California Wind Energy Association

May 19, 2011

BY EMAIL

Division of Fisheries and Habitat Conservation
Attention: Wind Energy Guidelines
U.S. Fish and Wildlife Service
4401 North Fairfax Drive
Mail Stop 4107
Arlington, VA 22203-1610

RE: California Wind Energy Association Comments on the Draft Land-Based Wind Energy Guidelines

Thank you for the opportunity to comment on the Draft Land-Based Wind Energy Guidelines (Guidelines) prepared by the U.S. Fish and Wildlife Service (Service). The California Wind Energy Association (CalWEA) is a trade association comprised of 25 wind energy companies focused on the California market, including wind project developers and operators, turbine and component manufacturers and related vendors. CalWEA is presently involved in several wildlife/wind energy research efforts. Of these, the most relevant to the Guidelines is a field examination of post-construction mortality estimation methods described in an Appendix to this letter. CalWEA requests inclusion of the results of that study in the Guidelines.

Wind energy produces electricity without air pollution, greenhouse gas emissions or other problems associated with many traditional forms of energy generation, such as water consumption, mining, drilling, refining, and hazardous waste. For example, the U.S. Department of Energy estimates that a single 1.5 megawatt (MW) wind turbine displaces 2,700 metric tons of carbon dioxide per year compared with the current U.S. average utility fuel mix.[1] And studies have demonstrated that wind energy is less impactful to wildlife than other energy sources such as coal, oil, natural gas, nuclear, and hydro.[2]

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[1] U.S. Department of Energy, *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply,* July 2008.

[2] Environmental Bioindicators Foundation, Inc. and Pandion Systems, Inc., *Comparison of Reported Effects and Risks to Vertebrate Wildlife from Six Electricity Generation Types in the New York / New England Region*, March 2009.

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Wind projects represent over 80 percent of all new renewable generation installed to date in the effort to meet California's 20-percent-by-2010 Renewables Portfolio Standard (RPS). This strong development track record is due to proven technology, competitive pricing, and relatively modest environmental impacts. Achieving California's recently legislated 33-percent-by-2020 RPS goal will depend in significant part on the continued success of wind energy developments.

Much of that success will in turn depend on the investment community's appraisal of the wind industry. Wind development projects require large capital investments. Wind developers attract investment by reducing the risks and uncertainties associated with a project. Much of this effort involves reducing the risk of liability under environmental laws.

CalWEA therefore has always understood the underlying goal of the Guidelines to be the creation of a consensus-based developer's manual that specifies voluntary yet rigorous wildlife protection standards for reducing liability under federal wildlife laws.

The Wind Turbine Guidelines Federal Advisory Committee (FAC) - comprised of state agencies, industry, academia and wildlife conservation organizations appointed by the Secretary of the Interior in 2007 - largely achieved that goal after a two-and-a-half year effort. The result was a body of practicable recommendations founded on carefully considered compromises made by the various interests involved (FAC Recommendations).

However, the Guidelines - proposed by the Service 11 months later - fall short of the consensus-based and voluntary risk-reduction standards they seek to establish. The Guidelines convert the FAC Recommendations into a new quasi-permitting regime of such broad scope that they are unworkable, thereby changing what was intended to be a liability reduction roadmap into a potential litigation roadmap. The net result is an *increase* in risk, rather than a reduction. As such, the Guidelines will have an immediate deleterious effect on over 7,500 MW of wind projects that have signed power purchase agreements with California utilities seeking to meet California's ambitious renewable energy goals.

CalWEA therefore respectfully requests rejection of the Guidelines and adoption of the FAC Recommendations, or, at the very least, an extensive revision of the Guidelines along the lines specified by the American Wind Energy Association (AWEA) in its own comments, which CalWEA incorporates into this comment letter by reference. To that end, given the distance between the Guidelines and the FAC Recommendations, CalWEA recommends (i) reconvening the FAC for at least one additional meeting after the Service has considered all comments on the Guidelines; and (ii) releasing the next iteration of the Guidelines as interim final guidelines with an additional comment period of 30 days.

CalWEA emphasizes the following key concepts expressed in AWEA's comments:

- **Restore enforcement assurances.**
  - As explained in detail in AWEA's comments, certain provisions within the Guidelines undermine the enforcement assurances that lie at the heart of the Guidelines. The Service should delete or properly qualify such language to restore the intent of the enforcement assurances as proposed by the FAC Recommendations.

- **Voluntary, not mandatory.**
  - The risk of enforcement as a result of failing to take "due care" under a voluntary program strikes the right balance between the occasionally competing public goods of renewable energy and conservation.
  - Voluntary guidelines allow for broader conservation benefits beyond the limits of federal trust species under a mandatory program.
  - The Service does not have the resources to implement a mandatory program.

- **Communicate, not coordinate.**
  - The Service does not have the resources to evaluate and respond to every wind project applying the Guidelines, and will consequently delay implementation.
  - Decisions regarding Guidelines compliance, such as when to initiate the process or whether to proceed to the next tier, should be left to the developer, not to the Service.

- **Two-year phase-in.**
  - As proposed, the Guidelines would take effect immediately.
  - Without a two-year phase-in, every wind project in the country would be out of compliance as soon as the final guidelines were released, including over 7,500 MW of wind projects that have signed power purchase agreements with California utilities seeking to meet California's RPS requirements.

- **Limit scope to FAC "species of concern."**
  - The Guidelines unworkably apply to all fish and wildlife.
  - The scope should be narrowed to "species of concern," as defined by the FAC Recommendations.

- **Limit scope to "significant" adverse impacts.**
  - The Guidelines unworkably apply to all adverse impacts, no matter how small.
  - Limit application to "significant" adverse impacts, a modifier already well defined through statute, regulation and case law.

- **Extent of pre- and post-construction monitoring duration should depend on project-specific factors**.
  - The Guidelines currently read as though all projects must undergo 3 years of pre-construction monitoring and between 3 and 5 years of post-construction monitoring, regardless of the risks involved.

- Determine duration of pre- and post-construction monitoring by following the project-specific criteria of the FAC Recommendations instead.

- **Reduce scope of pre- and post-construction monitoring.**
  - Focus study area on "species of concern."
  - Replace Guidelines habitat fragmentation requirements with those of FAC Recommendations.
  - Limit post-construction monitoring to areas around base of turbines.
  - Do not tie mortality monitoring to weather conditions.

- **Assess post-construction mortality estimation methods against field-tested results.**
  - CalWEA is presently engaged in a first-of-its-kind field examination of post-construction mortality estimation methods, funded by a grant from the California Energy Commission.
  - Incorporate applicable results of the CalWEA study, which are expected in early 2012. Please refer to an Appendix to this comment letter for details regarding the study.

- **Reduce emphasis on adaptive management.**
  - Adaptive management and operational modifications should be limited to instances of high impact and uncertainty, which the tiered approach would for the most part avoid.

- **Update science, methods and metrics on a regular basis.**
  - Constant updating of the science, methods and metrics underlying the Guidelines would introduce substantial compliance uncertainty.
  - The science, methods and metrics underlying the Guidelines should instead be updated as follows: (1) create a standing advisory panel of scientists to review existing literature and methodologies annually and make recommendations on incorporation of new information into the guidelines; (2) the panel should be guided by the FAC principles that recommendations be based on sound science and be practical and workable; (3) issue the panel recommendations for public comment prior to inclusion as revisions in the guidelines; (4) include updates in the guidelines on a three to five year cycle; (5) include clear language that demonstrating compliance means adhering to the recommendations available at the time the project entered the tiered process.

Finally, we must place the Guidelines in their proper context and remind the Service that the wind industry is a "green" industry; not just because it is renewable, but because its wildlife impacts are lower than that of other forms of energy generation.

CalWEA recognizes that the intent of the Service and the intent of the wind industry are one and the same: to find a practicable assurance mechanism for wind developers that promotes conservation. The Guidelines fall short of this goal in their current form, but could achieve it if AWEA's comments were implemented.

Sincerely,

Nancy Rader
Executive Director

Enclosure

Appendix to California Wind Energy Association Comments on the Draft Land-Based Wind Energy Guidelines

The Draft Land-Based Wind Energy Guidelines (Guidelines) involve a number of topics relevant to an on-going research program conducted by the California Wind Energy Association (CalWEA). CalWEA therefore would like to make the following comments regarding Tier 4 post-construction monitoring methods, with particular regard to the following fatality monitoring design issues:

- Duration and frequency of carcass searches,
- Number of turbines to monitor,
- Delineation of carcass search plots, transects, and habitat mapping,
- General search protocol guidance,
- Field bias and error assessment, and
- Estimation of fatalities.

To date these issues, and in particular none of the equations for estimating fatalities, have been rigorously tested in the field for precision and accuracy using experimentally designed and rigorous field studies. Specific sampling protocol recommendations are influenced by the degree to which they can provide precise and accurate measures of the variables used in estimating fatalities.

In 2009, CalWEA was awarded a grant from the California Energy Commission (CEC) to rigorously test the above design issues in the field. The attached project summary provides highlights of the research plan. The field sampling for this project is complete and data analysis is underway.

CalWEA requests that the Service incorporate applicable results of this research into the Guidelines, including specific recommendations for estimating mortality and mortality monitoring protocol approaches. CalWEA also requests the discussion on fatality monitoring be reviewed in light of more recent studies including the CalWEA studies.

On a related note, CalWEA cautions against using references and making general statement that may not be applicable across different species, particularly those of different sizes. For example, the Website "*Carcass Search Using Line Transects to Estimate Density and Number of Dead Eagles"* provides a list of references for estimating eagle mortality, however, no caveat is provided that these references may be useful for eagles but may not be useful for small birds. Similarly, there is a statement in the same Website that states "The Service believes that distance sampling will provide more reliable data than incomplete area searches and other traditional methods used to estimate mortality due to collisions with turbines and other above-ground structures at wind-power facilities." The basis for this "belief" should be substantiated. Finally, the citations assume that probability of detection is a function of distance. This may be true for birds falling on non-vegetative surfaces but is not true for field conditions and not true for all sizes classes of birds.

Improving Methods for Estimating Fatality of Birds and Bats at Wind Energy Facilities in California

(California Energy Commission Grant Award Number PIR-08-028)

Study by

California Wind Energy Association
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SUMMARY OF RESEARCH PLAN
(For Information Purposes Only)

Introduction

In 2007, the California Energy Commission (CEC) and California Department of Fish and Game released California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development[1] ("Guidelines") to provide recommended protocols for assessing and minimizing impacts from wind energy development to birds and bats. The Guidelines recommend protocols for assessing, evaluating, and determining the effects of wind projects on birds and bats, and also recommend impact avoidance, minimization, and mitigation measures. In addition, the Guidelines provide an equation that can be used to adjust for survey error the number of bird (or bat) carcasses that are visually observed during an environmental monitoring survey of a wind facility. The equation adjusts for survey errors resulting from the inability of an observer to locate all carcasses on the survey plot at the time of observation, and for the probability of scavenger removal prior to the time of observation.

In 2009 the California Wind Energy Association (CalWEA) submitted, and was subsequently awarded, a grant to rigorously evaluate the procedures provided in the Guidelines for estimating mortality of birds and bats associated with collisions with wind turbines in California. Information gathered from this study will be directly applicable to wind development projects in California and other parts of the US and Europe. The project is planned to be completed in early 2012.

Project Goals

The primary goal of this project is to generate information allowing for the comparison of existing mortality estimation methods, and the development of advanced models. The equations and models will

[1] California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development. 2006. California Energy Commission. Sacramento, CA.

be applied to the observed data generated during this study, and the model predictions compared and evaluated against the true mortality at the experimental location. Data generated by this project also can be used to provide insights into several other issues that are important to risk assessments of wind facilities. Specifically, this project will generate information that can be used to:

1. Compare existing mortality estimation methods.
2. Develop advanced models that link observational data with measurements of ecological condition.
3. Test and evaluate the shape of carcass removal curves (or scavenging curves) under a variety of environmental conditions.
4. Evaluate the effect of time-dependency on the probability of bird and bat scavenging and removal.
5. Evaluate the relationship of survey error with other factors, such as density of the carcasses on the ground at the time of observation, whole or partial carcass remains, and environmental conditions.

Once the data are evaluated and existing models tested or new models created, the information from this study will lead to the development of (1) guidelines for generating site-specific data used to parameterize equations, (2) guidance for selecting existing or new equations based on site-specific conditions, (3) guidance on field protocol procedures, and (4) guidance on the interpretation of the results generated by the statistical methods.

Mortality Estimation Equations

Various other equations[2] have been proposed for estimating the true mortality at a wind facility based on observational data collected during a monitoring survey. The equations found in the literature take

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[2] These equations include:

Schoenfeld, P. 2004. Suggestions Regarding Avian Mortality Extrapolation, unpublished report to West Virginia Highlands Conservancy, Davis, WV.

Erickson, W. P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Annual Report, Results for the Period July 2001 B December 2003, report submitted to FPL Energy, the Oregon Office of Energy, and the Stateline Technical Advisory Committee.

CEC *Guidelines* (note 1, *supra*). Appendix F of the *Guidelines* presents an alternative that was proposed by Dr. Ken Pollock of North Carolina State University (Dick Anderson, personal communication). http://www.energy.ca.gov/windguidelines/index.html.

Smallwood, K. S. 2007. Estimating wind turbine-caused mortality. Journal of Wildlife Management, 71(8), pp. 2781-2801. http://www.altamontsrc.org/alt_doc/m21_2008_altamont_bird_fatality_report.pdf

Huso, M. P. 2010. An Estimator of Wildlife Fatality From Observed Carcasses. Environmetrics. Published online in Wiley InterScience (www.interscience.wiley.com). http://www.nationalwind.org/pdf/HusoManuela.pdf.

various mathematical forms, but require (to varying degrees) similar types of data: number of observed birds (or carcasses, partial carcasses e.g. feathers, etc.) at a specific time and location, interval since the last survey at the location, a measure of searcher efficiency, an estimate of the carcass removal rate or an estimate of the scavenger efficiency as a function of time. Therefore, at a minimum the experimental design must collect these data, or information leading to the calculation of these variables, in order to test and evaluate the various equations.

Overview of Experimental Design

The study is being implemented at the Altamont Pass Wind Resource Area (APWRA), located in central California approximately 56 miles (908 kilometers) east of San Francisco. The APWRA supports a broad diversity of resident, migratory, and wintering bird species that regularly move through the wind turbine area (Orloff and Flannery 1996). The geographical unit of interest from an experimental perspective at the Altamont is a turbine string or a line of turbines. The Altamont has available to our study over 800 turbine strings. Over 400 of these strings are currently monitored on a regular basis (note: the number of turbine strings may change starting in October 2010). The monitored strings are located over 4530 square miles and cover the extent of the APWRA, and therefore cover a variety of ecological conditions. A subset of these strings will be used for the experimental design.

The total number of turbine strings that will be used in the project is 30 strings (the string is considered the experimental unit). A group of six strings will be simultaneously observed during any time period (this group of six strings is termed a block). Therefore, the entire experiment will consist of five blocks of six strings per block. Observations made at any block will be finished before the start of the next block of strings. At the Altamont, the number of individual turbines in a string can vary from three to as many as seventeen, but the majority of strings consist of approximately seven to eight turbines. Each string within a block will be observed for up to six weeks or until no marked birds or bats remain on the string. The entire study period of the project field trial is 30 weeks (5 blocks times 6 weeks of observation per block). Two strings will be randomly designated as controls, and will not be used to place marked carcasses. Therefore, data for model comparison and model development will be taken from twenty-eight total strings.

At the beginning of the observation period for each sampling block, the Project Field Manager (PFM) will randomly place a fixed number of uniquely marked birds and bats at each of the six strings comprising that sampling block. In order to maximize sampling efficiency, both birds and bats will be placed at the same string. The objective is to both observe the removal of birds and bats as a result of scavenging, and to generate observations reflecting monitoring error.

The PFM will visit the string daily for fourteen days and record the position and character (i.e., body parts) of all carcasses remaining at the string. After the initial fourteen day period, the PFM will also visit each string every other day for the remaining of the block study period. Therefore, the PFM will visit each string with marked carcasses a total of twenty-eight times over a six week period. The PFM will visit each string either during the evening or early morning, depending on the number of daylight hours available.

Independent observers will visit each string three times, at approximate two week intervals. The observers will be blind to the location of carcasses. An individual observer will visit a specific string only once during the block study period. The observers will walk the string using a standardized protocol (see below). The observers will identify observed birds and bats as "study carcasses" based on the markings. At the site of each observed study carcass, the observers will record the ecological conditions within a two-foot area around the found carcass (see below for details). Carcasses will not be removed by the observers. All observers will be given explicit instructions on survey technique, including instructions to ignore any pre-search information on the existence of birds or bats on the string. And, the observers will be informed that some strings will have no marked birds, therefore, surveys should be conducted without the pre-conception that marked birds are on the ground. In addition, the observers will be informed that the string may not have marked carcasses due to the presence of control strings. Strings will be selected such that the level of effort among observers is similar (i.e., the number of turbines and geographic area of the string is consistent). Given the above, a total of eighty-four observation days (28 strings times three observations per string) of data will be generated by the observers.

Ecological variation and string selection

Variation in habitat condition is considered a key variable affecting the change in survey error among locations. Variation in vegetation type and density, scavenger species and associated activity levels, climate conditions, geographic conditions associated with turbine placement, and a host of other site-specific variables could influence the overall survey error rate for a specific site.

Strings will be selected to (1) maximize ecological variation and coverage, and (2) to minimize labor required for the CalWEA survey crew to gain access to the geographical areas. To maximize labor management, strings that are selected for experimentation will generally be within close proximity to each other, sharing road access to minimize travel time. Based on the proposed experimental design, six strings (comprising a block) will be simultaneously used in the experiment. Selection of strings for a specific block will be based on the criteria mentioned above. All strings used in the study will contain operational turbines.

Process for marking, distributing, and observing carcasses

Study birds appendages will be marked with unique tape color and flight feathers will be clipped. Bats will have the appendages taped. Tracking the position of trial carcasses will involve recording the distance and bearing to the closest turbine, as well as using a GPS with sub-meter accuracy. As the carcasses age, they may fragment due to scavenging actions and weather conditions (e.g. wind, sun and rain). When the PFM checks the study carcasses on a daily basis, he/she will continue to update the position of the carcasses as well as carcass condition. The PFM will be able to identify trial birds and bats used in the study based on species-specific characteristics and initial marking procedures. The PFM will attempt to track and record individual body parts throughout the six week observation period for a specific block. If all carcasses are removed on an individual string before six weeks, the PFM will stop observations on that specific string.

The placement of whole bird and bat carcasses on a specific string will begin the observation period (day zero). Three observations periods are planned for each string within a block. The timing of the observations within the six-week period is critical. The objective is to distribute the observations over the six week observation interval so that a varying number of carcasses are on the plot at the time of observation. The actual number of the plot will be known to the PFM, but unknown to the blind observers. The rate at which carcasses will be removed from the string is unknown, and the generation of removal curves under varying condition is one of the objectives of this study. During the pilot study phase of this project, timing of the observation days will be evaluated. As the study progresses, changes in the timing of the observation days within the six week observation window may occur in order to maximize the variability in carcasses on the ground at the time of observation.

An additional issue that will be studied, and is affected by the timing of observations is the effect of carcass age on observer error. Carcass age is expected to influence scavenger removal rates, but may also affect observer detection probability. As an un-scavenged carcass ages it becomes may become less attractive to scavengers, reducing the chance for scavenging actions that may either remove the carcass completely or fragment the carcass spreading the carcass sign over the plot. Also as a carcass ages, if it is not removed, the chance that it will be fragmented by scavenging actions increases, possibly affecting the probability of observer detection. Once a carcass is scavenged and not removed, carcass sign may slowly degrade from abiotic mechanisms (wind and rain). This can reduce observer detection probability and can eventually remove all significant carcass sign. So, in general as a carcass ages removal rates may decrease and then eventually increase slowly as the carcass sign degrades. Observer detection probability may initially increase as a carcass ages and fragments, but as the carcass ages further and carcass sign degrades, observer detection probability may also decrease.

Species selection

Carcass size is a key variable that influences both the observer detection probability and scavenger removal rate. Generally, larger birds (e.g., golden eagles) are reported to have smaller survey error rates than smaller birds (or bats). The smaller birds and bats are more difficult to see over large distances, and may be more easily covered by vegetation. Also, smaller animals are more subject to complete removal by scavengers.

This study will focus on smaller animals. The cowbird (*Molothurus ater*) and bat (species to be determined) are the current species of choice. To date, approximately one thousand cowbirds and three hundred bats have been located and shipped to the NextERA laboratory located at the Altamont. If carcasses representing local species become available, for example the American kestrel or red tailed hawk, and are in sufficient numbers for statistically analysis they will be incorporated into the field activities.

Field measurements and Data Collection

The following information will be collected by the PFM during each observation of a specific string:

a. String number
b. Block number

c. Date
d. Temperature
e. Precipitation amount since last observation (inches)
f. Total number of birds/bats on the plot
g. Position of bird/bats or significant parts of birds/bats (distance and bearing from closest turbine and GPS location)
h. Number of birds/bats that show sign of vertebrate scavenging (i.e., torn apart)
i. Number of birds/bats with no visible sign detected (i.e., dragged outside of search area, blown away, removed completely, etc.)
j. Description of remaining carcasses and carcass parts
k. Vegetation type (genus and species), vegetation height (mm), and vegetation color.
l. Visibility class.
m. Topography

Data Analysis

Analysis of the data resulting from the field trials will be used to evaluate the multiple aspects of survey error. Data analysis will consist of the following components:

1. Comparison of mortality estimates generated by equations 1 – 5 with the true mortality.
2. Evaluation of the variation in carcasses removal rates as a function of site-specific conditions.
3. Evaluation of the relationship between observer error and site-specific conditions.
4. Development of new stochastic models that incorporate time-dependent relationships between carcass removal and observer error.

A variety of statistical techniques are available for deriving a statistical model using the field data. Classic survival model and hazard function3 equations can be used to generate a carcass removal curve for each string. Survival analysis is effectively a time to event analysis. The term survival analysis is used predominately in biomedical sciences where the interest is in observing time to death either of patients or of laboratory animals. Time to event analysis has also been used widely in the social sciences where interest is on analyzing time to events such as job changes, marriage, birth of children and so forth. In the case of this project, the event is the removal of a carcass from the ground, or the expected time a carcass will remain on the ground at any string. The mathematics of these models is not presented here, but numerous model forms with multiple parameters are available in the literature. Most of the available statistical software has modules for estimating the parameters of the hazard functions. Parameters of the hazard function can be linked to specific environmental characteristics, and an evaluation of the hazard rate and the relationship to environmental metrics can be evaluated. The parameters of the resulting models will be displayed in table form. A graphical presentation of the removal curves can be used to display the variability in removal rate within the data base.

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[3] Kleinbaum, D. G., and Klein, M. 2009. Survival Analysis, 2nd ed., Springer-Verlag. New York, New York. 196 pps.