

WIND POWER AND WILDLIFE IN COLORADO: AN INFORMATIONAL RESOURCE GUIDE

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This resource guide contains a collection of information intended to serve as a starting point for gaining a more complete understanding of issues related to the wind power development and wildlife conservation in Colorado. A large number of agencies and organizations are involved in these issues, and thus general descriptions and links to additional information (reports, websites, etc.) are listed here.

Although much information has been captured here, there is likely additional information that may be relevant to your area of interest. Furthermore, issues related to wind power developments are evolving rapidly and we expect new information to become available and for some information to change. We encourage you to use this resource guide as a launching point for further investigation.

Inclusion of information or listing of organizations is not intended to represent endorsement of specific actions, policies, or points of view. Users are encouraged to critically evaluate all information.

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Resource Guide

(alphabetical)

American Bird Conservancy (ABC): <http://www.abcbirds.org/>

American Bird Conservancy (ABC) is a 501(c)3 not-for-profit organization, whose mission is to conserve wild birds and their habitats throughout the Americas.

❖ Wind energy Policy

<http://www.abcbirds.org/policy/windpolicy.htm>

American Wind Energy Association (AWEA): <http://www.awea.org/>

AWEA is a national trade association that represents wind power plant developers, wind turbine manufacturers, utilities, consultants, insurers, financiers, researchers, and others involved in the wind industry—one of the world's fastest growing energy industries. In addition, AWEA represents hundreds of wind energy advocates from around the world.

❖ Proceedings of the Wind Energy and Birds/Bats Workshop: Understanding and Resolving Bird and Bat Impacts --

[http://www.awea.org/pubs/documents/WEBBProceedings9.14.04\[Final\].pdf](http://www.awea.org/pubs/documents/WEBBProceedings9.14.04[Final].pdf)

Proceedings of a comprehensive two-day workshop on wind energy, birds, and bats co-sponsored by the American Bird Conservancy (ABC) and the American Wind Energy Association (AWEA) in Washington, D.C., May, 2004. An excellent summary of current research and knowledge on the topic.

❖ Published Works

➤ AWEA Fact Sheets

<http://www.awea.org/pubs/factsheets.html>

➤ The Most Frequently Asked Questions About Wind Energy

<http://www.awea.org/pubs/documents/FAQ2002%20-%20web.PDF>

➤ 2005 Global Wind Energy Market Report

<http://www.awea.org/pubs/documents/globalmarket2005.pdf>

➤ Views on the Environment: Clean and Green (Public attitudes of wind power)

<http://www.awea.org/pubs/documents/oppoll.PDF>

➤ 2004 Wind Energy Information Guide

<http://www.awea.org/pubs/documents/INFOGUIDE2004.pdf>

➤ 2005 Wind Power Outlook

<http://www.awea.org/pubs/documents/Outlook%202005.pdf>

❖ Wind Energy and Energy Policy

<http://www.awea.org/policy/>

➤ Production Tax Credit (PTC)

- <http://www.awea.org/policy/index.html#PTC>
- Energy Bill Extends Wind Power Incentive Through 2007
http://www.awea.org/news/energy_bill_extends_wind_power_072905.html
 - Renewables Portfolio Standard (RPS)
<http://www.awea.org/policy/rpsbrief.html>
 - How a National RPS Would Affect Utilities
http://www.awea.org/pubs/factsheets/rps_utilities.PDF
 - Mechanics of the RPS at the Federal Level
<http://www.awea.org/policy/rpsmechfed.html>
 - Mechanics of the RPS at the State Level
<http://www.awea.org/policy/rpsmechste.html>
 - Transmission Policy
 - AWEA Electrical Guide to Utility Scale Wind Turbines
http://www.awea.org/policy/documents/AWEA_Electrical_Guide_to_UTILITY_Scale_Wind_Turbines.pdf
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Bats and Wind Energy Cooperative (BWEC): <http://www.batcon.org/wind/>

The Bats and Wind Energy Cooperative (BWEC) is an alliance of state and federal agencies, private industry, academic institutions, and non-governmental organizations interested in cooperating to develop solutions to minimize or, where possible, prevent mortality of bats at wind power turbines.

- ❖ Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines—
<http://www.batcon.org/wind/BWEC2004finalreport.pdf>
 - ❖ A Bibliography of Bat Interactions with Wind Turbines—
<http://www.batcon.org/wind/batandwindturbinebibliography.pdf>
 - ❖ Synthesis and Comparison of Baseline Avian and Bats Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments—
<http://www.batcon.org/wind/BPAAvian-BatStudy12-2002.pdf>
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Bureau of Land Management – Wind Energy:

http://www.blm.gov/nhp/what/lands/realty/wind_energy.htm

- ❖ Wind Energy Development Programmatic Environmental Impact Statement:
<http://windeis.anl.gov/>

The United State Department of the Interior, Bureau of Land Management (BLM), has prepared a Final Programmatic Environmental Impact Statement (EIS) to evaluate issues associated with wind energy development on Western public lands (excluding Alaska) administered by the BLM. This web site is the online center for public information and involvement in the EIS process.

 - BLM Programmatic EIS – Full Download:
<http://windeis.anl.gov/documents/fpeis/index.cfm>

The full text of the EIS is available as numerous PDF downloads.

- BLM Programmatic EIS – Executive Summary (direct link):
<http://windeis.anl.gov/documents/fpeis/maintext/Vol1/Vol1ExecSum.pdf>

❖ Management Policies

- Working Landscapes and Grazing Policies
<http://www.co.blm.gov/news/2003/workinglandscape.htm>
- Interim Wind Energy Development Policy
<http://www.blm.gov/nhp/efoia/wo/fy03/im2003-020.htm>
- Visual Resource Management Policy
<http://www.blm.gov/nstc/VRM/>
- Right-of-Way Management-Land Use Planning
<http://www.blm.gov/nhp/efoia/wo/fy02/im2002-196.html>

California Energy Commission- Public Interest Energy Research (PIER)

<http://www.energy.ca.gov/pier/>

The California Energy Commission's PIER Program supports energy research, development and demonstration projects that will improve the quality of life in California by bringing environmentally safe, affordable and reliable energy services and products to the marketplace

❖ Published Works

- Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area (executive summary)
http://www.energy.ca.gov/reports/500-04-052/500-04-052_00_EXEC_SUM.PDF
- Renewable Energy Program: 2005 Annual Report to the Legislature
<http://www.energy.ca.gov/2005publications/CEC-300-2005-020/CEC-300-2005-020.PDF>
- 2005 Integrated Energy Policy Report (executive summary)
<http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-ES.PDF>
- Intermittent Wind Generation: Summary Report of Impact on Grid System Operations
<http://www.energy.ca.gov/reports/CEC-500-2004-091.PDF>

Colorado Office of Energy Management and Conservation (OEMC)- Wind Energy:

<http://www.state.co.us/oemc/programs/renewable/windenergy.htm>

OEMC has public-private partnerships to promote Colorado's renewable energy potential.

❖ Published works

- **Distributed Wind Energy Study for Northeast Colorado**
<http://www.state.co.us/oemc/programs/renewable/windenergy/study/default.htm>

- **Handbook on Renewable Energy Financing for Rural Colorado**
<http://www.state.co.us/oemc/programs/renewable/windenergy/study/default.htm>

- ❖ ColoradoENERGY.org: <http://www.coloradoenergy.org/>
ColoradoENERGY.org is designed to help energy professionals in Colorado to network and get the word out about their activities.
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Colorado Public Utilities Commission (PUC)

<http://www.dora.state.co.us/puc/index.htm>

The PUC has full economic and quality of service regulatory authority over intrastate telecommunication services; and investor-owned electric, gas and water utilities, as well as partial regulatory control over municipal utilities and electric associations

- ❖ Amendment 37
<http://www.dora.state.co.us/puc/rulemaking/Amendment37.htm>

The PUC's final order implementing Amendment 37 rules:

http://www.dora.state.co.us/puc/decisions/2005/C05-1461_05R-112E.pdf

- Ballot Initiative (Blue Book pages 16-20)
http://www.state.co.us/gov_dir/leg_dir/lcsstaff/2004/ballot/2004BluebookforInternet.PDF
 - Comments on The Renewable Energy Standard Rules
<http://www.dora.state.co.us/puc/rulemaking/Amendment37/Amendment37Comments.htm>
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Interwest Energy Alliance

<http://www.interwestenergy.org/>

The Interwest Energy Alliance is a trade association that brings the nation's wind energy industry together with the West's advocacy community.

- ❖ Is Wind Energy Cost-Competitive
<http://www.interwestenergy.org/cost.htm>
 - ❖ Benefits of Renewable Energy
<http://www.interwestenergy.org/benefits.htm>
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National Renewable Energy Laboratory (NREL): <http://www.nrel.gov/>

The National Renewable Energy Laboratory (NREL) is the nation's primary laboratory for renewable energy and energy efficiency R&D.

- ❖ National Wind Technology Center (NWTC): <http://www.nrel.gov/wind/>

The mission of the Wind Energy Program is to support the President's National Energy Policy and departmental priorities for increasing the viability and deployment of renewable energy; lead the Nation's efforts to improve wind energy technology through public/private partnerships that enhance domestic economic benefit from wind power development; and coordinate with stakeholders on activities that address barriers to use of wind energy.

- Published works
 - Wind Energy Today and Tomorrow: an overview of the Wind and Hydropower Technologies Program
<http://www.nrel.gov/wind/pdfs/37147.pdf>
 - Assessing the Potential for Renewable Energy on Public Lands
<http://www.nrel.gov/docs/fy03osti/33530.pdf>
 - Wind Energy Multi Year Program Plan for 2005-2010
http://www.nrel.gov/wind_meetings/2003_imp_meeting/pdfs/wind_prog_myp_p_15Nov2004.pdf

 - Wind Energy Resource Information
 - How Does a Wind Turbine Work?
<http://www.nrel.gov/wind/animation.html>
 - Certification and Standards for Turbines
http://www.nrel.gov/wind/working_cert_guidelines.html
 - Wind Integration
http://www.nrel.gov/wind/working_integration.html

 - NREL Avian Literature Database: http://www.nrel.gov/wind/avian_lit.html
The Avian Literature Database is a bibliographic database of documents on the effects of wind energy development and towers, power lines and other wires, on birds. The effects on birds include mortality factors such as collision and electrocution and impacts on nesting, foraging, roosting/loafing and other forms of bird disturbances.

 - NREL Avian Publications Catalog:
http://www.nationalwind.org/workgroups/wildlife/publications_catalog.pdf
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National Wind Coordinating Committee (NWCC): <http://www.nationalwind.org/>

A U.S. consensus-based collaborative formed in 1994, the National Wind Coordinating Committee (NWCC) identifies issues that affect the use of wind power, establishes dialogue among key stakeholders, and catalyzes appropriate activities to support the development of environmentally, economically, and politically sustainable commercial markets for wind power. NWCC members include representatives from electric utilities and support organizations, state legislatures, state utility commissions, consumer advocacy offices, wind equipment suppliers and developers, green power marketers, environmental organizations, agriculture and economic development organizations, and state and federal agencies.

❖ NWCC Wildlife Workgroup: <http://www.nationalwind.org/workgroups/wildlife/>

The NWCC Wildlife Workgroup is a forum to define, discuss, and address wind-avian interaction issues, involving all stakeholders and focusing on public policy questions.

- Completed Papers from NWCC Wildlife Workgroup
 - Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions --
http://www.nationalwind.org/publications/avian/wildlife_factsheet.pdf
 - Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States --
http://www.nationalwind.org/publications/avian/wildlife_factsheet.pdf
 - Studying Wind Energy/Bird Interactions: A Guidance Document --
http://www.nationalwind.org/publications/avian/avian99/Avian_booklet.pdf
 - Avian Publications Catalogue?
- Published Works from NWCC Wildlife Workgroup Meetings
 - Onshore Wildlife Interactions with Wind Developments
<http://www.nationalwind.org/publications/avian/avian04/proceedings.pdf>
- ❖ NWCC Siting Workgroup: <http://www.nationalwind.org/workgroups/siting/>
The NWCC Siting Workgroup has served as a forum for the discussion of all siting issues, such as environmental impacts, permitting approaches and zoning questions. Addressing both process and substantive considerations related to wind turbine siting, the Workgroup has developed a Wind Energy Facilities Handbook to help decision-makers assure necessary environmental protection and respond to public needs – thereby avoiding costly court challenges, and allowing wind to be a competitive electrical generation resource.
- Completed Papers from NWCC Siting Workgroup
 - Permitting of Wind Energy Facilities: A Handbook—
<http://www.nationalwind.org/publications/permit/permitting2002.pdf>
 - Wind Power Facility Siting Case Studies: Community Response
http://www.nationalwind.org/publications/permit/Wind_Power_Facility_Siting_Case_Studies.pdf
- Siting Factsheet
http://www.nationalwind.org/Draft_Siting_Factsheets%20.pdf
- Technical Considerations in Siting Wind Developments: Research Meeting
 - Links to numerous presentations
<http://www.nationalwind.org/events/siting/presentations.htm>
- ❖ NWCC Economic Development Workgroup:
<http://www.nationalwind.org/workgroups/economic/default.htm>
The NWCC seeks to explore the economic development benefits and cost of wind power for landowners and communities, particularly economically challenged areas.

- Completed Paper from NWCC Economic Development Workgroup
 - Guideline for Assessing the Economic Development Impacts of Wind Power
<http://www.nationalwind.org/publications/economic/guidelines.pdf>
 - Economic Development Impacts of Wind Power- Case Studies
http://www.nationalwind.org/publications/economic/economic_case_studies.pdf

- ❖ Wind Energy Issue Papers
http://www.nationalwind.org/publications/issue_papers.htm
With the assistance of several consultants, NWCC members have developed a series of white papers and other projects to inform regulators, legislators, and other stakeholders on decisions about wind power development.
 - The Benefits of Wind Energy
<http://www.nationalwind.org/publications/wes/wes01.htm>
 - Wind Energy Environmental Issues
<http://www.nationalwind.org/publications/wes/wes02.htm>
 - Siting Issues for Wind Power Plants
<http://www.nationalwind.org/publications/wes/wes03.htm>
 - Wind Energy Resources
<http://www.nationalwind.org/publications/wes/wes04.htm>
 - The Effect of Wind Energy Development on State and Local Economies
<http://www.nationalwind.org/publications/wes/wes05.htm>
 - Utility Procurement of Wind Resources
<http://www.nationalwind.org/publications/wes/wes06.htm>
 - Wind in a Restructured Electric Industry
<http://www.nationalwind.org/publications/wes/wes07.htm>
 - Incorporating Wind into Resource Portfolios
<http://www.nationalwind.org/publications/wes/wes08.htm>
 - Wind Energy Transmission and Utility Integration
<http://www.nationalwind.org/publications/wes/wes09.htm>
 - Wind Performance Characteristics
<http://www.nationalwind.org/publications/wes/wes10.htm>
 - Wind Energy Costs
<http://www.nationalwind.org/publications/wes/wes11.htm>

State-specific Wind Power Siting Guidelines

- ❖ Kansas Renewable Energy Working Group: Siting Guidelines for Kansas
http://www.naseo.org/energy_sectors/wind/kansas_siting_guidelines.pdf

- ❖ Minnesota Environmental Quality Board: Wind Siting
<http://www.eqb.state.mn.us/EnergyFacilities/wind.html>

- ❖ Oregon: Energy Facility Siting Standards

<http://www.oregon.gov/energy/siting/standards.shtml>

- ❖ Washington Department of Fish and Wildlife: Wind Power Guidelines
<http://wdfw.wa.gov/hab/engineer/windpower/index.htm>
 - ❖ Wisconsin Model Wind Ordinance Reference Guide (Draft)
http://www.doa.state.wi.us/docs_view.asp?docid=2870
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U.S. Department of Energy: Energy Efficiency and Renewable Energy (EERE)

Wind and Hydropower Technologies Program

<http://eereweb.ee.doe.gov/windandhydro/>

The Wind and Hydropower Technologies Program works with industry to develop the advanced technology needed to convert more of the nation's wind into electricity.

❖ Wind Powering America

Wind Powering America is a commitment to dramatically increase the use of wind energy in the United States. This initiative will establish new sources of income for American Farmers, Native America, and other rural landowners, and meet the growing demand for clean sources of electricity

➤ Published Works

- Comparing Statewide Economic Impacts of New Generation from Wind, Coal, and Natural Gas in Arizona, Colorado, and Michigan
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/38154_econdev_compare_statewide.pdf
- Wind Energy Myths
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/wpa_factsheet_myths.pdf
- Wind Energy Benefits
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/wpa_factsheet_series.pdf
- A Guidebook to Expanding the Role of Renewables in a Power Supply Portfolio
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/power_supply_guidebook.pdf
- Small Wind Electric Systems: A Colorado Consumer's Guide
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_co.pdf
- Colorado Public Utility Commission's Xcel Wind Decision
http://www.eere.energy.gov/windandhydro/windpoweringamerica/astate_template.asp?stateab=co

❖ Renewable Energy Production Incentive

<http://www.eere.energy.gov/wip/program/rep.html>

U.S. Fish and Wildlife Service – Wind Energy:

<http://www.fws.gov/habitatconservation/wind.htm>

The Fish and Wildlife Service's Project planning Program typically becomes involved in the review of potential wind energy developments on public lands through the National Environmental Policy Act. This may be as a cooperating agency with the licensing agency under Section 1501.6, or because of its duty to comment on federally-licensed activities for which the agency has jurisdiction by law (Section 1503.4), in this case the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.

- ❖ Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines – <http://www.fws.gov/habitatconservation/wind.pdf>
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U.S. Government Accountability Office

- ❖ Wind Power Impacts on Wildlife and Government Responsibilities for Regulating Development and Protecting Wildlife
<http://www.gao.gov/new.items/d05906.pdf>
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University of North Dakota- Energy and Environmental Research Center (EERC): The Plains Organization for Wind Energy Resources

<http://www.undeerc.org/wind/default.asp>

The EERC is recognized as one of the world's leading developers of cleaner, more efficient energy and environmental technologies to protect and clean our air, water, and soil.

- ❖ Published Works
 - Harvesting the Wind: A landowners' guide to wind energy development in the Great Plains
http://www.undeerc.org/wind/literature/wind_brochure.pdf
 - Wind Energy Glossary
http://www.undeerc.org/wind/literature/Wind_Glossary.PDF
 - Small Wind Electric Systems: A U.S. Consumer's Guide
http://www.undeerc.org/wind/literature/small_wind_guide.pdf
 - Regional Wind Energy Analysis for the Central United States
http://www.undeerc.org/wind/literature/Regional_Wind.pdf
-

Western Ecosystem Technologies, Inc. (WEST, Inc.)- Wind Power Projects:

http://www.west-inc.com/wind_power.php

WEST, Inc. provides environmental and statistical consulting services and contract research nationally and internationally to industry, government, and private organizations.

- ❖ Project Reports
http://www.west-inc.com/wind_reports.php
-

Western Governor's Association

- ❖ Western Governor's Association Clean-Energy Resolution
<http://www.westgov.org/wga/policy/04/clean-energy.pdf>
 - ❖ Western States Energy Policy Roadmap
<http://www.westgov.org/wga/policy/03/roadmap3-19.pdf>
 - ❖ Clean and Diversified Energy Initiative
<http://www.westgov.org/wga/initiatives/cdeac/index.htm>
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Western Resource Advocate (WRA) – Renewable Energy:

<http://www.westernresourceadvocates.org/energy/index.php>

Non-profit environmental law and policy organization dedicated to restoring and protecting the natural environment of the Interior American West. Their Energy Project promotes sustainable energy technology in six states in the Rocky Mountain and Desert Southwest region

- ❖ Renewable Energy Standards
<http://www.westernresourceadvocates.org/energy/renew.php>
 - ❖ Responsible Energy Development
<http://www.westernresourceadvocates.org/land/oilgas.php>
 - ❖ Published Works
 - A Balanced Energy Plan for the Interior West (Executive Summary)
http://www.westernresourceadvocates.org/energy/BEP/WEB_pdfs/intro_execsum.pdf
 - ❖ **Colorado Wind Power Campaign**
<http://www.cogreenpower.org>
Information on utility green power programs and other ways consumers can use wind energy provided by WRA
 - ❖ **Renewable Energy Atlas of the West**
<http://www.energyatlas.org/>
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Utilizing state-of-the-art GIS technology, the Atlas brings together the best existing renewable resource maps and data into a single comprehensive, publicly available document and interactive web site. It does not provide a new regional assessment of renewable resources, but rather the issues affecting their development. In Addition, it identifies areas where new data are needed in order to more accurately represent the region's renewable energy resources.

Windustry

<http://www.windustry.org/>

Windustry works to create an understanding of wind energy opportunities for rural economic benefit. Windustry promotes wind energy through outreach, educational materials, and technical assistance to rural landowners, and state, regional, and nonprofit collaborations.

- ❖ Wind Energy Information for Landowners - Easements and Leases
<http://www.windustry.org/opportunities/lease.htm>
- ❖ Wind Energy Policy
<http://www.windustry.org/resources/legislation.htm>