June 16, 2006

Via Electronic Mail with Hard Copy Following in the Mail

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 06-OII-1
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Developing Statewide Avian Guidelines

Dear Commissioner Geesman and members of the Commission:

On behalf of Defenders of Wildlife (Defenders) and our more 120,000 members and supporters in California, I am writing to provide comments on the California Energy Commission's (CEC) effort to develop statewide avian guidelines for the siting of wind energy projects. Defenders strongly supports the expansion of the development of renewable energy sources. Doing so will help reduce emissions of greenhouse gasses, which contribute to global climate change.

While Defenders strongly supports renewable energy projects, we are concerned that the push to expand wind energy projects in California could have a serious impact on wildlife. Therefore, we believe it is essential for the state of California to work diligently to ensure that any such expansion will not come at the expense of wildlife. Thus, we strongly support the CEC's effort to formulate voluntary statewide guidelines for wind energy projects to avoid and minimize wildlife conflicts, particularly conflicts with bird and bat species. Indeed, we encourage the CEC to take a leadership role, as it has with renewable energy in general, in ensuring that energy companies develop wind projects in the most environmentally sustainable manner possible.

Before turning to the draft outline of the statewide guidelines for reducing wildlife impacts from wind energy development, I want to take the opportunity to highlight an issue regarding the use of scientific experts. While Defenders understands that there is a limited number of individuals involved in the field of wildlife and wind energy conflicts, we strongly urge the Commission to utilize those experts whom are the most neutral. It is essential that these experts appear unbiased and untainted in order for the guidelines to have the great degree of scientific credibility.

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In addition to the specific comments offered in this letter, I am attaching Defenders' national "Renewable Energy Wind Energy Resources Principles and Recommendations" white paper. (Attachment A). We encourage the CEC to review this white paper and incorporate the recommendations into the statewide guidelines.

We also believe that the Avian Protection Plan Guidelines set forth by the Edison Electric Institute's Avian Power Line Interaction Committee and the U.S. Fish and Wildlife Service in April 2005 provide a good example for the development of the wind energy guidelines. The Avian Protection Plan Guidelines can be found on the internet and details construction design standards, nest management procedures, an avian reporting system, risk assessment methodology, mortality reduction measures, avian enhancement options, and quality control. Specific recommendations relevant to the wind guidelines are: site analysis and bird use surveys to avoid collision problems; bird flight diverters to make lines more visible, avoid high bird use areas; site according to topographic features; minimum spacing of 60 inches between phases and phase to ground; cover or insulate ground wires and cover conductors; and changing cross arms and installing perch guards. The CEC guidelines should also take into account that wind energy project must tailor avoidance measures to the specific location and species of concern as current research indicates varying success of different techniques. For example, a study in Colorado demonstrated that perch guards might shift raptors to unsafe portions of a power pole (Harness 1999).

Overall, Defenders believes that the CEC's draft outline of statewide guidelines appear to be very solid and focused on the critical wildlife conflict issues. In terms of wildlife impacts, the CEC must address several issues in the proposed statewide guidelines. These include impacts stemming from the construction, on-going use, and maintenance of the wind energy infrastructure. As such, the guidelines must meet the legal standards set forth by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, the California Fish and Game Codes and the California and Federal Endangered Species Acts, and the "minimize and fully mitigate" standard set out by CEQA.

The CEC should ensure that the impact analysis portion of the guidelines address modeling for predicted mortality and displacement effect on avian and bat populations that may occur with wind projects (e.g., how do wind project change the behavior of wildlife not killed by the project). We also specifically request that the CEC address the following impacts in the guidelines:

- Minimize the project footprints
- Avoid steep slopes in order to reduce erosion impacts
- Avoid sensitive and rare natural communities
- Analyze, avoid, minimize, and otherwise fully mitigate impacts to wide-ranging species
- Require structures that discourage perching by raptors
- Avoid identified wildlife corridors (see Missing Linkages project in CA)
- Avoid fly-ways, especially for raptors

- Avoid development of priority areas as established in state comprehensive wildlife plans, regional conservation plans, and recovery plan for threatened and endangered species
- Avoid development that severs habitat corridors set out in any state Connectivity Plans (Defenders is currently working with UC Davis Center for Road Ecology, U.S. Forest Service and other partners to create a California Connectivity Plan)
- Avoid wetland resources (including the upland elements of the watersheds that support the wetlands themselves)
- Avoid impacts to species of plants and animals listed under the state and federal Endangered Species Acts
- Avoid overlap with designated critical habitat for federally listed species
- Be consistent with state and federal recovery plans for listed species
- Avoid local, state, or federally protected lands
- Be consistent with regional conservation plans (both current and draft)
- Minimize growth-inducing impacts
- Be consistent with the conservation priorities of existing land management plans
- Minimize impacts due to on-going maintenance of the pipelines, transmission lines, or distribution facilities
- Minimize cumulative impacts due to existing and planned development in the region
- Actively restore native vegetation to the project footprints after the infrastructure has been constructed

In addition, the CEC should draft its guidelines to minimize new road construction and other new linear structures such as energy corridors. In particular, we urge that guidelines minimize the need to build new transmission lines by advocating for projects sited in close proximity to existing transmission lines. Roads and other linear disturbances present a particular challenge to wildlife in the form of habitat fragmentation. Continued habitat fragmentation forces wildlife to live on ever-shrinking islands of habitat, where it is more difficult for them to find food, water, shelter, mates, and protection from predators. Genetic problems such as inbreeding appear, and populations become more susceptible to catastrophic events such as wildfire. The resulting fragmented habitat inevitably leads to smaller populations of wildlife, and extinction of populations or species becomes more likely.

We also strongly recommend that the guidelines look very closely at avoiding incompatible land uses. In addition to the discussion above regarding avoiding sensitive habitats, we also recommend that the guidelines address potentially incompatible land management actions such as grazing next to wind turbines.

Finally, any management actions designed to avoid, minimize, or otherwise mitigate impacts to wildlife must also be monitored adequately to demonstrate success or need for adaptive measures. Not only will this ensure that the techniques are effective, it will also provide critical data to inform the state of the knowledge on effective methods that the wind industry can employ in other areas. The guidelines must require that wind energy projects must implement and monitor contingency plans and adaptive measures to determine success and to address the potential environmental impacts.

As a last issue, Defenders would also like to highlight that the development of the wind energy guidelines also provides a unique opportunity to address the problem of a lack of science and data regarding wind energy projects and their impacts on wildlife, particularly bats. We strongly urge the CEC, as it works with scientific experts and state and federal wildlife agencies, to look at developing a pro-active research agenda. Research is needed not only to establish a baseline for wildlife on the landscape, but also to look at management practices and technology, distribution of wildlife species, changing environmental landscapes (e.g., the effect of climate change), and cumulative impacts. Research funding is limited. Therefore, it is important to prioritize funding in way that is the most efficient and effective use of those dollars for the benefit of both wildlife and wind energy companies.

We thank you for the opportunity to provide these comments. If you have any questions or comments, please do not hesitate to contact me at (916) 313-5800 ex. 109. We look forward to working with the CEC in the development of these statewide guidelines. Again, we commend the Commission for its pro-active and visionary leadership on this important energy and wildlife issue.

Sincerely,

Kim Delfino
California Program Director

ATTACHMENT A

RENEWABLE ENERGY
WIND ENERGY RESOURCES
PRINCIPLES AND RECOMMENDATIONS

Developed by Defenders of Wildlife

Current wind power generating capacity is 1,698 MW, which represents only 0.2% of America's electricity generation capacity. This number is projected to increase threefold by 2020, and has the potential to supply much more energy. The tremendous potential of wind energy to provide a clean, economical and renewable supply of electricity must be weighed against the potential for wind energy development to result in bird mortality, and the potential that wind farms could degrade important habitat.

Defenders believes that all wind energy initiatives should Adhere to the following principles:

Minimize bird and bat mortality

Bird and bat mortality can usually be kept to a minimum by ensuring appropriate siting of the wind farm, selecting appropriate turbine types and arrangement, and by using tower and turbine designs that cause the least mortality. Research indicates that the most severe problems with bird and bat mortality occur at older wind farms, with newer farms having considerably lower mortality rates; moreover, turbine collisions appear to cause far fewer bird fatalities than other anthropogenic factors, such as domestic cats.

For more information on this issue, please see the National Wind Technology Center.

Avoid incompatible land uses

Wind farms are most appropriately located in areas where there are existing compatible land uses, such as in many agricultural areas. They are less appropriate, and can be inappropriate, in undisturbed areas such as roadless areas or lands with scenic vistas, especially on public lands. New road building should be minimized, and best landscape practices should be used at all times to minimize erosion, water pollution, and disruption of surrounding habitats.

Avoid creating nuisances to humans

Noise, visual impacts, and electromagnetic interference are all nuisance-like conditions that should be avoided when siting wind farms. Ensuring compliance with zoning laws and allowing full public participation in siting decisions will do much to minimize these concerns, and current technology has reduced these problems relative to noise and electromagnetic interference.

Specific Recommendations for Wind Energy:

1. Bird and Bat Mortality Should Be Minimized

Background

Concerns about turbine-related bird mortality stem largely from the experience at Altamont Pass, California. The Altamont Pass Wind Resource Area (WRA) has approximately 6,500 wind turbines on 190 km^2 of rolling grassland and is situated just east of the San Francisco Bay (Hunt et al. 1998). Between 1989 and 1991, 182 dead birds were found in study plots associated with wind turbines, and approximately 39 golden eagles per year were killed by turbines (Orloff & Flannery 1992). Golden eagles, red-tailed hawks and American kestrels had higher mortality than more common American ravens and turkey vultures (Orloff & Flannery 1992, 1996; Thelander & Rugge 2000, 2001). Deaths of eagles and potential danger to endangered California condors have raised the biggest issues at Altamont Pass.

Bird mortality at comparably sized wind facilities has been recorded comparable to or lower than those at Altamont Pass. At San Gorgonio pass, a California facility with 2,700 turbines located along the Pacific migratory flyway, Southern California Edison estimates mortality of 3900 to 6900 birds per year (McCrary et al. 1993). At Tehachapi Pass, another California wind facility with 3,700 turbines, researchers calculated a bird risk factor (mortality rate / utilization rate) of 0.0242 (Anderson et al. 1996). At the 600-turbine Solano County site, overall mortality was estimated at 0.029 to 0.074 birds/turbine/yr (Howell & Noon 1992). Smaller windpower facilities all around the country have recorded low numbers of bird and bat mortality (Strickland et al. 2001, see also www.currykerlinger.com).

Fifteen years of study of the siting and design have helped to limit the impact of wind generation on bird populations. Bat mortality studies, on the other hand, are still at a preliminary phase, and more information is needed to properly assess bat mortality and manage turbine facilities to minimize this mortality (Keeley et al. 2001). Defenders believes that this research should continue to inform wind power decisions, and should be expanded to further elucidate the impacts of wind energy on bats and other wildlife.

Bird mortality from wind turbines should be put into perspective. The Cato Institute projects: "Ten thousand *cumulative* (emphasis added) bird deaths from 1,731 MW of installed U.S. capacity [as of 1995] are the equivalent of 4.4 million bird deaths across the entire capacity of the U.S. electricity market (approximately 770 GW)" (Bradley 1997), and uses this figure as argument against expansion of wind energy. However, in reality, even if wind power supplied all of the country's electricity, bird fatalities would still be dwarfed by the mortality figures for other types of structures: vehicles, 60 to 80 million; buildings, 98 to 980 million; power lines, up to 174 million; communication towers, 4 to 50 million (Erickson et al. 2001). Furthermore, the American Bird Conservancy estimates that feral and domestic outdoor cats probably kill on the order of hundreds of millions of birds per year (Case 2000). One study estimated that in Wisconsin alone, annual bird kill by rural cats might range from 7.8 to 217 million birds per year (Colemen & Temple 1995).

Furthermore, the costs of not adopting alternative energy strategies based on renewable energy sources such as wind are potentially enormous. Global climate change is predicted to result in countless bird deaths through large-scale alteration of breeding habitats (Gates 1993). Additionally, migratory stopovers could be affected by climate change because bird migration periods might no longer be synchronized with maximum food production times. Shorebird and waterfowl habitats could be altered. Global warming effects aside, the oil industry remains a source of bird mortality: the Exxon *Valdez* oil spill is estimated to have killed 375,000 to 500,000 birds (Gipe 1995).

One wind industry research task force "takes the view that some level of mortality associated with wind plant operations is acceptable, so long as it does not influence the long-term population viability of any species negatively" (Cade 1995). Defenders of Wildlife believes that wind energy production should be expanded, with bird and bat mortality minimized via careful attention to issues of wind farm siting, turbine arrangement and design, and land management.

Wind Farm Siting

At the Altamont Pass WRA, turbines within 500 feet of canyons (prey areas) were found to be associated with higher raptor mortality. Mortality is also higher at turbines at higher elevations (Orloff & Flannery 1992). Many of the negative impacts on birds and bats can thus be avoided by assessing usage and avoiding those areas where wildlife use is predicted to be highest (Cade 1995). Site evaluation should include habitat quality, bird abundance, bird use, prey base, migratory movements, and night use (PNAWPPM-II 1996). Preliminary bird surveys should include reviews of existing information on threatened and endangered species, candidate species, species of concern, and migratory species, particularly neotropical migrants (Gauthreaux 1995). Population censuses pre-and post construction should include breeding bird censuses, winter bird population studies, and spring and fall migration counts (Gauthreaux 1995).

Radar is a useful tool for studying bird and bat movements through proposed and existing wind power areas, particularly at night and during periods of low visibility; however taxa are indistinguishable (Cooper

1996). Guidelines for site evaluation are available (Anderson et al.1999), as are models to predict the impact of predicted mortality rates on bird populations (Shenk et al. 1996).

Within-Farm Turbine Arrangement and Usage

At Altamont Pass, bird mortality is higher at end turbines (Orloff & Flannery 1992), but is just as high within strings (rows) where there are gaps of 35m or more between two of the turbines in the row (Thelander & Rugge 2001). Altamont Pass mortality is also higher at sites with lower turbine density (Orloff & Flannery 1992). From these observations, it appears that more densely packed turbines present a visual obstacle to birds and therefore cause less mortality, while less dense arrangement of turbines might present less of a deterrent to bird passage, resulting in higher mortality. However, high turbine density might create more of a barrier to usage of the area by mammals.

At Altamont Pass, perching frequency was higher at end turbines than interior turbines (Orloff & Flannery 1996). This has been postulated as one of the factors causing increased mortality. "For example, steep slopes with available prey may be particularly attractive to red-tailed hawks in warm, strong winds if the aspect of the slope faces the wind condition. During these conditions the turbines on slopes that fit this model could be turned off or painted with bird-deterring visual cues" (Hoover et al. 2001). End turbines should be designed so as to discourage use as a perch site, and perhaps equipped with non-lethal repellant devices.

Design

Wind turbines of various designs differ in associated mortality. For instance, horizontal lattice towers (resembling radio towers) had high bird mortality at Altamont Pass, probably because raptors perched on the lattices (Orloff & Flannery 1992). This tower type has been discontinued, and all new turbines are built with a solid tubular tower.

Current turbine research centers on the relationship between various aspects of blade design and mortality or avoidance by raptors. At Altamont Pass, raptor deaths are associated with faster "tip speed" and at turbines that are in operation for a greater percent of time (Orloff & Flannery 1996). Variable-pitch blades may cause more mortality than fixed-pitch blades, but this effect may have been confounded by the fact that many of the variable-pitch turbines also had lattice towers (Orloff & Flannery 1996). On the other hand, no significant differences were found between "free-yaw turbines" (which move freely with changes in wind direction) and "driven-yaw" turbines (which have a sensor and motor to orient them to wind) (Orloff & Flannery 1996).

Turbine blades can also be designed in a way that makes them more visible to birds – wide black and white bands across the blade appear to make them more visible to kestrels and red-tailed hawks (McIsaac 2000). Other research suggests that using a single solid black blade and two white blades works equally well (Hodos et al. 2000). Research on birds' ability to hear blades is still in its infancy, but preliminary results indicate that birds do not hear turbines as well as humans do (Dooling & Lohr 2000).

Land Management

Raptor mortality at wind farm sites is correlated with raptor abundance and the proximity of habitat to a wind farm site (Orloff 1992). Where possible, pre-construction surveys and habitat analysis should minimize development of wind projects in prime raptor habitat. When species of concern are located near a wind farm, specific management must be undertaken. For example, in areas where endangered condor is being restored, wind farms should not be located near critical habitat or release sites. Grazing and other land uses that attract condors should be minimized near these wind farms and negative conditioning should be employed .

Cattle grazing in the Altamont Pass area has probably encouraged high populations of pocket gophers and ground squirrels, resulting in a large prey base that is likely attractive to red-tailed hawks and golden eagles (Smallwood et al. 2001). Pocket gophers, in particular, exhibit high densities near turbines in the Altamont Pass area. This might be a function of the maintenance of low-stature vegetation around the turbines. Smallwood et al. (2001) recommend several techniques for minimizing the attractiveness of turbines to small mammals (an therefore raptors): (1) Minimize road cuts, which are favored by pocket gophers and ground squirrels; (2) Maintain higher-height vegetation because pocket gophers and ground squirrels prefer short vegetation; and (3) Maintain no vegetation around the turbines, or use non-attractive plant species. This article recommended yellow-star thistle, a choice Defenders would oppose on the grounds that it is an exotic invasive species. Landscape management should minimize prey density in at least a 50-75 meter radius of turbines in raptor areas. Management strategies should take into account the habitat preferences of resident small mammal species. However, in no circumstance would Defenders advocate surrounding wind turbines with any demonstrated or potentially invasive species.

2. Incompatible Land Uses Should Be Avoided

Destruction Of Native Habitat For Turbine Construction Should Be Avoided--It Is *Preferable To Locate Turbines In Conjunction With Existing, Compatible Land Uses*

Habitat Loss and disturbance effects have been documented in Europe at a radius of 250 to 500 meters from turbines, and this might be more significant to birds than collision mortality (Winkelman 1995). Suitable locations for turbines might be areas already under medium-intensity land uses, such as agricultural lands, pastureland, and defunct strip mines.

New Road Construction Should Be Avoided

Wind farm development should not be a driver for the construction of new roads, particularly in large tracts of contiguous, roadless forest or other habitats. The existing road network should be utilized where possible.

Measures Should Be Taken To Minimize Erosion, Water Pollution And Habitat Disturbance During Construction

Best landscape practices should be undertaken during all phases of wind turbine installation, to minimize soil loss, water pollution and disruption of surrounding habitats.

3. Nuisance Situations Should Be Avoided

Noise

This is less of a factor than with earlier-generation wind turbines, as technology has lowered noise levels to a range comparable with the decibel level of an office environment (Carless 1993). Location of wind farms should comply with zoning requirements with respect to distance to residences and allowable noise levels (www.nationalwind.org).

Visual Impacts

Visual impacts are difficult to quantify. Many wind turbines maximize visibility, however, because maximum wind effect is often found at areas of high elevation and open ground. Design principles should be employed to reduce visual impacts, and the construction of new wind farms should include public input in order to decrease public opposition and account for local concerns about viewsheds, etc.

Electromagnetic Interference

Electromagnetic interference has decreased significantly from first-generation turbines, as current technology generally uses fiberglass blades (Carless 1993). However, if steel blades are to be used, care should be taken to minimize electromagnetic interference.

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