NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

OVERVIEW

Prepared for
Canada's Oil Sands Innovation Alliance (COSIA)

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EXECUTIVE SUMMARY

Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) has been progressing a suite of caribou recovery tools, one of which is the Caribou Predator Fencing Pilot project (the Pilot). A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus yearlings from within the fence to be moved outside to supplement the surrounding range population(s).

The objective of the Pilot project is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the northeast Alberta woodland caribou range and action plans. It is assumed that the Pilot would be funded by industry, championed by the GOA, and supported by the federal government.

Work conducted to advance predator fence design for the Pilot include: the identification of potential locations for a large predator fence exclosure (predator fence) or smaller maternal pen; investigation of potential fence designs; identification of anticipated regulatory requirements; and development of a strategy for stakeholder and regulatory engagement and implementation. The following reports have been completed to advance the Caribou Predator Fencing Pilot:

1. Preliminary Fence Design.
2. Regulatory Road Map, Strategy and Implementation Program.
3. Stakeholder Engagement Strategy.

The costs associated with this project for design, construction and implementation of the fence are as follows:

Fence Project Component	Cost	Contingency
Design	$600K - $900 K	30%
Construction	$2.5 - $5 million	30%
Implementation	$15 million	30%

These costs are discussed in greater detail in the sections below.

This document summarizes the content of the above noted reports that are attached as appendices to this Overview.

Preliminary Design

The desired technical and ecological outcome of the Pilot is to prove that the predator fence concept can contribute to boreal caribou population enhancement. Using a suite of ecological and technical criteria, eight areas of interest were identified in each of the four Lower Athabasca Region caribou ranges: West Side Athabasca River; East Side Athabasca River; Cold Lake; and Richardson. Four potential candidate areas in the East Side Athabasca River and Cold Lake caribou ranges were then selected for further analysis. These candidate areas were chosen because they are in the highest risk boreal caribou ranges in northeast Alberta, they are known to be used by caribou, and they provide better logistical access for piloting a predator fence. Two of the four potential candidate areas (one in East Side Athabasca River range and one in Cold Lake range) were identified as being the most technically suitable for the Pilot based on landscape characteristics and access considerations. Finally, example fence layouts that considered topographic features, access, other landscape level features and land use were developed.

Example predator fence layouts were developed for the four potential candidate areas to demonstrate how the Pilot would be implemented on the ground. The example fence layouts enclose an area of approximately 100 km^2 with a perimeter fence length of approximately 50 km and an estimated construction cost of $2.5 to $5 million, plus 30% contingency.[1] Example fence layouts were selected to:

- maximize use of existing all-weather transportation corridors (preferred) and other linear corridors for the fence line;
- minimize fence length;
- avoid crossings of navigable waterbodies;
- avoid crossings of railway lines and highways;
- minimize watercourse crossings;
- minimize length of wetlands (i.e., avoid organic surficial materials); and
- provide opportunities to be expanded.

Tenures and interests were not considered in the technical analysis, so potential candidate areas identified using technical and ecological criteria will need to be evaluated further. The perimeter fence-line layouts are intended to be advanced as working examples for discussion with tenure holders, regulators, Aboriginal groups, land users and other stakeholders in the regulatory approval and engagement process. This engagement and additional design work is intended to lead to selection of one preferred Pilot location and to ensure that all rights are respected.

Pilot Governance and Implementation Program

[1] This does not include costs for building all-weather road access along the predator fence perimeter in the event that this is required.

One of the conclusions of earlier conceptual design work was that a predator fence should be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government (Antoniuk et al. 2012). Ideally, this third-party Fence Management Team should involve one or more local Aboriginal community(s). Regardless of their background and experience, members of the third-party Fence Management Team need to be perceived as unbiased and qualified and should ideally be known to key stakeholders to help build support for the Pilot.

The implementation program discussion recommends that a third-party Fence Management Team be established as a legal entity for the Pilot in order to enter into agreements that carry financial and legal liability. There are a number of not-for-profit entities (i.e., company, corporation, society, association, or cooperative) that would be able to construct, own, and manage the Pilot predator fence to fulfill this requirement. A review of the advantages and disadvantages of different structures is beyond the scope of this preliminary design work, and will need to be completed by legal advisors to funders immediately following a decision to advance the Pilot.

The governance structure of not-for-profit companies, societies and associations, and cooperatives are dictated respectively by the *Companies Act, Societies Act,* and *Cooperatives Act.* A proposed Pilot governance model applicable to all potential organizational structures is provided. This includes:

- a Board of Directors composed of shareholders involved in the Pilot;
- a third-party Pilot Manager reporting to the Board and directing a Fence Management Team composed of employees, contractors, or secondees; and
- advisory Steering and Technical Committee(s) of representatives with interests in, or expertise on, Pilot construction and operation and ecology/wildlife management, to provide independent direction and feedback to the Fence Management Team.

Work completed to date for the Pilot has advanced the caribou predator fencing concept to preliminary design of four potential candidate areas in East Side Athabasca River and Cold Lake caribou ranges. Potential Pilot locations will need to be discussed and evaluated with a wide range of stakeholders, and this is expected to lead to modification of these candidates, or to identification of alternate candidates. The recommended Pilot implementation program involves five phases and associated activities:

- Pilot Definition
- Pilot Approvals and Planning
- Construction
- Operations
- Ten Year Program Review

Further work will be required prior to construction to implement the regulatory and stakeholder strategies, select a preferred location, prepare regulatory filings, and develop

detailed fence design and management plans that can be issued to a fencing contractor (estimated to require 12 to 18 months and $600K to $900K, plus 30% contingency). A key component of this will be engagement with tenure holders, regulators, Aboriginal groups, land users and other stakeholders with tenures or interests in potential candidate areas.

Ongoing effort will also be required during the Operations phase to monitor success, address evolving issues, and refine management plans so that an informed decision can be made following the Operations phase on whether to stop, continue or expand the Pilot fence. Detailed fence design, approvals, and management and monitoring costs over the 14 year Pilot design, construction and operations period are estimated to be $15 million (plus fence construction costs noted earlier and contingency factor of at least 30% because the Pilot site has not yet been selected).

A suite of desired technical and stakeholder outcomes and success metrics has been developed for the Approvals and Planning, Construction, and Operations phases to help guide Pilot implementation and monitoring. The discussion of outcomes and metrics is provided in Section 2.3 of this Overview report.

Regulatory Road Map and Strategy

The regulatory road map reviews provincial and federal legislation and policy that does or may apply to the Pilot (a regulatory road map), and proposes a regulatory strategy to obtain required approvals. The review concludes that the Pilot is a novel concept that from a construction and operation perspective is relatively simple and straightforward but from an ecological and stakeholder perspective is much more complex. This increases regulatory uncertainty and puts the Pilot at risk for onerous and extended review and consideration by regulators and stakeholders. Potential risks to wildlife and habitat inside the Pilot fence, the challenges of predator management and potential implications to tenure holders and land users are not trivial concerns and will need to be carefully assessed and managed by the proponent and by regulators.

The review of legislation and policy applicable to the Pilot makes clear that this project does not fit into an existing regulatory process that would provide schedule and consultation certainty for the proponent. While the regulatory review finds that a provincial or federal decision to require an environmental assessment is unlikely, uncertainty remains. As a result, the proposed regulatory strategy is for the Pilot proponent to proactively address these risks and concerns by engaging potential regulators and defining and guiding a process that meets known requirements and demonstrates that known and potential issues will be appropriately monitored and managed.

It is recommended that the proponent's Fence Management Team prepare a preliminary Pilot information package that can be used during engagement efforts. This document can be used to frame dialogue on the Pilot concept and preliminary design by proactively addressing anticipated questions and concerns and demonstrating that Pilot proponents have completed sufficient advance work to reduce risks and uncertainties to a level

acceptable to tenure holders, regulators, Aboriginal groups, and stakeholders. In this way, Pilot proponents can propose a suggested approach for regulating the Pilot with a comprehensive plan to support the strategy.

The preliminary Pilot information package should include an overview of specific management plans to transparently address known or anticipated issues. Development of these plans will demonstrate the management approach and contribute to efforts to secure tenure holder, regulatory, Aboriginal, and stakeholder support for the Pilot. Each management plan should be described in the preliminary Pilot information package in sufficient detail to demonstrate adequate risk management during construction, operation and decommissioning of the Pilot. Tenure holder, GOA, Aboriginal and stakeholder input on these plans will be sought and incorporated during the Pilot Approvals and Planning, Construction, and Operations phases as appropriate.

Stakeholder Engagement

A recommended stakeholder engagement strategy is provided, reflecting the view that proponents are committed to working with stakeholders by keeping them informed and engaged during all phases of the Pilot. Building strong relationships with stakeholders through collaboration and consultation is crucial for Pilot success and will result in enhanced project decisions.

The objectives of the stakeholder engagement strategy are to:

- provide accurate, consistent and timely information regarding the Pilot to interested tenure holders, stakeholders, Aboriginal groups, and the general public;
- obtain stakeholder feedback on the Pilot, including candidate sites, potential issues and sensitivities towards the project;
- work with interested tenure holders, stakeholders, and Aboriginal groups to ensure potential issues are fully understood and appropriately managed;
- facilitate meaningful involvement with interested tenure holders, stakeholders and Aboriginal groups that identifies common ground for action and innovative solutions; and
- work with interested tenure holders, stakeholders and Aboriginal groups to implement agreed upon decisions and approach.

A critical activity early in project definition will be to identify who will manage and implement the stakeholder engagement strategy. The Pilot is expected to be funded by industry, championed by GOA and implemented by an independent third-party so it will be essential that the roles and responsibilities of these three groups and their representatives be clearly established. Given that a number of companies operate within the candidate sites and have developed strong relationships with key stakeholders over the years, these companies and their engagement specialists may have significant roles in the engagement process.

A recommended stakeholder engagement process is described to support the Pilot design process as well as the recommended regulatory strategy and implementation program. The process focuses on issues identification and management, use of informative and consistent communication materials, and identification of appropriate engagement approaches. Key is the ability of the Fence Management Team and engagement specialists to work with stakeholders to not only identify interests, issues and concerns, but also to fine tune the engagement methods that will best work for them for effective collaboration. A flexible approach is critical to managing and executing a successful tenure holder, Aboriginal and stakeholder engagement strategy and plan.

GLOSSARY

Captive Breeding – the deliberate capture and rearing of wild animals in captivity to prevent extirpation or extinction of a species. "Captive populations need to be founded and managed according to sound scientific principles for the primary purpose of securing the survival of species through stable, self-sustaining captive populations. Stable captive populations preserve the options of a range of conservation translocations to support wildlife conservation and management" (IUCN 1987).

Maternal Pen(ning) – a wildlife conservation action that has been used (< 10 times in western Canada) to temporarily protect caribou cows and newborn calves from predation. Adult females are live captured from the wild during late winter (i.e., during the last trimester of pregnancy) and maintained in a small predator-free enclosure (~10 ha) that is situated within the population's current range. The cows and their captive-born calves (i.e., born in the enclosure) are held, with free access to feed and water for a period of several weeks to months after parturition until they are released back in to the wild. A key rationale for maternal penning is that predation of young calves is a key limiting factor affecting the growth of the population.

Predator Fence [Exclosure] – is a conservation approach that establishes and maintains small breeding subpopulations of caribou in large fenced enclosures within its original range. "Predator exclusion fences are erected to enclose large areas (100's -1000 km^2) that house 40-50 female caribou plus a small number of males required for breeding. The fence would be designed to exclude wolves and bears. Upon establishment of the fence, all wolves and bears are removed as are all deer and moose (required to prevent rapid population increase in the absence of predation). Female caribou are captured from the surrounding range and transported into the enclosure where they remain for multiple years. The size of the fenced area is such that caribou inside can gain most/all of their nutritional needs from natural forage (supplemental feeding will also be conducted if necessary). Calves born to the females remain in the enclosure until one year of age when they are captured and transported back in the surrounding range. The fence would be patrolled regularly and any predators that infiltrate the fence would be removed upon detection. Industrial activity would be allowed to continue in the enclosure but both industrial and public access would be limited to specific points through controlled gates" (Boutin and Serrouya 2015).

Conservation Translocation – a spectrum of conservation actions for a targeted species that are based on the intentional movement of animals to **restore** populations in historical range (i.e., reintroduction or re-enforcement) or **introduce** animals to new areas (i.e., ecological replacement or assisted colonization) (Seddon et al. 2012).

1. INTRODUCTION

The boreal woodland caribou, one of six ecotypes of woodland caribou (*Rangifer tarandus caribou*) found in Canada, were assessed as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2002 and were listed as threatened when the federal *Species at Risk Act* (*SARA*) came into force in 2002. The recovery strategy for the boreal population of woodland caribou (Federal Recovery Strategy; Environment Canada 2012) lists all of Alberta's 12 local populations as 'not self-sustaining'. Threats to these populations include habitat alteration from anthropogenic and natural disturbances as well as increased predation resulting from that habitat alteration (Environment Canada 2012).

The Recovery Strategy (Environment Canada 2012) was prepared to satisfy the *SARA* s37(1) requirement that recovery strategies be prepared for all extirpated, endangered or threatened species. The goal of the Strategy is to achieve self-sustaining local populations in all boreal caribou ranges throughout their current distribution in Canada, to the extent possible (Environment Canada 2012). This goal will be achieved primarily through the efforts of the provinces and territories, which have jurisdiction over the management of lands, natural resources and wildlife. The Government of Alberta (GOA) developed a Woodland Caribou Recovery Plan in 2005 and established a Woodland Caribou Policy for Alberta (the Alberta Caribou Policy; GOA 2011). This Alberta Caribou Policy established a framework for range level planning in Alberta and, at a high level, described the potential management tools that would be considered.

Two of the tools outlined in Alberta's caribou policy – caribou habitat restoration and predator and prey management – are management levers for which industry can provide expertise, research, and funding in support of Alberta's caribou recovery objectives. In addition to funding and implementing longer-term habitat restoration efforts, the Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) is investigating three possible approaches for supporting caribou recovery with more immediate effect – predator exclosure fencing (predator fence), maternal penning, and captive breeding.

This document provides an overview of work completed for the Caribou Predator Fencing Pilot project (the Pilot) by a team with expertise in caribou ecology, stakeholder engagement, regulatory process, and spatial / GIS analysis.

1.1 CARIBOU PREDATOR FENCING PILOT PROJECT

The objective of the Pilot project is to advance predator fence design sufficiently to expedite GOA endorsement and authorization of a caribou fencing trial. More specifically, the intent of this project is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the northeast Alberta woodland caribou range and action plans.

The following reports have been completed to advance the Pilot:

1. Preliminary Fence Design (Appendix 1).
2. Regulatory Road Map, Strategy and Implementation Program (Appendix 2).
3. Stakeholder Engagement Strategy (Appendix 3).

Additional information, key assumptions, and an overview of findings from these three components are provided below.

2. PILOT SCOPING AND PRELIMINARY DESIGN

2.1 BACKGROUND

The concept of creating a woodland caribou predator fence or safe zone in northeast Alberta is a management option that has been widely discussed but not yet implemented. In 2011, a group of oil sands operators (Oil Sands Leadership Initiative or OSLI) commissioned four independent feasibility assessments to identify the risks and opportunities of constructing, maintaining and monitoring a fenced predator exclosure and assess the overall practicality and likelihood of implementing a successful fencing program (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, Terrain FX 2011). OSLI then supported a workshop for 43 technical experts to discuss appropriate guidelines or criteria that would be required to successfully implement a caribou predator fence from a biological and ecological standpoint, or the science-based reasons why this approach should not be considered further (Antoniuk et al. 2012). OSLI also commissioned a high-level regulatory road map to document potential regulatory and stakeholder requirements associated with this concept (Terrain FX 2012).

Ecological experts participating in the 2011 and 2012 technical studies and workshop concluded that a large predator fence exclosure would be technically feasible, albeit challenging and costly to implement, and should be considered for implementation as part of caribou range plans. Technical experts unanimously agreed that a predator fence should not be done in isolation, and this tool to be part of an integrated government program to recover caribou habitat with lower predator and prey populations in surrounding areas. Many technical experts questioned the cost-benefit of the predator fence and maternal penning concepts and as a result, economic and ecological cost effectiveness analyses were subsequently commissioned by COSIA (Hauer et al. 2014,

Boutin and Serrouya 2015). These analyses concluded that predator fences and maternal pens represent viable, cost effective caribou recovery options to address unsustainable predation levels.

As a first step toward understanding the implementation of predator fence as a management tool, several COSIA member companies sponsored trials in 2014 to test multiple fence designs in boreal forest terrain to determine their effectiveness for exclusion of woodland caribou predators. These trials are ongoing and learnings to date have been considered in Pilot design through participation of the technical working group described below.

2.2 DESIGN ASSUMPTIONS AND METHODS

In mid-2015, a technical working group was formed to provide input on ecological aspects of fence design, construction, and operation. This technical working group included caribou experts from academic, government, oil sands, forest industry, and consulting sectors with experience in northeast Alberta and with maternal penning. Based on their technical analyses and discussion, this group concluded that the Pilot should focus on a smaller predator fence to formally test this concept (*i.e.*, approximately 100 km^2 enclosing 40 caribou rather than the 1,500 km^2 area enclosing 120-150 caribou initially considered during the OSLI evaluations and workshop in 2011 and 2012).

The technical working group also concluded that while maternal penning is currently being conducted in British Columbia (see McNay et al. 2013, Serrouya et al. 2015, S. McNay pers. comm.), there is uncertainty around the effects of repeated animal handling and the relative benefit of maternal penning for population-level recovery (CCRT 2010, Smith and Pittaway 2011). Results from British Columbia are expected to provide additional information about these issues and the potential value of the maternal penning approach. It is also important to highlight that the main objective of maternal penning is to increase early calf survival, which occurs – along with a secondary benefit of improved cow survival – during the penning period. From a technical perspective, maternal penning (assumed to represent a seasonal 10 ha fenced area) was therefore concluded to represent a short-term tool that could be deployed to complement the predator fence Pilot during critical periods where fast action is needed to manage predation risk.

Based on the information available to the Pilot team, preliminary design assumptions for a predator fence are that it will:

- be part of an integrated and long-term government range plan to recover caribou habitat and reduce densities of predator and primary prey populations in surrounding areas;
- enclose an area of approximately 90 to 150 km^2 in one of the four Athabasca caribou ranges (West Side Athabasca River (WSAR), East Side Athabasca River (ESAR), Cold Lake(CL), Richardson (RICH); Figure 1);
- maintain 20-40 cows and at least 2-4 bulls within the fenced area;

- be funded by industry, championed by the GOA, and supported by the federal government;
- respect tenure and interests within the fence;
- be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government and ideally involves one or more local Aboriginal community(s). As described in more detail in Section 6 of Appendix 2, the Fence Management Team will seek input from technical experts, as well as those directly affected by the Pilot;
- include a detailed animal husbandry plan (animal care protocols) and a predator control plan for the handling and continual monitoring of caribou and removal/monitoring of predators and other animals as required, that will be reviewed and approved by relevant regulators to ensure that no harm is done to the threatened caribou population;
- require fence crossings of watercourses of varying sizes;
- have explicit metrics to define desired project outcomes, success, and requirements for adaptive management along with an associated science program to monitor project outcomes;
- require the development and implementation of monitoring and maintenance programs;
- require managed road access at multiple entry points;
- allow for industrial/commercial activity to occur inside the fence that is consistent with existing regulatory requirements for managing caribou. Fence operation will result in some restrictions for road access at the fence perimeter that will be established in consultation with oil and gas, surface, timber, and mineral rights holders;
- allow for traditional Aboriginal land use to occur inside the fence with some restrictions for road access at the fence perimeter, established in consultation with Aboriginal groups;
- have a proposed Pilot duration of 10 years. If the Pilot is successful, fence operation could continue over multiple decades (40+ years). If the Pilot is not successful, the fence would be removed;
- have emergency response plans in place to minimize risk to caribou, the fence, and other infrastructure from a fire or other emergency;
- have continuous access to the fence perimeter for monitoring fence integrity and maintenance and for monitoring and responding to incursions by predators; this access will preferentially be provided by siting the fence perimeter along existing all weather access roads and cleared rights-of-way; construction of an all-weather road around the complete perimeter is not anticipated nor included in construction cost estimates for the Pilot;

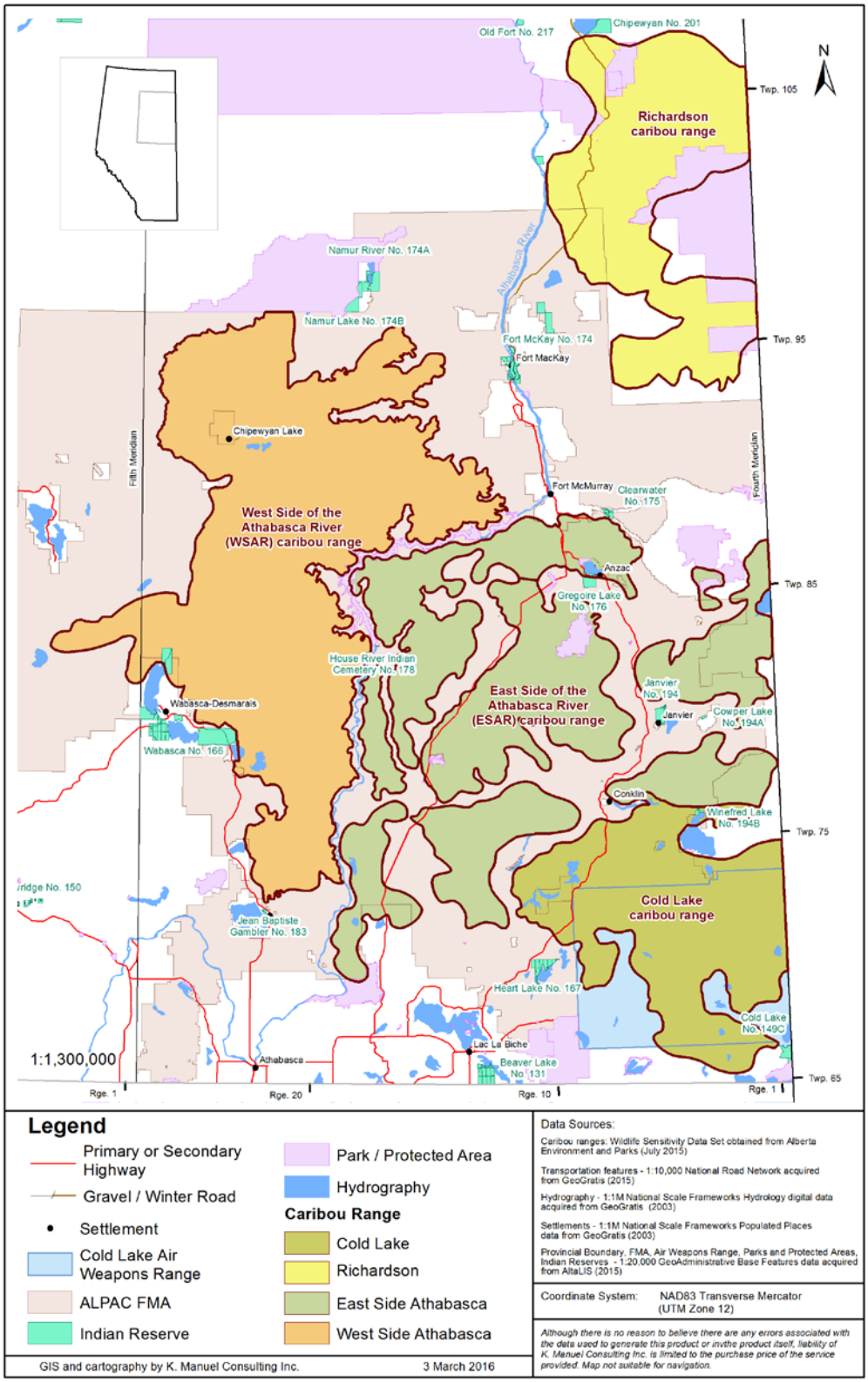

Figure 1. Caribou Predator Fencing Pilot study area.

- may or may not be expanded on the chosen site after the Pilot is complete; and
- allow tenure holders, Aboriginal groups, and other land users and stakeholders to be engaged and consulted during Pilot site selection and implementation.

These assumptions will need to be revisited during subsequent Pilot Definition, Approvals and Planning, Construction, and Operation phases (see Section 3.2).

Complete results of scoping and preliminary design work are provided in Appendix 1 (Preliminary Fence Design). The preliminary candidate areas and designs developed for the Pilot are intended to help encourage informed engagement and evaluation that should ultimately lead to detailed design of one preferred Pilot location.

The scoping and design team used a structured, criteria-based approach to identify areas of interest within each of four Lower Athabasca region caribou ranges: WSAR; ESAR; CL; and RICH. Habitat and caribou use criteria were reviewed and endorsed by the technical working group. To maximize the probability that caribou would successfully survive and reproduce, the criteria were designed to select areas:

- of at least one township (~ 100 km^2) within delineated ranges;
- with the best caribou habitat (mature forested peatlands and upland pine forests);
- known to be heavily used by caribou based on available telemetry data;
- outside of protected areas;
- with minimal area burned in the last 40 years; and
- with comparatively less land use.

The technical working group reviewed eight areas of interest and using ecological and technical criteria, selected four potential candidate areas for further evaluation (two in ESAR and two in CL). These areas were selected because they are in the highest risk boreal caribou ranges in northeastern Alberta and they provide better logistical access for piloting a predator fence.

The scoping and design team then used available imagery and spatial data to develop example fence layouts approximating 100 km^2 within the four potential candidate areas. Based on input from the technical working group, these potential fence designs were selected to:

- maximize use of existing all-weather transportation corridors (preferred) and other linear corridors for the fence line;
- minimize fence length;
- avoid crossings of navigable waterbodies;
- avoid crossings of railway lines and highways;
- minimize watercourse crossings;

- minimize length of wetlands (i.e., avoid organic surficial materials); and
- provide opportunities to be expanded.

Oil sands and timber disposition holders within the four potential predator fence layouts have been identified so that they can be contacted during the Pilot Definition phase to determine their development plans and willingness to participate in the Pilot. Tenure holder support for potential candidate areas and this industry-funded initiative is a prerequisite to further evaluation of any potential fence location.

Preliminary cost-estimates have been developed for the four potential predator fence locations based on the OSLI independent technical evaluations, COSIA member company fence trials, cost-benefit analysis white paper (Boutin and Serrouya 2015) and discussions with an experienced game farm fencing contractor. Actual construction costs cannot be determined until a Pilot site is chosen, but likely construction cost estimates for the four potential predator fence locations considered here range from $2.5M to $5M, plus 30% contingency given that a final site has not been selected.

2.3 DESIRED OUTCOME AND SUCCESS METRICS

The desired technical outcome of the Pilot is to demonstrate that this concept can meaningfully contribute to boreal caribou population enhancement, such that:

- a caribou predator fence can be constructed and maintained for at least 10 years,
- the local population of caribou maintained within the fence can survive and reproduce;
- the area inside the fence can be cleared of predators and kept clear of predators for the Pilot duration;
- caribou born within the fence can be moved as yearlings or adults to reduce the rate of decline and ultimately increase the size of the declining population(s) in surrounding range(s); and
- based on modelling conducted to date, implementation of a predator fence may also enable reduced predator management outside the exclosure.

In addition to the desired outcome, a fundamental design objective is that the Pilot "do no harm" to current boreal caribou populations.

Table 1 summarizes proposed Pilot technical, regulatory and stakeholder success metrics. These metrics are intended to be relevant to all project phases described in Section 3.2. below. Note that the variability in wildlife population metrics must be assumed and managed for, so success for wildlife metrics must be determined over at least three annual cycles.

Table 1. Success metrics and schedule for the Caribou Predator Fencing Pilot (year 1 assumed to represent Construction phase).

YEAR	METRIC	DEFINITION OF SUCCESS
0	Pilot location	Final pilot location selected following review of technically-preferred and potential candidate areas (and other locations if appropriate)
	Tenure holder support	Concerns identified and strategy developed that reflects appropriate management of these concerns
	Aboriginal group support	Aboriginal groups consulted, concerns identified and strategy developed that reflects appropriate management of these concerns
	Public support	Public concerns identified and strategy developed that reflects appropriate management of these concerns
	Regulatory approval	Pilot management plans finalized with input from Aboriginal communities and stakeholders All necessary approvals received for Pilot implementation
	Fence status	Fence and access points designed to address identified physical conditions, wildlife management, and access management, and maintenance issues
	Caribou status inside fence	Document caribou abundance and composition (number, age, sex, pregnancy rate, health/disease, genetic diversity) Minimal or no losses (<5%) to caribou
	Other prey status inside fence (moose, deer, beaver)	Determine need to document other prey abundance and composition in year 0 or 1
	Vegetation status inside fence	Determine need to document vegetation composition and forage biomass in year 0 or 1
	Vegetation (functional habitat) status outside fence	Pilot range restoration target and methods defined in consultation with GOA and industry.
1	Aboriginal group support	Aboriginal concerns identified and managed; level of support for the Pilot maintained or increasing
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing
	Fence status	Fence and access points constructed and functioning as designed; land user access maintained
	Caribou status inside fence	Desired caribou composition established within fence Minimal or no losses (<5%) to caribou
	Predator status inside fence	All mid-size to large predators removed from fenced area (wolves, bears, coyotes, wolverines, mountain lions)
	Other prey status inside fence (moose, deer, beaver)	Other prey abundance and composition documented
	Vegetation status inside fence	Vegetation composition and forage biomass documented; determine caribou carrying capacity
2	Aboriginal group support	Aboriginal groups consulted, concerns identified and managed; level of support for the Pilot maintained or increasing
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing
	Fence status	Fence and access points functioning as designed; predators effectively excluded; land user access maintained
	Caribou status inside fence	Caribou survival and calving rates equal to or higher than outside fence Desired caribou composition maintained

YEAR	METRIC	DEFINITION OF SUCCESS
	Predator status inside fence	Any incursions from outside fence are identified and predators effectively removed
	Caribou status outside fence	Initial translocation of yearlings born behind fence to designated areas outside of exclosure (depends on timing of year 1 activities)
	Other prey status inside fence	Active management of other prey initiated as required to reduce predator attraction, population irruptions, and food depletion
	Vegetation status inside fence	Vegetation composition and forage biomass documented
3	Aboriginal group support	Aboriginal groups consulted, concerns identified and managed; level of support for the Pilot maintained or increasing
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing
	Fence status	Fence and access points functioning as designed; predators effectively excluded; land user access maintained
	Caribou status inside fence	Caribou breeding, calving, and calf survival rates equal to or higher than outside fence Desired caribou composition maintained
	Predator status inside fence	Any incursions from outside fence are identified and predators effectively removed
	Caribou status outside fence	Initial translocation of yearlings born behind fence to designated areas outside of exclosure (depends on timing of year 1 activities)
	Other prey status inside fence	Active management of other prey as required to reduce predator attraction, population irruptions, and food depletion
	Vegetation status inside fence	Vegetation composition and forage biomass documented
4	Aboriginal group support	Aboriginal groups consulted, concerns identified and managed; level of support for the Pilot maintained or increasing
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing
	Fence status	Fence and access points functioning as designed; predators effectively excluded; land user access maintained
	Caribou status inside fence	Caribou breeding, calving, and calf survival rates equal to or higher than outside fence Desired caribou composition maintained
	Predator status inside fence	Any incursions from outside fence are identified and predators effectively removed
	Caribou status outside fence	Yearlings released in Year 3 have survival rate equal to or better than adults born outside the fence; translocation procedures modified as appropriate or recommendations made to GOA for predator management Second release of yearlings born inside fence
	Other prey status inside fence	Active management of other prey as required to reduce predator attraction, population irruptions, and food depletion
	Vegetation status inside fence	Vegetation composition and forage biomass documented

YEAR	METRIC	DEFINITION OF SUCCESS
5-9	Aboriginal group support	Aboriginal groups consulted, concerns identified and managed; level of support for the Pilot maintained or increasing for long-term fence operation
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing for long-term fence operation
	Fence status	Fence and access points functioning as designed; predators effectively excluded; land user access maintained
	Caribou status inside fence	Caribou breeding, calving, and calf survival rates equal to or higher than outside fence Desired caribou composition maintained, potentially involving movement of new animals from outside to inside the fence
	Predator status inside fence	Any incursions from outside fence are identified and predators effectively removed
	Caribou status outside fence	Yearlings released in prior years have survival rate equal to or better than adults born outside the fence; translocation procedures modified as appropriate Annual translocation of yearlings born inside fence to designated areas outside of exclosure
	Other prey status inside fence	Active management of other prey as required to reduce predator attraction, population irruptions, and food depletion
	Vegetation status inside fence	Vegetation composition and forage biomass documented
10	Ten year program review	Confirm level of industry, Aboriginal group and other stakeholder support and make decision to abandon, continue, or expand the fence
	Aboriginal group support	Aboriginal groups consulted, concerns identified and managed; level of support for the Pilot maintained or increasing for long-term fence operation
	Public support	Public concerns identified and managed; level of support for the Pilot maintained or increasing for long-term fence operation
	Regulatory support	Regulator concerns identified and managed; level of support for the Pilot maintained or increasing for long-term fence operation
	Regulatory approval	All necessary approvals received for long-term fence operation
	Fence status	Fence and access points functioning as designed; predators effectively excluded; land user access maintained
	Caribou status inside fence	Caribou breeding, calving, and calf survival rates equal to or higher than outside fence Desired caribou composition maintained within fence, potentially involving movement of new animals in
	Predator status inside fence	Any incursions from outside fence are identified and predators effectively removed
	Caribou status outside fence	Yearlings released in prior years have survival rate equal to or better than adults born outside the fence; release procedures modified as appropriate Annual release of yearlings born inside fence
	Other prey status inside fence	Active management of other prey as required to reduce predator attraction and food depletion
	Vegetation status inside fence	Vegetation composition and forage biomass documented

YEAR	METRIC	DEFINITION OF SUCCESS
	Vegetation (functional habitat) status outside fence	Range restoration progress documented.

3. PILOT GOVERNANCE AND IMPLEMENTATION

One of the conclusions of the OSLI-sponsored ecological expert workshop was that a predator fence should be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government (Antoniuk et al. 2012). Ideally, this third-party Fence Management Team should involve one or more local Aboriginal community(s). Regardless of their background and experience, members of the management team need to be perceived as unbiased and should ideally be known to key stakeholders to help build support for the Pilot.

3.1 GOVERNANCE MODEL

The complete governance and implementation discussion included in Appendix 2 (Regulatory Road Map, Strategy and Implementation Program) notes that a third-party Fence Management Team will need to be established as a legal entity in order to enter into agreements[2] that carry financial and legal liability. There are a number of not-for-profit entities (*i.e.*, company, corporation, society, association, or cooperative) that would be able to construct, own, and manage the Pilot predator fence to fulfill this requirement. Use of a legal entity would also allow this organization to hold liability insurance and would limit the liability of shareholders funding or participating in the Pilot as well as providing an arms-length relationship with industry or government.

The governance structure of not-for-profit companies, societies and associations, and cooperatives are dictated respectively by the *Companies Act, Societies Act,* and *Cooperatives Act.* A review of the advantages and disadvantages of different structures is beyond the scope of this preliminary design work, and will need to be completed by legal advisors to Pilot supporters immediately following a decision to implement the Pilot. A proposed Pilot governance model applicable to all potential organizational structures is depicted graphically in Figure 3, and described in more detail in Section 6 of Appendix 2.

[2] Agreements would include engaging staff and contractors, owning facilities, and holding approvals and permits.

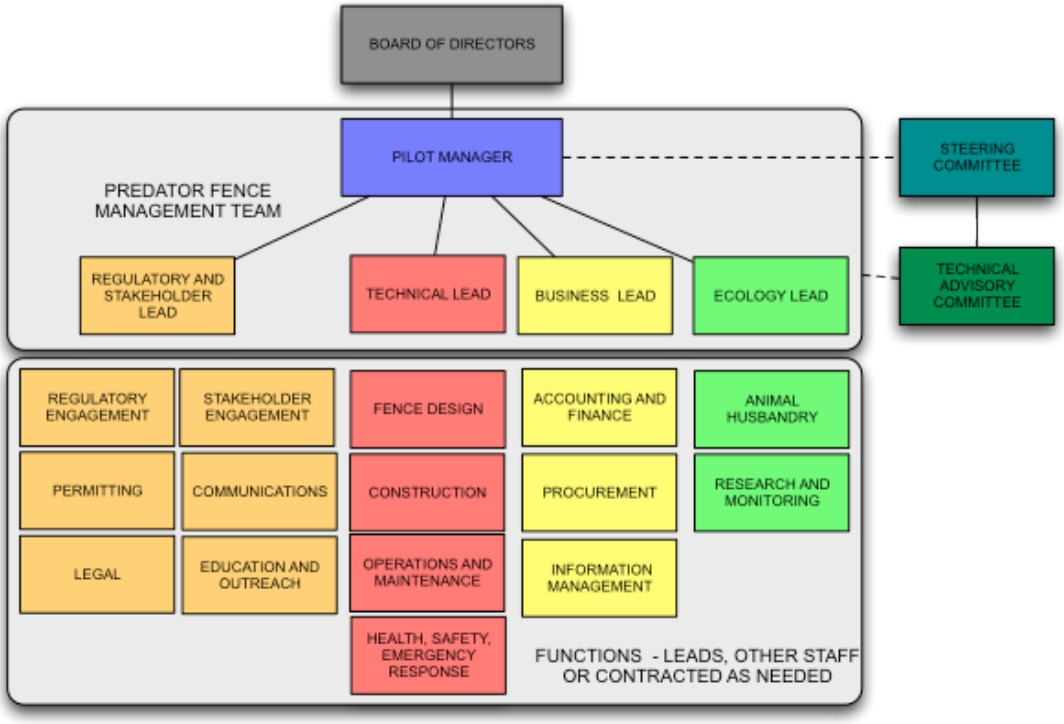

Figure 2. Caribou Predator Fencing Pilot governance model.

The proposed governance model includes a Board of Directors composed of shareholders that would include funders and may include Aboriginal groups with direct interest in the Pilot and a Director-at-Large to reflect a regional perspective and enhance the independent, third-party status of the organization. The proposed governance model also includes a Pilot Manager reporting to the Board and directing a Fence Management Team composed of employees, contractors, or secondees with expertise in regulatory affairs, stakeholder engagement, ecology/wildlife management, fence construction and operation, and financial management. Advisory Steering and Technical Committee(s) including representatives with interests in, or expertise on, Pilot construction and operation and ecology/wildlife management, are recommended to provide independent direction and feedback to the Fence Management Team and Board of Directors.

The Pilot Manager performs a critical role in this governance model not only for Pilot implementation, but also for ensuring that tenure holder, GOA, Aboriginal and stakeholder interests and concerns are identified and managed appropriately. The perception of the Pilot organization as an independent, third-party will depend in large part on the way in which the Pilot Manager and other members of the Fence Management Team deal with real, perceived, and conflicting interests and concerns.

3.2 IMPLEMENTATION PROGRAM

Work completed to date for the Pilot has advanced the caribou predator fencing concept to preliminary design of perimeter fences for four potential candidate areas. The Pilot implementation program involves five phases and associated activities:

- Pilot Definition
- Pilot Approvals and Planning
- Construction
- Operations
- Ten Year Program Review

These phases and associated activities and timeframes are depicted in Figures 3 and 4 and are further described in Section 6, Appendix 2.

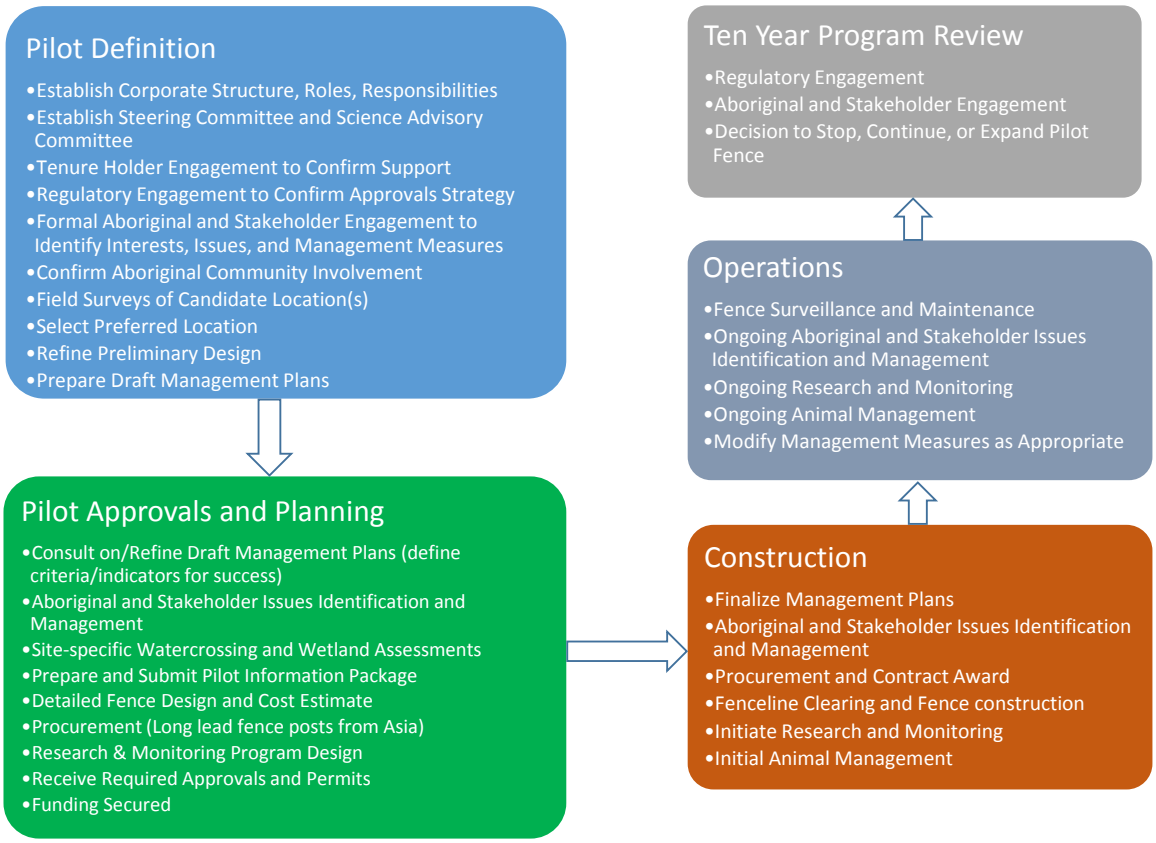

Figure 3. Caribou Predator Fencing Pilot implementation phases and activities.

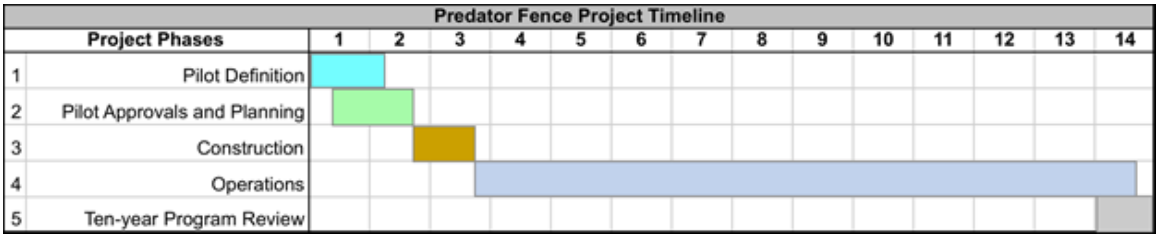

Figure 4. Caribou predator fencing Pilot implementation schedule.

Further work will be required to implement the regulatory and stakeholder strategies, engage with tenure holders, select a preferred location, prepare regulatory filings, and develop detailed fence design and management plans that can be issued to a fencing contractor (estimated to require 12 to 18 months and $600K to $900K; a contingency factor of at least 30% should be added because the Pilot site has not yet been selected). Ongoing effort will also be required during the 10 year Operations phase to monitor success, address evolving issues, and refine management plans so that an informed decision can be made following the operations phase on whether to stop, continue or expand the Pilot fence.

The suite of desired technical, regulatory and stakeholder outcomes and success metrics provided earlier in Section 2.3 of this Overview report is intended to help guide Pilot implementation and monitoring through all phases.

4. REGULATORY ROADMAP AND STRATEGY

One of the independent feasibility assessments commissioned by OSLI (Terrain FX 2011) identified several legal, regulatory and policy complexities and gaps that would need to be addressed to successfully implement a caribou predator fence. OSLI then commissioned a high-level regulatory road map to understand potential regulatory and stakeholder requirements associated with this concept (Terrain FX 2012). The regulatory road map has been updated for the Pilot (see Appendix 2, Regulatory Road Map, Strategy and Implementation Program) to ensure that all relevant preliminary design concepts are addressed.

The regulatory road map is a critical component of preliminary fence design because without support and promotion of the caribou predator fence concept by senior levels of government and tenure holders, the Pilot is unlikely to be implemented. Understanding and addressing provincial and federal regulatory requirements, challenges, and opportunities will be essential for obtaining this support.

The complete regulatory road map and strategy evaluation concludes that the Pilot is a novel concept that from a construction and operation perspective is relatively simple and straightforward but from an ecological and stakeholder perspective is much more complex. This increases regulatory uncertainty and puts the Pilot at risk for onerous and extended review and consideration by regulators and stakeholders. Potential risks to wildlife and habitat inside the Pilot fence, the challenges of predator management and fence access by land users will need to be carefully assessed and managed by the proponent and by regulators.

The review of legislation and policy applicable to the Pilot makes clear that this project does not fit into an existing regulatory process that would provide schedule and

consultation certainty for the proponent. Because of this, it is recommended that the third-party Fence Management Team (see Section 5 below) define and guide a process that:

- meets known regulatory requirements;
- demonstrates to regulators and stakeholders that risks to wildlife and habitat will be appropriately managed;
- demonstrates that Aboriginal, industrial, commercial, and public use of lands and resources will be appropriately managed; and
- demonstrates that the Pilot supports federal and provincial caribou objectives by increasing scientific understanding of a novel management tool through research and monitoring.

4.1 PILOT REGULATORY STRATEGY

The recommended regulatory strategy described in Appendix 2 includes the following steps:

1. Complete initial tenure holder engagement to determine their development plans and willingness to participate in the Pilot. Tenure holder support for potential and technically-preferred candidate areas and this industry-funded initiative is a prerequisite to further evaluation and engagement.
2. Complete initial regulatory engagement to identify provincial and federal regulatory interests and concerns and the recommended approvals strategy.
3. Complete initial Aboriginal and stakeholder engagement to confirm and identify issues and concerns with the concept and location(s) and rationale, the level of support or opposition to the predator fence, and appropriate measures to address issues and concerns.
4. Select the preferred Pilot location based on field surveys, tenure holder support, Aboriginal interest, and input from initial engagement.
5. Prepare a preliminary Pilot information package that addresses the interests of relevant regulators and can be used during subsequent tenure holder, Aboriginal and public engagement efforts. The document should describe: the Pilot's purpose in the context of federal and provincial caribou conservation objectives; proposed Pilot location(s), rationale, and preliminary design; anticipated regulatory interests and requirements and how the application will address these; known and anticipated tenure holder, Aboriginal and public concerns and the measures proposed to address these concerns; and the risk assessment and management plans to be developed and the process and schedule proposed to develop them.
6. Complete regulatory engagement to confirm the regulatory process, lead regulator (Alberta Environment and Parks or Alberta Energy Regulator), federal government role, and Pilot approval, permit, licence, and authorization requirements.

7. Complete detailed design and field assessments and prepare risk assessment and management plans with input from interested tenure holders, Aboriginal groups and other stakeholders.
8. Prepare and submit applications for required permits, licences and authorizations reflecting engagement in previous steps.

4.2 MANAGEMENT PLANS

Development of specific management plans is recommended for the Pilot to transparently address known or anticipated issues. Development of the plans identified below (or one or more consolidated plans that address these components) will demonstrate the management approach and contribute to efforts to secure regulatory, Aboriginal, and stakeholder support for the Pilot. Each draft plan should be described in the preliminary Pilot information package in sufficient detail to demonstrate adequate risk management during construction, operation and decommissioning of the Pilot. Aboriginal and stakeholder input on these plans will be sought and incorporated during the Pilot approvals and planning, construction, and operations phases as appropriate.

1. **Risk Management Plan** – process for identification and management of financial, technical, stakeholder and regulatory risks to inform planning and ongoing management.
2. **Animal Husbandry Plan** – caribou and alternate prey handling and care including reference to applicable standards that may include Alberta Wildlife Act Class Protocols, Canadian Council on Animal Care guidelines, and International Union for Conservation of Nature policies, guidelines and standards.
3. **Predator Control Plan** – predator control protocols that adhere to applicable standards and leverage Aboriginal and local partnerships.
4. **Access Management Plan** – protocols for access by tenure holders, Pilot staff and contractors and other users of the land.
5. **Construction Plan** – fence design, budget, schedule, procurement, contracting, staffing, health and safety, material handling, storage and construction methods including site specific aspects for water course crossings, access gates, *etc*.
6. **Operations and Maintenance Plan** – operating procedures and protocols, roles and responsibilities, health and safety, maintenance procedures, budget, schedule, staffing, procurement, contracting, *etc*.
7. **Emergency Response Plan** – incident definitions, response procedures and protocols including communications, roles and responsibilities, animal management, resources (e.g., fire response, medical, heavy equipment, air support).
8. **Research and Monitoring Program** - research objectives, monitoring objectives, alignment of operations, research and monitoring with federal, provincial and Pilot objectives, performance indicators, course correction and

reporting; early warning of unintended consequences to vegetation and non-target animals.

9. **Stakeholder Engagement Plan** - regulatory engagement, engagement with other surface and sub-surface rights holders, known users of the land (e.g., trappers and recreation groups).
10. **Aboriginal Consultation Plan** – consultation with Aboriginal communities including understanding of traditional knowledge, ongoing traditional land use, partnership opportunities and employment/business opportunities.
11. **Outreach and Communication Plan** – objectives, communication tools, audience assessment and monitoring (e.g., public response, social media, internet dialogue), content and materials, timing, education, public reporting, *etc.*

5. STAKEHOLDER ENGAGEMENT

Previous studies and the ecological expert workshop commissioned by OSLI (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, Terrain FX 2011; Antoniuk et al. 2012) noted that there will likely be regional, national, and international media and public interest in a predator fence. Early engagement and a collaborative approach were considered to be essential.

In addition to tenure holders, active engagement with potentially affected Aboriginal communities and individuals will be essential because of potential effects on access and traditional land use opportunities and requirements to actively manage caribou, moose, deer, wolf, black bear and possibly other wildlife. Workshop participants recommended that a stakeholder engagement strategy be developed to engage and collaborate with governments, Aboriginal communities, other industry and commercial tenure holders, non-government organizations, recreational users, *etc*. Workshop participants also concluded that a comprehensive engagement plan and resources to implement it would be essential for implementation (Antoniuk et al., 2012).

The Pilot Stakeholder Engagement Strategy (see Appendix 3) was developed to address these issues and recommendations. Key stakeholders include: Federal, Alberta and municipal governments; Aboriginal communities and associations (e.g., Athabasca Tribal Council); affected trappers; other communities in close proximity to proposed predator fence location(s); environmental non-governmental organizations (e.g., Pembina Institute, Canadian Parks and Wilderness Society, Alberta Wilderness Association); recreational users; companies, industries and associations active within the region (e.g., tenure holders, COSIA, Canadian Association of Petroleum Producers (CAPP), Alberta-Pacific Forest Industries Ltd. [AlPac], Canadian Boreal Forest Agreement signatories); other interested parties (e.g., media, other provinces and jurisdictions).

Ongoing engagement during all Pilot phases will be critical to its overall success. Each tenure holder, Aboriginal and stakeholder group is unique and will request different levels of engagement; accordingly, the level of involvement will range from informing to

collaborating or partnering. The detailed communication and engagement plan developed for each Pilot phase should reflect the concerns, needs and interests of all its stakeholders.

Monitoring the success and failures of engagement, and adapting as appropriate, will contribute to the long term success of the Pilot.

5.1 STAKEHOLDER ENGAGEMENT GOAL AND OBJECTIVES

Project proponents must be committed to working with stakeholders by keeping them informed and engaged during all phases of the Pilot. Building strong relationships with stakeholders through collaboration and consultation is crucial for the success of this Pilot and will result in enhanced project decisions.

The objectives of the Stakeholder Engagement Strategy are to:

- provide accurate, consistent and timely information regarding the Pilot to tenure holders, interested Aboriginal groups, stakeholders and the general public;
- obtain tenure holder, Aboriginal group, and other stakeholder feedback on the Pilot, including candidate sites, potential issues and sensitivities towards the project;
- work with interested tenure holders, Aboriginal groups and other stakeholders to ensure potential issues are fully understood and appropriately managed;
- facilitate meaningful involvement with tenure holders, interested Aboriginal groups and other stakeholders that identifies common ground for action and innovative solutions; and
- work with tenure holders, interested Aboriginal groups and other stakeholders to implement agreed upon decisions and approach.

5.2 STAKEHOLDER ENGAGEMENT PROCESS

5.2.1 Phases 1/2- Initial Communication and Dialogue

The intent of the initial communication and dialogue phase is to:

- complete initial tenure holder engagement to determine their development plans and willingness to participate in the Pilot. Tenure holder support for potential and technically-preferred candidate areas and this industry-funded initiative is a prerequisite to further evaluation and engagement;
- refine the preliminary Stakeholder Engagement Strategy by formalizing engagement roles and responsibilities and Pilot communication materials;
- meet with all tenure holders, Aboriginal groups and other stakeholders to create relationships with them and identify those interested in partnering or learning more about the Pilot;

- develop and populate an engagement database to to provide a readily accessible record of companies, groups and individuals consulted, the issues and concerns they raised, any commitments made, and follow-up required,
- identify or confirm the interests and concerns of these stakeholders and the measures proposed to address them; and
- support the Pilot regulatory strategy by identifying and documenting tenure holder, Aboriginal group and other stakeholder engagement activities, issues identified, and issues management.

A critical activity in the Pilot Definition phase will be to identify who will manage and implement the Stakeholder Engagement Strategy. Because the Pilot is expected to be funded by industry, championed by GOA, but implemented by an independent third-party, it is essential that the roles and responsibilities of these groups and their representatives be clearly established. Given that a number of companies operate within the candidate sites and have developed strong relationships with key stakeholders over the years, these companies and their engagement specialists may have significant roles in the engagement program.

The Stakeholder Engagement Strategy (Appendix 3) provides a list of primary stakeholders, their perceived or known concerns, and the communication tools recommended to support formal engagement. Known concerns were identified based on informal discussions with some primary stakeholders by COSIA members. Initial contact should consist of individual or small group meetings and include a short presentation followed by open discussion. Initially, technical experts should be included in engagement meetings to ensure that stakeholders can gain a thorough understanding of the Pilot.

5.2.2 Phases 1/2 –Issue Identification and Management

The objectives of the issue identification and management phase are to:

- identify all concerns and interests of tenure holders, Aboriginal groups and other stakeholders with the predator fence concept and location(s);
- prepare a strategy(s) that reflects appropriate management of these concerns, including appropriate measures for Pilot design as well as the construction, and operations management plans prepared for the Pilot; and
- support the Pilot regulatory strategy.

Draft management plans will be prepared by the Fence Management Team to summarize the measures that will be used to manage wildlife, access, and fence integrity during construction and operations. External input on these draft plans will be required to ensure that they appropriately reflect GOA, other government, Aboriginal community, land user, and stakeholder interests and concerns. This process could involve individual or small group meetings, or more formal topic-specific workshops with interested stakeholders.

As the Pilot preliminary fence design is refined and developed for one preferred location, additional issues and concerns may be identified by stakeholders or the engagement team. The Fence Management Team will need to continue to assess what opportunities exist to work together on issues and the Pilot. This may include changes and modifications to the engagement plan and activities. The Fence Management Team will need to find mutually acceptable ways to involve interested stakeholders in effective management and mitigation of these issues.

In addition, the Fence Management Team will need to respond to existing and new issues through consistent, factual messaging and ongoing communication to stakeholders, funders, and other interested parties. This proactive, fact-based approach should enhance success when developing collaborative based solutions to both expected and unexpected issues.

5.2.3 Phase 3 – Pilot Construction

Building upon the discussions and information gathered in Phase 1 and 2, engagement specialists will be able to develop a detailed communication and engagement plan that reflects the concerns, needs and interests of all its stakeholders.

The goals of stakeholder engagement during the Pilot Construction phase are to:

- provide information about construction and engagement plans and progress;
- to identify tenure holder, Aboriginal group and public concerns;
- develop strategies that reflect appropriate management of these concerns; and
- implement an education and outreach program to summarize research and monitoring results and provide non-technical and regular updates on Pilot progress, learnings and success.

These activities are designed to increase the probability that the level of GOA, tenure holder, Aboriginal and public support for the Pilot is maintained or increases as the Pilot proceeds.

5.2.4 Phase 4 – Pilot Operations

Prior to the commencement of the Operations phase, the Fence Management Team, other engagement specialists and key stakeholders should take the opportunity to analyze the success of the engagement activities undertaken during the Construction phase. Questions asked should include:

- What activities should be changed, modified or expanded to reflect the operational issues and concerns by stakeholders?
- What information needs to be communicated to stakeholders?
- Are the current mechanisms for contacting and communicating with stakeholders adequate?

- Is there a need to organize issue specific workshops and multi- disciplinary or discipline-specific committees?

As noted previously, monitoring the success and failures of engagement, and adapting as appropriate, will contribute to the long term success of the Pilot.

The goals of stakeholder engagement during the Pilot Operations phase are similar to those of the Construction phase, but with emphasis on operating status, research and monitoring, and learnings to date.

5.2.5 Phase 5 – Ten Year Program Review

An understanding of the success and failures of the Stakeholder Engagement Strategy, programs and activities will be critical to the long term viability of the Pilot. The ten year program review should address the following questions:

- After 10 years of operating the Pilot, are stakeholders satisfied with its management?
- Have their interests been understood and appropriately managed?
- Do they fully support the ongoing operations of the Pilot?
- Are they satisfied with the information they have received on the status of the Pilot?
- What information are they interested in receiving if the Pilot is extended in time or space (success rates of caribou breeding, calving, and calf survival rates)?
- What is their desired role if the Pilot is extended in time or space?

5.3 CONCLUSION

An important element of the Pilot Stakeholder Engagement Strategy will be the ability of the Fence Management Team to work with stakeholders to not only identify interests, issues and concerns, but also to fine tune the engagement methods that will best work for them to effectively partner and collaborate. A flexible approach is critical to managing and executing a successful Stakeholder Engagement Strategy and plan.

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APPENDIX 1

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

PRELIMINARY FENCE DESIGN

APPENDIX 2

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

REGULATORY ROAD MAP, STRATEGY AND IMPLEMENTATION PROGRAM

APPENDIX 3

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

STAKEHOLDER ENGAGEMENT STRATEGY

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

PRELIMINARY FENCE DESIGN

Prepared for
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EXECUTIVE SUMMARY

1. The members of Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (EPA) have been developing a suite of caribou recovery initiatives, one of which is the Caribou Predator Fencing Pilot (the Pilot). A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus caribou yearlings from within the fence to be moved outside to supplement the surrounding range population. The objective of the Pilot is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the Northeast Alberta woodland caribou range and action plans.
2. We used a structured, criteria-based approach to identify eight predator fence areas of interest for further consideration. Two areas of interest were identified within each of four Lower Athabasca region caribou ranges: West Side Athabasca River (WSAR); East Side Athabasca River (ESAR); Cold Lake (CL); and Richardson (RICH). To maximize likelihood of success, the following criteria were used to select areas of interest: at least one township (~ 100 km^2) within delineated caribou ranges with the best habitat (mature forested peatlands and upland pine forests); known to be frequently occupied by caribou based on available telemetry data; outside of protected areas; minimally burned in the last 40 years; and have comparatively less land use. Habitat and caribou use criteria were reviewed and supported by a technical working group established for this Pilot.
3. The technical working group reviewed the eight areas of interest and selected four as predator fence potential candidate areas (two in ESAR and two in CL) to be evaluated further through development and comparison of example fence layouts. The four potential candidate areas were selected because they were in the highest risk boreal caribou ranges and provided better logistical access for piloting a predator fence.
4. We used available imagery and spatial data to delineate example fence layouts enclosing ~100 km^2 within the four predator fence potential candidate areas. Based on input from the technical working group, example fence layouts were developed to: maximize use of existing all-weather transportation corridors (preferred) and other linear corridors for the fence line; minimize perimeter fence length; avoid crossings of navigable waterbodies; avoid crossings of railway lines and highways; minimize watercourse crossings; minimize length of wetlands (i.e., avoid organic surficial materials); and provide options to be expanded. In developing example fence layouts, we found that rather than completely excluding burned areas (< 40 years), it was necessary in some candidate areas to include some areas of recent burns to fulfill the criteria laid out above. Thus our approach was to minimize inclusion of recently burned areas where possible within example fence layouts.

Through consultation with the technical working group and review of example fence layouts, two candidate areas were identified as being technically preferred based solely on landscape characteristics and access considerations. We suggest that the two technically preferred candidate areas be advanced as working examples for discussion with tenure holders, regulators, Aboriginal groups, land users and other stakeholders in the engagement and regulatory approval process.

5. Tenures and interests were not considered in the technical analysis, so potential candidate areas identified using technical and ecological criteria will need to be evaluated further. Tenure holder support for this industry-funded initiative is a prerequisite to further evaluation. Indeed a key issue that was raised during this exercise was that best available data showing current footprint on the landscape does not reflect future and approved development plans by tenure holders. Some tenure holders have suggested that candidate areas that include large scale SAGD development projects may not be a suitable location for a predator fence. Engagement and additional design work is intended to lead to selection of one preferred Pilot location and to ensure that all rights and interests are respected.

   Preliminary cost estimates on a per kilometer basis ($50,000 - $100,000 / km) were extrapolated for a predator fence system based on the OSLI independent technical evaluations, COSIA fence trials, COSIA white paper (Boutin and Serrouya 2015) and discussions with an experienced game fencing contractor. The basic elements of the high fence system comprise woven wire mesh (~2.5 m high) supported by wooden and steel posts spaced at 5-6 m intervals, and with wire mesh ground aprons as a means of preventing animals from digging underneath the fence. Thus, construction cost estimates for an example fence layout with a 50 km perimeter would range from $2.5M to $5M. A contingency factor of 30% should be assumed for this preliminary cost estimate, as a final location has not been selected. Although not explicitly included in the construction cost estimate, addition of multiple single strand high tensile electrified (hot) wires attached to fence posts (with outriggers and insulators) would improve effectiveness of the predator fence system. The game fence (and ground apron) establishes a physical barrier to wildlife, while addition of hot wires adds a physiological barrier effect through aversive conditioning.

   The total estimated costs associated with this project for design, construction and implementation of the fence are as follows:

Fence Project Component	Cost	Contingency
Design	$600K - $900 K	30%
Construction	$2.5 - $5 million	30%
Implementation	$15 million	30%

These costs are discussed in greater detail in the Overview Section as well as Appendix 2: Regulatory Roadmap, Strategy and Implementation Program.

6. A key next step is to advance the concept of the predator fence Pilot from preliminary desktop analysis of several alternatives to design of a single preferred location, and technical specification of fence design features. This will require an integrated approach by a Fence Management Team that involves field surveys and regulatory and stakeholder engagement.

   In order to advance predator fence design, cost estimates, and construction and management plans in preparation for construction, it will be important to address the following key questions:

   - Where would the predator fence Pilot occur?
   - What is the optimal layout and configuration for the predator fence based on site-specific conditions and other land user interests?
   - What is the preferred specific predator fence design based on ongoing trials?

LIST OF ACRONYMS

COSIA	Canada's Oil Sands Innovation Alliance
EPA	Environmental Priority Area
GOA	Government of Alberta
MCP	Minimum Convex Polygon
OSLI	Oil Sands Leadership Initiative
RICC	Regional Industry Caribou Collaboration
SAGD	Steam Assisted Gravity Drainage

GLOSSARY

Captive Breeding – the deliberate capture and rearing of wild animals in captivity to prevent extirpation or extinction of a species. "Captive populations need to be founded and managed according to sound scientific principles for the primary purpose of securing the survival of species through stable, self-sustaining captive populations. Stable captive populations preserve the options of a range of conservation translocations to support wildlife conservation and management" (IUCN 1987).

Maternal Pen(ning) – a wildlife conservation action that has been used (< 10 times in western Canada) to temporarily protect caribou cows and newborn calves from predation. Adult females are captured from the wild during late winter (i.e., the last trimester of pregnancy) and maintained in a small predator-free enclosure (~10 ha) that is situated within the population's current range. Cows and calves (born in the enclosure) are held, with free access to feed and water for a period of several weeks to months until they are released back in to the wild. A key rationale for maternal penning is that predation of young calves is a key limiting factor affecting the growth of the population.

Minimum Convex Polygon (MCP) – "the oldest and most comment method of estimating home range is the minimum convex polygon. The minimum area polygon is constructed by connecting the outer locations to form a convex polygon and then calculating the area of this polygon" (White and Garrott 1990). The MCP is still widely employed because it is simple, flexible and easy to calculate, but has many drawbacks including often overestimating the size of home ranges.

Predator Fence [Exclosure] – is a conceptual conservation approach that establishes and maintains small breeding subpopulations of caribou in large fenced enclosures within its original range. "Predator exclusion fences are erected to enclose large areas (100's -1000 km^2) that house 40-50 female caribou plus a smaller number of males required for breeding. The fence would be designed to exclude wolves and bears. Upon establishment of the fence, all wolves and bears are removed as are all deer and moose (required to prevent rapid population increase in the absence of predation). Female caribou are captured from the surrounding range and transported into the enclosure where they remain for multiple years. The size of the fenced area is such that caribou inside can gain most/all of their nutritional needs from natural forage (supplemental feeding will also be conducted if necessary). Calves born to the females remain in the enclosure until 1 year of age when they are captured and transported back in the surrounding range. The fence would be patrolled regularly and any predators that infiltrate the fence would be removed upon detection. Industrial activity would be allowed to continue in the enclosure but both industrial and public access would be limited to access points through controlled gates" (Boutin and Serrouya 2015).

Conservation Translocation – a spectrum of conservation actions for a targeted species that are based on the intentional movement of animals to **restore** populations in historical range (i.e., reintroduction or re-enforcement) or **introduce** animals to new areas (i.e., ecological replacement or assisted colonization) (Seddon et al. 2012).

1. INTRODUCTION

Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) has been developing a suite of caribou recovery tools, one of which is the Caribou Predator Fencing Pilot (the Pilot). In addition to funding and implementing longer-term habitat restoration efforts, the COSIA Land EPA is investigating three possible approaches for supporting caribou protection with more immediate effect – predator exclosure fencing (predator fence), maternal penning, and captive breeding. As a first step toward understanding the implementation of predator fence as a management tool, several oil sands companies sponsored trials in 2014 to test multiple fence designs in boreal forest terrain to determine their effectiveness for exclusion of woodland caribou predators. These trials are ongoing and learnings to date have been considered in Pilot design (Serrouya et al. 2015a).

A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus yearlings from within the fence to be moved outside to supplement the surrounding range population(s).

The objective of the Pilot project is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the northeast Alberta woodland caribou range and action plans. It is assumed that the Pilot would be funded by industry, championed by the GOA, and supported by the federal government.

Work tasks required to advance predator fence design for the Pilot include:

- the identification of potential locations for a large predator fence exclosure (predator fence) or smaller maternal pen;
- investigation of potential fence designs;
- identification of anticipated regulatory requirements; and
- development of a strategy for stakeholder and regulatory engagement and implementation.

This document provides the Preliminary Fence Design prepared by John Nishi, EcoBorealis Consulting Inc., Karen Manuel, K. Manuel Consulting Inc., with input from Terry Antoniuk, Salmo Consulting Inc.

1.1 CARIBOU PREDATOR FENCING PILOT PROJECT

The Pilot scope, design assumptions, success metrics, and preliminary design are described in Section 2 of the Caribou Predator Fencing Pilot Overview report (Antoniuk et al., 2016). The desired technical and ecological outcome of the Pilot is to prove that the

predator fence concept can contribute to boreal caribou population enhancement. In summary, the preliminary design for a pilot predator fence would:

- be part of an integrated and long-term government range plan to recover caribou habitat and reduce densities of predator and primary prey populations in surrounding areas;
- enclose an area of approximately 90 to 150 km^2 in one of the four Athabasca caribou ranges (West Side Athabasca River (WSAR), East Side Athabasca River (ESAR), Cold Lake (CL), Richardson (RICH); Figure 1);
- maintain 20-40 cows and at least 2-4 bulls within the fenced area;
- be funded by industry, championed by the GOA, and supported by the federal government;
- respect tenure and interests within the fence;
- be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government and ideally involves one or more local Aboriginal community(s). As described in more detail in the Overview report, the third-party management team will seek input from technical experts, as well as those directly affected by the Pilot;
- include a detailed animal husbandry plan (animal care protocols) and a predator control plan for the handling and continual monitoring of caribou and removal/monitoring of predators and other animals as required, that will be reviewed and approved by relevant regulators to ensure that no harm is done to the threatened caribou population;
- require fence crossings of watercourses of varying sizes;
- have explicit metrics to define desired project outcomes, success, and requirements for adaptive management along with an associated science program to monitor project outcomes;
- require the development and implementation of monitoring and maintenance programs;
- require managed road access at multiple entry points;
- allow for industrial/commercial activity to occur inside the fence that is consistent with existing regulatory requirements for managing caribou. Fence operation will result in some restrictions for road access at the fence perimeter that will be established in consultation with oil and gas, surface, timber, and mineral rights holders;
- allow for traditional Aboriginal land use to occur inside the fence with some with some restrictions for road access at the fence perimeter, established in consultation with Aboriginal groups;

- have a proposed Pilot duration of 10 years. If the Pilot is successful, fence operation could continue over multiple decades (40+ years). If the Pilot is not successful, the fence would be removed;
- have emergency response plans in place to minimize risk to caribou, the fence, and other infrastructure from a fire or other emergency;
- may or may not be expanded on the chosen site after the Pilot is complete;
- allow tenure holders, Aboriginal groups, and other land users and stakeholders to be engaged and consulted during Pilot site selection and implementation; and
- adopt a fundamental design objective that the Pilot "do no harm" to current boreal caribou populations.

These assumptions will need to be revisited during subsequent Pilot Definition, Approvals and Planning, Construction, and Operation phases (see Section 3.2 of Overview report).

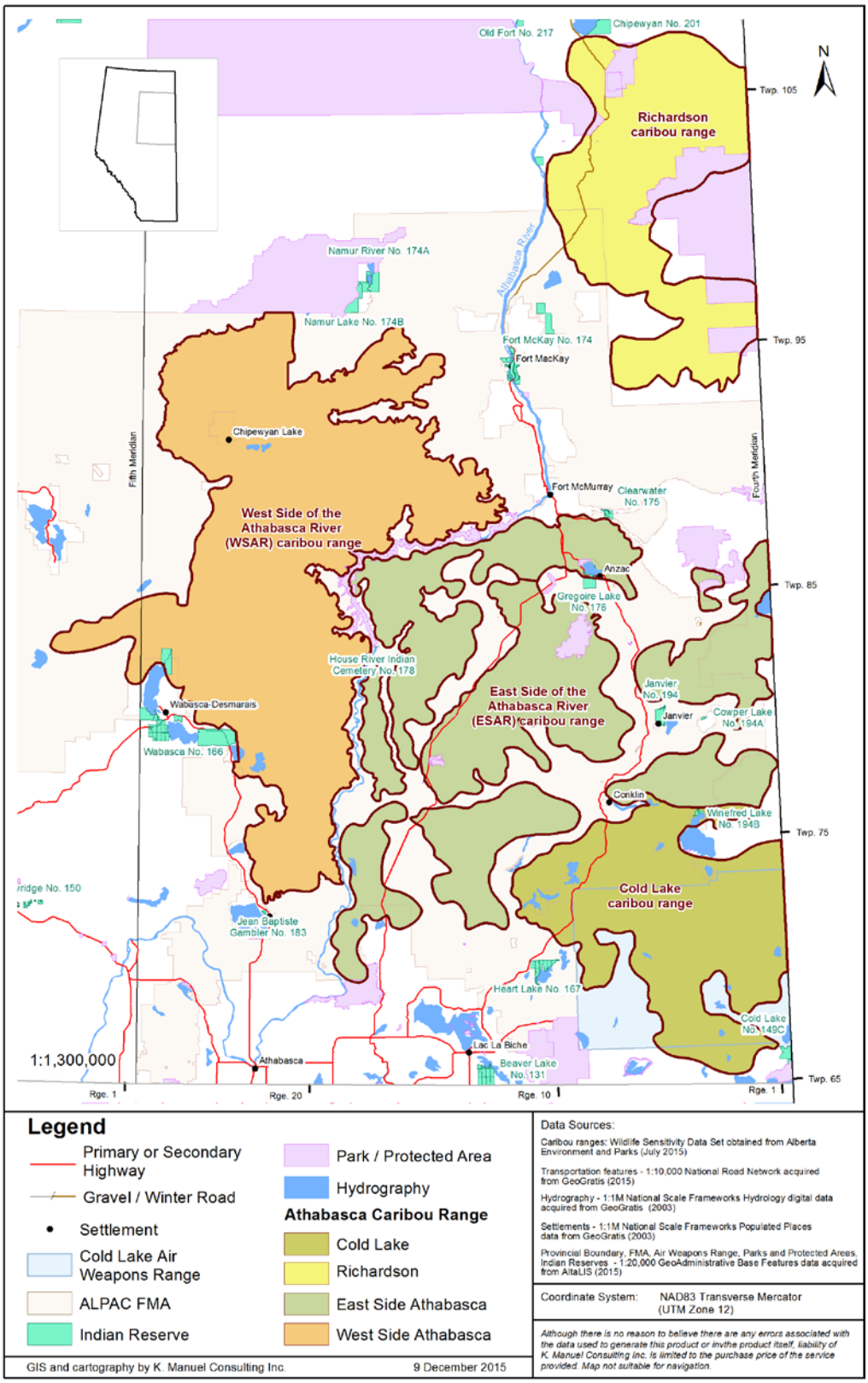

Figure 1. Study area for the Caribou Predator Fencing Pilot.

2. PREDATOR FENCE CANDIDATE AREAS, EXAMPLE FENCE LAYOUT AND DESIGN

In mid-2015, a technical working group was formed to provide input to the Pilot on ecological aspects of fence design, construction, and operation. This technical working group included academic, government, oil sands, forest industry, and consulting caribou experts with experience in northeast Alberta and with maternal penning. Based on their technical analyses and discussion, this group concluded that the Pilot should focus on a smaller predator fence to formally test this concept (i.e., approximately 100 km^2 rather than the 1,000-2,000 km^2 area initially considered). The technical working group also concluded that while maternal penning is currently being conducted in British Columbia (see McNay et al. 2013, Serrouya et al. 2015b), there is uncertainty around the effects of repeated animal handling and the relative benefit of maternal penning for population-level recovery (CCRT 2010, Smith and Pittaway 2011). Results from British Columbia are expected to provide additional information about these issues and the potential value of the maternal penning approach. It is also important to highlight that the main objective of maternal penning is to increase early calf survival, which occurs – along with a secondary benefit of improved cow survival – during the penning period. From a technical perspective, maternal penning (assumed to represent a seasonal 10 ha fenced area) was therefore concluded to represent a short-term tool that could be deployed to complement the predator fence pilot during critical periods where fast action is needed to manage predation risk.

We identified predator fence potential candidate areas based on GIS desktop analyses of available satellite imagery and other geo-spatial datasets (including telemetry locations from collared caribou) (Appendix A). We subsequently developed example fence layouts and considered preliminary design aspects of a predator fence in a subset of technically preferred candidate areas. During this project we did not have complete knowledge or access to geo-spatial datasets of all tenure holders within the study area; and acknowledge that potential locations and preliminary design of a predator fence are likely to be modified further through additional iterations based on consultation with tenure holders, GOA, Aboriginal communities, and other land users and stakeholders. Thus the primary intent of identifying these potential candidate areas and example fence layouts is to help facilitate informed engagement and evaluation that would ultimately lead to detailed design of one preferred pilot location.

2.1 METHODOLOGICAL APPROACH

Our methodological approach was initiated at a broad landscape scale to identify eight areas of interest for the Pilot. Our objective was to identify at least two areas of interest for each of the four caribou ranges (WSAR, ESAR, CL, and RICH). A subsequent task was to narrow down that list to four predator fence potential candidate areas based on discussion and feedback from the technical working group.

The second step in our approach was to develop example fence layouts within the four predator fence potential candidate areas and collaborate further with the technical working group to identify two technically preferred candidate Areas. Examples of

perimeter fence layouts within potential candidate areas were based solely on landscape level biophysical features, vegetation characteristics, and orientation along existing linear and polygonal anthropogenic footprints. The example fence layouts were explored to highlight potential differences and implications of site characteristics on fence design considerations. Where possible, the fence lines were oriented along existing industrial footprint features, as this was thought to support subsequent planning, construction, maintenance, and monitoring of a perimeter fence. The example fence layouts discussed in this report should not be considered as final, proposed, or even draft locations, as they have not yet undergone any level of consultation or engagement with tenure holders, Aboriginal communities and other stakeholders.

The third and final step of our desktop assessment was to provide a preliminary design for the perimeter fence, based on previous reviews (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, Terrain FX 2011), preliminary results of fence trials (Serrouya et al. 2015a) and expert opinion of an experienced fencing contractor. We combined those sources into an initial set of recommendations for preliminary design of a perimeter fence.

2.1.1 Identifying Predator Fence Areas of Interest

We used a structured, criteria-based approach to identify two initial areas of interest within each of four Lower Athabasca Region caribou ranges: WSAR, ESAR, CL, and RICH (Figure 1). We sequentially applied multiple criteria to reduce potential area and selected areas of at least one township (~ 100 km^2) within delineated caribou ranges with the best habitat (mature forested peatlands and upland pine forests) and met the following basic criteria (Figure 2):

- outside of protected areas (to minimize potential conflict with land-use priorities within protected areas and conservation zones);
- minimal inclusion of areas burned in the last 40 years (to reduce potential of selecting young forests, which are generally less suitable for caribou habitat); and
- did not include large rivers (to eliminate need to fence across large waterways) or permanent anthropogenic footprints (i.e., major roads, railways, towns, and settlements).

Selection of predator fence areas of interest was based on a ranking of relative habitat value applied to a 100 km^2 scale township grid, which incorporated the contribution of positive (habitat) and negative (disturbance) factors determined from available geo-spatial datasets and using a methodology described by McCutchen et al. (2009) and applied by the Athabasca Landscape Team (ALT 2009; p. 23). The positive and negative factors are summarized below.

- Positive (habitat) factors were those areas having more of the following features received a relatively high ranking:
    - woodland caribou habitat

      In general this means >50 year old forested peatlands and > 80 year old upland pine forests for boreal caribou.

- Negative (disturbance) factors were those areas having more of the following features received a relatively low ranking:
    - young forest (<30 years old natural disturbance)
    - cutblocks
    - well sites
    - linear features which includes all roads, pipelines, power lines, and
    - seismic lines
    - mines (e.g. oil sands, coal, peat, gravel)
    - steam assisted gravity drainage (SAGD) facilities
    - human settlements

We also used available telemetry data from caribou fitted with VHF and GPS to apply an index based on the relative frequency of use by caribou. We mapped the number of telemetry locations within a township grid that intersected the caribou ranges. Each township was ranked as low, medium or high according to the combined number of VHF and GPS locations that occurred within it.

The total count of VHF and GPS collar locations within a township cell were overlaid on the habitat values and displayed as low, medium, and high categorical values based on Jenks natural breaks classification method in ArcGIS (which assigns categorical breaks that best group similar values and maximize the differences between categories). Based on these habitat and caribou-use criteria, we visually evaluated townships within the study area and selected two areas of interest within each of the four ranges based on the relative habitat values and collar location data layers displayed at the township grid scale. We defined an area of interest using a circular search area of ~585 km^2, which was large enough to encompass a block of four townships and which was positioned over the 1-3 townships that had the best combination of high relative habitat values and high use by collared caribou.

We also reviewed additional ancillary map layers including:

- recent analyses and map layers provided by Alberta Environment and Parks (GOA), which showed overlays of caribou home ranges within the study area and draft priority areas for caribou habitat restoration; and
- restoration areas for landscape level caribou habitat restoration as identified by the Regional Industry Caribou Collaboration (RICC) (Saxena et al. 2014).

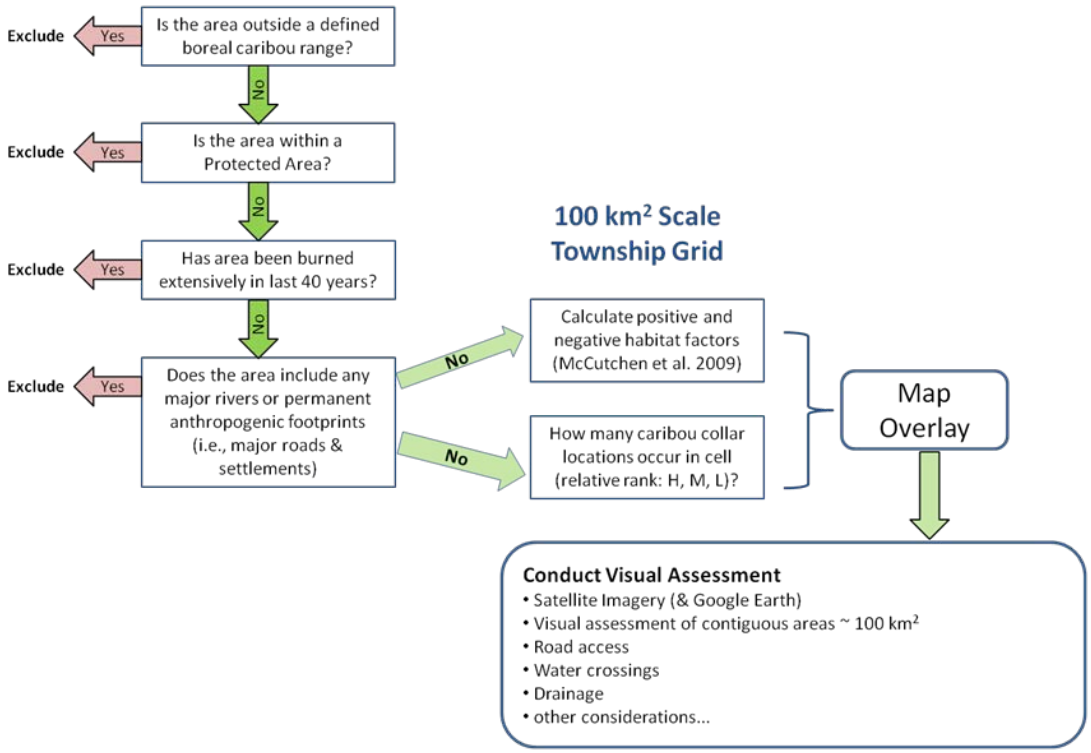

Figure 2. Overview of stepwise application of multiple criteria to identify areas of interest for predator fence Pilot.

2.1.2 Example Fence Layout

We met with the technical working group (September 2015) to assess and review a subset of the eight predator fence areas of interest based on visual assessment from satellite imagery, and consideration of topographic features, access, and other landscape level characteristics. The technical working group selected four predator fence potential candidate areas (two in ESAR and two in CL) and recommended those areas be assessed further for example fence layout and design. The technical working group selected those candidate areas because they were located in the highest risk boreal caribou ranges and provided better logistical access for a predator fence Pilot. Although at the range scale there is underlying rationale and evidence to suggest that risk to caribou subpopulations is linked to human disturbance (Schneider et al. 2010, Environment Canada 2012), the technical working group posited that a key factor tied to likelihood of success for the Pilot was linked to logistical access, which in turn would provide favorable conditions for fence construction, maintenance, and monitoring. In this context, presence of roads and linear features in a candidate area was thought to support a successful outcome to the Pilot.

Subsequently, we used available satellite imagery and spatial data to develop an example of a fence layout approximating 100 km^2 within each of the four potential candidate areas. Based on input from the technical working group, we developed example fence layouts in Google Earth with consideration of the following criteria:

- maximize use of existing all-weather transportation corridors (preferred) and other linear corridors for the fence line;
- minimize fence length to area enclosed;
- avoid crossings of navigable waterbodies;
- minimize watercourse and stream crossings;
- avoid crossings of railway lines and highways;
- minimize length of wetlands (i.e., avoid organic surficial materials) along fence lines; and
- provide opportunities for future expansion.

In developing example fence layouts, we found that rather than completely exclude burned areas (< 40 years), it was necessary in some candidate areas to include some recently burned areas to fulfill the criteria laid out above. Thus our approach was to minimize inclusion of recently burned areas where possible within fenced areas. The example fence layouts were subsequently reviewed and discussed with the technical working group in a follow-up meeting (November 2015).

2.1.3 Preliminary Design of Perimeter Fence

We summarized preliminary cost-estimates and design concepts for the predator fence locations based on the previously commissioned work, which included:

- the initial OSLI independent feasibility assessments (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, and Terrain FX 2011),
- COSIA white paper (Boutin and Serrouya 2015); and
- COSIA fence trials (Serrouya et al. 2015a).

We also consulted a fence construction contractor with extensive experience in game and wildlife fencing in northern Alberta (Appendix B).

3. RESULTS

3.1 PREDATOR FENCE AREAS OF INTEREST

The WSAR range (15,707 km^2) was the largest of the four caribou ranges, while CL (6,726 km^2) was the smallest (Figure 3). After the range areas were netted down following the subtraction of recent fires, protected areas, permanent human footprints, and major rivers, the WSAR range had the greatest area remaining for selection of areas of interest, while the RICH range had the least amount of area available (Figure 3). Across the four ranges, the area recently burned was the greatest net-down factor within the ranges; the RICH range had ~4,380 km^2 (62%) of the range subtracted due to fire leaving only 1,604 km^2, or 23% of the range area left for selection of areas of interest. In

contrast, recent fires accounted for only ~790 km^2 (5%) of the WSAR range leaving the vast majority of the area, 14,458 km^2 (92%), available for selection of areas of interest (Figure 3).

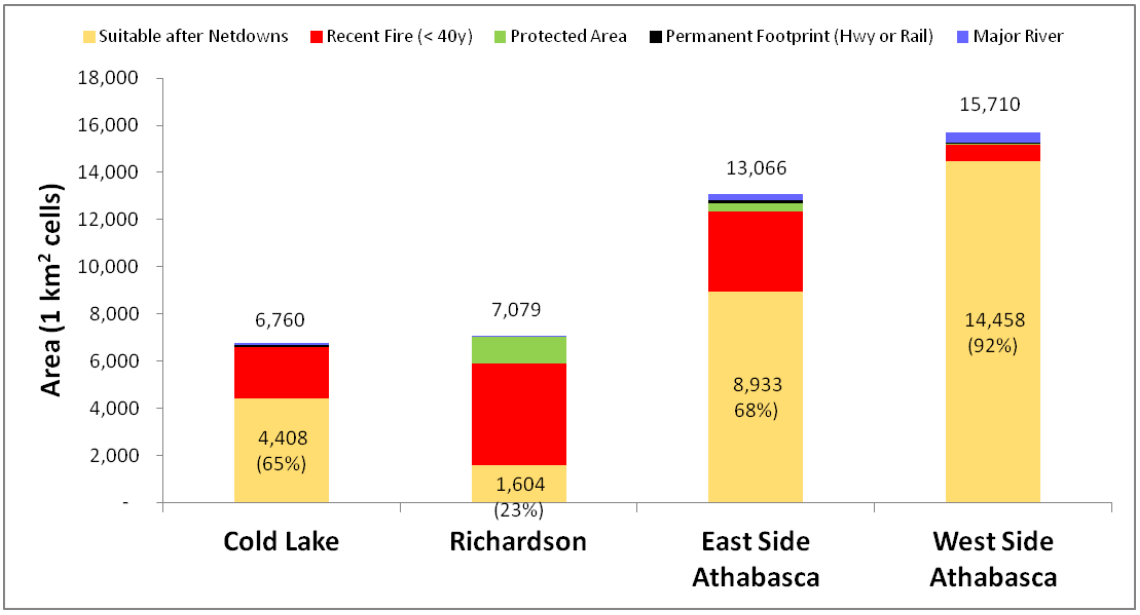

Figure 3. Caribou range areas (km^2) suitable for selection of predator fence areas of interest, following net-downs due to recent fires, protected areas, permanent footprints, and major rivers.

Within the suitable areas of the four caribou ranges, relative habitat values of township cells were mapped across a color spectrum ranging from green to red, with dark green showing the highest relative habitat values and red showing the lowest relative habitat values. The WSAR range had the greatest number of high habitat value township cells along its eastern and southeastern areas, followed by ESAR, CL and RICH.

Based on a review of the eight areas of interest with the technical working group, four potential candidate areas were advanced as locations to develop example fence layouts. Discussion of the pros and cons of the areas of interest was comprehensive (see Table 1), and the main rationale for selecting the four potential candidate areas was based on the group's understanding that:

- conservation benefit of a predator fence project would be greater for herds and ranges such as ESAR and CL that are considered to be at greater risk of extirpation (ALT 2009, Hervieux et al. 2013); and

- likelihood of Pilot success is tied to the construction and maintenance of an effective perimeter fence, and therefore success would be higher in candidate

areas that would enable year-round ground access through existing networks of roads and linear features.

Thus the four predator fence potential candidate areas in the ESAR and CL ranges were considered for the next phase – exploring options for example fence layout (Table 1). And the potential candidate areas that had higher potential ground access through existing roads and linear features were considered to be technically preferred locations.

Table 1. Summary of strengths and weaknesses of eight areas of interest discussed by technical working group (21 September 2015).

Area of Interest	Caribou Range	Strengths	Weaknesses	Consider for next phase?
1	**WSAR**	High habitat value and caribou use. No in situ development within area. Reasonable access.	WSAR is lower conservation priority. Challenging habitat to work in.	No
2	**WSAR**	"	Low existing road infrastructure. Much less MCP overlap relative to area 1. Lower conservation priority. Challenging habitat to work in.	No
3	**ESAR**	Good road access from south and NE.	Intensive seismic activity in recent years.	Yes
4	**ESAR**	Good road access and lower seismic line density compared to Area 3.	River/stream crossings may be an issue. (e.g., Christina River). Look at Canadian Boreal Forest Agreement deferral zones?	Yes
5	**CL**	Could use western edge of CLAWR as a boundary for fence (large benefit). Initial assessment of mineral lease tenure suggests that there may be a lot of untenured lands. Road access associated with Highway 881.	Access within CLAWR may be challenging. Non-military aircraft operations are restricted. Lakes/rivers may be an issue. Once released, caribou may not be close to range, e.g., on periphery of range. HWY may be an issue for released caribou to deal with. Predator management in CLAWR may be difficult due to restricted access.	Yes
6	**CL**	Could use northern edge of CLAWR as a boundary (large benefit). Good industrial road access through middle of area, which could help establish fence lines.	Medium occurrence of collar locations but area appears to be on periphery of home range densities. Large SAGD development project approved in the area. Predator management in CLAWR may be difficult.	Yes
7	**RICH**	Currently a stable subpopulation. Pilot project may support survival of most caribou, which could be used for conservation translocations. May have low predator density to start with.	Predator & other management would be very difficult outside of the fence. Overall access is low. May not result in highest conservation benefit (maybe just more animals) – e.g., success may be irrelevant for local population. Could open Pilot up to substantive criticism; for example, even if successful survival rate of calves, may be seen as un-needed in that area. May not learn the most / get best return on investment. May impact other Species at Risk (e.g., wood bison)	No
8	**RICH**	"	"	No

3.2 EXAMPLE FENCE LAYOUTS

Example layouts of perimeter fences were initially developed in Google Earth and subsequently assessed in ArcGIS for each of four predator fence potential candidate areas; average extent of the example fenced areas was 120.3 km2 and ranged from 99.5 – 133.7 km2 (Figure 4). The average length of example perimeter fences was 45.4 km and ranged from 39.5 – 51.3 km (Figure 4).

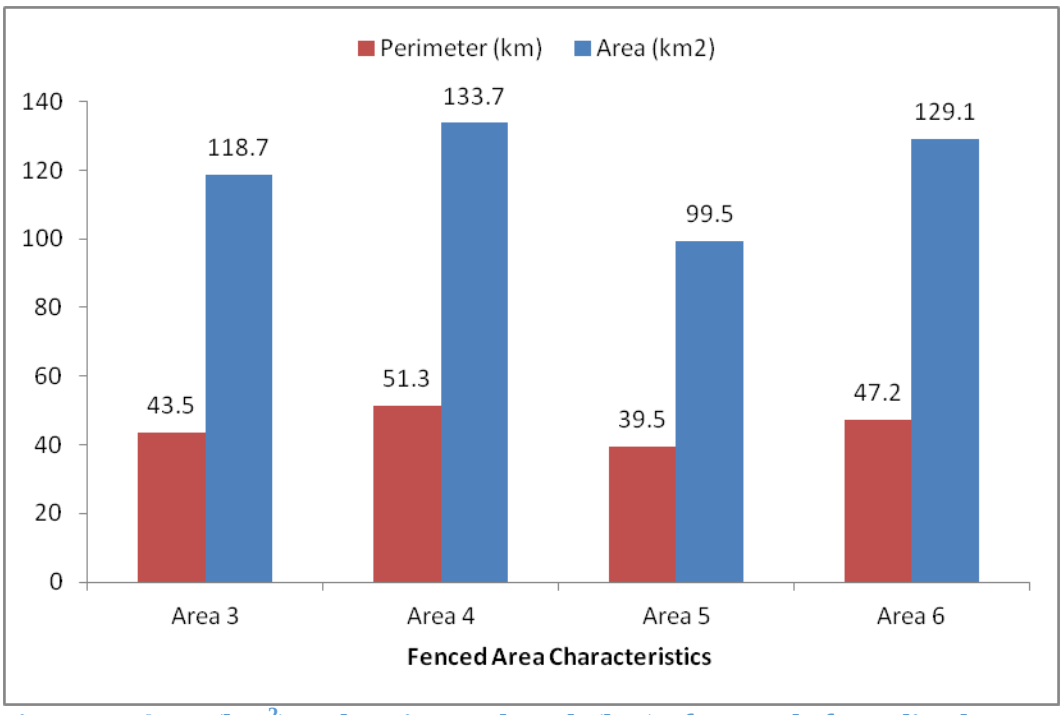

Figure 4. Area (km^2) and perimeter length (km) of example fence line layouts for four potential candidate areas.

Where possible, fence layouts paralleled existing linear features within a predator fence potential candidate area and main characteristics are summarized below.

- potential candidate area 3 had the greatest length of potential fence line paralleling existing seismic lines (17.5 km), and it also had the greatest requirement for new cut right-of-way (ROW; 17.8 km) (Table 2).
- potential candidate area 4 had the greatest length of potential fence line paralleling existing roads (26.6 km), and paralleled seismic lines for 13.2 km (Table 2).
- potential candidate area 5 paralleled roads for 18.9 km and rail for 10.4 km, and required 9.2 km of new cut fence line (Table 2).
- potential candidate area 6 had the least requirement for new cut right-of-way, and paralleled seismic (15.2 km), road (15.5 km) and pipeline (15.8 km) in approximately equal amounts (Table 2).

Table 2. Characteristics of example fence layouts within four predator fence potential candidate areas.

Candidate Areas	ESAR Area 3	ESAR Area 4	CL Area 5	CL Area 6
Fence Line Associated with Existing Footprints (based on Base Features data, Feb. 2014)				
Paralleling seismic	17.5	13.2	0.0	15.2
Paralleling road	7.9	26.6	18.9	15.5
Paralleling pipeline	0.0	4.9	0.7	15.8
Paralleling rail	0.0	0.0	10.4	0.0
Facility	0.4	0.4	0.4	0.0
Newcut right-of-way	17.8	6.3	9.1	0.8
Fence Line Length (km)	43.6	51.3	39.5	47.2
Fence Line Intersecting Landcover Types (AVI and AGCC*, July 2009))				
Upland Forest (HW, MW, Pine, Wh Sp)**	9.5	19.4	12.1	20.0
Riparian Forest	0.4	0.5	1.2	0.3
Black Spruce Forest (closed - open Bl Sp)*	12.4	9.6	14.9	8.8
Shrub	0.0	0.0	0.0	0.0
Herbaceous	0.1	0.6	1.8	0.0
Wetland (Bog, Fen)	21.2	21.2	9.5	18.1
Open water	0.0	0.0	0.0	0.0
Fence Line Length (km)	43.5	51.3	39.5	47.2
Number of small stream crossings	21	17	4	8

* AVI = Alberta Vegetation Inventory; AGCC = Alberta Ground Cover Classification

** HW = hardwood, MW = mixed wood, Wh Sp = white spruce, Bl Sp = black spruce

Table 2 also summarizes the landcover types or vegetation communities that intersected the examples of perimeter fence layouts within the four predator fence potential candidate areas. Potential candidate areas 4 and 6 had the greatest lengths of upland forest intersecting their example perimeter fence lines at 19.4 km and 20.0 km respectively. Potential candidate area 6 had the least amount of black spruce forest along its example perimeter fence (8.8 km) compared to the other areas, whereas potential candidate area 5 had the least amount of wetland (9.5 km) along its example fence line. Based on hydrological base features, potential candidate areas 5 and 6 also had the fewest number of expected small stream crossings with 4 and 8 respectively (Table 2).

Bog/fen was the most extensive vegetation or landscape type that occurred within each of the example fence layouts, and ranged from 49 – 64% of the fenced area (Figure 5). The second and third most extensive landscape types within the example fenced layouts were black spruce forest (range was 11-30%) and upland forests (range was 11 – 24%) (Figure 5).

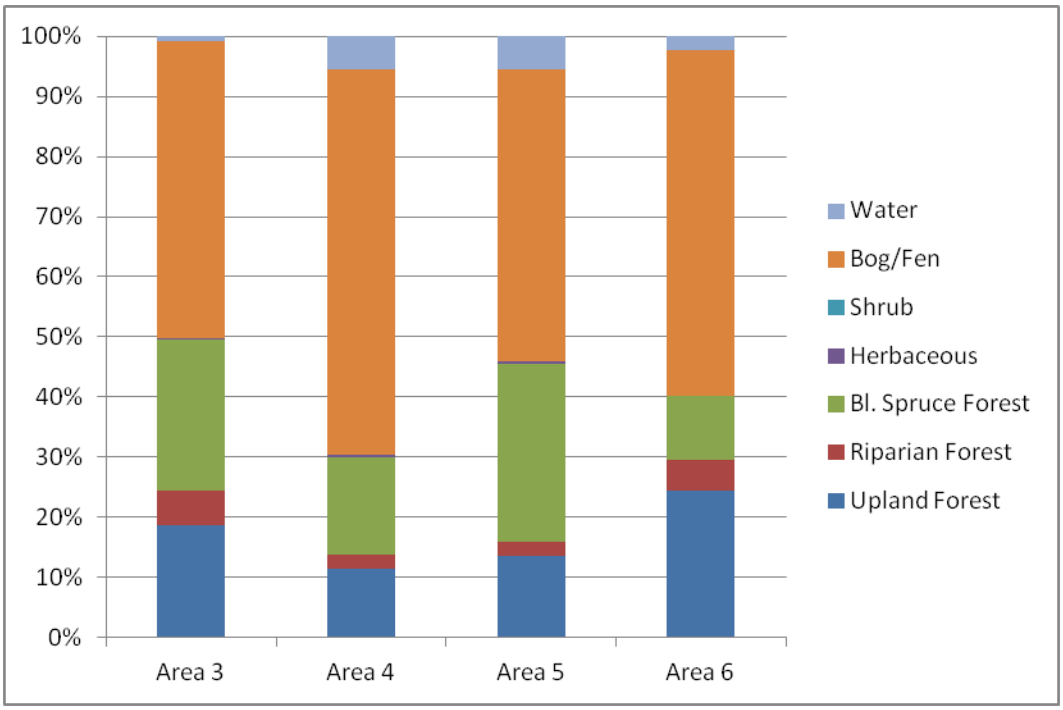

Figure 5. Proportion of landscape types enclosed within example fence layouts at four predator fence potential candidate areas.

Table 3 provides a more detailed breakdown of landscape and footprint types within example fence layouts in four predator fence potential candidate areas. The area taken up by direct footprint of anthropogenic features represented 1.9 – 3.7% of the example fenced areas. Linear feature density (i.e., roads, seismic lines and pipelines) across the example fenced areas ranged from a low of 1.9 km/km^2 in Area 6, to a high of 6.6 km/km^2 in potential candidate area 3.

Following discussion with the technical working group, predator fence potential candidate area 6 was ranked as the best option of the four example layouts for a predator fence Pilot based solely on landscape characteristics and access considerations. The positive evaluation was based on available footprint imagery, which resulted in an example fence layout that was tied to industrial road access and an industrial road running along the proposed north and eastern boundary. It also had a relatively low number of potential stream crossings (n=8) and a relatively high length of fence line (20 km) occurring within upland forest (Table 2). With respect to access, predator fence potential candidate area 4 was also identified as a good option because the example fence layout showed that the fence line could run parallel to industrial roads for 26.6 km; and that 19.4 km of the fence would occur in upland forest (Table 2). A potential drawback of

candidate area 4 was that the example fence layout had a comparatively high number of stream crossings (n=17) (Table 2).

Table 3. Landscape composition of areas within example fence layouts at four predator fence potential candidate areas.

Candidate Areas	ESAR Area 3	ESAR Area 4	CL Area 5	CL Area 6
	km²	km²	km²	km²
Total Area	118.7	133.7	99.5	129.1
Landscape Type				
Bog	14.1	11.8	4.3	0.9
Closed Black Spruce	29.3	21.3	28.4	13.3
Herbaceous	0.2	0.4	0.5	0.1
Hardwood	2.1	2.6	1.5	4.2
Lentic	0.8	7.1	5.2	2.8
Mixed wood	5.9	0.9	1.6	2.2
Open Black Spruce Fen	5.4	9.2	0.0	9.7
Open Fen	37.7	63.3	42.4	61.6
Pine	12.4	9.9	6.6	23.3
Riparian	6.7	3.3	2.3	6.3
Small Lotic	0.1	0.0	0.0	0.1
White Spruce	1.1	1.5	3.2	0.9
Sum	115.9	131.2	95.8	125.4

Footprint Type	km²	km	km²	km	km²	km	km²	km
MajorRoad	0.0		0.1		0.2		0.4	
MinorRoad	0.0	0.1	0.1	8.4	0.1	1.0	0.1	4.4
Rail					0.0			
Transmission Line					0.0	13.9		
Gravel Pits					0.1			
Industrial	0.3		0.2		0.1		0.4	
Seismic	0.9	739.8	0.8	302.9	0.8	208.6	0.6	159.3
WellSite	1.0		0.5		0.2		0.3	
Pipeline	0.5	41.5	0.8	37.1	2.2	58.7	2.1	83.5
Sum	2.8	781.4	2.5	348.5	3.6	282.2	3.8	247.3

Footprint in Fenced Area (%)	2.3%	1.9%	3.7%	2.9%
Linear Feature Density (km/km²)	6.6	2.6	2.8	1.9

3.3 PRELIMINARY DESIGN CONSIDERATIONS FOR PERIMETER FENCE

The initial predator fence feasibility assessments (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, Terrain FX 2011) commissioned by the OSLI Land Stewardship Working Group, highlighted common design elements for exclusionary fences. The basic high fence design originates from the game ranching industry and has been used extensively by national parks and transportation agencies to act as an impermeable barrier to contain large mammal populations (i.e., Elk Island National Park) and/or to restrict movements of large ungulates and carnivores on to highway corridors as a means of reducing wildlife-vehicle collisions (i.e., Banff National Park). The basic elements of the high fence system comprise woven wire mesh (~2.5 m high) supported by steel or wooden posts spaced at 5-6 m intervals. Wire mesh ground aprons have also been added to the basic fence design as a means of preventing animals from digging underneath the fence. The need to consider design measures that prevent climbing by bears and possibly other predators was identified at the expert-based workshop (Antoniuk et al. 2012).

In follow-up to the initial feasibility assessments and expert-based workshop, Serrouya et al. (2015a) recently completed a field test of a 'phase 1' fence design that comprised the following components: galvanized steel posts embedded in concrete, 2.5 m tall woven wire barrier topped with a metal sheet on the outside of the fence (to prevent climbing by bears), and a mesh apron extended from the bottom of the fence (to inhibit digging). Results indicated that the metal sheet prevented bears from climbing up the fence, but that a black bear(s) had gained entry on 2 of 22 detected attempts by opening the seam between the fence and the apron (Serrouya et al. 2015a). Due to the high cost of this 'phase 1' fence design (i.e., $183,000 / km), additional research is being conducted to evaluate electric fence options and the effectiveness of replacing the metal sheet and ground apron with an electrical fence set 1.5 to 2.0 meters away from the high fence (Harding 2015, Serrouya et al. 2015a).

To build upon the recent and ongoing research, we consulted a wildlife and game fencing expert (Appendix B), with the goal of advancing additional design options for the predator fence that would be practical and effective. Those additional design options are summarized below.

- High tensile game fences are designed to be stretched and give when tested by animals. Well-constructed fences are generally able to withstand animal impacts from large animals such as moose, and moose-fence interactions are likely inevitable. Tight-lock game fence built using high tensile galvanized wire and manufactured in Langley, BC is the best material to use. Chain link fence should be avoided because it does not attach well to posts and has little stretch, thus giving it poor ability to withstand sudden pressure by large animals and maintain integrity after impacts.

- For large scale fencing, a recommended fence post option is to alternate between pressure-treated wooden posts and galvanized steel posts at a 1:1 ratio or a ratio of 2 wooden posts: 1 steel post. The basis for this recommendation reflects the

contractor's field experience that wooden posts are less prone to frost heave than steel posts and are generally more solid once pounded in to the ground. The mix between wood and steel posts ensures that the fence will remain standing even if a wild fire burns some wooden posts along sections of fence.

- Fence post spacing is generally designed around 20 feet (6.1m), but in the field the spacing typically ranges between 16-20 feet (4.9-6.1 m) with an average of 18 feet (5.5 m).

- Pressure-treated wooden posts should last 25-30 years. The recommended post would be 5-6 inch (12.7 – 15.2 cm) diameter and 12 feet (3.7 m) long. Larger diameter posts, 6-7 inches (15.2 – 17.8 cm) are good but more expensive (>$40 / post).

- The best steel posts are galvanized and built based on a schedule 40 – heavy wall pipe designation – and have a $2\ ^{7}/_{8}$ inch (7.3 cm) outside diameter, 13 foot length (4.0 m), and weight of ~40-50 lbs (18 – 22 kg) each. For a large project such as the Pilot, these posts would likely have to be pre-ordered 1 year in advance.

- Fence corners (and in-line bracing) should be built as welded box ends using 5 inch diameter steel pipe (pilings), constructed with 16 foot posts, and 14-16 foot (4.3 – 4.9 m) cross piece.

- Single strand high tensile hot (electrified) wires can be attached to fence posts (with outriggers and insulators) and would improve effectiveness of the fence system. The game fence (and ground apron) establishes a physical barrier to wildlife, while addition of hot wires adds a physiological barrier effect through aversive conditioning. Placement of hot wires using outriggers and insulators and at designated heights is important to have the intended effect. For example, a hot wire on the outside of the fence placed closer to ground level (10-12 inches; 25.4 – 30.5 cm) would deter black bears. On the inside of the fence, an outrigger with a hot wire placed at nose height (3 feet; 91.4 cm agl) would deter ungulates from testing the fence.

- To prevent grounding out of electrical outrigger wires that may come into contact with growing vegetation and to maintain good visibility along fenceline, vegetation management would be required. Application of herbicide along the fence may control broadleaf and woody vegetation for multiple years.

- The fence line right-of-way should be at least two times the average tree height to minimize the likelihood and damage from tree fall, and to facilitate ground vehicle access.

Cost of a fence is fundamentally tied to fence design, materials and labor.

However, because the predator fence is still at a preliminary design stage, with ongoing field research and no consensus on the precise location or specific design parameters to

be implemented in the field, we reviewed and applied previous and recent best estimates of costs. Table 4 summarizes the estimated costs of fence construction on a per kilometer basis. Using an assumption of a 50 km average perimeter length, which reflects the fence layouts we drafted for the four potential candidate areas (Table 2), the estimated range of construction costs for the predator fence varied by an order of magnitude from $1M at the low end to $10M at the high end. However, we suggest that construction cost is more likely to range from $2.5M to $5M (see Discussion below), with associated cost estimates on a per kilometer basis ranging from $50,000 - $100,000 / km. A contingency factor of 30% should be assumed for this preliminary cost estimate, as a final location has not been selected.

Table 4. Summary of fence construction costs.

Fence Description (materials and labor)	Estimated Cost / km	Reference	Estimated Cost of 50 km Perimeter Fence
High tensile game fence: 10" x 10" mesh, 10' height, "chicken wire" apron	18,556	Terrain FX 2011	$ 927,778
Low range estimate: material costs on farmland = $15-18/m, & 'ready to go'	20,000	R. Boos pers. comm.	$ 1,000,000
High tensile game fence: predator fence apron, steel posts (Upland)	22,734	Matrix 2011	$ 1,136,700
High tensile game fence: predator fence apron, steel posts (Wetland)	27,243	Matrix 2011	$ 1,362,150
Highway style fence: woven wire, non electric, easy access	38,700	HAB-TECH 2011	$ 1,935,000
Banff National Park: 2 m high wildlife fencing	40,000	HAB-TECH 2011	$ 2,000,000
Wildlife exclusion fence along major highway in northwest U.S. in 2007 (US$)	48,000	Golder 2011	$ 2,400,000
Mid range estimate (adjusted material costs, transportation & logistics)	50,000	R. Boos pers. comm.	$ 2,500,000
Wildlife exclusion fencing, 2.5 m high page wire fence with wooden posts	50,000	Golder 2011	$ 2,500,000
Flathead Reservation – US Highway 93 (highest cost w mesh fence in soil)	53,000	HAB-TECH 2011	$ 2,650,000
Game fencing of Trans Canada Highway in Bow River corridor	60,000	Matrix 2011	$ 3,000,000
Electric fence	77,000	Serrouya et al. 2015	$ 3,850,000
High range estimate: premium materials, high variance conditions & logistics	100,000	R. Boos pers. comm.	$ 5,000,000
High tensile game fence: steel posts, metal sheet topper & wire mesh apron	183,000	Serrouya et al. 2015	$ 9,150,000
Margo Supplies fence: chain link, electric, buried apron & difficult access	200,000	HAB-TECH 2011	$ 10,000,000

4. DISCUSSION

4.1 VALUE OF METHODOLOGICAL APPROACH

As a desktop analysis, we used a systematic approach to define predator fence areas of interest within four caribou ranges of the Lower Athabasca Region of northeast Alberta. We started by mapping and discounting areas based on undesirable characteristics for administrative or biophysical reasons (i.e., protected areas, recent fires, permanent anthropogenic footprints, and large rivers). The next step was applied at a finer scale in which we used the Alberta Township System as a grid to define relative habitat potential and relative use by collared caribou in ~100 km^2 spatial units. The goal was to visually identify spatial units with the appropriate characteristics (i.e., having good habitat and used by caribou) as a basis for identifying and selecting predator fence potential candidate areas.

One potential problem with this approach is that land cover and footprint data used for the relative habitat assessment were from 2009, so actual landscape conditions have likely changed due to occurrence of additional human footprint and wildfires since the time of data collection. However, by mapping and accounting for recent fires (as of late summer 2015) we think that the potential candidate area assessment and ranking based on relative habitat value should not be unduly biased. With respect to changing landscape conditions that occur during the inherent time lag between monitoring and reporting anthropogenic footprint, we think that subsequent review of the areas of interest with tenure holders, GOA Base Features data and interpretation of high resolution imagery reflects the best available information. In addition, further detailed assessment and planning within potential candidate areas will necessarily rely on site-specific evaluations. For the purposes of defining and evaluating potential candidate areas for broader engagement, we suggest that our methodology was transparent and appropriate.

Based on our analysis, we identified eight areas of interest. Through consultation with the technical working group, we narrowed the list of eight areas of interest to four predator fence potential candidate areas. We subsequently developed configurations of example fence layouts for the four potential candidate areas, and ranked areas 6 and 4 as being technically preferred based solely on landscape characteristics, and access considerations. We suggest that the two technically preferred potential candidate areas be advanced as working examples for discussion with tenure holders, regulators, Aboriginal communities, land users and other stakeholders in the regulatory approval and engagement process.

Tenures and interests were not considered in the technical analysis, so potential candidate areas identified using technical and ecological criteria will need to be evaluated further. Tenure holder support for this industry-funded initiative is a prerequisite to further evaluation. Indeed a key issue that was raised during this exercise was that the best available data showing current footprint on the landscape does not reflect future and approved development plans by tenure holders. Some tenure holders have suggested that candidate areas that include large scale SAGD development projects may not be a suitable location for a predator fence project. Engagement and additional design work is intended to lead to selection of one preferred Pilot location and to ensure that all rights and interests are respected.

4.2 ADVANCING THE PREDATOR FENCE PRELIMINARY DESIGN FOR A PILOT PROJECT

Previous work to develop a conceptual design for a fenced woodland caribou safe zone was conceived at a broader landscape scale, where the fenced area would be on the order of ~1500 – 3000 km^2 and have an associated perimeter fence of ~ 150 – 300 km (Golder Associates 2011, Hab-Tech Environmental 2011, Matrix Solutions 2011, Terrain FX 2011). That work advanced the concept of landscape-level predator fencing and also provided insight on design and cost considerations (Antoniuk et al. 2012). Current technical rationale is that a caribou enclosure or predator fence should be advanced as a pilot project and implemented at a smaller scale of ~100 km^2 to demonstrate success (Boutin and Serrouya 2015).

However, in order to advance fence design and costing options from a conceptual, desktop analysis for several locations to detailed design sufficient for construction specifications, it is important that site-specific work be undertaken concomitant with regulatory and stakeholder engagement (see Section 3.2 in Overview report). Site surveys and engagement of tenure holders, GOA, Aboriginal communities, and other land users in the selected fence area are required to provide a more specific predator fence design that reflects both local habitat and topographical (i.e., drainage) conditions, access management requirements, and is consistent with the land management objectives of tenure holders and other key stakeholders. This will reduce uncertainty associated with the cost estimates outlined here. Advancing the Pilot preliminary design will require an iterative and coordinated approach to regulatory and stakeholder engagement (see Sections 3 to 5 in Overview report), and site-specific fence and infrastructure design requirements. Figure 6 (from Harding and Antoniuk 2016) depicts Pilot implementation phases and activities. Aspects relevant to fence design are discussed further below.

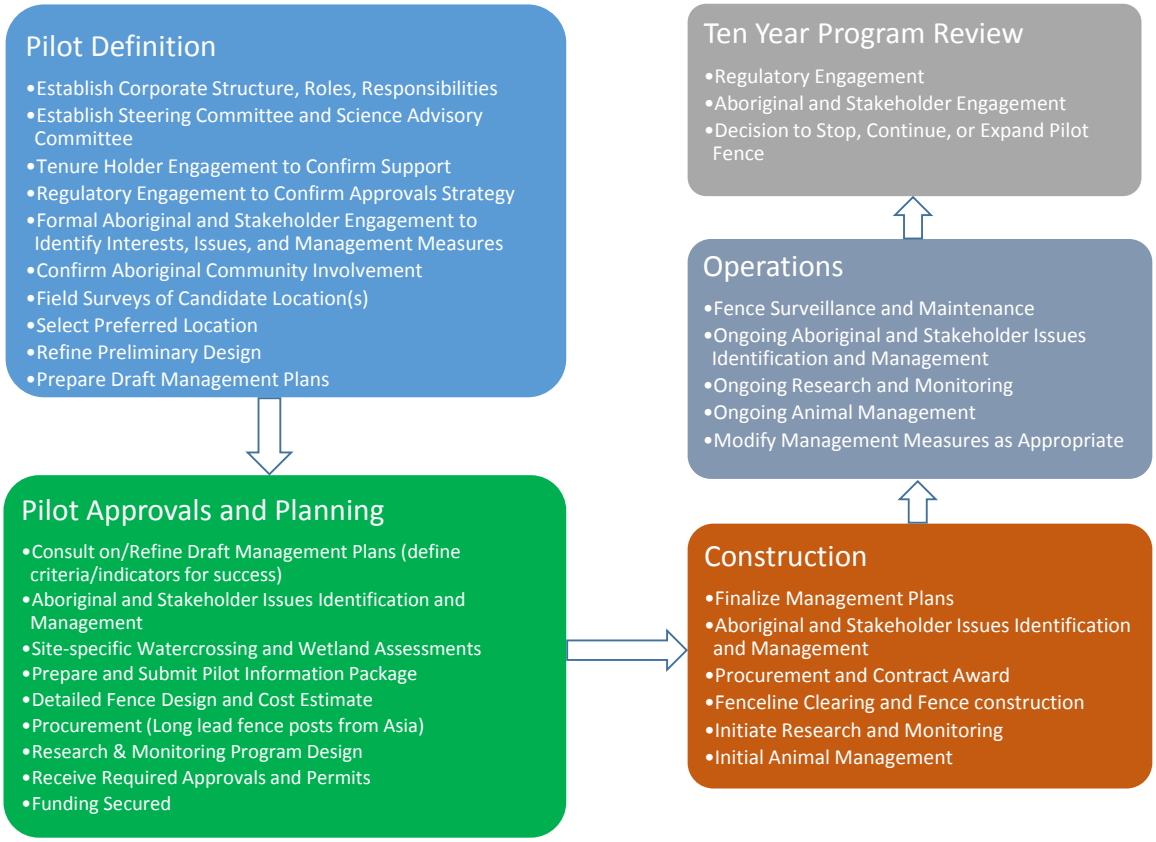

Figure 6. Caribou Predator Fencing Pilot implementation phases and key tasks.

4.2.1 Some Next Steps

The exercise of reviewing and comparing cost estimates of constructing a predator fence with a ~50 km perimeter (see Table 4) was informative. It provided insight on the range of plausible costs for fence construction. And it revealed that variance in the preliminary cost estimates for four candidate locations was not only a function of differing

perspectives on the key elements of fence design and construction, but was also affected by different assumptions on site location and conditions, as well as the scope of work that construction of a fence may actually entail.

The initial predator fence cost estimates developed for OSLI, when applied to construction of a 50 km predator fence, suggested a range of $1M - $10M (Table 4). The $1M cost estimate was similar to an independent cost suggested by an experienced contractor, but based on an equivalent per meter fence construction rate ($20/m) that he suggested was at the low end where construction would occur in an agricultural setting (Appendix B). At the upper range of the cost scale, the ~$10M estimate was based on a chain link fence design, which we suggest is an inappropriate fence type for an extensive wildlife containment fence (Appendix B). In their assessment of the second highest cost estimate (Table 4), Serrouya et al. (2015a) have suggested other modifications to fence design to reduce the price and suggested that an electrical fence design scaled to 50 km would cost ~$3.9M. We suggest that construction cost is more likely to range from $2.5M to $5M based on the median value of all estimates in Table 4, and 2X the median value. However, true fence costs are also a reflection of a broader cycle of purchasing materials, transporting materials to a staging area and construction site, consumables, capital costs, and labor effort that are closely linked. For this reason, a 30% contingency factor is recommended.

As suggested earlier, our review of previous cost estimates provided insight in to sources of variability or uncertainty in how those costs were determined. Two examples illustrate this point:

- Uncertainty around site location has cost implications tied to supply and transportation of materials and workers to and from the site, and worker accommodations; variable on-site conditions will determine field equipment requirements and influence fence design. Thus, costs associated with construction, materials, labor and fence design will legitimately vary depending on site location and site conditions.
- Differing assumptions on the scope of work that was included in fence construction also contribute to variance in previous cost estimates. For example, surveying and clearing of the fence line right-of-way could be considered part of fence construction or separate for contract purposes.

A key next step as part of the Pilot Definition and Approvals and Planning phases will be to advance the concept of the Pilot from preliminary desktop analysis of several alternatives to design of a single preferred location, and technical specification of fence design features. As outlined in Figure 12, this will require an integrated approach by a Fence Management Team that involves field surveys and regulatory and stakeholder engagement.

In order to advance predator fence design, cost estimates, and construction and management plans in preparation for construction, it will be important to address the following key questions:

- Where would the predator fence Pilot occur?
- What is the optimal layout and configuration for the predator fence based on site-specific conditions and other land user interests?
- What is the preferred specific predator fence design based on ongoing fence trials?

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6. APPENDIX A. DATA SOURCES

The following table summarizes data sources that were used for this project –Northeast Caribou Predator Fencing Pilot

NAME	SOURCE	Publically Available
Map data used for display purposes only		
Transportation features	1:10,000 National Road Network (2015)	yes - available from GeoGratis
Settlements	1:1M National Scale Frameworks Populated Places (2003)	yes - available from GeoGratis
Hydrography	1:1M National Scale Frameworks Hydrology (2003)	yes - available from GeoGratis
Map data used for display and analytical purposes		
Caribou ranges	AEP Wildlife Sensitivity Maps (July 2015)	yes - available from AEP
Fire	Forestry Division, Alberta Agriculture and Forestry (1931 to Aug 2015)	yes - available from AF
Hydrology	Base Features - Hydrography theme (2000 and 2004)	yes - available from AltaLiS
Parks and Protected Areas	Base Features - Geoadministrative theme (2008-2014)	yes - available from AltaLiS
LARP Conservation and Recreation Tourism Areas	Alberta Parks (2012)	yes - available from AEP
Forest Management Agreement (FMA) areas	Base Features - Geoadministrative theme (May 2014)	yes - available from AltaLiS
Cold Lake Air Weapons Range	Base Features - Geoadministrative theme (Feb 2012)	yes - available from AltaLiS
Quota holders	Forestry Division, Alberta Agriculture and Forestry (Nov 2015)	yes - available from AF
Land use - linear (roads, rail, powerlines, seismic, pipelines)	Base Features - Access theme (Feb 2014)	yes - available from AltaLiS
Land use - urban service area	Base Features - Geoadministrative theme (Jan 2015)	yes - available from AltaLiS
Land use - settlements	Base Features - Geoadministrative theme (May 2010)	yes - available from AltaLiS
Land use - indian reserves	Base Features - Geoadministrative theme (March 2011)	yes - available from AltaLiS
Land use - facilities	Base Features - Access theme (Feb 2014)	yes - available from AltaLiS
VHF and GPS caribou telemetry data	Albert Environment and Parks (AEP)	no - required Data Sharing Agreement (DSA)
Overlapping MCPs	AEP	no - required DSA
Priority Areas for Habitat Restoration	AEP	no - required DSA
RICC linear feature restoration inventory	Alberta Biodiversity Monitoring Institute (ABMI)	no - required DSA
RICC study area wolf and bear ranges	Wildlife Infometrics via RICC	no - required DSA
Oil sands project names and locations	AEP Authorization Viewer (online search Nov 2015)	yes - available from AEP
Athabasca Oil Sands Area	Athabasca Caribou Landscape Management project (2009)	no - required DSA
Imagery	ESRI - World Imagery dataset (Dec 2014)	yes
Oil Sands leases	Alberta Energy	no - required DSA
Petroleum & Natural Gas (PNG) leases	Alberta Energy	no - required DSA
Disposition holders	Abadata (online search Nov 2015)	no - required DSA
Registered Fur Management Area	Base Features - Geoadministrative theme (May 2014)	yes - available from AltaLiS
Trapper Names	AEP	no - required DSA
Land Cover (based on AVI and AGCC)	Athabasca Caribou Landscape Management project (2009)	no - required DSA
Relative habitat values	Athabasca Caribou Landscape Management project (2009)	no - required DSA

7. APPENDIX B. GAME RANCH & WILDLIFE FENCING IN NORTHERN ALBERTA – NOTES

Date: 23 November 2015
Interviewer: J. Nishi, EcoBorealis Consulting, Millarville, AB.
Interviewee: R. Boos, Whispering Winds Ranch, Manning, AB.

- Rancher and Contract Fence Specialist with 25+ years experience in northern Alberta including game fencing (bison and elk ranches), commercial industrial sites in oil sands region, and municipal and town sites.
- Reference Example: http://bisoncentre.com/resources/resource-library/bison-basics/how-build-better-fence/

Discussed overall objective of predator fence Pilot, which is to maintain a large fenced area that would keep predators out and serve as a safe zone for caribou within. Fence integrity is a key requirement in order to prevent predators from getting inside.

Fence Design

Secure 8 foot high game fence is the best fence option

- High tensile game fences are designed to be stretched and give when tested by animals. Can withstand animal impacts, i.e., moose and other ungulates
- High tensile game fences is resilient to temperature changes typical of northern Alberta winter conditions
- Generally able to withstand tree fall
- High tensile game fence will outlast chain link 5 to 1
- Elk and deer fences are designed to be 8 and 9 feet high respectively
- Recommended fence post options for large scale fencing is to alternate between pressure-treated wood and steel posts (2 wood to one steel or 1:1)
    - Pressure treated posts should last for 30 years
    - Wood pressure treated posts – 20 lines stapled to post so fence follows contour of land
    - The advantage of wooden posts are that they are less prone to frost heave and are able to get a better 'bite' in soil and organic substrate. Main disadvantage is that wooden poles will burn if a forest fire occurs across the fenceline.
    - Therefore, the use of alternating steel poles will ensure that the fence stays upright even if a fire occurs along a portion of the fenceline.
    - If drill stem (steel pipe) is used as the source of metal posts it is important to avoid pipe that has been used for natural gas. Sour gas (H_2S) permeates metal pipe and will cause erosion as the H_2S reacts with water to become sulfuric acid. Typically, steel pipe exposed to natural gas with rust out 2 inches below soil. If drill stem is to be used, need to source pipe that was used for crude oil and not natural gas.
    - Steel pipe: weld tabs for each post, or drilling holes, electrified
        - Drill stem: avoid sulfur contaminated pipe, hardness or soft of steel is important and variable
    - Metal posts
        - Hang and attach fence to metal posts using aluminum ties

        - Self-tapping drill bolts with heavy tabs is better than plumbers tape as a fastener to steel posts. It is more labor intensive and expensive than aluminum ties, but will last longer.
    - Wooden posts
        - Use barbed 2 inch, galvanized staples inserted properly

- Tight-lock game fence
    - Is recommended fence and mesh
    - Best quality wire is built in Langley, BC. The BC company has built their own fence weaving looms based on the original design from New Zealand.
    - Wire should be high tensile and galvanized
    - Wire should be fastened 8 times per post

- Electric fencing on whole fenceline inside and outside
    - Isolation on/off switch
    - 1-2 electrified wires: outriggers on inside and insulators on outside (3-3.5 feet agl)
    - Stay away from solar energizers because they are not reliable; need to be hard-wired 110 volt (use the best Gallagher energizer)

    - Bears dig under fence; cougars go over fence
    - Run electric wire about 10 inches above ground level on outside to deter bears wanting to get in.
    - Run electric wire 3 feet above ground level (nose level) on the inside to deter ungulates from testing the fence
    - Need to consider vegetation management along fenceline to keep electrical outrigger wires from grounding out and maintain good visibility
        - Application of a herbicide along the immediate fence line (i.e., Tordon-Roundup blend would control broadleaf and woody vegetation – good for 10 years)

- Concept of a "Floating Fence" - frost heave always pushes fence-posts up
    - Go around water bodies and wet sites if possible
    - Stream crossings need to be monitored; flip mechanisms to take pressure of current to take fence up; storms and beaver dams breaking; washout area needs to sacrificed
    - Washout areas may occur along streams. High variability in stream flow so small streams in low flow years can washout in higher flow years. Designing and monitoring water crossings will be important.

Wildlife – Fence Interactions

- Moose (ungulate) collision or interaction with fenceline
    - Moose will fight across the fence
    - Rear up and lay up on fence to try and cross
    - Animal running effect – moose will run right in to a fence
    - Predators may run ungulate prey in to fenceline as a means of catching prey

- Chain link fence
  - Not high tensile
  - Bull moose & elk will tear it apart
  - Can't attach it to the post very well, therefore it does not stand up when animals hit the fence
  - Chain link has no stretch and has poor ability to withstand sudden pressure by large animals, i.e., moose.
  - Chain link fencing should not be used in this application

- Fence wrapped with rodent: galvanized chicken wire
  - Grass grows through it one year; covering it in dirt may not be optimal

- In winter, when snow pack increases, it is possible that coyotes can enter through 6 inch squares; as snow pack goes up coyotes can walk through the mesh that occurs higher up the fence.
  - Should consider snaring wolves/coyotes

- Weak areas in a fenceline, that are more permeable for animals
  - Gates
  - Creek crossings
  - Bog areas
  - Tree blowdown – should construct fenceline in middle of a non-falling tree zone

Cost Consideration for Labor and Construction

- Supply materials and installation (develop a tender list)
- FOB Fort McMurray or Lac La Biche?
- Need good ground access to sites
- Accommodations & Travel of field crew
- Supply management of materials is important
  - Transportation and timing of getting supplies to site
  - At site, need to move supplies to specific areas

- Fenceline preparation
  - Bulldozer costs – high hoe work
  - Ideally should be able to drive a half tonne pick-up or ATV around year round, walk fence-line
  - Avoid sloughs and muskegs
  - Would need to conduct aerial reconnaissance and on-the-ground site-visit to recommend survey fence layout

- Cost of fence would be 2.5 million plus @ $48 / meter (converts to $48,000 / km)
  - Meet Occupational Health and Safety requirements for laborers
  - $20 / meter low end if everything is set to go, as high as $100 / meter
  - $50 / meter +
    - $15-18 / meter on farmland – material costs
    - $30-60 per post unit ($40 for 12 foot pressure treated pole)

- Site prep; construction; open access, start in spring and go in to winter
- 20 foot pole spacing for perimeter fence
    - 16-20 feet pole spacing, average = 18 feet
    - Multiple wrap ties
- Pressure Treated Wooden Post
    - Quality of pressure treating is important
    - 12 foot long wooden post with 5-6 inch diameter
    - 6-7 inch diameter post becomes more expensive ($\geq$ $40 / pole)
    - Larger diameter post pounds in hard but is harder to get out

- Steel Pipe: use the best pipe and avoid sour gas pipe
    - All new galvanized pipe = $80 per post with the following specifications
        - Schedule 40 (heavy wall pipe), with 2 & 7/8 inch outside diameter, 13 feet long, weighs ~40-50 lbs each
        - Pre-order in advance (galvanized from China or Indonesia)
    - Oil drill stem has a highly variable cost: best option is to buy pipe by joint (~30-60 foot lengths), then cut it in to pieces (28-32 feet long)
        - CCA standard for posts

- 880 posts per 1000 meters
    - = 10,000 posts
    - 500,000 lbs
    - Braces, gates, corners
    - Corners: box end
        - Big casing (pilings) 5 inch diameter pipe
        - 16 foot posts
        - 14-16 foot cross piece
        - Steel welded
    - Mile of netting
    - Stop and cut netting

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

REGULATORY ROAD MAP, STRATEGY AND IMPLEMENTATION PROGRAM

PREPARED BY:

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DISCLAIMER

This report was prepared for the Land Environmental Priority Area (Land EPA) of Canada's Oil Sands Innovation Alliance (COSIA). The Caribou Predator Fencing Pilot is a novel initiative with no directly relevant case studies in Alberta. No regulatory consultation was undertaken as part of this work and all recommendations herein must be discussed with appropriate regulatory decision makers to identify and address any additional interests or concerns before the final regulatory strategy is implemented for the Caribou Predator Fencing Pilot.

EXECUTIVE SUMMARY

The members of Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) have been developing a suite of caribou recovery initiatives, one of which is the Caribou Predator Fencing Pilot (the Pilot). A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus caribou yearlings from within the fence to be moved outside to supplement the surrounding range population.

The objective of the Caribou Predator Fencing Pilot is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the northeast Alberta woodland caribou range and action plans.

The desired technical and ecological outcome of the Pilot is to prove that the predator fence concept can contribute to boreal caribou population enhancement. Preliminary designs were developed for further evaluation of candidate predator fence locations in northeast Alberta. Using a suite of ecological and technical criteria, four potential Pilot candidate areas were selected in the East Side Athabasca River and Cold Lake caribou ranges. These candidate areas were identified because they are in the highest risk boreal caribou ranges, they are known to be used by caribou, and they provide better logistical access for piloting a predator fence. Potential Pilot locations will need to be discussed and evaluated with a wide range of stakeholders, and this is expected to lead to modification of these candidates, or to identification of alternate candidates.

This document contains a review of provincial and federal legislation and policy that does or may apply to the Pilot (a regulatory road map), and proposes a regulatory strategy as well as governance and implementation recommendations. The Pilot is a novel concept that from a construction and operation perspective is relatively simple and straightforward but from an ecological and stakeholder perspective is much more complex. This increases regulatory uncertainty and puts the Pilot at risk for onerous and extended review and consideration by regulators and stakeholders. Potential risks to wildlife and habitat inside the Pilot fence, the challenges of predator management and potential implications to land users are not trivial concerns and will need to be carefully assessed and managed by the proponent and by regulators.

The Province of Alberta has jurisdiction over the management of lands, natural resources and wildlife in the province and has a duty to consider Aboriginal treaty rights when making land use decisions. If the Pilot is located on provincial crown land, federal interest is limited to the protection of the boreal population of woodland caribou and other federally listed species at risk, the preservation of Aboriginal treaty rights, and protection of fisheries and navigable waters. Federal and provincial government legislation and policy relevant to land management and species at risk protection, including caribou specifically, establish a nested framework for caribou protection efforts.

A review of legislation and policy applicable to the Pilot makes clear that this project does not fit into an existing regulatory process that would provide schedule and consultation certainty for the proponent. Known regulatory requirements are limited to *Public Lands Act* dispositions and *Wildlife Act* permits and licenses. Other possible requirements are location and construction method dependent such as authorizations to conduct work in and around wetlands as per the *Water Act* and the associated Alberta Wetland Policy and authorizations pursuant to the federal *Fisheries Act*. Regulatory uncertainty exists

due to the potential for provincial and federal agencies to exercise their legislated discretion for additional project review including an environmental assessment pursuant to the Alberta *Environmental Protection and Enhancement Act* or the *Canadian Environmental Assessment Act* and the associated requirements for additional Aboriginal consultation and stakeholder engagement. While this report finds that a provincial or federal decision to require an environmental assessment is unlikely, uncertainty remains due to the following reasons:

- the potential for the Pilot to influence habitat and human and wildlife use within and around the Pilot area;
- the potential for the Pilot to influence Aboriginal use of lands and resources for traditional purposes;
- the fact that this Pilot has the potential to be expanded in size and/or used in other locations to meet federal and provincial caribou objectives; and
- the potential risks to caribou and other wildlife inside the predator fence due to disease or fire and the importance of reviewing potential mitigation related to those risks.

As a result, the proposed regulatory strategy is for the Pilot proponent to proactively address these concerns by defining and guiding a process that:

- meets known requirements (i.e., *Public Lands Act*, *Wildlife Act*) and describes how those requirements will be adequate to regulate the Pilot;
- demonstrates to regulators and stakeholders that risks to wildlife and habitat will be appropriately managed;
- demonstrates that Aboriginal, commercial, and public use of lands and resources will be appropriately managed; and
- demonstrates that the Pilot supports federal and provincial caribou objectives by increasing scientific understanding of a novel management tool through research and monitoring.

It is recommended that the proponent's Fence Management Team prepare a preliminary Pilot information package that can be used during early engagement efforts. This information package can be used to proactively address anticipated questions and concerns and to demonstrate that Pilot proponents have completed sufficient advance work to reduce risks and uncertainties to a level acceptable to regulators, Aboriginal groups, and stakeholders. In this way, Pilot proponents can propose a suggested approach for regulating the Pilot with a comprehensive plan to support the strategy. The information package should include:

- Pilot purpose in the context of federal and provincial caribou objectives;
- proposed Pilot location(s) and rationale;
- Pilot fence design and construction methods;
- anticipated regulatory requirements, the applications that will be prepared and how other regulatory interests have been considered;

- known and anticipated concerns of Aboriginal groups, other land users and the general public, and the measures proposed to address those concerns while achieving the desired outcomes of the Pilot;

- risk assessment work planned or completed; and

- an overview of management plans[1] that will be prepared for planning, construction and operation and the process and schedule proposed to finalize them.

Management plans should be described in the information package in sufficient detail to provide regulators and other stakeholders with confidence that the regulatory requirements identified this strategy are sufficient to manage Pilot risks and further assessment (i.e., environmental assessment) is not required.

Other implementation activities included in the regulatory strategy include site specific assessments (e.g., wetland assessment), policies and procedures for consideration in planning (e.g., best practices for construction in caribou ranges), recommended topics for early regulatory consultation and identification of provincial and federal government ministries, agencies and representatives that should be included in regulatory engagement throughout the life of the Pilot.

Formation of a third-party Fence Management Team is recommended as a legal entity for the Pilot in order to enter into agreements that carry financial and legal liability. There are a number of not-for-profit entities (company, corporation, society, association, or cooperative) that would be able to construct, own, and manage the Pilot predator fence to fulfill this requirement. A review of the advantages and disadvantages of different structures is beyond the scope of this project, and will need to be completed by legal advisors to funders immediately following a decision to advance the Pilot.

The governance structure of not-for-profit companies, societies and associations, and cooperatives are dictated respectively by the *Companies Act, Societies Act,* and *Cooperatives Act.* A proposed Pilot governance model applicable to all potential organizational structures is provided. This includes: a Board of Directors composed of shareholders involved in the Pilot; a third-party Pilot Manager reporting to the Board and directing a Fence Management Team composed of employees, contractors, or secondees; and advisory Steering Committee(s) of representatives with interests in, or expertise on, Pilot construction and operation and ecology/wildlife management, to provide independent direction and feedback to the Fence Management Team.

A Pilot implementation program involving five phases and associated activities is provided to direct next steps. Further work will be required prior to construction to implement the regulatory and stakeholder strategies, select a preferred location, prepare regulatory filings, and develop detailed fence design and management plans that can be issued to a fencing contractor (estimated to require 12 to 18 months and $600K to $900K, plus 30% contingency).

Ongoing effort will also be required during operations to monitor success, address evolving issues, and refine management plans so that an informed decision can be made following 10 years of operations on

[1] Could include: Risk Management Plan, Animal Husbandry Plan, Predator Control Plan, Access Management Plan, Construction Plan, Operations and Maintenance Plan, Emergency Response Plan, Research and Monitoring Program, Stakeholder Engagement Plan, Aboriginal Consultation Plan, Outreach and Communication Plan.

whether to stop, continue or expand the Pilot fence. Detailed fence design, approvals, and management and monitoring costs over the 14 year Pilot design, construction and operations period are estimated to be $15 million (plus $2.5 to $5 million fence construction costs and contingency factor of at least 30% because the Pilot site has not yet been selected).

LIST OF ACRONYMS

AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
ALSA	*Alberta Land Stewardship Act*
CEAA	*Canadian Environmental Assessment Act, 2012*
COSIA	Canada's Oil Sands Innovation Alliance
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CNC	Consultative Notation (Company)
CPP	Caribou Protection Plan
DML	Miscellaneous Lease (issued by AEP pursuant to the PLA)
EAP	Enhanced Approval Process
EIA	Environmental Impact Assessment
EPA	Environmental Priority Area
EPEA	*Environmental Protection and Enhancement Act*
FMA	Forest Management Agreement
GOA	Government of Alberta
LUF	Land Use Framework
LARP	Lower Athabasca Regional Plan
MLL	Miscellaneous Lease (issued by AER pursuant to the PLA)
NRCB	Natural Resources Conservation Board
PNT	Protective Notation
PLA	*Public Lands Act*
PLAR	*Public Lands Administration Regulation*
REDA	*Responsible Energy Development Act*
SARA	*Species at Risk Act*

1 INTRODUCTION

Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) has been progressing a suite of caribou recovery tools, one of which is the Caribou Predator Fencing Pilot project (the Pilot). A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus yearlings from within the fence to be moved outside to supplement the surrounding range population(s).

The objective of the Pilot project is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the Northeast Alberta woodland caribou range and action plans. It is assumed that the Pilot would be funded by industry, championed by the GOA, and supported by the federal government.

Work tasks required to advance predator fence design for the Pilot include:

- the identification of potential locations for a large predator fence exclosure (predator fence) or smaller maternal pen;
- investigation of potential fence designs;
- identification of anticipated regulatory requirements; and
- development of a strategy for stakeholder and regulatory engagement and implementation.

This document provides the Regulatory Road Map, Strategy and Implementation Program prepared by Rochelle Harding, REDES Inc. with input from Terry Antoniuk, Salmo Consulting Inc.

1.1 Caribou Predator Fencing Pilot Scope and Preliminary Design

The Pilot scope, design assumptions, success metrics, and preliminary design are described in Section 2 of the Caribou Predator Fencing Pilot Overview report (Antoniuk et al., 2016). The desired technical and ecological outcome of the Pilot is to prove that the predator fence concept can contribute to boreal caribou population enhancement. The preliminary design assumptions for a Pilot predator fence are that it will:

- be part of an integrated and long-term government range plan to recover caribou habitat and reduce densities of predator and primary prey populations in surrounding areas;
- enclose an area of approximately 90 to 150 km^2 in one of four caribou ranges (the West Side Athabasca River, East Side Athabasca River, Cold Lake, and Richardson caribou ranges; Figure 1);
- maintain 20-40 cows and at least 2-4 bulls within the fenced area;
- be funded by industry, championed by the GOA, and supported by the federal government;
- respect tenures and interests within the fence;

- be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government and ideally involves one or more local Aboriginal community(s). As described in more detail in the Overview report, the third-party management team will seek input from technical experts, as well as those directly affected by the Pilot;

- include a detailed animal husbandry plan (animal care protocols) and a predator control plan for the handling and continual monitoring of caribou and removal/monitoring of predators and other animals as required, that will be reviewed and approved by relevant regulators to ensure that no harm is done to the threatened caribou population;

- require fence crossings of watercourses of varying sizes;

- have explicit metrics to define desired project outcomes, success, and requirements for adaptive management along with an associated science program to monitor project outcomes;

- require the development and implementation of monitoring and maintenance programs;

- require managed road access at multiple entry points;

- allow for industrial/commercial activity to occur inside the fence that is consistent with existing regulatory requirements for managing caribou. Fence operation will result in some restrictions for road access at the fence perimeter that will be established in consultation with oil and gas, surface, timber, and mineral rights holders;

- allow for traditional Aboriginal land use to occur inside the fence with some restrictions for road access at the fence perimeter, established in consultation with Aboriginal groups;

- have a proposed Pilot duration of 10 years. If the Pilot is successful, fence operation could continue over multiple decades (40+ years). If the Pilot is not successful, the fence would be removed;

- have emergency response plans in place to minimize risk to caribou, the fence, and other infrastructure from a fire or other emergency;

- have continuous access to the fence perimeter for monitoring fence integrity and maintenance and for monitoring and responding to incursions by predators; this access will preferentially be provided by siting the fence perimeter along existing all weather access roads and cleared rights-of-way; construction of an all-weather road around the complete perimeter is not anticipated nor included in construction cost estimates for the Pilot;

- may or may not be expanded on the chosen site after the Pilot is complete;

- allow tenure holders, Aboriginal groups, other land users and stakeholders to be engaged and consulted during Pilot site selection and implementation; and

- adopt a fundamental design objective that the Pilot "do no harm" to current boreal caribou populations.

Using a suite of ecological and technical criteria, eight areas of interest were identified in each of the four Lower Athabasca Region caribou ranges: West Side Athabasca River; East Side Athabasca River; Cold Lake; and Richardson. Four potential candidate areas in the East Side Athabasca River and Cold Lake caribou ranges were selected because they are in the highest risk boreal caribou ranges in Northeast Alberta, they are known to be used by caribou, and they provide better logistical access for piloting a predator fence. Example fence layouts that considered topographic features, access, other landscape level features and land use were developed for the four potential candidate sites. Two of the four potential candidate areas (one in East Side Athabasca River range and one in Cold Lake range) were identified as being the most technically suitable for the Pilot based on landscape characteristics and access considerations. Tenures and interests were not considered in the technical analysis, so potential Pilot candidate areas identified using technical and ecological criteria will need to be evaluated further. The preliminary designs developed for the Pilot are intended to help encourage informed engagement and evaluation that should ultimately lead to detailed design of one preferred Pilot location.

Oil sands and timber disposition holders within the four potential predator fence locations have been identified so that they can be contacted during the Pilot definition phase to determine their development plans and willingness to participate in the Pilot. Tenure holder support is a prerequisite for further evaluation of any potential site.

1.2 Regulatory Road Map and Strategy

This regulatory road map outlines anticipated regulatory requirements and challenges and proposes a regulatory strategy for the Pilot that applies to any of the eight identified areas of interest. The Pilot is a novel initiative with no directly relevant case studies in Alberta, so consultation with and buy-in from senior decision makers in all appropriate regulatory agencies will be critical to Pilot success. This regulatory road map and strategy includes:

- a review of the current federal and provincial legislation and policy that is driving action on caribou recovery (Section 2);
- a review of legislation specific to the implementation of the Pilot as defined in Section 1.2 above including an assessment of anticipated regulatory requirements, uncertainties and potential risks (Section 3); and
- a preliminary strategy with recommended next steps for confirming the regulatory requirements for Pilot planning, construction and operation (Section 4).

This report does not address ecological feasibility or risk and it does not include a review of predator fence exclosure case studies in other jurisdictions[2]. Appendix A includes a listing of all federal and provincial legislation, policy and programs that were reviewed in the completion of this report.

[2] As one example, the Rhino Ark Aberdare fence in Kenya encircles an area over 2,000 km^2 and while not directly focused on predator control it is designed to restrict large animal movement and provides a useful example of fence construction, access management for multiple land uses and the development of community partnerships for fence maintenance (http://www.rhinoark.org/our-projects/aberdare-fence-project/about-the-fence.html).

2 REGULATORY CONTEXT – CARIBOU AND LAND MANAGEMENT

The Province of Alberta has jurisdiction over the management of lands, natural resources and wildlife in the province. If the Pilot is located on provincial crown land[3], federal interest is limited to the recovery of the boreal population of woodland caribou and the preservation of Aboriginal treaty rights. Federal and provincial government legislation and policy relevant to land management and species at risk protection, including caribou specifically, establish a nested framework for caribou recovery.

2.1 Federal Legislation and Policy

2.1.1 *Species at Risk Act* Recovery Strategy

The boreal woodland caribou, one of six ecotypes of woodland caribou (*Rangifer tarandus caribou*) found in Canada were assessed as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2002 and were listed as threatened when the federal *Species at Risk Act* (*SARA*) came into force in 2002. The recovery strategy for the boreal population of woodland caribou (the Strategy; Environment Canada, 2012) lists all of Alberta's 12 local populations as 'not self-sustaining'. Threats to these populations include habitat alteration from anthropogenic and natural sources as well as increased predation resulting from that habitat alteration (Environment Canada, 2012).

The federal Strategy (Environment Canada, 2012) was prepared to satisfy *SARA* s37(1) requirement that recovery strategies be prepared for all extirpated, endangered or threatened species. The goal of the Strategy is to achieve self-sustaining local populations in all boreal caribou ranges throughout their current distribution in Canada, to the extent possible (Environment Canada, 2012). The federal government has established a Critical Habitat definition of 65% undisturbed habitat within a range, which can be interpreted as a disturbance management threshold. This threshold is believed to provide a measurable probability (60%) for a local population to be self-sustaining. This threshold is considered a minimum threshold, as at 65% undisturbed habitat there is still a 40% risk that the local population will not be self-sustaining based on population and habitat conditions as measured in 2010 and reported in 2012 (Environment Canada, 2012).

The Strategy acknowledges that landscape level planning is critical to reaching this goal and that recovery will depend on actions undertaken by multiple levels of government. While the federal Strategy establishes a broad goal, overarching target and general approaches, progress will be achieved primarily through the efforts of the provinces and territories, which have jurisdiction over the management of lands, natural resources and wildlife[4]. The Strategy is the overarching national framework within which provincial and territorial governments will conduct range level planning and develop action plans for implementation.

There is flexibility written into the Strategy to manage caribou habitat in a manner appropriate for a particular population to take into account variations in habitat and population conditions. Nonetheless,

[3] See Section 3.3.5 for a review of additional federal requirements if the site is located on or near the Cold Lake Air Weapons Range.

[4] Cooperation on management of species at risk was formalized in the Accord for the Protection of Species at Risk, an agreement between the federal, provincial and territorial ministers responsible for wildlife (signed in 1996, modified in 1998).

any deviation below the 65% threshold will need to be supported with scientific evidence satisfactory to Environment Canada.

2.2 Provincial Legislation and Policy

2.2.1 Alberta Caribou Policy

The Alberta Caribou Policy (GOA, 2011) was released in June of 2011 and it confirms the GOA's commitment to achieving naturally sustaining woodland caribou populations. The Policy acknowledges that caribou conservation is a shared government, public and private sector responsibility that is led by government but leverages the resources of other land users, including industry. The Policy establishes a framework for range level planning in Alberta and, at a high level, describes the potential conservation tools that would be considered.

The GOA has placed highest priority on the identification and protection of existing caribou habitat but also recognizes that habitat restoration, land management decision-making, and management of wildlife populations are also important. The Policy explicitly includes predator and prey management as a conservation tool. The predator fence concept under consideration by industry and some caribou biologists is a predator management option that can be implemented in the near-term with potentially immediate positive effects for a caribou population.

2.2.2 *Alberta Land Stewardship Act* and Alberta Regional Plans

Alberta's Land Use Framework (LUF) (GOA, 2008), released in December 2008, sets out a systems based approach for decision-making on public and private lands and natural resources across Alberta. The LUF is supported by the *Alberta Land Stewardship Act* (*ALSA*) enacted in 2011, that provides the legal basis for regional land use planning in Alberta. The LUF established seven land use regions and requires the development of a regional land use plan for each. The Lower Athabasca Regional Plan (LARP) (GOA, 2012) came into effect in September 2012. The LARP is a legally binding roadmap that governs land use planning in an area that includes a substantial portion of the Athabasca oil sands resource (GOA, 2012) and several caribou ranges. Several strategic directions outlined in the LARP have implications for oil sands operators including integrated land management and progressive reclamation expectations and a biodiversity management framework that aligns with the Alberta Caribou Policy. The LARP establishes a number of desired regional outcomes and describes the objectives, strategies and actions to achieve them. Two of the desired outcomes of the LARP relevant to the Pilot are that landscapes are managed to maintain ecosystem function and biodiversity and that Aboriginal peoples are included in land-use planning. Key strategies to achieve these desired outcomes include the development and implementation of a Biodiversity Management Framework (BMF) and a Landscape Management Plan (LMP) and supporting sub-regional plans. The Fence Management Team should work to align Pilot design and monitoring with these two desired outcomes and the GOA strategies to achieve them.

2.2.3 Caribou Range Planning

The federal Strategy directs provincial and territorial governments to conduct range level planning and develop action plans for implementation. These range level plans are to outline how each caribou range will be managed to restore critical caribou habitat over time to support self-sustaining caribou populations.

Federal and provincial objectives for caribou habitat and populations will be integrated into these range level plans.

In Alberta, the ministries of Alberta Environment and Parks (AEP), Alberta Energy and Alberta Agriculture and Forestry are co-leading the caribou range and action planning process. Caribou range and action plans will align with the regional plans and management frameworks that form the GOA's developing integrated resource management system. More specifically, the LMP will support range-planning efforts by outlining proactive strategies and guidelines to avoid or reduce the creation of new footprint as well as identify priority areas to restore legacy footprint within caribou ranges in the Lower Athabasca Region.

The range planning process includes the development of potential management options appropriate in each range. The GOA has initiated range planning for northeast Alberta and the predator fence exclosure concept is being proactively developed as a potential management option for incorporation into these range and action plans.

3 REGULATORY REQUIREMENTS – IMPLEMENTATION

3.1 Jurisdiction

As previously noted, the Province of Alberta has jurisdiction over the management of lands, wildlife and natural resources within the province and various pieces of provincial legislation are applicable to Pilot implementation. Federal interest in the Pilot is primarily related[5] to the protection of the boreal population of woodland caribou and to potential effects on Aboriginal groups, such as their use of lands and resources for traditional purposes. Depending on the location and design, federal interest in the protection of fisheries and navigable waters may also need to be considered. Both the federal and provincial governments have a duty to consider Aboriginal treaty rights in decision-making on any development on crown land.

The sections below outline known and potential regulatory requirements and risks based on the Pilot definition in Section 1.1 of this report.

3.2 Provincial Approvals, Authorizations and Permits

Regulatory decision-making in respect of a new development can include planning stage decisions (e.g., environmental assessment) and permitting stage decisions (e.g., land dispositions). Regulatory requirements are defined according to the physical activities associated with the construction, operation and maintenance phases of a project. At minimum, this project will require Alberta *Public Lands Act* (*PLA*) disposition(s) and various permits and licenses pursuant to the Alberta *Wildlife Act*. While not expected, the potential for additional planning phase regulatory requirements such as an environmental assessment does exist and is reviewed herein.

For a number of the regulatory requirements discussed below, the provincial decision making authority for the Pilot will be determined based on whether or not the project falls into the definition of "energy resource activity" pursuant to the *Responsible Energy Development Act (REDA)* (see text box below). While it could be easily argued that the Pilot does not meet this definition, authorizations for the small

[5] This statement assumes that no federal lands are required.

scale fencing trial[6] undertaken in 2014 and 2015 were issued by the Alberta Energy Regulator (AER) rather than AEP because the proponent was an energy company not because the trials met the *REDA* definition of an "energy resource activity". If the Pilot is seen to be an oil sands company initiative or as incidental to the continued operation of oil sands projects the AER may be the decision making authority; however, since the Pilot will likely be proposed by a third party Fence Management Team it is expected that regulatory authority would rest with AEP[7]. AEP will have more subject matter expertise and will also issue other permits and licenses for the project that are not within the purview of the AER (i.e., *Wildlife Act*) so it will be assumed to be most efficient for AEP to issue other permits and dispositions as well. Early regulatory engagement should be undertaken to confirm that AEP is the most appropriate authority.

> *Responsible Energy Development Act* s1(1)(i)
> "energy resource activity" means
> (i) an activity that may only be carried out under an approval issued under an energy resource enactment, or
> (ii) an activity described in the regulations that is ***directly linked or incidental*** to the carrying out of an activity referred to in subclause (i)

3.2.1 *Environmental Protection and Enhancement Act*

The *Environmental Protection and Enhancement Act* (*EPEA*) applies to an "activity" or parts of an activity specifically listed in the Schedule of Activities included in the *Act.* The *Activities Designation Regulation* lists activities that are subject to environmental assessment, approvals, registrations or certificates pursuant to *EPEA*.

3.2.1.1 Environmental Assessment

The predator fence itself is not an *EPEA* "activity" so the project does not automatically trigger an environmental assessment or even the need for an *EPEA* approval. However, the *EPEA* contains several provisions for a Director (s43) or the Minister of Environment and Parks (s47) to require an environmental assessment for projects where further consideration of the potential environmental impacts is warranted. This discretionary authority is rarely, if ever, used.[8] Notwithstanding, if the purpose of environmental assessment as defined in the *EPEA* is considered (see text box below), it is foreseeable that the GOA may consider using this discretion for the Pilot because of:

- the potential for the Pilot to influence habitat and human and wildlife use in and around the Pilot area;
- the potential for the Pilot to influence Aboriginal use of lands and resources for traditional purposes;

[6] As a first step toward understanding the implementation of predator fence as a management tool, several oil sands companies initiated an effort in 2014 to test multiple fence designs in boreal forest terrain to determine effectiveness for exclusion of woodland caribou predators. These trials are ongoing and learnings will be fed into the Pilot design.
[7] See section 3.2.1 for a discussion of how the *REDA* definitions affect the provincial environmental impact assessment process.
[8] The authors were not able to identify a case study where this has occurred.

- the fact that this Pilot has the potential to be expanded in size and/or used in other locations to meet federal and provincial caribou objectives; and

- the potential risks to caribou and other wildlife inside the predator fence due to disease or fire and the importance of reviewing potential mitigation related to those risks.

> *Environmental Protection and Enhancement Act* s40
> The purpose of the environmental assessment process is
> (a) to support the goals of environmental protection and sustainable development,
> (b) to integrate environmental protection and economic decisions at the earliest stages of planning an activity,
> (c) to predict the environmental, social, economic and cultural consequences of a proposed activity and to assess plans to mitigate any adverse impacts resulting from the proposed activity, and
> (d) to provide for the involvement of the public, proponents, the Government and Government agencies in the review of proposed activities.

It is unlikely that this discretion would be used if the following are considered:

- doing so may set a precedent and complicate decision making on other projects including caribou recovery initiatives going forward;

- existing legislation and policy is sufficient to regulate the activities that define the Pilot; and

- the Fence Management Team is able to proactively demonstrate that they will address potential adverse effects on other land users, habitat, and wildlife through the development of management plans with input from potentially affected parties and approval by appropriate regulators (see Section 4);

It is recommended that the Fence Management Team prepare a preliminary information package that includes a proposed regulatory strategy, a description of applications that will be prepared to meet known permitting and licensing requirements and an overview of the management and mitigation plans for the construction, operation and decommissioning phases of the Pilot. This package would not need to include complete designs and plans but would demonstrate to regulators that the Pilot supports federal and provincial caribou protection objectives, respects other tenures and interests, and can be regulated effectively through permitting and licensing without the need for an environmental assessment. The documentation would need to describe animal husbandry protocols for caribou handling, and predator and alternate prey management, preliminary fence design, proposed location(s) and construction methods, emergency response planning, monitoring and maintenance (see Section 4). This document is not intended to serve as a screening report for review by the Director within existing *EPEA* processes; however, if the receiving regulatory agency interprets it to be a screening report it could trigger public notice requirements potentially creating additional schedule and project risk. This risk will need to be assessed and managed during early regulatory consultation.

There are examples of projects in Alberta that did not require an EIA where proponents 'opted-in' to the environmental assessment process to take advantage of a reasonably predictable process and known consultation requirements. If, after initial regulatory consultation, significant uncertainty remains regarding how the GOA views this project, it may be prudent to review the comparative advantages and

disadvantages of conducting an environmental assessment on the project to determine if the additional cost and effort may allow the project to proceed on a more certain schedule. If early consultation efforts indicate that public or Aboriginal concern is likely to be high, opting-in to the process may contribute to securing support for the Pilot or at least reducing the risk of an unfavourable decision on the project.

If the GOA were to require an environmental assessment or the Fence Management Team were to request one, the decision making authority will be determined based on whether or not the Pilot falls into the definition of "energy resource activity" pursuant to the *REDA* (see Section 3.2). If the Pilot is seen to be an oil sands initiative the AER would both manage the process and be the decision making authority. If a third party management team proposes the project and it is not deemed to be an "energy resource activity" the Natural Resources Conservation Board (NRCB) would be the decision making authority and the process would be managed by AEP staff.

3.2.1.2 Approval or Registration

The predator fence itself is not an *EPEA* "activity" so the project does not require an *EPEA* approval or registration. The *EPEA* does allow for the Director to require an approval for an activity that would normally require a registration (s66.1) but this authority does not apply to works that are not designated as an "activity" under *EPEA*. If preliminary regulatory consultation indicates that the GOA is considering requesting that an environmental assessment be completed, it would be useful for the Fence Management Team to suggest that the *EPEA* approval process be used instead. The legislation does not explicitly specify that this is possible but it would likely be a faster process than completion of an environmental assessment if the GOA is able and willing to pursue this approach.

3.2.2 *Public Lands Act*

The Province of Alberta manages the use of public lands through a variety of instruments pursuant to the *Public Lands Act* (*PLA*) and the *Public Lands Administration Regulation* (*PLAR*). Instruments that may be relevant to the Pilot include orders, reservations and notations and dispositions[9]. *PLA* instruments related to oil, gas, oil sands and coal activities are issued by the AER and all other *PLA* instruments are issued by AEP[10].

The Pilot will require one or more *PLA* dispositions prior to construction and consultation with AEP and/or AER will be necessary to determine what type of disposition will be granted for the project. One possible disposition could be a Miscellaneous Lease (DML if issued by AEP and MLL if issued by AER) that can be issued for a research site. A licence of occupation or other disposition will also be required for access roads or trails (DLO if issued by AEP and LOC if issued by AER) and other land uses associated with the Pilot. The fenced area and perimeter will need to be managed in a manner that does not adversely affect other land users with surface or sub-surface rights. Consultation with other surface and sub-surface rights holders, Aboriginal groups, known users of the land (e.g., trappers and recreation groups) and possibly the general public will be required as part of the *PLA* process for this Pilot.

It may also be appropriate to apply for a notation designed to add additional levels of protection for the Pilot area. A notation that could be pursued is the Consultative Notation (Company) (CNC) whereby

[9] Leases, licenses, permits, agreements, authorizations and approvals are all considered 'dispositions'.
[10] See Section 3.2 for a description of AEP and AER involvement.

proponents of activities in and around the fence would be required to consult the Fence Management Team prior to receiving any approvals for their activities. Government agencies also have a Consultative Notation (CNT) available to them that is used to alert potential applicants about a GOA interest in the land (e.g., administrative, planning). Neither of these notations place restrictions on land use or industry operations, they only create an obligation to inform the Fence Management Team of any new activities or development. Government agencies also have the authority to issue a Protective Notation (PNT) to achieve particular land use or conservation objectives. The government agency (AEP or AER in this case) have the ability to specify allowable land use using a PNT; however, this notation is not likely to be compatible with other land uses desired within the Pilot area (e.g., resource extraction) and a PNT cannot be held by the Fence Management Team as it must be held by the GOA. The Algar Caribou Restoration Pilot Project team explored the possibility of a CNT or PNT for that area but neither the AER nor AEP have been willing to use these notations in this manner.

The *PLA* contains broad authority for the Director to amend existing dispositions to resolve conflict between users (s14(4)), to refuse applications for any specified land (s16) and to establish multiple dispositions in respect of the same land (s25(1)(b)). The Director also has a specific authority to require holders of *Wildlife Act* fur management agreements or *Forests Act* timber dispositions to apply for a *PLA* disposition if imposing additional conditions on those agreements or dispositions supports the objectives of an *ALSA* regional plan (s20(5)). The *PLA* specifically includes confirmation that the objectives of a regional plan prevail over the terms and conditions of other authorizations to access public land to the extent necessary to resolve any conflicts (s20(3)). These *ALSA* related authorities provide a regulated approach to managing some of the other land uses that may occur inside the Pilot area. The various authorities held by the Director may be the most efficient way to achieve the desired land use outcomes in the fence area. Consultation with AEP/AER regarding various land uses (including resource extraction) within proposed Pilot area(s) will be an important early step to determine the best approach for respecting land user rights while achieving the desired outcomes of the Pilot.

AEP uses an Enhanced Approval Process (EAP) for disposition applications for oil and gas developments on public land. The EAP specifies controls, standards and guidelines for dispositions required for a wide range of energy activities[11] (e.g., pipelines, access roads, well sites) including a requirement to prepare Caribou Protection Plan (CPP) where necessary (GOA, 2013a). Exploration and construction activities not covered by the EAP also require the submission of CPP. Even though the predator fence is not specifically an energy development, it would be prudent to review and incorporate the best practices outlined in the EAP and Caribou Protection Plan requirements to the extent possible and applicable in Pilot planning and design. In this way, the Fence Management Team can proactively address expectations that regulators have regarding development projects within caribou ranges and be prepared with rationale for any deviations from standard practice (e.g., a request to construct during the restricted activity period to take advantage of winter conditions).

3.2.3 *Wildlife Act*

The wildlife management mechanisms in the Alberta *Wildlife Act* are primarily related to property rights (e.g., Crown ownership of wildlife unless vested in an individual by permit, licence or other transfer instrument) and the controls related to wildlife hunting, possession and commerce. The *Act* does include

[11] Oil sands activities are specifically excluded from the EAP.

mechanisms for the identification and protection of species at risk but action is primarily at the Minister's discretion and thus left to policy. Section 6(1) provides for the establishment of an Endangered Species Conservation Committee whose functions include making recommendations on species to be listed as endangered and the preparation of recovery plans.

The *Act* provides broad Ministerial discretion to issue licenses, permits (s13) and authorizations (s22(1)) with appropriate conditions. The *Wildlife Regulation* defines the rules for *Wildlife Act* licenses, permits and authorizations and includes provisions for research activities. AEP defines research to include but not be limited to applied research, surveying, inventory and monitoring activities. As the intent of the Pilot is to demonstrate that predator fences are a viable management option for caribou recovery, it is likely that AEP would recognize this project as a research effort and this view should be supported for regulatory purposes. A research permit and collection license[12] is required for research activity on private or crown land that involves collecting or possessing wildlife, any potential to involve handling or disturbance of wildlife, activities that occur in sensitive habitats during restricted activity periods or is included in a Class Protocol[13]. Class Protocols exist for capture and handling of live ungulates, wolves and bears for management purposes. Procedures not included within these protocols require a detailed plan to be submitted to AEP fish and wildlife staff for review as part of the permit application.

In addition to the Alberta *Wildlife Act* Class Protocols, other national and international policies, guidelines and standards related to animal handling and care should be reviewed and best practices incorporated (as recommended in Section 4.3 Management Plans). Applicable standards and guidelines may include Canadian Council on Animal Care (CCAC) guidelines and International Union for Conservation of Nature (IUCN) policies, guidelines and standards.

If wolves and bears are to be live captured for release outside of the fence, a research permit and collection license with adherence to applicable protocols may be all that is required. The permit and license application would outline the proposed methods and timing of predator management activities for review and approval by AEP fish and wildlife staff who would impose any conditions that they deem appropriate. If wolves and bears inside the fence area are to be destroyed to reduce ongoing predation risk, a research permit and collection licence may still be sufficient to regulate the activity. The collection licence would allow the licence holder to a hunt a specified number of animals with approved methods in periods designated in the licence (*Wildlife Regulation* s47). If animals are to be destroyed, additional consultation with AEP will be required to determine how to conduct predator management in a manner that does not contravene provincial wildlife regulations and follows accepted protocols for humane treatment of wildlife. The culling of wolves for caribou protection is a controversial topic in public discourse and among wildlife researchers and the decision to manage predators this way could be perceived as a negative aspect of the Pilot.

If the Pilot is successful and a decision is made to retain predator fences in one or more areas indefinitely, there are a number of provisions in the *Wildlife Act* and the *Wildlife Regulation* that may be applicable to the long-term management of these areas. For example, similar to provisions in the *PLA*, the Wildlife *Act* includes Ministerial authority to make regulations to establish and manage wildlife sanctuaries and habitat conservation areas (s103). The *Wildlife Regulation* also delegates certain

[12] A research permit is required before a collection licence can be issued (*Wildlife Regulation* s46).
[13] Class Protocols (e.g., capture and handling of bears, call playback, bird banding, *etc*.) are found at: http://esrd.alberta.ca/fish-wildlife/wildlife-research-collection/default.aspx

powers to the Alberta Conservation Association including implementation and support of projects and improvements that retain, enhance or create habitat (Schedule 2). This model could be applicable to the third-party management of one or more future predator fence exclosure areas if the concept becomes an important component of caribou protection in the province and is applied in areas where resource extraction is not occurring.

3.2.4 *Forests Act*

All timber located on public land is owned by the province and, pursuant to the *Forests Act*, the right to harvest timber is allocated though the issuance of forest tenures. Timber removed from the Pilot fence right-of-way on provincial crown land will need to be collected and accounted for in accordance with *Forest Act* and *Timber Management Regulation* requirements. Most of the proposed Pilot sites are located within the Forest Management Agreement (FMA) area held by Alberta Pacific Forest Products Incorporated (AlPac)[14] and removal of timber can be negotiated with AlPac and any other timber rights holders in the area. If the Pilot is located south or north of the AlPac FMA but still on provincial crown land, the third party Fence Management Team will need to determine if any forest tenures exist at the Pilot location and determine what applications for timber removal/salvage are required.

3.2.5 *Water Act*

3.2.5.1 *Water Act* Approvals and Licenses

The Alberta *Water Act* governs the management and protection of water in the Province. The *Water (Ministerial) Regulation* established under the *Water Act* defines the regulatory framework for *Water Act* approvals and licences. The *Water (Ministerial) Regulation* also establishes codes of practice that must be used to guide activities that are exempt from *Water Act* approvals but are listed in the *Regulation* as subject to an applicable code. There are codes that apply to pipeline and telecommunication crossings, watercourse crossings and outfall structures.

Regardless of how fence crossings are designed, it is likely that the work would be considered an 'activity' as defined in the *Water Act* (see text box below); however, the *Water (Ministerial) Regulation* specifically exempts the "placing, constructing, installing, maintaining, replacing or removing a fence in or adjacent to a water body" from the need for a *Water Act* approval (Schedule 1 s2(b)). The placement of a fence adjacent to or in a water body[15] is not included in the definition of a 'watercourse crossing' in the *Code of Practice for Watercourse Crossings* established under the *Water (Ministerial) Regulation.*

While fence crossings would not directly trigger *Water Act* provisions given the definitions outlined above, it would be prudent for the Fence Management Team to prepare a package of fence construction methods, crossing designs, construction management plans and maintenance plans that align to the extent applicable with the expectations and best practices described in the *Code of Practice for Water Course Crossings*. This package can be used for consultation with regulatory agencies and Aboriginal groups. Some activities such as vegetation removal (and access construction or improvement if required)

[14] AlPac may be a Pilot participant and timber removal can be aligned with their annual plans.
[15] A water body is defined in the *Water Act* as a location where water flows or is present regardless of whether it is continuous, intermittent or only during a flood (*Water Act* s1(1)(ggg)).

may require *Water Act* authorizations and regulatory consultation should include a description of all construction and operation activities to determine if and where such authorizations may be required.

> *Water Act* s1(1)(b)
> "activity" means
> (i) placing, constructing, operating, maintaining, removing or disturbing works, maintaining, removing or disturbing ground, vegetation or other material, or carrying out any undertaking, including but not limited to groundwater exploration, in or on any land, water or water body, that
> (A) alters, may alter or may become capable of altering the flow or level of water, whether temporarily or permanently, including but not limited to water in a water body, by any means, including drainage,
> (B) changes, may change or may become capable of changing the location of water or the direction of flow of water, including water in a water body, by drainage or otherwise,
> (C) causes, may cause or may become capable of causing the siltation of water or the erosion of any bed or shore of a water body, or
> (D) causes, may cause or may become capable of causing an effect on the aquatic environment;
> (E) ….

3.2.5.2 Alberta Wetland Policy

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* (GOA 2013b). The Policy introduces additional management actions for development in and around wetland areas and will be implemented in the Green Area[16] as of June 1st, 2016. The Policy applies to natural wetlands[17], restored natural wetlands and wetlands constructed for the purpose of wetland replacement but does not apply to ephemeral water bodies[18].

Project proponents who require *Water Act* approvals or licenses or *PLA* dispositions in the Green Area after June 1st 2016 will be required to determine if their activities may adversely affect wetlands. Prior to submitting a *Water Act* or *PLA* application for development in or around a wetland, a qualified professional must conduct a wetland assessment that includes wetland identification, delineation, classification and relative value assessment. If potential impacts exists, a wetland mitigation hierarchy must be applied – avoid the impact, minimize the impact, or replace the wetland where avoidance or minimization is not feasible or effective. Wetland replacement is required in the event of permanent wetland loss and may be required for the Pilot if all-weather access is to be constructed. As noted above, construction of a fence does not trigger *Water Act* approval or license requirements but does require *PLA* dispositions. How this Policy will be applied in the Green Area is still evolving and it is recommended that early Pilot planning include engagement with AEP to determine if the Alberta Wetland Policy applies to the activities that define the Pilot and, if so, what assessments will be required. Early Pilot planning should also include a desktop review of wetland areas along the Pilot fence right-of-way to inform discussions with AEP. Regardless of whether or not a formal application and review is required under the

[16] Land Use Framework Planning Regions and Green/White Management Areas map http://esrd.alberta.ca/lands-forests/forest-management/forest-management-facts-statistics/documents/LUF_GWAMap-Apr302011.pdf
[17] Wetlands include bogs, fens, swamps, marshes and shallow open water.
[18] Ephemeral water bodies are still subject to the *Water Act*.

Policy, best practices for construction in and around wetland areas should be incorporated into the Pilot construction plan to avoid adverse impacts to wetlands.

3.2.6 *Historical Resources Act*

The Alberta *Historical Resources Act* provides the Minister of Alberta Culture and Tourism the authority to manage the preservation, interpretation and promotion of historical resources in Alberta. Section 37 of the *Act* authorizes the Minister to require historical resource assessments for any operation or activity that will or is likely to alter damage or destroy historic resources. Construction of all-weather access and soil excavation for post or apron installation may alter or damage historical resources (see definition in box below) and the Fence Management Team should conduct a desktop review to determine if any listed historical resources exist in areas that will be disturbed by the Pilot. If a potential risk is identified, consultation with Alberta Culture and Tourism should be conducted to determine what additional work is required to obtain *Historical Resources Act* clearance. Regardless of whether or not historic resource assessment work is required, the construction plan must include the requirement that any person who discovers an historic resource during an excavation must notify Alberta Culture and Tourism (s31).

> *Historical Resources Act* s1(e)
> "historic resource" means any work of nature or of humans that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object;

3.3 Federal Authorizations and Permits

3.3.1 *Species at Risk Act*

The purpose of the federal *Species at Risk Act* (*SARA*) is to "*prevent wildlife species in Canada from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened*" (s6). The boreal population of woodland caribou is listed as a threatened species under *SARA* and a federal recovery Strategy was prepared as a national framework to satisfy the *SARA* s37(1) requirement for such a planning document.

For most listed species, including boreal caribou, the *SARA* only applies automatically to federal lands[19] with provinces and territories responsible for the protection of listed species and their critical habitat within their own jurisdictions. The federal government must prepare a recovery strategy for extirpated, endangered or threatened species, and the provinces and territories are responsible for the preparation of range and action plans that document their overall approach to manage for Critical Habitat and species recovery within their jurisdictions. The *SARA* does; however, include back-stop provisions to allow the federal Minister of the Environment to protect species at risk on provincial, territorial or public land if the provincial or territorial legislation and policy (including range and action plans) are deemed by the Minister to be inadequate (s34, s61).

[19] The *SARA* applies on provincial and territorial lands to species also protected under the federal *Migratory Birds Convention Act* and to aquatic species defined in the federal *Fisheries Act*.

If the Pilot is constructed on provincial lands, no specific authorization or permit will be required pursuant to the *SARA* and the potential applicability of the legislation to Pilot implementation is limited to the overarching policy direction that it provides to the province[20]. While consultation with Environment Canada may not be specifically required to implement the Pilot, it is recommended that early engagement with Environment Canada be conducted to demonstrate that the Pilot aligns with federal caribou objectives and that risks to caribou will be adequately managed. Engagement with Environment Canada will be important to increase support for the concept of predator fences as a management tool, to access relevant expertise within the federal government, and possibly to access support and funding for the research and monitoring programs.

SARA contains a number of provisions whereby the federal government can enter into conservation agreements with any government in Canada, organization or person to benefit a species at risk (s11). Such agreements can include participation in and support for research projects and the protection of critical habitat. Support can specifically include funding for projects included in these agreements (s13). The *SARA* also includes a provision by which the federal government can enter an agreement or issue a permit regarding an activity affecting a listed species or its critical habitat if the activity benefits the species (s73 on federal land and s78 related to provincial or territorial lands).

3.3.2 *Canadian Environmental Assessment Act, 2012*

The *Canadian Environmental Assessment Act, 2012* (*CEAA*) applies to projects described in the *Regulations Designating Physical Activities* (SOR/2012-147) where a federal decision on the activity is required. This Pilot is not a designated physical activity under the *CEAA* and does not directly trigger a review pursuant to the *Act.*

The *CEAA* can also apply to projects designated by the federal Minister of Environment where "either the carrying out of the physical activity may cause adverse environmental effects or public concerns related to those effects may warrant the designation" (s 14(2)). An 'environmental effect' is defined under the *CEAA* as "a change that may be caused to" a specific list of values in relation to "an act or thing, a physical activity, a designated project or a project". The list of values defined in the act does not include terrestrial species at risk (s5) as wildlife is within provincial rather than federal jurisdiction[21]. The list of values does include any change on the environment that affects aboriginal health and socio-economic conditions, physical and cultural heritage and the current use of lands and resources for traditional purposes (s5(c)(I, ii, iii)) so the possibility of a ministerial decision to designate the Pilot for *CEAA* review exists. Notwithstanding, it is highly unlikely that the federal Minister of Environment would request a review pursuant to *CEAA* for this reason alone, particularly if local Aboriginal groups are consulted on and engaged in the project. In the absence of strenuous Aboriginal or environmental group opposition, application of the *CEAA* to this project seems unlikely and would set precedent no matter what justification for *CEAA* review was used.

[20] *SARA* permits are required to conduct an activity that would violate *SARA*'s prohibitions. SARA permits are only required for species on federal lands or those protected by the *Migratory Birds Act* and the *Fisheries Act*. SARA permits are not currently required in relation to caribou handling (and the potential risk of death or injury) when on provincial land; however, since federal engagement on caribou recovery is evolving this should be confirmed in consultation with Environment Canada.
[21] Federal jurisdiction does include fish and fish habitat, other aquatic species and migratory birds.

3.3.3 Fisheries Act

The federal *Fisheries Act* (R.S.C. 1985, c. F-14) prohibits "serious harm to fish", defined in the *Act* as " the death of fish or any permanent alteration to, or destruction of, fish habitat". For work in and around fish bearing water in Canada the proponent is responsible to ensure that no "serious harm to fish" occurs and Fisheries and Oceans Canada has provided a list of measures to ensure compliance with the *Act* (DFO 2015). These measures describe project planning including timing restrictions, erosion and sediment control, bank stabilization and re-vegetation, fish protection and operation of machinery. Once a Pilot site is selected and crossing location and methods are known, an assessment of fisheries potential and whether or not serious harm to fish is likely will be required. If any construction or operation activities may pose a serious harm to fish a review by Fisheries and Oceans staff is required and an authorization to conduct the work may be required. The Fisheries and Oceans *Fisheries Protection Policy Statement*[22] provides proponent guidance and process steps for determining if authorizations are required.

3.3.4 Navigation Protection Act

It is assumed that there will be no crossings on water bodies considered to be navigable pursuant to the *Navigation Protection Act*. Depending on the fence design and size of the water body crossing there may be implications for local stakeholders and this will need to be incorporated into consultation efforts.

3.3.5 Federally Managed Lands - Cold Lake Air Weapons Range

Two of the potential candidate areas for the predator fence are located near the Cold Lake Air Weapons Range (CLAWR); a federal military training area managed by the Royal Canadian Air Force 4 Wing Cold Lake[23]. Proposing a predator fence adjacent to the CLAWR will require consultation with 4 Wing Cold Lake to understand the nature of any military operations that may affect the caribou inside the predator fence.

Consultation with 4 Wing Cold Lake is also recommended to explore potential issues and requirements for future expansion into the CLAWR, in the event that this is contemplated. Constructing a standalone predator fence or an extension of an adjacent predator fence area into the CLAWR would introduce a number of challenges and opportunities. The following analysis does not include a review of potential effects of military training operations on caribou but assumes that an area of suitable habitat with little or no military operations is available.

Public access to the CLAWR is prohibited by the *Defence Controlled Access Area Regulations* pursuant to the *National Defence Act.* While the federal government has control of surface access, the Province of Alberta maintains the mineral rights in this area and a 1986 agreement between the federal and provincial governments governs access to the CLAWR for oil and gas development (CLAWR 2015). The *Range Control CLAWR Policies and Procedures (Part II Policies)* (CLAWR 2015) specifically lists companies with approval to operate inside the CLAWR as "Prime" companies. Employees of these companies can access the CLAWR with appropriate training and adherence to relevant protocols. Anyone else seeking

[22] http://www.dfo-mpo.gc.ca/pnw-ppe/pol/PolicyStatement-EnoncePolitique-eng.pdf

[23] None of the potential candidate areas are within the CLAWR. Considerations relevant to this area were included in the scope of this report at the request of the Land EPA as some sites are adjacent to the CLAWR and there may be future interest in expanding an existing fence or constructing a new fence in this area.

to access the area must provide proof of employment or be sponsored by an employee of one of the Prime companies. There are also provisions for site visits by federal and provincial government employees and for access to conduct traditional knowledge and archaeological assessments. Cold Lake First Nations have also been granted access to the CLAWR for traditional pursuits with controls on the use of firearms.

A predator fence would not fall within the federal-provincial agreement for oil and gas development and access to the CLAWR to construct and operate a caribou safe zone would strictly be at the discretion of the Royal Canadian Air Force. If access were to be granted for this purpose, resources and protocols already in place for existing industrial operations on the CLAWR may also be appropriate for management of access for a predator fence.

Operational plans for a predator fence in the CLAWR would have to consider the strict controls for land and air access as well as caribou handling and predator control. The CLAWR is a closed airspace and 4 Wing Cold Lake is not obliged to grant access for any purpose. Aircraft access for commercial purposes is granted under strict controls and coordination with defence activities on the range and is only granted if and when the activity does not interfere with military operations. Use of helicopters for planned maintenance and monitoring of a predator fence could be scheduled; however, uncertainty regarding the use of aircraft during an emergency situation may introduce additional risk. Access by road is also closely controlled and additional protocols exist for any travel off of high-grade roads within the CLAWR. Consultation with the Royal Canadian Air Force would be necessary to determine how, when and where the Fence Management Team and their contractors could travel within the CLAWR.

Firearms on the range are restricted except for use by authorized personnel (e.g., Royal Canadian Mounted Police, range patrol officers, GOA fish and wildlife personnel) and members of the Cold Lake First Nations who must abide by firearm rules established for traditional hunting activities.

As noted in Section 3.3.2, the Pilot is not a designated physical activity under the *CEAA* and does not directly trigger a review pursuant to the *Act;* notwithstanding, construction of a predator fence on the CLAWR would require federal agency approval and is more likely to require a *CEAA* review than a fence constructed on provincial land. Safety, security and access control; and the protection of Aboriginal rights in an area with existing restrictions on traditional land uses will all factor into the Government of Canada's review of a proposed predator fence.

There may also be some opportunities related to operating a predator fence on the CLAWR:

- the Government of Canada has an interest in caribou recovery and may be supportive of the Pilot;
- the number of land users is significantly reduced;
- an existing range safety and coordination team with established protocols is in place to manage CLAWR access, reducing risks related to public access;
- resources from 4 Wing Cold Lake and from industry members who operate in the CLAWR may be available for immediate emergency response; and
- Cold Lake First Nations has existing access rights to this restricted space and could be a partner (as other Aboriginal communities are expected to be in areas outside of the CLAWR).

3.4 Considerations Specific to Proposed Locations

Candidate site selection was primarily focused on technical and ecological criteria such as incorporating high-value caribou habitat but design criteria also considered topographic features, access, other landscape level features and land use. This approach was taken to minimize potential regulatory risk and delay by minimizing watercourse crossings and avoiding major rivers, highways, protected areas and the CLAWR. None of the potential candidate sites have differentiating factors with respect to potential regulatory requirements other than to conduct consultation and engagement with location-appropriate stakeholders.

It is assumed that access to tenured oil and gas rights in all proposed candidate areas will continue under existing regulatory requirements. Site-specific consideration of surface and sub-surface rights, and measures to respect those rights, will be required in the next phase to select one preferred Pilot location.

3.5 Maternal Penning

Maternal penning is a management approach that involves protecting pregnant caribou cows and their young from predation during the calving season in fenced areas of much smaller scale (perhaps 10 ha) than the predator fence considered herein. Maternal penning involves repeated animal handling, the effects of which are not fully understood. Past and current maternal penning projects in Alberta and British Columbia are providing additional information on this management approach. Maternal penning could be used to complement the predator fence Pilot as a short-term tool during critical periods. A maternal pen would not carry the same regulatory and stakeholder scrutiny or expectations as the larger predator fence; however, assuming penning sites were located on provincial crown land, similar regulatory permitting requirements would exist. Specifically, a *PLA* disposition would be required, as would *Wildlife Act* Research Permits and Collection Licenses. Construction in and around water or wetlands may trigger *Water Act* or federal *Fisheries Act* requirements depending on the location and construction method. Other land users would need to be identified and considered. It is assumed that for a site of approximately 10 ha, site selection could effectively eliminate regulatory triggers other than the *PLA* and *Wildlife Act* requirements and address conflicts with other land users.

4 REGULATORY STRATEGY

4.1 Approach

The Pilot is a novel concept that from a construction and operation perspective is relatively simple and straightforward but from an ecological and stakeholder perspective is much more complex. This increases regulatory uncertainty and puts the Pilot at risk for onerous and extended review and consideration by regulators and stakeholders. Potential risks to wildlife and habitat inside the Pilot fence, the challenges of predator management and restricted access to other land users are not trivial concerns and will need to be carefully assessed and managed by the proponent and by regulators.

A review of legislation and policy applicable to the Pilot makes clear that this project does not fit into an existing regulatory process that would provide schedule and consultation certainty for the proponent. As a result, there is an opportunity for the Fence Management Team to define and guide a process that:

- meets known requirements (i.e., *Public Lands Act*, *Wildlife Act*) and describes how those requirements will be adequate to regulate the Pilot;

- demonstrates to regulators and stakeholders that risks to wildlife and habitat will be appropriately managed;

- demonstrates that tenure holder, Aboriginal, commercial, and public use of lands and resources will be appropriately managed; and

- demonstrates that the Pilot supports federal and provincial caribou objectives by increasing scientific understanding of a novel management tool through research and monitoring.

It is recommended that the proponent's Fence Management Team prepare a preliminary Pilot information package that addresses the interests of relevant regulators and can be used during early engagement efforts. This information package can be used to proactively address anticipated questions and concerns and to demonstrate that Pilot proponents have completed the sufficient advance work to reduce risks and uncertainties to a level acceptable to regulators, Aboriginal groups, and stakeholders. The information package should include a description of:

- Pilot purpose in the context of federal and provincial caribou protection objectives;

- proposed Pilot location(s) and rationale;

- Pilot fence design and construction methods;

- anticipated regulatory requirements, the applications that will be prepared and how other regulatory interests have been considered (see Sections 4.2.1 to 4.2.3);

- known and anticipated concerns of tenure holders, Aboriginal groups, other land users and the general public, and the measures proposed to address those concerns while achieving the desired outcomes of the Pilot;

- risk assessment work planned or completed; and

- an overview of management plans that will be prepared for planning, construction and operation and the process and schedule to finalize them (see Section 4.3).

4.2 Regulatory Requirements

4.2.1 Required Permits, Licenses and Authorizations

When considering the project definition provided in Section 1.2, at a minimum, it is anticipated that applications will need to be made for the following specific permits, licenses and authorizations:

- *Public Lands Act* disposition or dispositions to be determined but possibly a Miscellaneous Lease issued for a research site and other dispositions for ancillary works (e.g., roads or trails);

- *Wildlife Act* Research Permit;

- *Wildlife Act* Collection License;

- *Water Act* authorizations to construct in or around wetlands and any additional assessment and mitigation required which may including replacement as per the Alberta Wetland Policy; and

- *Fisheries Act* authorizations if any construction or operation activities have the potential to be a serious harm to fish.

4.2.2 Site Specific Assessments

Early site specific planning should include:

- assessment of watercourse crossings and wetland areas in the Pilot area;
- assessment of fish habitat to determine if Pilot activities could pose a serious harm to fish;
- wetland assessment including planning and preliminary cost estimate for any required mitigation;
- historical resources desktop review to determine if further work is required; and
- identification of other land users and tenure holders.

4.2.3 Policies and Guidelines

Several provincial and federal policies and guidelines, particularly related to construction are relevant for the Pilot (Table 1). Some are requirements and some are recommended in this strategy because while they do not necessarily apply to the Pilot itself, they do include best practices that apply to development within caribou ranges and should be reviewed, and incorporated into Pilot planning and detailed design as appropriate.

Table 1 Policies and Guidelines Relevant to the Pilot

Policy or Guideline	Relevance
Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population in Canada	Guiding document for boreal caribou policy in Canada - ensure alignment with desired outcomes, tools and monitoring
A Woodland Caribou Policy for Alberta	Guiding document for boreal caribou policy in Alberta - ensure alignment with desired outcomes, tools and monitoring
Lower Athabasca Biodiversity Management Framework (currently in draft)	Alignment of Pilot design and monitoring as appropriate.
Integrated Standards and Guidelines Enhanced Approval Process (EAP)	Best practices for construction, operation and maintenance including specific expectations for development in caribou ranges (applicable to oil and gas development) – not required but recommended for review
Water Act Code of Practice for Watercourse Crossings	Best practices and standards for watercourse crossings – not required but recommended for review
Alberta Wetland Policy	Best practices for construction in and around wetland areas
Fisheries and Oceans Canada – Fisheries Protection Policy Statement	Guidance document for protecting fish bearing water bodies.
Fisheries and Oceans Canada - Measures to Avoid Causing Harm to Fish and Fish Habitat	Work in or near fish habitat

Table 1 Policies and Guidelines Relevant to the Pilot	
Policy or Guideline	**Relevance**
Alberta Wildlife Research Class Protocols, CCAC guidelines, and IUCN policies, guidelines and standards.	Design of Animal Husbandry Plan and Predator Control Plan
Caribou Protection Plan Guidelines and Caribou Calving Information	AEP guidelines for the preparation of a Caribou Protection Plan

4.2.4 Uncertainties

At the request of the COSIA Land EPA, no regulatory consultation was undertaken to prepare this document and uncertainties will remain until provincial and federal regulators have been engaged to confirm regulatory requirements. As described in Section 4.1, the Pilot is relatively simple from a construction and operation perspective but is much more complex from an ecological and stakeholder perspective and regulatory consultation is required to provide clarity on provincial and federal requirements and expectations. Key uncertainties are:

- **Application of the *EPEA* -** As described in Section 3.2.1, the Pilot does not automatically trigger any *EPEA* requirements and its application would only occur if the Director or Minister exercised the discretionary authority provided by the *Act*.

- **Application of *SARA and CEAA*** - The Government of Canada has interest in caribou as a species listed as threatened under *SARA* but the *Act* itself does not directly apply for terrestrial species on provincial land (Section 3.3.1). As described in Section 3.3.2, the Pilot does not trigger a *CEAA* review and the potential reasons why the Minister would exercise discretionary authority to require a *CEAA* review (risk to caribou or aboriginal health and land use) do not seem to be commensurate with the size and scale of this project. Nonetheless, early and ongoing engagement with Environment Canada specialists is recommended to access technical support for the project and communicate its potential contribution to meeting Government of Canada objectives for caribou protection and respect of Aboriginal rights and interests. Early engagement with Canadian Environmental Assessment Agency representatives is also recommended to explain why, and confirm that, a *CEAA* review is not warranted.

4.3 Management Plans

Development of specific management plans is recommended for the Pilot to address known or anticipated issues. Development of the plans identified below (or one or more consolidated plans that address these components) will demonstrate the management approach and contribute to efforts to secure regulatory, Aboriginal, and stakeholder support for the Pilot. Each draft plan should be described in the Pilot information package in sufficient detail to demonstrate adequate risk management during construction, operation and decommissioning of the Pilot.

1. **Risk Management Plan** – process for identification and management of financial, technical, stakeholder and regulatory risks to inform planning and ongoing management.

2. **Animal Husbandry Plan** – caribou handling and care including reference to applicable standards that may include Alberta Wildlife Act Class Protocols, CCAC guidelines, and IUCN policies, guidelines and standards.

3. **Predator Control Plan** - predator control protocols that adhere to applicable standards and leverage Aboriginal and local partnerships.

4. **Access Management Plan** – protocols for access by tenure holders, Pilot staff, contractors, and other users of the land.

5. **Construction Plan** – fence design, budget, schedule, procurement, contracting, staffing, health and safety, material handling, storage and construction methods including site specific aspects for water course crossings, access gates, *etc*.

6. **Operations and Maintenance Plan** – operating procedures and protocols, roles and responsibilities, health and safety, maintenance procedures, budget, schedule, staffing, procurement, contracting, *etc*.

7. **Emergency Response Plan** – incident definitions, response procedures and protocols including communications, roles and responsibilities, animal management, resources (e.g., fire response, medical, heavy equipment, air support).

8. **Research and Monitoring Program** - research objectives, monitoring objectives, alignment of operations, research and monitoring with federal, provincial and Pilot objectives, performance indicators, course correction and reporting, early warning of unintended consequences to vegetation and non-target animals.

9. **Stakeholder Engagement Plan** - regulatory engagement, engagement with other surface and sub-surface rights holders, known users of the land (e.g., trappers and recreation groups).

10. **Aboriginal Consultation Plan** – consultation with Aboriginal groups including understanding of traditional knowledge, ongoing traditional land use, partnership opportunities and employment/business opportunities.

11. **Outreach and Communication Plan** – objectives, communication tools, audience assessment and monitoring (e.g., public response, social media, internet dialogue), content and materials, timing, education, public reporting, *etc*.

5 REGULATORY ENGAGEMENT

This regulatory strategy proposes that the Fence Management Team develop a preliminary information package defining the Pilot and how it will be operated before extensive engagement with regulatory agencies occurs. ConocoPhillips representatives have already engaged senior bureaucrats at provincial agencies to identify key issues and inform government officials about the intent and scale of the Pilot. Table 2 below lists the federal and provincial agencies with interest in the Project including the suggested timing for engagement based on Pilot implementation phases described in Section 6 and depicted in Figure 3 (e.g., Pilot Definition / Pilot Approvals and Planning / Construction / Operations / Program Review / All Phases).

Through the development of an information package as described in Section 4, Pilot proponents can propose a suggested approach for regulating the Pilot with a comprehensive plan to support the strategy. This package should contain sufficient detail to provide regulators and other stakeholders with confidence

that the regulatory requirements identified this strategy are sufficient to manage Pilot risks and further assessment (i.e., environmental assessment) is not required. It is anticipated that the Pilot proponent(s) will need at least three months following Pilot Definition to develop a complete version of these materials for regulatory, Aboriginal, and stakeholder engagement. It may be useful to prioritize specific pieces of work so that early engagement on the strategic items noted below can be conducted as the remaining work (e.g., development of management plans listed in Section 4.3) is completed. Strategic items that will need to be included in planning for early regulatory engagement include:

- documented confirmation that rights of tenure holders will be respected, adhering to current regulatory requirements (e.g., caribou timing restrictions);
- confirmation that the Pilot is not subject to the *REDA,* to confirm that AEP, not AER, will lead the regulatory review;
- confirmation that federal and provincial environmental impact assessments will not be required; and
- confirmation that the proposed approach(es) to manage other approved, traditional, and potential future land uses are appropriate, and identification of any additional measures that will need to be considered or adopted.

Table 2 Government and Non-Government Agencies With Project Interests			
Ministry or Agency	**Role**	**Interest or Decision Required**	**Engagement Level / Timing**
Federal			
Environment Canada	Canadian Wildlife Service	Discuss Pilot contributions to federal caribou protection objectives, compatibility with federal recovery strategy, and engage subject matter experts in research and monitoring.	Inform and Engage / All Phases
Canadian Environmental Assessment Agency	Regional Director	Confirmation that an environmental assessment is not required pursuant to the *CEAA*.	Inform and Decision / Pilot Definition
Fisheries and Oceans	Fisheries Protection Program	Authorization for works that may cause serious harm to fish.	Decision (if required) / Pilot Approvals and Planning
National Defence - Royal Canadian Air Force	4 Wing Cold Lake	Activities related to adjacent sites if selected (5, 6), potential for future expansion in to the CLAWR if contemplated, potential restrictions on ground and aircraft activity.	Inform / Pilot Definition (sites 5, 6)
Provincial			
Alberta Energy Regulator	Assistant Deputy Minister(s) as appropriate	Confirmation that the *REDA* does not apply and that AEP will manage the *PLA* applications. If REDA does apply, confirmation that regulatory strategy is acceptable and that an environmental assessment is not required pursuant to the *EPEA.* Input on potential conflicts with existing and proposed resource management direction.	Decision / Pilot Definition

Table 2 Government and Non-Government Agencies With Project Interests			
Ministry or Agency	**Role**	**Interest or Decision Required**	**Engagement Level / Timing**
Alberta Environment and Parks	Deputy Minister of Environment / Assistant Deputy Minister(s) as appropriate	Pilot alignment with existing and proposed provincial resource management objectives. Confirm land use by tenure holders within fence.	Inform / Pilot Definition and Approvals and Planning
	Land Use Planning	Pilot alignment with provincial land use planning.	Inform / Pilot Definition
	Director (Environmental Assessment)	Confirmation that regulatory strategy is acceptable and that an environmental assessment is not required pursuant to the *EPEA.*	Inform and Decision / Pilot Definition
	Fish and Wildlife	Pilot contribution to range planning. Participation in review of Pilot objectives, animal husbandry, research and monitoring.	Inform and Engage / All Phases
	Fish and Wildlife	*Wildlife Act* Research Permit and Collection Licences	Decision / Pilot Approvals and Planning
	AEMERA (responsible to AEP)	Participation in research and monitoring. Pilot alignment with Lower Athabasca Biodiversity Management Framework.	Inform and Engage / All Phases
	Water Policy Branch	Authorization for construction in and around wetlands as per the Alberta Wetland Policy.	Decision / Pilot Approvals and Planning
	Public Lands	*Public Lands Act* dispositions. Confirm land use by tenure holders within fence.	Decision / Pilot Approvals and Planning
	Parks	Opportunities or conflicts with Stony Mountain Wildland Park.	Inform / Pilot Definition (site 3)
Alberta Energy	Deputy Minister of Energy / Assistant Deputy Minister(s) as appropriate.	Pilot contribution to range planning and industry efforts on caribou recovery and understanding of any potential effects of Pilot operation on existing resource extraction and management direction. Confirm land use by tenure holders within fence.	Inform / Pilot Definition and Approvals and Planning
Alberta Indigenous Relations	Director / Section Lead / Aboriginal Consultation Office	Information on Pilot purpose and adequacy decision on Aboriginal consultation completed as per the *PLA* disposition process.	Inform and Decision / Pilot Definition and Approvals and Planning
Alberta Agriculture and Forestry	Deputy Minister / Assistant Deputy Ministers as appropriate	Pilot contribution to range planning and industry efforts on caribou recovery and understanding of any potential effects of Pilot operation on existing resource extraction and management direction. Confirm land use by tenure holders within fence. Fire management approach.	Inform / Pilot Definition and Approvals and Planning
Alberta Culture and Tourism	Land Use Planning	Historical resources requirements (if any) after desktop review is completed.	Decision (if required) / Pilot Approvals and Planning
Municipal			

Table 2 Government and Non-Government Agencies With Project Interests			
Ministry or Agency	**Role**	**Interest or Decision Required**	**Engagement Level / Timing**
Regional Municipality of Wood Buffalo	Mayor and Chief Administration Officer	Information on the Pilot purpose, communication materials, employment opportunities, building permits if required.	Inform / Pilot Definition and Approvals and Planning
Lac La Biche County	Mayor and Chief Administration Officer	Information on the Pilot purpose, communication materials, employment opportunities, building permits if required.	Inform / Pilot Definition and Approvals and Planning

6 IMPLEMENTATION

One of the conclusions of the OSLI-sponsored ecological expert workshop was that a predator fence should be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government (Antoniuk et al. 2012). Technical specialists also agreed that ideally, this third-party Fence Management Team should involve one or more local Aboriginal community(s). Regardless of their background and experience, members of the third-party management team need to be perceived as unbiased and qualified and should ideally be known to key stakeholders to help build support for the Pilot.

While the governance structure has yet to be finalized, this section assumes that a third-party management team will be established. A recommended governance model for the team is proposed, followed by a discussion of the activities that would be required to implement a Pilot in northeast Alberta. Confirmation of the most appropriate corporate structure and associated roles and responsibilities will be an initial required task during Pilot implementation.

6.1 Governance Model

A third-party Fence Management Team will need to be established as a legal entity in order to enter into agreements[24] that carry financial and legal liability. There are a number of not-for-profit entities (company, corporation, society, association, or cooperative) that would be able to construct, own, and manage the Pilot predator fence to fulfill this requirement. Use of a legal entity would also allow this organization to hold liability insurance and would limit the liability of shareholders funding or participating in the Pilot as well as providing an arms-length relationship with industry or government.

The governance structure of not-for-profit companies, societies and associations, and cooperatives are dictated respectively by the *Companies Act, Societies Act,* and *Cooperatives Act.* A proposed Pilot governance model applicable to all potential organizational structures is depicted graphically in Figure 2, with each key role described below. Funding to support the governance model (e.g., salaries, consulting fees, administration) is included in the high-level cost estimates prepared for this phase of the Pilot.

[24] Agreements would include engaging staff and contractors, owning facilities, and holding approvals and permits.

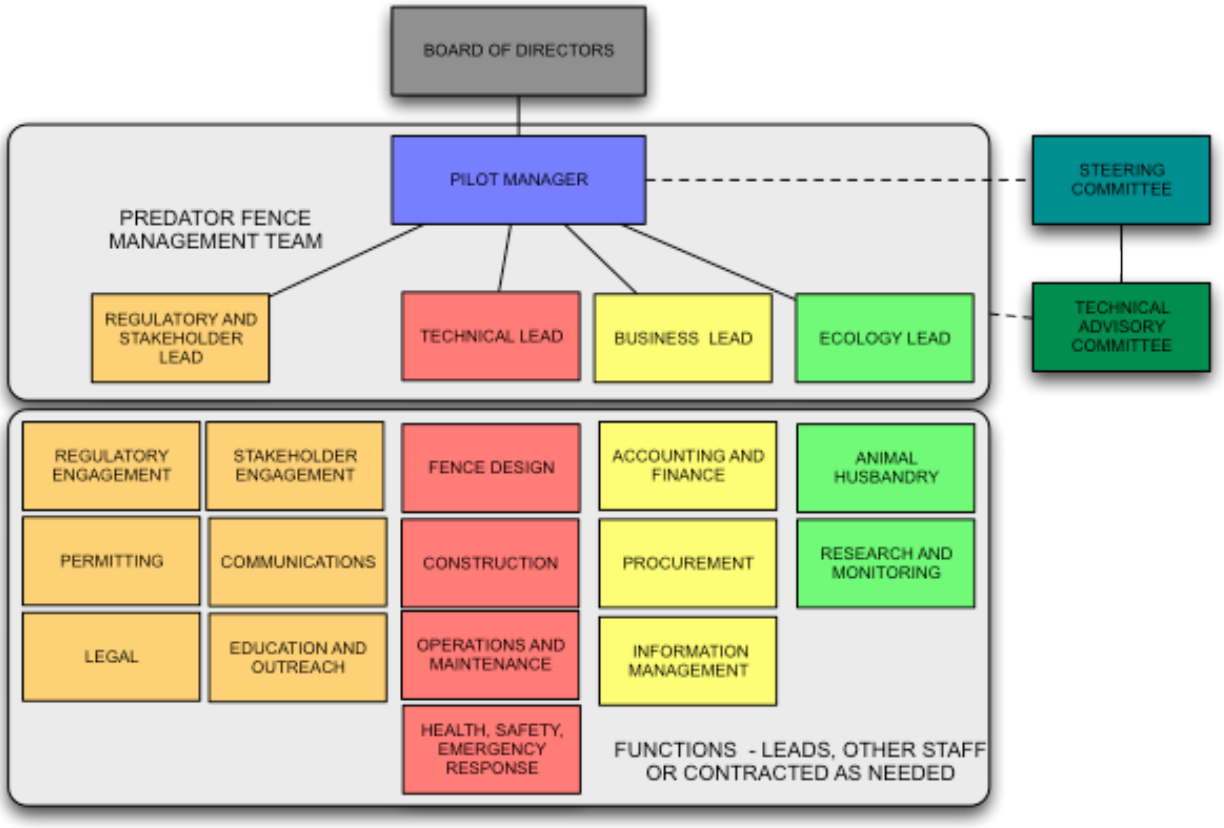

FIGURE 2 – Caribou predator fencing pilot governance model.

6.1.1 Board of Directors

All potential organizational structures include a Board of Directors to represent shareholders and direct the organization's activities. A review of the advantages and disadvantages of different structures is beyond the scope of this project, and will need to be completed by legal advisors to shareholders immediately following a decision to implement the Pilot. The tax implications of alternative structures will need to be specifically evaluated, as the Pilot is considered to be scientific research.

Shareholders in the Pilot not-for-profit organization are assumed to include industry funders and oil sands company(s) with intensive operations within the fenced area. Aboriginal community(s) with direct interest in Pilot activities may also wish to, or be invited to, participate as shareholders. The Board may also wish to appoint a Director-at-large, ideally from northeast Alberta, to reflect a regional perspectives and enhance the independent, third-party status of the organization.

Notwithstanding the need for active GOA involvement, the province would be unable to participate as a shareholder, so other mechanisms are needed to ensure that GOA and other key stakeholders are able to fill advisory roles to the not-for-profit organization.[25]

The Board of Directors would be responsible for:

- providing overall Pilot oversight and accountability;
- providing certainty that tenure holder rights will be respected prior to taking any decisions on construction of the Pilot fence;
- developing corporate by-laws, shareholder agreements, and articles; approving the funding model;
- approving performance and reporting measures;
- appointing the Pilot Manager (Executive Director) and evaluating their performance;
- approving the overall annual work plan and budget for the regulatory, stakeholder engagement, technical, business, and science programs; and
- providing final approval to construct, operate, stop, and continue the Pilot.

6.1.2 Pilot Manager or Executive Director

The Board of Directors should delegate day-to-day management responsibilities and decision-making to a Pilot Manager or Executive Director. The Pilot Manager would attend and participate in Board of Director meetings and head the predator Fence Management Team, an arms-length group comprised of employees, contractors, or secondees from Aboriginal and industry organizations or groups with direct interest in Pilot activities.

The Pilot Manager would head the predator Fence Management Team and be responsible for:

- developing the funding model;
- developing performance and reporting measures;
- coordinating preparation of annual business (operating) plans, financials, and Annual Reports;
- appointing Fence Management Team personnel or contractors and managing and evaluating their performance;
- coordinating implementation of the stakeholder engagement, regulatory engagement, and risk management strategies as defined;

[25] An alternate approach not discussed here would apply to a GOA-led Pilot. In this case, a Delegated Administrative Organization (*e.g.*, Alberta Conservation Association) could be established or used to implement the Pilot.

- coordinating annual work plans and budgets for the regulatory, stakeholder engagement, technical, business, and science programs;
- providing financial oversight and approving large capital expenditures within the Board approved annual plan; approving regulatory applications;
- coordinating Pilot management, research and monitoring plans; and
- recommending Board approval to construct, operate, stop, and continue the Pilot.

The Pilot Manager obviously performs a critical role in this governance model not only for Pilot implementation, but for ensuring that GOA, Aboriginal and stakeholder interests and concerns are identified and managed appropriately. The perception of the Pilot organization as an independent, third-party will hinge in large part on the way in which the Pilot Manager and other members of the Fence Management Team deal with these interests and concerns.

6.1.3 Steering Committee

While the Pilot Manager would ultimately be responsible to the Board of Directors, it is proposed that a Steering Committee be established to provide guidance to the Pilot Manager and provide a venue for input by key stakeholders who may be directly affected but are not shareholders. The Steering Committee would be expected to operate by consensus, but should have an odd number of members in the event that a vote is required for a recommendation to the Project Manager. Steering Committee members should include one or more interested representatives of key stakeholders: GOA, industry funding members including representatives with operations inside the fence area, Aboriginal groups, environmental organizations, and possibly local government.

The role of the Steering Committee would be to:

- provide input on Pilot oversight and performance;
- provide input on regulatory and stakeholder engagement;
- participate in issues identification and management;
- provide input on work and budget priorities;
- liaise with provincial, federal, and industry experts as appropriate;
- provide recommendations for decisions to construct, operate, stop, and continue the Pilot; and
- liaise with provincial, federal, Aboriginal, and industry experts as appropriate or defined in the Stakeholder Engagement Strategy.

6.1.4 Technical Advisory Committee

A Technical Advisory Committee should be established to provide independent advice on Pilot Management, Research and Monitoring Plans to the Fence Management Team and Steering Committee. This committee should include interested and representatives with specific technical or sector expertise

(e.g., wildlife ecology and research design, fence construction, game farming, academia, veterinarian, forest sector, hydrocarbon sector, and possibly recreational users) relevant to development or evaluation of the Pilot management, research, and monitoring plans described earlier in Section 4.3.

Senior GOA representatives and a number of ecological experts have identified the requirement for a robust, independent science program to evaluate the Pilot. The Fence Management Team or Steering Committee could obtain independent advice from the Technical Advisory Committee, or may choose to establish a more focused Science Advisory Subcommittee for this purpose.

The role of the Technical Advisory Committee would be to:

- provide input on Pilot management, research and monitoring plans developed by the Fence Management Team;
- identify the need for, and suggest, plan revisions based on monitoring results;
- provide input on annual work and budget priorities;
- engage with academic institutions and identify graduate students for research projects;
- provide peer review of designs, reports and publications;
- liaise with provincial, federal, and industry experts as appropriate or defined in the Stakeholder Engagement Strategy; and
- provide advice on decisions to construct, operate, stop, and continue the Pilot.

6.1.5 Regulatory and Stakeholder Lead

The Regulatory and Stakeholder Lead would report to the Pilot Manager and be part of the third-party Fence Management Team. Like other members of the Fence Management Team, the Regulatory and Stakeholder Lead could be a qualified employee, contractor, or secondee from Aboriginal and industry organizations or groups with direct interest in Pilot activities.

A key role of the Regulatory and Stakeholder Lead would be to develop and implement the Regulatory Strategy including:

- preparation or coordination of required documents, plans, and applications;
- regulatory engagement to describe and confirm the Regulatory Strategy;
- regulatory engagement for known permitting / authorization requirements; and management of applications through the regulatory process.

This position would also be responsible for:

- working with the Steering Committee to define Stakeholder Engagement Strategy activities, roles and responsibilities;
- implementing the Stakeholder Engagement Strategy as defined;
- coordinating communication, education and outreach activities;
- coordinating risk assessment efforts in collaboration with other leads;
- developing annual work plans and budgets; and
- managing legal, communications, and stakeholder engagement staff and contractors.

6.1.6 Technical Lead

The Technical (Construction and Operations) Lead would report to the Pilot Manager and be part of the third-party Fence Management Team. Like other members of the Fence Management Team, the Technical Lead could be a qualified employee, contractor, or secondee from Aboriginal and industry organizations or groups with direct interest in Pilot activities.

The Technical Lead would be responsible for:

- identification and engagement of contractors for detailed fence design, cost estimates and bid preparation;
- construction planning and implementation including close collaboration with the Regulatory and Stakeholder Lead and Ecology Leads;
- identification of roles for Aboriginal contractors and businesses in collaboration with the Pilot Manager and the Regulatory and Stakeholder Lead;
- working with the Technical Committee to develop, implement, and revise Access Management plan, Operations and Maintenance Plan, and Emergency Response plan in close collaboration with the Ecology Lead on animal husbandry and monitoring aspects of the Pilot;
- management of staff and contractors during construction, operations and maintenance, and decommissioning;
- health, safety and emergency response planning and implementation during construction, operation and decommissioning;
- developing annual work plans and budgets; and
- implementation of the Stakeholder Engagement Strategy as defined.

6.1.7 Ecology Lead

The Ecology Lead would report to the Pilot Manager and be part of the third-party Fence Management Team. Like other members of the Fence Management Team, the Ecology Lead could be a qualified employee, contractor, or secondee from Aboriginal and industry organizations or groups with direct interest in Pilot activities.

The Ecology Lead would be responsible for:

- working with the Technical Committee to develop and implement animal management research, and monitoring plans and reporting systems;
- reporting to the Pilot Manager and Technical Committee on Pilot progress and success based on monitoring results;
- developing annual research work plans and budgets;
- supporting graduate students participating in research;
- liaison with provincial, federal, and industry ecologists and veterinarians as appropriate or defined in the Stakeholder Engagement Strategy;
- and provide recommendations on decisions to construct, operate, stop, and continue the Pilot.

6.1.8 Business Lead

The Business Lead would report to the Pilot Manager and be part of the third-party Fence Management Team. Like other members of the Fence Management Team, the Business Lead could be a qualified employee, contractor, or secondee from Aboriginal and industry organizations or groups with direct interest in Pilot activities. This position would be responsible for designing and implementing procurement, accounting, financial reporting and information management systems.

6.2 Implementation Program

Work completed for the Pilot has advanced the caribou predator fencing concept to preliminary design of four potential and two technically-preferred candidate areas. Further work will be required prior to construction to:

- consult with tenure holders to determine their willingness to participate in the Pilot and confirm candidate area(s) for further evaluation;
- develop and implement the regulatory and stakeholder strategies;
- select a preferred location;
- prepare regulatory filings, and
- develop detailed fence design and management plans that can be issued to a fencing contractor.

As shown in Figure 3, ongoing effort will also be required during operations to monitor success, address evolving issues, and refine management plans so that an informed decision can be made following 10 years of operations on whether to stop, continue or expand the Pilot fence.

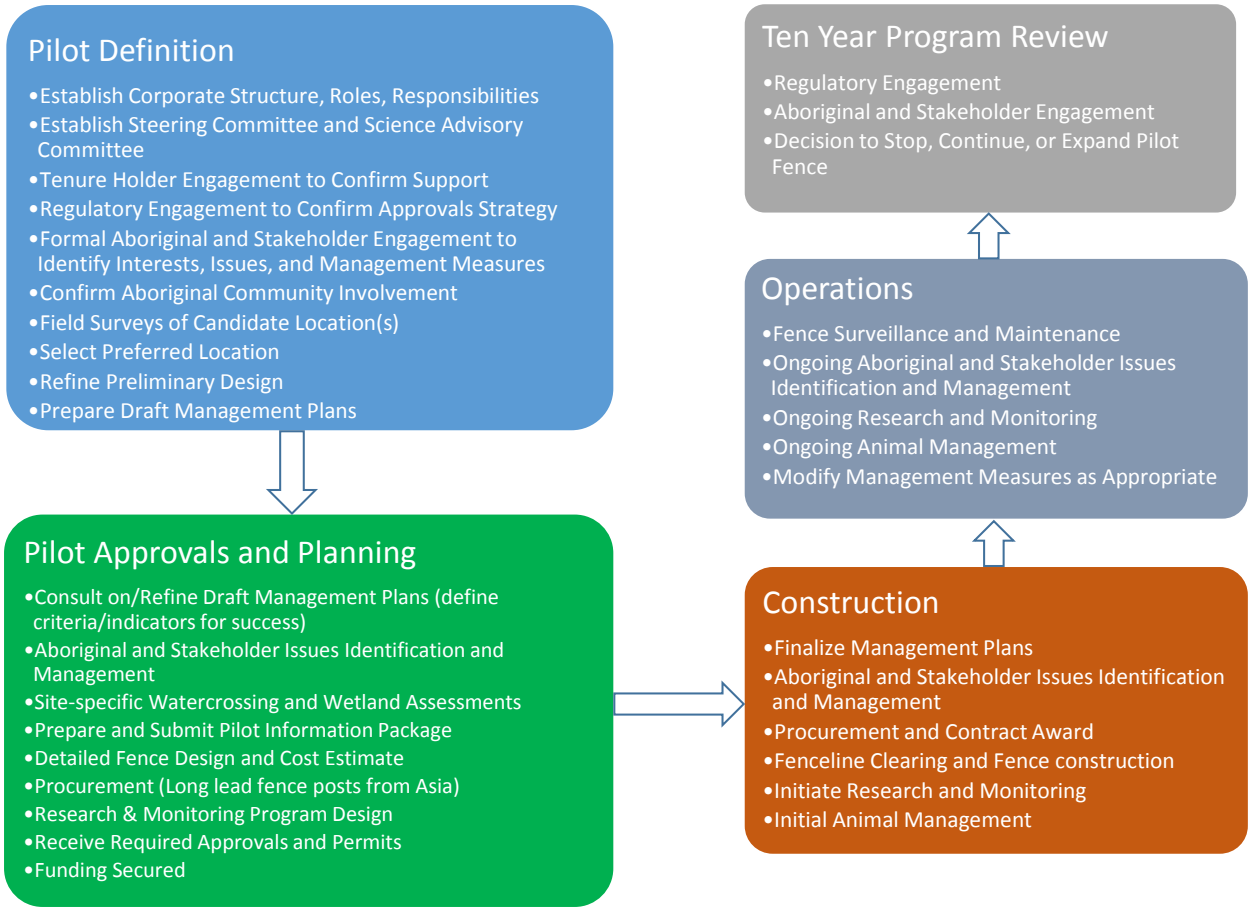

FIGURE 3 – Caribou Predator Fencing Pilot implementation phases and activities.

Figure 4 provides the projected implementation schedule for these phases and activities. The **Pilot Definition** phase would begin immediately following a decision to proceed with the Pilot. This phase is expected to require at least six months and $300 to $450K (a contingency factor of at least 30% should be added because the Pilot site has not yet been selected). The primary outcomes of this phase would be:

- Design and creation of a third-party organizational structure for Pilot implementation, including retention of employees, consultants, or secondees for the Fence Management Team and startup of the Steering Committee and Technical Committee(s).

- Definition of engagement roles and responsibilities of Fence Management Team, Steering Committee, companies operating within the Pilot predator fence.

- Initial tenure holder engagement to determine their development plans and willingness to participate in the Pilot. Tenure holder support for potential and technically-preferred candidate areas and this industry-funded initiative is a prerequisite to further evaluation and engagement.

- Initial regulatory engagement to identify provincial and federal regulatory interests and concerns and confirm the regulatory strategy.

- Formal Aboriginal engagement to identify interests, issues, management measures along with the groups or communities interested in participating in the Pilot.

- Initial engagement with other land users and stakeholder to identify interests, issues, management measures and groups or individuals interested in participating in the Pilot in some capacity.

- Field surveys to refine fence design requirements and costs.

- Decision on preferred Pilot location and design requirements based on these inputs.

- Preparation of draft management plans noted in Section 4.3.

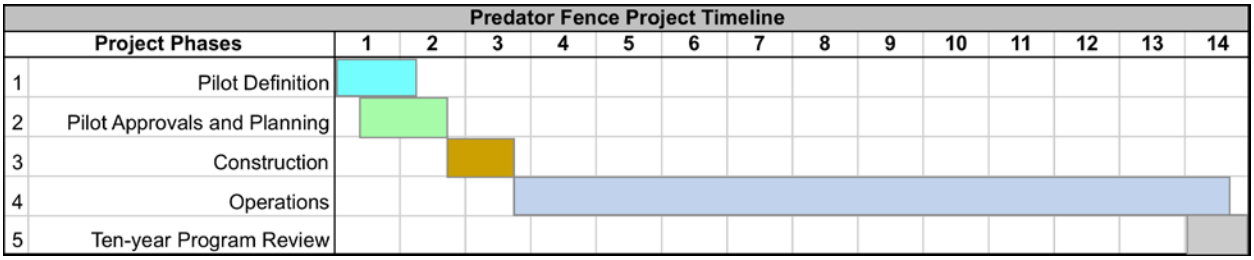

FIGURE 4 – Caribou predator fencing pilot implementation schedule.

The **Pilot Approvals and Planning** phase would begin once a preferred location is selected and decision to proceed with regulatory filings is received. This phase is expected to overlap with the Pilot Definition phase and require 6 to 12 months and $300K to $450K (a contingency factor of at least 30% should be added because the Pilot site has not yet been selected). The primary outcomes of this phase would be:

- Preparation and submission of a preliminary Pilot information package (see Section 4.1) to frame regulatory and stakeholder engagement.

- Ongoing tenure holder engagement to identify interests and issues and refine measures included in the draft management plans.

- Ongoing Regulatory engagement to confirm permitting requirements and obtain approvals.

- Field surveys to document watercrossing and wetland conditions and associated design requirements and costs.
- Historical resource assessment desktop and field studies, if required.
- Ongoing Aboriginal engagement to identify interests and issues and refine measures included in the draft management plans.
- Ongoing engagement with other land users and stakeholder to identify interests and issues and refine measures included in the draft management plans.
- Detailed fence design, costing, and bid preparation.
- Commitment to long-lead time items (i.e., one year lead time for fence posts identified in preliminary design; see Section 2 in Overview report).
- Research and monitoring program design and implementation as appropriate.
- Receipt of all required approvals and decision to release fence contract tenders and proceed with construction.

Fence construction will likely need to occur during frozen ground conditions, and this will dictate timing of the **Construction** phase. Restricted activity periods for construction in caribou zones and for migratory bird protection will need to be considered in construction planning. Clearing of the fence perimeter right-of-way could occur immediately following decision to proceed, subject to site conditions and migratory bird timing restrictions. Construction phase duration will also be affected by the effort and time required to remove predators and other prey from within the predator fence and to establish the desired caribou composition within the fence (number, age, sex, pregnancy rate, health/disease, genetic diversity), which may require capture and movement of animals from outside the fence area.

Based on the desired outcomes and success metrics provided in Section 2.3 of the Overview report, the **Operations** phase would begin once: the fence and access points are functioning as designed; desired caribou composition is established within the fence; and all mid-size to large predators have been removed from the fenced area. The Operations phase would continue for ten years, or until a decision is made to stop the Pilot in the event that it has not achieved pre-defined success criteria. Detailed fence design, approvals, and Pilot management and monitoring costs over fourteen year design, construction and operations period are estimated to be $15 million (plus fence construction costs noted earlier and contingency factor of at least 30% because the Pilot site has not yet been selected).

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APPENDIX A – SUMMARY OF REVIEWED LEGISLATION AND POLICY

Summary of Legislation and Policy Reviewed for the Completion of this Report	
Legislation or Policy	**Relevance**
Government of Canada	
Canadian Environmental Assessment Act	Federal government interest in species at risk
Fisheries Act	Potential effects on fish bearing waterways
Migratory Birds Convention Act	Potential effects on migratory birds (construction)
Species at Risk Act	Caribou protection and potential risk to caribou inside the fence
Navigation Protection Act	Potential effects on navigable waters at fence crossings
Accord for the Protection of Species at Risk	Coordination between federal and provincial governments
Canadian Biodiversity Strategy	Background on overarching policy
National Framework for Species at Risk Conservation	Background on overarching policy
Government of Alberta	
Alberta Land Stewardship Act	Enabling legislation for Land Use Framework
Environmental Protection and Enhancement Act	Decision making related to development in Alberta
Forests Act	Timber removal on fence right-of-way.
Provincial Parks Act	Activities adjacent to or within designated areas depending on location
Public Lands Act	Use of crown land – primary regulatory legislation for the Pilot
Responsible Energy Development Act	Determination of decision making authority
Water Act	Fence crossings on water bodies
Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act	Designation as a protected area
Wildlife Act	Caribou research and predator management
Alberta's Biodiversity Policy (Draft, December 2014)	Links provincial, regional, sub-regional and local biodiversity management initiatives, plans and policies to the Canadian Biodiversity Strategy. Sets the strategic direction for the Land Use Framework.
Alberta Land Use Framework	Enabling framework for the Lower Athabasca Regional Plan
Alberta's Strategy for the Management of Species at Risk	Guidance document for species at risk management in Alberta
Alberta Wetland Policy	Construction activities within or near a wetland.
Enhanced Approval Process (Integrated Standards and Guidelines)	Suggested best practices for construction in a caribou range
Responsible Actions - A Plan for Alberta's Oil Sands	Project aligns with multiple strategies in Responsible Actions.
Alberta Caribou Policy	Guiding document for boreal caribou policy in Alberta - ensure alignment with desired outcomes, tools and monitoring
Species at Risk Strategy (2009 to 2014)	Project aligns with objectives and strategies.

NORTHEAST ALBERTA CARIBOU PREDATOR FENCING PILOT:

STAKEHOLDER ENGAGEMENT STRATEGY

Prepared for
Canada's Oil Sands Innovation Alliance (COSIA)

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1. INTRODUCTION

Canada's Oil Sands Innovation Alliance (COSIA) Land Environmental Priority Area (Land EPA) has been progressing a suite of caribou recovery tools, one of which is the Caribou Predator Fencing Pilot project (the Pilot). A predator fence is a conservation approach that establishes and maintains a small breeding subpopulation of caribou in a large fenced enclosure within its original range. The fence is designed to exclude wolves and bears so that caribou reproductive success is improved, allowing surplus yearlings from within the fence to be moved outside to supplement the surrounding range population(s).

The objective of the Pilot project is to advance predator fence design sufficiently to expedite Government of Alberta (GOA) endorsement and authorization of a caribou fencing trial. More specifically, the intent of this Pilot is to ensure that a properly designed fencing scheme can be formally evaluated as a component of the northeast Alberta woodland caribou range and action plans. It is assumed that the Pilot would be funded by industry, championed by the GOA, and supported by the federal government.

Work tasks required to advance predator fence design for the Pilot include:

- the identification of potential locations for a large predator fence exclosure (predator fence) or smaller maternal pen;
- investigation of potential fence designs;
- identification of anticipated regulatory requirements; and
- development of a strategy for stakeholder and regulatory engagement and implementation.

This document provides the Stakeholder Engagement Strategy prepared by Lynn McNeil, McNeil Consulting Inc. with input from Terry Antoniuk, Salmo Consulting Inc.

2. PILOT SCOPE AND PRELIMINARY DESIGN

The Pilot scope, design assumptions, success metrics, and preliminary design are described in Section 2 of the Caribou Predator Fencing Pilot Overview report (Overview report; Antoniuk et al., 2016). The desired technical and ecological outcome of the Pilot is to prove that the predator fence concept can contribute to boreal caribou population enhancement.

The preliminary design assumptions for a Pilot predator fence are that it will:

- be part of an integrated and long-term government range plan to recover caribou habitat and reduce densities of predator and primary prey populations in surrounding areas;
- enclose an area of approximately 90 to 150 km^2 in one of four caribou ranges (the West Side Athabasca River, East Side Athabasca River, Cold Lake, and Richardson caribou ranges; Figure 1);
- maintain 20-40 cows and at least 2-4 bulls within the fenced area;
- be funded by industry, championed by the GOA, and supported by the federal government;
- respect tenures and interests within the fence;
- be proposed, constructed and managed by a third-party management team (the Fence Management Team) established for this purpose that is arms-length from industry or government and ideally involves one or more local Aboriginal community(s). As described in more detail in the Overview report, the third-party management team will seek input from technical experts, as well as those directly affected by the Pilot;
- include a detailed animal husbandry plan (animal care protocols) and a predator control plan for the handling and continual monitoring of caribou and removal/monitoring of predators and other animals as required, that will be reviewed and approved by relevant regulators to ensure that no harm is done to the threatened caribou population;
- allow for industrial/commercial activity to occur inside the fence that is consistent with existing regulatory requirements for managing caribou. Fence operation will result in some restrictions for road access at the fence perimeter that will be established in consultation with oil and gas, surface, timber, and mineral rights holders;
- allow for traditional Aboriginal land use to occur inside the fence with some with some restrictions for road access at the fence perimeter, established in consultation with Aboriginal groups;
- have a proposed Pilot duration of 10 years. If the Pilot is successful, fence operation may continue over multiple decades (40+ years). If the Pilot is not successful, the fence would be removed;
- have emergency response plans in place to minimize risk to caribou, the fence, and other infrastructure from a fire or other emergency;
- have continuous access to the fence perimeter for monitoring fence integrity and maintenance and for monitoring and responding to incursions by predators; This access will preferentially be provided by siting the fence perimeter along existing all weather access roads and cleared rights-of-way; construction of an all-weather road around the complete perimeter is not anticipated nor included in construction cost estimates for the Pilot;

- may or may not be expanded on the chosen site after the Pilot is complete;
- allow tenure holders, Aboriginal groups, other land users and other stakeholders to be engaged and consulted during Pilot site selection and implementation; and
- adopt a fundamental design objective that the Pilot "do no harm" to current boreal caribou populations.

Using a suite of ecological and technical criteria, two areas of interest were identified in each of the four Lower Athabasca Region caribou ranges: West Side Athabasca River; East Side Athabasca River; Cold Lake; and Richardson. Four potential candidate areas were selected in the East Side Athabasca River and Cold Lake caribou ranges. These potential candidate areas were identified because they are in the highest risk boreal caribou ranges, they are known to be used by caribou, and they provide better logistical access for piloting a predator fence. Example fence layouts that considered topographic features, access, other landscape level features and land use were developed for the four potential candidate sites. Two of the four potential candidate areas (one in East Side Athabasca River range and one in Cold Lake range) were identified as being the most technically suitable for the Pilot based on landscape characteristics and access considerations.

Tenures and interests were not considered in the technical analysis, so potential Pilot candidate areas identified using technical and ecological criteria will need to be evaluated further. However, the preliminary designs developed for the Pilot are intended to help encourage informed engagement and evaluation that should ultimately lead to detailed design of one preferred Pilot location.

Oil sands and timber disposition holders within the four potential predator fence locations have been identified so that they can be contacted during the definition phase to determine their development plans and willingness to participate in the Pilot. While these potential candidate areas are only considered preliminary, it is suggested that tenure holder support for candidate areas and this industry-funded initiative is a prerequisite to further evaluation.

It is important to note that the predator fence potential locations and preliminary design described in the Overview report are likely to be modified based on consultation with tenure holders, GOA, Aboriginal groups, and other interested land users and stakeholders. The Stakeholder Engagement Strategy described here will be a key component of further evaluation.

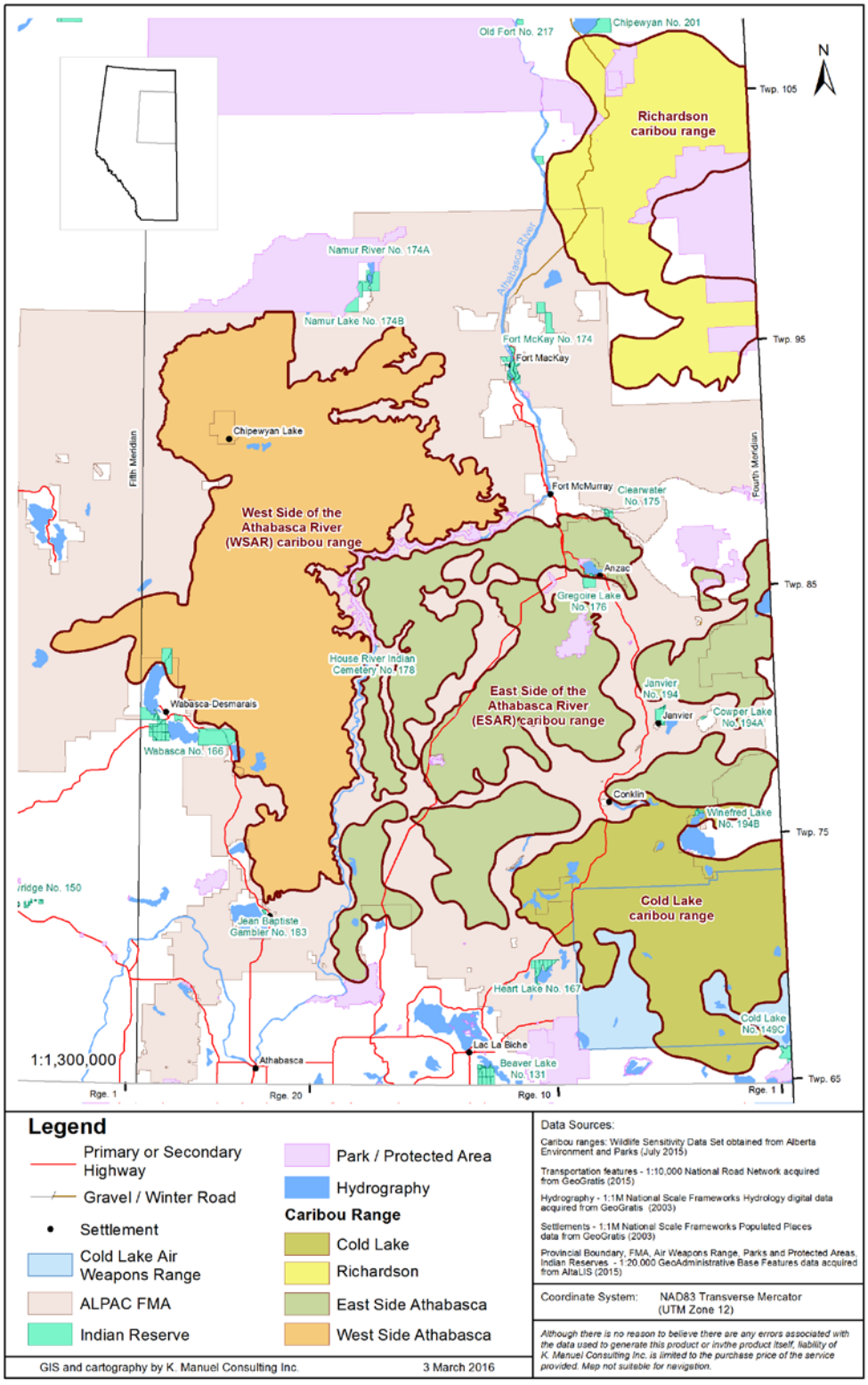


Figure 1. Caribou Predator Fencing Pilot study area.

3. STAKEHOLDER ENGAGEMENT STRATEGY

Previous technical work on the predator fence concept and the ecological expert workshop commissioned by OSLI (Golder Associates 2011; Hab-Tech Environmental 2011; Matrix Solutions 2011; Terrain FX 2011; Antoniuk et al. 2012) noted that there will likely be regional, national, and international media and public interest in a predator fence. Early engagement and a collaborative approach were considered to be essential.

Workshop participants recommended that a Stakeholder Engagement Strategy be developed to engage and collaborate with industry and commercial tenure holders, governments, Aboriginal communities, non-government organizations, recreational users, etc. Workshop participants also concluded that a comprehensive engagement plan and resources to implement it would be essential for implementation (Antoniuk et al., 2012).

The Pilot Stakeholder Engagement Strategy was developed to address these issues and recommendations. It is recognized that while Pilot implementation would be funded by industry it will likely be formally proposed, constructed and managed by a third-party management team (the Fence Management Team), with endorsement from the GOA. Accordingly, it will be essential for the Fence Management Team (see Section 3.1 in Overview report), to confirm the stakeholder engagement goal, objectives and process described here in consultation with GOA and industry groups (see Section 3.4.1 below).

Note that engagement programs should be developed based on specific stakeholder concerns: mineral tenure holder engagement, government engagement, aboriginal engagement and general public engagement.

Ongoing engagement during all Pilot phases will be critical to its overall success. Each tenure holder, Aboriginal and stakeholder group is unique and will request different levels of engagement; accordingly, the level of involvement will range from informing to collaborating or partnering. The detailed communication and engagement plan developed for each Pilot phase should reflect the concerns, needs and interests of all its stakeholders.

Monitoring the success and failures of engagement, and adapting as appropriate, will contribute to the long term success of the Pilot.

3.1 STAKEHOLDER ENGAGEMENT GOAL

Project proponents are committed to working with stakeholders by keeping them informed and engaged during all phases of the Caribou Predator Fencing Pilot. Building strong relationships with stakeholders through collaboration and consultation is crucial for the success of this Pilot and will result in enhanced project decisions.

3.2 STAKEHOLDER ENGAGEMENT OBJECTIVES

The objectives of the Stakeholder Engagement Strategy are to:

- provide accurate, consistent and timely information regarding the Pilot to tenure holders, interested Aboriginal groups, stakeholders and the general public;
- obtain tenure holder, Aboriginal group, and other stakeholder feedback on the Pilot project, including candidate sites, potential issues and sensitivities towards the Pilot;
- work with tenure holders, interested Aboriginal groups and other stakeholders to ensure potential issues and specific stakeholder concerns are fully understood and appropriately managed;
- facilitate meaningful involvement with tenure holders, interested Aboriginal groups and other stakeholders that identifies common ground for action and innovative solutions; and
- work with tenure holders, interested Aboriginal groups and other stakeholders to implement agreed upon decisions and approach.

3.3 KEY STAKEHOLDERS

Key stakeholders include: tenure holders; federal, Alberta and municipal governments; Aboriginal communities and associations (e.g., Athabasca Tribal Council); affected trappers; other communities in close proximity to predator fence location(s); environmental non-governmental organizations (e.g., Pembina Institute, Canadian Parks and Wilderness Society, Alberta Wilderness Association); recreational users; companies, industries and associations active within the region (e.g., COSIA members, Canadian Association of Petroleum Producers, Alberta-Pacific Forest Industries Inc. [AlPac], signatories to the Canadian Boreal Forest Agreement); and other interested parties (e.g., media, other provinces and jurisdictions).

Key stakeholder representatives will need to be confirmed prior to engagement once the proposed Pilot location(s) is selected.

3.3.1 Potential/Perceived Issues and Sensitivities

A number of potential or perceived issues and sensitivities have been identified in the technical studies and informal discussions completed to date. These include:

1. Effects on existing tenures and their associated regulatory and resource development plans and operating requirements.
2. Effects on access and traditional land use by Aboriginal communities.
3. Opportunities for, and potential benefits of, active participation by Aboriginal communities.
4. The need for, and specifics of road access restrictions at the fence perimeter for tenure holders, Aboriginal communities, and recreational users.
5. Potential effects on threatened boreal caribou.
6. Potential disturbance and effects on other wildlife species, such as deer, moose, wolves, bears and others.

7. Potential undesirable ecosystem effects within the fenced area and surrounding lands.
8. Potential conflicts with existing and proposed land management and resource development guidance.
9. Operational issues such as security, safety and fire management.
10. Link between predator fencing and ongoing habitat protection and restoration in and around the fence area.
11. Link between predator fencing and caribou protected area identification and management in northeast Alberta.

3.4 STAKEHOLDER ENGAGEMENT PROCESS

The Stakeholder Engagement Strategy for the Pilot has been designed with the goal of providing tenure holders, the GOA, and third-party Fence Management Team with a strong foundation, direction and vision of how to work effectively with its stakeholders through all phases of the Pilot. An effective strategy ensures appropriate activities and tactics are based upon the core foundation and elements of the plan.

The stakeholder engagement process described below reflects the Pilot design and recommended regulatory strategy and implementation program outlined in Section 3 of the Overview report. More specifically, it supports the implementation phases and activities provided as part of the recommended regulatory process (Figure 3; see Section 3 in Overview report).

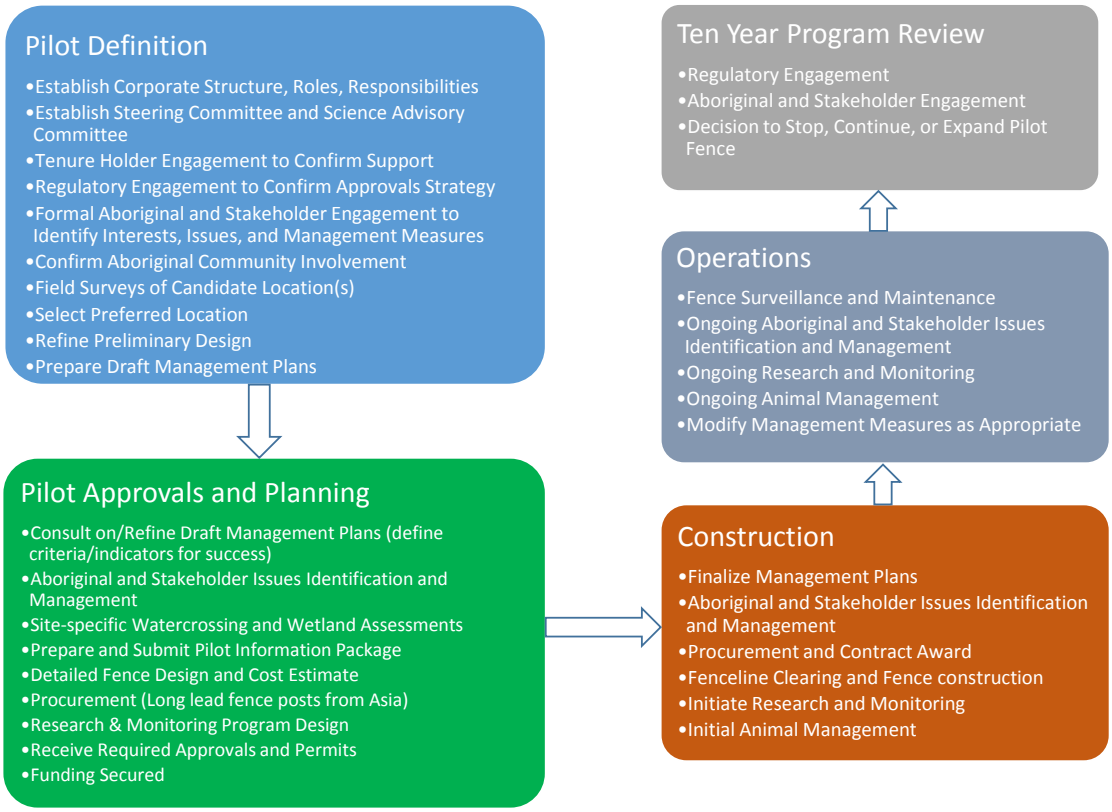


Figure 2. Caribou Predator Fencing Pilot implementation phases and activities.

3.4.1 Phases 1/2 - Initial Communication and Dialogue

The intent of the initial communication and dialogue phase is to: refine the preliminary Stakeholder Engagement Strategy by formalizing engagement roles and responsibilities and Pilot communication materials; identify the tenure holders, Aboriginal groups and other stakeholders interested in partnering or learning more about the Pilot; and identify or confirm the interests and concerns of these groups and the measures proposed to address them.

The initial regulatory process steps relevant to stakeholder engagement in the overlapping Pilot Definition and Pilot Approvals and Planning phases include:

1. Complete initial tenure holder engagement to determine their development plans and willingness to participate in the Pilot. Tenure holder support for potential and technically-preferred candidate areas and this industry-funded initiative is a prerequisite to further evaluation and engagement.
2. Complete initial Aboriginal and other stakeholder engagement to confirm and identify issues and concerns with the concept and location(s) and rationale, the

level of support or opposition to the predator fence, and appropriate measures to address issues and concerns.

3. Select the preferred Pilot location based on field surveys, tenure holder support, Aboriginal interest, and input from initial engagement.
4. Prepare a preliminary Pilot "Information Package" document that addresses the interests of relevant regulators and can be used during subsequent Aboriginal and public engagement efforts. The document should describe: the Pilot's purpose in the context of federal and provincial caribou conservation objectives; proposed Pilot location(s), rationale, and preliminary design; anticipated regulatory interests and requirements and how the application will address these; known and anticipated Aboriginal and public concerns and the measures proposed to address these concerns; and the risk assessment and management plans to be developed and the process and schedule proposed to develop them.
5. Complete detailed design and field assessments and prepare risk assessment and management plans with input from interested tenure holders, Aboriginal groups and other stakeholders.
6. Prepare and submit applications for required permits, licences and authorizations reflecting engagement in previous steps.

An initial action item will be to ensure that tenure holders, the GOA, third party Fence Management Team, and participating Aboriginal community(s) agree with the proposed goals, objectives and key assumptions of the Stakeholder Engagement Strategy as well as the general approach and initial key messages outlined below.

Once agreement and sign-off from responsible parties has been achieved, then implementation of the Strategy should ensure consistency in ongoing communication materials and activities as well as engagement techniques and methods.

3.4.1.1 Confirm Engagement Team, Roles and Responsibilities

The first activity will be to identify who will manage and implement the Stakeholder Engagement Strategy. Because the Pilot will be funded by industry, championed by GOA, supported by the federal government, but implemented by an independent third-party, the Fence Management Team, it is essential that the roles and responsibilities of these groups and their representatives be clearly established.

A number of tenure holders that operate within the candidate sites have developed strong relationships with key stakeholders over the years, consequently these companies and their engagement specialists may have significant roles in engagement for the Pilot.

Questions that need to be addressed early in the process should include:

- Who will manage engagement as well as issue management activities?

- What types of authority will the engagement team have regarding the involvement of tenure holders, Aboriginal groups and other stakeholders in Pilot planning and decision making?
- Who will be the primary contact with tenure holders, Aboriginal groups and other stakeholders and the Pilot spokesperson?
- Will other industry members discuss this Pilot when engaging with stakeholders?
- How will internal and external communication be coordinated? Who will develop the communication tools and materials?

3.4.1.2 Communication Materials

The engagement team (comprised of the Fence Management team and others as defined above) will need to establish consistent messaging with the development of communications materials (e.g. project description, maps, fact sheets) in support of the Pilot and engagement activities. Note that potential candidate areas and preliminary designs are likely to be modified based on consultation with tenure holders, GOA, Aboriginal groups, and other land users and stakeholders, but the preliminary designs provided in Section 2 of the Overview report are intended to help encourage informed engagement and evaluation.

A clear understanding of the Pilot and how it fits within an integrated program to recover caribou population will help establish a strong base for further discussions and meaningful involvement. A draft presentation and discussion points that introduce the Pilot concept are included in Appendix 1. This comprehensive presentation provides a somewhat detailed technical rationale for the Pilot and will need to be modified for non-technical audiences. In all cases, the engagement team will need to ensure that the communication materials provide consistent messages to all stakeholders, reflects the information the public is seeking, and responds to their questions and concerns.

3.4.1.3 Engagement Database

An engagement database will need to be developed and maintained by the Fence Management Team to provide a readily accessible record of groups and individuals consulted, the issues and concerns they raised, any commitments made, and follow-up required. Given that it is impractical to expect all team members to effectively use the database, a communications entry template document/website should be created for team members to summarize engagement results that can then be forwarded to the team member(s) responsible for the database.

3.4.1.4 Formal Engagement

A key component of the Pilot Definition phase will be meeting with all tenure holders, Aboriginal groups and other primary stakeholders affected and/or interested in the Project to create relationships with these key stakeholders, identify their level of interest and support, and their preferred engagement approach. Restoring caribou populations is

expected to be a common goal of Aboriginal communities, the GOA, and industry members. Tenure holders should be consulted first before communication regarding potential fence locations is made to GOA, GOC, Aboriginal communities, or other stakeholders.

Discussion with Aboriginal communities and organizations should focus on their potential involvement including participation in the Fence Management Team during all or certain phases of the development (Construction, and Operations phases); and access to and within the fence area. A desired outcome of this phase is to identify one or more Aboriginal community(s) who are interested in participating in the third party Fence Management Team. Endorsement by the Aboriginal communities on a path forward would be viewed positively by GOA and other stakeholders and is considered to be essential for Pilot implementation.

Table 1 provides a preliminary list of primary stakeholders, their perceived or known concerns, and the communication tools recommended to support formal engagement. Known concerns were identified based on informal discussions with some primary stakeholders by COSIA members. The engagement team will need to review and modify this list as appropriate to ensure that all stakeholders and known issues relevant to proposed project locations are included.

Initial contact should consist of individual or small group meetings and include a short presentation followed by open discussion. Initially, technical experts should be included in engagement meetings to ensure that stakeholders can gain a thorough understanding of the Pilot.

Table 1. Recommended Project Definition (Phase 1) Engagement.[1]

Group	Potential or Known Interests and Concerns	Engagement Approach
PROVINCIAL GOVERNMENT		
Alberta Environment and Parks	Site selection rationale. Risk to caribou population. Technical feasibility and probability of success. Aboriginal, stakeholder and political opposition to predator fence. Potential conflicts with existing and proposed land management direction. Undesirable ecosystem effects. Regulatory requirements. Need for robust independent research and monitoring. Reference existing precedents (i.e., Elk Island National Park, Yukon Wildlife Preserve).	Meetings with ADMs, senior technical staff, and Northeast regional staff to introduce concept and proposed regulatory strategy, confirm support for predator fencing pilot, and confirm regulatory strategy and regulatory roles and responsibilities (i.e., AEP vs AER-lead). Also to confirm land use by tenure holders within the fence.
Alberta Energy	Site selection rationale. Resource access by existing and future tenure holders. Aboriginal, stakeholder and political opposition to predator fence. Potential conflicts with existing and proposed land management direction. Regulatory requirements. Implementation and governance plan.	Meetings with ADMs and senior technical staff to introduce concept and proposed regulatory strategy, confirm support for predator fencing pilot, and confirm regulatory strategy. Also to confirm land use by tenure holders within the fence.
Alberta Agriculture and Forestry	Site selection rationale. Resource access by existing and future tenure holders. Aboriginal, stakeholder and political opposition to predator fence. Potential conflicts with existing and proposed land management direction. Regulatory requirements. Fire management.	Meetings with ADMs and senior technical staff to introduce concept and proposed regulatory strategy, confirm support for predator fencing pilot, and confirm regulatory strategy. Also to confirm land use by tenure holders within the fence.
Alberta Indigenous Relations - Aboriginal Consultation Office	Aboriginal, stakeholder and political opposition to predator fence. Regulatory requirements.	Meetings with ADMs and senior technical staff to introduce concept and proposed regulatory strategy, discuss level of support for predator fencing pilot, and confirm regulatory strategy.
Alberta Energy Regulator	Regulatory requirements. Potential conflicts with existing and proposed resource management direction.	Meeting with senior staff to introduce concept and proposed regulatory strategy and confirm regulatory strategy and regulatory roles and responsibilities (i.e., AEP vs AER-lead).
Alberta Culture and Tourism	Historical resource survey and permitting requirements (if any)	Meetings with senior technical staff to introduce concept and proposed regulatory strategy.
FEDERAL GOVERNMENT		
Environment Canada – Canadian Wildlife Service	Compatibility with Federal Caribou Recovery Strategy, engage subject matter experts in research and monitoring	Meeting with ADM and senior technical staff to discuss level of support for predator fencing pilot and confirm regulatory strategy.
Dept. of National Defence, 4 Wing Cold Lake	Restrictions on ground and aircraft activity for adjacent sites if selected, potential for future expansion into the Cold Lake Air Weapons Range	Meeting with senior staff to introduce concept and identify any operating restrictions or regulatory requirements for operations immediately adjacent to or within the range.

[1] This preliminary list of stakeholders and known issues will need to be reviewed and modified as appropriate once proposed Pilot location(s) is identified to ensure that all relevant stakeholders and issues are included.

Group	Potential or Known Interests and Concerns	Engagement Approach
Canadian Environmental Assessment Agency	Potential regulatory triggers	Meeting with senior staff to introduce concept and confirm that CEAA 2012 will not apply.
Fisheries and Oceans	Regulatory requirements for activities near watercourses	Meeting with regional staff to introduce concept and identify any operating restrictions or regulatory requirements
MUNCIPAL GOVERNMENT		
Regional Municipality of Wood Buffalo	Stakeholder and political opposition to predator fence. Regulatory requirements.	Meetings with Councillors and senior staff to introduce concept, identify issues, and confirm regulatory strategy.
Lac La Biche County	Stakeholder and political opposition to predator fence. Regulatory requirements.	Meetings with Councillors and senior staff to introduce concept, identify issues, and confirm regulatory strategy.
ABORIGINAL COMMUNITIES		
Chipewyan Prairie Dene First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Undesirable ecosystem effects. Potential community involvement opportunities? Interested in further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine process for further engagement and dialogue.
Heart Lake First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities?	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Cold Lake First Nations	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities?	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Beaver Lake First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities?	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Metis Nation of Alberta – Region 1	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities? Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Fort McMurray No. 468 First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities? Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Fort McKay First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept and identify issues.
Athabasca Chipewyan First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues.
Mikisew Cree First Nation	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept and identify issues.

Group	Potential or Known Interests and Concerns	Engagement Approach
Willow Lake Metis Local 780	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities? Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Fort McMurray Metis Local 1935	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities? Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
Conklin Metis Local 193	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Effect on opportunities to harvest moose and other traditional land uses. Potential community involvement opportunities? Need for further engagement and dialogue.	Meetings with Councillors and senior staff to introduce concept, identify issues, discuss interest in community involvement in the Pilot, and determine interest and process for further engagement and dialogue.
LOCAL GOVERNMENT		
Communities in proximity to potential Pilot areas	Stakeholder and political opposition to predator fence.	Meetings with Councillors and senior staff to introduce concept and identify issues and potential management measures.
HYDROCARBON SECTOR		
Companies with Petroleum and Natural Gas and surface tenures in Pilot potential candidate areas	Effect on existing and future activities and resource access. Reputational risk of working within Pilot area. Incremental capital costs and resource requirements for companies working within Pilot area. Active central processing facility likely in all four candidate areas. Process to abandon or continue Pilot after 10 years. Interested in further engagement and dialogue.	Meetings with tenure holders to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures and involvement in Fence Management Team or relevant advisory groups.
COSIA	Effect on existing and future activities and resource access. Reputational risk of working within Pilot area. Incremental capital costs and resource requirements for companies working within Pilot area. Technical feasibility and probability of success. Reputational risk of supporting Pilot. Risk to caribou population. Aboriginal, stakeholder and political opposition to predator fence. Regulatory requirements.	Presentations to COSIA committees and working groups.
Canadian Association of Petroleum Producers	Effect on existing and future activities and resource access. Reputational risk of working within Pilot area. Incremental capital costs and resource requirements for companies working within Pilot area. Technical feasibility and probability of success. Aboriginal, stakeholder and political opposition to predator fence.	Meetings with CAPP technical representatives to introduce concept, identify issues, and discuss access and operations management measures.
Canadian Energy Pipeline Association	Effect on existing and future activities.	Meetings with CEPA representatives to introduce concept, identify issues, and discuss access and operations management measures.

Group	Potential or Known Interests and Concerns	Engagement Approach
FORESTRY SECTOR		
AlPac	Effect on existing and future activities and resource access. Incremental capital costs and resource requirements for companies working within Pilot area. Risk to caribou population. Technical feasibility and probability of success. Aboriginal, stakeholder and political opposition to predator fence. Interested in further engagement and dialogue.	Meetings with tenure holders to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures and involvement in third party Fence Management Team.
Quota holders in potential Pilot areas	Effect on existing and future activities and resource access. Incremental capital costs and resource requirements for companies working within Pilot area.	Meetings with tenure holders to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures.
Canadian Boreal Forest Agreement	Effect on existing and future activities and resource access. Risk to caribou population. Technical feasibility and probability of success. Aboriginal community opposition to predator fence. Link to protected areas planning and restoration activities in and outside the fence. Interested in further engagement and dialogue.	Meeting with AlPac and CBFA representatives to introduce concept, determine future harvest plans, identify issues, and discuss access and operations management measures.
ENVIRONMENTAL ORGANIZATIONS		
Pembina Institute	Needs to be linked to ongoing habitat protection and restoration activities in and outside the fence. Need for GOA involvement. Technical feasibility and probability of success. Undesirable ecosystem effects. Aboriginal and stakeholder opposition to predator fence. Interested in further engagement and dialogue.	Meeting with Pembina representative(s) or ENGO consortium to discuss preliminary design, identify issues, and discuss fence management and habitat restoration measures, and discuss interest in formal or informal involvement in third party Fence Management Team.
CPAWS – Northern Alberta	Needs to be linked to ongoing restoration activities in and outside the fence. Needs to be linked to protected areas establishment outside the fence. Cost-effectiveness relative to other management options. Undesirable ecosystem effects. Technical feasibility and probability of success – release of naive yearlings. Aboriginal opposition to predator fence. Interested in further engagement and dialogue.	Meeting with CPAWS representative(s) to or ENGO consortium discuss preliminary design, identify issues, and discuss fence management and habitat restoration measures, and discuss interest in formal or informal involvement in third party Fence Management Team.
Alberta Wilderness Association	Needs to be linked to ongoing habitat protection and restoration activities in and outside the fence. Technical feasibility and probability of success. Undesirable ecosystem effects. Aboriginal and, stakeholder and political opposition to predator fence. Interested in further engagement and dialogue.	Meeting with AWA representative(s) or ENGO consortium to discuss preliminary design, identify issues, and discuss fence management and habitat restoration measures, and discuss interest in formal or informal involvement in third party Fence Management Team.
OTHER COMMERCIAL AND INDUSTRIAL LAND USERS		
Trappers in potential Pilot areas	Effect on existing and future activities.	Meetings with tenure holders to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures.
Other tenure/lease holders in potential Pilot areas.	Effect on existing and future activities and resource access. Incremental capital costs and resource requirements for working within Pilot area.	Meetings with tenure holders to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures.

Group	Potential or Known Interests and Concerns	Engagement Approach
RECREATIONAL USERS		
Alberta Fish and Game Association	Technical feasibility and probability of success. Undesirable ecosystem effects. Effect on existing and future access and recreational opportunities.	Meetings with AFGA representatives to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures. Need to determine whether to invite AFGA to participate in fence management.
Local recreation groups in potential Pilot areas.	Effect on existing and future access and recreational opportunities.	Meetings with recreational groups to introduce concept, determine future development plans, identify issues, and discuss access and operations management measures.
MEDIA		
Local, regional, and national media.	Risk to caribou population and other wildlife. Active management of caribou and other wildlife. Technical feasibility and probability of success. Undesirable ecosystem effects. Aboriginal, stakeholder and political opposition to predator fence. Link to habitat restoration within and near predator fence. Effect on wolf kills.	Prepare press releases to introduce concept, provide appropriate background, and address issues raised to date through engagement.

3.4.1.5 Support Regulatory Strategy

A summary of tenure holder, Aboriginal group, and other stakeholder engagement and issues management completed during Phase 1 will need to be prepared for the preliminary Pilot information package to be submitted as a key component of the regulatory strategy (Figure 3). The Pilot information package is intended to be used to frame dialogue on the Pilot concept and preliminary design by proactively addressing anticipated questions and concerns and demonstrating that Pilot proponents have completed sufficient advance work to reduce risks and uncertainties to a level acceptable to regulators, Aboriginal communities, and stakeholders (see Section 4 of Overview report).

3.4.2 Phases 1/2 – Issue Identification and Management

The objectives of the issue identification and management phase are to:

- identify all concerns and interests of tenure holders, Aboriginal groups and other stakeholders with the predator fence concept and location(s);
- identify strategy(s) that reflects appropriate management of these concerns, including appropriate measures for Pilot design as well as the construction, and operations management plans prepared for the Pilot; and
- support the Pilot regulatory strategy.

3.4.2.1 Input on Draft Management Plans

As part of the ongoing stakeholder engagement process, initial tenure holder, Aboriginal and other stakeholder engagement will be completed to confirm and identify issues and concerns with the concept and location(s) and rationale, the level of support or opposition to the predator fence, and appropriate measures to address issues and concerns.

Draft management plans are to be prepared by the Fence Management Team to summarize the measures that will be used to manage wildlife, access, and fence integrity during construction and operations. External input on these draft plans will be required to ensure that they appropriately reflect GOA, other government, tenure holder, Aboriginal group, and other land user and stakeholder interests and concerns. This process could involve individual or small group meetings, or more formal topic-specific workshops with interested stakeholders.

3.4.2.2 Ongoing Issue Management

As the Pilot preliminary fence design is refined and developed based on the preferred location, additional issues and concerns may be identified by stakeholders or the engagement team. The Pilot engagement/Fence Management Team will need to continue to assess what opportunities exist to work together on issues and the Pilot. This may include changes and modifications to the engagement plan and activities. The engagement/Fence Management Team will need to find mutually acceptable ways to involve interested stakeholders in effective management and mitigation of these issues.

In keeping with good documentation, the Fence Management Team will need to continue to utilize the data base to track and record issues. This will include revisions to the initial stakeholder list and refinement of perceived or known stakeholder issues.

In addition, the Fence Management Team will need to respond to existing and new issues through consistent, factual messaging and ongoing communication to stakeholders, funders, and other interested parties. This proactive, fact-based approach should enhance success when developing collaborative based solutions to both expected and unexpected issues.

3.4.3 Phase 3 – Pilot Construction

Building upon the discussions and information gathered in Phase 1 and 2, the Fence Management Team will be able to develop a detailed communication and engagement plan that reflects the concerns, needs and interests of all its stakeholders.

The goals of stakeholder engagement during the Pilot Construction phase are to:

- provide information about construction and engagement plans and progress;
- identify tenure holder, Aboriginal group and public concerns;
- develop strategies that reflect appropriate management of these concerns; and

- implement an education and outreach program to summarize research and monitoring results and provide non-technical and regular updates on Pilot progress, learnings and success.

These activities are designed to increase the probability that the level of tenure holder, GOA, Aboriginal and public support for the Pilot is maintained or increases as the Pilot proceeds.

3.4.3.1 Communication Materials

Communication materials should focus on: the timing of the Construction phase; who will be the lead and supporting contractors; construction methods; and how the Pilot will be mitigating construction concerns and issues. In addition, information on engagement activities should be outlined. Written materials should also include appropriate Fence Management Team and contractor contact information, thereby ensuring an open door policy for stakeholders to contact and communicate with the Fence Management Team. Based upon feedback during the initial phase of engagement, the team will be able to establish the most effective methods of communication such as e-newsletters, web sites, social media, or mail-outs.

3.4.3.2 Engagement Approaches

The specific methods to involve, collaborate and partner with Aboriginal communities and stakeholders will depend on how each interested group believes their individual needs and interests could best be represented. A key role of the engagement team will be to consult with these stakeholders to identify the most appropriate methods to share information and work together, including the roles and responsibilities of the Fence Management Team and others. This could include such activities as open houses, and establishing advisory groups or partnerships for the Construction phase. A multi-stakeholder local advisory group could be an effective forum to discuss Pilot construction plans and monitor performance relative to desired outcomes. Such an advisory group could also continue to function during the operation phase of the Pilot.

Table 2 provides a list of primary stakeholders, and the communication tools recommended to support formal engagement during Pilot construction.[2]

[2] Note that this table is repetitive and similar to Table 1, but is provided as a starting point for review and modification by the Fence Management Team.

Table 2. Recommended Pilot Construction (Phase 3) Engagement.[3][4]

Group	Potential or Known Interests and Concerns	Engagement Approach
PROVINCIAL GOVERNMENT		
Alberta Environment and Parks	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to ADM's and technical staff. Invites sent to open houses and any public events.
Alberta Energy	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to ADM's and technical and regional staff. Invites sent to attend open houses and any public events.
Alberta Agriculture and Forestry	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to ADM's and technical and regional staff. Invites sent to attend open houses and any public events
Alberta Indigenous Relations - Aboriginal Consultation Office	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to ADM's and technical and regional staff. Invites sent to attend open houses and any public events
Alberta Energy Regulator	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed; only if AER is regulatory lead.
Other?	Identified during Phase 1 and 2 engagement.	Level of ongoing engagement to be determined.
FEDERAL GOVERNMENT		
Environment Canada – Canadian Wildlife Service	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to ADM's and technical staff.
Dept. of National Defence, 4 Wing Cold Lake	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing engagement only if Pilot is located immediately adjacent to Cold Lake Air Weapons Range and could affect, or is affected by, restrictions on ground and aircraft activity.
Canadian Environmental Assessment Agency	As Table 1, updated based on engagement during Phases 1 and 2.	No ongoing engagement following regulatory approvals and planning phase.

[3] This preliminary list of stakeholders and known issues will need to be reviewed and modified as appropriate once proposed Pilot location(s) is identified to ensure that all relevant stakeholders and issues are included.
[4] Note that this table is repetitive and similar to Table 1, but is provided as a starting point for review and modification by the engagement team.

Group	Potential or Known Interests and Concerns	Engagement Approach
MUNCIPAL GOVERNMENT		
Regional Municipality of Wood Buffalo	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to municipal government representatives.
Lac La Biche County	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to municipal government representatives.
Other?	Identified during Phase 1 and 2 engagement.	Level of ongoing engagement to be determined.
ABORIGINAL COMMUNITIES		
Chipewyan Prairie Dene First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and initiated.
Heart Lake First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Cold Lake First Nations	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Beaver Lake First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Metis Nation of Alberta – Region 1	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Fort McMurray No. 468 First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Fort McKay First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Athabasca Chipewyan First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.

Group	Potential or Known Interests and Concerns	Engagement Approach
Mikisew Cree First Nation	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Willow Lake Metis Local 780	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Fort McMurray Metis Local 1935	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
Conklin Metis Local 193	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and occurring.
LOCAL GOVERNMENT		
Communities in proximity to selected Pilot area	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to local and municipal government representatives.
HYDROCARBON SECTOR		
Companies with Petroleum and Natural Gas and surface tenures in selected Pilot area	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to the appropriate Companies.
COSIA	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to appropriate COSIA committees and working groups.
Canadian Association of Petroleum Producers	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to appropriate CAPP working groups and technical committees.
Canadian Energy Pipeline Association	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to appropriate CEAPA members.

Group	Potential or Known Interests and Concerns	Engagement Approach
FORESTRY SECTOR		
AlPac	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to AlPac.
Quota holders in selected Pilot area	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback. All information distributed to interested stakeholders should be sent to tenure holders.
Canadian Boreal Forest Agreement	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback.
ENVIRONMENTAL ORGANIZATIONS		
Pembina Institute	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and initiated.
CPAWS – Northern Alberta	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and initiated.
Alberta Wilderness Association	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback. Engagement and partnership opportunities agreed upon and initiated.
Other?	Identified during Phase 1 and 2 engagement.	Level of ongoing engagement to be determined.
OTHER COMMERCIAL AND INDUSTRIAL LAND USERS		
Trappers in selected Pilot area	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback.
Other tenure/lease holders in selected Pilot area.	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback.
RECREATIONAL USERS		
Alberta Fish and Game Association	As Table 1, updated based on engagement during Phases 1 and 2.	Level of ongoing engagement to be confirmed. Ongoing updates on construction timing, stakeholder engagement activities and public feedback.
Local recreation groups in selected Pilot area.	As Table 1, updated based on engagement during Phases 1 and 2.	Ongoing updates on construction timing, stakeholder engagement activities and public feedback.
MEDIA		
Local, regional, and national media.	As Table 1, updated based on engagement during Phases 1 and 2.	Prepare press releases and backgrounders to introduce construction timing, stakeholder engagement activities and public feedback and endorsement.

3.4.4 Phase 4 – Pilot Operations

Prior to the commencement of the Operations phase, the Fence Management Team, other engagement team members, and key stakeholders should take the opportunity to analyze the success of the engagement activities undertaken during the Construction phase. Questions asked should include:

- What activities should be changed, modified or expanded to reflect the operational issues and concerns by stakeholders?
- What information needs to be communicated to stakeholders?
- Are the current mechanisms for contacting and communicating with stakeholders adequate?
- Is there a need to organize issue specific workshops and multi- disciplinary or discipline-specific committees?

As noted previously, monitoring the success and failures of engagement, and adapting as appropriate, will contribute to the long term success of the Pilot.

The goals of stakeholder engagement during the Pilot Operations phase are to: provide information about operations and engagement plans, progress, and feedback; and to identify any new Aboriginal community and public concerns and develop strategies that reflect appropriate management of these concerns. The education and outreach program should also be continued to summarize research and monitoring results and provide non-technical and regular updates on Pilot progress, learnings and success.

As with preceding phases, engagement activities during Pilot operations would be designed to increase the probability that the level of GOA, tenure holder, Aboriginal and public support for the Pilot is maintained or increases as the Pilot proceeds.

3.4.4.1 Communication Materials

Communication materials should focus on addressing questions, concerns and issues raised by interested stakeholders. Specific information on Operations phase activities, and how the Fence Management Team will be mitigating ongoing concerns and issues should also be shared with stakeholders. In addition, information on engagement activities should be outlined. Written materials should also include appropriate contact information ensuring an open door policy for stakeholders to contact and communicate with the Fence Management Team. Based upon feedback during the initial phase of engagement, the team will be able to establish the most effective methods of communication such as e-newsletters, web sites or mail-outs.

3.4.4.2 Engagement Approaches

Based upon a review of engagement activities occurring during the Construction phase, the activities undertaken during this phase should reflect the ongoing interest in stakeholders to stay informed and be involved in the Operations phase. Activities could range from general open houses, issues specific workshops and stakeholder committees

to address specific issues. In addition, a multi- stakeholder advisory group could be developed, if one was not established during the Construction phase.

The list of primary stakeholders provided in Tables 1 and 2 will need to be maintained and updated as appropriate to identify communication tools required to support formal engagement during Pilot operations.

3.4.5 Phase 5 – Ten Year Program Review

An understanding of the success and failures of the Stakeholder Engagement Strategy, programs and activities will be critical to the long term viability of the Pilot. The ten year program review should address the following questions:

- After 10 years of operating the Pilot, are stakeholders satisfied with its management?
- Have their interests been understood and appropriately managed?
- Do they fully support the ongoing operations of the Pilot?
- Are they satisfied with the information they have received on the status of the Pilot?
- What information are they interested in receiving if the Pilot is extended in time or space (success rates of caribou breeding, calving, and calf survival rates)?
- What is their desired role if the Pilot is extended in time or space?

3.5 CONCLUSION

The Stakeholder Engagement Strategy for the Pilot has been designed with the goal of providing the tenure holders, GOA, third-party Fence Management Team, and participating Aboriginal community(s) with a strong foundation, direction and vision of how to work effectively with its stakeholders through all Pilot phases. An effective strategy ensures appropriate activities and tactics are based upon the core foundation and elements of the plan.

Key is the ability of the Fence Management Team (and others as defined) to work with stakeholders to not only identify interests, issues and concerns, but to actively work with stakeholders to fine tune the engagement methods that will best work for them to effectively partner and collaborate. A flexible approach is critical to managing and executing a successful Stakeholder Engagement Strategy and plan.

4. REFERENCES

Antoniuk, T. M., L. McNeil, J. S. Nishi, and K. Manuel. 2012. Caribou protection and recovery program - technical guidance. Prepared for Oil Sands Leadership Initiative Land Stewardship Working, Calgary.

Antoniuk, T., J. Nishi, R. Harding, L. McNeil, and K. Manuel. 2016. Northeast Alberta caribou predator fencing pilot: Project overview. Prepared for Canada's Oil Sands Innovation Alliance by Salmo Consulting Inc., EcoBorealis Consulting Inc., REDES Inc., McNeil Consulting Inc., and K. Manuel Consulting Inc.

Golder Associates Ltd. 2011. Caribou protection and recovery program. Prepared for Oil Sands Leadership Initiative Land Stewardship Working Group by P. Bentham, C. De La Mare, M. Jalkotzy, K. Knopff, S. Boutin, and B. Simons, Edmonton.

Hab-Tech Environmental. 2011. Feasibility study for design and implementation of a fenced woodland caribou safe zone within the North Eastern region of Alberta. Prepared for Oil Sands Leadership Initiative Land Stewardship Working Group, Calgary by J. Kansas, H. Skatter, and M. Charlebois, Calgary.

Matrix Solutions Inc. 2011. Caribou protection and recovery plan fence feasibility study. Prepared for Oil Sands Leadership Initiative Land Stewardship Working Group by J. Keim, E. McNaughton, P. DeWitt, and D. Tober, Edmonton.

Terrain FX Inc. 2011. Feasibility study for a fenced woodland caribou safe zone. Report to the Oil Sands Leadership Initiative Land Stewardship Working Group, Calgary by R. Creasey, N. Roe, and L. Morgantini.

APPENDIX 1

DRAFT COMMUNICATION MATERIALS

KEY MESSAGES

- Woodland caribou in northeast Alberta are declining rapidly and will disappear within the foreseeable future if aggressive management actions are not implemented quickly.

- The immediate cause of woodland caribou decline is unnaturally high predation by wolves and bears. Predation has been increased by habitat changes that have unexpectedly increased the number and hunting efficiency of predators.

- In order to recover self-sustaining woodland caribou populations in northeast Alberta, an integrated approach including both habitat and predation management tools is needed. COSIA is funding work on both, with 2/3 of expenditures devoted to long-term habitat management. Habitat restoration work that is begun today will likely take decades to reduce unnaturally high predation.

- While this important long-term habitat restoration work continues, predation management will be needed to prevent caribou from disappearing. Predation management options include seasonal or permanent fenced enclosures to isolate caribou from predators and possibly predator control by the government. COSIA, working closely with the Government of Alberta, the forest sector, research biologists, and others have identified caribou predator exclusion fences as an innovative, but untested option with great potential benefits to caribou. These groups are proposing a collaborative pilot project to evaluate the actual benefits of fenced caribou enclosures in northeast Alberta. The Pilot will be designed to achieve potential benefits, but no net harm to current caribou populations.

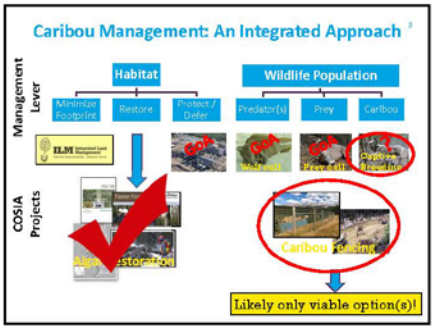
- Specific details of the collaborative fenced caribou predator fencing Pilot are still being worked on, but the concept is that this would be endorsed by the Government of Alberta as part of its caribou range and action plans, funded by industry , and likely implemented by an independent group or organization.

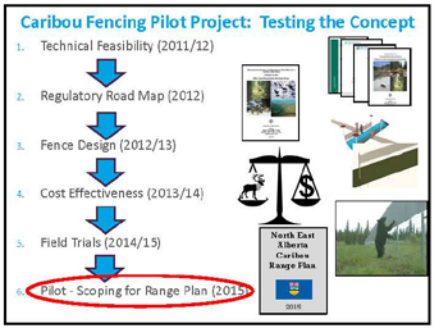
- A pilot project of this nature necessarily requires input from a variety of stakeholders with interests and ideas about how it might be designed and operated in a way that would provide the most answers on the viability and cost effectiveness of the concept.

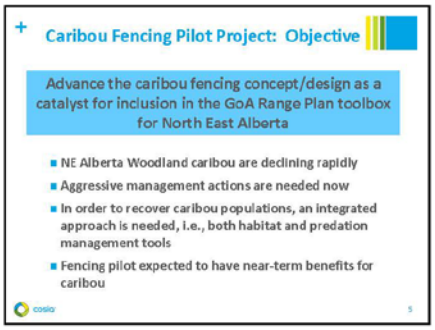
STANDARD POWERPOINT PRESENTATION


Caribou Fencing Pilot Project:
Overview & Engagement Discussion
cosia
September/October 2015


About COSIA
(Canada's Oil Sands Innovation Alliance)
VISION
To enable responsible and sustainable growth of Canada's oil sands while delivering accelerated improvement in environmental performance through collaborative action and innovation.


Caribou Management: An Integrated Approach
Management Lever
COSIA Projects
Habitat
Wildlife Population
Minimize Footprint
Restore
Protect / Defer
Predator(s)
Prey
Caribou
Caribou Fencing
Likely only viable option(s)!


Caribou Fencing Pilot Project: Testing the Concept
1. Technical Feasibility (2011/12)
2. Regulatory Road Map (2012)
3. Fence Design (2012/13)
4. Cost Effectiveness (2013/14)
5. Field Trials (2014/15)
6. Pilot - Scoping for Range Plan (2015)
North East Alberta Caribou Range Plan


Caribou Fencing Pilot Project: Objective
Advance the caribou fencing concept/design as a catalyst for inclusion in the GoA Range Plan toolbox for North East Alberta
NE Alberta Woodland caribou are declining rapidly
Aggressive management actions are needed now
In order to recover caribou populations, an integrated approach is needed, i.e., both habitat and predation management tools
Fencing pilot expected to have near-term benefits for caribou
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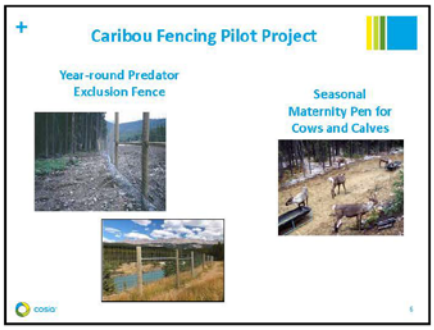
Caribou Fencing Pilot Project
Year-round Predator Exclusion Fence
Seasonal Maternity Pen for Cows and Calves
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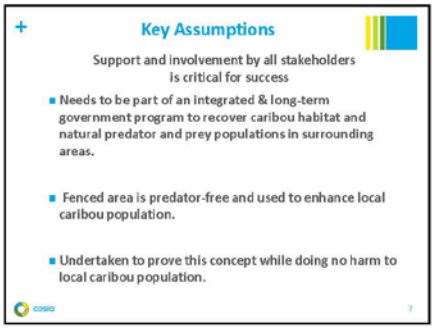
Key Assumptions
Support and involvement by all stakeholders is critical for success
Needs to be part of an integrated & long-term government program to recover caribou habitat and natural predator and prey populations in surrounding areas.
Fenced area is predator-free and used to enhance local caribou population.
Undertaken to prove this concept while doing no harm to local caribou population.
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Key Assumptions (continued)
Oil Sands development to continue within fenced area.
Interested Stakeholders will be engaged and consulted with during site selection.
Aboriginal communities will play a vital role in the management and implementation of the Fenced area.
Funded by COSIA, endorsed by Government of Alberta and acknowledged by Federal Government.
Fenced area may be implemented by an independent third party.
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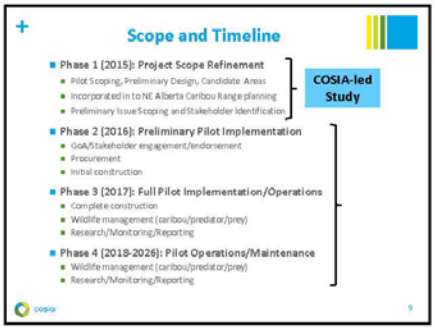
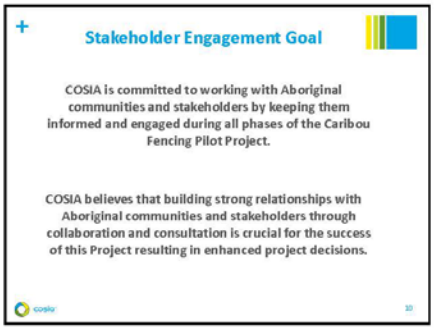
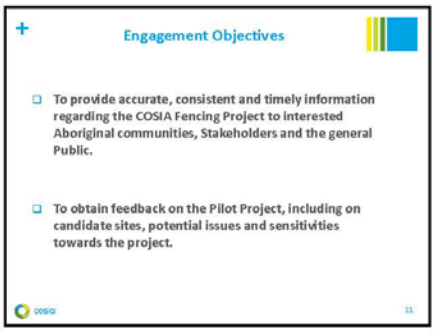
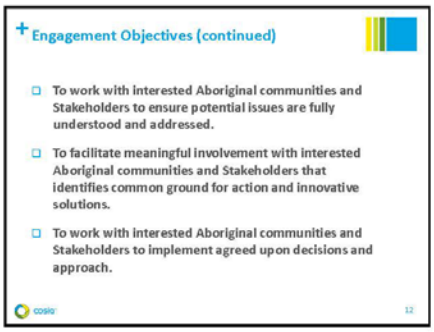

Scope and Timeline
Phase 1 (2015): Project Scope Refinement
Pilot Scoping, Preliminary Design, Candidate Areas
Incorporated in to NE Alberta Caribou Range planning
Preliminary Issue Scoping and Stakeholder Identification
COSIA-led Study
Phase 2 (2016): Preliminary Pilot Implementation
GoA/Stakeholder engagement/endorsement
Procurement
Initial construction
Phase 3 (2017): Full Pilot Implementation/Operations
Complete construction
Wildlife management (caribou/predator/prey)
Research/Monitoring/Reporting
Phase 4 (2018-2026): Pilot Operations/Maintenance
Wildlife management (caribou/predator/prey)
Research/Monitoring/Reporting


Stakeholder Engagement Goal
COSIA is committed to working with Aboriginal communities and stakeholders by keeping them informed and engaged during all phases of the Caribou Fencing Pilot Project.
COSIA believes that building strong relationships with Aboriginal communities and stakeholders through collaboration and consultation is crucial for the success of this Project resulting in enhanced project decisions.


Engagement Objectives
To provide accurate, consistent and timely information regarding the COSIA Fencing Project to interested Aboriginal communities, Stakeholders and the general Public.
To obtain feedback on the Pilot Project, including on candidate sites, potential issues and sensitivities towards the project.


Engagement Objectives (continued)
To work with interested Aboriginal communities and Stakeholders to ensure potential issues are fully understood and addressed.
To facilitate meaningful involvement with interested Aboriginal communities and Stakeholders that identifies common ground for action and innovative solutions.
To work with interested Aboriginal communities and Stakeholders to implement agreed upon decisions and approach.

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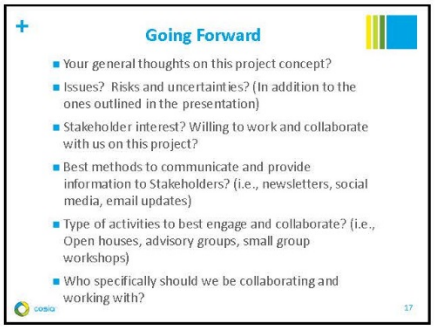
Going Forward
Your general thoughts on this project concept?
Issues? Risks and uncertainties? (In addition to the ones outlined in the presentation)
Stakeholder interest? Willing to work and collaborate with us on this project?
Best methods to communicate and provide information to Stakeholders? (i.e., newsletters, social media, email updates)
Type of activities to best engage and collaborate? (i.e., Open houses, advisory groups, small group workshops)
Who specifically should we be collaborating and working with?
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