Siting Guidelines for Wind Power Projects in South Dakota

Introduction

The South Dakota Bat Working Group in cooperation with the Department of South Dakota Game, Fish and Parks compiled these siting guidelines for wind power developers and other stakeholders to utilize as they consider potential wind power sites in South Dakota. Wind power siting and permitting processes vary by county and/or city. The Public Utilities Commission has agreed to distribute siting guidelines to all stakeholders involved in the development of wind power in South Dakota, since at this time no state environmental regulations exist in association with siting of wind turbines.

Wind siting guidelines relevant to South Dakota were adapted from the National Wind Coordinating Committee's (NWCC) Permitting of Wind Energy Facilities: A Handbook and the Kansas Renewable Energy Working Group (KREWG) Environmental and Siting Committee's Siting Guidelines for Windpower Projects in Kansas. The National Wind Coordinating Committee's guidelines are available online at the following website address: http://www.nationalwind.org/publications/siting.htm and the Kansas Renewable Energy Working Group's guidelines are available online at the following address: http://www.kansasenergy.org/krewg/reports/KREWGSitingGuidelines.pdf.

South Dakota's guidelines address activities and concerns associated with siting and permitting wind turbines. Successfully siting a wind power project often relies on trade-offs between community acceptability and economic viability, which relates to adequate communication.

Although wind power is considered "green energy," many concerns have been expressed about the effects of their presence on plants and animals native to South Dakota. Specific areas of South Dakota have been identified as potential sites for wind energy development, and these sites are located in, but not limited to, the Coteau des Prairies in eastern South Dakota and the Missouri River in central South Dakota, which are unique/rare in South Dakota. Additional areas in other regions of the state may be identified/added by ongoing studies or further infrastructure development (e.g., transmission lines and substations).

Wind energy issues in South Dakota are similar to those in other states. Most residents of South Dakota respect their local resources, wildlife, and environment, and have concerns regarding the exploitation and/or degradation of those resources. Developers, recognizing the opportunity to establish renewable energy generation facilities, may not be aware of concerns expressed by agencies, groups, or individuals regarding wind farm impacts. Each project should be evaluated on a case by case basis. Cumulative impacts will undoubtedly accrue as development proceeds within regions (e.g., Missouri River, Coteau des Prairies, Prairie Pothole) and across the state. These

cumulative effects may differ in type and significance from those experienced at individual project sites. In particular, the cumulative effects on natural and biological resources, such as habitat (e.g., native prairie) and wildlife (e.g., birds and bats), require consideration from all stakeholders; however, impacts on other resources are also important. For further development and sustainability of the wind energy industry, it is important by all stakeholders to evaluate the context of the collective merits of all projects.

Most guidelines within this document are issues and concerns identified by other parties, e.g., NWCC and KREWG, which are shared in South Dakota, but some guidelines are tailored to address the concerns and issues specifically to this state. These guidelines address issues/concerns associated with the pre-construction, construction or post-construction of wind turbines and have been divided into eleven general categories:

1) Land Use
2) Natural and Biological Resources
3) Noise
4) Visual Resources
5) Public Interaction
6) Soil Erosion and/or Water Quality
7) Health and Safety
8) Cultural, Archaeological, and Paleontological Resources
9) Socioeconomic, Public Service, and Infrastructure
10) Solid and Hazardous Wastes
11) Air Quality and Climate.

The guidelines outlined in this document are neither mandates nor regulations. They have been compiled/developed: 1) to encourage developers to select potential wind sites using a process that is acceptable to all stakeholders (e.g., state agencies/departments, federal agencies, sportsmen/women groups, local communities, developers, landowners, wildlife advocacy groups, and/or tribal agencies); 2) to protect South Dakota rare/unique areas (e.g., Coteau des Prairies, Missouri River, and Prairie Potholes) and thus the state's natural beauty; 3) to minimize deleterious effects to wildlife; 4) to help provide information to all involved/interested parties; and 5) to promote a responsible, guided, uniform approach to the siting of wind power projects in South Dakota.

1) Land Use - Wind development may be compatible with a variety of other land uses, including agriculture, grazing, open space, and habitat conservation, depending on the site, size, and design of the project. Other land uses, such as hunting/fishing, bird watching, and wildlife photography as well as resource values need to be considered when siting large wind projects in remote areas of South Dakota. Stakeholders need to understand all the land use issues associated with a site before finalizing development plans, permit conditions, or other requirements.
   a) Contact resource agencies (Table 1), property-owners and other stakeholders early to identify potentially sensitive land uses and issues. Ensure that all the stakeholders fully understand the entire project in order to address and resolve potential land use issues.

   b) Look at all the land use relationships and objectives for an entire wind resource area. Land use concerns are specific to different regions of South Dakota thus early scoping and planning is crucial to reducing potentially incompatible uses. Contact appropriate experts (Table 2) and resource agencies to research and evaluate the issues prior to selecting a specific site within the respective region.

   c) Careful consideration should be given to the impact of wind power projects in areas that are unique/rare in South Dakota, such as the Missouri and Prairie coteaus (Figure 1), the Prairie Pothole region and the Missouri River. Special care should be given to avoid damage to unfragmented landscapes and high quality remnants in wetland and prairie ecosystems (e.g., tall grass, mixed grass, and short grass prairie). If possible, wind energy development should be located on already altered landscapes, such as cultivated or developed lands. An undeveloped buffer adjacent to intact prairies is also desirable.

   d) Consider the potential impacts of both wind and non-wind (e.g., roads, transmission lines, substations) project development in the wind resource area before development projects are proposed, and develop a plan for the area that avoids or minimizes land use conflicts. Design the project site layout to limit the use of the land, consolidate necessary infrastructure requirements wherever possible, and evaluate current transmission lines and market access.

   e) Learn the rules that govern where and how a wind project may be developed in the project area. Become aware of potential conflicts between lease provisions and permitting agency (e.g., The Public Utilities Commission and/or local governments) conditions for project development.

2) Natural and Biological Resources - Bird and bat collision mortality and behavioral avoidance associated with wind energy facilities have been a controversial siting consideration. Typically, bats have a higher incidence of mortalities at wind energy sites than birds, though this depends on the site. Biological resource surveys at each potential wind power site in the early stages of planning can help determine whether serious conflicts are likely to occur at a particular site, but cumulative effects with multiple sites in a particular region/area must also be acknowledged and/or investigated and minimized/avoided. In some instances, the impact wind turbines have on birds, bats, and other sensitive biological resources can be adequately mitigated. However, wind development may be inappropriate in certain areas in South Dakota.

   a) Consider the biological setting early in project evaluation and planning. Use biological and environmental experts to conduct a preliminary biological reconnaissance of the likely site area. Communicate with personnel from wildlife agencies (e.g., South Dakota Game, Fish and Parks (SDGFP), U. S. Fish and Wildlife Service, U. S. Geological Survey, and Natural Resources Conservation Service; Table 1) and universities (e.g., South Dakota State University, University of South Dakota, Dakota State University, Black Hills State University, and Northern State University; Table 2). If a proposed turbine site has a large potential for biological conflicts and an alternate site is eventually deemed appropriate, the time and expense of detailed wind resource evaluation work may be lost.

   b) Contact the local resource management agency (e.g., local South Dakota Conservation District and SDGFP regional office, Appendix A) early in the planning process to determine if there are any resources of special concern in the area under consideration.

   c) Involve local environmental/natural resources groups (e.g., South Dakota Wildlife Federation, local chapters of Audubon Society, local chapters of The Wildlife Society, Izaak Walton League, The Nature Conservancy, South Dakota Bat Working Group, Ducks Unlimited, United Sportsmen for South Dakotans; Table 3) as soon as practicable. Early involvement of these organizations may provide additional resource information as well as minimize potential conflicts.

   d) Avoid unnecessary ecological impacts of wind power development through proper planning. Examine landscape levels of key wildlife habitats, migration corridors, staging/concentration area, and breeding/brood-rearing areas to help develop general siting strategies. Situate turbines so they do not interfere with important wildlife movement corridors and staging areas.

e) Avoid large, intact areas of native vegetation. Sites where native vegetation is scarce or absent will have substantially fewer biological resource concerns.

f) Careful review should be given to sites with legally protected wildlife (e.g., state or federal threatened or endangered species, migratory birds) present or potentially present. Recognize that other declining or vulnerable species (not legally protected) may also be present. Investigate wildlife issues associated with each potential wind energy site and determine the apparent impacts of each potential wind energy site on species of concern.

g) Avoid lattice-designed towers or other designs providing perches for avian predators. Avoid placing perches of any sort on the nacelles of turbines. Address potential adverse affects of turbine warning lights on migrating birds and bats. Minimize effects of meteorological towers when investigating wind energy potential by using tubular monopoles rather than lattice structures with guy wires and lighting systems, which could represent a hazard to birds.

h) Bury power lines and/or place turbines near existing transmission lines and substations, where possible. Infrastructure should be able to withstand periodic burning of vegetation, where prescribed burns are practiced. Minimize number of roads and fences.

i) Mitigate for habitat loss in areas where there is ecological damage in the siting of a wind power facility. Appropriate actions include but are not limited to ecological restoration, long-term management agreements, conservation easements, or fee title acquisitions to protect lands with similar or higher ecological quality as that of the wind power site.

j) Consider possible cumulative regional impacts from multiple wind energy projects when conducting environmental assessments and making mitigation decisions. Evaluation of these impacts could result in significant changes to project plans.

k) Consider turbine designs (e.g., wind turbines with tubular monopoles rather than lattice structures with guy wires) or deterrents, which minimize potential impacts on flying animals such as birds and bats.

l) Consider timing of construction and maintenance activities (including mowing) to minimize impacts on native flora (plants) and fauna (animals), including ground-nesting birds. Avoid construction and maintenance activities during breeding season (April to July) and, if possible, during migration (April – June and August – October).

m) Develop a stringent plan for preventing the introduction or establishment of non-native/invasive flora (plants) in disturbed areas and establishing the financial means to do so the duration of the wind power project.

3) Noise - Noise emitted by wind turbines tends to be masked by the ambient (background) noise from the wind itself and tends to fall off sharply with increased distance, therefore noise-related concerns are likely to occur at residences closest to the site, particularly those sheltered from prevailing winds. Advanced turbine technology and preventive maintenance can help minimize noise during project operation.
   a) Design projects with adequate setbacks from dwelling units, especially where the dwelling unit is in a relatively less windy or quieter location than the turbine(s). Recognize that residents who object to noise created by wind energy may replace residents who support wind systems. Efforts should be made to place the turbines in disturbed areas (e.g., croplands) as stated above.

   b) Avoid locating marginally noisy turbines in projects with nearby residences. In areas potentially sensitive to acoustic levels, e.g., nearby residences or natural surroundings, consider taking efforts to prevent problems by upgrading turbines with sound reduction technology.

4) Visual Resources - There are ways to reduce the visual impact of wind projects, but there may be tradeoffs to consider. One of the best tools for assessing project impact is the use of visual simulations.
   a) Consider visual impact of wind power projects when siting turbines. Evaluate the impact of siting turbines on the quality of the surrounding landscape, especially in areas where aesthetic qualities and/or neighboring properties might be affected. Prepare and use visual simulations and/or viewshed analyses to provide information to landowners, the general public, and other key stakeholders to identify potential impacts to visual resources from wind power developments.

   b) Educate all stakeholders about what to expect from a wind project.

   c) Prepare to make impact tradeoffs and coordinate planning efforts in all jurisdictions and with all stakeholders.

   d) Listen to the communities and stakeholders in all project phases and be prepared to adapt design to minimize industrial characteristics and structures and minimize visual exposure from sensitive areas.

   e) Minimize the need for developed roads or cut and fill techniques. Consider possibilities and benefits of using roadless project designs or designs relying on current roads, especially in remote or sensitive visual areas.

f) Identify designated scenic byways and popular landscapes and avoid siting turbines in areas that are readily visible from those sites. Priority should be given to wind power projects in sites where the natural landscape has already experienced significant change from human-related causes.

5) Public Interaction - It is important to inform all stakeholders of the benefits and tradeoffs associated with each wind power project, therefore wind projects entail public involvement. This makes it easier for all stakeholders to communicate and cooperative with each other in order to make informed decisions in the best interest of all parties.
   a) Prepare and implement a public education program to discuss the benefits and tradeoffs involved in wind generation.

   b) Provide objective information or access to objective information that allows interested parties to make informed decisions. Decision making by all stakeholders is enhanced through accurate and comprehensive information sharing and opportunities for communication between stakeholders. Invite public input in regards to wind power projects through public meetings and public forums.

6) Soil Erosion and/or Water Quality - Temporary and permanent soil disturbance results from wind projects. Care must be taken to estimate and control both runoff and erosion from each wind power site, particularly in areas where access roads and facilities are located in steep terrain, especially near waterways (e.g., creeks and rivers) and wetlands.
   a) Minimize the footprint of the project and evaluate alternative turbine pad and access road siting and layouts. Minimize improved roads and construction staging areas and avoid sensitive habitats (e.g., native prairies and wetlands).

   b) Preferably conduct construction and maintenance of wind power sites when the ground is frozen or when soils are dry and the native vegetation is dormant. Conduct ongoing operation and maintenance activities, as practical, by using light conveyances in order to minimize habitat disturbance and the need for improved roads.

   c) Whenever possible, avoid road construction on steep slopes.

   d) When selecting the appropriate erosion control measures, be aware that although some measures may require greater initial expense, significant savings will occur over the life of the project in reduced maintenance and replacement costs. Furthermore, a well-developed erosion and sediment control plan may also reduce regulatory delays in approving and monitoring the project.

e) Use certified weed-free seed of local ecotypes of native vegetation when reseeding disturbed areas and consider revegetation re-growth and cover. Consider animal and plant compositions when determining the frequency and timing of mowing near turbines.

7) Health and Safety - Most of the safety issues associated with wind energy projects can be dealt with through adequate setbacks, security, safe work practices, and the implementation of a fire control plan.
   a) Consider safety setback distances from wind turbines and habitable dwellings, public highways, and property lines when evaluating specific parcels for development. Setbacks should provide adequate spacing from falling ice, blown turbine parts, and major structural failure, which can mitigate siting issues.

   b) Design facilities and turbine pads to prevent or avoid public and worker safety problems. Consider the benefits of underground wiring between turbines and project substation.

8) Cultural, Archaeological, and Paleontological Resources - During project design and site development, important cultural and fossil resource sites should be avoided and protected or else a mitigation plan should be developed. Special care should be taken to preserve the confidentiality as well as the integrity of certain sensitive resources or sites sacred to Native Americans.
   a) Identify and avoid potentially sensitive cultural, historical, or pre-historical resources and involve all stakeholders early on.

   b) Consult with the South Dakota State Historical Society (Table 1) and other qualified professional specialists familiar with cultural and fossil resources in the project development area.

   c) Some sensitive resources and sites may be confidential to Native Americans. Respect this confidentiality and work closely with tribal representatives to protect these resources by avoiding disruption to these sites.

   d) Design project site layout to avoid sensitive resources, if possible.

   e) Prepare a monitoring and mitigation plan for protection of sensitive resources during construction and operation of the project. Require appropriate mitigation of unavoidable impacts and monitor to ensure measures are implemented.

   f) Allow adequate time in the project schedule for data and specimen recovery, mapping, analysis, and reporting.

9) Socioeconomic, Public Services, and Infrastructure - Developers and other stakeholders should coordinate with local communities and/or agencies to determine how the project may affect the community's fire protection and transportation systems and nearby airports and communications systems. Communities should work with wind project developers to ensure that any financial burden placed on them will be compensated through appropriate/reasonable property tax or other revenues.
   a) Identify any community services, costs, and infrastructure that may be affected by a project and work to involve all stakeholders in solving any conflicts and designing mitigation plans. Work with all the concerned stakeholders to develop appropriate mitigation for unavoidable impacts and monitor compliance to ensure the measures are implemented. Attempt to avoid or minimize potential impacts on community services, costs, and infrastructure.

   b) House Bill 1235, passed during Legislative Session 2003, is an act to provide for the taxation of wind energy property in South Dakota, encouraging developers to build in South Dakota yet help local communities. As any changes to the property tax rate are considered, local taxing jurisdictions should seek to recover only those costs directly associated with services to the wind development to avoid discouraging new wind projects. Involve local communities in economic plan and work to be good neighbors.

   c) Recognize that some districts, counties, and/or cities do not have an established zoning and/or permitting process applicable to wind power development. Do not exploit this fact rather work with appropriate local officials to establish reasonable parameters and make the process as clear to the public as possible.

   d) Use local contractors and providers for supplies, services, and equipment, when possible, during the construction and operation phases of the project.

   e) Acknowledge that there may not be specific needs by local communities for electricity generated by the proposed wind power project, therefore substantive public benefits should be provided beyond hosting the renewable energy facility.

   f) Provide information to all stakeholders in regards to future project expansions to ensure all stakeholders have precise information. Recognize that developers may not be fully informed about future expansions and stakeholders may have issues and concerns that are dependent on the project scale.

g) Expanded projects may involve impacts not specifically addressed during the initial project. Anticipate and make provisions for future site decommissioning and restoration.

10) Solid and Hazardous Wastes - Solid wastes need to be collected from dispersed sites and properly disposed of in a manner consistent with other power plants or facilities. Non-hazardous fluids should be used where possible, and a Hazardous Materials Waste Plan should be developed if their use cannot be avoided. By performing major maintenance and repair work off-site, certain problems can be avoided.

a) Ensure that construction wastes are collected from all wind power sites and disposed of at a licensed facility. Waste disposal practices should not be different in wind power from those required at other power plants or repair facilities.

b) Anticipate fluid leaks and avoid hazardous leaks by using non-hazardous fluids. Design a Hazardous Materials Waste Plan to address avoidance, handling, disposal, and cleanup, when necessary.

c) Conduct turbine maintenance facilities and major turbine repairs off-site.

11) Air Quality and Climate - Wind projects produce energy without generating many of the pollutants associated with fuel combustion. Temporary, local emissions associated with project construction and maintenance can be minimized, and any micro-climatic impacts should be insignificant.

a) Address air quality issues potentially associated with construction and operation of the wind generation project. Mitigate any impacts during sensitive operations so the overall impact is relatively small and temporary.

Table 1. Contact information for agencies in South Dakota.

Name	Specialty	Agency	Address	Telephone	Email
Silka Kempema	Birds and Bats	SDGFP	523 E Capitol Ave Pierre, SD 57501	605-773-2742	silka.kempema@state.sd.us
Natalie Gates	Federal Wildlife Regulations	USFWS	420 South Garfield Avenue, Suite 400 Pierre, SD 57501	605-224-8693	natalie_gates@fws.gov
Jill Shaffer	Bird Research	USGS/NPWRC	8711 37th St. SE Jamestown, ND 58401	701-253-5547	jshaffer@usgs.gov
Ken Higgins	Grassland Birds	USGS/SDSU	Dept of Wildlife & Fisheries Sciences Box 2140B, Brookings, SD 57007	605-688-6121	terry_symens@sdstate.edu
Kevin Luebke	Wildlife Conservation	NRCS	200 4th St SW Huron, SD 57350	605-352-1242	kevin.luebke@sd.usda.gov
Great Plains Office	Diane Mann-Klager	BIA	115 4th Ave SE Aberdeen, SD 57401	605-226-7343	Diane.Mann-Klager@bia.gov
Paige Hoskinson	Archeology	SHPO	900 Governors Drive Pierre, SD 57501	605-773-6004	paige.hoskinson@state.sd.us

Table 2. Contact information for experts and/or universities in South Dakota

Name	Specialty	Organization	Address	Telephone	Email
Scott Pedersen	Bats	SDSU	Dept of Biology Box 2207B Brookings, SD 57007	605-688-5529	scott_pedersen@sdstate.edu
Cheryl Schmidt	Bats	BS BioServ, Inc.	18897 Eichler Rd Newell, SD 57760	605-456-1470	cschmidt@bsbioserv.com
Joel Tigner	Bats	Batworks	2416 Cameron Drive Rapid City, SD 57702	605-721-4564	batworks@rushmore.com
Kristel Bakker	Birds	DSU	Dept of Biology SC 128 Madison, SD 57042	605-256-5182	kristel.bakker@dsu.edu
Kent Jensen	Birds	SDSU	Dept of Wildlife & Fisheries Sciences Box 2140B Brookings, SD 57007	605-688-6121	kent.jensen@sdstate.edu
Dave Swanson	Birds	USD	Dept of Biology 191 Churchill-Laines Labs Vermillion, SD 57069	605-677-5211	dlswanso@usd.edu
Dan Tallman	Birds	NSU	Dept of Biology; emeritus professor 1200 South Jay Street Aberdeen, SD 57401	605-626-7707	tallmand@northern.edu
Corey Huxoll	Eagles	SDGFP	523 E Capitol Ave Pierre, SD 57501	605-773-4195	corey.huxoll@state.sd.us
Rocco Murano	Waterfowl	SDGFP	South Dakota State Univeristy Brookings, SD 57007	605-688-4786	rocco.murano@state.sd.us
Dennis Skadsen	Butterflies	SDACD/Day Co.	600 Hwy 12, Suite 1 Webster, SD 57274	605-345-4661	dennis.skadsen@sd.nacdnet.net

Table 2. Contact information for experts and/or universities in South Dakota, cont.

Name	Specialty	Agency	Address	Telephone	Email
Paul Coughlin	Habitat	SDGFP	523 E Capitol Ave Pierre, SD 57501	605-773-4194	paul.coughlin@state.sd.us
Dave Ode	Native Plants	SDGFP	523 E Capitol Ave Pierre, SD 57501	605-773-4227	dave.ode@state.sd.us
Dan Hubbard	Wetlands	SDSU	Dept of Wildlife & Fisheries Sciences Box 2140B Brookings, SD 57007	605-688-4780	hubbardd@sdstate.edu
Tim Olson	Wetlands	SDGFP	523 E Capitol Ave Pierre, SD 57501	605-773-3658	tim.olson@state.sd.us
Karen Gaines	Landscape Ecology	USD	Dept of Biology 414 E Clark, Vermillion, SD 57069	605-677-6567	kfgaines@usd.edu
Carter Johnson	Landscape Ecology	SDSU	Dept of Horticulture, Forestry & Parks NPB 201, Box 2140A Brookings, SD 57007	605-688-4729	carter_johnson@sdstate.edu
Holly Downing	Dean of Dept	BHSU	Dept of Biology Jonas Rm 108 Spearfish, SD 57799	605-642-6056	hollydowning@bhsu.edu

Table 3. Contact information for environmental/wildlife interest groups in South Dakota.

Name	Agency	Address	Telephone	Email
Rick Warhurst/Paul Bultsma	Ducks Unlimited (Great Plains)	22525 River Rd Bismarck, ND 57503	701-355-3500	rwarhusrt@ducks.org pbultsma@ducks.org
Pete Bauman	The Nature Conservancy (Tallgrass Prairie)	PO Box 816, Clear Lake, SD 57226	605-874-8517	pbauman@tnc.org
Bob Paulson	The Nature Conservancy (Black Hills)	8100 Sheridan Lake Rd Rapid City, SD 57702	605-342-4040	bpaulson@tnc.org
Brad Phillips	South Dakota Bat Working Group	3406 Ivy Ave Rapid City, SD 57701	605-721-6607	bphillips@rushmore.com
Jerry Schlekeway	South Dakota Chapter of Izaak Walton League	1008 N Huron Ave. Pierre, SD 57501-1438	605-224-7780	gschlek@pie.midco.net
Kurt Forman	South Dakota Chapter of The Wildlife Society	419 Hunters Ridge Brookings, SD 57006	605-692-8359	sdtws@brookings.net
Chris Hesla	South Dakota Wildlife Federation	PO Box 7075, Pierre, SD 57501	605-224-7524	sdwf@pie.midco.net
Dave Johnson	Missouri Breaks Audubon Society	PO Box 832 Pierre, SD 57501		mbas@pie.midco.net
Richard Barnett	United Sportsmen for South Dakotans	PO Box 526 Aberdeen, SD 57402		

Appendix A. Local resource management agency contacts.

Name/Title	Agency	Address	Telephone	Email
Mike Kintigh/Regional Supervisor	SDGFP Region 1	3305 West South St Rapid City, SD 57702	605-394-6837	mike.kintigh@state.sd.us
Arden Petersen/Regional Supervisor	SDGFP Region 3	4500 S Oxbox Ave Sioux Falls, SD 57106	605-362-2706	arden.petersen@state.sd.us
Cliff Stone/Regional Supervisor	SDGFP Region 2	1550 King Ave Chamberlain, SD 57325	605-734-4532	cliff.stone@state.sd.us
Doug Alvine/Regional Supervisor	SDGFP Region 4	400 West Kemp Watertown, SD 57201	605-882-5201	doug.alvine@state.sd.us
Head Office	SDACD	PO Box 515 Presho, SD 57568	605-895-4099	info@sdconservation.org
Private lands biologist	USFWS Partners for Fish & Wildlife	PO Box 247 Brookings, SD 57006	605-697-2500	kurt_forman@fws.gov
Manager	USFWS Waubay NWR	44401 134A St Waubay, SD 57273	605-947-4521	douglas_leschisin@fws.gov
Manager	USFWS Sand Lake NWR	39650 Sand Lake Drive Columbia, SD 57433	605-885-6320	sandlake@fws.gov
Manager	USFWS Lacreek NWR	HC5 Box 114 Martin, SD 57551	605-685-6508	lacreek@fws.gov
Manager	USFWS Lake Andes NWR	38672 291st Street Lake Andes, SD 57356	605-487-7603	LakeAndes@fws.gov
Manager	USFWS Madison WMD	PO Box 48 Madison, SD 57042	605-256-2974	MadisonWetlands@fws.gov
Manager	USFWS Huron WMD	Rm 309 Federal Bldg 200 4th St SW Huron, SD 57350	605-352-5894	HuronWetlands@fws.gov

Appendix B. Acronyms used in tables and appendices.

Acronyms	Description
BHSU	Black Hills State University
BIA	Bureau of Indian Affairs
DSU	Dakota State University
NPWRC	Northern Prairie Wildlife Research Center
NRCS	Natural Resources Conservation Service
NSU	Northern State University
NWR	National Wildlife Refuge
SDGFP	South Dakota Game, Fish and Parks
SDACD	South Dakota Association of Conservation Districts
SDSU	South Dakota State University
SHPO	State Historic Preservation Office
USD	University of South Dakota
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
WMD	Wetlands Management District

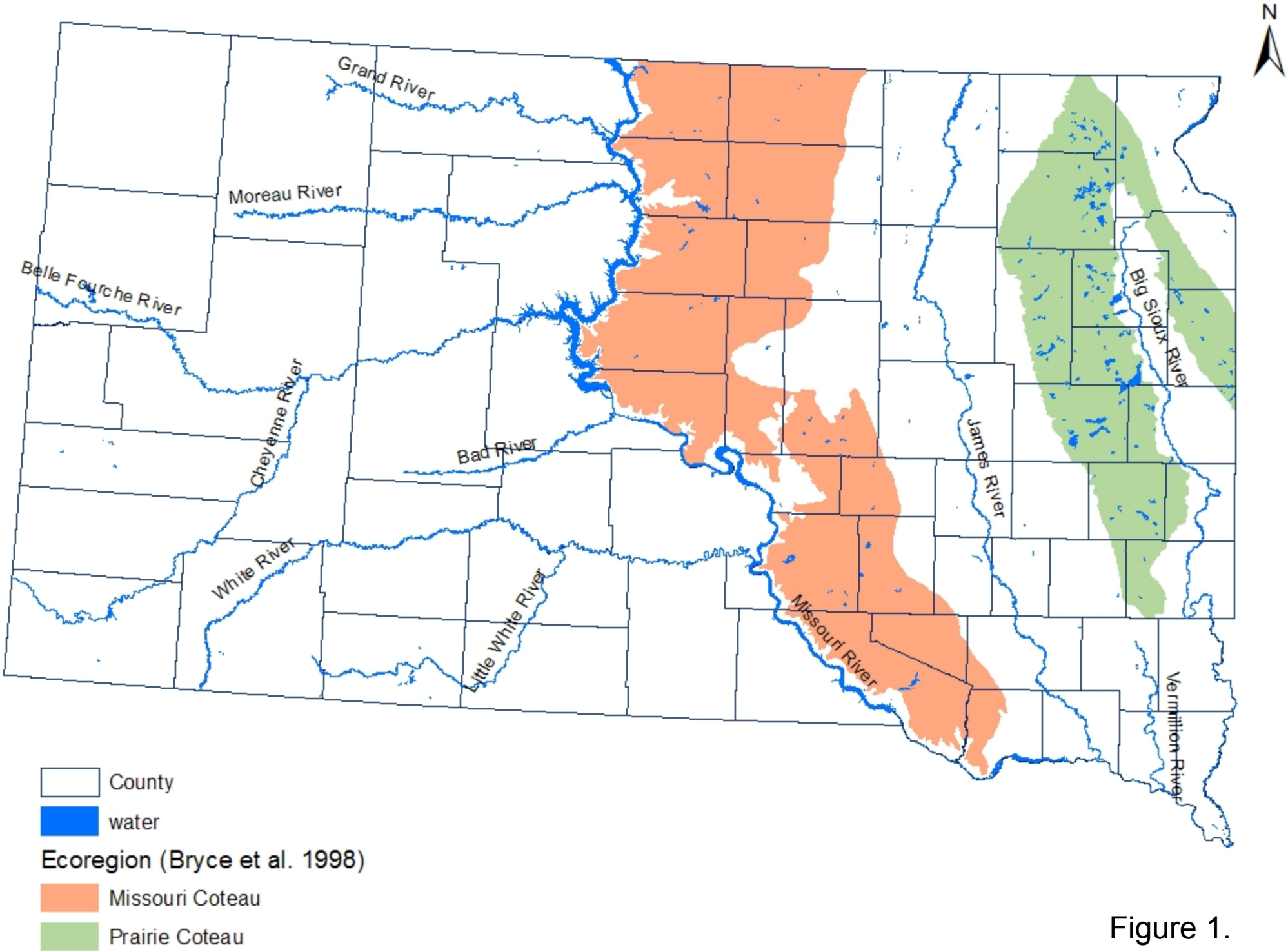
N
Grand River
Moreau River
Belle Fourche River
Cheyenne River
Bad River
White River
Little White River
Missouri River
James River
Big Sioux River
Vermillion River
County
water
Ecoregion (Bryce et al. 1998)
Missouri Coteau
Prairie Coteau

Figure 1.