by a Federal agency and by applicants," and "[r]easonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense rather than simply desirable from the standpoint of the applicant."[68] The elimination of the three other alternatives narrows the set of alternatives unreasonably and does not leave a reasonable range of alternatives. "A viable but unexamined alternative renders an EIS inadequate."[69]

USFWS rejected the following alternatives from detailed study: a shorter ITP term, an alternate location in Ohio, and reduced number of turbines.[70] Each of these rejections is now discussed in turn.

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[66] *Simmons*, 120 F.3d at 669 (quoting *Van Abbema*, 807 F.3d at 638).
[67] CEQ, *Forty Most Asked Questions Guidelines Concerning CEQ's NEPA Regulations*, Question 2a (Mar. 23, 1981), *available at* http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm.
[68] *Id*.; USFWS, *National Environmental Policy Act Reference Handbook*, CEQ Guidance Regarding NEPA Regulations, Memorandum to Heads of Federal Agencies (1983), *available at* http://wsfrprograms.fws.gov/subpages/toolkitfiles/fwsnepa.pdf.
[69] Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800, 814 (9th Cir. 1999) (quoting Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir. 1985)).
[70] DEIS, p. 2-5.

1. Shorter ITP Term

The DEIS explains the rejection of a shorter ITP term in part as follows: "[T]he Applicant determined that Project funding would be severely hampered by an ITP term that is shorter than the operational life of the Project."[71] This statement says nothing of the USFWS's opinion on feasibility or practicality, and only repeats the Applicant's opinion. Rather than accept the Applicant's assertion that investment would be "severely hampered," USFWS should test that presumption.[72]

We challenge the claim that investment in wind power facilities would be severely hampered if permit terms were not multi-decade. The most critical factors in renewable energy investment are federal subsidies such as the Production Tax Credit and the Investment Tax Credit. As (Buckeye's parent) EverPower's CEO said in 2011, "Without a tax credit, you will not see new construction of wind farms." Testimony given before Congress in 2009, by Timothy J. Richards, General Electric's Managing Director of International Energy Policy, was to the same effect. While Richards certainly identified "time horizons in decades" as a factor that distinguished renewable energy projects, the changes he asked Congress to make included tax credits and other subsidies of increased length and predictability, favorable trade policy, and the adoption of binding renewable energy standards. He made no mention of increasing the term of environmental permits.

This is not to say that energy developers would not like to be free of environmental permitting issues. Every risk they can eliminate or mitigate is an advantage to them. Buckeye Wind would certainly be very happy not to be accountable if it turns out that it miscalculated the risk of building a wind farm in Indiana bat habitat – a very real possibility in the dynamic context of climate change and White-Nose Syndrome. But the duration of an Indiana bat incidental take permit is simply not anywhere near the top of a full list of risks that Buckeye Wind faces. And it would be unwise and inconsistent with the purpose of the ESA to provide long-term relief from accountability in present circumstances.

With respect to the assumption that the timeframe of renewable energy projects requires permits of 20 years or more because potential investors require certainty for that period of time,

[71] DEIS, p. 2-5.
[72] *See* Simmons v. U.S. Army Corps of Engineers, 120 F.3d 664, 669 (7th Cir. 1997) ("[A]lternatives might fail abjectly on economic grounds. But the Corps, and more important, the public cannot know what the facts are until the Corps has tested its presumption.").

we have already commented that incidental take permits are nowhere near the top of any investor's list of risk factors. Further, it is a mistake to conclude that because the project has a planned life of decades, most potential investors in the project have a similar time horizon. Terra Firma Capital Partners Limited, which is the parent of Buckeye Wind's parent company, states in its public materials that the average duration of its investments is *five* years.

Even assuming that Buckeye Wind has, needs, or will seek additional bank financing, the availability and cost of that financing is relevant. Interest rates will vary depending on perceived risk, but the duration of an ITP, if an ITP is properly available, is highly unlikely to have a significant effect on the overall risk profile of the project.

Once the project is operational, the owners of Buckeye Wind may begin to look for a new owner that will operate it over the long term. Again, of the many variables and risks that will affect the market for such sales, the duration of an ITP (again, assuming an ITP is properly granted in the first place) is highly unlikely to be anything other than a very minor one. In a carefully and responsibly planned project that actually ought to move forward because it has been developed and located to minimize harm to the bat, the risk posed by the permitting process and the duration of the permit to investments in the project will be an insignificant one.

Eliminating that risk – a small one in the universe of risks Buckeye Wind faces – by issuing a long-term permit with no surprises assurances may on the other hand entail significant risk to the survival and recovery of the Indiana bat.

Buckeye Wind simply does not need an ITP of a duration that matches the term of the project, a duration that is unjustified given the uncertainties facing the Indiana bat. Permits of shorter duration are not only more consistent with the ESA's commitment to conserve Indiana bats, they are also entirely consistent with the goal of promoting responsible renewable energy development.

USFWS's dismissal of an ITP term alternative also begs the question why other ITP renewal strategies were not explored. If, for example, a streamlined 5-year ITP renewal process were proposed that achieved investor confidence but still provided USFWS with a mechanism by which it could incorporate new mitigation measures, this would certainly be a reasonable alternative to a 30-year ITP. A streamlined renewal process for 5-year ITPs would allow for the incorporation of newly-gathered Indiana bat population data and the implementation of better-studied operational measures.

Moreover, if the feasibility of an alternative is central to its rejection, USFWS should have likewise rejected Alternative A, the Maximally Restrictive Operations Alternative, given that the Applicant asserts it would not be commercially viable. USFWS is thus acting inconsistently in its choice of alternatives. On the one hand, it uses economic infeasibility to eliminate an alternative, but on the other hand, it ignores economic infeasibility in selecting another alternative for detailed study.

2. Alternate Location in Ohio

USFWS's justification for eliminating an alternative location in Ohio from further study rests on two assertions. First is the assertion that the "[p]roposed location provides adequate wind resource and technical feasibility" and "moving the project may still put Indiana bats at risk in Ohio."[73] Notwithstanding the possibility that the risk of harm "could be greater or lower"[74] than the Project's current proposed location, USFWS concludes that since Indiana bats may be present throughout Ohio, moving the project to a different area in the state "would not necessarily reduce the likelihood that Indiana bats would be affected."[75] This is faulty reasoning and does not demonstrate that the agency is taking a hard look at identifying a range of reasonable alternatives to the Proposed Action. The purpose of an EIS is to assess risk; therefore, to abandon a reasonable alternative because the risk is unknown is inconsistent with the purpose of preparing the EIS in the first place.[76] If, as USFWS itself notes in the DEIS, the risk to the Indiana bat could be lower at an alternate location, then that alternative falls squarely within the framework of the DEIS's statement of purpose and need – that is, "to ensure that take of Indiana bats is avoided and minimized to the *maximum extent practicable*."

The second assertion for eliminating the alternate location option is that "the Applicant asserts that it is not practical or financially feasible to fully develop a commercially viable alternate location."[77] This rationale is at odds with CEQ's guidance on what constitutes reasonable alternatives. Again, CEQ guidelines provide that "the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of

[73] DEIS, Table 2.2-1.
[74] DEIS, p. 2-5.
[75] DEIS, p. 2-5.
[76] NRDC v. Callaway, 524 F.2d 79, 92 (2d Cir. 1975) ("It is absolutely essential to the NEPA process that the decisionmaker be provided with a detailed and careful analysis of the relative environmental merits and demerits of the proposed action and possible alternatives, a requirement that we have characterized as 'the linchpin of the entire impact statement.'") (citation omitted).
[77] DEIS, p. 2-5; *see also* Table 2.2-1, fn. 2.

carrying out a particular alternative."[78] That the Applicant does not want to "double the effort and financial expenditure required to develop a single Project"[79] is not sufficient justification for failing to study an alternative that could present less risk to the Indiana bat and to its habitat while still promoting renewable energy and helping achieve Ohio's wind development goals. If wind resource potential and power infrastructure in eastern Ohio is even somewhat comparable to wind resource potential in western Ohio, and risk to the bat may be lower in eastern Ohio, then this alternative should certainly be further studied and explored as part of the NEPA process. The DEIS should take a broad look at the State and evaluate whether concentrating wind facilities in other parts of Ohio could substantially reduce the take of Indiana bats. The DEIS should explain the reasons for which western Ohio was chosen and describe whether wind resource potential, power infrastructure, and Indiana bat habitat in all Ohio regions are comparable. If the agency's goals are to protect Indiana bat habitat and avoid the take of Indiana bats, siting is critical to the accomplishment of those goals. An alternate location is therefore well within the range of reasonable alternatives that USFWS should explore in the EIS.

In fact, evidence presented in the DEIS suggests that the Project's current location in Ohio is in conflict with USFWS guidelines. The DEIS states that the Applicant followed the *Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines*[80] and suggests how the Applicant incorporated the recommendations. The first bullet point provides as follows:

> *Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.* The Applicant commissioned several bat studies (i.e., mist netting, acoustic detection, radar, and swarming studies) to determine the location of any bat hibernacula, maternity colonies, migration corridors, and flight paths in the Action Area . . . A Habitat Suitability Model and collision risk model (Appendices B and A of the HCP, respectively) for the Indiana bat was developed based on the Indiana bat survey results for the Action Area, other Indiana bat studies conducted in the Action Area vicinity, and the habitat in the Action Area in order to determine areas where impacts to this species would mostly likely occur.[81]

[78] CEQ, *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, Question 2a (Mar. 23, 1981), *available at* http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm.
[79] DEIS, p. 2-5.
[80] DEIS, p. 5-44.
[81] DEIS, pp. 5-44 to 5-45 (italics in original).

In a preceding section of the DEIS, USFWS presents a map of Indiana bat summer records (Figure 4.5-2) and a map of Indiana bat migration records (Figure 4.5-3).[82] Both maps, but particularly the migration records map, defies the above-quoted language. Figure 4.5-3 shows Indiana Bat Migration Records from 1971 to 2010 and identifies the Action Area as directly in a bundle of migration paths.[83] The eastern half of Ohio as well as the far western portion of Ohio, on the other hand, shows few migration paths. The siting of the Project directly in a major Indiana bat migration corridor cannot constitute avoidance as stated in the USFWS guidelines, particularly when the available data show many other locations in Ohio not in a migration path.

Furthermore, the DEIS explains that mist-netting and habitat surveys conducted in 2008 and 2009 indicated the presence of Indiana bats and 43 roost trees in Bellefontaine Ridge, an area overlapping the northern portion of the action area. These surveys took place early in project planning; yet, rather than pursue other locations for project development, the Applicant chose merely to redesign the wind facility. The sufficiency of these mitigation measures is questionable, and USFWS guidelines certainly indicate that relocation is a more desirable alternative. Given the strong evidence of Indiana bat activity in and around the proposed action area, it is confounding that USFWS continues to deem this location appropriate and maintains that the Project's siting design eliminates take of Indiana bats and Indiana bat habitat to the maximum extent practicable.[84]

3. Reduced Number of Turbines

Even if the Project's current location were as suitable as any other location in Ohio, reasonable alternatives still exist for turbine siting at the chosen location. The DEIS states that reducing the number of turbines would not provide "a sufficient level of associated environmental benefits" since "the presence of even one turbine still poses some level of risk to Indiana bats."[85] This statement does not, however, preclude USFWS from investigating an

[82] DEIS, pp. 4-46 to 4.47, Figures 4.5-2 & 4.5-3.
[83] *See* DEIS, App. B, Figure 4-6. This is the DHCP's version of the same Figure and includes the dates.
[84] Furthermore, although the DEIS notes that the OPSB waived the requirements for a Site Alternative Analysis, the state agency's waiver is not dispositive of NEPA and ESA requirements. In fact, the Applicant's Waiver Application merely reiterated the same argument with respect to economic feasibility without any showing of why economic constraints prevented an alternate site study. A reading of the Waiver Application shows that the Applicant did not want to pursue an alternate site study because of existing contracts and already-completed planning. An applicant for an ITP takes a risk by fixating on a single site before an EIS is completed. *See* OPSB Application, Exhibit Y, Motion for Waiver, p. 6 (Apr. 2009), *available at* http://dis.puc.state.oh.us/TiffToPDf/A1001001A09D27B44217C54527.pdf.
[85] DEIS, p. 2-5.

alternative to the project's current siting design. The proposed action area is segmented into habitat categories, with Category 1 encompassing land deemed most suitable as Indiana bat habitat and Category 4 encompassing land deemed least suitable for the Indiana bat. Even if the presence of just one turbine poses a risk to the Indiana bat, the location of that one turbine in the most suitable Indiana bat habitat likely poses a greater risk than the location of that one turbine in the least suitable Indiana bat habitat (if, that is, habitat suitability is a good predictor of bat use – see Comment 5.1). No explanation is provided to inform the reader why up to 10 turbines may be placed in Category 1 habitat rather than no turbines. If the Applicant is taking steps to minimize the project's impact to Indiana bats via siting, it is unclear why Category 1 habitat – those areas most suitable for the Indiana bat's roosting and foraging activities – was not entirely avoided. USFWS should explain what parameters and criteria it used in deciding that the siting of 10 turbines in Category 1 habitat constitutes avoidance to "the maximum extent practicable" and explain why other alternatives would result in either more take or the same amount of take of bats and/or suitable habitat. An alternative in which turbines are sited only in the lowest risk categories (i.e., Category 3 and 4) is a reasonable alternative to the Proposed Action. Or, if this option is technically infeasible, an explanation of infeasibility should be provided so that the public may understand what USFWS and the Applicant consider as avoidance "to the maximum extent practicable."

The rationale offered in the DEIS for not studying a different project design is clearly lacking. The DEIS must provide an explanation of why the proposed turbine siting, in USFWS's opinion, does indeed minimize take of Indiana bats to the maximum extent practicable.

D. The DEIS Must Consider and Analyze Alternative Schemes for Cut-In Speed (Operational Feathering).

Even the set of operational alternatives that is considered is not a reasonable range of alternatives; the considered set omits reasonable and feasible alternatives that the best available science shows can better meet the DEIS's purposes and needs. Studies of the likely reduction in bat fatalities due to increasing cut-in speeds at two operating wind power facilities – Casselman and Fowler Ridge[86] – show that curtailing cut-in speed to 6.5 m/s would substantially reduce bat

[86] Arnett, et al., *Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. A final report submitted to the Bats and Wind Energy Cooperative* (May 2010); Good et al., *Bat Monitoring Studies at the Fowler Ridge Wind Energy Facility, Benton County, Indiana, April 13 – October 15, 2010, A report prepared for*

mortality. Yet the highest cut-in speed proposed in the DEIS is 6.0 m/s and in Category 1 habitat only.[87] This curtailment proposal leaves un-minimized risk of Indiana bat fatalities due to turbine operation, for no justified reason. The studies to date show that 6.5 m/s is the cut-in speed that reduces bat fatalities substantially – not 6.0 m/s and not 5.75 m/s. In fact, there is no evidence that a cut-in speed of 6.0 m/s would reduce bat fatalities by the same amount as would 6.5 m/s. A choice of cut-in speed below 6.5 m/s is not indicated by the best available science presented and is arbitrary. Moreover, the application of categories of habitat suitability as a basis for proposing cut-in speeds is likely not valid for Indiana bats migrating through the Project area (see Comment 5.1).

A reasonable set of alternatives for operational feathering includes the following: (1) an alternative that sets a nightly cut-in speed at 6.5 m/s for all turbines in all habitats in all seasons; (2) an alternative that prohibits turbines from Category 1 and 2 habitats or shuts down those turbines nightly in the active seasons, and sets a nightly cut-in speed at 5.75 m/s for turbines in Category 3 and 4 habitats; (3) an alternative that sets a nightly cut-in speed at 6.5 m/s for turbines in Category 1 and 2 habitats and cut-in speeds of 5.75 to 6.0 m/s for turbines in Category 3 and 4 habitats; (4) an alternative that sets a nightly cut-in speed at 6.5 m/s for turbines in fall and summer only.

The DEIS's treatment of alternatives A and B illustrates that the range of alternatives considered is unreasonable. The Applicant asserts that Alternative A is not economically feasible, and that Alternative B does not meet the goals of USFWS to the same extent as the Proposed Action. Therefore, the choice is essentially between the Proposed Action and No Action.

Neither the DEIS nor the DHCP elaborate on what constitutes "economically feasible." In order to assess whether a proposed alternative can in fact meet USFWS's needs of "protecting the Indiana bat's habitat to the maximum extent practicable" there needs to be a discussion of what constitutes commercial viability. Otherwise, it is impossible to conduct an objective and fair comparison of the competing alternatives. In any event, it may be assumed (from the Applicant's statement about economic viability) that should USFWS select Alternative A, the

Fowler Ridge Wind Farm (Jan. 28, 2011); *see also* Good et al., *Bat Monitoring Studies at the Fowler Ridge Wind Farm, Benton County, Indiana, April 1 – October 31, 2011, A report prepared for Fowler Ridge Wind Farm* (Jan. 31, 2012).

[87] DHCP, p. 126, Table 5-4a.

Applicant would not move forward with the project as it would no longer be economically viable. If economic viability means profitability, Alternative A would not be profitable and therefore unmanageable. As mentioned above, if Alternative A is in fact not economically viable, it should have been eliminated from detailed study or, if retained for detailed study, the DEIS should present evidence for that claim to show that the conclusion is based on sound reasoning. The DEIS does not discuss the Applicant's renewable energy goals or threshold generation requirements for commercial viability. USFWS cannot approve the Proposed Action without considering an alternative that allows for economic feasibility but is more restrictive than that proposed by the Applicant. As it stands now, the comparison between the proposed Action and Alternative A is uninformative. It tells us nothing about the relative value and practicability of incrementally increasing cut-in speeds.

The DEIS explains that for the Proposed Action's "Fall Feathering Plan" the late summer/early fall cut-in speeds were selected based on acoustic monitoring studies and post-construction mortality monitoring studies that reported significant reductions in bat mortality rates at cut-in speeds of 5.0 m/s and 6.5 m/s.[88] The authors of the Casselman wind facility study – a study upon which the Applicant relies in part in proposing cut-in speeds – concluded that if the 6.5 m/s cut-in speed had been applied to all 23 turbines during the study period, the lost output would have amounted to only 1% of total annual output.[89] In other words, by applying a cut-in speed of 6.5 m/s to turbines, a measure indicated by the available science as relatively protective, lost power revenues would be negligible while bat mortality would be substantially reduced.

And yet, the highest cut-in speed in the Proposed Action is 6.0 m/s in Category 1 habitat and only at certain times of the year. Neither the DEIS nor the DHCP explain why the Applicant chose 6.0 m/s rather than 6.5 m/s. The studies relied upon in the DEIS and DHCP, taken together, convey that commercial wind facilities can operate with cut-in speeds of 6.5 m/s and remain economically viable. If these studies represent the most up-to-date information regarding the impacts of cut-in speeds on bat mortality – and they are presented as such by the documents – USFWS must study an alternative that incorporates the actual findings of the study. Again, NEPA regulations require USFWS to "rigorously explore" all "[r]easonable alternatives" which

[88] DEIS, p. 3-12.

[89] Arnett et al., Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities – 2008 Annual Report, p. 3 (2009), *available at* http://www.batsandwind.org/pdf/Curtailment_2008_Final_Report.pdf.

"include those that are practical or feasible from the technical and economic standpoint and using common sense rather than simply desirable from the standpoint of the applicant."[90] Not only do the cut-in speed studies cited above indicate that cut-in speeds of 6.5 m/s are technologically workable but they also indicate that higher cut-in speeds are economically feasible.

In summary, USFWS has not adequately explored other alternatives to the Proposed Action that may be both technologically and economically feasible. The DEIS's analysis of the alternatives artificially and without adequate justification narrows the studied alternatives to two – the Proposed Action and No Action. The maximally restrictive operations Alternative A is deemed economically inviable, and the minimally restricted operations Alternative B does not meet USFWS's purpose and needs. In between the maximally and minimally restricted operational alternatives are a range of reasonable operational alternatives and reasonable non-operational alternatives. The DEIS's alternatives analysis as it currently stands violates NEPA.

COMMENT 4.2. THE STUDY AND COMPARISON OF THE FOUR ALTERNATIVES IS INSUFFICIENT AND DOES NOT CONSTITUTE A HARD LOOK AT THOSE ALTERNATIVES.

A. Background

The "heart of the EIS"[91] is the comparison of alternatives. An EIS is only "satisfactory if treatment of alternatives is sufficient to permit a reasoned choice among the various options."[92] CEQ regulation 40 C.F.R. § 1502.14 requires "substantial treatment" of the alternatives, so as to allow an objective and fair comparison of the proposed action and the alternatives studied. CEQ guidelines provide that "the degree of analysis devoted to each alternative in the EIS is to be substantially similar to that devoted to the 'proposed action.'"[93]

[90] USFWS, *National Environmental Policy Act Reference Handbook*, CEQ Guidance Regarding NEPA Regulations, Memorandum to Heads of Federal Agencies (1983), *available at* http://wsfrprograms.fws.gov/subpages/toolkitfiles/fwsnepa.pdf.
[91] CEQ, *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, Question 7 (Mar. 23, 1981).
[92] Druid Hills Civic Association v. Federal Highway Admin., 772 F.2d 700, 713 (11th Cir. 1985).
[93] CEQ, Forty Most Asked Questions Concerning CEQ's NEPA Regulations, Question 5b (Mar. 23, 1981).

B. The Descriptions And Comparisons Of The Alternatives Are Confusing, Inconsistent, And Do Not Offer A Baseline From Which To Evaluate Them.

The DEIS studies four alternatives: Proposed Action, Maximally Restrictive Operations ("Alternative A"), Minimally Restrictive Operations ("Alternative B"), and No Action. We have already commented above that this is not a reasonable range of alternatives and thus violates NEPA. In addition, the explanation of these alternatives is inadequate. A reasoned choice requires the agency to clearly document the environmental advantages and risks of the proposed alternatives as completely and objectively as possible. Unfortunately, USFWS has not done so in the DEIS. The DEIS must be more descriptive and thorough.

USFWS repeatedly makes inconsistent statements so as to render the comparison of alternatives confusing. First, it is unclear whether the Proposed Action's "project components and associated infrastructure" include the "Siting Criteria" on page 3-3 or whether it merely includes the project components (i.e., turbines, service roads, electrical interconnect lines, etc.) as listed on pages 3-3 to 3-4.[94] Second, Table 3.5-1, which summarizes the key features of each alternative, indicates that two of the DHCP's components include (1) avoiding the removal of the three known Indiana bat roost trees in the action area and (2) conducting tree clearing between November 1 and March 31 to avoid potential mortality of Indiana bats that could result from removal of previously unidentified maternity roost trees. The Table notes that under Alternative A, the Maximally Restricted Operations Alternative, neither of these features would be implemented. And yet, Table 6.1-1, which summarizes the comparison of anticipated impacts for each alternative, indicates that as with the Proposed Action, habitat loss would occur only under Alternative A during construction in the non-roosting season so as to preclude direct effects to Indiana bats.

A complete and thorough discussion of the alternatives in the DEIS is clearly lacking. The inconsistencies throughout the DEIS serve only to confuse the reader. If the two key features of the HCP mentioned above – the non-removal of known Indiana bat maternity trees and the timing of tree clearing – are not in fact incorporated into Alternative A, as Table 3.5-1 would suggest, then the analysis of direct and indirect impacts to the Indiana bat and its habitat under section 5.5 is inaccurate. If the known maternity roost trees are removed, the impact to the Indiana bat's habitat is in fact greater than that described in the DEIS. Similarly, if tree clearing

[94] *See also* DEIS, Table 3.5-1.

is conducted during the roosting period, the risk of take of Indiana bats is much greater than if tree clearing is conducted from November through March. USFWS must reassess the descriptions of the alternatives and give a baseline from which the alternatives differ. As it stands, it is unclear which avoidance and mitigation measures correspond to each and which do not.

C. The Treatment of Alternatives Shows a Bias In Favor of the Proposed Action, And as a Result, the DEIS Fails to Give Substantial Treatment to the Other Alternatives.

To illustrate the appearance of bias in favor of the Applicant's Proposed Action, one need only look at the brief and bare discussions of Alternatives A and B. With respect to the cumulative impacts on migratory birds, for example, the DEIS spends pages 5-158 to 5-173 on the Proposed Action's cumulative impacts, a total of 15 pages. The summary paragraph concludes:

> Migratory bird collisions at man-made structures including wind turbines, communication towers, windows, and transmission lines, may account for 278 million to more than 1.1 billion birds per year and could equate to as many as 33.75 billion birds over the life the Buckeye Project, resulting in a significant cumulative impact. Mortality is likely to be distributed across many groups and species, but most (approximately 70%) would be comprised of passerines. Fatalities of a single passerine species could number as many as 12,700 in a year based on certain projections . . . For many common species of migratory birds, this level of mortality would not significantly impact the ability of the larger population to survive, but for rare species and local populations of some species, this mortality level could affect long-term viability of the species or its distribution locally . . . Many measures that Buckeye Wind is proposing within their ABPP would avoid and minimize the potential for bird strikes to occur at their facility. These measures would prevent large-scale episodic mortality events and minimize bird attraction to the facility. The proposed avoidance and minimization measures that would be implemented by Buckeye Wind should substantially reduce the likelihood that mortality of migratory birds at their facility would be significant or substantially additive from a regional cumulative effects perspective. Should other wind and communication towers and buildings in the eastern flyways zone implement lighting protocols to reduce attraction of birds and implement an ABPP similar to that proposed by Buckeye Wind, cumulative bird collision mortality could be substantially reduced.[95]

[95] DEIS, pp. 5-172 to 5-173.

The discussion of Alternatives A and B are each a single paragraph compared to the Proposed Action's fifteen page discussion. That a single paragraph satisfies "substantial treatment" is questionable, especially considering the fifteen pages dedicated to the Proposed Action. The cumulative impacts to migratory birds under Alternative A reads as follows:

> The operational adjustment under Alternative A would involve all 100 turbines being non-operational from sunset to sunrise from April 1 through October 31, which would reduce the collision risk to night-flying birds during this period. Birds would still experience collision risks associated with early spring and late-fall migration. Diurnally active migratory and resident birds and winter resident birds would also be exposed to collision risk during their regular activities within the Action Area. It can be assumed that mortality impacts to bird species would be similar to the Proposed Action during the period from November 1 through March 31, but somewhat lower from April 1 through October 31. Therefore, the cumulative effects of Alternative A on migratory species would be much less than those of the Proposed Action, *although this alternative is not economically feasible for the Applicant. The Proposed Action, which includes feathering and modified cut-in speeds, is economically feasible and would not contribute significantly to cumulative effects on migratory birds*.[96]

Notably missing from the discussion is any quantitative data to provide meaning and context for the terms "somewhat lower" or "much less." Courts have found that "[g]eneral statements about 'possible effects' and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided."[97] But even more perplexing is the inclusion of the worth of the Proposed Action in the discussion of Alternative A's cumulative effects. Rather than providing an objective statement about cumulative impacts to migratory birds under Alternative A, the DEIS instead makes a statement that borders on justification for preferring the Proposed Action. It becomes even more problematic when one considers the paragraph on Alternative B:

> The operational adjustment under Alternative B would involve feathering turbines until cut-in speeds of 5.0 m/s (11 mph) for all 100 turbines during the first one to six hours after sunset from August 1 through October 31. The effects of feathering on birds are not well known, and reduced cut-in speeds have not been clearly shown to reduce bird deaths. However, given the minimal operational restrictions, it is likely that this alternative would result in higher levels of mortality than under the Proposed Action or Alternative A, and would therefore increase the cumulative effects on bird species in the region.[98]

[96] DEIS, p. 5-172 (emphasis added).
[97] Neighbors of Cuddy Mountain v. US Forest Service, 137 F.3d 1372, 1380 (9th Cir. 1998).
[98] DEIS, p. 5-172.

Taken together, the cumulative impacts assessment on migratory birds is overly suggestive of the worth of the Proposed Action. If Alternative B increases cumulative effects and Alternative A is not economically feasible, then the only viable alternative to No Action is the Proposed Action. This does not represent an objective and reasonable evaluation of alternatives. Most of the other sections in the DEIS incorporate the same pattern of bias and give undue weight to the merits of the Proposed Action.

5
ITP ISSUANCE CRITERION–MINIMIZE AND MITIGATE TO THE MAXIMUM EXTENT PRACTICABLE

DHCP/ESA

COMMENT 5.1. THE DHCP'S PROPOSED OPERATIONAL CHANGES TO CUT-IN SPEEDS (OPERATIONAL FEATHERING) DO NOT MEET THE "MINIMIZE TO THE MAXIMUM EXTENT PRACTICABLE" STANDARD.

A. Background

To issue an ITP, USFWS must find that the Project's applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking.[99] This is also part of the goal stated in Section 1.2 of the DHCP.

According to the HCP/ITP Handbook,[100] USFWS ultimately must decide, at the conclusion of the permit application processing phase, whether the minimization and mitigation program proposed by the applicant has satisfied this statutory issuance criterion. The finding that the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking, typically requires consideration of two factors: adequacy of the minimization and mitigation program and whether it is the maximum that can be practically implemented by the applicant. "To the extent that the minimization and mitigation program can be demonstrated to provide substantial benefits to the species, less emphasis can be placed on the second factor. However, particularly where the adequacy of the mitigation is a close call, the record must

[99] 16 U.S.C. § 1539(a)(2)(B); 50 C.F.R. § 17.22(b); USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996), pp. 7-3 to 7-4.
[100] USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996).

contain some basis to conclude that the proposed program is the maximum that can be reasonably required by that applicant. This may require weighing the costs of implementing additional mitigation, benefits and costs of implementing additional mitigation, the amount of mitigation provided by other applicants in similar situations, and the abilities of that particular applicant."[101]

USFWS's 2011 Wind Energy Projects Guidance[102] provides additional guidance regarding this permit issuance criterion. In the guidance, USFWS addressed the question, "What does 'minimize and mitigate to the maximum extent practicable' mean?" The agency response is as follows:

> Response: This issuance criterion requires us to evaluate the effectiveness of the applicants' proposed minimization and mitigation measures. It is important to understand that in doing so, we must focus solely on measures to be undertaken to reduce the likelihood and extent of the impact of take resulting from the project as proposed, as well as appropriate compensatory measures. We interpret this section to mean that the impacts of the proposed project, including the HCP, which were not eliminated through informal negotiation *must be minimized to the maximum extent practicable and those remaining impacts that cannot be further minimized must be mitigated to the maximum extent practicable. These standards are based in a biological determination of the impacts of the project as proposed, what would further minimize those impacts, and then what would biologically mitigate or compensate for those remaining biological impacts.*
>
> If applicants provide biologically based minimization measures and mitigation measures that are fully commensurate with the level of impacts, they have minimized and mitigated to the maximum extent practicable. It is only where certain constraints may preclude full minimization or full mitigation that the "practicability" issue needs to be addressed more thoroughly. *In those circumstances where the applicant cannot fully achieve the minimization and mitigation standards, we must evaluate whether the applicant has still minimized and mitigated to the maximum extent practicable.* Note, in issuing the ITP we must not appreciably reduce the likelihood of survival and recovery of the species in the wild. Inability to fully compensate for the impacts of the take may make this criterion difficult to satisfy. *Factors to be considered in the practicability analysis may include constraints based on the site itself, availability of mitigation habitat, timing and nature of the project, the financial means of the applicant, costs and time associated with redesign and going through local and state permitting and zoning processes, etc. We must evaluate whether the applicant has provided reasonable explanations concerning constraints and independently*

[101] USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996), pp. 7-3 to 7-4.
[102] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011).

> *review the record of evidence supporting the applicant's assertions*. The practicability evaluation is necessarily project specific, and may properly yield different determinations in different situations. [103]

USFWS addressed two further questions in the guidance that are relevant to the issuance criterion:

> 68. Is it allowable for an applicant to mitigate in lieu of minimization measures, or must the applicant first minimize if possible? Response: An applicant must first minimize to the maximum extent practicable.
>
> 69. How do developers demonstrate "to the maximum extent practicable" when it comes to siting wind projects? How do we evaluate whether their "demonstration" is sufficient? Response: In reviewing an applicant's HCP, the Service must analyze the biological impacts of the project on the covered species. If the proposed siting of some or all of the turbines will cause impacts to the species the applicant should minimize those impacts by moving the turbines to more suitable locations. If an applicant is unwilling to move the turbines to further minimize the impacts due to economic reasons, the Service should require them to provide justification why they are unable to do so. An independent analysis or third party should review the information provided by the applicant to verify they have sited the turbines to the maximum extent practicable.[104]

A third source of guidance that is relevant to the ESA permit issuance criterion that the impact of take must be minimized to the maximum extent practicable is USFWS's interpretation of the practicability criterion in the Bald and Golden Eagle Protection Act. USFWS applies the "practicability" criterion for standard (one-time) eagle take permits. In determining whether to issue a standard permit, the agency evaluates, among other things, "*Whether the applicant has proposed avoidance and minimization measures to reduce the take to the maximum degree practicable*."[105] USFWS must find, before issuing the permit, that "[t]he taking cannot practicably be avoided" and that "[t]he applicant has avoided and minimized impacts to eagles to the extent practicable."[106] The regulations define the term "practicable" as "capable of being done after taking into consideration, relative to the magnitude of the impacts to eagles, the following three things: the cost of remedy compared to proponent resources; existing

[103] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), p. 47.
[104] *Id*. at pp. 47–48.
[105] 50 C.F.R. § 22.26(e)(3) (emphasis added).
[106] 50 C.F.R. § 22.26(f).

technology; and logistics in light of overall project purposes."[107] In its response to public comments on the 2009 final eagle rule, USFWS provided examples of evaluating two factors – the magnitude of the impacts to eagles, and the resources of the project proponent – to determine whether a proposed set of conservation measures meets the criterion that "[t]he applicant has avoided and minimized impacts to eagles to the extent practicable."[108] FWS explained how it might apply these two factors by giving examples in which it varied one factor at a time: i.e., varying the level of proponent resources while holding impact to eagles constant,[109] and then varying impact while holding proponent resources constant.[110]

B. The Proposed Set of Cut-In Speeds (Operational Feathering) Does Not Satisfy the Permit Issuance Criterion and DHCP Goal of Minimization of Take.

An applicant for an ITP must first minimize take to the maximum extent practicable before he or she mitigates the remaining take to the maximum extent practicable.[111] The operational measures proposed in the DHCP, in particular the proposed cut-in speeds, do not satisfy the permit issuance criterion and DHCP goal of minimizing the impact of the likely take as predicted by the Risk Model and cut-in speed studies.

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[107] 50 C.F.R. § 22.3.

[108] 74 Fed. Reg. 46836 (Sept. 11, 2009); *see also* 50 C.F.R. § 22.26(f).

[109] *See* 74 Fed. Reg. at 46853 ("In fact, we do believe that more stringent measures are appropriate for project proponents with more financial means. The plainest meaning of 'practicable' is 'capable of being done.' Greater resources, financial and otherwise, enhance capability and increase options. For example, a large landowner will generally have more options when designing a project than a small landowner. Thus, a large land-holding company building on 500 acres should be able to site proposed buildings farther from a communal roost than would a private homeowner on a 2-acre lot. Similarly, if the potential remedies for avoiding the take entail more money as opposed to more land, a proposed, large commercial project that is likely to take eagles may be able to alter the project design in a manner that requires additional financial resources but avoids the take, and still make enough money to be profitable."); *see also* 74 Fed. Reg. at 46865 ("We believe 'practicable' inherently encompasses consideration of what the proponent can muster and marshal towards achieving a goal, whether it be money, time, ingenuity, or other factors that contribute to the chances of being able to accomplish something. Our inclusion of the phrase 'the cost of remedy comparative with proponent resources' was intended to confirm the integral role such a consideration plays in determining what is practicable.").

[110] *See* 74 Fed. Reg. at 46865 ("The phrase 'relative to the magnitude of the impacts to eagles' is important because whether something is practicable is relative to the risk of not doing it. If the adverse impact is small, it may be impracticable to undertake enormously costly measures to avoid it, but it if the impact will be extremely detrimental, increased measures may be deemed reasonable and practicable. For example, it may not be practicable to find a new site for a proposed larger scale wind turbine project in order to avoid disturbing one nesting pair of eagles, whereas it may be considered practicable to find an alternative if the site originally proposed was within a major migration corridor for Golden Eagles and would likely result in significant eagle mortalities.").

[111] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), p. 47 ("68. Is it allowable for an applicant to mitigate in lieu of minimization measures, or must the applicant first minimize if possible? Response: An applicant must first minimize to the maximum extent practicable.").

The DHCP's assessment of the likely reduction in bat fatalities due to increasing cut-in speeds relies on studies at two operating wind power facilities – Casselman and Fowler Ridge – to develop its proposed minimization measures.[112] The DHCP describes the results of these studies:

> The relationship between low wind speed and high activity is reinforced by operational curtailment experiments which have documented reductions in bat mortality by reducing the speed at which turbines become operational, or the "cut-in speed". During 2 years of study during the peak fall fatality period at the Cassleman, PA, wind facility, 12 turbines were randomly assigned each night to 1 of 3 experimental groups: fully operational, cut-in speed of 5.0 m/s, or cut-in speed of 6.5 m/s. Total fatalities at fully operational turbines were estimated to be 5.4 times greater on average than at curtailed turbines in 2008, and 3.6 times greater in 20094. In other words, 82% (95% confidence interval [CI] = 52% to 93%) of all fatalities at experimental turbines in 2008 and 72% (CI = 44% to 86%) in 2009 likely occurred when the turbines were fully operational (Arnett et al. 2010).
>
> A similar study was conducted at the Fowler Ridge, IN wind facility in 2010, after the first documented Indiana bat fatality was discovered there in 2009 (Good et al. 2011). From 1 August 2010 to 15 October 2010, 27 turbines were randomly assigned on a weekly basis to 1 of 3 experimental groups: fully operational, cut-in speed of 5.0 m/s, or cut-in speed of 6.5 m/s. An additional 9 turbines were fully operational for the entire survey period. Curtailment at 5.0 m/s was found to reduce mortality by 50% (90% CI = 37% to 61%), and curtailment at 6.5 m/s was found to reduce mortality by 79% (90% CI = 71% to 85%).[113]

Good et al. found a statistically significant difference between the cut-in speed treatments of 5.0 m/s and 6.5 m/s, although wind speeds at Casselman were not within the range required to show a statistical difference between the two cut-in speeds for a long enough period of time.[114] In any case, the DHCP presents these studies as the best available science on the effects of curtailing cut-in speeds of wind turbines. Both studies found that curtailing cut-in speed up to 6.5 m/s would substantially reduce bat mortality. Yet, the highest cut-in speed proposed in the

[112] Arnett et al., *Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. A final report submitted to the Bats and Wind Energy Cooperative* (May 2010); Good et al., *Bat Monitoring Studies at the Fowler Ridge Wind Energy Facility, Benton County, Indiana, April 13 – October 15, 2010, A report prepared for Fowler Ridge Wind Farm* (Jan. 28, 2011); *see also* Good et al., *Bat Monitoring Studies at the Fowler Ridge Wind Farm, Benton County, Indiana, April 1 – October 31, 2011, A report prepared for Fowler Ridge Wind Farm* (Jan. 31, 2012).
[113] *See* DHCP, p. 19
[114] *See* DHCP, p. 19, fn. 4.

DHCP is 6.0 m/s and in Category 1 habitat only.[115] This curtailment proposal leaves un-minimized risk of Indiana bat fatalities due to turbine operation, for no justified reason. The studies to date show that 6.5 m/s is the cut-in speed that reduces bat fatalities substantially – not 6.0 m/s and not 5.75 m/s. In fact, there is no evidence that a cut-in speed of 6.0 m/s would reduce bat fatalities by the same amount as would 6.5 m/s. A choice of cut-in speed below 6.5 m/s is not indicated by the best available science presented and is arbitrary. Thus, for modification of cut-in speed as a curtailment method, a baseline cut-in speed of 6.5 m/s is the only non-arbitrary choice for minimizing Indiana bat take to the maximum extent practicable, as is particularly important if turbines end up being located in the highest risk Category 1 habitat.

The DHCP presents reasons why it concludes that the proposed plan for minimizing take satisfies the "adequacy" requirement under USFWS's interpretation of the issuance criterion.[116] This conclusion is inconsistent with the risk modeling presented as the best available science. First, as discussed in Comment 3.1, the Risk Model indicates that baseline take may be much higher than accounted for by the DHCP's decision to collapse all the information on uncertainty and use a global average of the outputs. Second, as discussed above, the studies of cut-in speed relied upon by the DHCP show that substantial benefit if gained by increasing cut-in speed to 6.5m/s.

Thus, the choice of the baseline cut-in speed of 6.0 m/s is arbitrary, particularly in Category 1 habitats, and is not shown to be adequate to minimize the effects of the take of Indiana bats. Even if the adequacy of the proposed minimization plan is a close call, its adequacy should be considered together with the "practicability" prong of the issuance criterion.[117]

[115] DHCP, p. 126, Table 5-4a.
[116] DHCP, p. 217.
[117] USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996), pp. 7-3 to 7-4.

C. The DHCP Presents No Evidence or Explanation That It Would Be Impracticable to Apply a Cut-In Speed of 6.5 m/s, Which Is Shown by the Best Available Science to Substantially Reduce Bat Morality.

The DHCP's analysis of "practicability"[118] is inadequate for at least two reasons. First, as discussed in Section 5 above, a full range of reasonable alternatives is not evaluated, and so the practicability analysis is incomplete with regard to the range of alternatives considered. The draft analysis considers only two alternatives: the proposed action and the maximally restrictive operations alternative.[119] Other reasonable alternatives, such as applying the cut-in speed of 6.5 m/s as indicated by the best available science to minimize Indiana bat fatalities, were not considered. For example, the DHCP presents no evidence or explanation that applying a cut-in speed of 6.5 m/s in Category 1 (highest risk) and Category 2 (moderate risk) habitat, at least, would be impracticable. Contrary to the DHCP's suggestion that operational constraints more restrictive than those proposed in the DHCP would be uncertain, the benefit of a cut-in speed of 6.5 m/s is well documented by the Casselman and Fowler Ridge studies. The burden is on the Applicant to present evidence that the proposed cut-in speeds are as effective as the cut-in speed of 6.5 m/s, particularly in Category 1 and Category 2 habitats. The record does not to date contain any basis to conclude that the proposed program of minimization is the maximum that can be reasonably required of the Applicant.

Second, the practicability analysis for the proposed alternative and maximally restrictive alternative is inadequate even for those limited alternatives considered. The DHCP's analysis considers one factor only: the estimated costs of the minimization and mitigation measures to the Project expressed in implementation costs and lost revenues. Costs by themselves do not indicate "practicability" as that term is used in the ESA regulations. As discussed in the Background for this Comment, implementation and opportunity costs of an alternative must be considered in the context of several other factors, such as magnitude of the predicted impacts, the Applicant's resources, existing technology, and constraints on the Project. The DHCP's apparent conclusion that the maximally restrictive operations alternative is impracticable simply because "the cost of minimization would be significantly greater" and because the alternative "would place substantial additional financial burden on the Project" relative to the proposed

[118] DHCP, pp. 218–219

[119] In the maximally restrictive operations alternative, all 100 planned turbines would be non-operational from sunset to sunrise from April 1 to October 31 of each year.

alternative is unwarranted by the analysis presented. For example, costs in the millions are relatively minor if expected revenues are substantially larger or if the Applicant has sufficient resources earned in other operations.

In fact, the DHCP focuses on project "viability" in its statement of purpose and need for the Project. For example, the final two purposes and needs of the Buckeye Wind Project are to "[l]ocate wind facilities in areas where adequate wind resources are available *to make commercial wind development possible*," and "[c]onstruct wind facilities with turbines of adequate size and number to be operated in a manner that allows them to be *economically viable*."[120] The DHCP explains project viability further:

> 1.3.3 Project Viability
> Quality of wind resource, proximity to the bulk power transmission system, and availability of land are the primary factors driving the initial site selection of any wind power project. In addition to these factors, wind energy facilities also require an adequate number of appropriately-sized turbines to produce sufficient power to provide an economic return. The manner in which these turbines are operated also affects a wind facility's economic viability; increases to the manufacturer's specified cut-in speeds can impact annual power production and revenue.[121]

The DHCP's practicability analysis does not put the costs of minimization measures in the context of economic viability. The HCP should, but does not, address whether the costs of any alternative would make the Project economically inviable.

The DHCP's suggestion that an adaptive management plan and uncertainty in benefits of curtailment justify the conclusion of impracticability is unwarranted. An adaptive management plan cannot be invoked to substitute for measures that are indicated by the best available science to constitute minimization to the maximum extent practicable. Moreover, contrary to the DHCP's suggestion, the benefit of the maximally restrictive operations alternative is relatively certain: bat mortality would be expected to be zero because turbines would not be spinning during the main period of bat activity. Again, the DHCP's conclusion that the proposed operational measures minimize the impacts of take to the maximum extent practicable is not warranted by the practicability analysis presented.

[120] DHCP, p. 10 (emphasis added).
[121] DHCP, p. 12.

This Project and ITP are but the beginning of a wave of similar projects and ITP applications as wind power development surges forward. The cumulative impact of wind power development is potentially severe for the Indiana bat and other hibernating bats as well as for tree bat species such as the red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).[122] The Service now has an opportunity to ensure that wind power is developed in an environmentally responsible and sustainable manner that is protective of bats and other wildlife. It is imperative that the plan for avoidance and minimization of bat fatalities in this HCP squarely meets the issuance criterion to "minimize the impacts of take to the maximum extent practicable."

D. The Application of the Proposed Habitat Suitability Categories to Migrating Indiana Bats Is Not Adequately Supported by the Best Available Science, and Thus Differentiation of Minimization Measures by Habitat Category Is Not Warranted for Those Bats.

The DHCP does not adequately justify why *migrating* bats using Category 2 and Category 3 habitats should not receive the same amount of protection from turbine-caused mortality, via a 6.5 m/s cut-in speed, as bats using Category 1 habitat. First, the habitat suitability model in draft Appendix B applies to summer habitat only, and not to migration habitat. The DHCP states that the delineated habitat categories were developed based on telemetry data from summer foraging and roosting Indiana bats, even though the DHCP goes on to briefly, but inadequately, argue that these same categories present varying levels of risk during migration. Second, studies indicate that Indiana bats may fly direct routes without respect to landscape structure or habitat. Third, even if summering Indiana bats use the habitat Categories differently in extent or degree, all of the habitats are "suitable" for Indiana bats. The DHCP itself states that "[f]or purposes of the risk analysis, Categories 1, 2 and 3 were considered suitable roosting and foraging habitat."[123] Fourth, even with the results of the summer habitat suitability model, how bat presence and mortality are related to landscape and habitat features is highly uncertain. The Service has recently stated that there is "currently no reliable method for

[122] *See, e.g.,* Cryan, *Wind Turbines as Landscape Impediments to the Migratory Connectivity of Bats*, Environmental Law 41, 355–370 (2011).
[123] DHCP, p. 171.

determining or evaluating the relative value of [different] areas as summer habitat for the Indiana bat."[124]

Thus, even if Category 2 and Category 3 habitats are indeed less suitable summer habitat and may be used with less frequency than Category 1 summer habitat, the DHCP does not take a hard look at why risk of exposure to turbines would significantly differ among the three habitat categories for Indiana bats *migrating through the action area*. The DHCP's argument that the summer habitat categories present varying levels of risk for migrating Indiana bats is cursory, speculative, and inadequately supported. The DHCP estimates that approximately 5800 Indiana bats will fly through the action area during spring and fall migration.[125] If the Applicant desires to base its minimization measures on the conjecture that those Indiana bats will differentiate between the three categories of habitat during migration, then the HCP must provide evidence of such differentiation.

To summarize, the best available science indicates that 6.5 m/s is the proper baseline cut-in speed to minimize the impacts of take to the maximum extent practicable, especially in habitat Categories 1 and 2 for bats summering in the action area and in habitat Categories 1, 2, and 3 for bats migrating through to other locations. We suggest that if several years of monitoring during the operational phase of the facility indicates that a 6.5 m/s cut-in speed in Category 2 or 3 habitats is associated with zero fatalities, then the adaptive management plan may provide for incrementally dropping the cut-in speed in response to the lack of take in those habitats.

E. The Application of the Proposed Habitat Suitability Categories to Indiana Bat Maternity Colonies Should Be Viewed With Caution.

The results of the habitat suitability model are used in the DHCP to set different cut-in speeds for turbines in different habitat Categories. This sub-comment cautions against the general use of this method to identify differences in minimization and mitigation measures, particularly where Indiana bat maternity colonies may be undetected. Evidence suggests that we should have limited confidence in the validity of the habitat suitability categories as applied to areas containing maternity colonies. In USFWS's biological opinion for the current plan to

[124] 72 Fed. Reg. 9916, *Endangered and Threatened Wildlife and Plants; 90-Day and 12-Month Findings on a Petition To Revise Critical Habitat for the Indiana Bat* (Mar. 6, 2007).
[125] DHCP, p. 6.

extend Interstate 69 from Evansville to Indianapolis, Indiana, the agency observed, "Because the Indiana bat is philopatric (i.e., loyal to its traditional summering area), there is currently no evidence to suggest that all maternity colonies are located in optimal foraging and roosting habitat. A possibility that may have contributed to the species' decline is that many existing maternity colonies are senescent (i.e., deaths outnumber births) or are population sinks."[126] Moreover, of the 13 Indiana bat maternity colonies that would be affected by the I-69 project, USFWS identified four maternity colonies deemed to be of high concern for their long-term viability and conservation. All four of those high-concern colonies are located in marginal to poor habitats.[127] Although USFWS's heightened concern for those colonies is due to both the poor habitat and development pressures, the point is that maternity colonies important to the Midwest RU may be located in low-suitability habitats.

COMMENT 5.2. THE DHCP DOES NOT EXPLAIN WHY IT IS IMPRACTICABLE TO ADJUST THE LOCATIONS OF TURBINES TO MEET THE "MINIMIZE TO THE MAXIMUM EXTENT PRACTICABLE" STANDARD.

A. Background

According to the USFWS Wind Energy Project Guidance, siting of turbines should be adjusted to minimize their impacts.

> 69. How do developers demonstrate "to the maximum extent practicable" when it comes to siting wind projects? How do we evaluate whether their "demonstration" is sufficient?
>
> Response: In reviewing an applicant's HCP, the Service must analyze the biological impacts of the project on the covered species. If the proposed siting of some or all of the turbines will cause impacts to the species the applicant should minimize those impacts by moving the turbines to more suitable locations. If an applicant is unwilling to move the turbines to further minimize the impacts due to economic reasons, the Service should require them to provide justification why they are unable to do so. An independent analysis or third party should review the information provided by the applicant to verify they have sited the turbines to the maximum extent practicable.[128]

[126] USFWS, *Revised Programmatic Biological Opinion on the Proposed Construction, Operation, and Maintenance of Alternative 3C of Interstate I-69 from Evansville to Indianapolis* (Aug. 24, 2006), p. 43.
[127] *Id*. at 87.
[128] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), p. 48.

USFWS recommends in its 2011 Wind Energy Projects Guidance that Indiana bat maternity colony home range be delineated to include all suitable habitat within 5 miles of a capture location if only capture data are available; all suitable habitat within at least 2.5 miles of a single documented maternity roost tree; all suitable habitat within at least 2.5 miles of the line drawn between the two documented roost trees; and all suitable habitat within at least 2.5 miles of the center of the polygon created by connecting three or more documented roost trees.[129]

B. The DHCP Presents No Evidence or Explanation That It Would Be Impracticable to Locate Most of the Turbines at Least 2.5 Miles from Known Roost Trees and Maternity Colonies.

The DHCP fails to explain how placement of the turbines will be compatible with the standard assumption that foraging Indiana bats may travel 2.5 miles from their roosts. The choice to locate as many turbines as practicable beyond this 2.5 mile distance would be an important method for minimizing the impacts of the turbines on Indiana bats. In fact, estimated take could be reduced to very low levels with such adjustments in turbine siting. The DHCP does not consider or examine such adjustments in turbine location. Thus, until that analysis is completed, the DHCP cannot conclude that the proposed measures meet the issuance criterion to minimize the impacts of take to the maximum extent practicable.

C. The DHCP Presents No Evidence or Explanation That It Would Be Impracticable to Locate All Turbines Outside of Category 1 Habitat.

Category 1 habitat, as delineated by the summer habitat suitability model in draft Appendix B, comprises 12% of the proposed action area.[130] That is, 12% of the proposed action area was categorized as having the highest suitability for Indiana bat roosting and foraging activities. Locating all wind turbines *outside* of this Category 1 habitat might contribute substantially toward minimizing the take of Indiana bats. The DHCP should, but does not, consider and take a hard look at the contribution of this option to reducing take and the practicability of implementing this option. Thus, until that analysis is completed, the DHCP

[129] USFWS, *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects, Revised* (Oct. 26, 2011), pp. 8–13.
[130] DHCP, App. B, Table 4-7.

cannot conclude that the proposed measures meet the issuance criterion to minimize the impacts of take to the maximum extent practicable.

6
CUMULATIVE IMPACTS AND EFFECTS

DEIS/NEPA

COMMENT 6.1. CUMULATIVE IMPACTS HAVE NOT BEEN ADEQUATELY ANALYZED.

A. Background

USFWS recognizes that further information and analysis is needed regarding the cumulative impact of past, present, and future wind developments.[131] Individual impacts may appear small but, combined with other small projects, may collectively have significant impacts. In general, there is growing concern in the scientific community regarding the potential for bat kills and population declines given the rapid proliferation of wind power facilities and the large-scale mortality that has occurred at some facilities.

Under NEPA, cumulative impact analysis is broader than for ESA Section 7 purposes. "Cumulative impact" under NEPA is defined as "the impact on the environment [that] results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[132] Cumulative impacts are thus the total effect, including both direct and indirect effects, on a given resource (in this case the endangered Indiana bat), of all actions taken, no matter who has taken the actions (federal, nonfederal, and private).[133] The CEQ advises that when analyzing the contribution of the proposed action to cumulative effects, the geographic boundaries of the analysis should be conducted at the scale of human communities, landscapes, airsheds, watersheds, or eco-regions.[134] Generally, the NEPA analyst must determine the geographic areas occupied by the affected resources outside of a project impact zone, and in most cases "the largest of these areas will be the appropriate area for the

[131] *See, e.g.*, USFWS, *Indiana Bat Draft Recovery Plan* (2007), p. 101.
[132] 40 C.F.R. § 1508.7.
[133] CEQ, *Considering Cumulative Effects Under the National Environmental Policy Act* (Jan. 1997), p. 8, *available at* http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm.
[134] *Id*. at 12-14.

analysis of cumulative effects."[135] For example, for migratory wildlife the appropriate geographic scale of analysis would be the breeding grounds, migration route, and wintering areas of affected population units.[136]

An adequate cumulative impact analysis requires exploration of, among other things, "the trends for activities and impacts in the area."[137] Identification of activities and impacts are made by assessing, for example, "the proximity of the projects to each other either geographically or temporally; the probability of action affecting the same environmental system, especially systems that are susceptible to development pressures; the likelihood that the project will lead to a wide range of effects or lead to a number of associated projects; whether the effects of other projects are similar to those of the project under review; and the likelihood that the project will occur."[138]

Other sources of direct and indirect mortality for Indiana bats, besides wind power projects, include those listed in the 2007 Indiana bat draft recovery plan: quarrying and mining operations (summer and winter habitat), loss/degradation of summer/migration/swarming habitat, loss of forest habitat connectivity, some silvicultural practices and firewood collection, disease and parasites (e.g., WNS), predation, competition with other bat species, environmental contaminants (not just "pesticides"), climate change, and collisions with man-made objects (e.g., communication towers, airstrikes with airplanes, and roadkill).[139] Human disturbance at hibernacula also is still an important threat to Indiana bats.[140] Furthermore, the impacts of WNS may mask population declines resulting from projects and these other sources.

B. The DEIS's Cumulative Impact Analysis Does Not, But Should, Consider the Spatial Distribution of Expected Development.

As discussed in Section 4, western Ohio appears to be more risky than eastern Ohio for migrating Indiana bats. In the DEIS, USFWS presents a map of Indiana bat summer records

[135] CEQ, *Considering Cumulative Effects Under the National Environmental Policy Act* (Jan. 1997), p. 15.
[136] *See, e.g.*, NRDC v. Hodel, 865 F.2d 288, 297-300 (D.C. Cir. 1988) (requiring the Secretary of Interior to analyze the cumulative effects of offshore drilling near California and Alaska together because whales and salmon would pass through both project drilling areas in the normal course of migration).
[137] EPA, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (May 1999), section 4.3, *available at* http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf.. section 4.3.
[138] *Id*.
[139] USFWS, *Indiana Bat Draft Recovery Plan* (2007); USFWS, *Indiana Bat (Myotis sodalis) 5-Year Review: Summary and Evaluation* (Sept. 2009), pp. 13–14.
[140] USFWS, *Indiana Bat 5-Year Review*, p. 15.

(Figure 4.5-2) and a map of Indiana bat migration records (Figure 4.5-3).[141] Figure 4.5-3 in particular shows Indiana Bat Migration Records from 1971 to 2010 and identifies the action area as directly in a bundle of migration paths.[142] Both maps, but particularly the migration records map, indicate that Indiana bat migration paths are concentrated in western Ohio. The eastern half of Ohio, on the other hand, shows few migration paths. The DEIS should examine the implications of whether future projects that may take Indiana bats will be concentrated in some parts of Ohio rather than other parts. The spatial distribution of future sitings may affect the cumulative impacts on the Indiana bat and other bats and birds.

C. The Geographic Scope Of The Cumulative Impacts Analysis on Indiana Bat Habitat Is Too Narrow.

In assessing the cumulative effects of the Proposed Action on bat *mortality*, the DEIS focuses on a wide geographic scale – the Midwest RU. The DEIS then inexplicably narrows its geographic scope to the proposed action area for the cumulative effects review on Indiana bat *habitat*. The DEIS avoids discussing the consequences to habitat loss and bat displacement on a larger scale. Habitat loss is a significant factor in cumulative effects analysis and should be comparable to the discussion on bat mortality in geographic scale.

To illustrate the inadequacy of the "Habitat Loss" discussion, the DEIS simply states that "[o]ther than ongoing agricultural and small-scale and periodic timber harvesting activities, which are occurring or may occur in the Action Area over the ITP Term, the USFWS is not aware of future federal, state, or private activities *in the Action Area* that would directly or indirectly affect habitat for Indiana bats or other bats."[143] The preceding discussion on bat mortality, however, was entirely focused on the Midwest RU.

The DEIS predicts that Ohio will nearly quadruple its wind energy production, from 112 MW in 2011 to 414.4 MW in 2035.[144] In Ohio, 2455 wind turbines are currently proposed.[145] USFWS must analyze the location of reasonably foreseeable wind facilities and whether, in the aggregate, there is any potential to impact the migratory connectivity or habitat availability for

[141] DEIS, pp. 4-46 to 4.47, Figures 4.5-2 & 4.5-3.
[142] *See* DEIS, App. B, Figure 4-6. This is the DHCP's version of the Figure and includes the dates.
[143] DEIS, p. 5-190 (emphasis added).
[144] DEIS, Table 5.15-6.
[145] DEIS, Table 5.15-4 & accompanying footnotes.

bats. If all of the wind facilities are concentrated in places such as western Ohio where migratory paths of Indiana bats are concentrated, this raises a question as to the sustainability and trends of the Indiana bat population. If, on the other hand, wind resources will be fragmented throughout the State, or possibly concentrated in the eastern portion, the cumulative effects may be different.

D. The Cumulative Impacts Analysis on Bats and Birds Ignores the Impact That Projected Wind Facility Construction Will Have on Migratory Behavior.

The cumulative impacts sections on birds and bats focus heavily on mortality rates. The calculations for those mortality rates take into consideration wind facilities that are currently operational, under construction, proposed, and expected by 2025 in the Midwest RU and eastern flyways zone.[146] The cumulative impacts analysis fails, however, to consider wildlife *behavior* in the face of increased wind facility construction. The DEIS does not inform the public about the potential behavioral changes, such as migration patterns, roosting, or feeding activities, that may change over the course of the next 30 years. If wind facilities are concentrated in a particular region, the impacts to wildlife habitat could be greater than currently implied by the DEIS. Birds and bats may be forced to shift their migratory patterns and seek other suitable habitat.

E. The Cumulative Impacts Analysis of WNS is Inadequate.

The cumulative impacts analysis of WNS is likewise lacking. USFWS discusses the significance of the role that WNS could play in the viability of the species' survival but fails to identify the additional impact that wind facility projects in the aggregate will have in the worst-case scenario where WNS does cause a 70% decline in population in the Midwest RU as occurred in the Northeast RU. Instead, the DEIS focuses narrowly on this 100 turbine project, concluding that once mitigation measures are implemented, "[t]he reduction in take. . .would proportionately reduce the impact on overall population numbers, and therefore impacts of Project-related take are highly unlikely to appreciably reduce the likelihood of survival and recovery of the Midwest RU population under predicted WNS scenarios."[147] Later on in the

[146] DEIS, Tables 5.15-4 & 5.15-5.
[147] DEIS, p. 5-54.

DEIS, however, USFWS states that "[i]f the Midwest RU Indiana bat population or other cave bat populations were substantially reduced as a result of WNS or other causes, the projected level of mortality resulting from wind turbines could have greater implications for the viability of the population and the cumulative effects of this Project and past, present, and reasonably foreseeable actions considered in this analysis could result in significant effects to the Indiana bat or other cave bat population size or distribution."[148] Our comments in Comment 3.2 are incorporated here by reference: we contend that the DHCP's and DEIS's conclusion that impacts of Project-related take are unlikely to appreciably reduce the likelihood of survival and recovery of the Midwest RU population under predicted WNS scenarios is unsupported and does not account for the dependence of the jeopardy determination on the status of the Midwest RU.

COMMENT 6.2. THE DEIS DOES NOT, BUT SHOULD, TAKE A HARD LOOK AT THE BIOLOGICAL IMPLICATIONS OF CUMULATIVE IMPACTS BY USING THE LESLIE MATRIX MODEL.

The Leslie Matrix model results in Figure 5-2 of the DHCP[149] shows that the Project's impact to the Midwest RU is negative: that is, the requested take of Indiana bats by the Project alone, without other impacts such as WNS considered, causes a decline in the population abundance. Although the decline is relatively small – about 100 bats over 25 years – the significance of this result is that the natural reproduction of the populations is insufficient to compensate for the Project's take. The theory behind harvest limits is that the population will compensate for the harvest-induced mortality.[150] This Leslie Matrix model result begs the

[148] DEIS, p. 5-189.
[149] DHCP, p. 138.
[150] *See* McGowan et al., *The role of demographic compensation theory in incidental take assessments for endangered species,* Biological Conservation 144 (2): 730-737 (Feb. 2011). Abstract: "Many endangered species laws provide exceptions to legislated prohibitions through incidental take provisions as long as take is the result of unintended consequences of an otherwise legal activity. These allowances presumably invoke the theory of demographic compensation, commonly applied to harvested species, by allowing limited harm as long as the probability of the species' survival or recovery is not reduced appreciably. Demographic compensation requires some density-dependent limits on survival or reproduction in a species' annual cycle that can be alleviated through incidental take. Using a population model for piping plovers in the Great Plains, we found that when the population is in rapid decline or when there is no density dependence, the probability of quasi-extinction increased linearly with increasing take. However, when the population is near stability and subject to density-dependent survival, there was no relationship between quasi-extinction probability and take rates. We note however, that a brief examination of piping plover demography and annual cycles suggests little room for compensatory capacity. We argue that a population's capacity for demographic compensation of incidental take should be evaluated when considering incidental allowances because compensation is the only mechanism whereby a population can absorb the negative impacts of take without incurring a reduction in the probability of survival in the wild. With many endangered species there is probably little known about density dependence and compensatory capacity. Under these

question regarding cumulative impact: what would the downward trajectory of the Indiana bat population look like if the existing and reasonably foreseeable future developments and projects in the Midwest RU are taking bats, with or without ITPs? This analysis was not but could have easily been completed to show the biological implications of the cumulative impacts in the Midwest RU. Moreover, what would the downward trajectory look like if that cumulative impact were added to possible impacts of WNS? Such an analysis would assist the agency in making the necessary determinations in this HCP/ITP process, and its absence reflects the failure of the DEIS to look hard at the cumulative impacts relevant to this proposed ITP.

DHCP/ESA

COMMENT 6.3. THE DHCP MENTIONS A NEIGHBORING WIND FACILITY, BUT DOES NOT EXPLAIN WHY THIS FACILITY WAS OMITTED FROM THE CUMULATIVE EFFECTS ANALYSIS.

A. Background

Coordination of the HCP with Section 7 of the ESA requires USFWS to ensure that the Project is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat.[151] Section 7 implementing regulations require, among other things, analysis of the direct and indirect effects of a proposed action and the cumulative effects of other activities on listed species. ESA regulations define "cumulative effects" as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."[152] The agency uses cumulative effects to assist with the assessment of jeopardy: the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with that action, are considered along with the environmental baseline and the predicted cumulative effects to determine the overall effects to the species for purposes of preparing a biological opinion on the

circumstances, using multiple system models (with and without compensation) to predict the population's response to incidental take and implementing follow-up monitoring to assess species response may be valuable in increasing knowledge and improving future decision making."

[151] USFWS, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* (Nov. 4, 1996), p. 3-15.

[152] 50 C.F.R. § 402.02.

proposed action.[153] USFWS's responsibilities during formal Section 7 consultation include "[e]valuate[ing] the effects of the action and cumulative effects on the listed species or critical habitat" and "[f]ormulat[ing] its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat."[154]

B. The Completeness of the DHCP's Analysis of Cumulative Effects Is Unclear.

The DHCP's cumulative effects analysis is unclear in light of other discussions in the DHCP. The DHCP describes an "unrelated project" in Champaign County that may impact Indiana bats: "Mist-netting conducted in Champaign County during summer 2009 for an unrelated project resulted in the capture of 5 Indiana bats in the current Action Area."[155] This and other descriptions suggest that there may be at least one other project footprint within the Project's action area or there may be action areas associated with other projects that overlap with the Project's action area. The HCP should clearly explain the boundaries of the Project's action area and describe any other developments or projects whose action area would overlap with the Project's action area.

[153] USFWS & NMFS, *Endangered Species Consultation Handbook* (Mar. 1998), p. xiv; 50 C.F.R. § 402.02.
[154] 50 C.F.R. 402.14(g)(3) & (g)(4).
[155] DHCP, p. 1; *see also* DHCP, p. 6.

7
ADAPTIVE MANAGEMENT

DEIS/NEPA – DHCP/ESA

COMMENT 7.1. THE PLANNED RESPONSE TO A DRASTIC POPULATION DECLINE CAUSED BY WNS DOES NOT REFLECT THE BEST SCIENCE AVAILABLE.

The DEIS highlights the devastating effect that WNS has had on the Northeast RU Indiana bat populations. Specifically, the DEIS notes that "since the onset of WNS in 2006-2007 significant population declines have been observed in the Northeast RU (70% decline between 2007–2011)."[156] USFWS predicts that as a result of "the extremely rapid rate at which WNS has spread over just 3 years, and the high mortality rates observed in the Northeast RU, population reductions of all cave bat species as a result of WNS in the Midwest RU are expected to increase . . . which makes additional mortality from other sources (i.e. wind power) even more significant."[157]

The DHCP describes the proposed take reductions as a result of WNS:

> As a result of past and anticipated future declines due to WNS, the recovery of the Indiana bat is dependent upon reversing the current rate of decline. Therefore, Buckeye Wind, in coordination with the USFWS, will review the biennial winter census results compiled by the USFWS Indiana Bat Recovery Team and if the population of Indiana bats in the Midwest RU is reduced by 50% or more from 2009 pre-WNS levels, Buckeye Wind will commit to reducing requested 5-year take limits by 50%. In this event, the 5-year take limit would be 13.0 Indiana bats (or average of 2.6 Indiana bats per year). These reductions in take will result from fewer Indiana bats exposed because of overall population declines, having an effective adaptive management plan in place, and voluntary reductions in take because as the population declines, each individual becomes more valuable to the population as a whole.[158]

The DHCP's plan is to reduce the requested take limit of Indiana bats by the same percentage of the population decline due to WNS – i.e., a 50% decline in the Midwest RU would trigger a 50% reduction in annual take. This response is not consistent with the stated

[156] DEIS, p. 4-43.
[157] DEIS, p. 5-188.
[158] DHCP, pp.141–142.

justification: i.e., (1) that 50% fewer Indiana bats will be exposed because of the assumed linear relationship between overall population decline and the number of bats exposed to wind turbines in this particular action area; (2) that the adaptive management plan will kick in if that assumption is determined to be wrong; and (3) that "each individual becomes more valuable to the population as a whole."[159] In the absence of the last factor, the 50% reduction in requested take might be a reasonable response to a 50% drop in the Midwest RU population only if the assumption that reductions in bats at the hibernacula have a uniform effect on all maternity colonies and summer use areas holds up to evidence. The last factor, however, indicates that the proper response to a 50% drop in the Midwest RU population is to implement further minimization and mitigation measures to compensate for the increased significance of the adjusted take.

The DEIS and DHCP both point out that the significance of take increases as the status of the species becomes more dire. The DHCP states, "[A]s the population declines, each individual *becomes more valuable to the population as a whole*."[160] Similarly, the DEIS states, "Although population numbers in this RU are still seemingly high, given the extremely rapid rate at which WNS has spread over just 3 years, and the high mortality rates observed in the Northeast RU, population reductions of all cave bat species as a result of WNS in the Midwest RU are expected to increase . . . *which makes additional mortality from other sources (i.e. wind power) even more significant*."[161] The DEIS also states, "If the Midwest RU Indiana bat population or other cave bat populations were substantially reduced as a result of WNS or other causes, the projected level of mortality resulting from wind turbines *could have greater implications for the viability of the population and the cumulative effects of this Project and past, present, and reasonably foreseeable actions considered in this analysis could result in significant effects to the Indiana bat or other cave bat population size or distribution*."[162]

Thus, a 50% reduction in the species or Midwest RU population should trigger not only a reduced request of the take limit (due to fewer bats to encounter turbines) but also additional minimization and mitigation measures to account for the increased significance of the remaining population and take. This consideration should be considered or discussed in the DEIS and the

[159] DHCP, p. 141.
[160] DHCP, p. 141 (emphasis added).
[161] DEIS, p. 5-188 (emphasis added).
[162] DEIS, p. 5-189 (emphasis added).

DHCP. In light of these considerations, the description of adaptive management measures for WNS is inadequate. There is no indication how the Applicant proposes to reduce the proportion of bats taken from the population in the event that the population of Indiana bats does indeed decrease by half. For example, it is unclear whether feathering will be increased to a higher cut-in speed at all turbines, or only at a selection of turbines depending on the habitat category, or whether the turbines will be shut off at certain times instead. Additionally, the DEIS provides no explanation for the choice of proposed measures – that is, feathering versus non-operational turbines. The DEIS and DHCP should also specify the population abundance at which these adaptive management measures will be implemented. There is an inconsistency between the 2009 pre-WNS rangewide population figures cited in the DEIS and the DHCP. Whereas the DEIS states that the 2009 rangewide population of Indiana bats was 415,512, and the 2009 population estimate for the Midwest RU was 281,909,[163] the DHCP puts the population of Indiana bats at 387,835 and the 2009 Midwest RU population estimate at 269,574.[164]

DHCP/ESA

COMMENT 7.2. THE TRIGGERS FOR ADAPTIVE MANAGEMENT DO NOT, BUT SHOULD, INCLUDE CORRECTION FOR BIAS.

A. The Best Science Indicates that a Trigger Based on Uncorrected Observations of Dead Bats Substantially Underestimates the Actual Impact.

As the DHCP recognizes, unbiased estimates of bat mortality rates due to wind turbines are typically calculated using the number of observed carcasses and correcting that number for searcher efficiency, carcass persistence, the probability that a killed animal falls into a searched area, and searchable area.[165] Variation in bat mortality estimates among studies may be partially attributable to differences in monitoring methodology and correction factors among other variables.[166] However, the DHCP appears to be proposing in some instances to use triggers for adaptive management that are uncorrected for bias. Such use of uncorrected observations of fatalities is unwarranted and would hide the true take of Indiana bats.

[163] DEIS, p. 5-54.
[164] DHCP, pp. 56, 136.
[165] DHCP, p. 128; Korner-Nievergelt et al., *A new method to determine bird and bat fatality at wind energy turbines from carcass searches*, Wildl. Biol. 17: 350-363 (2011).
[166] DHCP, p. 92.

To get an idea of the bias error associated with using uncorrected observations of bat fatalities at wind turbines, we evaluated the results from three studies of bat fatalities at turbines.[167] Table 1 shows the results of our evaluation. The table shows that on average, bat fatality estimates corrected for bias are four times the observed carcass count.

Table 1.

Source	**Uncorrected bat mortality**	**Corrected bat mortality during same study period**	**Multiplication factor**
Aaftab et al 2010	30/26 turbines =1.15 bats / turbine	396/89=4.45 bats/turbine	3.87
	45/26 =1.73 bats / turbine	636/89=7.14 bats/turbine	4.13
Mountaineer Wind Energy Center	10.6 bats / turbine	47 bats / turbine	4.43
Maple Ridge Wind Power Project	2.19 bats / turbine	8.18 bats / turbine	3.74
DHCP Trigger	2 bats (2/100 turbines = 0.02) bats / turbine	2 x 4(avg. correction factor) = 8 bats (0.08 bats / turbine)	4

B. The DHCP's Triggers for Adaptive Management Are Not Clearly Explained.

Section 6.5.3.4 of the DHCP describes a scheme for triggering "immediate adaptive management." The section states in relevant part as follows:

> During any year of post-construction monitoring, observed Indiana bat mortality rates may trigger the need for immediate adaptive management. *If 2 Indiana bat mortalities are documented* at the site before the fall season, cut-in speeds will be increased by 1.0 m/s at all turbines for the remainder of the active period (Figure 6-5). *Any additional documented* Indiana bat mortality before the fall season or 2 additiona fatalities during the fall season will result in all turbines being operated with a cut-in speed of 7.0 m/s. After the cut-in speeds are increased to 7.0 m/s, if additional Indiana bat mortality is documented all turbines will be turned off from 1 hour before sunset to 1 hour after sunrise for the remainder of the active period.

[167] Jain et al., *Bat Mortality and Activity at a Northern Iowa Wind Resource Area*, Amer. Midland Natur. 165: 185-200 (2010); Kerns & Kerlinger, *A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia*: *Annual Report for 2003* (Feb. 14, 2004); Jain et al., *Annual Report for the Maple Ridge Wind Power Project: Post-construction Bird and Bat Fatality Study – 2008* (May 14, 2009).

> *If less than 2 Indiana bat mortalities are documented* before the fall season, *2 Indiana bat mortalities* in the fall season will trigger immediate adaptive management. *If no Indiana bat mortalities are documented* before the fall season and *3 Indiana bat mortalities are documented* at the site during the fall season, immediate adaptive management will be triggered. In either scenario cut-in speeds will be increased by 1.0 m/s for the remainder of the active period. *Any additional documented Indiana bat mortality* will result in all turbines being operated with a cut-in speed of 7.0 m/s. *If additional Indiana bat mortality is documented*, all turbines will be turned off from 1 hour before sunset to 1 hour after sunrise for the remainder of the active period.
>
> Without knowing the scavenger rate and searcher efficiency correction factors at this time, it is not possible to predict how many "estimated" Indiana bats would be calculated from a particular number of "observed" Indiana bats. *However, once a "trigger point" is reached, adaptive management is designed to identify when "observed" Indiana bats would indicate exceptionally high number of "estimated" Indiana bats and to ensure that the elevated take does not occur in any one year.* If a trigger event occurs in any year, adaptive management will be applied the following year according to the procedure following Greater than Expected Average mortality as described in section 6.5.3.4 – Greater Than Expected Average Mortality of Indiana Bats in Year-1.[168]

It is not clear from this discussion in the DHCP whether the trigger point is "observed" bat fatalities or an estimate of actual fatalities corrected for bias. Figure 6-5 indicates that a "documented mortality" is an observed carcass, but in section 6.5.2.8 the DHCP states that "in the time between creation of this HCP and commencement of post-construction mortality monitoring, and at times throughout the term of the ITP, it is highly likely that new formulas for estimating mortality based on observed carcasses will be developed." The HCP should clearly state whether the triggers for adaptive management are expressed in terms of raw observations of bat carcasses or in terms of estimates of fatalities corrected for bias.

C. The Adaptive Management Triggers Should Depend on Estimates of Mortality Corrected for Bias and Not on Raw (Uncorrected) Observations.

If the proposed trigger points for adaptive management set forth in the DHCP are expressed in terms of "observed" bat fatalities, these planned trigger points are unjustified and unacceptable. The above table shows that a correction factor of 4x is reasonable for converting observations of bat carcasses into estimates of actual mortality. Although a correction factor

[168] DHCP, pp. 209–210 (emphasis added).

refined for the Project may differ, this 4x conversion factor provides an example of a rough but useful initial estimate. A rough correction is better than no correction, and that initial correction factor can be refined over time.

The rough correction factor of 4x indicates that if the trigger for immediate adaptive management (as discussed on pages 209-210 of the DHCP) is an uncorrected observation of 2 dead Indiana bats, then the corresponding actual mortality is likely to be in the vicinity of 8 dead Indiana bats, almost twice the proposed annual baseline take of 5.2. The reasonable response to this level of take is to turn off all turbines from 1 hour before sunset to one hour after sunrise, rather than incrementally increasing cut-in speeds (the suggested response). The trigger points for immediate adaptive management, expressed as observed fatalities, should therefore be set at one observed bat fatality.

Although the above comment focuses on the "immediate adaptive management" plan in Section 6.5.3.4 of the DHCP, the general principle that corrected estimates rather than raw observed fatalities should be the triggers for adaptive management applies to all triggers in the adaptive management plan.

Thank you for considering our comments.

Sincerely,

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