

Local Government Regulation of Wind Energy Development in Montana

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Student Authors

Abby Rivenbark, Lead Author
Brandon Hoskins, Lead Author
Janet Harrison

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Nathan Stone

The Land Use Clinic

The University of Montana School of Law
32 Campus Drive
Missoula, MT 59812
406.243.2528

Clinic Director and Associate Professor
Michelle Bryan Mudd



The University of Montana

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INTRODUCTION

Wind energy development is an emerging form of land use in Montana communities, and it is thus important for local governments to consider whether and how their current land use regulations address wind energy. Communities that proactively plan for the appropriate placement and permitting of wind energy are in the best position to reduce potential conflicts and benefit from this alternative energy resource.

This report describes issues that rural communities should consider when regulating wind energy development. While many of the issues discussed are relevant to any wind energy development, the emphasis of the memo is primarily on regulatory issues for large-scale and commercial wind energy projects. In preparing this memo, the Clinic looked nationwide for rural communities and local governments, both cities and counties, which have wind energy development ordinances in place. The Clinic also looked to scientific studies, government guidance documents, and legal treatises.

The first part of this memo serves as a checklist that identifies the regulatory issues associated with wind energy development in rural communities. After discussing each issue, the memo also provides sample ordinance provisions currently used in other rural communities. For readers wanting additional background, the Clinic identifies recommended reading on wind energy development in Montana and nationwide. Endnote citations are provided for each source, and, whenever possible, sources have been hyperlinked for the reader's convenience.

REGULATORY ISSUES

Many rural communities now have wind energy development ordinances. While each ordinance addresses the specific goals, objectives, and characteristics of its community, common issues are identifiable. This part addresses the following common issues:

- Role of Federal & State Laws
- Location of Wind Projects
- Local Government Review Process
- Project Viability Requirements
- Human Health & Safety
- Environmental Impacts
- Aesthetic Considerations

A. Role of Federal & State Laws

Nationwide, local governments are using their traditional land use planning and zoning authority to regulate wind energy development on private lands within their jurisdictions. Local governments in Montana also have similar authority to regulate wind development projects.¹ Nonetheless, wind energy development occupies a position similar to many other energy or environmental standards in that local government regulations also must comply with applicable federal and state laws. Most

ordinances surveyed by the Clinic have a section that acknowledges the applicability of federal and state laws and that requires a wind project to comply with those laws.

- **Wind projects should comply with FAA requirements for lighting.** Wind turbines can reach heights over 400 feet, which can obstruct flight patterns and compromise aircraft safety. Therefore, public safety requires turbines be lighted in a manner that makes them visible, and therefore avoidable, to aircraft. Most ordinances require lighting to “be in compliance with Federal Aviation Administration (FAA) regulations and guidelines,” which helps create uniformity across jurisdictions.²

Sample Provision: [Watauga County, North Carolina](#).³ Watauga County requires wind development projects of any size comply with FAA regulations and submit proof of compliance or non-applicability upon application.

- **Wind projects should comply with FAA and FCC regulations for signal interference.** Wind turbines, like other large metal structures, may interfere with radar or communication standards. Because electromagnetic signal interference may jeopardize navigational and defense radar signals, public safety mandates that wind projects adhere to both FAA and Federal Communication Commission (FCC) regulations and guidelines to avoid or mitigate electromagnetic signal interference.⁴

Sample Provision: [Brookings County, South Dakota](#).⁵ Brookings County requires permittees to operate in accordance with FCC regulations, and in a manner that does not interfere with microwave, television, radio, or navigation signals. If there is interference, the permittees are required to corrective action.

Sample Provision: [Buffalo County, Wisconsin](#).⁶ Buffalo County requires applicants to submit documents showing that the FCC has approved the both the site and the construction plans for the wind energy project.

- **Wind projects should undergo an environmental analysis comparable to those required under federal and state environmental laws.** A wind project on private land may not be subject to state or federal environmental review. Thus, to mitigate environmental impacts, many rural communities require wind project applicants to submit a local impact review and mitigation plan. If a federal or state agency environmental analysis is required for a project, the reports generated are usually sufficient to meet the rural communities’ requirements as well. The following is a breakdown of key federal and state laws relating to wind projects:

- Siting of a wind project may trigger application of the Endangered Species Act if it involves a “take.”⁷
- An environmental analysis may be required if a major federal action is involved, which includes projects using federal funding.⁸
- Currently, major wind projects in Montana have occurred on state lands that are subject to DNRC review.⁹
- The Montana Major Facilities Act does not apply to wind projects.¹⁰

- Though there are no legislative standards regulating noise pollution in Montana, the Department of Environmental Quality does consider noise when drafting an Environmental Impact Statement.¹¹

Sample Provision: [Sweetwater County, Wyoming](#).¹² “[I]n the absence of a required environmental analysis by a state or federal agency, which encompasses the entire project area, [an applicant must] provide a project impact review and a proposed impact mitigation plan.” Sweetwater County goes on to list what this plan must address, including endangered species, avian populations, wildlife and wildlife habitat, flora, soil erosion, water supply and quality, dust, and historic, cultural or archeological resources.

- **Wind projects should comply with federal and state construction and electrical laws.** To promote public safety, some ordinances require a licensed engineer or manufacturer to certify that wind projects comply with applicable building codes.¹³

Sample Provision: [Sweetwater County, Wyoming](#).¹⁴ Sweetwater County requires a line drawing of the electrical components and wind turbine structures to ensure the equipment complies with the National Electric Code and the ICBO building and electric codes. This information must be certified by a licensed engineer.

B. Location of Wind Projects

Appropriate placement of wind projects is crucial not only for minimizing project impacts on a community but also for maximizing a community’s economic and renewable energy development potential.

- **Address community wind energy goals within the Growth Policy.** While an existing growth policy may not specifically address wind energy, some components of a policy may impact wind energy developments. For example, emphasis on protecting natural resources, developing alternative infrastructure to decrease reliance on fossil fuels, and protecting and preserving human health and safety may provide a basis for a local government’s approach to wind development.¹⁵ However, a growth policy can be strengthened by specifically setting wind energy goals and identifying where wind energy development is most appropriate within the jurisdiction.¹⁶
- **Identify zoning areas best suited for wind energy development.** Wind energy development is not appropriate in all areas as it relies on an unpredictable source — wind — and it may be incompatible with some types of land uses in the community. There are three main approaches to zoning areas suited for wind energy development: (1) allowing wind projects only in particular base land use classifications, (2) creating an overlay district, or (3) allowing wind projects anywhere, but only upon approval of a conditional use permit. Some counties combine these approaches, such as creating an overlay district and also requiring a conditional use permit.

Identifying specific wind project areas is important because wind development may not be a viable option in all areas:

- Because of natural topography and wind patterns, not all areas are equal when it comes to having sufficient wind supply to power an energy project. The DNRC provides [wind power maps](#) for Montana that contain basic information on the wind supply potential around the state. DNRC notes, however, that “[w]hile wind power maps can give people a general idea of wind availability on a particular site, it’s critical to have at least a year of actual anemometer data to truly judge the practicality of developing a site.”¹⁷
- In selecting development areas, local governments should consider how wind projects will impact floodplains, wetlands, historical and cultural areas, viewsheds, environmentally sensitive areas, and residential areas. Also relevant is a wind project’s proximity to the power grid.¹⁸
- Local road access to the project site should be considered because construction of a wind energy project may require use of large trucks and cranes. Because these vehicles need a large turning radius and the size and weight of the equipment could damage the roads and bridges, a conditional use permit may be required and the applicant may be responsible for the costs of repairing road damage.¹⁹

Sample Provision: [Rock Island County, Illinois](#).²⁰ Rock Island County permits large-scale wind farms only in agricultural and industrial zones. Small-scale wind farms are permitted on any property, as long as all permit requirements are met. With the exception of agricultural wind farms, both large- and small-scale wind farms are subject to a special use permit process.

Sample Provision: [Hamlin, New York](#).²¹ The Town of Hamlin implemented a wind energy overlay district, which must be initially created through application for a Wind Energy Conservation System special use permit. Wind development facilities may be added only in existing overlay districts subject to a special use permit.

Sample Provision: [Sweetwater County, Wyoming](#).²² Sweetwater County allows non-commercial wind farms as an accessory structure in all base zoning districts with an approved construction/conditional use permit. Commercial wind farms are classified as large-scale industrial uses and are permitted only as a conditional use in the agriculture zone district.

C. Local Government Review Process

Most wind energy development ordinances have an explicit review process. These ordinances identify necessary documents that must accompany an application and require a public participation process before a wind project is approved.

- **Supplement standard application requirements with additional application requirements specific to wind energy development.** To ensure that a wind project sufficiently considers impacts to public health and safety, as well as impacts to

natural resources and the environment, the application process for the project is often comprehensive and lengthy. In addition to the general application requirements for a special or conditional use, some of the most common application materials specifically addressing wind energy development include:

- Project rationale;
- Detailed site plan;²³
- Maps and data describing wind characteristics at the proposed site;²⁴
- Visual simulations of the project components;²⁵
- Maps of potential environmental impacts;
- Detailed analysis of the impact and mitigation plan when an environmental analysis is not otherwise required by a federal or state agency;²⁶
- Written approvals or contracts from agencies and third parties (e.g., utility companies, property owners, equipment manufacturers, emergency services, and any state or federal agencies);²⁷ and
- Reclamation plan.²⁸

- **Streamline the review process for small-scale wind projects.** Small-scale, single turbine wind projects are often used exclusively for on-site home, farm, or small commercial uses. While the exact definition of “small-scale” differs, every community that treats these projects differently than large-scale or commercial wind projects defines the parameters in the ordinance. A few rural communities treat small-scale, single turbine projects as an accessory use and exempt them from review. However, most communities streamline the review process for small-scale wind projects. Therefore, while an applicant for small-scale projects must obtain a typical administrative conditional use permit, the application is exempt from the extensive reporting, approval, and review process required of large-scale projects.

*Sample Provision: [Rock Island County, Illinois](#).*²⁹ Rock Island permits small-scale wind farms on any property, as long as all special use permit requirements are met.

*Sample Provision: [Natrona County, Wyoming](#).*³⁰ Natrona County exempts wind projects “having an aggregate generating capacity of 10kW or less, and that will be used to provide electricity only on the Owner’s property.”

- **Invite public comments from individuals and interested agencies.** Many ordinances include an opportunity for public comment and participation. In addition to a public comment period, the process should allow for comment from interested agencies (e.g., FWP, Parks & Recreation, the fire department).³¹

*Sample Provision: [Sweetwater County, Wyoming](#).*³² Sweetwater County requires all reasonable neighborhood concerns be resolved prior to a permit being issued. The county accomplishes this through a request for written comment from all adjacent property owners, public notice of the proposed project on the applicant’s property, and a public hearing if written objections are received.

*Sample Provision: [Henry County, Illinois](#).*³³ Henry County requires the Planning Committee and Board of Appeals to give 15-day notice and hold a public hearing on a completed application for wind energy projects.

D. Project Viability Requirements

To implement a wind project, the rural community and the project applicant must invest significant time, resources, and funding. Therefore, it is in the best interest of all parties that a project must be deemed likely to succeed as a condition of approval. To that end, many ordinances require a showing that: (1) there is sufficient wind at the proposed project site; (2) the equipment is sufficient to meet the proposed project goals; and (3) the proposed project is economically viable. Often, these are ongoing requirements that continue to apply after a project is initially approved.

- **Require sufficient wind to power a project.** Because of the significant investments required, wind projects should be approved only in areas where the applicant can show that sufficient wind power exists to support the proposed project.

*Sample Provision: [Lehi City, Utah](#).*³⁴ Lehi City requires an applicant to submit a wind feasibility study that recommends locations and optimal height for all turbines.

*Sample Provision: [Montana State Trust Lands](#).*³⁵ Montana's Department of Natural Resources and Conservation requires an applicant to consult wind power maps and collect at least one year of actual anemometer data to determine the practicality of development for a proposed wind development on state trust lands.

- **Require that project equipment meet national standards.** Communities should ensure that wind turbines are capable of producing the energy described in the project goals and that resources are not wasted. Many counties require the project applicant to make a showing that the equipment used will meet national standards.

*Sample Provision: [Sweetwater County, Wyoming](#).*³⁶ Sweetwater County requires that the wind farm equipment and design be "in accordance with proven good engineering practices," purchased from a national manufacturer with a proven track record, or be certified by an engineer.

- **Require wind projects to be economically viable.** A wind project may require the dedication of a large amount of land that will then become unavailable for other land uses. The project may also command substantial start-up capital and maintenance costs. If the project is decommissioned, further significant expenses may be involved. For these reasons, some ordinances require applicants to show that the project will be economically viable prior to issuing a permit.

*Sample Provision: [Sweetwater County, Wyoming](#).*³⁷ Sweetwater requires applicants to submit a cost/benefit analysis of the project's impact on local and state economies.

Sample Provision: [Watauga County, North Carolina](#).³⁸ Watauga County requires applicants to submit information regarding the cost to decommission the wind energy system, a schedule for updating the cost of decommissioning, and a method of ensuring sufficient funds will be available at the time of decommissioning.

- **Require that permits automatically expire if a project becomes inoperable or is not used.** There is a risk that wind turbines will deteriorate or become unused due to lack of wind or financial resources. Many ordinances require wind project removal and reclamation if projects become inoperable or go unused for a period of time.

Sample Provision: [Henry County, Illinois](#) and [Sweetwater County, Wyoming](#).³⁹ Both of these counties requires special use permits for wind energy systems that expire if the system is not installed and functioning within 5 years of the date the permit is issued or if the system is unused or out of service for a continuous 12-month period.

Sample Provision: [Watauga County, North Carolina](#).⁴⁰ Watauga County requires any non-functional wind energy system be removed by the owner. If the County becomes aware of a system that has been inoperable for a continuous 6-month period, the County sends notice to the owner that either the owner must provide reasons for operational difficulties and a timetable for corrective actions, or the owner must remove the system within 120 days.

Sample Provision: [Muskegon City, Michigan](#).⁴¹ Muskegon requires an abandoned wind turbine to be removed within 12-months of the last date the turbine provided electricity to the grid or development. If the structure is not removed within 30 days, the city removes the turbine and related facilities, which become property of the city. All costs associated with removal are the burden of the property owner and are added to the owner's tax bill as a lien on the property.

E. Human Health & Safety

Wind energy development presents several issues concerning the public's health and safety. Possible negative effects must be balanced with the positive effects of the clean energy alternative that wind energy can provide. Many of these risks can be minimized by creating buffers around the wind project, but some of the risks require additional regulation and oversight.

- **Create "fall zones" to prevent injuries to persons if a turbine, ice, or other debris falls.** There is a risk of injury when turbines fall because of severe weather or improper construction. Another concern, especially in colder weather areas like Montana, is ice throw off of wind turbines.⁴² Here, the key considerations include:
 - Setbacks and proper fencing can prevent unauthorized access.
 - Fall zones of 1.5 times the height from a property line and 2 times the height from dwellings or roads are common.⁴³ It should be noted that this may not be enough in some cases. For example, the Vestas V90, a 300 foot rotor span

turbine, requires a 1,300 setback from the turbine at all times, which is more than four times the turbine length.⁴⁴

*Sample Provision: [Massachusetts](#).*⁴⁵ “§ 4.3 Setbacks. Small wind turbines shall be set back a distance equal to the total height of the wind turbine from the nearest existing residential or commercial structure and 30 feet from the nearest property line and private or public way.

§ 4.4 Setback Waiver. The permit granting authority may reduce the minimum setback distance as appropriate, based on site-specific considerations, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a special permit under the provisions of this section.”

*Sample Provision: [North Carolina](#).*⁴⁶ The North Carolina Wind Energy Working Group published a Model Wind Ordinance that requires medium-scale wind project be located 2 times the overall height from the nearest occupied building on a non-participating landowner’s property. Large-scale wind projects must be located 2.5 times away from the overall height of the turbine.

➤ **Keep noise levels to a minimum.** Wind projects cause a constant whirring sound from the spinning blades, the generators, and the fans. While much of the research shows that the noise levels are relatively low, regulations should still consider ways of dampening the effects of wind energy noise levels. The key considerations are:

- Wind turbines emit two types of noise: (1) blade noise and (2) generator and fan noise. These noises combine to create the total decibel output of the wind turbine.⁴⁷
- Turbine decibel levels, and the corresponding recommended time exposure, are as follows:⁴⁸

Type of Wind Turbine	Turbine Decibel Level at Source	ANSI Recommended Maximum Exposure
Small Turbines (generate up to 10kW)	83.8-105.4 dB(A)	8.0 hours at 90 dB(A) 4.0 hours at 95 dB(A) 2.0 hours at 100 dB(A)
Industrial Turbines (generate between 1.8 and 4MW)	98-107 dB(A)	1.0 hour at 105 dB(A) 0.5 hour at 110 dB(A)

- Turbine decibel levels compared to other types of environmental noises:⁴⁹

Source/Activity Indicative noise level dB(A)	
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Car at 40mph at 100m	55

Busy general office	60
Truck at 30mph at 100m	65
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

- Any regulations that affect noise levels of wind turbines should specify where the noise level is measured. Wind turbines have a source noise level that has been determined by the manufacturer.⁵⁰

*Sample Provisions: [Sweetwater County, Wyoming](#).*⁵¹ Sweetwater County’s regulation states that “[t]he noise level caused by the operation of the project, measured at five (5) feet above ground level at the property line coincident with or outside the project boundary, shall not exceed 65 [dB(A)] and shall not exceed 50 [dB(A)] if it is determined that a pure tone noise is generated by the project . . .”

- **Avoid possible effects of Wind Turbine Syndrome, which is caused by inaudible noises that are harder to regulate than audible noises.** “Wind Turbine Syndrome” is the term coined for the myriad of symptoms that may affect those who live in close proximity to industrial wind turbines.⁵² The key considerations include:
 - Wind Turbine Syndrome occurs when low frequency sounds from wind turbines cause problems in the inner ear resulting in dizziness, headaches, ringing of the ears (tinnitus), vertigo, insomnia and nausea. The vibrations trick the inner ear into thinking the body is moving.
 - Buffering residential areas from industrial wind turbines could curb the possibility of such negative effects on people. The study sees these effects in people 1,000-4,900 feet away from a turbine. Although the Clinic located no rural communities that have addressed this syndrome in their regulations, Dr. Pierpont suggests that industrial wind turbines not be placed closer than 1.5 miles from residential dwellings.⁵³
- **Require that all access to ladders, generators, fans, and other maintenance areas be properly secured.** These areas around wind turbines should be properly secured at all times to avoid access by children or other unauthorized people.

*Sample Provision: [Grand Prairie, Texas](#).*⁵⁴ The City of Grand Prairie requires all electrical and control equipment to be labeled and secured. The turbines must be designed so as to not provide readily accessible ladders or step bolts for a minimum of 12 feet from the ground. All accesses must be locked or fenced.

- **Implement braking standards to avoid accidents related to excess speed and to ensure shut down of the turbine in emergencies.** Braking systems are installed in wind turbines to ensure they can be shut down in extreme winds. Regulations should ensure that these braking systems are maintained properly and can be used to shut down the turbines in case of other emergencies, including a turbine fire.

Sample Provision: [Maine](#).⁵⁵ The State Planning Office Model Wind Energy Facility Ordinance states that: “Each Wind Turbine shall be equipped with an overspeed control system that: 1) includes both an aerodynamic control such as stall regulation, variable blade pitch, or other similar system, and a mechanical brake that operates in fail safe mode; or 2) has been designed by the manufacturer or a licensed civil engineer and found by the municipal entity responsible for review and approval of the application under 9.1, based on its review of a written description of the design and function of the system, to meet the needs of public safety.”

Consider requiring liability insurance for approved wind energy developments. A minority of rural communities require a minimum amount of liability insurance in case of personal injury caused by the wind turbines.

Sample Provision: [Maine](#).⁵⁶ Maine’s Model Wind Energy Ordinance states that: “The Applicant or an Applicant's designee acceptable to the [Municipal Reviewing Authority] shall maintain a current general liability policy for the...Wind Energy Facility that covers bodily injury and property damage with limits in an amount commensurate with the scope and scale of the Facility. The Applicant or its designee shall make certificates of insurance available to the [Municipal Reviewing Authority] upon request.”

F. Environmental Impacts

The main environmental concerns involved with wind energy development are the negative impacts to avian populations, wildlife and wildlife habitats, and natural vegetation. As noted in Section B of this memo, rural communities can exclude potential wind energy development from the most environmentally sensitive areas. In areas that permit wind projects, an applicant must address environmental concerns through submission of an impact and mitigation plan.

➤ **Mitigate the effects on avian populations.** Avian species are negatively impacted by wind projects in many different ways and these effects should be avoided. Rural communities should evaluate the risks of avian species hitting turbines or losing habitat, quantity or quality of prey, or nesting sites. Siting is likely the most efficient way to mitigate such harmful effects by avoiding areas of heavy migration or occupancy by avian wildlife.⁵⁷ The California Energy Commission issued the following list of strategies for mitigating negative impacts on avian species:⁵⁸

- “Minimize fragmentation and habitat disturbance by placing roads, turbines and other infrastructure in a pattern that does not fragment habitat corridors.
- Establish buffer zones around known avian habitats to minimize collision hazards.
- Reduce impacts with appropriate turbine layout by studying daily flight patterns of birds.
- Reduce artificial prey habitat at the base of turbines, which may in turn attract foraging raptors.

- Designs that minimize disturbed or unvegetated banks should be incorporated into the construction of turbine pads.
- Rodenticides are not recommended as a way to remove potential prey from wind sites.
- Avoid lighting that attracts birds and bats. Although lighting effects are poorly understood at this time, migrating song birds and bats appear to be attracted to steady burning lights. New FAA standards require synchronized flashing red lights to be mounted to the nacelle for turbines on the perimeter of the wind farm with unlighted gaps of no more than ½ mile.
- All electrical wires and power lines should be placed underground.
- Avoid guyed structures as they are known to pose a serious threat to avian species.
- Decommission non-operational turbines so they no longer present a collision hazard.
- Compensation [for habitat disturbance] can be obtained via [project developer] purchase of land through fee title or purchase of conservation easements and the permanent protection of the biological resources on these lands. The land or easements should have a high biological value for the target species that have been affected by the wind energy project.”

Sample Provision: [Montague Township, Michigan](#).⁵⁹ “At the Township’s request, the applicant shall fund an environmental assessment of impact study and/or other relevant report(s) or studies (including, but not limited to assessing the potential impact on endangered species, eagles, birds, and/or other wildlife) as required by the Township for review by the Township regarding the area or surrounding areas where the Wind Turbine Generator will be placed. Each such study or report shall be provided to the Township one month prior to the time when the Planning Commission makes its formal recommendation regarding the Conditional Use request to the Township Board.”

Sample Provision: [Sweetwater County, Wyoming](#).⁶⁰ Sweetwater County prohibits wind turbine towers from using lattice-type construction or other designs that provide perches for avian predators.

Sample Provision: [Shawano County, Wisconsin](#).⁶¹ Shawano County prohibits wind projects from adversely impacting migratory avian species. In addition, wind project operators must submit a quarterly report identifying all dead birds within 500 feet of the project, must notify the Wisconsin Department of Natural Resources within 24 hours if an unexpected large number of birds are killed and must submit a report describing the cause and future steps to avoid the occurrence.

- **Mitigate effects on wildlife and wildlife habitat.** Wind projects can occupy a significant amount of land area, which may negatively impact wildlife and wildlife habitat. Most ordinances address these concerns twice: once in the application process and again in performance standards. In 2003 the U.S. Fish & Wildlife Service published interim guidelines on mitigating wind turbine impacts, which the DRNC relied on for its FEIS of Coyote Wind Farms. Some of the guidelines were:⁶²

- Identify whether the proposed project site is located in a migratory corridor.
- Identify the existence of endangered or threatened species, species of concern, or designated critical habitat.
- Analyze each project site independently because the negative impacts at one site do not mirror potential impacts at another site.
- Conduct pre- and post-construction scientific studies of wildlife at the proposed site. FWS found that wind projects were moving quickly into areas that had not been studied, which posed a greater threat to wildlife.
- Avoid fragmenting contiguous wildlife habitat by placing turbines on land that (1) has already been altered or cultivated or (2) is already fragmented.
- Minimize roads, accessory structures, and fences. Wildlife friendly fences should be used when possible.
- Develop a habitat restoration plan that minimizes impacts on vulnerable wildlife, but maintains the habitat for other species. “For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.”
- Practice responsible animal husbandry to reduce the availability of carrion.
- Promote wildlife conservation through conservation easements and voluntary habitat acquisition.
- Place electric power lines underground.

Sample Provision: [Riley County, Kansas](#).⁶³ Riley County imposes performance guidelines that expressly discourage wind projects in areas of significant biological diversity, migratory corridors and staging areas, and critical habitats.

Sample Provision: [Sweetwater County, Wyoming](#).⁶⁴ Sweetwater County strongly discourages wind projects in areas where the potential for biological conflicts are great: wilderness study areas; special management areas; and important wildlife habitat areas. Further, the applicant must prepare an environmental impact review and mitigation plan addressing wildlife, wildlife habitat, and endangered or threatened species on the site or in biologically significant areas around the site.

➤ **Mitigate effects on native vegetation.** Wind projects can negatively affect viewsheds, wildlife habitats, wetlands, and forested regions. For this reason, some rural communities do careful site planning to locate turbines away from sensitive vegetation areas and require mitigation measures where vegetation is impacted. Additional considerations include:

- The wind project must control noxious weeds. The Oregon Department of Energy notes that: “Ground disturbance during construction of the energy project and associated access roads, pipelines or transmission lines exposes areas for weeds to become established. The spread of noxious weeds is a serious problem, especially in rural areas of the state. For counties with a large agricultural base, an invasion of weeds can affect the value of cropland.”⁶⁵

- Construction of wind projects, roads, and other related infrastructure can cause erosion, particularly in sloped areas. Mitigation measures, such as erosion control fences and seeding disturbed areas should be used whenever possible.⁶⁶

Sample Provision: [Sweetwater County, Wyoming](#).⁶⁷ Sweetwater County requires applications to submit and adhere to a construction and maintenance plan that minimizes erosion and damage to existing vegetation. Vegetation damaged during construction in areas not occupied by the wind project must be restored upon completion of construction. Disturbed areas must be reseeded to the landowner's or manager's requirements. Dust control is required.

Sample Provision: [Oregon](#).⁶⁸ The Oregon Department of Energy Model Ordinance for Energy Projects requires the applicant agree to implement a plan for weed control during construction and operation of the proposed energy project.

Sample Provision: [Shawano County, Wisconsin](#).⁶⁹ Shawano County requires that "measures shall be used to prevent erosion until vegetation is re-established on areas from which it is removed, such as seeding and sodding, stockpiling and reuse of topsoil, temporary use of straw or fabric cover, aggregate cover, diversions authorized by state permit, sediment basins and filters."

Sample Provision: [Maine](#).⁷⁰ Maine's Model Wind Energy Ordinance § 10.1.6 requires a site plan showing affected vegetation and "the location and average height of tree cover to be retained and the location, variety, planting height and mature height of proposed trees, if any."

- **Ensure site reclamation after the wind project ceases to be operational.** When wind projects cease to operate, full reclamation should be required. Reclamation should include removal of turbines, power lines and other accessory structures, as well as re-vegetation and any other steps necessary to restore the site. Some rural communities require that an applicant submit a reclamation plan and a financial guarantee before allowing a wind project to begin construction.

Sample Provision: [Sweetwater County, Wyoming](#).⁷¹ Sweetwater County requires that a reclamation bond be posted within 30 days of construction on the wind energy development. The amount of the bond must cover 100% of the costs of reclamation of the entire site, including removal of all above and below ground equipment and foundations, as determined by the Board of County Commissioners.

Sample Provision: [Lehi City, Utah](#).⁷² Lehi requires a decommission plan prior to permit approval. The plan must detail the projected cost of decommissioning and how those funds will be secured. Further, the plan must address the manner in which the facility will be decommissioned, "which shall include removal of all structures and debris to a depth of 3 feet, and restoration of the soil and vegetation (consistent and compatible with surrounding vegetation.)"

G. Aesthetic Considerations

Aesthetics are a concern with wind projects because they add large man-made structures to the natural landscape. Effects on the aesthetics of a region can be limited through regulations addressing the design and construction of wind projects.

- **Wind projects should be uniform in development.** To reduce the negative effects, and to keep the turbines as uniform and integrated into the landscape as possible, communities usually require white, grey, or black to be used on turbines and prohibit advertisement on towers.

Sample Provision: [Minnesota](#).⁷³ Minnesota’s Model Wind Ordinance states: “All wind turbines and towers that are part of a commercial [Wind Energy Conversion System] shall be white, grey or another non-obtrusive color. Blades may be black in order to facilitate deicing. Finishes shall be matt or non-reflective. [Exceptions may be made for metrological towers, where concerns exist relative to aerial spray applicators.]”

Sample Provision: [Sweetwater County, Wyoming](#).⁷⁴ Sweetwater County requires visual unity among clusters of turbines. All wind turbines to be at similar ground elevation, and have the same: height from blade tip to ground, number of rotor blades, which shall spin in the same direction in relation to the wind. Except during construction and removal, no outdoor storage is permitted except at locations screened from view. All transformers and other electric equipment must be hidden from view on constructed in harmony with surrounding landscape.

In addition, Sweetwater County prohibits billboards, logos or advertising signs of any kind on the turbines. Telecommunication dishes, antennas, or cellular phone repeaters may not be attached to the turbines. And, all inverters and pendant power cables must be located inside the wind turbine.

- **Lighting should be limited to FAA standards.** Lighting used on turbines can cause safety and nuisance issues or negatively impact the aesthetics of a wind project. For these reasons, some rural communities prohibit wind projects from exceeding FAA standards for lighting.

Sample Provision: [Minnesota](#).⁷⁵ Minnesota’s Model Wind Ordinance requires states “Lighting, including lighting intensity and frequency of strobe, shall adhere to but not exceed requirements established by Federal Aviation Administration permits and regulations. Red strobe lights are preferred for night-time illumination to reduce impacts on migrating birds. Red pulsating incandescent lights should be avoided.”

- **Protect the natural viewsheds of the county.** Some rural communities protect their viewsheds by restricting wind energy development within viewshed areas and requiring heightened design standards in areas adjacent to viewsheds.

Sample Provision: [Sweetwater County, Wyoming](#).⁷⁶ “Wind Farms should avoid those visual corridors that are designated by the P&Z as essential view sheds or scenic

areas. Essential view sheds or scenic areas are those areas designated by the P&Z and the Board after analyzing the applicant’s wind farm visual simulations and considering public hearing comments.”

*Sample Provision: [Watauga County, North Carolina](#).*⁷⁷ Watauga requires approval from the National Park Service when a wind project is proposed in the Blue Ridge Parkway viewshed. Viewshed is not a zoning classification; it is determined by the County using maps and documents prepared for that purpose by the Design Research Laboratory at NC State University and the Blue Ridge Parkway Division of Resource Planning and Professional Services.

*Sample Provision: [Oregon](#).*⁷⁸ The Oregon Department of Energy’s Model Ordinance prohibits wind energy development in scenic corridors and viewsheds. Additionally, if a proposed project is adjacent to a designated scenic corridor, “the applicant agrees to implement mitigation measures that would protect the resource values of the designated scenic corridor as a condition of approval. Such measures may include, but are not limited to, using colors that blend with the background, setting the development back from a right-of-way or stream corridor, using the natural topography to screen the energy project and retaining or planting vegetation that would obscure the view of the energy project within the scenic corridor.”

CONCLUSION

This report provides Montana local governments with a starting place for designing wind energy regulations as part of their land use planning and regulatory laws. Although some sample provisions are provided, each community will have to tailor the provisions to suit their unique needs and objectives. At the end of the day, those local governments that anticipate wind energy development will be better positioned to minimize the risks associated with wind projects while reaping the rewards of bringing alternative energy production into their communities.

RECOMMENDED READING

Montana

- DNRC’s Trust Land Management Division provides a variety of resources on the [Wind Energy Development on School Trust Lands](#) website:
 - [Wind power maps](#) for Montana.
 - The [sample RFP](#) goes through application requirements for state projects.
 - Description of the [Judith Gap Wind Farm](#).
 - Description of the [Martinsdale Wind Farm](#), including links the project’s [Wildlife Assessment](#), and [Winter Flight Wildlife](#) Memo.
 - Description of the [Springdale/Coyote Wind Farm](#), including links the [Final Environmental Impact Statement](#) and the [Record of Decision](#).

- The DEQ's [Wind Energy Program](#) website has numerous, comprehensive resources about wind energy development projects, including information on [tax incentives](#), sources for [wind data](#), and [permit requirements](#).

National

- Katherine Daniels, N.Y. State Energy Research and Dev. Auth., [Wind Energy Model Ordinance Options](#) (Oct. 2005). Part of New York State's Wind Energy Tool Kit, this document outlines model ordinances that range from free-standing wind energy ordinances to wind energy developments addressed through zoning ordinances.
- National Renewable Energy Laboratory, [Wind-Wildlife Impact Literature Database](#) (last updated Aug. 26, 2009). A continuously-updated, national database maintained by the National Wind Technology Center that covers a broad spectrum of research about the impact of wind energy development on wildlife. There is a specific avian literature database.
- F. Oteri, [An Overview of Existing Wind Energy Ordinances](#) (Nat. Renewable Energy Laboratory Dec. 2008). This survey of zoning ordinances covers many of the ordinances discussed in this memo and provides hyperlinks to each ordinance discussed.
- Benjamin K. Sovacool, [Contextualizing Avian Mortality: A Preliminary Appraisal of Bird and Bat Fatalities from Wind, Fossil-fuel, and Nuclear Electricity](#), 37 Energy Policy 6, 2241-2248 (June 2009). Includes statistics about how many birds are killed every year by wind energy and points out that such effects are negligible compared to fossil fuel and non-energy causes of avian mortality.
- United States Department of Energy, [Wind Powering America](#) (last updated Oct. 10, 2011). This website tracks wind energy development nationwide and provides a comprehensive look at program areas, current research, and tools.
- United States Department of Energy, [20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply](#) (July 2008). This report provides an overview of U.S. goals to increase wind energy development over the next 20 years, the details of which are important because Montana ranks 5th in the U.S. for potential wind energy development.
- United States Fish and Wildlife Service, [Interim Guidelines To Avoid And Minimize Wildlife Impacts From Wind Turbines](#) (May 2003). This is a good resource when considering the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Acts.

ENDNOTES

- ¹ See e.g. Mont. Code Ann. § 76-2-202(1) (2011).
- ² James W. Patterson, Jr., [Development of Obstruction Lighting Standards for Wind Turbine Farms](#), FAA Doc. No. TN05-50 (Nov. 2005). See FAA, [Configuration for Lighting Windmill Farms](#) (last updated May 18, 2009).
- ³ Watauga Co., N.C., Ordinance to Regulate Wind Energy Systems, § 4.4 (2006).
- ⁴ U.S. Dept. of Energy, [New England Wind Forum: Radar, TV, and Radio Signal Interference](#) (last updated Oct. 10, 2011).
- ⁵ Brookings Co., S.D., 2007 Revised Zoning Ordinance § 23(D)(3) (2010).
- ⁶ Buffalo Co., Wis. Wind Energy Facility Zoning Ordinance § 7.3(b) (Dec. 2006).
- ⁷ 16 U.S.C.A. §§ 1532(19), 1538 (West 2009).
- ⁸ 42 U.S.C.A. § 4332; 40 C.F.R. §§ 1502.4, 1508.18 (2009).
- ⁹ See e.g. DNRC, [Record of Decision](#) 2 (Dec. 2009).
- ¹⁰ Cmt. from Jeff Blend, Economist and Energy Analyst, DEQ, to Jeff Bollman, Planner, DNRC, [Final Environmental Impact Statement for Coyote Wind Project, LLC](#) app. A.
- ¹¹ See e.g. DNRC, [Final Environmental Impact Statement for Coyote Wind Project, LLC](#) (Nov. 2009).
- ¹² Sweetwater Co., Wyo., Wind Farm Zoning Regulations § 1.5.1(g) (Res. 06-07-PZ-01) (Jul. 5, 2006).
- ¹³ Lehi City, Utah, Wind Energy Facility Regulations §§ 19.070(I) (Apr. 8, 2008); Sweetwater Co., Wyo., Wind Farm Zoning Regulations at §§ 1.4 (n)-(p).
- ¹⁴ Sweetwater Co., Wyo., Wind Farm Zoning Regulations at §§ 1.4(n)-(p).
- ¹⁵ See e.g. [Missoula Co. Growth Policy, Goals & Objectives](#), ch. 3, 3-2 (2005).
- ¹⁶ Mont. Code Ann. 76-1-601(2)(e).
- ¹⁷ DNRC website, [Wind Energy Development on School Trust Lands: Getting Started](#) (accessed Mar. 21, 2012).
- ¹⁸ See e.g. Sweetwater Co., Wyo., Wind Farm Zoning Regulations at §§ 1.5.1(d)(iv)-(vi), (g), 1.5.2-1.5.3.
- ¹⁹ Oregon Department of Energy Model Ordinance for Energy Projects § ##.06.15 (July 2005).
- ²⁰ Rock Island Co., Ill., Article XL – Wind Energy §§ 40.04, 40.05 (accessed March 12, 2012).
- ²¹ A Local Law Governing Wind Energy Facilities in the Town of Hamlin (2008). See also e.g. Huron Co., Mich. Wind Energy Overlay District Ordinance § 3.1 (2006) (allows wind energy projects only in agricultural zones that are also in a wind energy overlay district); Lehi City, Utah, Wind Energy Facility Regulations at § 19.040(A) (allows wind energy projects only as conditional uses in industrial and technical manufacturing zones that are also in a wind energy overlay district).
- ²² Sweetwater Co., Wyo., Wind Farm Zoning Regulations at § 1.4.
- ²³ Natrona Co., Wyo. Meteorological Tower and Wind Energy Conversion System Regulations § 9(b) (2009).
- ²⁴ Sweetwater Co., Wyo., Wind Farm Zoning Regulations at §1.5.1(d)(v).
- ²⁵ *Id.* at §1.5.1(e).
- ²⁶ *Id.* at §1.5.1(g).
- ²⁷ See e.g. Lehi City, Utah, Wind Energy Facilities Regulations at § 19.060 (requiring consultation with a licensed acoustic consultant, the City Fire Department, and a licensed surveyor or engineer).
- ²⁸ See e.g. Sweetwater Co., Wyo., Wind Farm Zoning Regulations at § 1.5.1; Lehi City, Utah, Wind Energy Facilities Regulations at § 19.060(g).
- ²⁹ Rock Island Co., Ill., Article XL – Wind Energy § 40.04(a)(1) (accessed Dec. 2, 2009).
- ³⁰ Natrona Co., Wyo., Meteorological Tower and Wind Energy Conversion System Regulations at § 3(b).

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- ³¹ We did not find any ordinances that held a separate review process for interested agencies, however, *see e.g.* Mont. Code Ann. § 76-3-504(1)(i) (2009) (Montana Subdivision and Platting Act requires a local governing body provide opportunity for affected agencies to comment prior to approval of a subdivision application).
- ³² Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.4(i). *See also e.g.* Riley Co., KS Special Use Permit Regulations for WECS-C (May 12, 2006) (requires a notice and protest petition period for all proposed commercial wind energy systems).
- ³³ Henry Co., Ill. Wind Zoning Ordinance § 2.09(2) (Sept. 13, 2005). *See also* Rock Island Co., Ill. Wind Energy Ordinance at § 40.07(b).
- ³⁴ Lehi City, Utah Wind Energy Facilities Regulations at § 19.060(g).
- ³⁵ DNRC website, [Wind Energy Development on School Trust Lands: Getting Started](#) at ¶ 1.
- ³⁶ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at §1.5.3.
- ³⁷ *Id.* at §1.5.1(f).
- ³⁸ Watauga Co., N.C. Wind Ordinance at § 5.1(g).
- ³⁹ Henry Co., Ill. Wind Zoning Ordinance at § 2.07(3); Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.4. *See also* Rock Island Co., Ill. Wind Energy Ordinance at § 40.05(c).
- ⁴⁰ Watauga Co., N.C. Wind Ordinance at § 4.7.
- ⁴¹ Muskegon Township, Mich. Zoning Ordinance § 2311(10)(j) (Oct. 2009).
- ⁴² Henry Seifert et al., [Risk Analysis of Ice Throw from Wind Turbines](#) (April 2003).
- ⁴³ N.C. Model Wind Ordinance § 7 (June 2008).
- ⁴⁴ [Mechanical Operating and Maintenance Manual – V90 – 3.0MW, VCRS 60Hz](#), (June 29, 2007).
- ⁴⁵ Mass. Model Amendment to a Zoning Ordinance or By-law: Allowing Wind Facilities by Special Permit at §§ 4.3, 4.4 (October 2008).
- ⁴⁶ N.C. Model Wind Ordinance at § 7.
- ⁴⁷ Daniel J. Alperets, [Addressing Wind Turbine Noise](#) (October 2006).
- ⁴⁸ *Id.* (the dB(A) readings are from the source, meaning directly at the blade; the sound will lessen as it gets farther from the turbine).
- ⁴⁹ British Wind Energy Association, [Reference – Noise from Wind Turbines](#) (2009).
- ⁵⁰ Alperets, [Addressing Wind Turbine Noise](#) at 4.
- ⁵¹ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.3
- ⁵² [Wind Turbine Syndrome](#) website (accessed Dec. 2, 2009).
- ⁵³ Nina Pierpont, [Health Effects of Wind Turbine Noise](#) (March 3, 2006).
- ⁵⁴ Grand Prairie, Tex. Small Wind Energy Ordinance § 9(M) (Apr. 2007).
- ⁵⁵ Maine State Planning Office Model Wind Energy Facility Ordinance § 12.4 (Aug. 27, 2009).
- ⁵⁶ *Id.* at § 14.9.
- ⁵⁷ In considering impact to avian populations, Missoula County should consider that it may be located in the Central North American Flyway. A flyway is a flight path used for bird migration. *See e.g.* <http://www.birdnature.com/flyways.html>.
- ⁵⁸ Anderson et. al., *Statewide Guidelines for Reducing Impact to Birds and Bats from Wind Energy Development*, California Energy Commission Report CEC-700-2006-013-SD (Dec. 2006).
- ⁵⁹ Carolyn Weed, *Examples of Wind Turbine Environmental Regulations: Montague Township*, Mich. Wind Ordinance § 23 (Aug. 12, 2006).
- ⁶⁰ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.3.
- ⁶¹ Shawano Co., Wisc. Wind Energy Conversion System Ordinance at §§ 3.28, 5.7.3 to 5.7.4 (July 2005).
- ⁶² Memo. from the Deputy Director, FWS, to Regional Directors of Regions 1–7, FWS, [Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines](#) 1 (May 13, 2003).
- ⁶³ Riley Co., Kan. Zoning Regulations Section 22 - Special Use Permit Regulations for Wind Energy Conversion Systems, Commercial (WECS-C) at 9(a)-9(c) (July 2010).
- ⁶⁴ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.1(g).
- ⁶⁵ Oregon Department of Energy Model Ordinance for Energy Projects at § ##.06.19.

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- ⁶⁶ *Id.* at § ##.06.17.
- ⁶⁷ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.3.
- ⁶⁸ Oregon Department of Energy Model Ordinance for Energy Projects at § ##.06.19.
- ⁶⁹ Shawano Co., Wisc. Wind Energy System Conversion Ordinance at § 3.2.9.5 (July 2005).
- ⁷⁰ Maine State Planning Office Model Wind Energy Facility Ordinance at § 10.1.6.
- ⁷¹ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.5.
- ⁷² Lehi City, Utah Wind Energy Facilities Regulations at § 19.060(L).
- ⁷³ Minnesota Model Wind Ordinance Model Wind Ordinance 9 (2005).
- ⁷⁴ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at §§ 1.5.2-1.5.3.
- ⁷⁵ Minnesota Model Wind Ordinance Model Wind Ordinance 9 (2005).
- ⁷⁶ Sweetwater Co., Wyo. Wind Farm Zoning Regulations at § 1.5.2.
- ⁷⁷ Watauga Co., N.C. Wind Ordinance at § 5.1(i).
- ⁷⁸ Oregon Department of Energy Model Ordinance for Energy Projects at § ##.06.11.