Recommended Principles and Guidelines for Minimizing Disturbance of Native Prairie from Wind Energy Development

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and

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• Staff of the following government ministries and agencies:
- Alberta Environment *
- Alberta Municipal Affairs - Special Areas Board *
- Alberta Sustainable Resource Development – Fish and Wildlife *
- Alberta Sustainable Resource Development – Land Management *
- Alberta Utilities Commission *
- Blood Tribe Land Management *
- Cardston County
- Cypress County
- Energy Resources Conservation Board
- Municipal District of Willow Creek

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1.0 Introduction

This document contains recommended principles and guidelines for minimizing surface disturbance of wind energy projects on native prairie in Alberta. The recommended principles and guidelines and implementation considerations have been defined by a variety of stakeholders and are primarily based on existing principles and guidelines that apply to oil and gas development in native prairie. If adopted by regulators the principles and guidelines would complement and/or improve current guidelines of Alberta Fish and Wildlife that provide guidance on protecting bats, birds and other species of conservation concern when locating wind turbines.

The recommended principles and guidelines have been developed for use not only by regulators but also by wind energy developers, consultants, conservationists and landowners. Currently in Alberta, wind power projects occur only on private land. As owners of freehold land, landowners have the discretion for those aspects of project siting, construction, operations and reclamation that affect their use of the land and that are not regulated by municipal, provincial or federal governments. The guidelines recognize the role and responsibilities of private landowners and are developed to assist landowners in their stewardship of native prairie.

2.0 Overview of Process

A workshop to review Sustainable Resource Development – Fish and Wildlife Division *Wildlife Guidelines for Alberta Wind Energy Projects* was held February 10th and 11th, 2010 in Cochrane, Alberta. A gap in the guidelines was identified with respect to a broader approach for maintaining biodiversity by minimizing disturbance to native ecosystems, including wetlands. Currently, wind energy projects, approved and proposed, are concentrated in the Grassland, Parkland and Montane natural regions of southern and central Alberta where grasslands naturally occur. A working group, known as the Native Prairie Working Group, comprised of representatives from the wind energy companies, government agencies, and environmental/reclamation interests was formed to define and recommend guidelines for wind energy development on native prairie and with regard to wetlands.

The Native Prairie Working Group met on May 28th, 2010. A decision was made to compile and summarize information on existing information letters, principles and guidelines for minimizing native prairie disturbance as well as the regulatory framework for addressing the environmental effects of wind energy development. The resulting document, *Minimizing Surface Disturbance of Alberta's Native Prairie: Background to Development of Guidelines for the Wind Energy Industry*, was circulated for review by working group members as well as members of the Foothills Restoration Forum and Prairie Conservation Forum. All comments and suggestions were addressed. The Native Prairie Working Group met again on September 20th, 2010. It was agreed the background document, with minor revisions, would serve as a common base of information for moving forward in developing guidelines regarding wind energy and native prairie.

The Native Prairie Working Group requested that the Foothills Restoration Forum organize a field tour and workshop that would bring together key interests to share information and review current native prairie principles and guidelines with respect to their appropriateness for application to the wind energy industry. Sources of current principles and guidelines for minimizing disturbance of native prairie are:

- *ERCB IL 2002-1 Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas*
- *SRD IL 2010-02 Foothills Fescue Grassland Principles for Minimizing Surface Disturbance*
- *SRD 2006 Wildlife Guidelines for Alberta Wind Energy Projects*

A field tour and workshop were held on October 27th and 28th, 2010 in Cowley. The 35 participants came from a broad variety of backgrounds and interests and included wind energy developers, landowners, range specialists, environmental consultants, mitigation/reclamation specialists, and representatives of non-government environmental organizations as well as representatives from Blood Tribe Lands and municipal and provincial government agencies. Participants considered the appropriateness of applying current principles and guidelines to wind energy development and any modifications needed. Barriers or challenges and opportunities with respect to applying existing principles and guidelines to the wind energy industry were identified and discussed. Implementation processes and tools were also identified.

A report of the results of the workshop, *Principles/Guidelines for Minimizing Disturbance of Native Prairie from Wind Energy Development: Results of a Workshop and Field Tour held October 27 and 28, 2010 in Cowley AB*, was provided to all participants and invitees for their consideration and for broader circulation among others who may be interested in reviewing it, including members of the Foothills Restoration Forum Technical Advisory Committee and of the Prairie Conservation Forum Board. In particular, comments were sought on suggested principles and guidelines and implementation considerations. Fifteen responses were received. Responses were integrated into the revisions of the draft principles and guidelines.

The Native Prairie Working Group held two additional meetings on February 14th and April 4th, 2011 to review and finalize the recommended principles and guidelines.

This report is being provided to staff in Alberta Sustainable Resource Development (ASRD) – Fish and Wildlife for their consideration in updating the *Alberta Wildlife Guidelines for Alberta Wind Energy Projects* and for broader considerations relevant to the Department's role in reviewing applications for wind energy projects. In addition, all participants in the process are being provided the report.

During the process to develop recommended principles and guidelines for minimizing disturbance of native prairie from wind energy development, participants raised questions, issues and concerns regarding provincial regulation of the wind energy industry and also provided suggestions for improvement in the regulatory framework. These comments have been compiled and summarized in a separate document that will be provided to all participants. Addressing these matters is beyond the scope of this process.

In addition, participants in the field tour provided observations and suggestions for specific beneficial practices in construction, operations and reclamation of wind energy projects. These ideas have been compiled and summarized for use in any future effort to more clearly define beneficial practices. These are available on the website of the Foothills Restoration Forum.

3.0 Outcomes and Outputs

The following short-term outputs and long-term outcomes are sought from this process:

Outputs (short-term):

Recommended guidelines for minimizing disturbance of native prairie and wetlands that:

- are based on best available science and traditional knowledge;
- have broad agreement;
- provide guidance rather than prescriptive requirements;
- define a suite of practices for minimizing disturbance through regional and project planning and during project construction, operations, maintenance and restoration;
- encourage ongoing improvement, and
- are useful and practical for wind energy developers, consultants, landowners, conservationists, and regulators.

Outcomes (long-term):

- Disturbance of native prairie and wetlands is minimized.
- Environmental risks of developing on native prairie are well understood.
- Expectations for planning and development of wind energy projects with respect to native prairie and wetlands are consistent among all interests.
- Industry practices are well defined and continue to improve.

4.0 Recommended Principles and Guidelines and Implementation Considerations

Three principles are defined. Associated with each principle are more specific guidelines.

A **principle** is defined as a basic generalization that is accepted and can be used as a basis for conduct. A **guideline** is defined as a general statement of desired practices. Some guidelines may be supported by regulation. Implementation considerations include key points that arose during development of the guidelines and that support understanding and implementation of the guidelines.

The principles and guidelines for wind energy development are derived from the following key sources:

- *ERCB IL 2002-1 Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas*
- *SRD IL 2010-02 Foothills Fescue Grassland Principles for Minimizing Surface Disturbance*
- *SRD 2006 Wildlife Guidelines for Alberta Wind Energy Projects*
- *AENV 2010 Reclamation Criteria for Wellsites and Associated Facilities for Native Grasslands*
- *SRD 2010 Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta*

These original sources are referenced for each principle and guideline. During the process to develop guidelines specific to the wind energy industry, some of the statements from the original sources were modified and merged, however the intent of the original statements is maintained.

Native prairie is used synonymously with **native grasslands** as defined in the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Native Grasslands* (p. 5) found online on the Alberta Environment website.

> "The Grassland Reclamation Criteria should be used for native grasslands and modified native grasslands, (not tame grasslands which are dominated by agronomic species and have been ploughed or tilled). Native grasslands commonly present a mixture of different native grass species, forbs (flowering/broad-leaved species), shrubs (woody species) and tree species. Modifed native grasslands are ones where native species integrity has been altered by past disturbance, and where more than 70% of community is composed of nonnative plant species.…
>
> Native grassland plant communities vary with the Natural Region [Grassland, Parkland, Foothills, Rocky Mountain] …. Plant Community Guides for many of the Natural Subregions can be found online on the Sustainable Resource Development website. The range plant community information describes the unique characteristics of each Natural Subregion in terms of climate, soils, vegetation, landform and topography."

Appendix 1 summarizes the current environmental regulatory framework regarding wind energy projects in Alberta.

RECOMMENDED PRINCIPLE	IMPLEMENTATION CONSIDERATIONS
Principle A: Surface disturbance of native prairie should be avoided. To the extent possible fragmentation of large blocks of native prairie and other areas of high value for maintenance of biodiversity must be avoided. (Source: *ERCB IL 2002-1, SRD IL 2010-2*)	This principle is applied in planning at the regional and municipal level. In Alberta, wind energy projects occur only on private land. Application of the principle on private land would occur through Alberta's Land Use Framework, municipal land use plans, and stewardship among all stakeholders. Areas of high value for maintenance of biodiversity include intact and fully functioning native prairie and parkland ecosystems, connecting corridors for species migration and isolated habitats (e.g. wetlands) that retain diverse communities of native species (*Alberta Prairie Conservation Action Plan 2011 – 2015*).
Principle B: Where avoidance of native prairie is not achieved, disturbance must be minimized. (Source: *ERCB IL 2002-1*)	This principle is applied at the project planning level. Complete avoidance of native prairie may not occur in situations where a decision is made to proceed with planning a wind energy project on private lands that are not designated for conservation purposes. Encourage knowledge and consistent application of this principle among all interests. Practices to achieve the end goal of minimum disturbance are not yet well defined and are expected to improve over time.
Principle C: Where disturbance of native prairie occurs the goal of reclamation during project planning, construction, operation and at decommissioning is restoration (Source: *AENV 2010)*.	Ecological restoration is defined as "the process of re-establishing the structure, function and integrity of native ecosystems and their habitats" (Society for Ecological Restoration 1993). In practical terms restoration involves returning a disturbed site to the ecosystem characteristics that existed prior to surface disturbance, usually based on the characteristics of an adjacent reference or control site. Native grassland vegetation is an indicator of equivalent land capability, ecosystem function and/or operability (*AENV 2010*). Alberta Environment's *2010 Reclamation Criteria for Wellsites and Associated Facilities for Native Grasslands* provides guidance on reclaiming native grasslands. Considerable economic investment and long term commitment may be required to accomplish the goal of native plant community restoration.

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
A. Planning for Avoidance of Native Prairie	
Guideline A - 1: A cumulative effects management approach is applied to planning wind energy development and other land uses at the regional level. This approach establishes outcomes by considering the combined effects of past, present and foreseeable human activities, over time, on the environment, economy and society in a particular place. Large contiguous blocks of native prairie, connecting corridors (ridges, river valleys), environmentally significant and sensitive areas, other important wildlife habitats and areas of cultural and historical significance must be identified and should be avoided. Avoidance is accomplished by preferentially siting development within or adjacent to existing man-made disturbances or non-native prairie areas. (Source*: ERCB IL 2002-1, SRD IL 2010-2, SRD 2006*)	Regional and municipal plans may identify priority areas of native prairie where there would be a high environmental and/or economic risk to development. The information base for such an assessment includes the Grassland Vegetation Inventory, Environmentally Significant Area studies, Prairie Conservation Action Plan 2011-2015, identification of critical wildlife habitat including for provincially and/or federally listed species at risk, and other information in databases of the Alberta Conservation Information Management System (ACIMS) and Fisheries and Wildlife Management Information System (FWMIS). Protective Notations (PNTs) placed on specified public lands known to include foothills fescue grassland are an indication of the value society places on native grasslands. The PNTs were applied because of the high conservation value of fescue grasslands and the difficulties in restoration (*Ref: SRD IL 2010-2*). Similar societal values regarding native grasslands on private lands may be expressed in regional land use planning. Land use planning would direct wind energy development to areas that are largely cultivated (only remnants of native prairie remaining) and away from areas that are largely native prairie (relatively contiguous blocks of native prairie). There may be constraints and setbacks associated with other land uses (e.g. transportation corridors) that also need to be considered. Cultural and historical significance must be considered. Compliance with the *Historical Resources Act* is required. Resources of cultural and historical significance, especially for aboriginal communities, may be linked to native prairie landscapes. There are options for compensating landowners who forgo development to protect native prairie. Land pooling arrangements among neighbouring landowners is one such approach (Pembina Institute 2010). Outcomes for optimal wind energy development in Alberta also need to be considered.

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
Guideline A - 2: Predevelopment planning and design must include analysis of resource requirements to avoid or minimize disturbance to native prairie and parkland, environmentally significant and sensitive areas, wetlands and other important wildlife habitats. (Source: *ERCB IL 2002-1, SRD 2006*)	If properly done, such planning should help to minimize environmental impacts, reduce costs for site reclamation and decrease the risk of incurring environmental liability. (Source: *ERCB IL 2002-1*) Predevelopment planning and analysis should include adequate biophysical inventory, assessment of environmental and socio-economic risk, potential measures required to minimize disturbance, feasibility of restoration, and scheduling to allowing sufficient time for beneficial practice. Construction and operations components of a project, as well as access and site management plans, should be carefully thought out to minimize disturbance. This should include contingency measures for unforeseen circumstances. (Source: *ERCB IL 2002-1*)
Guideline A - 3: Notification and consultation with SRD staff and/or others knowledgeable about the environmental value and sensitivity of the area is expected to occur early in the predevelopment planning and analysis process. (Source*: SRD IL 2010-2*)	Under Alberta's *Wildlife Act* and *Wildlife Regulation* the Minister has the authority to influence and control human activities that may have direct adverse effects on the populations and habitat of wildlife species. Nests and dens of endangered animals, upland game birds, migratory birds, and certain snakes and bats must be avoided (*Wildlife Act 36(1)* and *Wildlife Regulations* 96). Refer to *Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta* (ASRD Fish and Wildlife Division 2010). Critical habitat for species listed as endangered or threatened under federal legislation (*Species At Risk Act*) must be avoided.
Guideline A - 4: Loss or degradation of wetlands associated with native prairie must be avoided. For wildlife conservation purposes, Fish & Wildlife Division recommends that there be no industrial activity within 100 m of wetlands within the Grassland and Parkland Natural Regions of Alberta. Setback distances vary based on the degree to which vegetation, soils and hydrology will be affected by the proposed development. (Source: *SRD Land Use Guidelines 2010*)	The following Wetland Mitigation Decision Framework is included in *Recommendations for a New Alberta Wetland Policy* (*Alberta Water Council 2008*): • Avoid loss or degradation of wetlands. • Minimize loss or degradation, where avoidance is not fully achieved. The proponent must make a reasonable case to the regulator why the proponent cannot achieve avoidance. • Compensate, as a last resort, for loss of wetland area or for wetland degradation. Compensation, as assessed by the regulator, refers to a suite of options to replace lost wetland area through science-based actions that are consistent with watershed and regional wetland objectives, where they exist.

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
Guideline A – 4 Continued: Loss or degradation of wetlands associated with native prairie must be avoided.	A wetland is defined as land having water at, near, or above the land surface or which is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained (hydric) soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to the wet environment (Alberta Water Council 2008). Wetlands include riparian areas. Refer to the *Riparian Health Assessment for Lakes, Sloughs and Wetlands Field Workbook* (2004) on the Cows and Fish website. The wetland classification system of Stewart and Kantrud (1971) is commonly applied in prairie Alberta. It categorizes wetland types based on factors such as length of time water is present, water depth and common vegetation (Alberta Water Council 2008). It includes ephemeral waterbodies; temporary ponds; seasonal ponds and lakes; semi-permanent ponds and lakes; permanent ponds and lakes; alkali ponds and lakes; and fen ponds. To determine the location, extent and type of wetlands, GIS databases of biophysical features, including the Grassland Vegetation Inventory, as well as topographic maps and air photos may be consulted. Verification through field survey is required to define the riparian area. A useful reference is the *Memorandum of Understanding Between the Energy Resources Conservation Board, Alberta Environment, Alberta Sustainable Resource Development, and the Special Areas Board on the Identification and Delineation of Water Bodies (November 2010)*. Field survey is required to determine the occurrence of any rare plant species and communities associated with wetlands where disturbance is proposed. Potential alteration to surface and subsurface drainage, soils and vegetation need to be considered as well as feasibility to restore. Setback distance should be measured from the edge of the disturbance footprint during construction. The full project footprint, including access routes, construction lay-down areas, and operational facilities, need to be considered as well as all activities in all phases of the development. Setback distance for birds should be measured from the turbine blade tip during operations. Refer to *Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta (SRD 2010.* Alberta's *Water Act* requires that proponents obtain an approval before conducting an activity in a water body. Draft requirements for oil and gas development in or near water bodies are contained in *ERCB Directive 056: Energy Development Applications and Schedules, Appendix 14: Oil and Gas Development In or Within 100 m of Water Bodies*. The preference is to avoid developing within a water body or 100 m setback distance; however, in circumstances where no other viable option exists, development may be allowed to proceed provided all required approvals are in place (such as a *Water Act* approval), the proposed lease site and surrounding area have been assessed for sensitivities, and plans to address identified sensitivities have been developed and will be implemented.

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
B. Planning to Minimize Disturbance of Native Prairie Where Avoidance is Not Achieved	
Guideline B - 1: On landscapes where native prairie and important wildlife habitats occur, but on which there are a large number or high density of developments, the addition of a proposed project may exceed thresholds that would limit development. Thresholds are defined through cumulative effects assessment. To avoid exceeding the threshold, another location may be chosen, the size of the development may be reduced, the project layout may be modified or mitigation measures may be taken to reduce the cumulative impact to below the threshold. (Source: *SRD 2006*)	The Government of Alberta is developing a Cumulative Effects Environmental Management System. Under this system, cumulative effects thresholds are defined through regional planning. Measures to reduce the cumulative impact below a defined threshold need to be defined early in project planning by the proponent and the regulators.
Guideline B - 2: Overall adverse environmental effects are reduced. This principle includes the avoidance of cumulative adverse environmental effects through coordination, integration and cooperation with other prairie users. (Source: *ERCB IL 2002-1*)	Integration of all phases and components of the project (turbines, access, collection systems, substation, transmission etc.) with other land uses must be considered at the planning stage. Early consultation and negotiation with landowners, neighbours, aboriginal communities and with other users (existing and potential) will help to identify opportunities to integrate land uses and reduce adverse environmental effects. Where opportunities exist to integrate uses to minimize disturbance, it is important to reach agreement among all users about implementing appropriate practices. The Canadian Wind Energy Association guide titled *Wind Energy Development Best Practices for Community Engagement and Public Consultation* (CanWEA 2010) outlines a range of practices and procedures for meaningful consultation. Requirements for setback from other facilities prescribed by municipal, provincial and federal governments (e.g. roads, oil and gas facilities) must be identified and reviewed to determine if there is flexibility to allow for reducing adverse environmental effects. Integrated access management plans, developed in consultation with other users, will minimize disturbance. Where livestock grazing occurs, range health and the response of cattle to industrial disturbances can influence overall environmental effects and reclamation potential. Early in the project planning process, it is important to identify grazing management measures to minimize disturbance and promote restoration in consultation with the landowner.

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
Guideline B - 3: The multidisciplinary project team responsible for site selection and development planning may include but is not necessarily restricted to specialists with adequate qualifications and experience in biology, hydrology, rangeland agrology, reclamation and minimal disturbance construction techniques. (Source: *SRD 2010-2*)	Where applicable, adequate qualifications may include membership in professional regulatory organizations (e.g. Alberta Society of Professional Biologists, Association of Professional Engineers, Geologists, and Geophysicists of Alberta).
Guideline B - 4: Predevelopment site assessment will improve the potential to avoid or minimize disturbance of native prairie or parkland and must be conducted. (Source: *ERCB IL 2002-1, SRD 2006*)	Predevelopment site assessment would include a suite of environmental studies that are provided to Alberta Sustainable Resource Development for consideration in their advisory role to wind energy developers prior to application for a project being made to the Alberta Utilities Commission. Studies may include, but not be limited to: - Defining the project footprint for the full life cycle of the project. - Identifying and delineating native grasslands. - Identifying and delineating wetlands. - Assessing surface water and groundwater to assist in determining sensitivities regarding alteration in drainage or water quality. - Assessing the potential for soil compaction and erosion. - Assessing range and riparian health to assist in determining environmental sensitivities and to provide a benchmark for measuring reclamation success. Refer to guides for conducting these assessments on websites of Alberta Sustainable Resource Development and the Alberta Riparian Habitat Management Society (Cows and Fish). - Conducting botanical surveys to identify rare plants and ecological communities. Refer to documents for botanical surveys on the website of the Alberta Native Plant Council and to tracking lists on the website of the Alberta Conservation Information Management System. - Determining habitat for species at risk and other important wildlife habitats.
Guideline B - 5: Risk assessment associated with native grassland disturbance during the planning process is required to understand restoration potential and reduce the impact of non-native plant species invasion. (Source: *SRD IL 2010-2*).	

RECOMMENDED GUIDELINE	IMPLEMENTATION CONSIDERATIONS
Guideline B - 6: Where disturbance of native grasslands cannot be avoided, discussions should occur with an SRD Wildlife Biologist, range agrologist and reclamation specialist as well as potentially with other parties such as landowners, municipalities and conservation organizations to identify mitigation and restoration measures. Potential measures for no net loss through compensation, enhancement and protection of natural habitats on site or nearby should be defined. (Source: *SRD Wildlife Guidelines*)	Considerations would include conditions regarding reclamation post-construction and at project decommissioning. There would be measurable end points to be achieved in specified time frames. Refer to the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Native Grasslands* available on the website of Alberta Environment. With respect to reclamation of wind energy projects, a standardized process is lacking that defines expectations for reclamation and criteria for evaluating if the goals of reclamation have been achieved. Criteria for reclamation certification are not yet defined or enforceable. This gap has yet to be addressed by regulators.
Guideline B - 7: Industry is expected to take advantage of new technologies and practices designed to reduce surface disturbance and enhance restoration. (Source: *IL SRD 2010-2*)	Practices to consider include using existing access routes, temporary access routes versus permanent ones, two-strip gravel tracks, using geotextile mats on access routes and crane pads, common corridors for access and cables, reducing cut and fill, using right-sized equipment with rubber tires, and shutdown of activities during adverse conditions including wet weather.

C. Minimizing Disturbance during Construction, Site Maintenance, Monitoring and Restoration/Reclamation

Guideline C - 1: An Environmental Protection Plan (EPP) that defines practices to minimize disturbance of native prairie should be developed. The EPP may include but not be limited to the following components:

1 INTRODUCTION - Pertinent Project Overview Information
This section includes a high level summary of the overall project and the purpose of the document to ensure all personnel involved understand the considerations incorporated into this document. Project execution will include diverse teams, often dealing with specialized tasks or elements of work. A unified context sets the process for all. A high-level project location map could be included for reference.

2 ENVIRONMENTAL PROTECTION PLAN ORGANIZATION - Implementation Considerations
This section defines the process that is to be followed to execute the project. It also provides guidance for potential situations for which measures are not clearly identified within the Environmental Protection Plan.

3 ENVIRONMENTAL COMPLIANCE - Legislation and Corporate Compliance Practices
This section outlines corporate policy (e.g., Environmental Management Plan, Environmental Policy), and summarizes regulatory and legislative requirements to be met by the project. It itemizes permits and authorizations that are in place, or that need to be obtained and at what time they are required. Approaches for issues management, negotiation and defining conditions of variance are defined. Roles, responsibilities, accountabilities and communications for both the proponent as well as its contractor(s) for all stages of the project are outlined. One or more organizational charts could be used to convey this information. Documentation of compliance, including the role and authority of environmental inspectors, also is outlined.

4 GENERAL ENVIRONMENTAL PROTECTION MEASURES - Overarching Measures/Mitigations
This section of the EPP details the protection measures and commitments that apply to all aspects of project development. These typically include everything from site rules, restricted areas or activities, waste disposal, fire prevention, general environmental constraints, wildlife timing restrictions, and vehicular restrictions or requirements (including adverse weather shutdown).

5 ACTIVITY SPECIFIC PROTECTION MEASURES - Construction Steps and Associated Measures
Activity-specific protection measures are typically presented in grouped categories of logical development activities (access and site preparation, foundation construction, turbine installation, substation construction and collector system installation). This section details the appropriate means of execution from site preparation, soil handling, excavation practices, erosion controls, dewatering considerations, site-specific constraints or restricted areas, and any other activity that should be planned and executed in a responsible manner. For each development activity, a map could be used to illustrate infrastructure (turbines, access roads, substation), historical resource and biophysical features, soil stripping depth and storage locations, etc.

6 SITE CLEAN-UP AND INTERIM RECLAMATION PLAN

This section addresses closure of each development activity (access and site preparation, foundation construction, turbine installation, substation construction and collector system installation). It clearly states what is to be partially or fully restored, and the means to accomplish that restoration/reclamation. Details of reclamation measures such as seed mixes to use and any differing practices within the project lands are presented by location. A map could be used to illustrate infrastructure (turbines, access roads, substation), seed mixes, vegetation management requirements, grazing management considerations and other mitigation measures.

7 OPERATION AND MAINTENANCE

This section provides detailed considerations of all measures that need to be controlled or maintained during operation or maintenance. Typically this could include weed control measures, contingency measures for emergencies etc.

8 POST-CONSTRUCTION MONITORING

This section outlines post-construction monitoring commitments made in the project Environmental Assessment (if one was prepared) and/or in regulatory permits and authorizations.

9 DECOMMISSIONING

This section provides a statement of commitment for the project to progress through refurbishment or decommissioning as appropriate. Typically this infers minimally meeting current expectations, but with a commitment to adhere to the standards of the day when the project reaches this milestone.

APPENDICES (as needed)

Appendices may include but are not limited to: Project Contact List, Erosion and Sediment Control Measures, Traffic Management Plan, Waste Management Plan, Adverse Weather Plans, Fire Contingency Plan, Contaminated Soils and Spill Plan, Weed Management Plan, and Seed Mixes.

Appendix 1 - Current Environmental Regulatory Framework Regarding Wind Energy Projects in Alberta

The following is a summary of the regulatory process currently governing the approval, operation and decommissioning of wind energy projects in Alberta with respect to environmental effects.

Alberta Utilities Commission

The Alberta Utilities Commission (AUC) regulates electric, gas and water utilities including wind energy projects pursuant to the *Alberta Utilities Commission* Act, and the *Hydro and Electric Energy Act* and *Gas Utilities Act*. AUC is charged to protect social, economic and environmental interests of Alberta when considering these projects.

In addition to the AUC Rule 001, Rule of Practice, AUC has two Rules that apply to environmental considerations of applications for wind energy developments. These are:

- *AUC Rule 007: Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (Alberta Utilities Commission 2009)
  Applicants for wind power plants 1MW or greater are required to contact Alberta Environment to determine if an EIA is required (not mandatory) and to refer the application to Alberta Sustainable Resource Development – Fish and Wildlife Division for sign-off. Other environmental information required is a general overview of environmental impacts, identification of land-use issues and evaluation of visible impacts. Clearance from Alberta Culture and Community Spirit regarding protection of historical resources according to the *Alberta Historical Resources Act* is also required. Consultation is required only with directly affected persons. Applications for transmission lines must include environmental information, with the level of detail needed to describe the impacts created by the project. AUC determines the detail on a case by case basis and decides if an Environmental Impact Assessment is required. The applicant also is directed to contact Alberta Environment to determine if their approval is required.
- *AUC Rule 012: Noise Control* (Alberta Utilities Commission , February 23, 2010)
  Applicants for wind power plants must provide a Noise Impact Assessment (NIA) which is a documented prediction of noise to be generated by proposed wind turbines. The NIA must evaluate noise to be generated by the facility(ies) proposed, ambient noise and noise from all existing and proposed energy-related facilities. The predicted cumulative noise levels must not exceed the Permissible Sound Level at the nearest or most impacted dwellings, or, in the absence of dwellings affected by noise from the proposed facility, at a distance of 1.5 km from the facility fence line.

AUC does not currently administer a compliance assurance program and is assessing its compliance assurance strategies.

Alberta Environment

Wind energy projects consist of two activities, the first being power production from wind turbines and the second being transmission of the power from the turbines to Alberta's power grid. Power production from wind turbines is not a defined activity in the *Activities Designation Regulation* (ADR) of The *Environmental Protection and Enhancement Act* (EPEA). Therefore there are no approvals, registrations or notifications required under EPEA for power production from wind turbines.

"Transmission lines" in the ADR means a transmission line as defined in EPEA, and any infrastructure in connection with that transmission line, with a voltage of 130 kilovolts or more and in respect of which an environmental impact assessment report is required. However, the *Environmental Assessment (Mandatory and Exempted Activities) Regulation* exempts a transmission line from requiring an environmental impact assessment. Therefore there are no approvals, registrations or notifications required under EPEA for transmission lines.

Part 5 of EPEA prohibits the release of a substance into the environment that causes or may cause a significant adverse effect. If such a release occurs then it must be reported to Alberta Environment as required in the *Release Reporting Regulation*. The responsible party for the release has a duty to take remedial measures as described in sections 110 and 112 of EPEA.

Transmission lines, as defined in EPEA, are included in the definition of "specified land" in the *Conservation and Reclamation Regulation*. As such, transmission lines and associated substations are to be conserved and reclaimed as required under Part 6 of EPEA. Wind power production sites are not included in the definition of "specified land".

Under the *Water Act* if the wind energy project involves any work within a water body or any de-watering of groundwater from excavations, there may be requirements under the *Water Act* in which case the proponent should contact the local regional Alberta Environment office for specific information.

Alberta Sustainable Resource Development – Fish and Wildlife Division

AUC requires that applications for wind energy developments be referred to Alberta Sustainable Resource Development (ASRD) – Fish and Wildlife Division for review and sign-off. Fish and Wildlife Division's *Wildlife Guidelines for Alberta Wind Energy Projects (April 2006)* (ASRD 2006b) provide guidance on protecting bats, birds and other species or conservation concern when locating a wind turbine on public or private land in Alberta. Consideration includes protecting habitat for species with legal designation as threatened or endangered under the *Alberta Wildlife Act* and/or the federal *Species At Risk Act*. The Fish and Wildlife Division also participated in the development of *Bats and Wind Turbines. Pre-siting and pre-construction survey protocols (May 2008)* (Lausen et al. 2008), which are directed at preventing bat mortality. These guidelines, available on the department's external website, are amended from time to time and have been recently updated.

At the current time for projects proposed on private land, the Fish and Wildlife Division works directly with the wind power industry and the Alberta Utilities Commission to minimize impacts on wildlife. Conditions that reflect ASRD guidelines may be applied to a project approval by the Alberta Utilities Commission.

Field surveys are conducted after development to collect further information regarding wildlife in an area. Regulatory authority and responsibility for ensuring compliance with conditions applied by ASRD are unclear.

ASRD does not participate in hearings of the Alberta Utilities Commission unless called to testify.

Alberta Sustainable Resource Development – Public Lands

Approval of the allocation and use of public land for development of projects is the responsibility of Alberta Sustainable Resource Development (ASRD). Currently there are no approved wind power projects on public lands managed by ASRD. The department accepts applications for exploration for a maximum term of two years on the condition that all future decisions on land allocation are deferred pending completion of guidelines.

ASRD is reviewing policy options regarding the location of long-term, permanent wind power developments on public land, including development of guidelines that will have criteria to review applications. Of particular consideration are sensitive public land areas including native prairie, high value wildlife areas, and other high value resource or conservation lands. A key principle of any development on public land is to avoid, minimize or mitigate impacts on environmentally sensitive lands, including impacts on sensitive native grasslands.

ASRD is anticipating that regional plans, which are being prepared under Alberta's Land-use Framework, will provide clear guidance for managing public land, including land use decision-making for wind power projects.

Special Areas Board

Wind power project development is not allowed on public lands managed by the Special Areas Board.

Federal Government

Application for funding of a wind power project to the federal government (e.g. ecoENERGY for Renewable Power program of Natural Resources Canada) triggers the need for a federal environmental assessment pursuant to Section 5(1)(b) of the *Canadian Environmental Assessment Act (CEAA*). The agency overseeing funding is the Responsible Authority under CEAA.

Any project requiring federal permits from the list of regulations under *CEAA* must also have an environmental assessment. The Law List regulations that may apply to wind projects are *The Fisheries Act* and *The Navigable Water Act*.

There are federal guidelines dealing with the assessment of effects on birds prepared by the Canadian Wildlife Service of Environment Canada (CWS 2007).

Wind Energy Development in Alberta

Suggestions for Beneficial Management Practices

INPUT BY PARTICIPANTS IN A PROCESS TO RECOMMEND GUIDELINES FOR MINIMIZING DISTURBANCE OF NATIVE PRAIRIE

April, 2011

Cheryl Bradley & Marilyn Neville
COMPILERS ON BEHALF OF

Foothills Restoration Forum

SUGGESTIONS FOR BENEFICIAL MANAGEMENT PRACTICES BASED ON FIELD TOUR OBSERVATIONS

On October 27, 2010, twenty-nine individuals from a broad range of interests participated in the field tour of a wind power development constructed in 2004-2006. The site was in foothills fescue grassland near Pincher Creek. Participants were asked to record their observations regarding practices that work, those that need improvement and any innovative ideas. The following are key ideas that were provided by the ten participants who responded. These ideas may provide a useful starting point for defining beneficial management practices with respect to construction, operation, maintenance and decommissioning of wind energy projects where avoidance of native prairie is not achieved.

Site wind energy projects to avoid native grassland

Observations/Rationale: Siting on already disturbed land may be a preferable option to siting on native grassland as there are less environmental considerations to address. Siting considerations for wind energy developments include proximity to transmission lines and substations, wind regime for energy generation, land ownership, land use, archeological/historical sites, wildlife habitat and presence/absence of native prairie.

Integrate all uses and activities on the site

Avoid traditional land use sites

Observations/Rationale: Aboriginal grave sites, dream beds and other sites occur on ridges with rough fescue grasslands. Unearthed rocks indicates disturbance. These sites need to be identified and avoided throughout the lifetime of the project.

Plan early for grazing management

Observations/Rationale: Heavy pressure from livestock grazing appears to be hampering restoration of some disturbed sites. There is a need to consider the response of cattle to the disturbances and how to avoid damage. Include grazing management details (season, intensity of use, fencing needs) in negotiations with the landholder.

Fence disturbances from livestock for a few years after seeding to assist in restoration to native community

Observations/Rationale: Grazing pressure and poor range health are impacting revegetation around the base of the towers, on the cable trench and along the access route. Microsites with higher moisture regime occur at the base of the towers and pugging, uneven surfaces caused by livestock hoofs, is occurring. The composition of vegetation communities is affected either due to the towers directing more water to the base of the structure and/or of cattle seeking shade and shelter.

Plan for all aspects of the development, including transmission
Observations/Rationale: New transmission towers on the wind energy development site have not been built with the same attention to minimizing disturbance as the original wind turbine construction. There is a need to consider all elements of the project in the planning stage and ensure that construction practices to minimize disturbance are consistently used.

Minimize the width of the access RoW

Observations/Rationale: A shadow effect, that is alteration of native vegetation due to disturbance and spread of invasive species, was observed adjacent to roads constructed for the project. Consideration should be given in project planning to minimizing the width and length of access roads during both construction and operation phases.

Use geotech mats (geo-membranes or geo-textiles) when building access for heavy equipment in the construction phase

Observations/Rationale: The environmental effects of moving heavy equipment, such as construction cranes, were still apparent even after initial reclamation was complete. Disturbance could be reduced by use of minimal disturbance construction techniques. Road width can be considerably reduced after the turbines are installed.

Consider options other than permanent access routes for operations and maintenance (e.g. access on two-track trails using ATVs)

Observations/Rationale: Surface disturbance may be minimized and the risk of invasion of non-native species reduced by utilizing alternative forms of access to sensitive areas. This is particularly important during temporary winter thaw and spring when moist soil conditions can exacerbate the disturbance caused by conventional vehicle access to the turbines.

When permanent roads are needed, use low profile construction techniques

Observations/Rationale: Moisture collecting in depressions caused by disturbance promotes invasion of non-native species. The risk of invasive species spread may be reduced by using low-profile roads without ditches compared to roads with ditches. Low profile roads could also improve the feasibility of restoring native plant community.

Avoid spreading spoil, from excavation for road construction and tower bases, on native prairie

Observations/Rationale: There was evidence of spoil overlays extending beyond the road right-of-way and around towers into native grassland. This soil admixing impedes successful restoration of native plant community.

Use biodegradable mats when needed to prevent erosion

Observations/Rationale: Matting appears to have been effective in minimizing erosion; however the nylon is not decomposing.

Install power cables along the access right-of-way to minimize surface disturbance

Observations/Rationale: Use of this practice on the site has reduced the disturbance size and edge.

> **Strip vegetation and soil only along the cable ditchline.**
> *Observations/Rationale:* Is it necessary to use sand in the cable trench? Consider plough-in of cable line.

Design seed mixes considering the need for erosion control as well as potential competition from non-native species

Minimize traffic during operations

Observations/Rationale: Vehicles contribute to the spread of propagules of invasive non-native plants.

Manage weeds to adhere to the Weed Act (2010)

Observations/Rationale: There is a legislative requirement to monitor and control non-native species listed in the *Weed Act (2010).* Monitoring and controlling invasive non-native species requires long-term commitment of personnel and resources.

Monitor success of reclamation and invasion of non-native species over time

Observations/Rationale: Having monitoring data of vegetation change over time on and adjacent to disturbances is needed to assess the success of reclamation practices and collectively build knowledge about what works and what doesn't.