**HOW IS BIOLOGICAL SIGNIFICANCE DETERMINED WHEN ASSESSING POSSIBLE IMPACTS OF ONSHORE WIND POWER FACILITIES?**

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**RESOLVE**
**1255 Twenty-third St., NW, Suite 275**
**Washington DC 20015**

***Draft Meeting Summary***

## Welcome , Introductions and Background

Abby Arnold of RESOLVE, meeting facilitator, welcomed participants to the meeting. Participants introduced themselves (see Attachment 1 for list of attendees).

Dick Anderson of the California Energy Commission and National Wind Coordinating Committee (NWCC) Wildlife Workgroup Chair, provided a history of the development of the Wildlife Workgroup and outlined its current activities (see Attachment 2). The National Wind Coordinating Committee (NWCC), a U.S. consensus-based collaborative formed in 1994, identifies issues that affect the use of wind power, establishes dialogue among key stakeholders, and catalyzes activities to support the development of environmentally, economically, and politically sustainable commercial markets for wind power. NWCC members include representatives from a broad spectrum of interests. All NWCC business, including meetings and topic specific workshops, white papers, member listings, and other wind related events are available on the NWCC web site, *www.nationalwind.org*.

Since 1994, the NWCC Wildlife Workgroup, formerly referred to as the Avian Subcommittee has been a forum to define, discuss, and address wind-avian interaction issues, involving all stakeholders and focusing on public policy questions. The Workgroup serves as an advisory group for national research on wind-avian issues. The NWCC has facilitated four National Avian-Wind Power Planning Workshops to define needed research and explore current issues. The workgroup reviews wildlife/biological resources issues, such as avian and bat mortality, effects of habitat fragmentation, and state and national guidelines that regulate these areas.

Recently questions were raised about how to determine the biological significance of a bird kills caused by wind turbines. Mr. Anderson clarified that biological significance has legal and scientific definitions, but that this meeting's focus is on the biological questions.

Ms. Arnold then reviewed the groundrules and agenda for the meeting, emphasizing that the primary purpose of the meeting was to have an opportunity to exchange information and engage in dialogue. She noted that the NWCC has focused on onshore issues

because as offshore development has only recently been considered in the U.S, there is not enough information for analysis.

**Why Talk About Biological Significance?**

*Government Jurisdiction*
Al Manville, U.S. Fish and Wildlife Service (USFWS), outlined how federal regulations relate to biological significance (see Attachment 3). Mr. Manville noted that while USFWS supports wind energy, there is concern about possible impacts on target species. The Division of Migratory Bird Management does not have a standard definition of biological significance, USFWS has issued voluntary guidance and policy to encourage industry to implement measures to conserve target species. Mr. Manville proposed a definition of biological significance (suggested by Dr. Dale Strickland, WEST, Inc.), *a biologically significant outcome "must have a measurable impact on the population and/or its habitat which could reasonably be expected to affect a population's finite rate of increase (lambda) or its stability, and as a result influence a population's viability."* Mr. Manville suggested that the USFWS focuses on the risks to population and issues of population decline. Risk factors for birds include both natural mortality and anthropocentric impacts. Estimates on human-induced mortality in birds range from 300 million to over 1 billion birds killed a year. These combined and cumulative impacts present a key concern for USFWS. About 26% of the migratory bird population is considered to be in trouble, which highlights for Mr. Manville the need to do everything possible to reduce mortality trends.

Mr. Manville outlined how the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA) address biological significance. Of these statutes, NEPA comes closest to defining biological significance, but applies only where a project involves federal funding or is on federal lands. If an environmental impact statement (EIS) is required under NEPA, the cumulative impacts, context, and intensity of impact must be examined. Mr. Manville recommended that developers contact their local USFWS Ecological Field Office when considering sites to get more information on species in the area. Mr. Manville concluded with a reminder that the USFWS voluntary guidance is the best attempt at minimizing biological impacts at this time and encouraged industry to use and review the guidance.

In response to questions, Mr. Manville clarified that a more direct nexus exists with the electric utility industry and that enables prosecution to reduce impacts. Also, in reference to the focus of the USFWS, Mr. Manville responded that it focuses on sources of mortality where actions can make a difference, such as keeping mortality levels from wind turbines as low as possible. He also noted that the USFWS lacks good population information on about one-third of the species it manages, which is a separate group from the 223 species in trouble. After the meeting he will attempt to identify more information on how biological significance is considered under section 10 and how degradation and permits under the MBTA could address biological significance.

*The Wildlife Community*

Gerald Winegrad, American Bird Conservancy (ABC), described which species ABC is concerned about due to risks from wind power development (see Attachment 4). He stated that the conservation community faces a dilemma in advocating for alternative energy sources that help protect the environment while also being concerned about risks to wildlife presented by the sources. ABC fully supports the development of wind energy in the U.S., but emphasizes that before construction of new wind energy projects, thorough site analysis should be conducted and lighting be designed to prevent and minimize avian impacts. Mr. Winegrad summarized risks to birds from sources such as global warming, coal mining, and communication towers. For example 90% of the species killed at communication towers are neo-tropical migrants, and many are on the USFWS Species of Management Concern List. ABC is concerned that wind towers might pose a similar threat. When developing projects, biologically significant risks should be avoided by looking at alternatives: using a different type of tower, developing in a different location, not developing at all, or mitigating risk of impacts.

Mr. Winegrad noted that the wind industry has collected more data and conducted more monitoring of avian effects than the communications industry. The studies show that wind energy development may affect birds through mortality from collisions with turbine structures, avoidance of the turbines and surrounding habitat, or impacts from the footprint of the development. ABC has several concerns about these effects, including ESA listed species, cumulative impacts, and subspecies and specific populations that may be threatened. Mr. Winegrad listed the species of concern killed at wind turbines and fatalities at specific sites (details are in the presentation). He encouraged elements of USFWS guidelines for communication towers to be applied to wind turbines to eliminate mortalities, particularly using minimal white lighting and eliminating use of guy wires. Wind turbines also have habitat impacts, which are addressed in the USFWS 2003 Interim Voluntary Wind Turbine Siting Guidance. He stated that according to the MBTA every taking of a migratory bird is a technical violation and thus each source of human-caused avian mortality needs to be addressed. In conclusion, Mr. Winegrad stressed that preventing or minimizing avian impacts at each wind energy project is essential to prevent impacts on species, whether "biologically significant" effects may occur or not.

A participant inquired about ABC's level of optimism regarding FAA modifying light requirements for structures. Mr. Winegard replied that he is not very optimistic and that lawsuits have not resulted in any changes to the requirements. In response to a question about formulas for determining offsets, Mr. Winegard stated that the goal should be to prevent avian mortality with a pragmatic approach.

*The Wind Industry*

Tom Gray, American Wind Energy Association, provided an industry perspective on considering biological significance (see Attachment 5). He described the wind industry's record with the NWCC, study of wind turbine technology and siting, and consideration of biological significance issues. He stated that wind developers need to know more about

biological significance in order to make better use of available avian studies. Research determining biological significance by looking at effects on: population, habitats, or cumulative impacts are complex and the baseline data for many species does not exist. The extensive study required presents an excessive or inappropriate burden for the developer if required for each site. Given the variety of factors that may contribute to species decline, an important question for consideration is, what is the appropriate burden for new wind development? Wind developers also need to know more about what is considered biologically significant in order to inform and discuss effects of proposed wind projects with the public and state and local officials to assess potential regulation. Regulatory judgments involve some consideration of biological significance, but developers are unclear about the basis of these judgments. Some combination of common sense and population/impact analyses offer the best hope from the developer's perspective.

Participants offered the following comments on this topic:

- Population decline is biologically significant and has multiple causes. Industry should attempt to estimate or measure the impact and work with the regulatory community to replace birds lost. Section 3005 of the California fish and game code is one model that attempts to minimize takings of birds.
- Concern exists that much of the available funds goes to a small percentage of bird species. Industry has provided millions in funding, but additional money is needed for non-game species to support research on habitat disruption and avoidance.
- If the burden on industry is excessive, what other groups should the burden costs? Responses from participants included that single companies are not responsible for rigorous assessments in other industries, but that site assessments, knowledge of bird species, footprint, and the conditions in the area should be determined.
- Options suggested include: national efforts for standardizing these measures could be implemented with congressional appropriations and voluntary partnerships with industry to evaluate sites before selection. It was noted that the Bureau of Land Management is developing regulations for siting turbines on federal property.
- One participant voiced concern that they did not think that industry would back off if it found a troubled species at a site. Another participant replied that industry has avoided development at a site because of wildlife issues.
- Industry wants to better understand the rules, including for which actions they will be fined. If it is difficult for industry to back off a development investment, what are the mitigation opportunities?
- A federal agency representative clarified that industry is encouraged to use the USFWS guidance to the best of its ability and to minimize impacts through cooperation.

Ms. Arnold informed participants that ABC, AWEA and other groups are planning a spring meeting on avian and wind energy issues, looking at a variety of topics including climate change, behavioral modification, and fatalities. Contact Gerald Winegrad, Tom Gray or Abby Arnold for more information.

**What is Biological Significance?**

Doug Johnson, U.S. Geological Survey, presented information on the factors in studying biological significance (see Attachment 6 for this presentation). He first emphasized that statistical significance is different than biological significance. Statistical significance involves the probability of getting certain results given that some null hypothesis is true. Biological significance involves factors that influence the "value" from a population perspective rather than individual perspective. Specific factors influencing whether an impact has biological significance include sex and age of the animals, time of year when the impact occurs, whether the population is at or below carrying capacity, rarity of the species, and genetic uniqueness of the individuals. If impacts do occur, most populations can recover from losses through compensation, that is, density-dependent changes in survival or reproduction. Assessing either the individual or the cumulative consequences of intrusions such as roads, powerlines, buildings, and wind farms that may have biologically significant impact is challenging, however.

Bill Kendall, U.S. Geological Survey, described how biological significance can be applied in resource management decisions (see Attachment 7 for this presentation). Wind power development has both direct effects on population balance, such as bird strikes, and indirect effects, including habitat alteration. Dr. Kendall shared examples of approaches and models used in resource management to understand population effects. One management framework for protecting populations is adaptive resource management, which is used for waterfowl harvest management. This approach, which involves gathering extensive information through surveys and banding, allows agencies to identify the boundaries of uncertainty about the species. Biological significance is evaluated in light of set management goals developed by the responsible agency.

A second management scenario addresses the incidental “taking” of Florida manatees, an endangered species. The model used in this case reflects environmental variation over time. Different scenarios were modeled, some optimistic and some pessimistic with regard to survival. Uncertainty exists, however, in some life-history parameters and processes such as density dependence. Models such as these can be used to simulate population change and evaluate survival rates compared to agency goals. Dr. Kendall reviewed numerous studies that evaluate population impact and/or biological significance, including various comparative analysis and population studies. Dr. Kendall noted that the population study of the Golden Eagle (Hunt et. Al., NREL 1998, Shenk et al.., 1996) is a model population study. In conclusion, Dr. Kendall stated that biological significance is ultimately in the eye of the beholder, depending on management objectives and other factors, and added that detecting population effects for migratory birds is very difficult.

In response to questions from participants, Dr. Kendall offered the following comments:

- If a crash in local populations occurs, waterfowl biologists will attribute this to population flux and expect a rebound the following year. However, for species in decline or of concern, a separate process exists for managing these populations.

- For species where less is known about mortality and non-fatal effects, biological significance could be defined as a decline in population below the objectives set by the management plan. Having information on species strengthens inferences used in evaluating wind impacts.
- Wind power contributions to mortality have been included in model simulations the impacts of wind power are looked at as marginal, given all other factors. If it does cause a problem in a certain model, managers could examine how to lighten pressures on the population.
- Limits for declining species are set through a formal adaptive management framework, which simulates effects of regulations based on historic impacts and projects the impact on population. If the projected decline is too large, then adjustments are made.
- Biological impact is seen through the stakeholder's view of the value of the species.
- In response to comments that this approach cannot be used for wind because it involves hundreds of species for which much information is needed and the resources are not available to set limits for species, Mr. Kendall noted that adaptive management could be an appropriate paradigm to set management objectives, but these are difficult to set for non-game animals.

One participant requested that participants engage in a good faith conversation about the purpose of examining biological significance, whether it will be used to establish management objectives that will keep bird populations at a certain level, just mitigate the effects of wind energy, or another objective. Another participant commented that although population loss for waterfowl can be corrected through management to reduce kills, studies can be also done on ways to reduce kill associated with wind power through equipment and techniques alterations along with habitat improvement.

**Discussion: What Have We Learned and Can It Be Applied?**

Ms. Arnold reminded participants that the purpose of the meeting is to define biological significance, and apparently there are a variety of definitions based on what values/perspectives individuals have. The Wildlife Workgroup could take a variety of actions from this meeting, such as drafting a whitepaper, summarizing what was learned, or supporting a pilot project on a specific idea.

Participants offered a variety of comments and concerns on the topic of biological significance:

*Considerations for Defining Biological Significance*

Subjectivity of the Definition

- Biological significance definitions are usually conceptual and involve subjective analysis.
- Stakeholders have different objectives that need to be on the table (e.g., manage species to specific population level, avoid any avian mortality) and will need to make choices about relative levels of avian impacts for different activities.

- Who defines biological significance is important. It should not be framed by the concerns for a single bird or by a local population.

What is Biological Significance?

- A biologically significant effect is an effect that could result in an influence on population viability.
- From an ecological perspective, mortality should be reduced as much as possible to keep it at a very low level for wind.
- Stakeholders ultimately need to decide if avoidance or minimization is enough and develop a common understanding of how much is enough.

Scope

- The definition should include a statement that defining biological significance for a population may require examination of the region and habitat for a specific species.
- Biological significance is most useful at a site specific and regional scale.
- Regulators need to adopt a broad definition in general and narrow the definition for species types.
- Avoid a strict definition of biological significance so that views of all stakeholders can be reflected.
- Frame the definition around individual birds killed, because there is no data on the risk being significant at the population level except for a narrow group of populations.

How the Definition Could be Used

- Biological significance should be used as a tool for assessment of significant impact at a site that involves criteria and is used in permitting processes.
- Use defined criteria for biological significance to evaluate potential sites as to the likelihood of resulting in major impacts as compared to other sites (i.e., avoid areas where important populations of birds migrate, are used as pathways, or are close to threatened species and suitable habitat).
- Questions to ask in assessment include: Significant to what? Within what geographic area? Over what timeframe?
- The management objective/end goal for the use of biological significance is unclear.
- Regulators have the responsibility to provide guidance to industry.
- Decision makers should derive parameters for avoidance and minimization using criteria.
- Wind energy development in California is proceeding without adverse impacts, which could provide a model for applying information in making decisions.

Accepting Uncertainty in the Definition

- The definition needs to include a statement about accepting uncertainty.
- Precise population estimates are not required to assess whether an impact is significant.

- Deal with uncertainty in supporting decisions through transparent risk assessment methods and procedures that document where uncertainly lies and how decision makers deal with these factors.

*Concerns with Defining Biological Significance Applied to Development of Wind Power*

Need To Look At Broader Impacts

- Significant impacts are broader than biological significance and can be addressed through mitigation, avoidance, or decisions not to build.
- Regulations should focus on how to minimize effects of wind turbines, not define what are significant effects are, because it will be obvious if there is a rare large affect from a turbine.
- Any increased cumulative "take" is biologically significant, which could lead to termination of projects. Need to look at other factors beyond the biological significance of an entire population.
- Identifying only significant impacts and minimization actions ignores cumulative impacts.
- We need to identify all significant factors that affect bird populations to understand biological significance; cannot look at wind power alone.
- Some local jurisdictions, without understanding of cumulative impacts, have the permit authority for wind facilities.

Population Definition

Data Gaps

- Lack of information on factors of biological significance, including cumulative impacts, exists.
- Facilities should be designed to help collect data post-construction.
- Research money is directed to top four or five species (all raptors) leaving limited resources for other species.
- Long-term science and monitoring is needed.
- Population dynamic studies are needed.
- *Partners in Flight* has information available on its website on population targets for species of risk and concern by biological conservation region.
- Over the long term, the field needs a good knowledge management system that will be included in policy and strategy development and allow companies to consider ecological impact to maintain a sustainable industry.

Measurement Challenges

- Can we even measure biological significance?
- How necessary is it to quantify impacts?
- Biological significance is synonymous with population viability, but this involves having to determine too many input values (e.g., timeframe, measurements, population, habitat, population stability).
- Biological significance can only be measured after development is in place, which then makes the issue moot.

- If biological significance could be defined and measured, individual projects would rarely be determined to be biologically significant.
- How will population be defined and will historic or current population targets be used?

**Summary of Discussion and Next Steps**

Ms. Arnold summarized the key points raised in the discussion of defining biological significance:

- Views of biological significance are subjective.
- Biological significant impacts are difficult to determine.
- Defining and developing data for biological significance is challenging.
- Questions exist about what a definition will offer for various interest groups.
- Biological significance criteria can be used when choosing a site, but much of the data are not available.
- Concerns exist about addressing cumulative impacts, but this has not been thoroughly discussed.

Ms. Arnold closed the meeting by thanking participants and reminding them of the meeting of the Wildlife Workgroup convening the following day.