WHISTLING RIDGE ENERGY LLC
K. SHAWN SMALLWOOD
SEPT. 2, 2008 SMALLWOOD DECLARATION
EXHIBIT NO. 22.09c

BEFORE THE HEARING EXAMINER
FOR SKAMANIA COUNTY

In the Matter of the Appeals of	) County File No. SEP-08-14
Friends of the Columbia Gorge, Inc. and Save Our Scenic Area,	) DECLARATION OF K. SHAWN SMALLWOOD
Of a SEPA Determination of Nonsignificance	)

I, K. SHAWN SMALLWOOD, make this declaration based upon my personal knowledge and belief and declare as follows:

1. I am an ecologist with 23 years of experience as a researcher and consultant on issues related to wildlife and wildlife management and conservation problems. My qualifications for preparing this declaration are summarized in my curriculum vitae. I earned a Ph.D. degree in ecology from the University of California at Davis in 1990. Then I worked as a post-graduate researcher for four years in the Department of Agronomy and Range Science at UCD before working as a consulting ecologist. My clientele has included citizen groups, businesses, attorneys, and government agencies. Much of my work has been research and environmental review related to special-status species issues. I have worked directly with multiple endangered species. I have authored numerous papers on special-status species issues, including "Using the best scientific data for endangered species conservation," published in Environmental Management, and "Suggested standards for science applied to conservation issues" published in the Transactions of the Western Section of The Wildlife Society. My work also included hazardous waste management and human systems analysis. Also, I served as the

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Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section, I am a member of the Society for Ecological Restoration and the Raptor Research Foundation, and I have been a part-time lecturer at California State University, Sacramento. For three years I was Associate Editor of wildlife biology's premier scientific journal, The Journal of Wildlife Management, and I served as Associate Editor of Biological Conservation and as a Board member of Environmental Management.

2. I also have considerable experience with the biological impacts caused by wind turbines. I performed field work in the Altamont Pass Wind Resources Area (APWRA) for six years, and I senior authored many reports that followed. I consulted for the California Energy Commission on matters related to wind farm development. I have also consulted to wind farm developers, and helped project applicants obtain permits to develop the Buena Vista Wind Energy project in the Altamont Pass, California.[1] I have also previously reviewed the effects of proposed wind power in Klickitat County, Washington.[2] My contribution to wind energy development has been to produce research-based solutions to avoiding, minimizing, and reducing bird collisions with wind turbines.[3]

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[1] Wallace Erickson and Shawn Smallwood. 2005. Avian and Bat Monitoring Plan for the Buena Vista Wind Energy Project Contra Costa County, California. Unpubl. report to Contra Costa County, Antioch, California. 22 pp.

Lamphier-Gregory, West Inc., Shawn Smallwood, Jones & Stokes Associates, Illingworth & Rodkin Inc. and Environmental Vision. 2005. Environmental Impact Report for the Buena Vista Wind Energy Project, LP# 022005. County of Contra Costa Community Development Department, Martinez, California.

[2] I provided expert testimony on the Windy Point Wind Farm Environmental Review and 2006 EIS (14 pp and 36 Powerpoint slides in reply to responses to comments).

[3] Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

Smallwood, K. S., C. G. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

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Smallwood, K. S. 2007. Estimating wind turbine-caused bird mortality. Journal of Wildlife Management 71:2781-2791.

Smallwood, K. S., C. G. Thelander, M. L. Morrison, and L. M. Rugge. 2007. Burrowing owl mortality in the Altamont Pass Wind Resource Area. Journal of Wildlife Management 71:1513-1524.

Smallwood, K. S. and L. Spiegel. 2005a. Assessment To Support An Adaptive Management Plan For The APWRA. Unpublished CEC staff report, January 19. 19 pp.

Smallwood, K. S. and L. Spiegel. 2005b. Partial Re-assessment of An Adaptive Management Plan For The APWRA. Unpublished CEC staff report, March 25. 48 pp.

Smallwood, K. S. and L. Spiegel. 2005c. Combining biology-based and policy-based tiers of priority for determining wind turbine relocation/shutdown to reduce bird fatalities in the APWRA. Unpublished CEC staff report, June 1. 9 pp.

Smallwood, K. S. 2004. Alternative plan to implement mitigation measures in APWRA. Unpublished CEC staff report, January 19. 8 pp.

Smallwood, K. S., and L. Neher. 2004. Repowering the APWRA: Forecasting and minimizing avian mortality without significant loss of power generation. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-005. 21 pp. [Reprinted (in Japanese) in Yukihiro Kominami, Tatsuya Ura, Koshitawa, and Tsuchiya, Editors, Wildlife and Wind Turbine Report 5. Wild Bird Society of Japan, Tokyo.]

Smallwood, K. S. and C. Thelander. 2005. Bird mortality in the Altamont Pass Wind Resource Area, March 1998 – September 2001 Final Report. National Renewable Energy Laboratory, NREL/SR-500-36973. Golden, Colorado. 410 pp.

Smallwood, K. S. and C. Thelander. 2004. Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. 500-01-019. Sacramento, California. 531 pp.

Smallwood, K. S., L. Neher, D. Bell, J. DiDonato, B. Karas, S. Snyder, and S. Lopez. 2008. Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. Pending. Sacramento, California. 208 pp.

Smallwood, K. S., and L. Neher. 2008. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. Pending. Sacramento, California. 47 pp.

Smallwood, K. S., K. Hunting, L. Neher, L. Spiegel and M. Yee 2007. Indicating Threats to Birds Posed by New Wind Power Projects in California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. Pending. Sacramento, California. 22 pp.

Smallwood, K. Shawn, Lourdes Rugge, Stacia Hoover, Michael L. Morrison, Carl Thelander. 2001. Intra- and inter-turbine string comparison of fatalities to animal burrow densities at Altamont Pass. Pages 23-37 in S. S. Schwartz, ed., Proceedings of the National Avian-Wind Power Planning Meeting IV. RESOLVE, Inc., Washington, D.C.

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3. At the request of Friends of the Columbia Gorge and Save Our Scenic Area, I reviewed Skamania County's proposed zoning amendments and maps.

4. Zoning and map updates are precisely where the public can most effectively participate with the environmental review of possible future actions in the County. Wind power generation and hazardous waste management can vary greatly in their environmental impacts based on location. For example, the environmental impacts of a hazardous waste facility can vary based on the local soils, suite of native species of fossorial mammals, and exposures to winds and rainfall.[4] Similarly, the environmental impacts of wind power generation can vary greatly based on the overlap of geographic ranges of special-status species,[5] terrain, habitat, locations relative to migratory routes, and wind profiles. In either case, there are opportunities for the public to utilize emerging map-based planning tools to steer projects to the least environmentally harmful, most economically viable locations within the County. I have developed just these types of tools, including a map-based indicators approach for deciding where mitigation for residential and commercial development would be most effective within a County,[6] a map-based indicators approach to decide where agricultural pesticide reduction efforts would most minimize exposures to special-status species of wildlife,[7] and an indicators

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[4] Smallwood, K.S., M.L. Morrison, and J. Beyea. 1998. Animal burrowing attributes affecting hazardous waste management. Environmental Management 22: 831-847.

[5] i.e., species susceptible wind turbine collisions, transmission line collisions, and avoidance of tall structures, as well as threatened or endangered species under State and Federal Endangered Species Acts, and species protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

[6] Smallwood, K.S., B. Wilcox, R. Leidy, and K. Yarris. 1998. Indicators assessment for Habitat Conservation Plan of Yolo County, California, USA. Environmental Management 22: 947-958.

[7] Zhang, M., K. S. Smallwood, and E. Anderson. 2002. Relating indicators of ecological health and integrity to assess risks to sustainable agriculture and native biota. Pages 757-768 *in* D.J. Rapport, W.L. Lasley, D.E.

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approach for assessing the impacts of wind power development on bird species at any location in California.[8] Furthermore, I helped develop a map-based approach to minimize bird collision impacts within the area zoned for wind turbines in a County, so at the level of the individual turbines.[9] These map-based indicators approaches can be developed for Skamania County so that the public and the County can together make intelligent decisions about where to encourage hazardous waste management facilities as well as wind, solar, bioenergy, and geothermal power generation facilities. They should form the bases of an EIS for the zoning and map adjustments proposed by the County.

5. **Probable Environmental Impacts of Zoning Adjustments**

6. The environmental checklist characterized the zoning adjustment as a non-project action, based on the assumption that site-specific projects will be required to conform to planning requirements detailed in the Environmental Impact Statement (EIS) prepared

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Rolston, N.O. Nielsen, C.O. Qualset, and A.B. Damania (eds.), Managing for Healthy Ecosystems, Lewis Publishers, Boca Raton, Florida USA.

[8] Smallwood, K. S., K. Hunting, L. Neher, L. Spiegel and M. Yee *In review*. Indicating Threats to Birds Posed by New Wind Power Projects in California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. *Pending review*. Sacramento, California. 22 pp.

[9] Smallwood, K. S., and L. Neher. 2004. Repowering the APWRA: Forecasting and minimizing avian mortality without significant loss of power generation. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-005. 21 pp. [Reprinted (in Japanese) in Yukihiro Kominami, Tatsuya Ura, Koshitawa, and Tsuchiya, Editors, Wildlife and Wind Turbine Report 5. Wild Bird Society of Japan, Tokyo.]

Smallwood, K. S., and L. Neher. 2008. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. *Pending*. Sacramento, California. 47 pp.

Alameda County Scientific Review Committee (Smallwood, K. S., S. Orloff, J. Estep, J. Burger, and J. Yee). February 7, 2008. Guidelines for siting wind turbines recommended for relocation to minimize potential collision-related mortality of four focal raptor species in the Altamont Pass Wind Resource Area. Alameda County SRC document P-70. 21 pp. P70 SRC Hazardous Turbine Relocation Guidelines

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specifically for each project. However, in my experience, zoning decisions are environmental actions, and can quickly lead to site-specific and *cumulative* project impacts. The planning for a site-specific project tends to be restricted to the project at the site preferred by the applicant, and may only address cumulative impacts in a cursory manner, whereas a county-wide zoning change can more effectively address cumulative impacts and project alternatives, including site alternatives. The zoning adjustment is therefore an action, because it includes a decision over whether site-specific projects will be considered in a piecemeal fashion, i.e., in separate EISs, or within a county-wide framework that already addressed project alternatives and their environmental impacts based on location attributes.

7. Because the environmental checklist portrays the zoning adjustment as a non-project action, it repeatedly claims that there will be no environmental impacts associated with the zoning adjustment, even though the adjustment would most probably encourage applications for the construction of power plants and hazardous waste management facilities. The claims of no environmental impacts are misleading. For example, section B.1.e. of the environmental checklist states, "No filling and grading are proposed with this non-project action." The types of projects allowed in the zoning adjustment, however, would result in substantial filling and grading. Hazardous waste facilities typically include cribs or trenches to bury waste (Figure 1). Wind power projects require extensive grading, including cutting into slopes for the many access roads that will be needed (Figures 2 and 3).

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Figure 1. Buried waste trenches at Hanford Nuclear Reservation, Washington. Grading and fill are typical of hazardous waste management facilities.

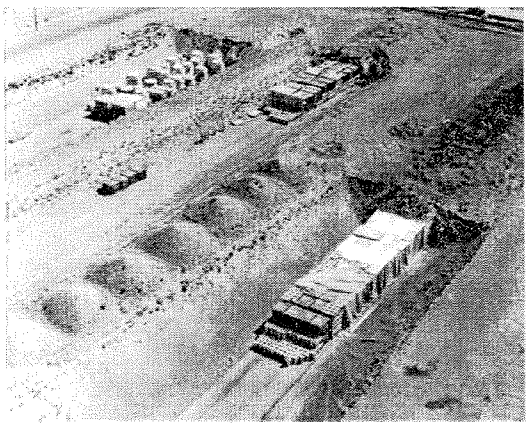
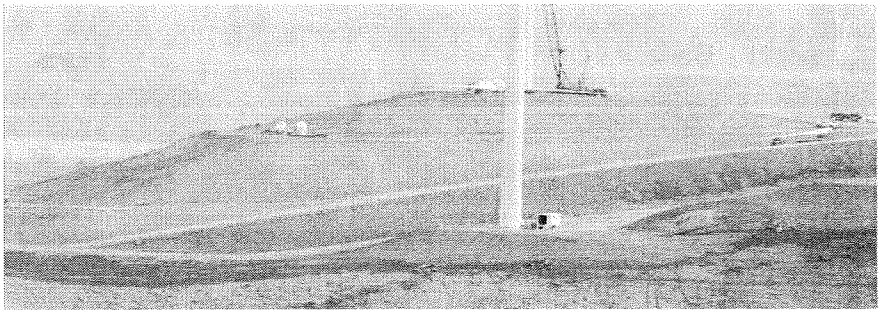


Figure 2. Grading for Buena Vista Wind Energy project in Contra Costa County, California (two photos), including slope clearing and cutting into slopes for access roads.



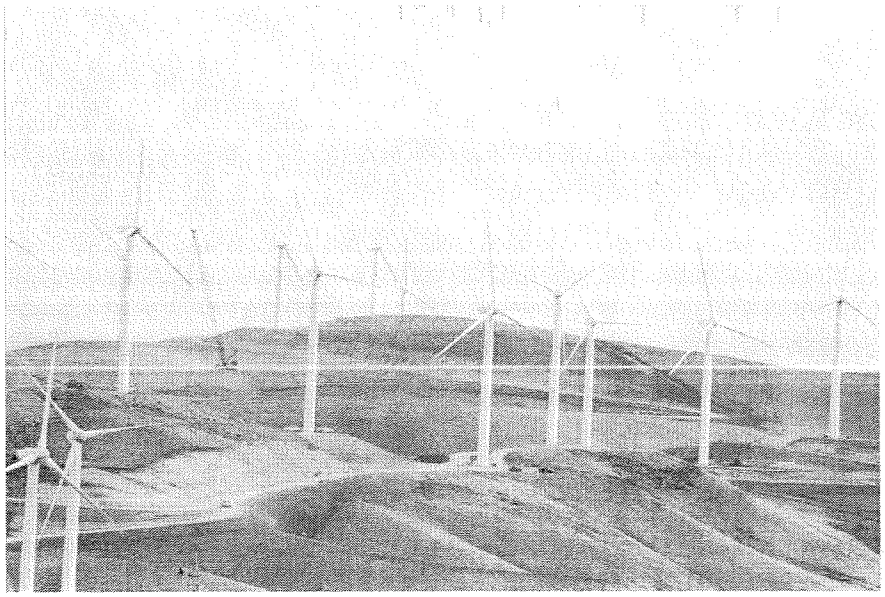


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Figure 3. Access roads to wind turbines in the Altamont Pass Wind Resource Area, California.

8. In another example, section B.1.f. of the environmental checklist states, "No clearing, construction, or uses are proposed with this non-project action." The zoning adjustment will probably result in considerable clearing of vegetation for the construction of transmission lines, wind turbines, and other facilities. In the Altamont Pass Wind Resource Area, annual grasslands are routinely cleared around all electric distribution poles, transmission towers, electric transfer boxes, and most wind turbines in order to protect the facilities from grass fires (Figure 4). In most of Skamania County, this type of clearing will result in loss of forest cover, resulting in habitat loss for many plant and animal species. The probable increase in fire suppression as a means to protect the constructed wind power projects will result in habitat degradation due to the suppression of the natural fire cycle. If an EIS is not prepared as part of the proposed zoning adjustment, then the types of map-based planning tools I described earlier will probably never be used in Skamania County, because doing so would be atypical of a site-specific project EIS.

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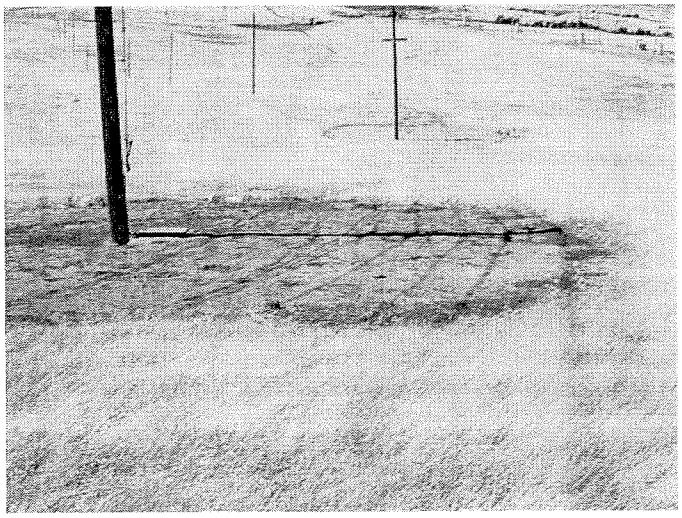
Figure 4. To protect against fire damage, annual grassland is cleared around electric distribution poles and other electric generation and transmission facilities in the Altamont Pass Wind Resource Area, California.



9. **Hazardous Waste Management**

10. Hazardous waste facilities cause a variety of environmental impacts, which can vary considerably based on location. Rocky Flats Plant in Colorado, for example, was constructed on brittle, clay soils which cracked and leaked contaminants in solar evaporation ponds into the aquifer. Rocky Flats Plant was also exposed to seasonally strong winds, which entrained contaminated soil particles that had been excavated by fossorial mammals. As a result, weapons grade plutonium and many other hazardous materials were transported both vertically through the soil and laterally through ground water and winds to locations where the contaminants were out of the control of the managers. Property values declined in communities downwind and downstream.

11. Hanford Nuclear Reservation was based on sandy soils, where groundwater leaching and soil bioturbation took hazardous wastes out of the reach of management. An estimated 2.2 metric tons of weapons grade plutonium ended up in the soils around Hanford Nuclear Reservation, and 1.5 metric tons was labeled MUF – materials unaccounted for. Those who established Hanford Nuclear Reservation and Rocky Flats Plant grossly underestimated the

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ability of microbes, insects, mammals and plants to access and transport the hazardous waste stream. Harvester ants, pocket gophers, ground squirrels, prairie dogs, and American badgers were able to access and transport plutonium that had been buried at depths to 5 meters below grade.[10] Therefore, it is critical to plan alternative locations and management options for hazardous waste management facilities. Zoning should discourage such facilities where the soils are more susceptible to leaching or preferred by fossorial animals, or where winds are strong or sensitive habitats will be intolerably fragmented by the facility. It must also be kept in mind that eradication efforts are often directed to wildlife on hazardous waste management facilities, so constructing such a facility where special status species are likely to reside can result in periodic takings under the Endangered Species Act, Migratory Bird Treaty Act, or other environmental laws.

12. **Wind Power Generation**

13. Wind turbines kill thousands of birds and bats each year in the U.S., and the fatality rates caused by wind turbines pose an emerging environmental crisis with the proliferation of wind power generation. In the Altamont Pass Wind Resource Area alone, I conservatively estimated the 580 MW (megawatts) of rated power capacity kills 2,710 to 11,520

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[10] Smallwood, K.S. 1996. Assessment of the BIOPORT model's parameter values for pocket gopher burrowing characteristics. Report to Berger & Montague, P.C. and Roy S. Haber, P.C., Philadelphia. (peer reviewed).

Smallwood, K.S. 1997. Assessment of plutonium releases from Hanford buried waste sites. Report Number 9, Consulting in the Public Interest, 53 Clinton Street, Lambertville, New Jersey, 08530.

Smallwood, K.S. 1996. Soil Bioturbation and Wind Affect Fate of Hazardous Materials that were Released at the Rocky Flats Plant, Colorado. Report to Berger & Montague, P.C., Philadelphia.

Smallwood, K.S. 1996. Second assessment of the BIOPORT model's parameter values for pocket gopher burrowing characteristics and other relevant wildlife observations. Report to Berger & Montague, P.C. and Roy S. Haber, P.C., Philadelphia.

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birds per year, including 1,127 to 2,277 raptors per year.[11] More recent estimates from another team of researchers produced even higher estimates than mine, amounting to 6,186 to 13,768 birds, including 1,702 to 3,325 raptors per year.[12] Whereas some have attempted to portray the Altamont Pass Wind Resource Area as unique or anomalous,[13] there is no reason to conclude that other wind farms could not kill just as many birds. The construction of wind turbines within the Columbia River Gorge, which the environmental checklist acknowledged is a migratory route, could kill just as many raptors and other birds as the Altamont Pass, on a per MW basis.

14. Fatality monitoring in the Altamont Pass Wind Resource Area has documented the deaths of 81 bird species and 3 bat species, and more species are found dead the longer we search for carcasses. Birds killed by wind turbines have included about 67 golden eagles per year, as well as peregrine falcons, prairie falcons, red-tailed hawks, Swainson's hawks, ferruginous hawks, burrowing owls, great horned owls, barn owls, sandhill cranes, and many other special status species. In Skamania County, special-status species of birds that will be vulnerable to wind turbine collision would include the federally threatened or endangered northern spotted owl, brown pelican, marbled murrelet, and snowy plover, the state threatened or endangered American white pelican, sandhill crane, streaked horned lark, upland sandpiper,

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[11] Smallwood, K. S., C. G. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

[12] Alameda County Avian Monitoring Team (Jones & Stokes, Inc., BioResource Consultants, Inc., University of Santa Cruz Predatory Bird Research Group). 2008. Bird fatality study at Altamont Pass Wind Resource Area: October 2005 to September 2007. Alameda County Scientific Review Committee Document M21, Alameda County Community Development Agency Planning Department, Hayward, California. http://www.altamontsrc.org/alt_doc/m21_2008_altamont_bird_fatality_report.pdf

[13] Erickson, W. P., G. D. Johnson, M. D. Strickland, D. P. Young, Jr., K. J. Sernka, and R. E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee, c/o RESOLVE, Washington, D.C. 62 pp

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ferruginous hawk, sage grouse, and sharp-tailed grouse. Sensitive species that will be vulnerable to wind turbine collision in Skamania County would include bald eagle, common loon, and peregrine falcon, and candidate species would include golden eagle, burrowing owl, flammulated owl, Lewis' woodpecker, pileated woodpecker, loggerhead shrike, merlin, northern goshawk, and others. Raptors would be particularly vulnerable, including owls such as spotted owl.

15. Once wind turbines are installed and operating, there appears to be little that can be done to reduce bird and bat collisions. Few mitigation measures in the Altamont Pass have been regarded as potentially effective, and almost none have been implemented.[14] The wind companies have resisted seasonal shutdowns of wind turbines, removal or relocation of wind turbines from particularly dangerous locations, and other measures recommended by various researchers, including by me and the Alameda County Scientific Review Committee. Careful siting of wind power projects as well as of wind turbines within projects is essential to minimizing bird and bat collisions, because little can or will be done once the wind turbines are installed. Furthermore, based on my experience in the Altamont Pass, it is essential that a substantial performance bond be secured prior to the operation of the wind turbines, to ensure permit compliance and the capacity to provide offset or compensatory mitigation for impacts to birds and bats.

16. Bat collisions are of growing concern to conservationists and ecologists, because in some places the fatality rates of bats have far exceeded those of birds in the Altamont Pass. A

[14] Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

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recent study using thermal imaging found that bats forage around moving turbine blades.[15] These bats were not just flying through the rotor plane, but actually chasing insects around the moving blades. Bats also investigated the turbine blades, sometimes alighting on them when they were not moving. More recently yet, Baerwald et al. (2008) found that most bats died of lung hemorrhaging due to the sudden drop in pressure behind the rotor plane.[16] In other words, bats usually do not even need to collide with the turbine blades to get killed by the wind turbines. Bat species that could be threatened by the zoning adjustment leading to the installation of wind turbines include the state sensitive Townsend's big-eared bat and Keen's myotis.

17. In addition to wind turbine collisions, wind turbines also displace multiple bird species, which have demonstrated aversion to the presence of wind turbines.[17] Some raptor

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[15] Horn, J. W., E. B. Arnett, and T. H. Kunz. 2008. Behavioral responses of bats to operating wind turbines. Journal of Wildlife Management 72:123-132.

[16] Baerwald, E. F., G. H. D'Amours, B. J. Klug, and R. M. R. Barclay. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18:695-696.

[17] Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. Ibis 148:29-42.

Leddy, K. L., K. F. Higgins, and D. E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program Grasslands. Wilson Bulletin 111:100-104.

Erickson, W. P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline wind project wildlife monitoring final report, July 2001–December 2003. Technical Report submitted to FPL Energy, the Oregon Energy Facility Siting Council and the Stateline Technical Advisory Committee. 98 pp.

Schmidt, E., A. J. Piaggio, C. E. Bock, and D. M. Armstrong. 2003. National Wind Technology Center site environmental assessment: Bird and bat use and fatalities – Final Report. NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, CO. 29 pp.

Kerlinger, P. 2002. An assessment of the impacts of Green Mountain Power Corporation's wind power facility on breeding and migrating birds in Searsburg, Vermont, July 1996 – July 1998. NREL/SR-500-28591, National Renewable Energy Laboratory, Golden, CO. 95 pp.

Johnson, G. J., W. P. Erickson, J. White, and R. McKinney. 2003. Avian and bat mortality during the first year of operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Unpubl. report to Northwestern Wind Power, Goldendale, Washington. 17 pp.

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species have demonstrated high turbine avoidance behaviors at wind farms, including an estimated 100% avoidance by northern harriers at 6 sites in the US, 99.8% at one site, and 93.2% at another site.[18] Kerlinger et al. (2005)[19] compared post-construction bird activity to pre-construction activity in the High Winds Wind Project area in Solano County, California. They reported substantial reductions in bird use of the project site for numerous species. Compared to pre-construction activity levels, post-construction activity declined 75% for golden eagle and horned lark, 82% for American crow, 91% for cliff swallow, 81% for house finch, 33% for killdeer, 55% for northern mockingbird, 100% for rough-legged hawk, Say's phoebe, long-billed curlew, chipping sparrow, song sparrow, white-crowned sparrow, scrub jay, and tricolored blackbird, as well as for other species. These levels of apparent avoidance of the project site due to the installation of wind turbines represent reductions of habitat suitability, and ultimately habitat loss for these species.

18. Large areas within Skamania County may be inappropriate for zoning for wind energy generation or hazardous waste management. Ironically, section A.8. of the environmental checklist references the Final Environmental Impact Statement (FEIS) for the energy overlay zone in Klickitat County, although it is unclear to me why the FEIS was referenced. What is ironic about the reference to Klickitat County's FEIS, however, is that (1)

Petersen, I. K., T. K. Christensen, J. Kahlert, M. Desholm, and A. D. Fox. 2006. Final results of bird studies at the offshore wind farms at Nysted and Horns Rev, Denmark. National Environmental Research Institute, Ministry of the Environment, Denmark.

[18] Whitfield, D. P., and M. Madders. 2006. A review of the impacts of wind farms on hen harriers Circus cyaneus and an estimation of collision avoidance rates. Natural Research Information Note 1 (revised). Natural Research Ltd., Banchory, United Kingdom.

[19] Kerlinger, P., L. Culp and R. Curry. 2005. Year one report: Post construction avian monitoring study for the High Winds Wind Power Project, Solano County, California. Unpublished report prepared for High Winds, LLC and FPL Energy, 70 pp.

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the FEIS (page 2-15) concluded that forested areas support higher concentrations of owls and other sensitive species than other areas; (2) use of forested areas by large falcons was significantly higher than in other cover types in the county (FEIS page 3-53); (3) after screening of the alternatives, the FEIS recommended exclusion of large forest tracts from the geographic scope of the Overlay Zone due to the forest's support of more sensitive species; and (4) the Limited Geographic Alternative was developed in response to comments (FEIS page G-43), with the intent to encourage wind power development where the transmission infrastructure already exists. Skamania County is largely forested, so much of it may be unsuitable for wind power development and probably should not be zoned for it.

19. My assessment of potential impacts of wind farm development at multiple locations in California came to the same conclusion as the Klickitat County FEIS that forested areas support more special-status species that would be vulnerable to wind turbine collisions.[20] Specifically, my colleagues and I identified coastal oak woodland as the vegetation cover type that would cause the greatest bird impacts in California, if wind turbines were sited there. Siting wind farms in Pinyon-Juniper forests would lead to the third greatest level of impacts, and siting wind farms in redwood forests would lead to the fifth greatest level of impacts. Scrubs and chaparrals were least susceptible to bird collision impacts due to wind farm siting.

20. At a minimum, an EIS is needed for the zoning adjustments in Skamania County. The EIS should make use of the scientific tools and understanding of environmental impacts that are available, such as using a map-based indicators approach to help the public participate with

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[20] Smallwood, K. S., K. Hunting, L. Neher, L. Spiegel and M. Yee *In review*. Indicating Threats to Birds Posed by New Wind Power Projects in California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. *Pending review*. Sacramento, California. 22 pp.

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an intelligent zoning that truly minimizes the environmental impacts of future site-specific projects. Such tools are relatively easy to develop and use, and the framework I helped develop for California wind farm siting can be updated and improved as more is learned about the interactions of birds and bats with vegetation cover, landscapes, and wind turbines.

21. I declare under penalty of perjury that the foregoing is true and correct to the best of my personal knowledge, information, and belief.

Executed in Davis, California this 2nd day of September, 2008.

Shawn Smallwood

K. Shawn Smallwood

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