

Oregon Columbia Plateau Ecoregion Wind Energy

Siting and Permitting Guidelines

September 29, 2008

In the fall of 2007, representatives from the wind energy industry, counties, environmental organizations, consultants and state and federal resource agencies (the Taskforce) convened to collaboratively develop wind energy siting and permitting guidelines for the Columbia Plateau Ecoregion¹ (Guidelines). For almost a year the Taskforce compiled and synthesized current industry practices, agency recommendations, environmental concerns, and supportive science. These Guidelines apply to the five counties where the majority of Oregon's wind energy development is ongoing.

The Taskforce believes these Guidelines represent a successful balance between environmental protection and future development of renewable wind energy resources in the Oregon Columbia Plateau Ecoregion. The intention of the Taskforce is that wind project developers, resource agencies, permitting authorities and other stakeholders consistently apply these Guidelines. The success of these Guidelines requires training and understanding by relevant agencies, counties, and other stakeholders.

The Taskforce recognized that while the expansion of wind power resources has the potential to significantly impact wildlife and habitat, it also provides significant environmental and economic benefits. Maximizing the Ecoregion's wind energy generation potential will be an important factor in achieving Oregon's renewable energy and climate change targets. These guidelines seek to support future wind energy development, thereby achieving multiple environmentally beneficial goals, while providing careful guidance towards protection and conservation of important biological resources.

As wind energy development expands to other areas within Oregon outside the Columbia Plateau Ecoregion, the Taskforce hopes to amend these Guidelines to provide regionally specific guidance. Until separate regional guidelines can be developed, the Taskforce recommends using these Guidelines as a roadmap during each step of a potential wind project's development, construction, and operation.

These Guidelines do not expand or alter any of the existing laws, regulations, or other authorities under which local, state and federal agencies and permitting authorities operate. However, to fulfill the intent of these Guidelines, modifications to wind project developer and permitting authority practices and procedures may be necessary. It is expected that wind project developers and relevant permitting authorities will use all their means to implement these Guidelines, in a unified, consistent fashion.

¹ As defined in the ODFW wildlife conservation strategy. See Appendix for a map of the Ecoregion.

Participant List

Renewable Northwest Project

United States Fish & Wildlife Service

Oregon Department of Fish & Wildlife

Oregon Department of Energy

Washington Department of Fish & Wildlife

Sherman County

Morrow County

Klickitat County

Iberdrola Renewables

Horizon Wind Energy

Portland General Electric

Eugene Water & Electric Board

Audubon Society of Portland

Lane County Audubon

The Nature Conservancy

Stoel Rives, LLP

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Introduction

In the fall of 2007, the Oregon Department of Fish and Wildlife (ODFW), the Oregon Department of Energy (ODOE) and the United States Fish and Wildlife Service (USFWS) initiated a stakeholder Taskforce (Taskforce) to assess current and future project facility siting and permitting in Oregon's Columbia Plateau Ecoregion²(Ecoregion). The Taskforce included conservation and environmental organizations, wind project developers, local governments, and representatives of USFWS, ODFW, ODOE, and Washington Department of Fish and Wildlife (WDFW). As wind project development continues to rapidly expand in the Ecoregion, the Taskforce is charged with developing regionally consistent, voluntary siting and permitting guidelines that allow for additional wind power development while avoiding or minimizing impacts to wildlife resources. Consistent application of these guidelines by all wind developers, permitting authorities, resource agencies, and interested stakeholders is essential to successfully balance expansion of wind power resources in the region with conservation of wildlife resources. It is the Taskforce's view that while these guidelines were developed for specific application on the Oregon side of the Ecoregion, the guidelines process and approach can be adapted to other Oregon ecoregions and across state lines, and that a coordinated, consistent approach across the region is desirable.

The Taskforce recognized that while the expansion of wind power resources has the potential to significantly impact wildlife and habitat, it also provides significant environmental benefits. The Oregon legislature has acknowledged the environmental benefits of the wind industry through the passage of related legislation. Oregon law requires utilities to provide 25% renewable energy to their customers by 2025. In addition, Oregon has established goals to reduce greenhouse gas emissions by 75% below 1990 levels by 2050. Maximizing the Ecoregion's wind energy generation potential will be an important factor in achieving Oregon's renewable energy and climate change targets. These guidelines seek to support future wind energy development, thereby achieving multiple environmentally beneficial goals, while providing careful guidance towards protection and conservation of important biological resources.

The purpose of the guidelines is to ensure that wind project siting and permitting for all project sizes within the Ecoregion in Oregon, at **all permitting jurisdictional levels** (both county-level conditional use permitting and the Oregon Energy Facility Siting Council (EFSC) site certification process³) is protective of important biological resources. While these Guidelines were designed to help wind project developers comply with state and federal wildlife regulations and policy, they do not in any way supersede or delegate current regulation at the state and federal level.

The regulatory environment for the siting of wind projects in the Ecoregion is governed by multiple agencies at the Federal, State and Local levels. Each of these agencies can apply requirements to a wind project. Wind project developers should meet with regulators and

² A map of the Columbia Plateau Ecoregion of Oregon is included in the Appendix.

³ <http://www.oregon.gov/ENERGY/SITING/index.shtml>

potentially interested stakeholders such as non-governmental organizations with wildlife expertise and tribal governments early in the wind project planning process to understand those regulatory requirements and wildlife impact concerns that may be applicable for the project.

At the Federal level, applicable laws include, but are not limited to, the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), the Endangered Species Act (ESA), and the Clean Water Act. The MBTA prohibits the taking of migratory birds except when specifically authorized by the Department of Interior (16 USC 703). Most native songbirds, wading birds, waterfowl and birds of prey are protected under the MBTA. The USFWS encourages proactive consultation between USFWS, other resource agencies, wind project developers and the permitting authority regarding the applicability of federal wildlife laws to a wind project.

At the state level, all wind projects in Oregon over 105 megawatts (MW) are reviewed and approved through a formal process coordinated by the ODOE. Wind projects smaller than 105 MW may opt into the state siting process. The formal process leads to a site certificate issued by the Oregon Energy Facility Siting Council (EFSC). Oregon EFSC guidelines state “to issue a site certificate, the [Energy Facility Siting] Council must find that the design, construction and operation of the facility, taking into account mitigation, are consistent with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025 in effect as of September 1, 2000.” Early consultation with ODFW can clarify those fish and wildlife mitigation goals and standards (see Appendix, Table 3).

At the local level, wind projects less than 105 MW are approved through a local land use procedure requiring a conditional use permit. Counties which review wind project proposals less than 105 MW in the Oregon portion of the Columbia Plateau include Wasco, Sherman, Gilliam, Morrow and Umatilla counties. Each county may have a different set of local energy facility siting criteria as some counties have adopted criteria of varied nature and complexity.

These Guidelines include specific recommendations for each phase of facility site selection, development, and operation. These wind project recommendations include consistent strategies to avoid key wildlife habitat, minimize other wind project-related impacts to habitat and wildlife, and mitigate strategies for unavoidable wind project impacts. A key recommendation that is continually stressed herein is the value of the wind developer seeking early consultation with local, state, and federal natural resource agencies. Consistent application of these Guidelines across the Ecoregion will be critical to their effectiveness. These Guidelines are designed to develop best wildlife and habitat conservation practices for wind development by (in part) creating incentives to direct wind farm development away from the highest value wildlife habitat (avoid habitat categories 1, 2,) and towards sites of lower biological value (target development on habitat categories 4, 5 and 6).

These Guidelines recommend five sequential phases: the first phase, macrositing, identifies conflicts that may make a wind project prohibitively difficult to permit from a wildlife perspective before significant investment is made by wind project developers. The second phase, pre-project assessment, identifies and assesses wildlife and habitat resources on the potential wind project site and identifies macrositing corridors that will be utilized to locate specific turbines and associated infrastructure. The third phase, macrositing, determines the final wind project design

(i.e., the final placement of turbines, roads, transmission lines, other wind project features). The fourth phase, construction, seeks to avoid and minimize impacts to wildlife by following protective measures. The fifth phase, operational monitoring, determines the actual direct mortality impacts of the wind project on wildlife and involves working with a Technical Advisory Committee (TAC) to review the results of monitoring data and make suggestions regarding the need to adjust mitigation and monitoring requirements. For projects regulated by EFSC, the project proponent should work with the USFWS, ODFW and ODOE and EFSC will determine appropriate actions. Next, these Guidelines describe mitigation strategies to compensate for unavoidable temporary and permanent impacts to habitat and wildlife species due to wind project development and operation. Finally, the Guidelines include programmatic recommendations, particularly three recommendations of high priority.

Included in the Appendix is a summary of information regarding the currently known cumulative wildlife and habitat impacts of wind energy development in the Columbia Plateau Ecoregion. Recommendations included in this summary are intended to inform future wind project planning and development within the Columbia Plateau Ecoregion, as well as direct resources to more fully understand indirect cumulative effects.

A table displaying the sequence of the five wind development and operation phases and relationship to project permitting is provided below.

Phase	Timing	Task
1 - Macrositing	Early evaluation of potential wind project site	Information/desktop review of habitat, wildlife, plants, and cumulative impacts; review of regulatory requirements; preliminary scoping of potential issues with resource agencies and permitting authorities
2- Pre-Project Assessment	During preparation of permit application	Identification of macrositing corridors, habitat mapping; early coordination with resource agencies regarding survey protocols; undertake raptor surveys; avian use surveys; T/E species and other wildlife surveys; assessment of project impacts; presentation of habitat mitigation proposal and initial calculation of habitat mitigation acreages to resource agencies.
Submit Permit Application for Agency and Public Review		
	Permit application review	Review of application by resource agencies and permitting authority for completeness. Scoping/public

		comment period. Wind project developers are encouraged to engage stakeholders with wildlife expertise.
Phase	Timing	Task
Permit Issued		
3 - Micrositing	Can occur prior to or after permit issuance, and continues through construction.	Initial micrositing to minimize habitat and wildlife impacts. Continuation of discussions with resource agencies.
4- Construction	After permit is issued, prior to and during construction.	Identification of key compliance staff; environmental training; flagging and micrositing to avoid sensitive resources; implementation of construction best management practices (BMPs).
5- Operation	After construction, during operations.	Implementation of habitat mitigation prior to wind project operation start date; site revegetation; operational monitoring; engagement with the TAC; determine potential additional mitigation with resource agencies and permitting authority as necessary.

Wind Project Development and Operations Phases

1.0 Macrositing – Preliminary Site Review

Macrositing is a proactive process for identifying potentially significant wildlife and habitat conflicts early on in the site selection process for new wind farm projects. Macrositing should be viewed as a coarse wind project siting filter based primarily upon pre-existing information of the natural resource values located on and in close proximity to the proposed development site. This initial step in siting a project is meant to identify conflicts that may make a project prohibitively difficult to permit from a wildlife perspective before significant investment is made by project developers. Pursuing wind projects on sites where there are significant wildlife concerns should trigger elevated pre- and post-construction surveying and monitoring requirements, longer review processes, increased site development restrictions, and higher mitigation ratios compared to development of wind power projects on previously disturbed sites with lower wildlife habitat value where these requirements may be significantly reduced.

The macrositing assessment should consist of a preliminary reconnaissance field survey and a desktop review of existing information about the proposed development site. Recommended components of a macrositing review process for the proposed wind project site include broad habitat, wildlife, plant, cumulative effects, and agency/stakeholder interviews. Not all of the individual elements listed below will be prohibitive of development, but each of the elements should be considered individually and collectively to develop a preliminary understanding of wildlife impact-related project feasibility.

Wind Resource Review

1. Temporary meteorological towers (met towers) are deployed to determine if adequate wind resources occur on potential wind project sites. To the extent feasible, temporary met towers for potential wind project sites should be deployed in locations that avoid likelihood of wildlife collisions. Project developers should remove all temporary met towers and associated equipment after they are no longer needed, including removal of temporary met towers from potential wind project sites where no additional development effort is expected to be undertaken.

Habitat Review

1. Identification of habitat types and habitat categorization as per ODFW's Fish and Wildlife Habitat Mitigation Policy (Oregon Administrative Rules [OAR] 635-415-0000 through 635-415-0025, http://www.dfw.state.or.us/lands/mitigation_policy.asp) for the potential wind project development site. These habitat types and categories should be determined on a site specific basis through consultation with ODFW⁴. ODFW considers Category 1 habitats irreplaceable. These Guidelines recommend that wind developers, under all circumstances, should avoid Category 1 habitats. These Guidelines strongly discourage

⁴ See Appendix for additional detail.

wind developers from pursuing project development activities on Category 2 habitat, and strongly encourage wind developers to pursue project development activities on categories 4, 5, and 6 habitats.

2. Review of ODFW Conservation Opportunity Areas, Strategy Habitats and Strategy Species, as described within the Oregon Conservation Strategy (ODFW February 2006 – <http://www.dfw.state.or.us/conservationstrategy/>).
3. Review of other existing wildlife and habitat data systems including Oregon Natural Heritage Database, Defenders of Wildlife Conservation Registry, Partners in Flight Bird Conservation Areas, Audubon Important Bird Areas, The Nature Conservancy Conservation Areas, etc.
4. Review of potential ecological impacts to proximal protected, public and private wildlife refuges and wildlife areas.
5. Evaluation of the presence of habitat types of specific concern, including native grasslands, shrub-steppe, oak-pine woodlands, riparian woodlands, cliffs, Washington ground squirrel burrow complexes and required adjacent habitat for squirrel survival, big game winter range, and riparian corridors.
6. Evaluation of potential impacts on proximal recognized or probable migratory corridors or existence of topographic features, such as ridges or peninsulas that could funnel migratory species towards a wind power facility.
7. Review of occurrence of seasonal weather conditions, such as dense fog or low cloud cover, which may increase risk of bird and bat collisions with wind towers.

Wildlife Review

1. Presence of state or federally listed Endangered, Threatened or Sensitive Species, designated Critical Habitat, or other important wildlife habitat.
2. Presence of priority Strategy wildlife species identified in the Oregon Conservation Strategy for the Columbia Plateau Ecoregion, including but not limited to, brewer's sparrow, ferruginous hawk, grasshopper sparrow, Lewis' woodpecker, loggerhead shrike, long-billed curlew, sage sparrow, Swainson's hawk, burrowing owl, pallid bat, Townsend's big-eared bat, Washington ground squirrel, and northern sagebrush lizard.
3. Proximity to known bat colonies or important bat habitat.
4. Presence of species vulnerable to habitat loss or displacement.

Plant Review

1. Presence of state or federally listed plant species.
2. Presence of priority Strategy plant species identified in the Oregon Conservation Strategy.

Cumulative Impacts Review

1. Presence of existing proximal wind power developments.
2. Presence of other proximal causes of wildlife mortality.

Tabletop Review with Agencies and Stakeholders

1. Preliminary scoping conversations with state and local natural resource agencies, permitting entities, land managers and conservation organizations.
2. Preliminary consideration of laws and regulations (MBTA, ESA, BGEPA, Clean Water Act, Oregon Fill-Removal Law, and State Endangered Species Act).

In certain instances, where wildlife and/or habitat conflicts are identified via the macrositing process, it may be possible to design a project to avoid or minimize impacts to biological resources. In other instances wildlife and habitat priorities (e.g. listed species, Category 1 habitat) may make it prohibitively difficult to develop acceptable mitigation plans. In either situation, early knowledge of potentially significant wildlife and/or habitat conflicts should serve as a strong caution to project developers considering further investment in exploration of wind farm development on these areas of concern. If a project in an area of high natural resources concern does proceed beyond macrositing to the permitting stage and eventual wind project construction, extensive additional pre-development site-specific surveying and operational monitoring may be necessary (described in the Pre-project Assessment and Operational Monitoring sections) to identify, quantify, and mitigate specific wildlife and habitat impacts.

2.0 Pre-Project Assessment

When a potential wind project moves past the broad macrositing stage and wind resources prove to be adequate, onsite field study is necessary to further assess the site's suitability for wind energy development and, if appropriate, determine the general location of facilities within the specific parcels. The objective of this phase is to identify and assess micrositing corridors that will be utilized to locate specific turbines and associated infrastructure. The components of this phase include field studies and coordination with the permitting authority and resource agencies (i.e. state and federal wildlife agencies).

Recommended pre-project assessment components are discussed below. The pre-project assessment should be designed in consultation with the permitting authority, resource agencies and interested stakeholders with wildlife expertise. The site-specific components and the duration of the pre-project assessment should depend on the size of the project, the availability and extent of existing and applicable information in the vicinity of the project, the habitats potentially affected, the likelihood and timing of occurrence of Threatened and Endangered and other Sensitive-Status (TES) species at the site, and other factors identified during early resource agency coordination. If applicable pre-existing information is available, the project developer, permitting authority, and resource agencies should take this information into consideration when designing (and potentially modifying) the baseline studies identified below. Conversely, in areas where pre-existing information is not available or in areas of unique biological significance and/or high quality habitat, additional study may be required. The results of the information review and baseline studies should be reported to and discussed with the permitting authority and resource agencies in a timely fashion.

Identify Micrositing Corridors

Micrositing corridors represent a surveyed area within which turbines, associated access roads, collector cables and other project facilities are proposed. The micrositing corridors are centered on the preliminary project layout, and range in width depending on site and habitat conditions and the need for micrositing flexibility. The project developer should identify the micrositing corridors early in the development process, map the habitat and habitat categories within and adjacent to these corridors, and conduct all biological resource surveys, as described below. This information would be used for the project impact assessment and included in permit application materials. After the project is permitted, the turbines and other project facilities are sited within the micrositing corridors identified. These facilities may be located slightly outside the micrositing corridors if they have been adequately surveyed for biological and cultural resources before construction. Final project feature locations should comply with all applicable permit conditions. Final facility micrositing, where specific locations of project features are determined, is discussed further in Section 4.0, Micrositing – Final Project Design.

Habitat Mapping

Information about general vegetation and land cover types, wildlife habitat, habitat quality, extent of noxious weeds, and physical characteristics within the project site⁵ should be collected and compiled using best available standards.

All habitat within the project site should be mapped into specific, clearly defined habitat types, such as grassland, shrub-steppe, woodland, cropland, and Conservation Reserve Program (CRP). These broad habitat types should be further defined within the micrositing corridor into subtypes based on additional field surveys, and rated according to the ODFW habitat categories (as defined by the ODFW Fish and Wildlife Habitat Mitigation Policy; see Appendix for further information).

Raptor Nest Surveys

One full season of raptor nest surveys should be conducted, using best available standards. Consult with the local resource agency biologist as to the species to survey near the boundaries of the micrositing corridors and the appropriate timing of surveys for the applicable species. Survey(s) should determine the species and nest location(s) that will potentially be disturbed by construction activities. The survey(s) should also identify active, potentially active, and alternate or historic (active within the past five years) nest sites with the highest likelihood of impacts from the operation of the wind project. A larger survey area outside the boundaries of the micrositing corridors may be necessary if there is a likelihood of nesting or other use by state and/or federally protected or sensitive raptor species (e.g., ferruginous hawk, Swainson's hawk, bald eagle, golden eagle). A larger survey area will also be useful if the wind project is implementing site-specific studies on wildlife displacement impacts (see Wildlife Displacement Section,

⁵ Site – a project “site” is defined as the project area bounded on all sides by the furthest most external perimeter of any ground disturbing activity and includes gravel sites used for construction, overhead and underground electrical routes, and new and upgraded substations. When EFSC is the permitting authority, wind developers should refer to EFSC site boundary definitions.

below). Additional surveys may be required depending on resource agency guidance, site-specific conditions, and preliminary findings.

All potential and confirmed raptor nests should be recorded, regardless of activity status. If possible, inactive nests (without sign of use) should be assessed for nest age, species of use, and estimation of last season used.

General Avian Use Surveys

In general, one full year of avian (including raptors, passerines, etc.) use surveys should be conducted in the project site, using best available standards. Surveys should be designed by species group and by season, as appropriate for the wind project area and its habitat types. Two or more years of seasonal data is recommended in the following cases: 1) use of the project site by the avian groups of concern is estimated to be high, 2) there is little existing relevant data regarding seasonal use of the wind project site or on nearby areas of similar habitat type, and/or 3) the wind project is especially large and/or complex. This additional avian use data should be collected to refine impact predictions and make decisions on project design. Survey durations may also be reduced dependent upon availability of pre-existing relevant survey data.

Survey protocol and duration should be discussed with the permitting authority and resource agencies prior to commencement of surveys. Best available standards should be used to design survey protocols. Good references for designing survey protocols are the National Wind Coordinating Collaborative Guidance Documents (www.nationalwind.org), listed below. Please note that these documents undergo frequent revisions.

Anderson et al. 1999 *Studying Wind Energy/Bird Interactions: A Guidance Document Metrics and Methods for Determining or Monitoring Potential Impacts On Birds At Existing And Proposed Wind Energy Sites*. National Wind Coordinating Committee
http://www.nationalwind.org/publications/wildlife/avian99/Avian_booklet.pdf

Anderson et al. 2003. *The Proper Use Of "Studying Wind Energy/Bird Interactions: A Guidance Document."* (addendum to the 1999 document) National Wind Coordinating Committee
http://www.nationalwind.org/publications/proper-use_mm.pdf

Kunz et al. 2007. *Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document*. National Wind Coordinating Committee
http://www.nationalwind.org/pdf/Nocturnal_MM_Final-JWM.pdf

Surveys for Threatened, Endangered and Sensitive Species

If existing information suggests the probable occurrence of state and/or federal TES species in the micro-siting corridor (e.g., presence of suitable habitat or past sightings on-site or in the vicinity), surveys using best available standards are recommended during the appropriate season to determine the presence or likelihood of presence of the TES species. For example, if bald eagles are expected to concentrate in or near the project vicinity during winter, targeted surveys to estimate bald eagle use of the site would be appropriate. If the project is located in the known range of the state-endangered Washington ground squirrel, surveys using best available standards should be conducted in suitable Washington ground squirrel habitat. Other

multi-species surveys may also be appropriate. Survey protocol should be discussed with the permitting authority and resource agencies prior to commencement of the surveys.

Bat Surveys

Conduct bat surveys using best available standards if determined to be necessary after consultation with resource agencies. Appropriate methods, survey periods and locations depend on local environmental conditions and elevation, and vary by species and/or life stage.

Additional Wildlife Surveys

If additional species of concern (e.g., mammals, fish, reptiles, amphibians, invertebrates, etc.) may be in the project area, appropriate surveys using appropriate species-specific protocols may be conducted if determined to be necessary after consultation with resource agencies. Discuss appropriate methods, survey periods and locations with the permitting authority and resource agencies prior to commencement of the surveys.

Cumulative Impacts Report

Wind developers should summarize existing available data on wildlife impacts associated with existing wind projects proximal to proposed wind projects. This information should include habitat, displacement and mortality data and an estimation of how the new proposed wind project may affect those impacts.

Coordination

The permitting authority and resource agencies should be involved in site visits, study design, review of study results, and application of these results as they inform project design.

3.0 Micrositing – Final Project Design

Final project design (i.e., the final locations of wind turbines, roads, transmission lines, other wind project features) within the micrositing corridor is determined in this phase, and is informed by the constraints identified in the habitat mapping and other studies from Pre-Project Assessment and the subsequent conditions of permit approval. As appropriate, final wind project design should occur in consultation with the permitting authority and resource agencies and seek to avoid and/or minimize biological resource concerns, based on their input and issues of constraint identified during pre-project assessment. If further engineering design requires the wind project developer to seek to locate facilities outside of the previously surveyed micrositing corridors, the wind project developer should consult with the permitting authority and resource agencies to determine additional survey requirements.

Final wind project design should be an iterative process that should involve considerations and trade-offs between engineering, constructability, and natural resource considerations. Final wind project design should consider biological resource surveys, resource agency input, and associated permit conditions such as avoidance criteria. For instance, final location of wind project facilities may be limited by topography, meteorology and geotechnical considerations.

During final wind project design, the wind project developer and their biology consultant, working with the permitting authority and resource agencies, should continually evaluate tradeoffs among: locations of turbines, crane paths, roads, collector cables (overhead vs. underground), and other facilities; potential impacts to habitat and species that may occur; and mitigation that may be required.

Below are considerations for avoiding and/or minimizing impacts to biological resources when finalizing wind project design. These considerations should also be addressed in the permitting process and permit conditions.

Within micro-siting corridors, where feasible:

- Encourage siting on agricultural lands, including using existing transmission corridors and roads where feasible.
- Protect specifically identified key habitat sites, such as raptor nests, flight routes, cliffs, high bird or bat concentration areas (especially concentration areas of sensitive status species), breeding sites, contiguous habitat where area-dependant species are present, and core habitat areas for displacement-sensitive species.
- Use tubular turbine towers to reduce perching ability and to reduce the risk of avian collision. Avoid the use of lattice turbine towers, particularly those with horizontal cross-members.
- Avoid use of guy-wired permanent meteorological towers.
- Discourage overhead collector lines⁶, unless underground collector lines are not feasible to construct (e.g., soil conductivity), the overhead collection line option has lower environmental impact, or the cost of overhead collector lines would make the wind project commercially infeasible. Overhead collector lines should be constructed in accordance with the recommendations of the Avian Power Line Interaction Committee⁷ for raptor protection on power lines, including minimum conductor spacing. Anti-perching devices should be installed on transmission pole tops and cross arms where the poles are located within 0.5 mile of turbines.

Wind Project Lighting

These Guidelines recommend minimizing wind project lighting wherever possible, except where required by the FAA. Wind project lights may attract wildlife and increase the potential for wildlife mortality.

⁶ Collector lines are lower voltage underground or overhead power lines that deliver electricity from the turbine strings to the project substation. Collector lines do not include grid transmission lines.

⁷ www.aplic.org

Wind Turbine Lighting Plan & Implementation

In general not all wind turbines within a wind project require Federal Aviation Administration (FAA) lighting. Before beginning construction the project proponent should submit a Notice of Proposed Construction or Alteration to the FAA identifying the locations of the turbines and permanent meteorological towers over 200 feet in height and a proposed lighting plan. The proposed lighting plan should minimize use of lights on towers, while complying with the FAA lighting requirements. These Guidelines recommend proposing the following in the project lighting plan to FAA:

- Use of standard white turbine paint as daylight marking, rather than daytime white flashing lights.
- Where lights are necessary, use red, flashing, synchronized lights
- Propose lighting of turbines on the periphery of the wind project and every half mile;
- Set lights at the minimum beam spread and the maximum off-phase between light pulses/bursts. Currently, the FAA requires the beam spread on turbine lighting to be between 6 and 20 degrees wide and that red lights flash between 20 and 40 times per minute. Therefore, lights should be set to a 6-degree beam spread and should flash at 20 flashes a minute.

Other Project Lighting

For any lighting at project facilities that is not regulated by the FAA, these Guidelines recommend the following best management practices to minimize potential for wildlife impacts:

- Ground lighting/outbuilding lighting should operate only on motion-sensing devices such that lights remain off unless triggered.
- Security lighting should be shielded or directed downward to reduce glare.

4.0 Construction

During project construction, project developers should continue to avoid and/or minimize impacts to wildlife and habitat by following these Best Management Practices (BMPs):

Identify Key Compliance Staff

- Each project should identify a Field Contact Representative (FCR) to be on-site to oversee compliance during construction and provide environmental training to on-site personnel. The FCR is responsible for overseeing compliance with all protective measures and coordination in accordance with the permitting authority and resource agencies and should have the authority to issue a “stop work order” if deemed necessary.

- The FCR should coordinate with a qualified biologist who should be available as needed to assist with specific issues of biological concern that are identified either prior to or arise during construction.

Environmental Training

- Develop a compliance matrix describing permit conditions for use as a reference and tracking tool for the FCR.
- Provide maps of environmental constraints (sensitive areas) to contractors to ensure sensitive sites are avoided.
- Environmental training should be provided for all on-site construction personnel, including:
 - permit requirements
 - exclusion flagging
 - sensitive species present onsite
 - protocol for responding to wildlife discoveries
 - protocol for responding to dead or injured wildlife (see Operational Monitoring Section reference to a Wildlife Handling and Reporting System)
 - any other protocols related to avoiding and/or minimizing impacts to wildlife

Sensitive Resource Avoidance

Sensitive areas to be avoided during construction, such as occupied Washington ground squirrel burrow complexes and required adjacent habitat for squirrel survival, riparian areas, and sensitive raptor nests, should be identified near planned construction areas, as described below:

- Mark sensitive habitat or species areas with orange exclusion fencing, brightly colored pin flags, wooden lathes or other marking. The contractor(s) will be instructed to work outside these boundaries at all times. The FCR should ensure that exclusion flagging is in place prior to construction in that area.
- Sensitive raptor nest trees should be flagged. The FCR should work with the construction contractor to minimize construction work in these areas to the extent feasible during periods when the nests are active.
- Avoid constructing during avian nesting season, wherever possible. If previously unknown active nests are discovered during construction, the project developer should consult with resource agency(s).

Construction Compliance

- Avoid introduction of noxious weeds as a result of disturbance from construction and operation by implementing a weed control plan developed in accordance with local guidelines.

- Minimize the risk of fire as a result of construction and operation activity by developing a fire protection plan established in conjunction with permitting authority and in accordance with local guidelines. Train all onsite personnel in the application of the fire protection plan. A wildfire can significantly impact the natural (wildlife habitat) environment.
- Undertake the restoration of wildlife habitat temporarily disturbed during the construction, maintenance or repair of the project, using a revegetation plan developed with the recommendation of the permitting authority and resource agency(s).
- Instruct all construction personnel to observe caution when driving through the project area and to maintain reasonable driving speeds (particularly during the period from 1 hour before sunset to 1 hour after sunrise) so as not to harass or accidentally strike wildlife. Post speed limits on project roads (not public roads) throughout the project construction area.
- As required under Clean Water Act National Pollutant Discharge Elimination System (NPDES) regulations, develop an Erosion and Sediment Control Plan for the project site to be implemented and monitored during construction. The plan will require the contractor to install erosion and siltation controls near riparian areas and other appropriate locations as designated in the plan. The plan should be implemented until the wind project restoration is complete and no additional erosion or sediment loss is occurring.

Minor Construction Layout Changes

Minor layout changes may occur within and outside the micro-siting corridors during construction, typically as a result of landowner feedback and recommendations from the construction contractor. The project developer should continue ongoing communication with the permitting authority and resource agencies to ensure they are aware of minor changes outside the micro-siting corridors or in areas previously restricted by the permitting authority within the micro-siting corridors and seek to ensure any minor project changes do not adversely affect wildlife or their habitats.

5.0 Operational Monitoring

Monitoring studies, such as avian and bat carcass surveys using best available standards are required to determine the actual direct impacts of the wind farm on wildlife mortality. Wildlife displacement surveys or other specialized surveys for species of concern may also be necessary (see the Wildlife Displacement section of the Mitigation section, below). The duration and scope of the monitoring should depend on the size of the project, and the availability of existing monitoring data at nearby projects in comparable habitat types. Wildlife species most closely monitored should be state and federal TES species, and declining species.

Operational monitoring should be designed in consultation with the permitting authority, resource agencies and interested stakeholders with wildlife expertise. A good resource for designing survey protocols is the National Wind Coordinating Collaborative Wildlife/Wind

Interaction Publications website (<http://www.nationalwind.org/publications/wildlife.htm>). A minimum of two full years of operational avian and bat fatality monitoring (not necessarily consecutive) should be conducted on the wind project site, using best available standards. Shorter study duration may be recommended if mortality information exists from immediately adjacent projects on similar habitat types. Conversely, longer study duration may be recommended in the following cases: 1) use of the project site by the avian and bat groups of concern is estimated to be high; 2) there is little existing data regarding avian and bat fatalities in the project area; 3) the project is especially large and/or complex; and/or 4) initial fatality monitoring identifies unexpectedly high incidence of mortality or locally or regionally significant impacts to avian and bat species of concern.

Wind project operators should also develop a Wildlife Handling and Reporting System. This system is a monitoring program set up for responding to and handling avian and bat casualties found by construction and maintenance personnel during construction and operation of the facility. This monitoring program should include the initial response, the handling and the reporting of bird and bat carcasses discovered incidental to construction and maintenance operations. Construction and maintenance personnel should be trained in the methods needed to carry out this program.

The wind project operator is strongly encouraged to establish and/or participate in a Technical Advisory Committee (TAC), which will be responsible for reviewing results of monitoring data and making suggestions to the permitting authority and resource agencies regarding the need to adjust mitigation and monitoring requirements based on results of initial monitoring data and available data from other projects. For projects regulated by EFSC, the project proponent should work with the USFWS, ODFW, ODOE, and the EFSC will determine appropriate actions.

Potential members to the TAC include stakeholders such as state and federal wildlife agencies, environmental organizations, landowners, permitting agencies and county representatives. The TAC needs to be comprised of an equal number of individuals with vested (monetary) and non-vested interests in the project. The project developer should make all information generated by the pre-project assessment and operational monitoring of the wind project available to the public, except where necessary to keep confidential for species protection purposes. Protocols for conducting the operational monitoring studies and procedures for reporting and handling, and rehabilitating injured wildlife should be reviewed by the TAC. Progress reports summarizing the monitoring results should be reported to the TAC on a quarterly basis.

During a wind project's post-construction monitoring, review the results and consult with the permitting authority, resource agencies and the TAC. If the results of the operational monitoring or the wildlife handling and reporting system in place for the project life indicate mortalities to bird and bat species populations or other wildlife species populations are at a level of biological concern⁸, the project developer should review and discuss these impacts with the proper

⁸ Events of biological concern could include:

- Mortalities involving endangered, threatened or sensitive and declining species and species of concern identified in the ODFW Conservation Strategy
- Large individual mortality events involving any species

regulatory agency (e.g., USFWS for ESA-listed species) and the TAC for input on a course of action. Discussions may result in the recommendation for additional conservation actions (e.g. habitat conservation, raptor nest platforms, donations to wildlife rehabilitation centers), and other options. Additional monitoring may also be required. Any impacts to state or federally-listed species require immediate consultation with the ODFW and USFWS.

Mitigation

These Guidelines strongly recommend consistent application of the following mitigation recommendations regardless of the jurisdiction in which the wind project is permitted.

These Guidelines are designed to help avoid and minimize impacts to wildlife habitat and wildlife populations during development and operations of wind power projects. However, in some cases, development and operation of wind projects will result in direct and indirect impacts to wildlife and habitat that cannot be avoided. Wind project developers should be responsible to mitigate for temporary and permanent impacts to wildlife habitat, significant displacement of wildlife populations, and other wildlife impacts that result from wind project development and operations.

These Guidelines strongly recommend that the counties' wind project permitting process rely on ODFW's Fish and Wildlife Habitat Mitigation Policy for guidance on mitigation strategies, as does Oregon's EFSC permitting process. Close and early coordination with ODFW, and other resource agencies, is therefore critical. The mitigation described in this section is designed to correlate directly with wind project impacts to wildlife and habitat. Wind power developers should hire a qualified professional biologist (generally an external consultant under contract to the wind project developer) to assess potential project impacts to wildlife habitat and wildlife populations. Wind power developers also should coordinate with resource agencies throughout the wind project development process to ensure that direct and indirect impacts to wildlife resources are accurately identified, avoided and minimized to the degree possible and completely mitigated where avoidance cannot be accomplished. Working with qualified, professional, external consultants and undertaking consultation with resource agencies will maximize transparency, credibility and efficacy of the wind project development process.

Wherever possible, mitigation should replace or provide comparable habitats. However, the proximity of mitigation activities to site of impact needs to be balanced with maximizing the efficacy of mitigation. In some instances the best mitigation solution may occur by aggregating mitigation responsibilities and activities from multiple dispersed wind projects into one larger, strategically placed mitigation activity.

Habitat Impacts

-
- Long-term high mortality levels for any species

Wind project developers should be responsible for mitigation of temporary and permanent impacts to habitat due to project development. Differing mitigation ratios should apply based on the habitat type and category that is impacted. These guidelines strongly recommend early coordination with the permitting authority and resource agencies regarding habitat typing and categorization for the proposed project site as well as for the proposed mitigation site.

Habitat types should be rated into categories based on ODFW's Fish and Wildlife Habitat Mitigation Policy. For purposes of these guidelines, habitat should be categorized based on consideration of the habitat's current condition. Permitting authorities should be aware of the potential for situations in which land has been deliberately converted to avoid or reduce mitigation responsibilities. See Tables 1, 2 and 3 in the Appendix for a description of the six habitat categories and mitigation goals and standards as defined in ODFW's Fish and Wildlife Habitat Mitigation Policy. These guidelines are designed to develop best wildlife and habitat conservation practices for wind development by (in part) creating incentives to direct wind farm development away from the highest value wildlife habitat (avoid habitat categories 1, 2, and higher quality category 3) and towards sites of lower biological value (target development on habitat categories 5 and 6). Habitat typing and categorization work for the proposed project site and the proposed mitigation site should be done by a qualified professional biologist (generally an external consultant under contract to the wind project developer).

Wind project developers, in conjunction with their consultants, and in coordination with resource agencies and the permitting authority, should develop a habitat mitigation plan that:

- (a) Describes how the mitigation plan meets the mitigation goals and standards listed in Table 3 of the Appendix in order to mitigate for the habitat impacts at the project site;
- (b) Describes and maps the location of the development action and the mitigation actions including the county, latitude and longitude, township, range, section, and quarter section;
- (c) Provides performance measures for habitat enhancements and long-term habitat conservation, including success criteria with timelines for the mitigation site, and;
- (d) Provides, at a minimum, for life of project protection and management of the mitigation site.

These guidelines recommend that all wind project mitigation funds target habitat conservation and enhancement towards higher quality habitat (i.e., Categories 1 – 4). Any mitigation habitat conserved and/or enhanced should be:

- Where possible, protected in perpetuity.
- At minimum, protected for the life of the wind project⁹ or longer through the following avenues:

⁹ The life of the wind project includes the post-operation project decommissioning and habitat restoration.

1. Fee title acquisition with conservation easement held by ODFW or a third party;
 2. Conservation easement with landowner;
 3. Provision of funds by the project developer towards a third party purchase, habitat enhancement and management action (e.g. a land trust). The intent of this option is to have the land protected in perpetuity.
- At some risk of development or conversion.
 - Protected from degradation to improve habitat function and value over time (i.e. be subject to a habitat management plan and provided legal protection).
 - In the same geographical ecoregion as the impacted habitat unless an area outside the geographical area is agreeable to resource agencies and permitting authorities.
 - Formally agreed upon by the wind developer, resource agencies and permitting authorities.
 - Transparent to the public.¹⁰

The following table provides Guidelines to implement the ODFW Fish and Wildlife Habitat Mitigation Policy's habitat categories and mitigation goals and standards. These guidelines provide corresponding examples of habitat for each ODFW habitat category and recommended mitigation for permanent and temporary impacts for each habitat category. Some especially sensitive habitat subtypes such as areas with lithosol soils or biotic crusts do not fit easily into this table's habitat categorization and mitigation and should be addressed on a case-by-case basis.

ODFW Habitat Categories and Mitigation Goals and Standards	Examples of Habitat Categories	Mitigation for Permanent Impacts	Mitigation for Temporary Impacts
1 – Irreplaceable, limited, and essential habitat. Goal of no loss of habitat quantity or quality. The standard by which to achieve the mitigation goal is	Washington ground squirrel burrow complexes and required adjacent habitat for squirrel survival Federally or	No example provided. Project developers should avoid impacts to this habitat, as it is irreplaceable.	No example provided. Project developers should avoid impacts to this habitat, as it is irreplaceable.

¹⁰ Mitigation costs may be excluded for proprietary reasons.

avoidance.	<p>State listed or Sensitive-critical raptor nests (e.g. bald eagle, golden eagle, peregrine falcon, ferruginous hawk, burrowing owl)</p> <p>Mature oak woodlands</p> <p>Critical bat habitat (which includes roost, maternity colony and hibernaculum sites – these can be found in mines, caves, rock crevices, trees, buildings or bridges, depending on the bat species)</p>		
ODFW Habitat Categories and Mitigation Goals and Standards	Examples of Habitat Categories	Mitigation for Permanent Impacts	Mitigation for Temporary Impacts
2 – Essential and limited habitat. Goal of no net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality. The standard by which to achieve the mitigation goal is provision of in-kind and in-	<p>Quality native grassland that provides habitat for sensitive wildlife and plant species (e.g. long-billed curlew, burrowing owl, grasshopper sparrow)</p> <p>Unoccupied but potential</p>	Project developers are strongly encouraged to avoid impacts to this habitat.	Project developers are strongly encouraged to avoid impacts to this habitat. If impacts are unavoidable, temporary impacts should be mitigated for by implementing an approved restoration plan for the temporarily-impacted habitat that assures an overall net benefit of habitat quantity or quality at the site. For habitat restoration anticipated to be difficult or long-term (greater than 5 years), an additional 0.5 acres of

<p>proximity mitigation.</p>	<p>Washington ground squirrel habitat adjacent to an existing colony</p> <p>Quality native shrub-steppe (e.g., mature sagebrush) with sensitive wildlife and plant species (e.g. sage sparrow, loggerhead shrike)Key waterfowl use areas, quality wetlands, streams and riparian areas</p>		<p>restoration/acre of impact should be negotiated. In all cases, a good faith effort should be made to restore the temporarily impacted area.</p>
<p>ODFW Habitat Categories and Mitigation Goals and Standards</p>	<p>Examples of Habitat Categories</p>	<p>Mitigation for Permanent Impacts</p>	<p>Mitigation for Temporary Impacts</p>
<p>3 – Essential or important and limited habitat. Goal of no net loss of either habitat quantity or quality. The standard by which to achieve the mitigation goal is provision of in-kind and in-proximity mitigation.</p>	<p>Medium-quality native grassland or shrub-steppe.</p> <p>Functional but small or fragmented grassland or shrub-steppe habitat.</p>	<p>The quality of Category 3 habitat can vary considerably. Avoidance, where possible, is desirable. Mitigation can vary relative to habitat quality.</p> <p>These Guidelines recommend a 2:1 compensatory ratio when avoidance is not feasible. A 1:1 ratio may be considered where a developer can</p>	<p>If impacts are unavoidable, temporary impacts should be mitigated for by implementing an approved restoration plan that assures no net loss of habitat quantity or quality. For habitat restoration anticipated to be difficult or long-term (greater than 5 years), an additional 0.5 acres of restoration/acre of impact could be negotiated. In all cases, a good faith effort should be made to restore the temporarily impacted area.</p>

		demonstrate a significant opportunity to enhance a mitigation site to achieve no net loss of habitat quality or quantity.	
ODFW Habitat Categories and Mitigation Goals and Standards	Examples of Habitat Categories	Mitigation for Permanent Impacts	Mitigation for Temporary Impacts
4 – Important habitat. Goal of no net loss of habitat quantity or quality. The standard by which to achieve the mitigation goal is provision of in-kind or out-of-kind, in-proximity or off-proximity mitigation.	Low-quality grassland or shrub-steppe	These Guidelines recommend a 1:1 compensatory mitigation ratio for permanent impacts.	If impacts are unavoidable, temporary impacts should be mitigated for by implementing an approved restoration plan that assures no net loss of habitat quantity or quality. For habitat restoration anticipated to be difficult or long-term (greater than 5 years), an additional 0.5 acres of restoration/acre of impact could be negotiated. In all cases, a good faith effort should be made to restore the temporarily impacted area.
5 – Habitat with high potential to become either essential or important. Goal of net benefit in habitat quantity or quality. The standard by which to achieve the mitigation goal is provision of actions that improve the mitigation site's habitat conditions.	Low-quality (weed-infested and/or highly disturbed) habitat	These Guidelines recommend that some net benefit in habitat quantity or quality be attained through action(s) that improve the habitat conditions. For example, weed control.	A good faith effort should be made to restore the impacted area.
6 – Habitat with low potential to	Cropland that is currently being	No mitigation required other	No mitigation required.

<p>become essential or important. Goal is to minimize impacts to surrounding habitat.</p>	<p>cultivated Developed land i.e., areas with pavement, structures or facilities, that eliminates natural habitat values.</p>	<p>than to minimize impacts to surrounding habitat.</p>	
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Wildlife Displacement

Indirect impacts to wildlife and habitat may occur because the wind project may cause disturbance to wildlife, causing the habitat to be less appealing and suitable to both resident and/or migratory birds and other wildlife species. The displacement effect to wildlife may be temporary or permanent. If there is a strong likelihood for displacement (e.g. an existing species or habitat assemblage is especially vulnerable to displacement by wind project development), the project developer should consult with the permitting authority and resource agencies. Projects sited in higher quality habitat with sensitive species are more likely to raise displacement concerns than projects sited in lower quality habitat.

The need for site specific assessment of potential wildlife displacement should be negotiated on a project-by-project basis. If, based on existing information, displacement of wildlife from a wind project is anticipated, the project developer, permitting authority and resource agencies should discuss and agree upon suitable mitigation to offset indirect displacement effects. Alternatively, following project start-up, a research project could be implemented by the project developer to determine if wildlife displacement effects are occurring from the wind project. Results of research should be provided to the TAC for review and recommendations, and, if necessary, appropriate measures to mitigate wildlife displacement effects should be taken by the wind project operator.

Wildlife Fatalities

As is the case with most development, some mortality of bats and birds is expected to result from wind power projects. During pre-project assessment, wind project developers should estimate bird and bat mortality to determine expected wildlife impacts and associated risk. These data will be useful for efficacy of pre-project assessment, design of future projects, and assessing cumulative impacts to wildlife species. Impacts to state or federally-listed species require consultation with the ODFW and USFWS if there is potential for take of listed species. Wind power project-related mortality to sensitive, declining and more common species of birds and bats is expected to be minimized at wind projects if proper macrositing, pre-project assessment, and micrositing are implemented and good project management practices are established.

During a wind project's operational monitoring, the project owner should review the results and consult with the permitting authority and resource agencies. If mortalities to bird and bat species populations or other wildlife species populations are at a level of biological concern,¹¹ consult with the permitting authority, resource agencies and TAC. Discussions may result in the recommendation for additional conservation actions (e.g. habitat conservation, raptor nest platforms, donations to wildlife rehabilitation centers), and other options. Additional monitoring may also be required. Any impacts to state or federally-listed species require immediate consultation with the ODFW and USFWS.

Programmatic Recommendations from the Columbia Plateau Ecoregion Wind and Wildlife Energy Taskforce

During the course of development of these Guidelines, the Taskforce discussed the larger context of wind development and wildlife impacts and came up with the following policy and program recommendations:

Priority Recommendations

- 1) Regionally-specific guidelines should be created for other areas of Oregon, where wind development will likely occur. It is the Taskforce's view that the Columbia Plateau Ecoregion Guidelines process and approach contained in this document can be applied in a broader regional perspective. However, examples of mitigation ratios, species and habitats of concern, and other tools for different ecoregions in Oregon will need further development. When developed, these additional regional guidelines can be provided as appendices or supplements in this document.
- 2) The success of these Guidelines depends on providing adequate funding for full ODFW staffing support to wind developers, counties, and EFSC, to effectively participate in implementation of these Guidelines at proposed wind energy facilities. Funding could be via a legislative support package or via a cost-reimbursement agreement with wind developers.
- 3) Oregon EFSC's model wind energy siting ordinance for county governments should be revised to reflect these Guidelines.

Other Recommendations

- State legislators and agency directors should develop and fund programs designed to educate and work closely with county staff, wind project developers, agency staff and

¹¹ Events of biological concern could include:

- Mortalities involving endangered, threatened, sensitive and declining species and species of concern identified in the ODFW Conservation Strategy
- Large individual mortality events involving any species
- Long-term high mortality levels for any species

other stakeholders on the Guidelines' application to current and future wind energy project proposals. Educational and training outreach should target all interested and affected stakeholders.

- State legislators should develop legislation/support packages designed to help overcome county technical obstacles that complicate efforts to develop fully transparent procedures and access to relevant documents for wind project siting and permitting, including the creation of internet based document libraries and public notification platforms.
- The Taskforce endorses the creation of statewide digital maps depicting the intersection of wind energy potential and related transmission lines, and Oregon environment and conservation priorities. At the time of this writing, this map does not currently exist, but would be a useful tool that could be periodically updated to assist in the macrositing process. Including wind mapping databases into these Guidelines will be useful. These types of maps are usually the key factor governing where potential future projects will be located. Overlapping wind resource mapping with wildlife habitat information would allow proposed biological surveys to be prioritized in areas with the highest potential for development.
- In addition to developing these Guidelines, the Taskforce reviewed and discussed potential cumulative impacts from future wind energy development in the Columbia Plateau Ecoregion. The Taskforce developed a white paper¹² to review our discussions, research to-date, consensus opinion and recommendations for future research and analysis. The recommendations include:
 - o Fund and designate a management entity to design, establish and manage a central data repository for wildlife mortalities and habitat impacts from wind projects.
 - o Collaboratively design, fund, and implement cumulative impact analysis(es) for the Columbia Plateau Ecoregion. This analysis should determine the generational population dynamics caused by wildlife mortality from all sources of cumulative effect, create a report of key species status, trends, and "impact thresholds of concern", and develop a comprehensive mitigation plan for impacts to key species above threshold-of-concern levels.
- Studies of potential direct wildlife impacts from temporary met towers should be initiated.
- Studies of potential wildlife displacement impacts from wind project development and operation should be initiated.
- Siting and permitting guidelines for smaller scale, community wind projects (typically 10 MW or less) should be developed.

¹² The cumulative wildlife and habitat impacts review and recommendations is included in the Appendix.

Appendix

Map of the Columbia Plateau Ecoregion

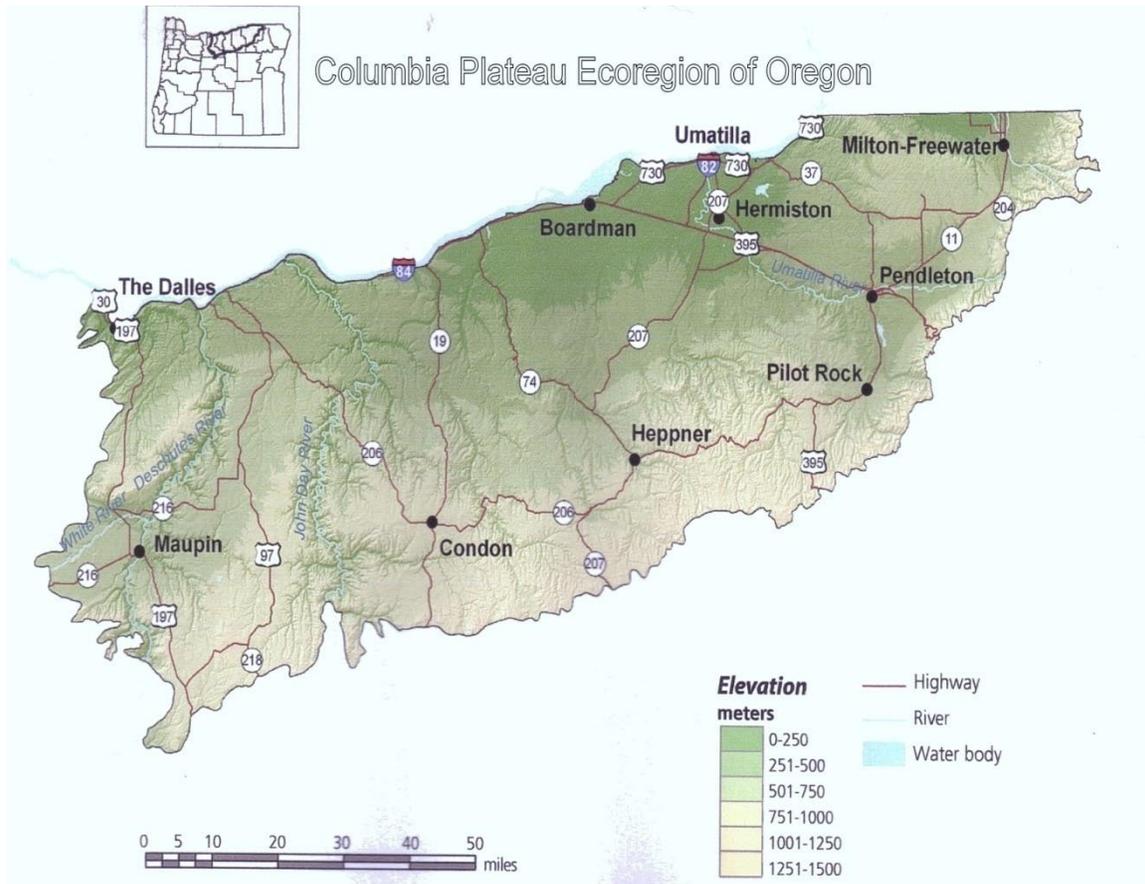
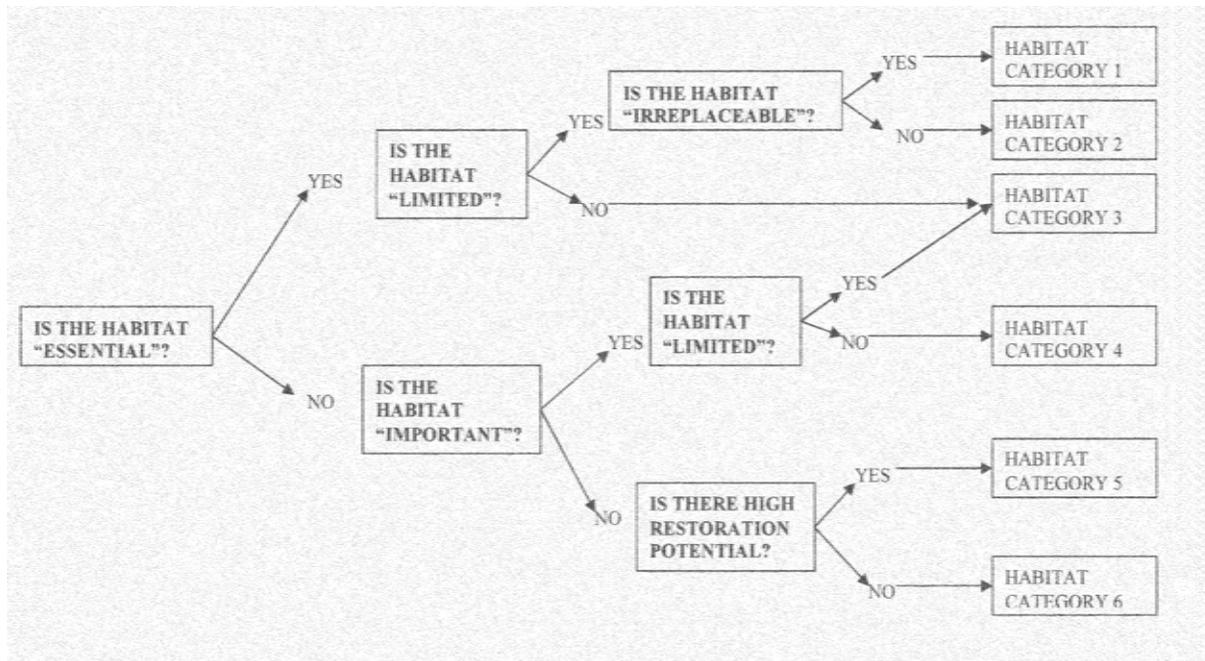


Table 1. ODFW Fish and Wildlife Habitat Categories

Habitat Category	Habitat Included
Category 1	Irreplaceable, essential and limited habitat
Category 2	Essential and limited habitat
Category 3	Essential habitat, or important and limited habitat
Category 4	Important habitat
Category 5	Habitat having high potential to become either essential or important habitat
Category 6	Habitat that has low potential to become essential or important habitat

Table 2. Fish and Wildlife Habitat Mitigation Policy Habitat Categorization



The following definitions describe various terms used to categorize habitats:

Essential Habitat: means any habitat condition or set of habitat conditions which, if diminished in quality or quantity, would result in depletion of a fish or wildlife species. These habitats contain the physical and biological conditions necessary to support the most critical life history function of the fish and wildlife species being considered.

Limited Habitat: means an amount of habitat insufficient or barely sufficient to sustain fish and wildlife populations over time. This concept requires that the relative availability of suitable habitats to support important life history functions be considered at variable scales that may go beyond the project site.

Important Habitat: means any habitat recognized as a contributor to sustaining fish and wildlife populations on an ecoregion basis over time. These habitats may not be necessary to support the most critical life history functions (i.e., spawning, breeding/nesting, juvenile rearing) of the species being considered.

Irreplaceable Habitat: means that successful in-kind habitat mitigation to replace lost habitat quantity and/or quality is not feasible within an acceptable period of time or location, or involves an unacceptable level of risk or uncertainty, depending on the habitat under consideration and the fish and wildlife species or populations that are affected. An acceptable period of time would correlate to benefiting the affected fish and/or wildlife species. Examples provided by ODFW are old-growth forests and bogs.

High Restoration Potential: means habitat that previous land uses or activities have eliminated or severely reduced its value to fish and/or wildlife. The habitat is technically feasible to restore such as a diked or drained coastal marsh.

**Table 3. Mitigation Goals and Standards of ODFW's
Fish and Wildlife Habitat Mitigation Policy**

Category 1	No loss of habitat quantity or quality	Avoidance
Category 2	No net loss of habitat quantity or quality <u>and</u> to provide a net benefit of habitat quantity or quality	In-kind, in-proximity mitigation
Category 3	No net loss of habitat quantity or quality	In-kind, in-proximity mitigation
Category 4	No net loss of habitat quantity or quality	In-kind or out-of-kind, in-proximity or off-proximity mitigation
Category 5	Net benefit in habitat quantity or quality	Actions that improve habitat conditions
Category 6	Minimize impacts	

Cumulative Wildlife and Habitat Impacts Review and Recommendations

September 29, 2008

In 2007, the Oregon Energy Facility Siting Council (EFSC) requested a cumulative wildlife impacts analysis from existing and proposed wind energy development in the Columbia Plateau Ecoregion (Ecoregion), which in Oregon includes parts of Morrow, Umatilla, and Wasco counties and all of Gilliam and Sherman counties. The Council's recent and future review of a large number of wind energy facility applications proposed to be sited in the Ecoregion, coupled with concerns from the U.S. Fish and Wildlife Service (USFWS), the Oregon Department of Fish and Wildlife (ODFW), and environmental groups regarding wildlife and habitat impacts from wind energy development in the ecoregion, was the primary impetus for the Council's request.

Wind energy development in the Ecoregion continues to expand. Approximately 3,848 MW of wind energy generation facilities are currently operating, being constructed, or have been approved for construction within the Ecoregion (2,107 MW in Oregon, 1,741 in Washington) to date. An additional 1,309 MW of facility applications in the Ecoregion are pending Oregon EFSC siting approval, and at least 520 MW of additional county jurisdictional facilities have been proposed or are in the permitting process in Washington and Oregon.

In the fall of 2007, the ODOE, USFWS and ODFW convened the Columbia Plateau Ecoregion Wind Energy Taskforce (Taskforce). The Taskforce includes multiple state and federal agencies (ODFW, USFWS, ODOE, WDFW), wind energy developers, county representatives, non-profit environmental organizations, and consultants. The Taskforce has developed voluntary wind project siting and permitting guidelines (Guidelines), with hopes that future wind energy development in the Ecoregion is sited in a manner that prioritizes wildlife and habitat protection.

Over the course of several months, the Taskforce reviewed and discussed the most current research and opinion from consulting biologists and statisticians, state and federal agencies and non-profit environmental organizations on wind energy development and wildlife/habitat impacts in the Ecoregion, with a specific interest in defining and understanding the cumulative wildlife and habitat impacts from wind energy development.

This document provides a summary of information regarding the currently known cumulative wildlife and habitat impacts of wind energy development in the Ecoregion. Recommendations included in this document are intended to inform future wind project planning and development within the Ecoregion, as well as direct resources to more fully understand indirect cumulative effects.

Benefits of Wind Power for Conservation of Species

The Taskforce recognizes that responsible wind power development potentially offers significant environmental benefits for species conservation. One of the most significant threats facing wildlife in North America is habitat modification attributed to climate change. Wind power development represents an important strategy for reducing dependence on fossil fuels and combating the effects of climate change. The State of Oregon is a national leader in developing efforts to combat climate change. Oregon law currently requires utilities to provide 25% renewable energy to their customers by 2025. In addition, Oregon law establishes goals to

reduce greenhouse gas emissions by 75% below 1990 levels by 2050. Maximizing the region's wind energy generation potential will be an important factor in achieving renewable energy and climate change targets.

In addition, development of wind power facilities at carefully selected sites offers the potential to reduce incentives to redevelop property for less wildlife friendly practices. For many species, wind power development on disturbed sites may represent a relatively benign land-use conversion.

Finally, by developing and implementing strong guidelines, the Taskforce has created an opportunity to effectively avoid the highest quality habitats, minimize impacts, and mitigate for unavoidable direct and indirect impacts to wildlife from wind power development and to set a standard for responsible energy generation. Strategic investment of mitigation resources can allow for targeted protection of the most critical habitats and most vulnerable species.

All forms of energy generation present both direct and indirect impacts on wildlife and wildlife habitat. By carefully considering the placement of wind power facilities and mitigating for unavoidable consequences, wind power offers opportunities to minimize direct and indirect impacts on wildlife and wildlife habitat while helping to address the global threat presented by climate change.

Cumulative Impacts

The challenge facing wind power in Oregon is to meet aggressive targets to combat climate change while simultaneously avoiding adding significantly to the direct and indirect hazards facing Oregon's wildlife populations, many of which are already in serious decline. Cumulative impacts to wildlife from many sources, including wind energy, represent one of the most challenging and complicated aspects of assessing potential wind power impacts on wildlife and wildlife habitat. By definition, cumulative impacts are the additive or incremental effects of past, present, and foreseeable (future) actions taken as a whole. The impacts associated with an individual action, such as a single wind energy project, may be minor, but the impacts from a number of similar actions or projects taken collectively may be significant. Most activities, including wind energy development, have both direct and indirect impacts. Direct impacts of wind projects on birds and bats are generally associated with mortality from wind turbines. Indirect impacts may occur as a result of habitat loss from the project footprint (e.g., habitat replaced by turbine towers, access roads, substations, and other O&M facilities), lowered habitat value in close proximity to wind turbines (e.g., species displacement), decreased population viability, and habitat fragmentation. Habitat fragmentation is one of the main causes of declines in wildlife populations (Yahner 1988). Direct impacts are often easier to estimate and measure than indirect impacts. As a consequence, cumulative impact analyses have typically focused on direct impacts, such as bird mortality from collisions with turbine blades.

At a broader level, cumulative impacts reach beyond just the consequences from wind power alone. On a regional scale, there is an argument for assessing not only the cumulative impacts of wind power, but also the cumulative impacts of wind power and various other activities taken together as a whole. In other words, in addition to asking whether wind power in and of itself is having population level impacts on birds and other wildlife, consideration should be given to whether wind power is contributing cumulatively along with multiple other causes to population declines. For example, documented population declines in some avian species over the past

few decades are attributed to a number of human-related factors that result in either continued loss of habitat (e.g. urban sprawl, agricultural development), or direct mortality (e.g. collisions with buildings, vehicles, power lines, or, predation from house cats). Therefore, while wind energy developers cannot be held accountable for these other human-related factors, the question is whether the added impacts from wind power could potentially continue or even hasten documented declines in some species populations.

Understanding potential cumulative impacts of wind power development is particularly critical because aggressive state renewable energy targets may lead to large-scale habitat modification across Oregon. Failure to understand the cumulative impacts of this rapid wind project development expansion could contribute to population level impacts to species that could result in future state and federal listings. Additional species listings in turn could have dramatic impacts on the future viability of the wind development industry in Oregon. Comprehensive understanding of the cumulative impacts of wind power development is necessary both to protect our natural heritage and to preserve the viability of wind power development in Oregon. The understanding is also necessary in order to achieve objectives related to combating climate change.

Current Sources and Summaries of Cumulative Impacts Information

To determine the potential impacts of individual and multiple wind projects, the Taskforce focused its attention on several recent mortality assessments conducted by WEST, Inc. These studies found that when averaged across the Ecoregion, the number of bird and bat fatalities per megawatt from existing wind energy facilities is currently relatively low compared to other areas of the country. Each of the assessments concluded that wind power facilities on their own were not having direct population level impacts on birds or bats due to the proportion of birds and bats killed by wind turbines. However, not all cumulative avian mortality impact analyses evaluated whether wind power is contributing cumulatively along with multiple other causes to population declines of birds, bats or other wildlife species. Additionally, existing studies were not all designed to assess the cumulative impacts on species populations resulting from habitat loss or fragmentation, including that unrelated to wind energy facilities¹³. WEST, Inc estimates that 69% of bird fatalities from wind projects in the Ecoregion are passerines (e.g., golden-crowned kinglet), 18% are game birds, and 7% are raptors/vultures. From Ecoregion projects conducting post-construction monitoring, a total of 636 bird fatalities were recorded, which included 73 species, 9% of which were raptors, 40% were horned larks, and 6.5% were golden crowned kinglets. Annually, on average, they estimated 0.07 raptor fatalities/MW, 2.2 general bird fatalities/MW, and 0.68 bat fatalities/MW. The most common bat fatalities observed were the hoary bat and the silver-haired bat. These two bat species comprised more than 90 percent of all bat fatalities.

¹³ The Taskforce also reviewed the programmatic Environmental Impact Statement (EIS) for Klickitat County's Energy Overlay Zone, which did evaluate cumulative impacts associated with loss of habitat, including quantity and distribution/concentration of impacted areas across the county.

Upon review and discussion of current avian and bat fatality monitoring studies and expertise, from the Columbia Plateau Ecoregion as well as nationwide, it is the Taskforce's opinion that:

- The cumulative direct mortality from existing wind energy facilities in Oregon where mortality monitoring studies have been undertaken in the Ecoregion has not revealed population level impacts to bird or bat species;
- Past studies are not necessarily a good indicator of future cumulative impact, given the rapid expansion of wind power development in Oregon and increasing pressure to develop wind projects in high quality habitat;
- There are concerns regarding the potential for wind power development impacts on several wildlife species that are already rare or exhibiting widespread species population and distribution declines (e.g., ferruginous hawk, Swainson's hawk, Washington ground squirrel, burrowing owl);
- There are concerns that key habitats that support these sensitive wildlife species are rapidly being converted due to multiple factors, primarily unrelated to wind development;
- In the extreme, siting of even a single wind project may have a significant effect on future cumulative impact analysis¹⁴;

Based on these findings, the Taskforce's Guidelines make several recommendations that will assist with evaluating and reducing the potential for cumulative impacts. These include:

- Presence of existing proximal wind power developments.
- Presence of other proximal causes of wildlife mortality.
- Pre-project assessment surveys and operational monitoring studies that should be implemented;
- Disincentives (including increased mitigation for impacts to wildlife and habitat) to encourage avoidance of key habitats, and incentives to encourage future development on highly disturbed habitats.

However, the Taskforce acknowledges that more information sources on bird, bat and other wildlife species' population status and trends as well as status and impacts on regional habitat

¹⁴ The Altamont Pass Wind Resource Area in Northern California serves as a case in point. The wind projects are connected with the fatality of an approximately 2,000 protected birds of prey annually (Bird Fatality Study at Altamont Pass Wind Resource Area, Table 1: Total Recorded Bird Fatalities, October 2005-September 2007, Altamont Pass Avian Monitoring Team). Costly litigation and redevelopment of these facilities have not yet substantively addressed these mortality concerns. While the Altamont example is frequently cited regarding wind generation facilities, no wind energy project in the Columbia Plateau Ecoregion has demonstrated wildlife mortality problems on the scale associated with the Altamont Pass Wind Resource Area.

resources are needed. The Taskforce believes a broad-scale research project(s) is needed to better inform assessment of the cumulative impacts from wind project development on key species and habitats. Supporting collaborative monitoring and research within the Ecoregion to fully understand wind energy development and project siting impacts to key habitats will be important as wind energy development continues to expand.

Cumulative Population and Habitat Effects Research Needs Recommendations

To address concerns of cumulative impacts to avian and other wildlife populations as well as key habitats from siting of wind energy facilities, the Taskforce is providing the following recommendations to help focus research and conservation efforts.

Data Repository

Useful bird/bat/habitat data has been and is currently being collected from the wind development sites. The challenge is to make fatality, survey and monitoring data, and general site information available and easily accessible to ODFW, USFWS and interested stakeholders for ongoing wildlife fatality and habitat cumulative impact analysis. The Taskforce recommends:

- Funding and designating a central management entity to design, establish, and manage a central data repository for previously-generated and future bird/bat/habitat monitoring data;
- Requiring future developers to submit data to the central data repository;
- Engaging in a national discussion regarding a data repository for wind turbine sites across the country; and
- Requiring county planners to provide ODOE with location data on all county-permitted wind energy facilities.

Population Assessment and Scale

Currently, more research is needed that analyzes species fatality numbers or habitat impacts from all anthropogenic sources across the entire Ecoregion in the context of overall population trends. The Taskforce acknowledges that individual wind projects cannot be held to account for all anthropogenic sources. For some focal species, research of this kind would be very helpful to identify the significance of the individual wind project data that is being collected, to better define key habitat areas of high concern and wind energy-related mortality thresholds of concern, to identify areas where future wind development should be discouraged, and to identify the types of mitigation or conservation actions that would provide the greatest benefits to these species.

- Collaboratively design, fund, and implement cumulative impact analysis(es) for the Columbia Plateau Ecoregion, including investigation of fragmentation of habitat, for species of concern (e.g. ferruginous and Swainson's hawks).
- Design, fund, and implement studies to determine the generational population dynamics caused by avian and other species mortality.
- Using the results from the above Columbia Plateau Ecoregion study(ies) to collaboratively create a report of key species status, trends, and "impact thresholds of concern" for:

- A limited number of key species that are highly sensitive to additional mortality factors (for example, ferruginous hawk, Swainson's hawk, burrowing owl, hoary bat, and silver-haired bat)
- A limited number of key species that are highly sensitive to habitat loss or displacement (for example, long-billed curlew, loggerhead shrike, grasshopper sparrow)
- Developing a comprehensive action plan for impacts to key species and associated habitats that are above threshold-of-concern levels
- Publishing wind energy ecoregional studies, analyses, and monitoring in order to raise the standard and credibility of these collaborative efforts.
- Identifying the most up-to-date habitat information and data sources that should be used to evaluate cumulative impacts from wind energy development.
- Extend the study to include anticipated cumulative impacts on wildlife species and their habitat to include other areas in Oregon targeted for clean energy development.

Citations

Johnson, G. D. 2007. Cumulative Impacts Analysis for Birds and Bats from Existing and Permitted Wind Energy Projects in Klickitat County, Washington. Western EcoSystems Technology, Inc. 30 pp.

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