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1018–0148 Proposed Information Collection; Land-Based Wind Energy Guidelines

Jim Sinclair <jim.sinclair@tx-esa.com> Sep 1

to me

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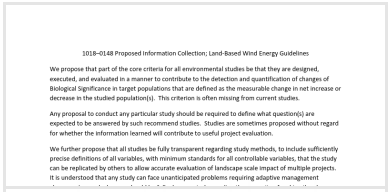
1018–0148 Proposed Information Collection; Land-Based Wind Energy Guidelines

We propose that part of the core criteria for all environmental studies be that they are designed, executed, and evaluated in a manner to contribute to the detection and quantification of changes of Biological Significance in target populations that are defined as the measurable change in net increase or decrease in the studied population(s). This criterion is often missing from current studies.

Any proposal to conduct any particular study should be required to define what question(s) are expected to be answered by such recommend studies. Studies are sometimes proposed without regard for whether the information learned will contribute to useful project evaluation.

We further propose that all studies be fully transparent regarding study methods, to include sufficiently precise definitions of all variables, with minimum standards for all controllable variables, that the study can be replicated by others to allow accurate evaluation of landscape scale impact of multiple projects. It is understood that any study can face unanticipated problems requiring adaptive management

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The following comments apply to generic data collection to evaluate environmental impact. It is expected that evaluating the impact on Species of Interest (SOI), defined as including all listed species (Species of Concern, SOC) plus any species being considered for listing may require additional specialized methodologies that may be specific to that species and/or to the specific habitat being evaluated.

Preconstruction

Generic Point Counts: In our opinion continuing to conduct generic point counts as part of pre-construction environmental assessment has minimal value for evaluating risk assessment of any specific site, and provides minimal useful information for subsequently evaluating landscape scale impact. We have learned much from earlier studies, but are no longer learning anything of significance.

TXESA conducted an analysis of all point count data collected on six different lower Texas coast sites from Nueces County to Cameron County over a seven year period. Four of those six sites are mostly agricultural fields, while two are mostly savanna with isolated oak mottes. This first data set contains nearly 22,000 sightings recorded during more than 3,000 point surveys

The second data set contains sightings recorded during point surveys from a single, mostly contiguous inland area over a two year period. This area was at similar Latitude as the coastal sites but was approximately 50 miles west of the coastal sites. The second data set contains more than 4,000 sightings recorded during 750 point surveys. All visual sightings were recorded in one of three categories:

1. Birds on the ground. This included all heard-only birds unless flight status was established. The number of birds recorded on the ground should not be assumed to be reflective of the actual density. Visibility of birds on the ground is quite limited and point surveys undercount ground birds by nature, especially outside of the breeding season when they are mostly silent.

2. Birds flying within the Rotor Swept Area (RSA) altitude (25-150 m). Additionally, if a bird entered the RSA after first being recorded during the observation period, it was moved to that category.

3. Birds flying outside the RSA altitude (0-25m or >150m).

The primary conclusion was that the cumulative Exposure Index (number observed in RSA divided by total number of birds observed) for the coastal sites was measurably higher than that of the inland site.

Post-construction mortality data from some of those coastal sites suggest that the strike risk is acceptably low, falling within the national average for modern wind farms. It is a reasonable assumption that the mortality at the inland sites would also be acceptably low.

(Full report available upon request with permission of client.)

We inferred from this analysis that there is now minimal utility in continuing to conduct generic point counts. Those surveys tell us nothing new of value, nor do they provide useful information for evaluating the landscape scale impact of multiple facilities in the same area.

Targeted point surveys: We were allowed the opportunity to conduct a different type of point survey on one of the early South Texas projects. During pre-construction evaluation we conducted a modified Breeding Bird Survey (BBS).

Data collected during BBS's typically vary from year to year due to changes in climatic conditions. This minimizes any value from year to year comparison of any particular route. We modified the generic methodology for our purposes. With our methodology the number of points is greater, and the route is not linear.

Our goal is to collect data from within the proposed turbine grid area and from the immediately surrounding area. Those point breeding bird surveys will then be repeated in subsequent years. Although the actual density and diversity of species is expected to vary from year to year, the ratio between two adjoining areas is expected to remain relatively constant, barring any major habitat change or modification. We propose conducting at least two annual BBS's during the pre-construction period, followed by at least two annual surveys post-construction. The ratios between the two areas (within the grid and outside the grid) would be determined for all surveys. Any significant change in the ratio from the pre-construction period as compared to the post-construction period would be expected to be driven by habitat modification and would then aid in identifying and understanding any landscape scale impact on the resident avian breeding population.

TXESA previously conducted a single year pre-construction BBS on one project followed by a single year post-construction survey. The overall landscape was mostly homogeneous savanna with isolated oak mottes. Although the detailed results are not currently releasable, we can state that there was a significant quantified increase in avian breeding activity within the turbine grid post-construction as compared to the area outside the grid. Anecdotally (too small a sample size) there may have been an

increased raptor fledge rate, as a small increase in the numbers of juvenile White-tailed Hawks (Texas threatened) were observed. If so, this could possibly be attributed to an increased prey base.

We contribute this to the increase of edge habitat as a function of the project infrastructure - string roads, stub roads, and turbine pads - as that was the only significant change in the landscape. This positive outcome must be tempered by the fact that there were no breeding Species of Interest detected during either survey. Some prairie breeding species in other areas are suspected to be negatively impacted by wind farms.

Although we have not had a significant opportunity to do so to date, we recommend conducting a similar survey in the winter. This would provide data to help identify and quantify any possible displacement of species on their wintering grounds. We had an opportunity to conduct a limited evaluation of this hypothesis in the Texas coastal bend area regarding two Species of Interest, Sprague's Pipit and Mountain Plover. Although the resulting data set is too small to support any quantifiable conclusions we detected virtually no change in the spatial distribution of Sprague's Pipit, but potentially a significant change in the spatial distribution of Mountain Plover.

This methodology is a major reduction of effort (and cost) for generic pre-construction avian risk assessment, requiring only a few days of field work per year for each study, while providing valuable data for evaluating landscape scale impacts. Although there is some increased cost for post-construction studies, the net savings is still significant over pre-construction generic point counts, and the post-construction study occurs when the project is generating income.

We recommend the targeted point count studies to be the only recommended/required generic pre-construction avian study for land based projects. Additional studies would be recommended/required to address site specific and/or species specific issues.

Post-construction Baseline Mortality Studies

Although multiple mortality assessments have been conducted through the years utilizing different methodologies, all are expensive. Some consultants/developers have recommended minimizing or eliminating them. We think this is premature, especially during these times of often rapidly changing climatic conditions. Although we think that many project sites are generally sufficiently safe (especially as compared to total environmental impact of fossil fuel energy production), significant changes in avian behavior due to climate change may result in the necessity to introduce operational mitigation techniques under certain conditions.

In order to be able to identify and, ultimately, predict when such conditions are expected, we suggest that baseline mortality assessments followed by reduced effort long term monitoring should continue, at least until we have a greater understanding of the dynamics of mortality.

We are not recommending or promoting any particular mortality assessment methodology, but we are very concerned about one that is currently being promoted - The Road & Pad (R&P) search methodology.

This method was designed and implemented by Western Ecosystems (WEST) at the Fowler Ridge Wind Farm in 2011 to monitor bat mortality. Although avian mortality was recorded during that study, avian mortality was specifically excluded from evaluating the R&P protocol. A subsequent study purporting to validate the efficacy of the method for avian mortality was flawed in that un-mowed search areas (crops) were compared to groomed areas utilizing different search methodologies, and the asymmetrical nature of the search areas was not addressed (see discussion below).

The R&P protocol as currently designed and implemented is fatally flawed for a number of reasons:

Non Blade Strike Mortality: Maturing crops create significant avian edge habitat where edges of crop fields meet roads & pads. Edge habitat in agricultural field situations may have minimal effect on bat mortality, as they mostly occupy the homogeneous air space above the crops, and are not foraging at the edge habitat. Birds, on the other hand, show significant behavioral changes under these conditions.

As written in WEST's Scope of Work, all mortality was assumed to be blade strike related unless proven otherwise. But no methods were described to address the issue.

Anecdotal and quantitative observations in these edge habitat areas (especially in agricultural fields) in South Texas over a twelve year period (with and without wind farms) suggest that certain species are at elevated risk of being directly struck by vehicles or flushed in a manner to cause the bird to collide with another object. It is essential to be able to quantify and exclude non-turbine blade strike mortality before extrapolating detected mortality to full search areas.

Example: Horned Lark carcasses are often reported during mortality studies at some sites, while not reported at others, even in the same geographical area. Our pre-construction point count data and behavioral observations of this species in Texas suggest that it should rarely be a blade strike casualty. At five ag field locations we studied in South Texas we recorded 6,591 Horned Larks during 1,360 point counts. Only 13 individuals were observed in the Rotor Swept Area, where they would be at risk of blade strike. Due to the expected low blade strike vulnerability of this species based upon observed behavior and its known vulnerability to vehicle related mortality it is probable that a significant percentage of carcasses discovered in R&P search areas would be non-blade strikes.

Wind Velocity (speed and direction): Any time a search area is significantly asymmetrical in relation to turbine location, wind velocity at time of fatality is crucial for properly evaluating mortality rates. Turbine rows are typically laid out perpendicular to prevailing wind direction, and string roads are often parallel to the turbine rows. Therefore, R&P search areas will also often be perpendicular to prevailing wind direction, either on the upwind side or the downwind side. As wind velocity changes, excluding wind velocity at time of bird strike from the calculations could easily result in significant errors in computed mortality. (Properly searching a square or circular area with the turbine in the center minimizes any search bias related to wind velocity.)

Most blade strike carcasses land inside a long, narrow rectangle parallel to and downwind from the plane of the Rotor Swept Area (RSA) at the time of strike. Under prevailing wind conditions this

rectangle is typically on the prevailing downwind side from the turbine and often parallel to the string roads. The string road itself (R&P search area) may be on the upwind or downwind side of the RSA.

An R&P search area encompasses less than one half of that rectangle, introducing a potential significant but unquantifiable mortality bias as the methodology is currently defined.

If the string road portion of R&P search area is on the downwind side of the turbine, the bias will be toward higher mortality. If on the upwind side, the bias will be toward lower mortality. See Table 1. The table contains aggregated avian mortality data from four projects. Each carcass was spatially referenced to the searched turbine, and that location was evaluated to determine where and if it would have been found if the R&P methodology were in use during that search at that turbine.

Table 1. R&P Equivalent Mortality

Total # searches	Total avian mortality				
	mortality all searches	R&P equivalent			
		road only upwind	road only downwind	pad & stub	
4955	343	1	0	18	meandering string roads
		0	5	28	strings roads mostly upwind
		4	30	19	string roads mostly downwind

Note that seven times as many carcasses would have been found on the downwind side from the prevailing wind direction compared to the upwind side. Wind velocity at time of strike unknown in all cases. Cause of mortality (blade strike or vehicle related) unknown in all cases.

Table 2 contains data on the size and orientation of the R&P search areas if applied to four separate agricultural projects in South Texas. These data were obtained from publicly available satellite imagery. Each of the projects contains some turbines that do not fit the typical pattern for that project. The data in the table reflect the majority configuration. The total area assumes that crops are growing right up to the edge of the roads and pad, as is the case observed at multiple sites in South Texas.

A subset of the total carcasses in Table 1 above were from turbine locations that had no maturing agricultural crops, eliminating possible bias from the edge habitat phenomenon in ag fields. If the relative positions of those avian carcasses were superimposed on the two projects in Table 2 with 100+ meter stub roads a maximum of only 11% of the carcasses would have been discovered on the stub roads, depending upon wind velocity at time of strike. If wind velocity were always from the prevailing direction, few, if any carcasses would have been found on those stub roads as few of those roads aligned with the prevailing wind.

Table 2. Typical Area (in sq. meters) of R&P search polygons

Project	Pad		Stub Road			String Road				Notes
	Width	Area	Width	Length	Area	Width	Length	Area	Total Area	
A	20	1256	8	100	800	8.5	n/a	n/a	2056	Most turbines located at end of stub roads that were longer than 100 meters. So R&P area would only be a single radial from the turbine.
B	21	1385	4	12	48	5	180	900	2333	
C	17	907	4.5	100	450	5	n/a	n/a	1357	Many turbines located at end of stub roads that were longer than 100 meters. So R&P area would only be a single radial from the turbine. Stub roads angled ~ 45 degrees from prevailing wind direction, either on upwind or downwind side.
D	20	1256	4	12	48	5	190	950	2254	

The Current FWS Wind Energy Guidelines (WEG) recommend a circular search area of 120 meters radius from the turbine. This is a total area of 45,000+ square meters, or more than 20 times larger than the proposed R&P search areas.

Impossible to meet the number of searched turbines required to fulfill WEG recommended minimum total search area size. Significantly smaller total search area, approximately 5 % of full sized search area per turbine. Not possible to exceed even 50% of the recommended total project search area with R&P exclusive search areas.

R&P Conclusions:

Inherent undetectable and unquantifiable biases for each R&P search due to unknown wind velocity at time of strike, and unknown cause of mortality (blade related or non-blade related).

In summary we strongly recommend that the Road & Pad methodology not be accepted as scientifically valid until the above issues are fully addressed and independently resolved/validated. Such independent validation efforts should include active involvement of those with no vested interest in the outcome.

Ethics of Study Design:

Study Design/Protocol: Must be publicly available. Must include definitions and detailed procedures for determining all variables utilized in computations with sufficient precision to enable independent replication and validation of the protocol.

Minimum acceptable Confidence Interval should be stated as part of protocol, as it has a significant impact on the utility of the mortality assessment. That minimum is partly driven by the variables of Searcher Efficiency (SE), Search Frequency (SF) and Carcass Persistence (CP). For example, as CP goes up, SF can be extended. If SE is too low, the search effort must either be increased, and/or have the search method modified. The study design should include specific minimums for those variables as related to each other and to their impact on Confidence Interval. Appropriate adaptive management tools to achieve the desired minimum Confidence Interval should be part of the initial study design.

Split responsibilities among consultants: One consultant supplies searchers, conducts carcass searches, and performs the overall analysis. Separate consultant conducts Searcher Efficiency (SE) trials and Carcass Persistence (CP) trials. This mitigates potential search (and searcher) bias, both unintentional and intentional, and, in our opinion, should be mandatory. Separate consultant also monitors the execution of the study to insure compliance with the written proposal. The implementation of the R&P protocol, In particular, is easily and undetectably abused without independent oversight. Note that there is minimal, if any, increase in cost to the client utilizing this approach, as there is no additional work being performed beyond that expected of any reputable study.

All parties, including client, should be actively involved in adaptive management of the study when problems arise.