

# Principles for Minimizing Surface Disturbance in Native Grassland



Principles, Guidelines and Tools for all Industrial Activity in Native Grasslands in the Prairie and Parkland Landscapes of Alberta



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## Acknowledgements

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## Abbreviations

ACA	Alberta Conservation Association
AEP	Alberta Environment and Parks
ACIMS	Alberta Conservation Information Management System
AER	Alberta Energy Regulator
AGRASID	Agricultural Region of Alberta Soil Information Database
AIA	Alberta Institute of Agrologists
ANPC	Alberta Native Plant Council
APEGGA	Association of Professional Engineers, Geologists and Geophysicists of Alberta
EPEA	Environmental Protection and Enhancement Act
ASIC	Alberta Soil Information Centre
AUC	Alberta Utilities Commission
BMP	Best Management Practices
CEMS	Cumulative Effects Management System
EAP	Enhanced Approval Process
EGS	Ecological (or Ecosystem) Goods and Services
EPP	Environmental Protection Plan
ERCB	Energy Resources Conservation Board
ESRD	Alberta Environment and Sustainable Resource Development
ESRRA	Ecological Site Restoration Risk Analysis
FRF	Foothills Restoration Forum
FWMIS	Fish and Wildlife Management Information System
GoA	Government of Alberta
Gov't	government
GVI	Grassland Vegetation Inventory
IL	Information Letter
ILM	Integrated Land Management
km	kilometre
LAT	Landscape Analysis Tool
LUF	Land Use Framework
NCC	Nature Conservancy of Canada
NSR	Natural Subregion
OPAC	Online Permitting and Clearance System
PCF	Prairie Conservation Forum
PNT	Protective Notation
PVI	Parkland Vegetation Inventory
RPC	Reference Plant Community
RRMP	Range Resource Management Program
SAR	Species at Risk
SER	Society for Ecological Restoration

## 1.0 Background and Intent

The Government of Alberta (GoA) recognizes the need to conserve native grassland ecological resources for future generations. Industrial activity, agriculture, municipal development, infrastructure, recreation and conservation interests often are competing to use the same piece of land. The intent is to establish positive and sustainable environmental outcomes. A key challenge is to reduce environmental impact while working individually and collectively.

A common element to all aspects of this document is the acknowledgment of the important role strategic siting and risk analysis plays in achieving the principles of this document and the documents that came before it.

The first guidelines crafted to minimize surface disturbance and improve reclamation outcomes for native grasslands were a direct result of the *Prairie Conservation Action Plan 1989-1994* (PCF 1989). The Plan was used as intervener evidence by a Special Areas landowner during an Energy Resource Conservation Board (ERCB) hearing for a well site and access road. The landowner was opposed to disturbance of plains rough fescue grasslands. The hearing recommended agencies collaborate to reduce industrial impact in native grasslands. The ERCB subsequently joined the Prairie Conservation Forum (PCF), resulting in the first guidelines, ERCB *Information Letter (IL) 92-12, Guidelines for Minimizing Disturbance in Native Prairie Areas* (ERCB IL 92-12). As knowledge and experience was gained the guidelines were revised and captured in IL 96-9 *Revised Guidelines for Minimizing Disturbance in Native Prairie Areas* (ERCB IL 96-9). This IL was subsequently revised in 2002 to include Parkland Areas; *IL2002-01: Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas* (EUB IL 2002-1). These information letters came about through the experience and adaptive learning of a multi-stakeholder group with representatives from government, industry and the prairie conservation community (EUB IL2002-1). Principles and guidelines for minimizing surface disturbance have been adopted as standard practice and commonly implemented by the petroleum industry. With the development of the Alberta Energy Regulator, *Principles for Minimizing Surface Disturbances in Native Prairie and Parkland Areas*, was released for the oil and gas industry as Manual 007.

A key intent of the release of this publication is to promote consistent and effective use of pre-site assessments for all industrial activity in native grasslands.

The GoA recognizes the need for a broader application of these principles and guidelines by industry across all sectors developing and operating projects in native grassland landscapes. The desired outcome is to reduce cumulative impacts on grassland ecosystems while allowing industrial activity and renewable developments to occur within the broad multiple use landscape.

Recognizing the diversity of industrial activity on the landscape, this document is intended to provide government regulatory agencies and industry with a comprehensive set of principles and guidelines for all industrial activity in native grassland landscapes. Many of the principles are requirements for development on public lands, as stated in the standards and conditions of public lands formal dispositions, authorizations and approvals. These principles and guidelines are also appropriate and applicable to other land holders for the promotion and advancement of avoidance and minimal disturbance practices.

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## 2.0 How to Use This Document

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These principles apply to lands where the native plant communities remain intact and functioning. Essential areas would include grasslands with 30 per cent or greater native communities in place (less than 70 per cent disturbance).

Each industrial sector offers challenges in development planning, with unique construction specifications, post construction reclamation and restoration requirements. The principles and guidelines outlined in this document are general in nature to allow each industrial sector to develop Best Management Practices (BMP) specific to the type of industrial activity and land use practice.

Examples of land use practices resulting in native grassland disturbance and requiring careful management include:

- mineral exploration and development, such as wellsites, mines, aggregate, quarry pits and associated facilities and infrastructure;
- forest industry timber extraction infrastructure;
- transportation infrastructure and borrow pits;
- electric energy transmission lines and associated infrastructure;
- renewable energy development, such as wind and solar power and associated infrastructure;
- communications related development and infrastructure;
- municipal developments and road access through public land for country residential development;
- recreational facilities and associated infrastructure; and
- rangeland improvement infrastructure required for livestock production.

These land uses affect the ecological integrity of the grassland environments and, if not managed properly, may lead to the loss of native grassland landscapes.

Past methods of land management and reclamation have not always resulted in the restoration of native plant community ecological integrity, resulting in a net loss of native biodiversity. Full incorporation and utilization of the proven threefold strategy below, is key:

1. Avoidance of native grasslands where possible, especially in critical ecological sites identified as extremely difficult to reclaim.
2. Reducing area and impacts of industrial disturbance to the extent possible, and
3. Developing practical methods that will allow eventual restoration of disturbed areas.



It is important to incorporate native plant community restoration planning in all phases of development activity. Reclamation practices following industrial disturbance in native grassland landscapes have been steadily evolving since the early 1980s. Over time the focus of reclamation practices in native grassland has shifted from controlling soil erosion and establishing sustainable grass cover; to development planning with pre-disturbance assessment and implementation of procedures designed to facilitate the restoration of native plant community structure, health and function. This shift in focus from traditional reclamation outcomes to reclamation with restoration outcomes was acknowledged in the *2010 Reclamation Criteria for Wellsites and Associated Facilities in Native Grasslands* (ESRD 2013). Post development restoration monitoring and adaptive management is required to ensure validation of and continued improvement to the environmental protection and restoration strategies employed by industry (Neville et al. 2014).

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### 3.0 Regional Planning and Conservation of Biodiversity

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Future population and economic pressures in Alberta will increase pressure on the extent and biodiversity of native grassland ecosystems from the cumulative effects of agricultural conversion, energy development, mineral extraction, transportation corridors and urban settlement. The Grassland and Parkland Natural Regions of Alberta (Natural Regions Committee 2006) are rich in petroleum resources with a large and diverse development infrastructure in native grasslands. Recently, renewable energy projects have also increased, whose infrastructure can result in extensive, long-term impacts on native grassland. Linear footprint from multiple industries continues to degrade the overall health of native grasslands. A key commonality among all disturbance types, is the creation of conditions that promotes establishment of invasive species and reduces the ability of these native grasslands to recover.

As the demand for development has increased, so has public pressure to reduce the impact of industrial disturbance and the cumulative effects of multiple activities on native grassland ecosystems. The *South Saskatchewan Regional Plan* (GoA 2014a) identifies retention of biodiversity and healthy ecosystems as a key goal, including to:

- develop a regional biodiversity management framework that defines thresholds for loss of native species and habitat;
- conserve critical habitats for species at risk;
- avoid, minimize or mitigate the conversion of native grasslands on public lands;
- apply integrated land management to minimize native vegetation loss; and
- co-ordinate land use activities to reduce fragmentation by roads, access and facilities.

Effective recovery strategies are necessary to retain and maintain native plant community biodiversity, health and resilience. A cumulative effects approach to land management will encourage restoration of existing footprint and minimize new footprint (Neville et al. 2014).

### 3.1 Why Conservation of Native Grassland is Important

Native grasslands are regarded as the native landscapes most altered by human land use practices. Found largely in the Grassland and Parkland Natural Regions (including the Peace River Parkland) of Alberta these landscapes are also found in the Rocky Mountain Region, particularly in the Montane Natural Subregion (see Figure 1). Remnant grasslands also exist in the Foothills Natural Region, and portions of the Dry Mixedwood Natural Subregion. Alberta has only about one third of its native grasslands remaining. These native landscapes are diverse and can encompass riparian forests, potholes and wetlands, badlands, shrub dominated communities, and sandhill complexes (Native Prairie Guidelines Working Group 2002).

Alberta's remaining native grasslands have multiple use values (e.g. extensive recreation, hunting) and environmental significance (e.g. habitat, natural landscapes, undisturbed archaeological sites) and provide ecological services (e.g. groundwater recharge, carbon storage, wildlife habitat and biodiversity). Society values these areas and conserving them is in the public interest (Native Prairie Guidelines Working Group 2002).

Although extensive tracts of native grassland remain in the Grassland Natural Region, much of this is highly fragmented. The grasslands in the Parkland Natural Region are also highly fragmented due to a focus on developing its highly productive soils and climate. Alberta's native grassland landscapes are continuing to be transformed by agricultural, industrial, commercial, recreational, and residential/urban development (Native Prairie Guidelines Working Group 2002). Until the past decade, the prevailing assumption was that disturbed grasslands, once reclaimed, would gradually recover to a plant community with similar characteristics as the pre-disturbance plant community. Recent research and field studies have shown that with a careful minimum disturbance approach and appropriate prescriptive development practices, considerable health and function may be recovered on many sites particularly with brown and dark brown soils or on coarse textured soils, such as sands. However, some plant communities may be permanently altered to a non-native condition with enduring impacts on the level of ecological services provided. Examples of these are grasslands on black soils, such as those in the Foothills Fescue and Montane Natural Subregions as well as within the Parkland Natural Region.

Cooperation of government, industry, and a wide range of stakeholders has resulted in policies and practices of minimum disturbance. Continued cooperation is key to advance the management of cumulative effects.

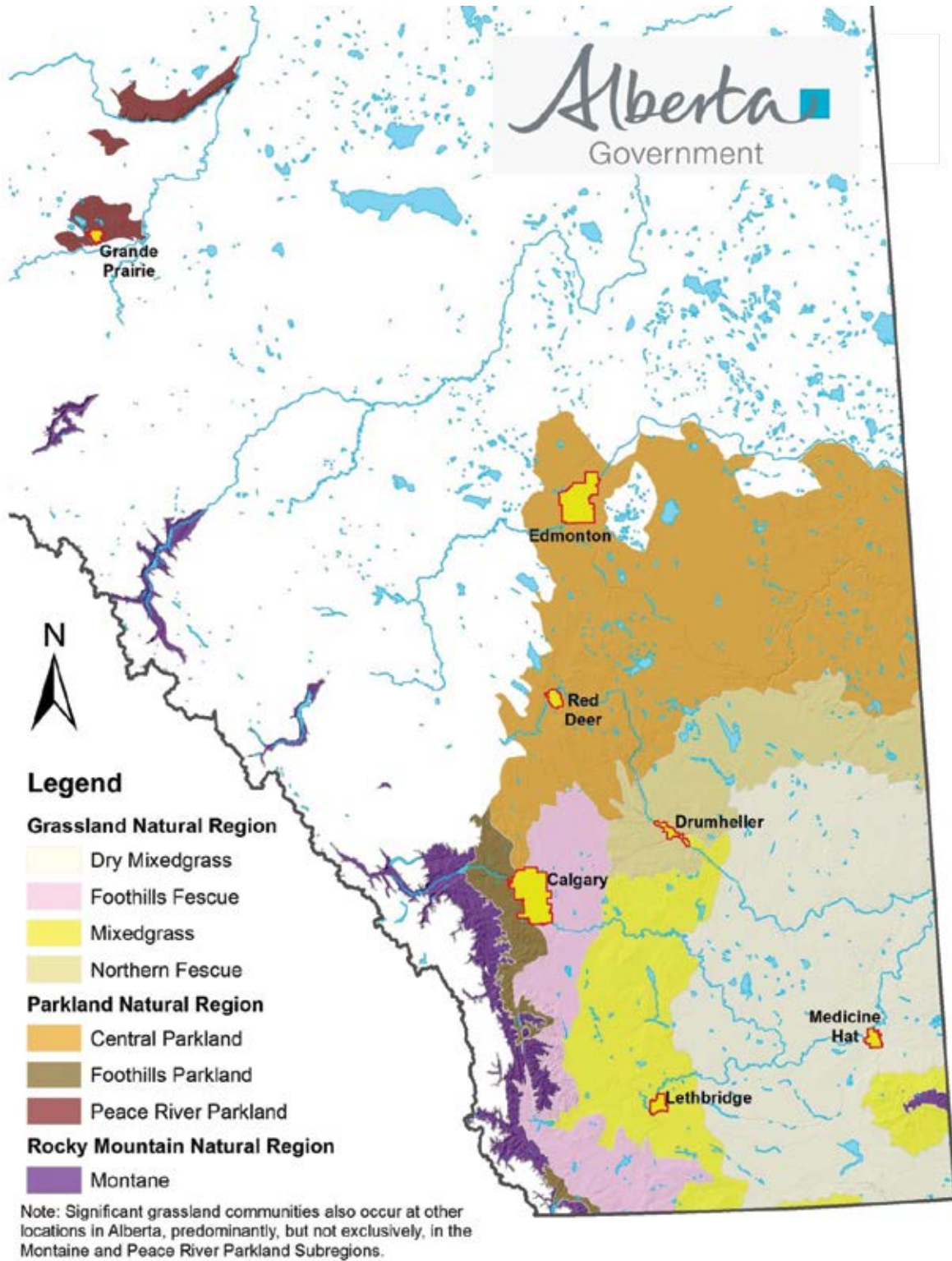


Figure 1 – Select Natural Subregions of Alberta

## 3.2 Cumulative Effects

Cumulative effects are the combined effects of past, present and reasonably foreseeable future land-use activities on the environment. Important factors related to cumulative effects in grasslands can be categorized in a number of measurable categories. These can help in the understanding and management of cumulative impacts of land use practices to Alberta's native grasslands.

These include:

1. **Permanent Conversion to Non-native Cover Types**

Over the past century, extensive tracts of Alberta grasslands have been permanently converted to non-native cover types primarily for agricultural cropping, transportation and energy infrastructure, and urban and country residential development. Incremental losses through these processes continue.

2. **Reclamation Success and Plant Community Integrity**

Relative to each unique ecological site, intact native grasslands possess a rich diversity of native grasses, forbs and shrubs that produce a characteristic plant community structure, facilitating optimal use of moisture, nutrients and available sunlight. To the extent possible, reclamation practices aim to restore the native plant community so that ecological health and function, and the related ecological services are maintained. Field experience and monitoring programs have revealed variable results. Reclamation outcomes range from strong recovery to very limited success where invasive species may replace the original native community. In the Alberta Grassland Natural Region, recovery of native plant communities can be more readily achieved in drier prairie environments while mesic environments are much more challenging, primarily due to the greater competitiveness of agronomic grasses and weeds in the moister growing environment. Ecological health, function and associated ecological services are diminished when plant communities are modified by non-native species.

3. **Anthropogenic Edge Density and Fragmentation**

The progressive additions of linear developments like roads, pipelines and transmission rights-of-way in a unit of native grassland can be expressed as anthropogenic edge density and measured in km/square kilometer of linear feature. Research shows that grassland intactness declines as anthropogenic edge increases. Left unmanaged it results in the progressive fragmentation of native grasslands, reducing their health and function.

4. **Shadow Effect and Invasive Species**

Anthropogenic edge results in disturbed grassland and also an interface into undisturbed grassland for invasive species. The seed stock of invasive species may spread from the reclaimed linear feature or be transported by the associated traffic along the access feature. The rate at which invasive species move off the linear feature can be measured and expressed as meters/year.

5. **Reduced Habitat Effectiveness**

Habitat loss, alteration and fragmentation can result in reduced quality of wildlife habitat due to increased mortality, reduced reproductive success, displacement to other habitat, and loss of habitat connectivity.

## 6. **Reduced Ecological Services**

Reduced watershed protection, carbon storage and soil moisture retention are examples of some of the ecological services which can be negatively affected as a consequence of surface disturbances.

Minimum disturbance practices are an essential tool in the management of cumulative effects in native grasslands.



Cumulative Effects: Cultivation, Road Ditch with Invasive Species, Cabin, Wellsite and Gravel Pit on Native Grassland. Photo Courtesy of Jane Lancaster, Kestrel Research Inc

## 4.0 Principles for Minimizing Surface Disturbance on Native Grasslands in the Prairie and Parkland

The **Principles** provide the foundation to minimizing impacts to native grasslands, with numerous different applications across activity types and Native Grassland Subregions.

As a result, these principles may apply as requirements or Best Management Practices within different jurisdictions, regulators and lease agreements. It is the operator's responsibility to fully understand the requirements of their operating approval, such as:

- **Public Lands:** Some of the below principles may be conditions included as part of an operator's formal disposition.
- **Specified land activities as defined in the *Environmental Protection and Enhancement Act* (EPEA) (private or public):** Restoration to the pre-existing grassland community is the most common requirement for reclamation certification.

The following principles are intended to reduce grassland disturbance in native prairie or parkland areas of Alberta (Figure 1) and apply to lands where native plant communities remain intact and functioning. They are divided into three categories that relate to the project phase of planning and siting, construction and operations, and reclamation. The last category, project phase contains principles that relate to the entire operation.

### Planning and Siting

#### 1. **Avoid Disturbing Native Grassland Plant Communities**

Locate disturbances on lands that have been previously disturbed or where long-term land-use commitment is less certain (e.g. tame pasture or cultivated lands). A strategic siting risk analysis at the initial project planning phase, field verification of identified site specific issues and risk within the defined project footprint and the preparation of a detailed environmental protection, reclamation and restoration plan are essential for avoiding native grassland and for reducing disturbance.

#### 2. **Reduce Surface Land Disturbance Area**

If the disturbance cannot be sited elsewhere, the area disturbed should be the smallest land base possible for the development to be constructed and operated safely and successfully.

#### 3. **Reduce Cumulative Impacts**

Minimize the area and intensity of the overall footprint during all phases of the project. Reduce cost of assessment, monitoring, reclamation and regulatory approvals by optimizing or utilizing existing disturbances. This principle includes the avoidance of cumulative impacts through coordination and cooperation with other native grassland users.

## Construction and Operations

- 4. Schedule Activities to Reduce the Impact to Soils, Native Plant Communities, Wildlife, Wetlands and Water Courses.**  
Scheduling of construction and operational activities can address issues such as conflicts with other land users, considerations of wildlife seasonal habitat use, vegetation response to growing season disturbances, optimal use of dry or frozen ground conditions and timing restrictions for watercourse crossings. Timing restrictions for watercourse crossings can be found in the Code of Practice for Watercourse Crossings. The standard and operating conditions on public lands contain other timing restrictions on public lands.

## Reclamation

- 5. Incorporate Native Plant Community Restoration Planning in All Phases of Development Activity.** The goal is to restore native plant community integrity and function by facilitating the eventual restoration of the full range of biological structure and diversity.
- 6. Monitoring and Reporting Results is Critical to Improved Performance.** An effective monitoring program ensures reclamation objectives are met through identification of issues and adaptive management. Erosion control, re-vegetation success and sustainability, and invasive non-native plant management are considered key components of any monitoring program. Long-term monitoring of the re-vegetated areas is necessary until the appropriate native plant community has been re-established.

## All Project Phases

- 7. Retain Professional Environmental Specialists to Facilitate the Resolution of Problems.** Retain professional environmental specialists to: analyze risk associated with site and route selection, develop appropriate mitigation plans, and to monitor construction and reclamation activities through the life cycle of the project to decommissioning and abandonment.
- 8. Convey Corporate and Government Commitment to Minimal Disturbance to All Staff and Contractors.** It is the shared responsibility of everyone involved in a project to ensure that training and education is conducted so that environmental protection values are well communicated, understood, and implemented.
- 9. Conduct a Public Consultation Program Appropriate to the Scale of the Project.** Native grasslands and parklands are multiple use landscapes with important values for stakeholders such as landowner groups, the ranching community and environmental groups. Early consultation is important to reduce conflicts with other land users.

## 5.0 Guidelines for Minimizing Surface Disturbance in Native Grassland and Parkland

In this document, **Guidelines** are general rules that provide clarification to support each corresponding **Principle**. The guidelines are not prescriptive and are general in nature to allow industry to develop and apply best management practices appropriate to industry specific development procedures and outcomes. These guidelines can be applied to the full range of landscapes from large tracts of unbroken native grassland and parkland to small remnant native grassland areas within disturbed landscapes.

### Planning and Siting

#### 5.1 Avoid Disturbing Native Grassland Plant Communities

Avoiding native grasslands may be accomplished by locating surface disturbances:

- within cultivated agricultural land that is in annual crop production, hay land or tame pasture;
- within abandoned cultivation where the integrity of native plant communities have been modified by non-native forages composing greater than 70 per cent of cover (Adams et al. 2009); and
- using Integrated Land Management (ILM) to utilize existing access trails, transportation infrastructure, pipeline corridors or industrial surface disturbance within native grassland where the vegetation has been removed and the soil profiles have been altered.

##### 5.1.1 Conduct a Strategic Siting Risk Analysis (Desktop Level)

A desired outcome is the avoidance of native grassland landscapes where the native plant communities remain intact and functioning.

Conduct a strategic siting risk analysis early in the development planning phase and before application. The Strategic Siting Risk Analysis Flow Chart (Figure 2) illustrates the steps in project planning used to minimize avoidance and disturbance. It also provides guidance to efficient construction and restoration planning.



## Pre-Disturbance Site Assessment Flow Chart to Minimize Impacts to Native Grassland Ecosystems

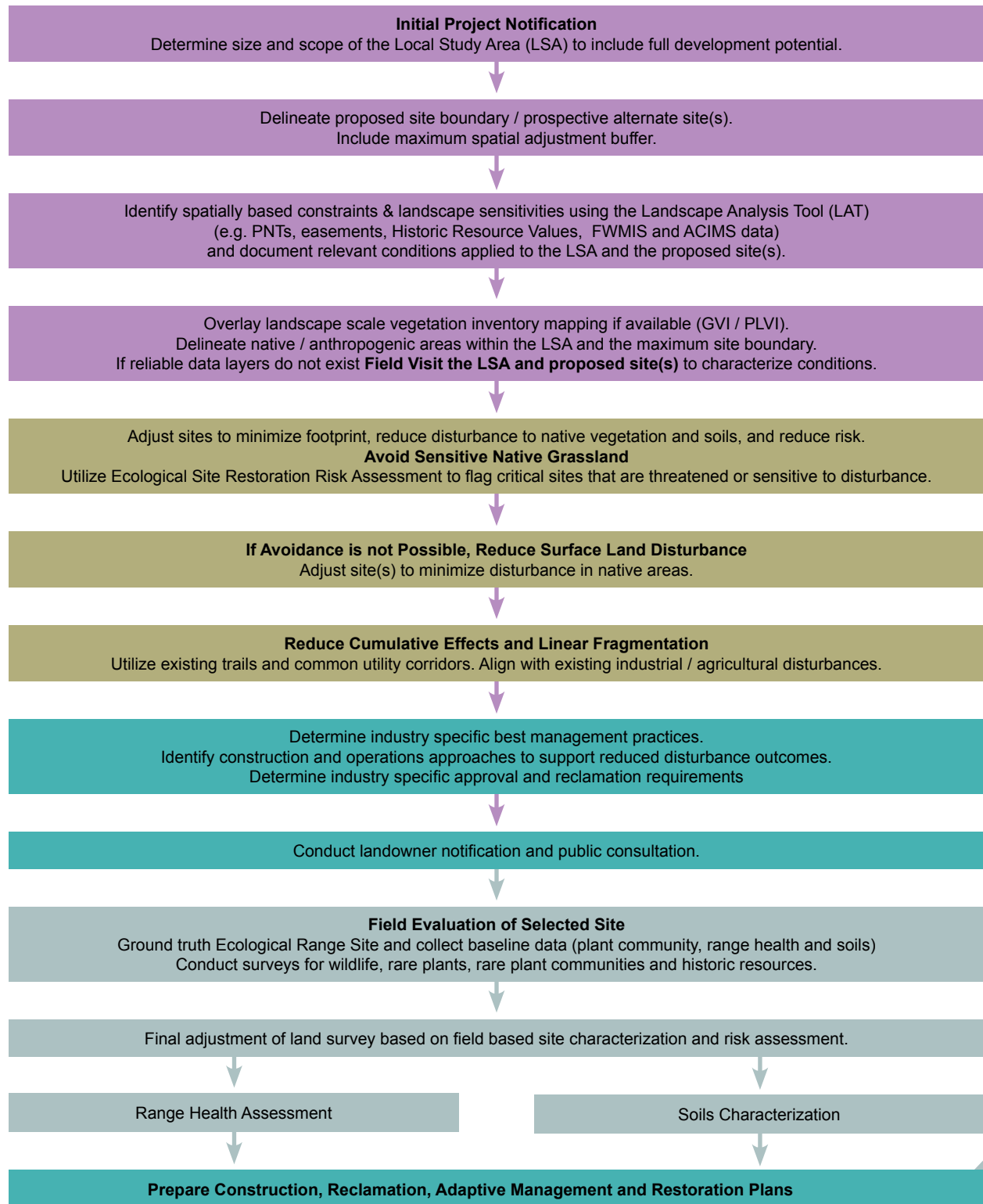


Figure 2 - Strategic Siting Risk Analysis Flow Chart for Native Grassland Communities

## Planning and Siting

Note: The intent of the desktop review is to capture as many planning variables as possible to limit re-siting at the field verification step. However, the field verification may prompt you back to siting, adjusting the BMP and construction approach or any other previous step.

### **5.1.2 Conduct an Environmental Risk Analysis (Field Level)**

An environmental risk analysis provides a process for determining the most appropriate mitigation to reduce the impact of development. Typically this process includes minimal disturbance and the application of best management practices designed to reach the expected outcome of restoration over time. This process will support reducing the disturbance to native grassland and parkland by identifying development options and risks. The process includes field visit protocols to enable identification of unique features such as rare plants, wildlife species and habitats of special concern, water bodies, and historical resources. With field verification of previous tools mentioned in the siting process such as vegetation inventory and the Ecological Site Restoration Risk Analysis (ESRRA) tool outlined in 6.1.4, the process further refines physical limitations that could affect construction and restoration success.

## **5.2 If Avoidance is Not Possible, Reduce Surface Land Disturbance**

### **5.2.1 Reduce the Area of Surface Disturbance through Minimal Disturbance Construction Practices**

Reduce the area of surface disturbance through construction practices appropriate for conservation of soil resources; and that optimize potential recovery of the native plant community while allowing industrial activity to be constructed and operated safely. Examples include reducing topsoil stripping within the right-of-way to the trench line where appropriate when constructing pipelines, minimizing grading through route selection, and utilizing existing access trails during construction and operations.

Each industrial sector has its own opportunities for reducing surface disturbance and its own limitations regarding safe construction practices. Best practices appropriate for the industry should be developed in collaboration with GoA agencies and regulatory authorities and adhered to throughout project development.

### **5.2.2 Reduce Fragmentation of Prairie and Parkland Plant Communities and Wildlife Habitat Features throughout Project Planning and Development**

Fragmentation reduces the ability for native plant communities to recover from disturbance. Wildlife rely on connectivity of habitat features to complete their life cycles in the grassland and parkland landscapes. Avoid remnant areas of intact native grassland and parkland and key interconnecting wildlife corridors.

### 5.2.3 Soil Must Be Conserved and Replaced Where Minimal Disturbance Methods Cannot Be Used

Conservation of soils during construction, operation and final reclamation is a requirement under the *Environmental Protection and Enhancement Act* Conservation and Reclamation Regulation for all lands as defined as specified lands. Through the *Public Lands Act* and associated standards and conditions for formal dispositions, authorizations and approvals, soils conservation is also a requirement. Proper soil handling and stockpiling of topsoil and subsoil is required to ensure conservation through all phases of the project. This includes controlling soil loss from wind and water erosion. Erosion control measures should be considered when specifying construction methods, soil conservation during construction, interim stabilization of conserved soils during operations and final reclamation at abandonment.

### 5.2.4 Conserve Historical Resources

The undisturbed grassland and parkland areas of Alberta are rich in cultural resources. Alberta Culture and Tourism evaluates and coordinates the review of land based development proposals that potentially impact historic resources such as archaeological resources, paleontological resources, historic sites or structures and Indigenous traditional use site(s) considered as historic resources under the Historical Resources Act (Province of Alberta 2013).

The Act gives the Minister of Alberta Culture and Tourism the authority for the orderly development, preservation, study, interpretation, and promotion of appreciation for Alberta's historic resources. The Act provides a means to achieve these goals through a variety of mechanisms, including requiring developers to conduct studies on potential impacts of their development on historic resources. These studies ensure appropriate consideration of historic resources during land use planning activities for developments within the Province.

The Act applies to all developments in Alberta on both public and private lands, except land under federal authority. Sections 31, 32 and 37(2) within the Act are important for developers (Province of Alberta 2013).

Land use planners work closely with areas of expertise within Alberta Culture and Tourism, federal, provincial and municipal approval authorities, and industry to ensure a timely review of development proposals. Comprehensive land use planning guides this process for historic resources (Alberta Culture and Tourism website accessed April 8, 2016).

## 5.3 Reduce Cumulative Impacts

Effective planning and implementation of post construction recovery strategies by all industrial sectors are necessary to retain and maintain native plant community biodiversity, health and resilience. A cumulative effects approach to land management will encourage restoration of existing footprint and minimize new footprint (Neville et al. 2014).

### 5.3.1 Align Project Development with the Alberta Wetland Policy

The Alberta Wetland Policy provides the strategic direction and tools required to make informed management decisions in the long-term interest of Albertans. The policy endeavors to minimize loss and degradation of wetlands, while accommodating continued growth and economic development in the province.

The goal of the Alberta Wetland Policy is to conserve, restore, protect, and manage Alberta's wetlands to sustain the benefits they provide to the environment, society, and economy. To achieve this goal, the policy focuses on the following outcomes:

- 1) Wetlands of the highest value are protected for the long-term benefit of all Albertans.
- 2) Wetlands and their benefits are conserved and restored in areas where losses have been high.
- 3) Wetlands are managed by avoiding, minimizing, and if necessary, replacing lost wetland value.
- 4) Wetland management considers regional context.

Where development activities have the potential to impact wetlands, the wetland policy promotes avoidance and minimization, as the preferred courses of action. Where impacts cannot be avoided or minimized, and permanent wetland loss is incurred, wetland replacement is required. The amount of wetland replacement required will reflect differences in relative wetland value (GoA 2013c).

### 5.3.2 Align Project Development with Regional Plans

Cumulative effects management is a component of regional planning in the Grassland and Parkland Natural Regions.

Regional planning initiatives under the Alberta Land Use Framework (LUF) provides new policy direction to maintain intact native grassland valued not only for its traditional value as grazing lands but also for biodiversity, watershed protection, carbon storage, recreation and habitat for wildlife including species at risk.

For example, the **South Saskatchewan Regional Plan** (GoA 2014a) is the first plan that specifically creates policy tools to conserve native grassland and to manage cumulative effects. Policy direction and management intent are provided through the following provisions of the regional plan for the South Saskatchewan Region. The following examples are to illustrate policy tools; the original plan should be consulted for full details.

- *Public Lands Act* (Province of Alberta, 2000) and Public Lands Administration Regulation (Province of Alberta, 2011) – Provides for the setting of land disturbance standards and land conservation tools in support of biodiversity management.

## Planning and Siting

- In the grasslands, the overarching management intent is to create an interconnected network of conservation areas on public land and conservation efforts on private land to sustain and improve overall habitat connectivity for grassland species.

The South Saskatchewan Regional Plan also describes the elements of a cumulative effects management system (CEMS) as follows:

- **Outcome-based** – guided by clearly defined environmental outcomes;
- **Place-based** – guided by the specific priorities of regions and subregions;
- **Knowledge-based** – system is guided by science based learning and monitoring;
- **Adaptive** – adaptation of land use practices is required to achieve desired outcomes;
- **Shared stewardship** – collaboration is required to inform development outcomes and practices and to build commitment for shared responsibilities.

### 5.3.3 Consider All Components of Full Development Potential

Consider all components of the development including requirements for future upgrades to transportation or utilities corridors. Consult, cooperate and coordinate with other land users and managers to reduce additional surface disturbance within the project area.

Examples include:

- access management plans where existing prairie trails are used by multiple industrial users which share responsibility for access control and maintenance;
- common utility corridors where appropriate for reducing footprint and cumulative impact; and
- aligning surface disturbances as close to existing industrial or agricultural disturbances as possible.

### 5.3.4 Manage for no net loss of native grasslands

Impacts to native plant communities may appear to be insignificant in the course of a year or two, but viewed cumulatively over time result in significant alteration and degradation of plant community health and function and ecological services. This phenomenon has given rise to three important approaches for the goal of this guideline:

- restore the pre-disturbance native plant communities and wildlife habitat potential soon after the site activity has ended. Abandoned facilities and un-reclaimed disturbances are an ecological liability in terms of cumulative effects management;

## Planning and Siting

- progressively reclaim in those grassland, especially in those that are subject to rapid re-colonization by invasive species. Without effective re-vegetation treatments, invasive species may permanently establish on the disturbance preventing the desired native plant community from recovering. Progressive reclamation should also provide more cost effective results by reducing costly efforts to remove established invasive species in the final stages of the project; and
- offset progressive impacts that may come with development. The goal is to maintain the functional balance of the native grasslands; offsetting losses due to development with grassland reclamation, mitigation, and restorations efforts, so that the total acreage of native grasslands in a region or district does not decrease, but remains more or less constant;

## Construction and Operations

### 5.4 Schedule Activities to Reduce the Impact to Soils, Native Plant Communities, Wildlife, Wetlands and Watercourses

Scheduling of activities, specific to the region and/or environmental sensitivity can greatly reduce impacts to soils, native plant communities, wildlife, wetlands and watercourses.

#### 5.4.1 Schedule Construction Activities during Dry and /or Frozen Ground Conditions

Effective scheduling of minimal disturbance construction activities is specific to the local Natural Subregion's climate and moisture regimes. In the Dry Mixedgrass, Mixedgrass, Central Parkland and Northern Fescue Natural Subregions scheduling construction activities during dry and/or frozen ground conditions reduces impact to the undisturbed soils. These subregions typically don't have chinooks, so typical winter months apply for frozen ground conditions. However, during dry moisture conditions, especially in sandy soils, the implementation of erosion control measures and traffic control may be required to prevent pulverization of soils.

The Foothills Fescue, Foothills Parkland, and Montane Natural Subregions are prone to chinook winds that can cause rapid thawing of soils. On public lands, construction in Fescue grasslands must follow strict timing restrictions during key chinook periods. For example the Integrated Standards and Guidelines 2013, indicates no construction between Dec16th to July 31st on fescue grasslands. At the time of release of this document, the Standards and Conditions for public lands were in the process of being updated, to require avoidance of all native grasslands in chinook prone subregions, during the above time period.

Lastly, where ever possible, the scheduling of construction activities when native plant communities are dormant increases restoration success.

Construction  
and  
Operations**5.4.2 Time soil handing to minimize losses**

Where soil disturbance is necessary, the timing of topsoil stripping and replacement can have a dramatic effect on the success of the restoration strategy. Soil handling in the fall, after the seed set of most species, is often the more successful time of the year. It is important to reduce the timeframe between topsoil stripping and replacement. It is also important not to re-disturb an area left to recover naturally. Ideally topsoil stripping and replacement should occur when the native vegetation is dormant within the same year and before the next growing season (Kestrel Research Inc. and Gramineae Services Ltd. 2011).

## Reclamation

**5.5 Incorporate Native Plant Community Restoration Planning in All Phases of Development Activity**

Reclamation practices following industrial disturbance in native grassland landscapes have been steadily evolving since the early 1980s. Over time the focus of reclamation practices in native grassland has shifted from controlling soil erosion and establishing sustainable grass cover, to the restoration of native plant community structure, health and function. This need for a shift in focus from reclamation to restoration was acknowledged in the *2010 Reclamation Criteria for Wellsites and Associated Facilities in Native Grasslands* (ESRD 2013). A key component enabling this shift was development planning utilizing a pre-disturbance assessment and implementation procedures designed to facilitate a restoration outcome specific to the pre-disturbance ecological range site.

Restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (SER 2004). The goal for restoration of industrial disturbances in native grassland or parkland ecosystems is to re-establish mature native plant communities that are suited to the ecological range site and are equivalent in composition, structure and successional stage to the surrounding native grassland or parkland. The process of recovery evolves over time through initial establishment through several successional stages as ecosystem processes redevelop and species composition and structure matures (Kestrel Research Inc. and Gramineae Services Ltd. 2011).

It is important to understand the location of the project area and ecological range site within the Natural Subregion context. The Natural Regions and Subregions of Alberta (Natural Regions Committee 2006) ecological classification and mapping assists reclamation practitioners with understanding the Natural Region context of restoration opportunities and limitations. Each Natural Subregion is unique in climate, landscape, soils, and native plant communities. Maps detailing the Grassland and Parkland Natural Regions and the Montane Natural Subregions are included as Figure 1.

## Reclamation

**5.5.1 Choose the Appropriate Recovery Strategy**

The Recovery Strategies Project was developed to support the intent of the *2010 Reclamation Criteria for Well Sites and Associated Facilities in Native Grasslands* (ESRD 2013) to provide guidance for reclamation strategies specific to ecological range site for practitioners, contractors, landowners and Government of Alberta regulatory authorities. The project compiles a literature review, a field component based long term monitoring, and data analysis. The outcome is the production of a manual for each of the Grassland and Parkland Natural Subregions.

The strategies presented in each manual are not intended to be prescriptive, but rather strive to present options and pathways to enable selection of the most appropriate recovery strategy for the type of industrial disturbance on a site specific basis. Their purpose is to provide the expectations of what is required to reach the outcome of restoration over time.

**5.5.2 Define Expectations for the Timeframe for Recovery**

It is important to define for the project management team, early in project development, the timeframe for the process of recovery and restoration. This will allow budgets to be defined including the necessary funds for adaptive management and monitoring.

The timeframe for recovery will vary depending on the size of the disturbance, recovery strategy used, and site specific conditions of the ecological range site where disturbance has occurred (climate, presence of invasive species, grazing pressure and range health). For example, if the surrounding area has a low range health score, the proposed site has a sensitive species such as rough fescue, or it is located in a moist/loamy range site, recovery may be slow (e.g. 15-20 years for rough fescue communities). Patience is required to allow natural successional processes to take place.

**5.6 Monitoring Reclamation and Reporting Results is Critical to Improved Performance**

Implement an effective monitoring program to ensure that reclamation objectives are met. Erosion control, re-vegetation success and sustainability, and invasive non-native plant management are considered key components of any monitoring program. Long-term monitoring of the re-vegetated areas should be conducted until the appropriate native plant community has been re-established.

**5.6.1 Use Standardized Methodology to Measure Success**

Utilizing standardized monitoring methods and data collection provides the opportunity for:

- continual improvement in reducing the impact of industrial activity on native grassland and parkland ecosystems, and
- increasing restoration success.



## Reclamation

### 5.6.2 Retain Records and Data for Long-Term Monitoring

Keep accurate records during construction and reclamation regarding the efficacy of the best management practices and mitigation methods implemented. These records are useful in implementing site specific restoration monitoring. Retain all records until the site/project has been reclaimed and transfer records if a change of ownership occurs.

Keeping detailed records of post-construction weed control and invasive non-native species management allows for accurate evaluation of the success of products and methods used. Furthermore, it facilitates research and development of new methods and products.

Note: Sharing monitoring data and results across industry sectors increases the opportunity for continued improvement.

## All Project Phases

### 5.7 Retain Professional Environmental Specialists to Facilitate the Resolution of Problems

Professional environmental specialists conduct site assessments, assist with site and route selection, develop appropriate mitigation plans, and monitor construction and reclamation activities. These specialists provide direction if problems arise and are qualified to complete follow-up monitoring programs specified in the initial application process, by regulatory agencies in the approval process, or by land administrators, or landowners/occupants. It is important to retain specialists with field based experience in native grassland landscapes, who are familiar with the principles, guidelines and best management practices for minimizing the disturbance of industrial activity.

#### 5.7.1 Ensure Environmental Specialists Are Qualified

Select specialists who have experience with native prairie and parkland development issues and minimal disturbance principles and guidelines. Most projects will require a team of specialists during the project planning phase. Knowledge of industry specific minimal disturbance best management practices is important.

### 5.8 Conduct a Public Consultation Program Appropriate to the Scale of the Project

Minimizing disturbance on native grassland landscapes is the shared responsibility of the appropriate land management agency or regulator, the surface lease holder or landowner, and the industry representative.

The responsibility for identifying the presence of native grassland and the subsequent application of these guidelines is the responsibility of the developer. Proponents of development are strongly encouraged to contact landowners, lease holders, and representatives of the public land management agencies (see Appendix A) to determine if native grassland is present in areas where development is proposed.

## All Project Phases

Native grassland and parkland landscapes are shared with livestock producers, who depend on native grassland resources for their livelihood. Grazing management is an integral factor in the maintenance of healthy native grasslands. Consultation with the landowner or land manager throughout the life of the project can benefit all parties.

For example, grasslands in the Central Parkland Subregion are found within a mosaic of shrublands and deciduous forests. Currently, mapping in these areas is not detailed enough to consistently capture these. It is the responsibility of the developer to assume that all grasslands are native and plan accordingly unless detailed surveys or mapping indicate otherwise. This should occur at the very beginning of planning and in consultation with the landowner, leaseholder and/or land management agency.

#### **5.8.1 Implement Industry Specific Consultation Requirements**

Different projects may require different consultation requirements. These should be reviewed prior to beginning consultation planning.

#### **5.8.2 Expand Consultation to Local Government Before Application**

Early consultation with affected municipalities can provide input into development planning. The Special Areas is unique in that it is the largest area of Dry Mixedgrass, Mixedgrass and Northern Fescue grasslands in Alberta. Special Areas has processes and guidelines for development approval at [www.specialareas.ab.ca](http://www.specialareas.ab.ca).

#### **5.8.3 Consider the Input of Interested Stakeholders**

Native grassland and parkland landscapes are valued for their aesthetic appeal and recreational value. Landowner groups, conservation groups with special interest in Species at Risk, and organizations with recreational interests are often very interested in proposed development. Early consultation with these groups provides an opportunity for their interests to be considered during development planning.

#### **5.8.4 Follow Indigenous Consultation Procedures**

The Consultation and Land Claims division in Alberta Indigenous Relations manages and oversees all substantive aspects of the First Nations and Metis Settlements consultation processes, including:

- Pre-consultation assessment
- Management and execution of the consultation process
- Assessment of consultation adequacy

Consultation is a process intended to help parties understand and consider the potential adverse impacts of anticipated Crown decisions on the continued exercise of First Nations' Treaty rights or traditional uses, and Metis Settlement members' harvesting or traditional use activities. When considering proposals regarding land and resource management, the Government of Alberta may

## All Project Phases

delegate procedural aspects of consultation to another party, such as the project proponent. Proponents may include industry, municipal government or any other organization or individual requiring a provincial approval. Consultation with First Nations is triggered when the GoA is contemplating a decision that has the potential to adversely impact the exercise of Treaty rights or traditional uses. Similarly, consultation with Metis Settlements is triggered when the GoA is contemplating a decision and has a knowledge of the potential for that decision to have an adverse impact on their members' harvesting or traditional use activities. Proponents are encouraged to review the Government of Alberta's current [Indigenous consultation policies and guidelines](#) and associated [Proponent Guide](#) to gain a deeper understanding of Alberta's consultation requirements and procedures.

### 5.9 Convey Corporate and Government Commitment to Minimal Disturbance to All Staff and Contractors through Education and Training

Informed and committed personnel are an integral element of any strategy to avoid or reduce disturbance of native grassland or parkland landscapes.

#### 5.9.1 Develop an Environmental Protection and Reclamation Plan Designed to Reduce the Impacts Identified

Detailed pre-development planning can reduce environmental impacts, reduce costs for site reclamation, and decrease the risk of incurring environmental liability. Both the construction and operations components of a project, as well as access and site management plans, should be carefully thought out and implemented to reduce disturbance. This should include contingency measures for unforeseen circumstances.

Ensure the environmental protection and reclamation plan is included in the construction bid process and is appended to project management and construction contract documents.

Retain qualified and experienced environmental inspection during construction, reclamation and restoration monitoring and reporting to ensure the mitigation strategies are followed and terms and conditions of approval are adhered to.

#### 5.9.2 Provide Education and Training

The corporate proponent of a project should provide education and training regarding native grassland and parkland issues to staff involved in all phases of the project. It is the shared responsibility of everyone involved in a project to ensure that environmental protection values are well communicated, understood, and implemented. It is therefore critical that staff and contractors be aware of and adhere to operational policies that reduce disturbance.

#### 5.9.3 Retain Informed and Experienced Contractors

Informed construction contractors, with experience in native grassland and parkland environments that understand the principles and guidelines of minimal disturbance can be a valuable asset to development projects.

## 6.0 Tools

A number of restoration **Tools** have been developed by GoA agencies to assist industry in minimizing project related environmental impacts in native grassland and parkland landscapes.

The tools have been broken into sections by project phase. However, these tools may be applicable to more than one guideline, as well as more than one phase of a project.

The restoration tools are revised and upgraded on a regular basis and the reader is advised to check for the most recent version posted on the internet.

### Planning and Siting

#### 6.1 Alberta's Regional Ecological Land Classification System

The first step in restoration planning requires an understanding of Alberta's regional ecological land classification system. The Natural Regions and Subregions of Alberta have provided the provincial ecological context within which resource management activities have been planned and implemented for many years. The current revision entitled "*Natural Regions and Subregions of Alberta*" (Natural Regions Committee 2006) builds on two previous classifications: *Ecoregions of Alberta* (Strong and Leggat 1992) and *Natural Regions and Subregions and Natural History Themes of Alberta* (Achuff 1994).

It is important to understand the ecological diversity of the Grassland, Parkland, and the Montane Natural Subregion, and the unique restoration challenges offered in each. The Natural Subregion dichotomy is the first level of ecological classification in Alberta and assists practitioners with the understanding of restoration opportunities and limitations within the Subregion context.

#### 6.2 Range Plant Community Guides

Many tools are designed with a Natural Subregion context, as well as Range Plant Community Guides. These guides are an essential reference for identifying common plant communities and conducting range health assessments in the Grassland and Parkland Natural Regions and Subregions of Alberta. The guides provide plant community descriptions by ecological range site, which can be linked to the GVI site types where this data is available. The plant community that is an expression of site potential is referred to as the reference plant community, as it represents the potential natural community for comparison in range health assessment. The plant community guides have been compiled from data collected from both detailed vegetation inventories and an extensive system of reference areas established across the province by the AEP Range Resource Management Program (RRMP). The guides are updated on a regular basis as new data is gathered and made available in PDF format on the AEP website at the links below. To access the guides, search for "Range Plant Community Guides" at: [www.aep.alberta.ca](http://www.aep.alberta.ca). Hard copies can be purchased from the Foothills Restoration Forum.

### 6.3 Vegetation / Soil Inventories

Vegetation Inventories are comprehensive biophysical, vegetation and anthropogenic inventory of the Grassland Natural Region. They can be used as a coarse filter in the planning phase to locate native grassland areas, in contrast to cultivation or other anthropogenic features.

Currently the Central Parkland is limited in detailed inventories. A new spatial layer is being developed for the Landscape Analysis Tool that will provide a coarse filter for this region, but has not been released at the time of this publication. In these cases where there is very little spatial data, a field survey of the site should be part of the process early on to quantify the ecological ranges site, soils, and vegetation composition; resulting in early identification of any constraints present on site.

The **Grassland Vegetation Inventory (GVI)** was developed by the GoA and the Prairie Conservation Forum and covers the extent of the grassland natural region. It provides mapped information of landscape scale soil/landform features and vegetation cover for use in planning and management of rangelands, fish and wildlife, wetlands, land use and reclamation. It also includes a coarse hydrological feature layer. GVI is comprised of ecological range sites based on landform, soils and vegetation information for areas of native vegetation and general land use for non-native areas (agricultural, industrial, and urban areas).

- A user manual entitled “*Specifications for the Use and Capture of Grassland Vegetation Inventory (GVI) Data 5th Edition*” (Alberta Sustainable Resource Development and LandWise Inc. 2011) is available on the web.
- GVI data is available either by contacting the Resource Information Management Branch Data Distribution (within AEP) or obtaining website information available in Appendix A.

The **Primary Land Vegetation Inventory (PLVI)** is another inventory created by the GoA with the intent to cover land not already covered by GVI or Alberta’s forest inventory mapping (Alberta Vegetation Inventory). PLVI mainly covers the forested areas of the province, but is coarser in forest inventory detail than AVI. It is similar in resolution as GVI and has been found quite useful in inventorying land that is the transition to forested areas such as the Central Parkland. Currently PLVI covers some patches in the east Central Parkland, but the plan is to expand throughout its entirety.

- PLVI data is available through a data request from AEP’s Resource Information Management Branch Data Distribution Unit. A similar inventory for the Parkland Natural Area, Parkland Vegetation Inventory (PVI) is in progress. For further information regarding coverage contact AEP.

## Planning and Siting

Lastly, the **Agriculture Region of Alberta Soil Information Database Version 3.0** (AGRASID 3.0) provides a 1:100,000 scale inventory of the soils for the white area of the Province. Both the Grassland and Parkland Areas are covered by AGRASID.

- AGRASID is available to all by downloading the GIS coverage online.

### 6.4 Ecological Site Restoration Risk Analysis (ESRRA)

This tool can be used to complement vegetation inventory information by providing a pathway for determining the ability of the components of an ecological range site to recover from the direct impact of industrial activity (ASRD 2009). This involves an understanding of the characteristics of the site, soils, landscape type, moisture regime and associated plant community. The ESRRA report, prepared by AEP – RRMP in consultation with Rangeland Agrologists and Land Use Specialists can be found in the information portal on the Foothills Restoration Forum website at: <http://www.foothillsrestorationforum.ca>.

### 6.5 The Landscape Analysis Tool

The **Landscape Analysis Tool (LAT)** is a web enabled geospatial mapping tool designed to assist with the identification of base and sensitive features and how they interact with a proposed land location and activity being considered for development on public land. The LAT allows users the ability to map and view their proposed projects, identify areas of concern and in doing so make planning and location adjustments. The LAT generates reports (LAT Reports) for project applications which is a requirement of the Enhanced Approval Process application (GoA 2013a).

To ensure the LAT is used effectively, users should perform the following:

- Ensure activities are located outside of sensitive areas when possible or as required by the standard or condition,
- Review the *Desired Outcomes and Best Management Practices within the Integrated Standards and Guidelines* (GoA 2013b) document to assist in the placement of activities,
- When satisfied with the placement of activities, users should review the generated LAT Report for the assigned conditions and ensure that they are able to meet these based on the proposed activity,
- To better meet applicable standards, users should be encouraged to experiment with the location, sizing and orientation of the activity to avoid or better align with sensitive features, and
- The user must ensure that prior to application, the LAT Report and standards and conditions are understood.

## Planning and Siting

Although the LAT does identify many interactions between the proposed activity and certain features, applicants must still ensure the requirements of any associated reservations, notations, Integrated Resource Plans, Public Land Use Zones and other regulatory requirements are met.

### 6.6 Public Land Protective Dispositions

In order for a disposition to be approved on public land, an applicant must produce and provide a **land standing report**. This report lists all dispositions that occur on the land within the application area. It is the responsibility of the person making a new application to ascertain and review current dispositions, including reservations and to ensure their planned activity is compatible and allowed.

**Protective Notations (PNTs)** are placed by government agencies in consultation with public land managers. They identify land and resources that are managed to achieve particular land use or conservation objectives and in the hierarchy of reservations, represent reservations with a high degree of sensitivity, value or need for conservation. PNTs identify the agency that has placed the reservation, indicate allowable land uses and may give management guidelines for integrating different uses on the land, where applicable.

Many of the areas where fescue grasslands occur have been identified by a Protective Notation. Fescue grasslands are defined as the native grassland communities associated with the black and to a lesser extent, dark brown grassland soils of Alberta that are located within the Foothills Fescue, Northern Fescue, Central Parkland, Foothills Parkland, Montane and Subalpine Natural Subregions.

The GoA has placed Protective Notations on mesic foothills rough fescue (*Festuca campestris*) grasslands to alert industry to the sensitive nature of these grasslands. Once disturbed these grasslands are **very difficult** to restore. *Industrial Activity in Foothills Fescue Grasslands – Guidelines for Minimizing Surface Disturbance* (ASRD 2010) provides information and guidelines to reduce disturbance in these sensitive grasslands.

### 6.7 Conservation Easements

Conservation Easements are becoming more common on freehold lands in native grassland and parkland areas and denote lands with high conservation value for biodiversity. Examples include the Nature Conservancy of Canada (NCC) and the Alberta Conservation Association (ACA). Conservation easements appear on land titles. Notification and consultation is recommended and specific guidelines for development activity may apply.

## Planning and Siting

### 6.8 Alberta Conservation Information Management System (ACIMS)

ACIMS is a data centre that provides biodiversity information on Alberta's species, natural ecological communities and sites. Information about the location, condition, status and trends of selected elements is collected, updated, analyzed and disseminated. ACIMS can provide a coarse filter of sensitive features within the project area early in the planning phase. Combined with GVI, ACIMS provides a useful tool for avoiding sensitive features within the proposed project landscape.

### 6.9 Online Permitting and Clearance (OPAC) system

In order to comply with the *Historical Resources Act*, proponents and agents need to consult with Alberta Culture and Tourism prior to the onset of development activities. Project details must be provided to Alberta Culture and Tourism in a Historic Resources Application submitted through the OPAC system.

### 6.10 Fisheries and Wildlife Management Information System (FWMIS)

FWMIS is the GoA's Fisheries and Wildlife database. FWMIS provides a central repository for which government, industry, and the public can store and access extensive and reliable fish and wildlife inventory data.

### 6.11 Species at Risk Information

Species at risk habitat protection information can be located in both the EAP-LAT map layers and Protective Notations to identify key wildlife zones. Additional information on Species at Risk can be found on the AEP website. Included are:

- Detailed status reports
- Fact sheets and profiles
- Management plans
- Recovery plans
- Species at Risk program reports
- Wild species general information

NOTE: The Emergency Order for the Protection of the Greater Sage-grouse under the federal Species at Risk Act came into force on February 18, 2014 and provides restrictions on activities within the described greater sage grouse range. This range overlaps with large areas of native grasslands and needs to be considered when proposing development in the area.

For more information on the Order, please contact: Canadian Wildlife Service, Environment and Climate Change Canada  
Email: [Enviroinfo@ec.gc.ca](mailto:Enviroinfo@ec.gc.ca) Tel: 1 800 668-6767

The Emergency Order can be viewed here:  
[www.registrelp-sararegistry.gc.ca/document/default\\_e.cfm?documentID=1736](http://www.registrelp-sararegistry.gc.ca/document/default_e.cfm?documentID=1736)



## Planning and Siting

### 6.12 Range Health Assessment protocol and the Range Health Assessment Field Workbook

This protocol and associated workbook were developed by the AEP – RRMP and have been used to assess, monitor and manage Alberta’s rangeland since 2003. Range health is defined as the ability of rangeland to perform certain key functions. These functions include: net primary production, maintenance of soil/site stability, capture and beneficial release of water, nutrient and energy cycling, and functional diversity of plant species. The assessment approach builds on the traditional range condition concept that considers plant community type in relation to site potential, but adds new and important indicators of natural processes and functions. The methodology provides a visual system that allows users to readily see changes in range health and to provide early warning when management changes are needed. Understanding range health is an important component of a restoration risk assessment. In the context of reclamation after disturbance, they provide a measure of native plant community recovery. The Range Health Assessment field workbooks are provided to participants of range health assessment training courses.

### 6.13 Riparian Health Assessment and Riparian Health Assessment Field Workbooks

These workbooks were developed by GoA and are used to evaluate the riparian health of stream and small rivers (Fitch et al. 2009) and the riparian health of lakes, sloughs and wetlands (Ambrose et al. 2009). The field workbooks are available through the Cows and Fish program and are provided to participants of training courses offered through Cows and Fish.

### 6.14 Sensitive Species Inventory Guidelines (GoA 2013d)

Guidelines for conducting wildlife surveys are contained in this document. The guidelines provide direction for survey planning, conducting wildlife surveys, data analysis and reporting.

### 6.15 Alberta Native Plant Council Guidelines for Rare Vascular Plant Surveys in Alberta - 2012 Update (ANPC 2012)

This document provides direction for surveys for rare vascular plants. The associated document *Recommended Documents for Botanical Surveys in Areas of Proposed Development* (ANPC 2010) provides direction regarding surveys for rare ecological communities, rare non-vascular plants (mosses, liverworts and hornworts) or rare lichens.

### 6.16 Industrial Activity in Foothills Fescue Grasslands (ASRD 2010)

This document provides guidelines specific to industrial disturbance in foothills rough fescue grasslands.

Planning and Siting

**6.17 Industrial Activities in Central Parkland and Northern Fescue Native Grasslands - Strategies for Minimizing Disturbance (AEP 2016)**

This document provides guidelines and tools specific to industrial disturbance in native grasslands found within the Central Parkland and Northern Fescue Natural Subregions. It was developed concurrently with a complementary document *Reclamation Practices in the Central Parkland and Northern Fescue Natural Subregions: A Literature Review* by Peggy Desserud (Desserud 2016).

Current links to these tools are available online.  
Links are listed in Appendix A; or use Keyword Search.

Construction and Operations

**6.18 Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta (GoA 2011)**

This document contains guidelines designed to help land users minimize, or avoid, potential adverse effects on selected wildlife and wildlife resources when conducting activities on public and private lands within the Grassland and Parkland natural regions of Alberta.

Reclamation

**6.19 Recovery Strategies for Industrial Development in Native Prairie, by Native Grassland Subregion**

These documents have been completed for the Dry Mixed Grass, Mixed Grass and Northern Fescue Subregions and the final edition for the Foothills Fescue Subregion is in progress. The documents provide guidance for reclamation strategies specific to the ecological range site, post-construction monitoring programs, adaptive management, and standardized data collection required to measure restoration success. The guidance is applicable to all Natural Subregions where grassland and/or parkland native plant communities are encountered.

## 6.20 Professional Responsibilities in Completion and Assurance of Reclamation and Remediation Work in Alberta - Joint Practice Standard (APEGGA 2007)

This document provides guidance for retaining qualified professionals for the project management team. The joint practice standard (APEGGA 2007) is intended to define the professional and ethical responsibilities of professional members in the completion and assurance of reclamation and remediation work in Alberta.

## 6.21 The Foothills Restoration Forum

The role of the FRF is to encourage and promote integrated research, information sharing, and to foster stewardship and education related to the reclamation and restoration of the native plant communities of the southern Eastern Slopes. Program activities also include focusing on the broader Grassland Natural Region.

The Foothills Restoration Forum offers range health assessment training for industry. The training offers a standardized method of measuring grassland plant community health and the ability to perform certain key functions within the landscape (Adams et al. 2009). Used during the pre-development site assessment, this tool provides a base for restoration planning and post construction monitoring. The Foothills Restoration Forum can be found at <http://www.foothillsrestorationforum.ca/>

## Appendix A – References & Additional Resources

### References

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All links listed in the Reference & Additional Resource Sections are current as of April 2016.  
Guidelines are available online; use keyword search if links are inactive.

## Additional Resources

Alberta Conservation Association (ACA): <http://www.ab-conservation.com>

Alberta Conservation Information Management System (ACIMS): <http://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-%28acims%29.aspx>

Alberta Culture: <http://culture.alberta.ca/heritage-and-museums/programs-and-services/land-use-planning/> and <http://culture.alberta.ca/heritage-and-museums/programs-and-services/opac/>

Alberta Institute of Agrologists (AIA): <http://www.albertaagrologists.ca/>

Alberta Utilities Commission (AUC): <http://www.auc.ab.ca>

Enhanced Approval Process (EAP) Manuals & Guides: <http://aep.alberta.ca/forms-maps-services/enhanced-approval-process/eap-manuals-guides/default.aspx>

EUB Information Letters: <http://www.aer.ca/rules-and-regulations/informational-letters>

First Nations Consultation: <http://www.aboriginal.alberta.ca/1.cfm>

Fish and Wildlife Management Information System (FWMIS): <http://aep.alberta.ca/fish-wildlife/fwmis/>

Foothills Restoration Forum: [www.foothillsrestorationforum.ca](http://www.foothillsrestorationforum.ca)

Glossary of Environmental Assessment Terms and Acronyms Used in Alberta Updated February 2010: <http://environment.gov.ab.ca/info/library/8003.pdf>

*Historical Resources Act* Clearance: <http://culture.alberta.ca/heritage-and-museums/programs-and-services/opac/>

Integrated Land Management: <http://aep.alberta.ca/lands-forests/integrated-land-management/default.aspx>

Integrated Resource Plans: <http://aep.alberta.ca/lands-forests/landuse-planning/integrated-resource-plans.aspx>

Landscape Analysis Tool (LAT): <http://aep.alberta.ca/forms-maps-services/industry-online-services/landscape-analysis-tool/landscape-analysis-tool.aspx>

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Nature Conservancy of Canada (NCC): <http://www.natureconservancy.ca>

Prairie Conservation Forum (PCF): [www.pcf.org](http://www.pcf.org)

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Provincial Wetland Policy, info and legislation: <http://www.wetlandsalberta.ca/policy/>

Range Health Assessment Protocol & Field Workbook: <http://aep.alberta.ca/lands-forests/grazing-range-management/range-health.aspx>

Range Plant Community Guides: <http://aep.alberta.ca/lands-forests/grazing-range-management/range-plant-community-guides-stocking-rates.aspx> or <http://www.foothillsrestorationforum.ca/range-plant-community-guides/>

Recovery Strategies: <http://www.foothillsrestorationforum.ca/recovery-strategies/>

Riparian Assessment and Field Workbooks: <http://cowsandfish.org/riparian/health.html>

Species at Risk: <http://aep.alberta.ca/fish-wildlife/species-at-risk/>