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Ms. Sue Oliver
Oregon Department of Energy
395 E. Highland Avenue
Hermiston, OR 97838

Dear Ms. Oliver:

Please find contained herein my written testimony, for entry into the public record, regarding the application by Horizon Wind Energy Inc. to develop the Antelope Ridge Wind Farm, in Union County, Oregon. Based on my review of the application, Oregon Administrative Rules (OARs), and relevant science findings, I have concluded that the Oregon Department of Energy (ODOE) must recommend to the Energy Facility Siting Council (EFSC, "the Council") that the submitted application be categorically denied. I want to further stress in particular the words "must" and "categorically" in the previous sentence, as I see no means by which any other recommendation by ODOE to the EFSC could be considered other than arbitrary, capricious, and contrary to applicable law and policy. More specifically, the application categorically fails ODOE Standards of Review that are grounded in specific Oregon Administrative Rules (OARs) concerned with protected resources. Furthermore, the application contains substantial technical errors. These errors variously involve omission, de-emphasis, and/or mis-interpretation of well-established (i.e., peer-reviewed) scientific knowledge that is directly relevant to understanding the project's likely adverse impacts. These errors collectively contribute ambiguity and bias to the application's representation of adverse impacts, thereby preventing the ODOE and EFSC from understanding the full significance of the project's likely adverse impacts. The application fails to demonstrate, by preponderance of evidence, any likelihood that the proposed project's benefits can realistically be expected to outweigh its adverse impacts to protected public resources, or that mitigations it proposes are likely to succeed. Finally, the application disregards specific technical recommendations, which if followed by the applicant could have helped the project avoid adverse impacts to federally protected resources. As a result of that disregard, the proposed project, if approved by EFSC, could only be expected to operate in violation of federal law.

To facilitate your consideration, this written testimony is divided into three sections: I. an overview of relevant OARs and standards of review, II. description of the application's specific failures to satisfy those OARs and standards, and III. summary of the relevance of those failures, in aggregate, to the issuance of a site certificate.

Section I - OARs and Standards of Review Relevant to Protected Public Resources.

Oregon Administrative Rules (OARs) mandate that specific impacts to protected resources must be evaluated:

The ODOE's General Standard of Review (OAR 345-022-0000) requires that in order to issue a site certificate "...the Council shall determine that the preponderance of evidence on the record supports the following conclusions: (a) The facility complies with ...ORS 469.300 to 469.570 and 469.590 to 469.619, and the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards...in section (2); (b) Except as provided in OAR 345-022-0030 and except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility. If the Council finds that applicable Oregon statutes and rules, other than those involving federally delegated programs, would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the Council cannot waive any applicable state statute.". Furthermore, section (2) states that "The Council may issue or amend a site certificate for a facility that does not meet ...standards...under ORS 469.501 if the Council determines that the overall public benefits of the facility outweigh the damage to the resources protected by the standards...", but "...The Council shall make this balancing determination only when the applicant has shown that the proposed facility cannot meet the Council standards or has shown, to the satisfaction of the Council, that there is no reasonable way to meet the...standards through mitigation or avoidance of the damage to protected resources. The applicant has the burden to show that the overall public benefits outweigh the damage to the resources... The Council shall weigh overall public benefits and damage to the resources as follows: (a) The Council shall evaluate the damage to the resources by considering factors including, but not limited to, the following: (A) The uniqueness and significance of the resource that would be affected; (B) The degree to which current or future development may damage the resource, if the proposed facility is not built;..(E) Evidence that the benefits are likely to occur only if the proposed facility is built;". And, "...(3) Notwithstanding section (2) ...the Council shall not apply the balancing determination to the following standards:...(b) The land use standard described in OAR 345-022-0030;...or (f) The protected areas standard described in OAR 345-022-0040, if the statutes or administrative rules governing the management of the protected area prohibit location of the proposed facility in that area." And, finally, "...(4) In making determinations regarding compliance with statutes, rules and ordinances normally administered by other agencies or compliance with requirements of the Council statutes if other agencies have special expertise, the Department of Energy shall consult with such other agencies during the notice of intent, site certificate application and site certificate amendment processes. Nothing in these rules is intended to interfere with the state's implementation of programs delegated to it by the federal government.". (emphasis added).

The ODOE's specific standard for protected areas (OAR 345-022-0040) states that "(1) Except as provided in sections (2) and (3), the Council shall not issue a site certificate for a proposed facility located in the areas listed below. To issue a site certificate for a proposed facility located outside the areas listed below, the Council must find that, taking into account mitigation, the design, construction and operation of the facility are not likely to result in significant adverse impact to,...(d) National and state wildlife refuges...(h) State parks and waysides...(i) State natural heritage areas...(L) Experimental areas established by the Rangeland Resources Program, College of Agriculture, Oregon State University:... the Union site; (m) Agricultural experimental stations established by the College of Agriculture, Oregon State University, including but not limited to:...East Oregon Agriculture Research Center, Union...(p) State wildlife areas and management areas identified in OAR chapter 635, division 8.." (emphasis added)

The ODOE's specific standard for scenic resources (OAR 345-022-0080) states that "(1)...to issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic resources and values identified as significant or important in local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area described in the project order. (2) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions..." (emphasis added)

Section II - Description of the Application's Specific Failures.

The Application fails to meet mandatory Standards through the following errors:

A. The application fails to inform the ODOE and the EFSC that the proposed project's impact area (defined here as the total land area over which project impacts can be expected) lies within lands that have been categorized as either "High Sensitive" or "Sensitive" by the Western Governors Wildlife Council.¹

(1) In 2007 the Western Governor's Association (WGA) unanimously approved policy resolution 07-01, "*Protecting Wildlife Migration Corridors and Crucial Wildlife Habitat in the West*", and launched the WGA Wildlife Corridors Initiative. In 2008, in order to coordinate and manage the implementation of the WGA Wildlife Corridors Initiative, The Western Governors established the Western Wildlife Habitat Council

¹ See Western Governors' Association, June 29, 2008, Jackson, Wyoming. <http://www.westgov.org/wga/publicat/wildlife08.pdf>, and link to 'WREZ09[1].pdf' at http://www.westgov.org/index.php?option=com_content&view=article&id=129&Itemid=57. The WGA's working groups have been variously populated by representatives of the following Oregon administrative agencies (including but not limited to): Oregon Department of Energy (Energy Working Group, Robin Straughan), Oregon Department of Land Conservation and Development (Land Use Working Group, Amanda Punton), and Oregon Department of Fish and Wildlife (Land Use Working Group, Patty Snow).

(WWHC).² Among other things, the WWHC's priorities included fostering a "Decision Support System" defining key wildlife corridors and crucial wildlife habitats, and to "...Make the WGA Western Renewable Energy Zone Project (REZ) a model for applying the Wildlife Corridors Initiative, and to consider policies and actions to avoid, minimize, and mitigate impacts in these sensitive areas..." (emphasis added). Among other things the report recognized that increased energy efficiency and use of distributed generation (e.g., rooftop solar) can reduce the need to add new generation sources and thereby to reduce their negative impacts. In 2009, the WGA chartered the Western Governors Wildlife Council (WGWC) with the explicit mission to "...identify key wildlife corridors and crucial habitats in the west and to coordinate implementation of needed policy options and tools for conservation of those landscapes."³ (emphasis added). The governors tasked the WGWC with providing wildlife sensitivity information for the Western Renewable Energy Zones project. The WGWC's products include wildlife data, categorization criteria, and a final report summarizing data collection and mapping processes.⁴ Included in the products are categorizations that include "High Sensitive" areas that delineate wildlife corridors and/or habitats which are "...crucial to wildlife conservation that are irreplaceable and where mitigation may not be feasible or effective." (emphasis added), and "Sensitive" areas that delineate those "...where development would likely pose a significant risk to wildlife values."⁵ (emphasis added).

(2) The WGWC's report was in draft form in April, 2009, and it was finalized on June 30, 2009. Since that time, the WGWC's report (including its maps) have been made readily available to energy companies and to the public on the Western Governors website⁶, and the WGA passed its Policy Resolution 10-10, in which "The Governors encourage the widespread use of these systems as they are developed..." (emphasis added).⁷

(3) The relevance of WGWC products and WGA resolutions to Antelope Ridge, specifically, is that WGWC's maps (in the 2009 report and on the WGA website) delineate several "High Sensitive" and "Sensitive" areas in Oregon, and some of these overlap Horizon Wind Energy's proposed Antelope Ridge project area. Indeed, the WGWC's State-approved map for Oregon shows that most if not all of the Antelope Ridge project area is categorized as either "High Sensitive" or as "Sensitive". However, the application does not inform the ODOE and EFSC of the proposed project site's categorization by WGWC (and by WGA), and it certainly does not make any attempt to specifically address the relevance of Horizon's proposed mitigations in light of these categorizations specifically. This omission of crucial information from the application

² Documented in the 2008 Wildlife Corridors Initiative Report 'wildlife08.pdf', at <http://www.westgov.org/wildlife>

³ Oregon's representative on the WGWC is Holly Michael, Conservation Policy Coordinator, Office of the Director, Department of Fish and Wildlife.

⁴ See 'WGA_WREZ_NatureServ_report_FINAL_20090630[1].pdf', referenced at www.westgov.org/wildlife, under the heading "Western Renewable Energy Zones -- State-approved Wildlife Maps.

⁵ See Western Governors' Association <http://www.westgov.org/wga/publicat/wildlife08.pdf>

⁶ See 'Western Renewable Energy Zones' at <http://www.westgov.org/wildlife>

⁷ See 'WGA Resolutions' at <http://www.westgov.org/wildlife>

should be troubling to the ODOE in light of the fact that it is the burden of the applicant to demonstrate that its project benefits outweigh its adverse impacts. If an applicant is unwilling to even inform the ODOE and the EFSC of all relevant habitat categories within a proposed project area, then it seems unreasonable to expect that ODOE and the EFSC can place any confidence in that applicant's mitigation measures. Surely, if an application does not straightforwardly address a specific, relevant, categorization (indeed, one for which special attention has been recommended by the Governor's Office), then there can be no basis for the EFSC to conclude that the applicant has not also omitted other relevant information as well. Given that products of the WGWC and specific recommendations of the WGA must have been known to the applicant, one may conclude that the applicant withheld crucial information from the ODOE and the EFSC. It is also important to note that such information most certainly could have been used by the EFSC to either recommend denial or to condition a site certificate, and thus, such withholding of information was prejudicial (leading to premature or unwarranted conclusion by the EFSC). On the other hand, if one chooses to assume that the applicant did not know of the WGWC products or of the WGA's recommendations (no matter how unrealistic such an assumption would seem), then, one could only question the applicant's competence (if not the applicant's attention to good-faith disclosure on behalf of the public good). In either case, the application's failure to disclose this information, and its failure to deal with the information straightforwardly for the EFSC, provides a sufficient reason for the ODOE to recommend to the EFSC that this application, by this applicant, be denied categorically.

(4) Furthermore, while WGA recommendations are non-binding to applicants (conformance by an applicant such as Horizon Wind Energy is not categorically mandatory even though it is desirable for the public good), those WGA recommendations nevertheless may be considered mandatory for any public agency that is subordinate to a Governor's Office that approved WGA Resolution 10-10. The issuance of a site certificate for any energy project that inadequately addresses "High Sensitive" and/or "Sensitive" areas could only be considered an arbitrary and capricious act (if not an insubordinate act as well). The applicant must show, with a preponderance of evidence, that specific issues contributing to any project area's categorization as "High Sensitive" and/or "Sensitive" have been specifically addressed, and the applicant must show that any impacts are likely to be mitigated successfully. Given that these categorizations explicitly demonstrate high public concern, the standards for review of any project that involves such resources must reflect the importance of those resources and the ultimate severity any adverse impacts. The ODOE's General Standard of Review is very explicit in mandating that "The applicant has the burden to show that the overall public benefits outweigh the damage to the resources..." Horizon Wind Energy's application categorically fails this Standard by not addressing specifically the likelihood that its mitigations will indeed succeed despite the WGA's opinion (and that of the Oregon Governor's office) that development in the Antelope Ridge area is likely to pose significant risk (Sensitive) and that mitigation may not be either feasible or successful (High Sensitive) over much of the proposed project's impact area. Therefore, Horizon Wind Energy's application for a site certificate at Antelope Ridge must be denied.

B. The application fails to meet standards for evaluating adverse impacts to an Oregon Protected Area: Ladd Marsh Wildlife Area.

(1) It is notable that OAR chapter 635 division 8 specifically identifies the Ladd Marsh Wildlife Area (LMWA) as relevant to the ODOE's Standard for Protected Areas (see OAR 635-008-0120). Furthermore, the ODOE's publication entitled "Council Standards" states (at page 3) that *"The applicant must address direct impacts as well as downstream impacts such as air and water quality."* In that passage, the term "downstream" must be interpreted to include "indirect", and the phrase "such as air and water quality" must be interpreted to include public fish and wildlife. (emphasis added)

(2) The Ladd Marsh Wildlife Area is both highly significant and unique. It is the largest remnant wetland complex in northeastern Oregon and it is crucial to restoration and mitigation of lost habitats for many species of wildlife. Ladd Marsh was purchased and designated in 1949 after extensive drainage of Tule Lake had reduced that wetland complex from roughly 20,000 acres to a mere 400 acres. Ladd Marsh was purchased and established to support flyway management goals for North American waterbirds, including waterfowl and shorebirds. Since then, the Ladd Marsh remnant has comprised a hub for restoration and mitigation of lost habitats, not only for habitats lost in the Grande Ronde Basin but for mitigation of other habitats lost in the greater Columbia River Basin, and the LMWA's goals and objectives have been expanded to address upland wildlife and habitats as well as wetland species.⁸ Ladd Marsh is itself a federal mitigation area with goals and objectives that are both consistent with and underwritten by obligations established under the Northwest Electric Power Planning and Conservation Act of 1980 (NWEPPCA) for the Northwest Power and Conservation Council (NWPPCC).⁹ Goals and objectives of the Ladd Marsh Wildlife Area include protection, restoration, and management of wetland and upland habitats and to provide a wide variety of recreational and educational opportunities. The LMWA consists of roughly 6,000 acres including "key habitats" defined in the Oregon Conservation Strategy, and it provides habitat for at least 284 species of wildlife. Up to 700 elk winter on the wildlife area, and roughly half of those animals originate from Craig Mountain. Ladd Marsh Wildlife Area contributes roughly \$400,000 annually to the local economy. Ladd Marsh projects (implemented and planned) implicate several agencies, tribes, and private-sector cooperators, and 75% of the Wildlife Area's operation are funded entirely from federal sources.¹⁰ The proposed Antelope Ridge project would involve lands immediately west and south of Ladd Marsh, and in such close proximity to the Wildlife Area that impacts must be reasonably expected to occur. OARs mandate (make mandatory) evaluation of all those impacts, including those that are indirect as well as those that are direct.

⁸ Oregon Department of Fish and Wildlife. 2008. Ladd Marsh Wildlife Area Management Plan. ODFW, 3406 Cherry Ave. NE., Salem, OR, USA.

⁹ see NWEPPCA, Section 4(H)(1)(A). Current federal mitigation programs at Ladd Marsh can be reviewed at the NWPPCC website (<http://www.nwcouncil.org>). See archives for past projects.

¹⁰ Federal Aid and Wildlife Restoration Act (aka, the Pittman-Robertson Act). 75% of funds from federal sources, and 25% from hunting license receipts.

(3) Several specific actions and processes are required to enable ODOE and EFSC to evaluate the likelihood of significant adverse impacts to the Ladd Marsh protected area. From standards cited above it is clear that the EFSC must be able to specifically determine that the proposed project is not likely to have any significant adverse impact on the Protected Wildlife Area. Furthermore, impacts that must be evaluated include indirect (i.e., "downstream") as well as direct impacts on the Wildlife Area's ability to meet its various goals and objectives. Clearly, the applicant has the burden to show that the project's benefits will outweigh any damages to any part or program of the Wildlife Area that may be affected, -- not merely areas within an arbitrary or restricted "site boundary" or "analysis area" that may be defined to the applicant's benefit. Indeed, given the specific status of Ladd Marsh under Oregon's OARs, the "analysis area" for any proposed energy project within its proximity must consider the entire Wildlife Area and all of the wildlife area's resources, programs, goals and objectives. The burden of doing so is upon the applicant, and it is the ODOE's responsibility to ensure that the rigor of the applicant's analysis is commensurate with the value of the protected resources that may be impacted. Furthermore, the Standards provide reasonable expectation that the content of any impact analysis will respond to consultations with any/all other agencies having "special expertise" regarding the Protected Area, its resources, programs, goals and/or objectives. All programs, objectives, and goals relevant to the Wildlife Area's wildlife, habitats, scenic values, and recreational values are clearly "protected resources" that are subject to the applicant's analysis and to the responsibilities of ODOE and to those of the Council, respectively. Given that Ladd Marsh is a federal mitigation area, it is also reasonable to expect that, at minimum, federal agencies must be consulted with specifically (e.g., National Marine Fisheries Service, U.S. Fish and Wildlife Service) as well as with relevant state agencies (e.g., Oregon Department of Fish and Wildlife) and any other relevant entities that may have special expertise regarding the Wildlife Areas goals, objectives, or programs (e.g., Private-sector agencies, Nongovernmental Organizations, and/or Tribal governments). Given that certain Protected Area programs are delegated to the Oregon Department of Fish and Wildlife (ODFW) by the federal government, it is also reasonable to conclude (from the Standards) that ODOE's recommendations and EFSC's determination of impacts cannot in any way result in interference to ODFW's execution of its federally-delegated programs, unless the federal government specifically concurs with that determination (what ever it may be).

(4) Based on the ODOE's Standards of Review, it is logical to conclude that for any analysis of impacts to be considered adequate it must contain certain types of information that include but are not necessarily limited to: (a) demonstration that the project's defined analysis area is adequate to address all concerns and/or issues relevant to the Protected Area, its goals, objectives, and programs; (b) estimation of passage rates by wildlife through the proposed project's analysis area to/from the Wildlife Area, purposes and times spent in the project's area by those wildlife, and estimation of wildlife mortality rates from collisions with turbines, power lines, substations and any other relevant developments; (c) estimation of probable displacement of wildlife from the project area onto the Wildlife Area, and (d) description of implications of any project-induced mortalities and displacements to the Wildlife Area for its programs, goals, and objectives.

Furthermore, based on the ODOE Standards it is clear that evaluation of "downstream" impacts to the Wildlife Area must include at minimum (i) a visual impact study evaluating explicit visual impacts of all specifically identified turbines, transmission lines, roads, substations, and related developments within the Wildlife Area's viewshed, and (ii) a noise impact study specifically addressing the extent and influence of noise pollution from the project onto the Wildlife Area from all specifically identified project facilities, and (iii) specific conclusions and recommendations for addressing the impact of visual and noise impacts to the Wildlife Area's ability to meet its publicly mandated goals and objectives. For example, the ODOE publication entitled "Council Standards" states (at page 4) that under the standard for recreation (OAR 345-022-0100), "*...the Council must decide whether construction or operation of the proposed facility would adversely affect recreational opportunities at the site or in the surrounding area. The applicant must identify the recreational opportunities and describe the potential impact of the facility...if...significant impact is likely, the Council may impose...conditions to avoid or reduce the impact...*" (emphasis added). It is hard to imagine how the extent of impacts to either quantity or quality of recreational opportunities at Ladd Marsh could be determined by the Council in the absence of a statistically valid study of opinions held by recreationists regarding the proposed facility, and furthermore, such a study would necessarily involve showing survey participants exactly what the facility could be expected to look like (and sound like) from all parts of the Wildlife Area. Given the "protected" status of the Ladd Marsh Wildlife Area and its status as a federal mitigation area, the applicant's analysis of visual, noise, and recreational impacts must incorporate an analysis area of sufficient size to address all Wildlife Area concerns that are relevant to the OARs. And, furthermore, given the explicit status of the Wildlife Area as "Protected" the impact analysis itself must demonstrate basic principals of sampling design and their implications for the possibility that the Council could make erroneous conclusions based on the applicant's analysis (specifically, Type I and Type II error probabilities).^{11,12}

(5) The "Antelope Ridge Wind Farm -Final ASC Exhibit P" fails all standards described in paragraphs above. Furthermore, the document's failure is virtually categorical. The document contains no analysis that can be used by ODOE and/or the Council to "determine" that the facility is unlikely to have any significant negative impact on the Ladd Marsh Wildlife Area, and indeed, the application seems to avoid analyses that could have provided ODOE and the EFSC with an articulate understanding of the fullness of those potential impacts. For example, omissions of crucial information include but are not necessarily limited to: (a) the application contains no articulate description of wildlife movements, habitat use, specific mortality rates, or likely displacements of wildlife and their implications to the adjacent Wildlife Area; (b) it contains no final description of where individual turbines would be sited specifically, their individual heights, or extents to which those turbines would impact the Wildlife Area's viewshed, and (c) the "analysis area" defined in the application does not even

¹¹ Hurlbert, S.H. 1984. Pseudoreplication and the design of ecological field experiments. Ecological Monographs 54:187-211.

¹² Eberhardt, L.L., and J.M. Thomas. 1991. Designing environmental field studies. Ecological Monographs 61:53-73.

include all of the Wildlife Area. The last of those omissions could be particularly relevant to The Council's ability to evaluate visual impacts, given that any turbines near the top of Craig Mountain, regardless of their heights, could only become more visible moving toward the northern end of the Wildlife Area (which the applicant did not include in the "analysis area"). By not including the northern extreme of the Wildlife Area, and by not specifically describing turbine locations, heights, or visual impacts, the application's lack of relevant content simply facilitates the application's apparent avoidance of visual impacts on the LMWA. This fails both the letter and intent of ODOE Standards of Review that are mandated by OARs, and it prevents the ODOE and EFSC from understanding the fullness of the proposed project's impacts. In the absence of such specific analyses, the application fails to show how the project's benefits could outweigh any of its adverse impacts. Consequently, the application prevents ODOE from making informed recommendations, and it prevents the EFSC from making informed determinations on behalf of the citizens of Oregon. Therefore, ODOE must recommend to the EFSC that the application before it be categorically denied.

C. The application's analysis of impacts to big game is both incomplete and biased.

(1) At least four species of big game occur within the project's analysis area (antelope, elk, mule deer, and white-tailed deer). Black bear, cougar, and wolves have also been documented at one time or another. The applicant's analysis of project impacts on big game mentions results of several peer-reviewed research publications that concern impacts of wind and oil/gas developments on three of those species. Nevertheless, the application's treatment of facts regarding big game is so incomplete that it can only be expected to mis-inform the EFSC's attempt to accurately determine the likely extent of adverse impacts. The application biases its description of big game habitats in the project area and it inadequately discusses the statistical veracity of research that it does cite as relevant. Furthermore, the application inadequately discusses differences in landscape contexts between cited research areas and the proposed facility, and it fails to discuss any implications that such landscape differences could have for the Council's understanding of the project's likely impacts. On balance, the analysis subtly highlights research studies that have shown little or no apparent impacts of energy development on big game regardless of the statistical veracity of those studies, while at the same time giving short shrift to significant, locally generated research that could have been used to more explicitly calculate the proposed facility's likely impacts. The following paragraphs illustrate this inadequacy and bias.

(2) The application states "*Portions of the Facility are located within areas designated by Union County as either Goal 5 Big Game Winter Range or Critical Wildlife Habitat...*" (emphasis added). The emphasis of that statement is clearly on "*Portions...the Facility...Goal 5...*". By "*...the facility...*" one can only presume that the applicant is referring to the site boundary (as depicted in Attachment P-1: Habitat Categorization) and not to the project's larger analysis area (as depicted in Figure 3 of Attachment P6, or as may have been otherwise delineated by ODFW in other documents). Indeed, it is not clear exactly what land area the applicant is actually using

as the basis for accounting various habitat categories. Furthermore, the statement emphasizes the Union County "Goal 5" but it does not list on equal footing any relevant designations by the ODFW. The use of the term "Portions..." serves to convey a notion that the designated areas may not be all that important in terms of their spatial extent. Nevertheless, among specific ODFW habitat designations, the dominant habitat category in the project area actually appears to be Category 2 (Big Game Critical Wildlife Habitat) on both the facility site and over the surrounding analysis area that would be impacted by the facility. Only eight areas within Union County are classified as Big Game Critical Wildlife Habitat. Three of those areas (North Craig Mtn., East Craig Mtn., and Catherine Creek/High Valley) are involved within a Zone of Multiple Biological Values (ZMBV) that has been designated by ODFW for this particular project area.¹³ Contrary to the applicant's statement above, "Most of the proposed project is on either big game winter range or big game critical wildlife habitat, and extremely critical to the continued welfare of the deer and elk that depend on it."¹⁴ (emphasis added). The distinction between ODFW's Category 2 and its lower habitat categories (i.e., Category 3, 4, 5, etc.) and the Union County designation of "Goal 5" is not trivial. Unlike the other habitat categories, Category 2 is defined as, "...essential...limited habitat..." for which Oregon State policy is, "...Avoidance of impacts through alternatives to the proposed development...or...Mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity...mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided..." (emphasis added). Thus the State of Oregon's wildlife agency has identified most of the project area (i.e., apparently the facility site and its analysis area, if not more land area) as being habitat that is limiting and critical to public wildlife. These facts were known to the applicant, but disregarded in the application. While these facts may not of themselves solely preclude a landowner from developing his/her private property in a way that would harm that public resource, the existence of established State policies for those critical habitats should nevertheless influence the making of any recommendation by the ODOE, and the making of any determination by the EFSC, that would result in the use of State subsidies (i.e., Oregon tax credits) to cause net loss of critical habitat quality or quantity of Oregon's public wildlife. Salient points are: (a) By continuing to focus on the county classification and de-emphasizing the state classification, and by focusing on the facility site rather than on a larger project analysis area, the applicant contributes to ambiguity regarding the project's relevance to well established public wildlife policies; (b) The EFSC should not be erroneously recommended (by ODOE) to conclude that ODFW habitat categorizations are less relevant to its determination of impacts than is the county categorization; and (c) In any event, State policy is primarily "...avoidance..." and only secondarily "...mitigation..." with respect to these particular habitats.

¹³ All of these areas occur within "High Sensitive" or "Sensitive" areas delineated for the Western Governors' Wildlife Council. Recall that "High Sensitive" areas are, among other things, defined as areas "...where mitigation may not be feasible or effective."

¹⁴ Quotation from a letter addressed to Sue Oliver, Oregon Department of Energy, from Colleen Fagan, Oregon Department of Fish and Wildlife, dated May 6, 2010. This information was clearly available to the applicant prior to submission of the application. In submitting the application, the applicant clearly disregarded the best information that could have been provided.

(3) The analysis states that there have been no studies in the United States that specifically address wind projects, and that most studies (presumably of other types of energy projects) have "...*focused on displacement of big game, but have not determined whether displacement results in any significant population level effects, such as decreased survival.*" That passage seems to imply that displacement metrics are the only metrics available to the EFSC for its determination of likely negative impacts to big game. Indeed, the rest of that section of the application is devoted to reviewing studies that were principally concerned with displacement. The application contains no articulate discussion of where displaced animals might be reasonably expected to be displaced to from Antelope Ridge, or any articulate discussion of what the biological or financial consequences of that displacement would or could be. Furthermore, the application omits reference to well known scientific literature that could have enlightened ODOE and EFSC understandings of the full range of those possible consequences. Those consequences might indeed involve "...*decreased survival...*" as eluded to in the application's text, but, even in the absence of any decreased survival, it is prudent for the EFSC to assume that any displacement of several hundred big game into less-suitable habitats would induce nutritional deficiencies, thereby reducing reproductive vigor of big game animals without necessarily influencing their survival rates.¹⁵ If reproductive vigor is reduced by displacement, then reduction in harvest opportunities for Oregon's hunters would result, with concomitant reduction in their contributions to the local recreation-based economy. Notwithstanding any previous publications or research regarding displacement of big game in other landscapes, the preponderance of site-specific evidence from the operating Elkhorn Valley facility suggests that effects of the proposed Antelope Ridge facility are likely to be substantial indeed. The average non-weighted distance displacement from Elkhorn has been approximately 2.4 km for deer and elk in aggregate, with some effects possibly extending as far as 5 km.¹⁶ That information is the best available site-specific information at this time. Furthermore, given the land ownership pattern in the lands surrounding the project area, which is dominated by private and State lands, any displacement of animals from the project will certainly result in movement of animals onto surrounding private lands or onto the adjacent Ladd Marsh Wildlife Area. Such displacement would increase costs to the ODFW, either to support intensified management at Ladd Marsh, or to support that agency's responses to damage complaints by neighboring private landowners. Such displacements can reasonably be expected to adversely affect private-land management programs. For example, the adjacent Price Cattle Company (PCC) land is under a conservation easement to the Rocky Mountain Elk Foundation (RMEF). The PCC land is 2562 acres in total, of which 640 acres (1 square mile) are in a conservation easement. The entire ranch is variously managed for the wildlife, livestock grazing and timber production. It is prudent for ODOE and the EFSC to assume that some proportion of the animals displaced from Horizon's project area would shift onto the adjacent PCC land, and it is prudent to assume

¹⁵ Cook, J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. DelCurto, L.D. Bryant, and L.L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. *Wildlife Monographs, No 155:1-61.*

¹⁶ The actual displacement is not entirely clear, but the numbers presented here were derived from pre- and post-construction data that were presented by Colleen Fagan (ODFW) to Sue Oliver (ODE) in a letter dated May 6, 2010. Use of updated data would logically yield a somewhat different number, and specific consultation with ODFW is strongly advised to ensure that "best available data" is conveyed to the Council.

that increased use of that land by displaced animals would be likely to severely impact one or more of that landowner's programs. It is reasonable to ask, then, to what extent would displacement of several hundred elk and deer onto that land impact the conduct, efficacy, or cost burden of PCC and/or RMEF management programs? Such issues were not addressed by the applicant at all, and PCC is only one example. Furthermore, the direction of any displacement from Antelope Ridge will influence the viability of particular surrounding land parcels as potential mitigation sites. The ODFW has eluded to that issue in stating that any mitigation of Category 2 habitat must be on-site or in-proximity, rather than off-site. The salient point is simply that by not discussing these issues in some specific depth the application has propagated substantial ambiguity. That ambiguity is clearly an obstacle to the EFSC's ability to understand the fullness of the proposed project's likely negative impacts to adjacent lands.

(4) The application does a reasonably good job of citing some of the pivotal studies that have made conclusions, to one extent or another, regarding likely influences of the proposed project's road- and traffic-induced disturbance to big game. However, the weight of emphasis placed on those various literature sources in the application must be a source of concern to ODOE and to the EFSC in light of the statistical veracity of those sources and/or their limited relevance to Antelope Ridge specifically. For example, the application devotes an entire paragraph to two Colorado studies (Rost and Bailey 1979¹⁷, Sawyer et al. 2006¹⁸, 2009¹⁹) one of which was a 30-year-old investigation based merely on fecal pellet group counts (Rost and Bailey 1979). Then, the application devotes the better part of another paragraph to the results of a non-replicated case study in Montana (Van Dyke and Klein 1996²⁰). The applicant's salient conclusions from those reviews were that the amount of displacement from roads should generally depend on the amount of suitable habitat away from the road (from Rost and Bailey 1979, Van Dyke and Klein 1996) and that traffic level should influence the amount of displacement/avoidance (from Sawyer et al. 2009). Those are certainly reasonable conclusions, albeit they amount to nothing more than a collective "glittering generality" that has virtually no quantitative value for predicting likely impacts of roads to big game in the Antelope Ridge analysis area specifically. In contrast to the weight given those papers, the application did little more than "mention in passing" two other studies (Rowland et al. 2000²¹, Wisdom 2002²²) that can only be described as far more intensive

¹⁷ Rost, G.R. and J.A. Bailey. 1979. Distribution of Mule Deer and Elk in Relation to Roads. *Journal of Wildlife Management* 43(3): 634-641.

¹⁸ Sawyer, H., R.M. Nielson, F. Lindzey, and L.L. McDonald. 2006. Winter Habitat Selection of Mule Deer before and During Development of a Natural Gas Field. *Journal of Wildlife Management* 70(2): 396-403.

¹⁹ Sawyer, H., M. J. Kauffman, and R. M. Nielson. 2009. Influence of well pad activity on the winter habitat selection patterns of mule deer. *Journal of Wildlife Management* 73:1052-1061.

²⁰ Van Dyke, F. and W.C. Klein. 1996. Response of Elk to Installation of Oil Wells in South-Central Montana. *Journal of Mammalogy* 77(4): 1028-1041.

²¹ Rowland, M.M., M.J. Wisdom, B.K. Johnson, and J.G. Kie. 2000. Elk Distribution and Modeling in Relation to Roads. *Journal of Wildlife Management* 64: 672-684.

²² Wisdom, M., A.A. Ager, H. Preisler, and B.K. Johnson. 2002. Progress Report on a

and far more geographically relevant than any of the other literature cited in the application. In deed, both of those other studies have been conducted in northeastern Oregon (on the nearby 25,000-acre Starkey Experimental Forest and Range, and by one of the most renowned research teams in North America). More specifically, in contrast to the relatively weak results of the studies emphasized the applicant, Rowland et al. (2000) in particular used roughly 100,000 telemetry relocations of big game to analyze influences of road distance, road pattern, and traffic levels. Furthermore, Rowland et al. (2000) described a methodology for evaluating road effects on elk distributions and habitat effectiveness using "distance-bands" in a Geographic Information System (GIS). That model, contained in Rowland et al (2000), could have been easily implemented in Horizon's GIS to quantitatively estimate likely road effects *a priori*, and it is hard to imagine that any other approach could be considered suitable given the statistical veracity and the geographic relevance of Rowland et al. (2000). Frankly, such an analysis must be considered prerequisite for the identification of likely road impacts, and for the estimation of related mitigation measures and/or costs. Salient points include: (a) by not conducting such an analysis the application apparently avoided an articulate explanation of the project's likely adverse effects; and (b) notwithstanding any previous publications or research, the preponderance of actual site-specific evidence from the nearby Elkhorn Valley facility clearly indicates that the proposed project's influences on big game distributions will be substantial (see more specific testimony in the preceding paragraph).

(5) In conclusion, the application presents a biased review of relevant literature regarding big game. It does this by emphasizing literature that can only be considered inconclusive and of limited relevance to the proposed facility (because of low statistical veracity and/or because of dissimilar ecological settings) while at the same time giving short shrift to locally generated data and peer-reviewed, published models that are statistically more rigorous, geographically more relevant, and already widely applied throughout the region. Use of those locally generated resources by the applicant would have helped the applicant to clarify, to the ODOE and to the EFSC, the likely extent of serious adverse impacts. The application propagates unnecessary ambiguity that may serve to under-represent: (a) amounts of various classified habitats in the analysis area, and particularly that of "Category 2" habitat for which "no net loss of quantity or quality" is mandated by State policy; (b) extents of displacements and their biological, social, and economic consequences to surrounding public and private lands; and (c) availability of sound technical resources that were available to the applicant for clarifying the proposed project's road and traffic effects *a priori*. These ambiguities were not necessary given extant literature and analytical standards that are widely recognized in this region, available to the applicant, and within the applicant's ability to implement.

D. Inventory and Protection measures for some bird species are inadequate.

Manipulative Study to Evaluate the Effects of Off-Road Vehicles and Other Off-Road Recreational Activities on Mule Deer and Elk at Starkey Experimental Forest and Range, Northeast Oregon. Report on file, Forestry and Range Sciences Laboratory, La Grande, Oregon 97850.

(1) The application goes to some length to describe the applicant's various inventory procedures for birds, and the application ultimately concludes that any potential impacts are generally low and/or amenable to mitigation. However, the inventory procedures were not sufficient for certain species that are of particular concern under policy or law. Furthermore, the best available information suggests that impacts for some species should have been described more articulately (northern goshawk), and that the proposed project's protection measures for raptors are insufficient (golden eagle). The following paragraphs explain the nature and extent of these inadequacies.

(2) The applicant's inventory of some avian species appears to fail to meet agency expectations based on what was (apparently) an approved protocol. In Table P-2 the application notes that several wildlife surveys were conducted including: (a) sensitive species survey within the analysis area, 04/09-07/09; (b) supplemental species survey, 05/10-07/10; (c) aerial raptor-nest survey within a 2-mile buffer of the site boundary; (d) aerial sage grouse lek survey and ground follow-up, 03/09-04/09; (e) anabat surveys, 08/08-10/08; (f) breeding bird survey for coniferous obligates sensitive status species, 04/09-07/09; and (f) four season wildlife baseline study including avian use of the analysis area. Regarding sage grouse, specifically, Attachment P6 states, *"two...surveys...March...April...area flown will include Site Boundary and a two mile buffer..."* Furthermore, the application specifically states, that *"...methods, results, and conclusions of the various surveys...for...the Site Boundary are presented...as Attachments to Exhibit P, including...P-5...P-7...P-8...and...P-9."*, and further that, *"The baseline and supplemental studies have fully covered the Site Boundary and analysis area."* (emphasis added). Nevertheless, Exhibits P-5 and P-9 refer to surveys conducted at the Elkhorn Valley site - not at the proposed Antelope Ridge site and analysis area, and the application's claim that studies "...fully covered..." the site boundary and the analysis area is categorically false. The application's exhibits P-7 (Figures 4,5,6,7,8, and 11) and P-8 (Figures 1 through 6) clearly show that avian surveys in particular did not fully cover either the Site Boundary or the analysis area. Indeed, the site boundary itself was sampled (not covered), and the analysis area was sampled (not covered) only to the detection limits of the site boundary samples (with exception of aerial raptor surveys which did apparently cover the analysis area as defined by the applicant). Therefore, it should be evident that rather than "covering" the analysis area in particular, the protocol surveys apparently avoided the vast majority of the analysis area (outside the site boundary) to the maximum extent possible (with exception of the raptor surveys).

(3) Furthermore, survey coverage exhibited in P-7 and P-8 should be considered particularly inadequate from the perspective of two species specifically. First, while the applicant's raptor surveys did extend to a 2-mile buffer, the Fish and Wildlife Service has actually recommended protections for golden eagles out to a 6-mile buffer.²³ Golden eagle mortality rates must be a particular matter of concern for this proposed facility siting given the demonstrated rate of unauthorized mortality that is already occurring at the Elkhorn Valley site. To understand the full impact of an additional 300-mw installation at the proposed Antelope Ridge site (over and above the 100-mw installation

²³ see letter addressed to Valerie Franklin, Horizon Wind Energy LLC, from Paul Henson, State Supervisor, USDI Fish and Wildlife Service, dated September 20, 2010.

at Elkhorn Valley), the applicant must at least determine for the Council the number of golden eagles within an area that is specifically relevant to the public's protection goals. Based on current USDI recommendation, that relevant area extends out 6 miles, not merely 2 miles. Without knowing how many eagles occur within the 6 mile buffer, it is impossible for ODOE or the EFSC to determine with any degree of confidence whether or not the mortality rate from collisions with turbines in the combined installations (Elkhorn Valley + Antelope Ridge) would be sustainable by the eagle population (what ever that population is). Furthermore, without that specific information it would seem to be categorically impossible for the U.S. Department of Interior to issue any "taking" authorization for either facility (Elkhorn or the proposed Antelope Ridge). Second, based on the application's own cover type classification, much of the area within 2 miles of the site boundary that was not protocol surveyed for sage grouse should indeed be considered suitable habitat for sage grouse, and therefore, that area should have been sampled systematically for leks. It should be clear that despite the (apparently approved) protocol for aerial sage grouse surveys out to a 2-mile buffer (as apparently committed to in P6), the protocol surveys for sage grouse during the leking season were apparently never conducted beyond the Site Boundary. By not surveying all apparently suitable areas purposefully during the sage grouse breeding season (as compared to making observations incidentally during other surveys outside the grouse breeding season) the application minimizes the possibility that any more potential leks could be found (one can only find leks when the birds are actually using them - during the breeding season). Consequently, in the absence of additional surveys for golden eagles and for sage grouse, it is impossible for the ODOE to make an informed recommendation to the EFSC regarding the extent of likely impacts to either golden eagles or sage grouse.

(4) The application states that *"No adult northern goshawks were observed during baseline studies, although a nest was found on Craig Mountain during supplemental surveys in 2010. The Ponderosa pine coniferous forest represents sub-optimal foraging and nesting habitat for goshawk, and the site boundary is not likely to support a significant goshawk population."* First, the application provides no indication that the protocol for *"...baseline studies..."* were suitable for locating actively nesting goshawks in the Antelope Ridge analysis area (goshawk protocols are usually rather specific in terms of transect spacing and "calling" method). Thus the fact that none were observed during the baseline study is not surprising. Second, the statement that *"...Ponderosa pine coniferous forest represents sub-optimal...habitat..."* is categorically false. Ponderosa pine forest is the dominant habitat for northern goshawks in the American Southwest, and it is suitable for goshawks in the Interior Pacific Northwest as well, provided that site-specific characteristics of canopy density and canopy evenness (contagion) across the surrounding landscape are suitable. Furthermore, much of the *"...coniferous forest..."* on Craig Mountain is not "Ponderosa pine" type *per se*, but rather consists of "mixed conifer" forests, which are ultimately dominated by Douglas fir or grand fir, and which typically occur on forest sites that are somewhat moister and cooler than those limited to true ponderosa pine site potentials. In mixed conifer forest, ponderosa pine is often the dominant species in seral (i.e., early) stages of forest development. Mixed conifer forests, whether dominated by seral ponderosa pine or by late-seral fir species, are quite capable of producing canopy densities suitable for

goshawk nesting, and thus, it should not be surprising that a goshawk nest was eventually found in the supplemental survey - even though only a very small portion of the apparently suitable habitat was included in the supplemental survey area. The application thus correctly recognized the occurrence of this species (luckily), but not the extent of its occurrence. The application falls far short of analyzing the proposed project's impacts on the species given generally accepted tools that are available for doing so. The application omits any reference to well-established, peer-reviewed science publications that could have provided a sound statistical basis for predicting impacts to nesting habitat over the entire life of the project and taking into account the project's impacts to forest cover^{24,25}. It is notable that the first of those publications (McGrath et al. 2003) contains a GIS-implementable model for predicting nesting habitat suitability that is specific to northeastern Oregon. That model can predict spatially-explicit nest-site suitability in both strategic (long-range) and in tactical (short-range) planning contexts, and it has a cross-validated prediction accuracy of roughly 75% (i.e., very high). Omission of this literature by the applicant should be a matter of concern to the ODOE and to the Council when judging the application's completeness and/or the adequacy of its conclusions. Based on examination of the application's project maps, much of the coniferous forest in the northern region of Craig Mountain, including that on its northeast flank, should be (tentatively) considered suitable for goshawk *a priori*, and from those maps it is clear that those forests would be impacted rather substantially by forest clearing for turbine strings and roads that would service those turbine strings. Nevertheless, implementation of McGrath et al. (2003) would have clarified the issue for the applicant and provided a basis from which the applicant could have clarified the proposed project's implications to the ODOE and to the Council.

(5) The number of active raptor nests identified within the 2-mile sample area (the buffer) by WEST Inc., in 2009 is truly remarkable (N=57), plus an additional 8 nests that were located in 2010 (total N= 65). Setbacks illustrated in Attachment P-15 indicate that the applicant intends to provide setbacks for 22 of those nests (1 goshawk, 5 golden eagle, 2 burrowing owl, and 14 Swainson's hawk). However, Attachment P-15 also shows that 11 of those 22 setbacks remain overlain by what are apparently turbine strings and/or their service roads. So, it is not clear whether those are really setbacks or not. If disturbance agents such as turbines, roads, or transmission lines are allowed in a "setback", then is it really a setback, and if so, how effective does ODOE think that setback will be, and why? It seems reasonable to expect that the applicant not be given credit for any of the setbacks in question until the applicant clarifies to ODOE exactly what each setback will exclude, and until the effectiveness of each setback is determined by ODOE in consultation with ODFW. In absence of specific evidence to the contrary, all raptor nests should be considered sensitive to potential impact from turbine strings and associated activities. Furthermore, specifically with respect to golden eagle nests, the proposed setbacks appear to be categorically insufficient based on recommendations

²⁴ McGrath, M.T., S. DeStefano, R.A. Riggs, L.L. Irwin, and G.J. Roloff. 2003. Spatially explicit influences on northern goshawk nesting habitat in the Pacific Northwest. Wildlife Monographs 154:1-63.

²⁵ Reich, R.M., S.M. Joy and R.T. Reynolds. 2004. Predicting the location of northern goshawk nests: modeling the spatial dependency between nest locations and forest structure. Ecological Modeling 176(1-2):109-133.

provided to the applicant by the U.S. Fish and Wildlife Service, which recommended setbacks of 6 miles from both active and inactive nests.²⁶ That recommended setback is far greater than the 0.5 mile setbacks proposed by the applicant, and it should be of concern to the ODOE and the EFSC that the application was submitted by the applicant with full knowledge that its proposed setbacks would be considered inadequate by federal authority. Clearly, the best available information that was provided to the applicant by the Department of Interior was disregarded. In omitting reference to those recommendations, the applicant misinforms the ODOE and the EFSC.

(6) The Bald and Golden Eagle Protection Act specifically prohibits the "taking" of any golden eagles except when specifically authorized by the U.S. Department of the Interior. Four (4) unauthorized mortalities are known to have occurred already at Horizon's operating Elkhorn facility. This reviewer's understanding is that unauthorized mortalities are technically classified as felony violations of the act. The letter referenced in this testimony, from Mr. Henson to Ms. Franklin, provided the applicant with unambiguous setback recommendations, presumably to help the applicant ensure that Horizon could avoid felony violations at the proposed facility, and that letter also provided the applicant with the biological basis for those recommendations. In submitted this particular application to ODOE, the applicant obviously disregarded those recommendations, and furthermore, based on my review, the applicant apparently chose to not inform the ODOE and EFSC of those recommendations.²⁷ Given that Horizon Wind Energy's proposed Antelope Ridge project would be roughly three times (3x) larger than the operating Elkhorn facility, a reasonable, site-specific, empirical approximation of the likely resulting mortality rate at Antelope Ridge would be roughly three times the known mortality rate at Elkhorn, thereby effectively quadrupling the current rate of unauthorized mortalities by Horizon Wind Energy. In the absence of any actual data to the contrary, that level of unauthorized mortality must be assumed unsustainable, and thus categorically unacceptable to the State of Oregon. Furthermore, if the facility is sited by EFSC with the preponderance of evidence indicating that the facility will result in further unauthorized mortalities, then the State would certainly become a party to any subsequent felony violations. Given that the proposed facility is virtually certain to contribute to further unauthorized mortalities, those mortalities can only be assumed to be illegal under federal law in the absence of any specific authorization by the U.S. Department of Interior. Furthermore, under the circumstances described here, it seems unimaginable that the U.S. Department of Interior could issue a "taking" authorization to the proposed facility. In absence of an approved golden eagle protection plan (GEPP) which presumably would be modeled on the content of the referenced Fish and Wildlife Service recommendations (a plan which the application does not contain), any application for any turbines within 6 miles of any bald or golden eagle nest must be categorically denied by the EFSC. Furthermore, as eluded to in paragraph (3) above, simply conditioning a site certificate on an increase in buffer widths around nests that are currently known would not meet ODOE's Standards of Review. Given that 6-mile

²⁶ See letter addressed to Valerie Franklin, Horizon Wind Energy LLC, from Paul Henson, State Supervisor, USDI Fish and Wildlife Service, dated September 20, 2010.

²⁷ The application may have informed the ODOE of those recommendations by USDI, but if so, I did not find the passage that did so.

buffers have been recommended by federal authority, any such conditioning by the State logically requires that all the lands within 6 miles of the project be surveyed prior to ODOE's recommendation to the EFSC. With this information in mind, the ODOE can only recommend to the EFSC that Horizon's application be categorically denied. Denial of the application would remove any ambiguity about what must be surveyed and buffered by this or any other applicant, and thus in the best interests of all parties including the applicant's if it would chose to resubmit another application at a later time. Most importantly, such action would be in the best interest of the State of Oregon.

E. Proposed monitoring and mitigation for some bat species are inadequate.

(1) The application describes some of the species of bats that are known or likely to occur within the site boundary. Among the species known to occur are the Hoary bat (*Lasiurus cinereus*) and the Silver-haired bat (*Lasionycteris noctivagans*). Both species are migratory tree-roosting species, federal species of concern, state "SV" category species, and Oregon Conservation Strategy species. The application also documents that migratory tree-roosting species account for roughly 75% of all documented bat mortalities at wind projects (apparently nation-wide), and that Hoary and Silver-haired bats, in particular, comprise roughly 93.5% of all bat mortalities documented in the CPE region of the Pacific Northwest, and further, that these two species engage in "...open-air hawking..." which presumably predisposes them to turbine-induced mortality (either from collision or from barotrauma). The application acknowledges that these two species are likely to comprise the majority of fatalities at the proposed facility and that mortality rates could be elevated where the project's turbines are located in forested habitats along ridges. Those conclusions are clearly substantiated by the cited scientific literature, but the application concludes that "*...These levels are not likely to result in any population-level effects to sensitive bat species.*" That conclusion is not substantiated by any data or calculations. The conclusion is, therefore, arbitrary and capricious.

(2) It is unrealistic to expect that the minimal monitoring efforts proposed by the applicant could be used to establish the actual extent of impacts with any degree of confidence. Rather, it is more likely that the proposed monitoring could only produce inconclusive results, thereby preventing the applicant from being held accountable for adverse impacts. The proposed monitoring is inadequate for two reasons. First, understanding the significance of any level of mortality that might be documented from monitoring depends on understanding the quantitative relevance of that mortality to the size and reproductive capacity of the affected population. In absence of any data describing the affected population's size and its vigor, any mortality rate is rendered meaningless. The proposed plan provides no commitment to document size or reproductive vigor of bat populations with statistical confidence. Second, the proposed plan for monitoring mortality is itself statistically inadequate. The applicant proposes monitoring only 1/3 of the turbines, and for only for 1-2 years post construction.²⁸ The ODOE should understand that a mere sample of roughly 30 plots, even if read over two years, is not likely to provide conclusive estimates of long-term project-induced mortality

²⁸ The plan is not even clear as to whether mortality monitoring will extend for 1 year or 2 years. In one place it stated 1 year, and in another it stated up to 2 years.

rates (for a 20-year project), and under that circumstance the EFSC should be concerned with the real possibility that the monitoring program could conclude "no significant effect" when in fact a significant effect has occurred.²⁹ The burden is on the applicant to demonstrate the veracity of the applicant's sampling scheme, but the applicant has not done so. Given the conservation status of these two particular species, and given the acknowledged likelihood that they will be affected by the proposed project, a more rigorous sampling scheme than the one proposed is required if the EFSC hopes to have any confidence that actual project impacts can be quantified. In the absence of any professional analysis to the contrary by an objective and qualified bio-statistician, this testimony suggests that mortality monitoring for these species should extend for not less than 5 years past initial operation of the facility, and the monitoring scheme should be executed in a stratified sampling design that can articulate contributions of operational factors (e.g., turbine location, turbine height, blade length, turbine speed, etc.) to observed mortality rates. Furthermore, mortality monitoring must be accompanied by population monitoring to determine the affected population's size, its reproductive vigor, and the statistical likelihood that documented mortality will adversely impact the affected population over time. The sampling design would also benefit from before-and-after sampling, executed in a "paired-plot" approach. Inclusion of a statistically robust monitoring scheme for these sensitive species would have demonstrated the applicant's attention to detail and its ability to provide the information necessary for confident actions by ODOE and EFSC. A statistically valid monitoring scheme would have provided the ODOE and EFSC with a basis for confidence that adverse impacts to these sensitive species would indeed be determined, and with confidence that monitoring results could guide modification of operations to reduce or negate adverse impacts over the life of the project. Coincidentally, such monitoring would also have provided the ODOE and EFSC with confidence that the monitoring program's results could eventually provide them with guidance for judging the adequacy of other applications for site certificates in the future. In the opinion of this reviewer, the minimal monitoring scheme proposed in this application cannot provide a sound basis for judging the extent of adverse impact to these species. On that basis, the submitted application for a site certificate must be denied.

F. The proposed monitoring plan is inadequate.

(1) It is important that the ODOE and the EFSC understand, that as proposed by the applicant, the implementation of long-term mitigations, and the assigning of their costs, will in several respects be entirely dependent upon the rigor of the applicant's monitoring program. If the monitoring program cannot conclude the full extents of various impacts to wildlife with confidence, then the likelihood that the State of Oregon will be able to retrieve adequate mitigation (including costs) from the applicant is low. Given that habitats and species in the proposed project area are widely recognized as

²⁹ See: Eberhardt, L.L., and J.M. Thomas. 1991. Designing environmental field studies. Ecological Monographs 61:53-73. This publication, which has been in the ecological literature for nearly 20 years, clearly addresses the importance of addressing such error probabilities where the ecological cost of erroneous conclusions is likely to be high.

limited, critical, High-sensitive, Sensitive, and irreplaceable, the ODOE must be able to recommend to the EFSC that the monitoring program is sufficient to produce conclusive results. The monitoring program proposed by the applicant is inadequate to meet ODOE's General Standard for Review. Principal inadequacies of the monitoring plan revolve around the extent and frequency of monitoring. Principal inadequacies of the mitigation plan revolve around the severity of impacts required to trigger mitigation and the apparent procedure for approving amendments.

(2) Principal inadequacies of the monitoring plan revolve around the extent and frequency of monitoring. As discussed above in D(3), the extension of raptor monitoring to only 2 miles beyond the site boundary is inadequate based on best available information conveyed by the U.S. Department of the Interior (the buffer distance for sampling should be 6 miles for eagles). Regarding monitoring frequency and extent for forest birds, the monitoring and mitigation plan (Exhibit P13) proposes limiting the duration of monitoring to 1 year post construction, or to year 1 and year 5 following construction. Such infrequent and intermittent monitoring is not likely to be sufficient for the EFSC to determine either the magnitude or duration of project impacts with confidence, simply because annual weather variation is likely to confound the results of isolated 1-year samples. To guard against such confounding, previous studies of forest avifauna in northeastern Oregon's industrial forests have sought replication across at least 3 sequential years.^{30,31} Given that the submitted application acknowledges that 5-year effects are of interest for resolving this particular project's impacts, it seems reasonable to expect that all monitoring for sensitive avifauna (including bats) should be carried out annually for a period not less than 5 years post-construction, with adequate pre-construction sampling required to develop the baseline for comparison. Furthermore, mortality monitoring should be linked to population monitoring, for reasons explained in explained at E(2) above. Similarly, sage grouse surveys should extend for 7 years post-construction, not only at the suspected lek site, but also across any other potentially suitable lek sites that may be identified by ODFW within the project's 2-mile buffer area. The plan also proposes that the applicant will direct (i.e., engage or employ) qualified biologists "...approved by ODOE..." With all due respect, the ODOE is not qualified to approve or disapprove the qualifications of professional biologists. Therefore, this testimony recommends that those biologists be approved by ODOE: (a) only in consultation with ODFW, and (b) under condition that biologists approved by ODOE hold, as a condition of their approval, the status of "Certified Wildlife biologist"® as conferred by the Wildlife Society.³²

(3) Concerns regarding the mitigation plan revolve principally around the severity of impacts that would be required to trigger certain mitigations, particularly those enumerated in P13 (at page 10, paragraph (g)). The threshold for mitigation of bat

³⁰ Sallabanks, R., R.A. Riggs, and L.E. Cobb. 2001. Bird use of forest structural classes in grand fir forests of the Blue Mountains, Oregon. *Forest Science* 48(2):311-321.

³¹ Sallabanks, R., R.A. Riggs, L.E. Cobb, and S.W. Dodson. 2006. Bird-habitat relationships in grand fir forests of the Blue Mountains, Oregon. *Forest Science* 52(5):489-502.

³² The Wildlife Society is the association of professional wildlife biologists. Certification requires that a wildlife biologist has satisfied certain educational and experiential requirements. It may be notable that it is unclear if the applicant's consulting biologists are/were certified.

losses, in particular, is proposed as 2.50 mortalities per MW per year. However, the Final ASC (Exhibit P, at page 58) reports that the range of mortality rates across 10 existing wind farms in the Pacific Northwest has been 0.39 - 2.46 mortalities/MW/yr. Thus, the applicant is apparently proposing that mitigation for bats only be implemented in the event that the Antelope Ridge mortality rate is greater than any other mortality rate reported to date in the region. Furthermore, "mitigation" proposed, in the form of payment to Bat Conservation International (BCI), in no way demonstrates any likelihood that mitigation will indeed be achieved. In order for the applicant to demonstrate an ability to avoid or mitigate adverse impacts successfully, the applicant must be able to show that proposed mitigation has some reasonable probability of being successful. If the applicant is unable to do that, then the site certification (if one is issued) must be conditioned to avoid impacts that may exceed any mitigation threshold. If significant adverse impacts cannot be shown to be amenable to mitigation or unavoidable, then the application must be denied.

(4) Concepts of the previous paragraph apply to any species, not to bats alone, but bats provide a useful example of how those concepts can be used to enlighten and ensure successful avoidance and/or mitigation. Given that at least two species of bats are of concern (Hoary and Silver-haired), the threshold for mitigation for those species should reflect the level of concern. With this in mind, the mitigation threshold for these species should follow from the likely impact of documented mortalities on the population (to be determined from linked population monitoring). Furthermore, given that mortality monitoring would be mandated at all turbines for 5 years, it would be possible to identify those turbines that are most likely responsible for mortalities. Thus, once the mortality is defined, and its implications for the population estimated, it would be possible to identify specific turbines for decommissioning and removal. Such measures apply to more species than just bats, but in any event the measures described here provide the only non-arbitrary and non-capricious basis for ensuring that mitigation will succeed. "Buying off" the problem by giving token amounts of money to concerned third parties such as BCI in no way ensures that ODOE's standards for avoidance and mitigation will be met.

(5) Any amendments to the monitoring plan that may be recommended to the EFSC by ODOE should be made only after consultation with and concurrence by ODFW.

Section III - Summary.

To summarize, Section II should clearly show that Horizon Wind Energy's application for a site certificate at the Antelope Ridge facility must be denied. The proposal lacks critical information that can only be considered requisite for an informed recommendation to the EFSC by the ODOE, and furthermore, the application's apparently purposeful omission of critical information should be a source of concern to both the ODOE and to the EFSC. Generally speaking, the presence of protected

resources including critical habitats and sensitive species, and knowledge *a priori* that mitigation of adverse impacts to those resources may not be feasible or successful in this particular area, should be sufficient to motivate denial. If that is not considered sufficient reason to deny the application, then the ODOE should be motivated to recommend denial based on the fact that the project's operation would certainly violate federal law. The Council should be encouraged by the ODOE to recognize, without any ambiguity, that the proposed Antelope Ridge project, if built, would not be merely another wind farm in yet another Columbia Basin wheat field, where State-subsidized impacts to public wildlife resources might well be considered minimal. Rather, in Antelope Ridge, Horizon Wind Energy proposes to industrialize a significant acreage of Oregon's designated critical wildlife habitat. The ODOE must ensure that adherence to its Standards of Review is commensurate with the seriousness of this particular project's implications. For the EFSC to determine the weight of the proposal's benefits against the weight of its damage to resources, the EFSC must be able to clearly and fully understand what those damages will be in specific terms. The application's proposed monitoring is insufficient to provide the ODOE and the Council with clear understanding of adverse impacts. If the Council is unable to determine that significant negative impacts are unlikely, or if it is unable to determine that identified negative impacts will be fully mitigated to extents required by law and policy, then ODOE must recommend to the Council that the application be denied categorically.

Sincerely,

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RAR/rar