Alberta Government

Draft Moose Lake 10 km Management Zone Plan

Released February 6, 2018

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ISBN: 978-1-4601-3792-5 (PDF)
Printed February 2018

EXECUTIVE SUMMARY

Note: The management plan for this 10KM management zone is currently in draft form and undergoing a Stakeholder / Indigenous review. Until such time as the plan is finalized and approved by Government, all management direction described in this document should be interpreted as proposed.

The following management plan and statements apply to the Moose Lake 10 km Management Zone, the first completed component of a broader Moose Lake Sub-regional plan located within the Lower Athabasca Region of Alberta.

The vision for managing the 10KMZ is to maintain Fort McKay First Nation's ability to exercise Treaty rights and traditional practices, while maintaining opportunities for managed, controlled resource development. This plan provides proposed management requirements and regulatory controls that will contribute to maintaining Treaty rights and opportunities for traditional use and cultural practices of Fort McKay First Nation and other Indigenous peoples, ecosystem function and biodiversity, and continued opportunities for economic development. Managing the extent and duration of resource development footprint is fundamental to achieving these objectives.

The 10 km Management Zone (10KMZ) is located approximately 100 km northwest of Fort McMurray (Figure 1 draft plan). It is an area of land with a 10 km perimeter centred on Fort McKay First Nation's Gardiner and Namur Lake reserves (Reserves No 174A and 174B), locally known as the Moose Lake reserves. The 10KMZ comprises portions of the Birch Mountains Wildland Provincial Park (park) and overlaps portions of the Red Earth Caribou Range Planning area. This Management Plan and ensuing management requirements will apply to all Crown land within this area.

While bitumen extraction remains the principle activity likely to create the majority of development disturbance in the 10KMZ, other activities also take place including Indigenous traditional land use, commercial trapping, guiding/outfitting operations, and public recreational activities such as hunting and fishing. There are also two established hunting/fishing lodges located on Crown Land within the planning area.

This area has been identified as an area of significant importance by Fort McKay First Nation who see this as their last meaningful place to practice Treaty Rights and traditional uses. The area is poised to experience significant land use pressures related to industrial development associated with in-situ bitumen extraction and increasing public access; a scenario that this management plan intends to address.

Fort McKay has been seeking access management and protection of the Moose Lake area since the early 2000s. A planning process was enabled through a letter of intent between the Government of Alberta and Chief Boucher on March 10, 2015 and continued through a Collaboration Agreement (January 2016) between the Minister of Alberta Environment and Parks and the Chief of Fort McKay First Nation. This process involved co-leads representing Alberta

and Fort McKay First Nation engaging with stakeholders and Indigenous groups for the purpose of jointly submitting a recommendation. The recommendations to government developed by the lead contacts, while not used in their entirety, informed the creation of this plan.

The draft plan (currently being put forward for Stakeholder and Indigenous review) includes the following management requirements within the Moose Lake 10km Management Zone:

Land and Footprint Management

- A maximum of 1.5 per cent of new buffered resource development footprint will be permitted within the 10KMZ. This limit is established to minimize the impact and duration of resource development footprint within the 10km Management Zone for the purposes of: (a) preserving and enhancing the ability of Indigenous communities to undertake traditional activities and cultural practices; (b) maintaining biodiversity and ecological integrity; and (c) permitting a sufficient land base for resource development
- Oil sands agreement holders will receive a proportional disturbance limit based on existing size of agreement holding. When an oil sands agreement holder applies to develop, its applications will have to consider their existing disturbance relative to their proposed disturbance and allocated limit. Any physical footprint regardless of available disturbance footprint remains subject to *Oil Sands Conservation Act, EPEA*, and *Public Lands Act* Approvals.
- Forestry, aggregate (sand and gravel), and Petroleum Natural Gas sectors will also be included in the allocation of disturbance limits
- No new surface resource development will be permitted within 1 km of the boundaries of the Moose Lake Reserves or the ordinary high-water mark of Buffalo (Namur) and Moose (Gardiner) Lakes.
- Commercial forest harvest is excluded from the 10KMZ for a period of 30 years. The potential for commercial harvesting relative to disturbance limits will be reviewed 5 years after plan implementation.
- Culturally relevant conservation and reclamation plans will be required for all approved developments. Criteria will be developed during the plan implementation phase through the Technical Committee in collaboration with industry, Fort McKay First Nation and Government.
- Reclamation planning, reporting and monitoring data will be collected and reported through a transparent and publicly accessible system.
- Further engagement is sought on the impacts of a potential infrastructure prohibition. Infrastructure is defined as processing facilities, including central processing facilities, aerodromes/air strips, permanent or temporary worker camps, and landfills. The 60-day public consultation process on the draft plan will provide the forum to gather this additional information prior to a final decision on this significant point.

- To support future expansion of the Birch Mountain Wildland Park within the 10KMMZ, untenured land or any leases that expire (returned to the Crown) will have no surface access. These lands will be considered for future inclusion in the Birch Mountain Wildland Park.

Air Management

Moose Lake air management criteria will include enhanced air quality management and monitoring for the 10KMZ and facilities developed within 2 km of the 10KMZ. The intent is to ensure air quality on the reserves and in the 10KMZ is rigorously protected and is supported by the LARP Air Management Framework principle of keeping clean areas clean. Main components include:

- Requirements and support for air monitoring
- Establishing ambient air quality targets
- Use of Best Available Technology Economically Available (BATEA)

Water Management

To protect surface and groundwater to maintain watershed function and integrity. To protect FMFN drinking water supply and other drinking water uses from Buffalo (Namur) Lake, Moose (Gardiner) Lake and the Ells River watershed and to manage water resources in consideration of FMFN cultural practices. Management requirements include:

- Direct surface water withdrawals from Buffalo Lake, Moose Lake and the Ells River are prohibited for thermal injection purposes.
- Water allocation amounts within the 10KMZ will be subject to volumes that are protective of Namur and Gardiner Lakes and reflect cumulative allocation limits for the Ells River and be informed by Alberta's draft Surface Water Allocation Rule sets and Surface Water Objectives to be established as part of plan implementation
- Groundwater/surface water modeling is required for groundwater withdrawal applications within the 10KMMZ to assess the potential stream flow or lake-level reduction impacts by the proposed groundwater diversion
- Use of a common model will be promoted, which would be regularly updated and validated with monitoring and calibration information

Moose Lake Trail / Access

Establish a Moose Lake Trail that provides unfettered access for FMFN members between Fort McKay and the Moose Lake Reserves.

Fish and Wildlife Management

Maintain sustainable and healthy wildlife populations through the development or refinement of fish and wildlife management plans that include Treaty Rights as a fundamental component of those plans.

Plan Implementation and Stewardship

A co management Technical Committee will be established to support and oversee plan implementation. This includes defined evaluation and review intervals. A role for Minister(s) and Chief and Council will be defined to provide political oversight, accountability and stewardship with respect to implementation of the 10KMZ.

Performance Management and Monitoring

A monitoring program, including community-based monitoring, will be established through the activities of the Technical Committee to evaluate the effectiveness of implementation and to achieve the principles, objectives and management intents of this plan. Monitoring includes:

- Surface and Groundwater
- Wildlife
- Air
- Reclamation
- Resource Development Footprint tracking

More detail and additional rationale for the establishing of these management requirements is available within the full Moose Lake 10km Management Zone Draft Plan. Once completed and approved, The 10 km Moose Lake Management Zone Plan will be part of a broader Moose Lake Sub-regional Plan, which is still to be developed. This 10 Km Management Zone Plan (and eventually the Moose Lake sub-regional plan) is anticipated to be included and have authority in an amended Lower Athabasca Regional Plan. Until that time implementation will occur under existing government legislation, policy and mechanisms.

1.0 INTRODUCTION

1.1. Purpose of the Plan

The 10 km Moose Lake Management Zone (10KMZ) Plan will apply to a 10 km radius of Crown land around Fort McKay First Nation's (FMFN) Reserves 174A and 174B (collectively known as the Moose Lake Reserves). The region is considered to have high biodiversity value and to be important to the members of the FMFN for the ability to exercise Treaty rights and traditional practices. The management plan applies specifically to Crown land within the 10 km Management Zone.

The planning process was enabled through a letter of intent between the Government of Alberta and Chief Boucher on March 10, 2015 and continues through a Collaboration Agreement (January 2016) between the Minister of Alberta Environment and Parks and the Chief of Fort McKay First Nation.

The purpose of the 10 km Management Zone Plan is to provide management requirements and regulatory controls that will contribute to maintaining ecosystem function and biodiversity and continued opportunities for economic development, while maintaining and enhancing opportunities for the exercise of Treaty rights, traditional use, and other cultural practices.

Currently, while the majority of provincial Crown land within the 10KMZ is under subsurface lease, there are no active in-situ bitumen operations. All petroleum and natural gas operators in the 10 km zone have previously been shut-in under the Alberta Energy and Utilities Board's (now Alberta Energy Regulator's) Interim Directive (ID) 99-01. The directive stops any PNG extraction if it is in a position to compromise the extraction of the surrounding bitumen. A forest management agreement covers 48 per cent of the total 10KMZ (89 per cent of leasable area). A disposition for aggregate extraction also occurs in the 10KMZ. Apart from those listed, there are currently no other dispositions for resource development.

Approximately half of the 10KMZ is within the Birch Mountains Wildland Provincial Park, which is a Conservation Area under LARP. The other half is within the LARP "mixed use" area. The broader Moose Lake Sub-regional Plan (of which this 10KMZ plan is the first piece to be completed) specifically supports outcomes 3, 4, and 7 of the Lower Athabasca Regional Plan (LARP) and management direction has been focused to specifically support those outcomes:

- LARP Regional Outcome 3: Landscapes are managed to maintain ecosystem function and biodiversity
- LARP Regional Outcome 4: Air and Water are managed to support human and ecosystem needs
- LARP Regional Outcome 7: Inclusion of aboriginal peoples in land use planning

This 10KMZ plan includes requirements for air and water management, land disturbance limits, and the types of facilities and their operation that will be allowed within this zone.

1.2. Planning Area

The 10 km Management Zone is located approximately 100 km northwest of Fort McMurray (Figure 1). It is an area of land with a 10 km perimeter centred on FMFN's Gardiner and Namur Lake reserves (Reserves No 174A and 174B), locally known as the Moose Lake reserves. The 10KMZ comprises portions of the Birch Mountains Wildland Provincial Park (park) and public (Crown) land. Crown land within the 10KMZ, not including the park, for the purposes of this plan is called the "mixed use" area. As discussed above, oil sands agreements for the extraction of bitumen can be acquired in that area.

The vision for managing the 10KMZ is to maintain FMFN's ability to exercise Treaty rights and traditional practices, including transferring traditional knowledge to their future generations, while permitting resource development in a controlled, orderly and phased manner. The area is poised to experience significant land use pressures related to industrial development associated with in-situ bitumen extraction and increasing public access; a scenario that the management plan intends to address.

While bitumen extraction remains the principle activity likely to create the majority of development disturbance in the 10KMZ, there are other activities that take place in this area including some guiding/outfitting operations, and public recreational activities such as hunting and fishing. There are also two established hunting/fishing lodges located on Crown Land within the planning area.

The 10KMZ Plan will be part of a broader Moose Lake Access Management Sub-regional Plan, which is still to be developed and would be part of the Lower Athabasca Regional Plan (LARP). The broader Moose Lake Sub-regional Planning exercise will be initiated following completion of this 10 km Management Zone Plan.

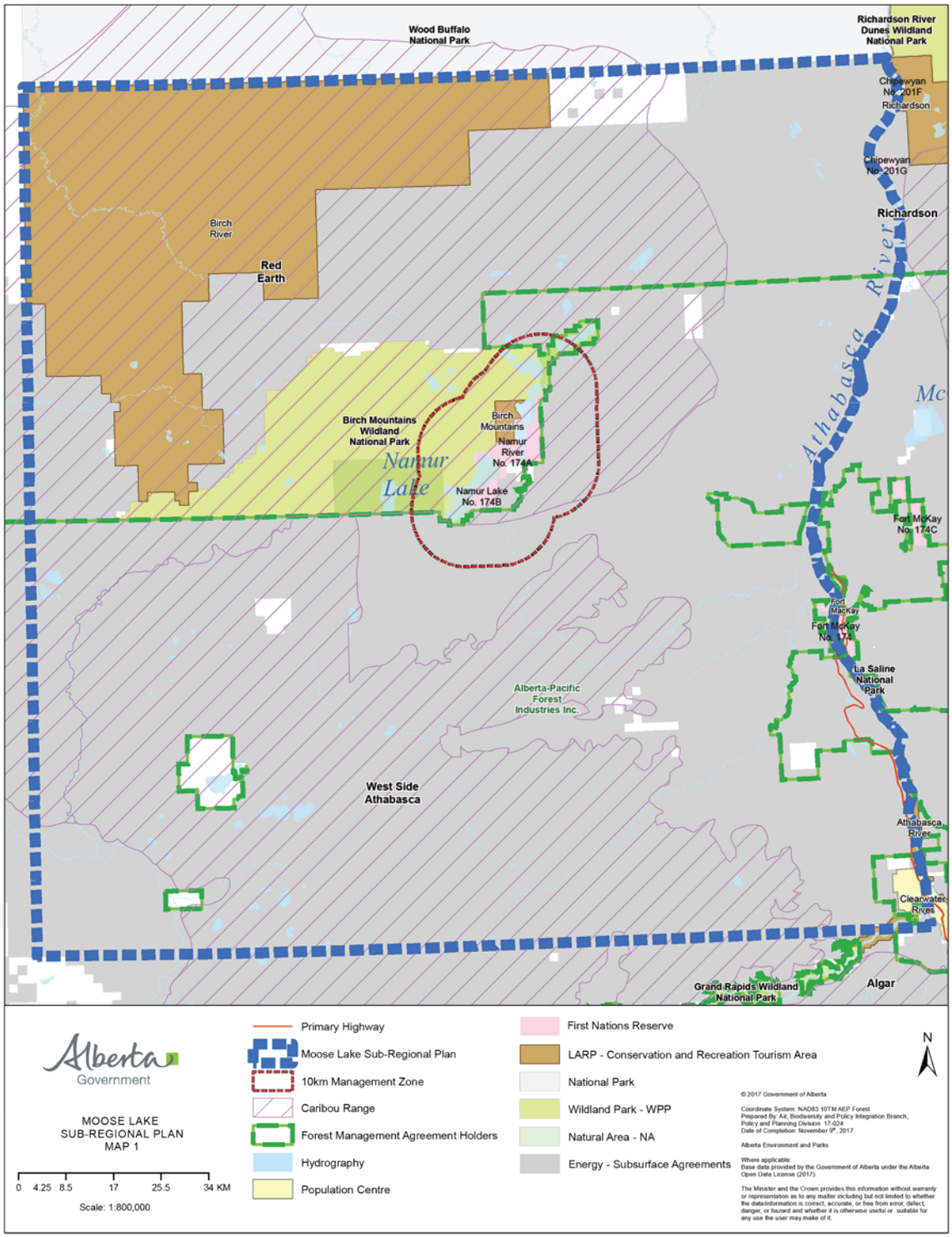

Figure 1 – Moose Lake 10 km Management Zone (red boundary)

1.3. Plan Authority

Legal Authority and Mechanism(s) for plan implementation

The Moose Lake 10 km Management Zone (Figure 1) is a smaller component of the larger Moose Lake Sub-Regional plan that will be part of the Landscape Management Plan (LMP) being developed for the Lower Athabasca Region (Figure 2). The 10 Kilometre Management Zone Plan is the first completed piece of the broader Moose Lake Sub-regional plan and is intended to be expeditiously implemented upon approval, prior to its inclusion in any future LARP amendments.

Until such time as the Plan is incorporated within an amended LARP (including requisite regulatory details for specific components of the plan*), the plan will be interpreted as government policy for the purpose of informing and providing direction for land and resource management decisions. The plan is consistent with provincial policies, strategies and frameworks, and with the desired outcomes for the region as stated within the LARP.

Interim implementation of the 10 km Management Zone plan will be through a variety of existing and established mechanisms available to government and enforceable under existing home legislation. The Plan will have authority under the *Public Lands Act, Water Act, Forest Act, Provincial Parks Act*, and the *Environmental Protection and Enhancement Act* (EPEA), as well as other applicable policies and strategies.

Full implementation details, including timelines and allocation of resources, will be determined when the Moose Lake 10 km Management Zone Plan is approved by Cabinet and is considered final.

* It is anticipated that some components of the plan will have further authority under specified Regulatory Details of an amended LARP. These are likely to be in reference to implementation of disturbance limits, and conditions/restrictions to infrastructure within the 10 km Management Zone.

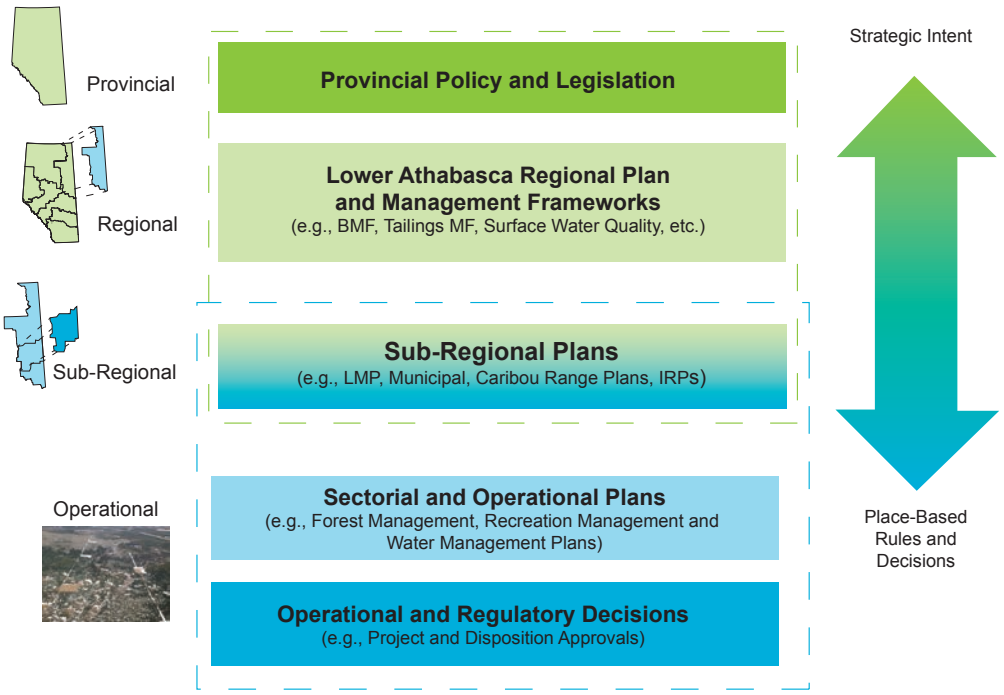

Figure 2: Provincial planning system hierarchy – The Moose Lake 10 km Management Zone plan will be part of the larger Moose Lake Sub-regional plan and incorporated as a chapter in the larger Landscape Management Plan (LMP)

This plan is effective xxxx, 2018 under the ….. Act. , (this section is to be completed upon plan approval. state when the plan was approved, the enabling legislation and the effective dates of the plan).

2.0 RESOURCE MANAGEMENT CONTEXT

2.1 Management Context

Since early 2003, FMFN has been in discussions with the GOA and industry groups to develop a plan for the Moose Lake area to manage access and resource development so that its members are able to continue to exercise its Treaty rights, traditional use and cultural practices. To that end, GOA and FMFN agreed on January 14, 2016 to each appoint a lead contact to recommend a Moose Lake Access Management Plan to the Minister of Environment and Parks and FMFN Chief and Council, known as the Renewed Collaboration Agreement. The recommendations to government developed by the lead contacts, while not used in their entirety, provided the basis for the creation of this plan.

The 10KMZ plan, once approved will provide management requirements to be implemented by regulators with respect to land use decisions.

While a broader Moose Lake planning area has been defined for a future planning exercise as part of the LMP planning process, the current management plan and management direction outlined in this document is specific to the 10KMZ.

2.2 Principles

The following principles guided the planning process:

- The Moose Lake area, including the Reserves and adjacent area, has significant cultural and heritage importance for FMFN and its members.
- Bitumen development will not be sterilized. Controlled, orderly and phased development along with coordinated access will enable sustainable development of those resources.
- Preservation of the ecological integrity and biodiversity of the Moose Lake area requires minimization of adverse impacts of resource development on the environment, including plants, fish and wildlife, and water. Avoid and mitigate (where avoidance is not feasible), impacts to the Moose Lake Reserves from noise, odours, visual, air and water pollution and water withdrawals and drawdown.
- The planning process relating to the Moose Lake area, including the establishment of land use and land disturbance standards, is collaborative. Land uses, limits and thresholds must be enforceable and must be implemented as soon as practicable.

2.3 Desired Outcomes and Management Intent

The Moose Lake 10KMZ Plan objectives include the coordination and management of access and development of current and future land use activities to achieve the following outcomes:

- maintain and enhance opportunities for the exercise of Treaty rights, traditional use and cultural practices of Fort McKay First Nation and Métis people;
- maintain ecological integrity and biodiversity;
- manage environmental values within thresholds for environmental protection;
- provide clarity and direction to the province's regulatory processes in relation to land management.

3.0 RESOURCE MANAGEMENT DIRECTION

3.1 Land

Management Intent

Minimize the extent and duration of resource development footprint within the 10KMZ for the purposes of

a. preserving and enhancing the ability of FMFN and other aboriginal persons to undertake traditional activities and cultural practices,

b. maintaining biodiversity and ecological integrity, and

c. permitting a sufficient land base for resource development.

Rationale

The application of land disturbance limits will encourage industry and other land users to employ innovative approaches to reduce their environmental footprint. The interior habitat indicator, as described in the Biodiversity Management Framework (Draft 2014) for the Lower Athabasca Region, will be used as a tool to measure and manage resource development land disturbance.

Using an Interior Habitat Approach

Human activity (often measured as footprint) has not only a direct effect on plants and wildlife, but also extends some distance from the actual disturbance into the adjacent (undisturbed) habitat. This adjacent disturbance or edge effect is also referred to as a buffer. Interior habitat refers to the proportion of habitat that is distant from human footprint, outside of the edge effects. Human footprint decreases interior habitat by creating edge effects that alter predation patterns and competition, and fragment species' habitats (Murcia 1995, Didham 2010).

Therefore, interior habitat is calculated as the percent of habitat that is a defined buffer distance from human footprint. Following Biodiversity Management Framework methods, the amount of habitat is calculated using a 50 m and 200 m buffer distance from human footprint; these results are then averaged. Any habitat outside of the human footprint and buffer distance is considered interior habitat. Buffer widths are also discounted for footprint less than 20 m wide and for the successional recovery of footprint.

Further information of interior habitat and details on how it will be applied in order to manage the cumulative effects of human footprint in the 10KMZ are detailed in ***Standards and Guidelines for Footprint Management in the Moose Lake 10 km Management Zone*** (Appendix A). Below is a summary of the approach.

Disturbance Limit Management Requirements

1. Up to 1.5 per cent of new buffered resource development footprint (industrial footprint plus the average buffer defined by the BMF) will be permitted within the 10KMZ. **This translates to a maximum land disturbance limit within the 10KMZ of 15,537 ha buffered footprint.** Assuming a small amount of new footprint will occur in the park, most of the available buffered footprint (**12,471 ha**) will be allocated to the mixed use area within the 10KMZ as exemplified in Table 1.

   All resource development activities within the 10KMZ will be considered in calculating / assessing the limits for interior habitat losses. For the purposes of assessing resource development footprint within the 10KMZ disturbance is defined as any human-caused activity required for the purposes of exploration, development, extraction or production of a resource that results in an identifiable and visible land disturbance footprint. The edge effect surrounding that disturbance (defined as buffered disturbance) will also be included in the disturbance limit calculation. The compendium *Standards and Guidelines document for Footprint Management in the Moose Lake 10 km Management Zone* provides further detail.

   With respect to accounting of seismic footprint, most low-impact seismic as defined in the *Standards and Guidelines for Footprint Management in the Moose Lake 10 km Management Zone* will not be considered in resource development footprint. Activities that employ low impact seismic techniques use a meandering path to avoid large trees and break the line of site for predators and are expected to recover naturally. Low impact seismic will only be considered as footprint if it is both located in a bog or a poor fen ecosite, and not hand-cut. In these circumstances, natural recovery has been shown to be limited. Low impact seismic will be required for any seismic activity going forward.

Table 1 Current Interior Habitat within the 10 km Management Zone and Disturbance Limits calculated based on a proposed 1.5 per cent decrease in Interior habitat from current state (reference) condition. Note: Co-lead recommendation stated between 1 and 2 per cent Interior Habitat decline

		10 km Management Zone		Mixed Use Area Only*	
		Hectares (ha)	Per cent	Hectares (ha)	Per cent
Total Area		103,565	100%	56,203	54%
Current State	Interior Habitat	89,581	86.50%	45,285	80.57%
	Buffered Footprint	13,984	13.50%	10,918	19.43%
Disturbance Limit	Interior Habitat	88,028	85.00%	43,732	77.81%
	Buffered Footprint	15,537	15.00%	12,471	22.19%

*As there will be little to no anticipated development taking place in the Birch Mountain Wildlands Park, any additional resource development footprint is expected to occur only in the mixed use area which is approximately half the size of the SMZ. Therefore, a 1.5 per cent interior habitat decline in the overall 10KMZ translates to approximately 3 per cent allowable decline in the mixed use area.

Based on a 1.5 per cent decrease in interior habitat within the 10KMZ, disturbance allocations are proposed (using the Co-lead recommendation of between 1 and 2 per cent) for the Oil Sands, Forestry, Petroleum and Natural Gas, and the Sand and Gravel sectors (Table 2). Oil Sands operators will have operator-specific allocations proportionally based on their total agreement area held within the 10KMZ. The buffered footprint available to each oil sands agreement holder translates into hectares by calculating 20.7 per cent of the total size of the operator's sub surface agreement holdings within the 10KMZ. Resource development footprint cannot be physically created until a project proponent receives the requisite approvals for resource development purposes that first considers the operator's existing disturbance relative to any new disturbance that could result in an exceedance.

Table 2 Distribution of proposed buffered footprint within the 10KMZ.[1]

Sector	Buffered Footprint Allocation (ha)	Buffered Footprint Allocation (per cent of whole)
Forestry[2]	738	~6%
Oil Sands	11,204	~90%
Petroleum and Natural Gas	200	~2%
Sand and Gravel	330	~3%
Total	12,471	100%

[1] Draft numbers may not fully balance due to rounding and are subject to change.

[2] Distribution of buffered footprint for forest harvesting will be re-evaluated after the deferral period as SAGD resource development in this area will be in a more mature phase where redistribution of footprint can be considered.

Existing and proposed disturbance values will be used to inform the Alberta Energy Regulator and other decision-making bodies in their review and evaluation of all new applications. Upon implementation of this plan, any applications before the regulator or public lands authority would be reviewed in terms of existing footprint and allowable footprint. Applicants who are initially over their disturbance limit would not be considered out of compliance, but would be unable to receive approval from the regulator or public lands authority to create any additional footprint until the applicant can demonstrate they are able meet their specific disturbance limits.

A book-keeping, monitoring and tracking system for calculating industrial footprint against disturbance limit thresholds will be established. Each agreement holder that has applied for and received surface rights will be required to annually track and report their resource development footprint for the purposes of evaluating the current state of interior habitat on their lease.

To account for recovery of footprint and associated changes to interior habitat, reclamation planning and monitoring of resource development footprint will be coordinated. Interior habitat and development footprint data will be administered (tracked and reported) through

a comprehensive and transparent system that is accessible to regulators, land users and the Moose Lake Technical Advisory Committee. The Reclamation Information System (RIS) currently in use by government may be suitable for this application and purpose.

2. Human footprint not related to resource development will not be counted towards the resource development disturbance limit.

   This type of disturbance could include:

   - The Moose Lake Trail - footprint associated with the trail will have an impact on interior habitat, but will not be considered in determining disturbance limits.
   - Other non-resource development access (i.e. designated recreational or traditional use access)
   - Activities on Fort McKay First Nation reserves

3. Commercial forest harvest is excluded from the 10KMZ for a period of 30 years. The potential for commercial harvesting relative to disturbance limits will be reviewed 5 years after plan implementation with the understanding that there may be opportunities for some ecologically based harvesting and wildfire management.

4. Any resource development footprint is required to avoid old-growth forest where feasible. For the purposes of this Special Management Zone, old-growth forest is operationally defined as forest over 80 years old.

5. Setbacks: No new surface resource development will be permitted within 1 km of the boundaries of the Moose Lake Reserves or the ordinary high-water mark of Buffalo (Namur) and Moose (Gardiner) Lakes.

6. The following measures will be required and included in an resource developer's scheme submission within the 10KMZ:

   - Use of low impact seismic (as defined in Appendix A) for oil sands exploration programs;
   - Reclamation of legacy seismic and other exploration footprint (based on need of agreement holder to operate within their defined disturbance limit)
   - Timely reclamation of inactive laydown areas;
   - Use existing disturbance wherever possible;
   - Optimize the use and design of well pads;
   - Use of progressive reclamation techniques, such as forest stand modification, mounding, topsoil reconstruction and the use of seed collection and vegetation cooperatives to enhance the pace and quality of reclamation; and
   - Operations based on mandatory demonstrable integrated land and footprint management.

In addition, further consideration regarding the following footprint reduction possibilities are being contemplated:

- Reducing Minimal Level of evaluation
- Reducing requirement for optimization of resource (i.e. to permit stranding of marginal resources so as to not facilitate additional footprint for minimum gain).

7. Untenured land or any leases that expire (returned to the Crown) will be designated as having no surface access. These lands will be considered for future inclusion in the Birch Mountain Wildland Park (see Section 3.7).

3.1.1. Conservation and reclamation planning and activities

Management Requirements

1. Conservation planning and activities are required to include the following for all new project applications within the 10KMZ as part of their Project-level conservation, reclamation and closure plan submitted to the Alberta Energy Regulator (AER) as a requirement of *Environmental Protection and Enhancement Act* (EPEA):

    - Seek and (if provided) incorporate input from FMFN based on cultural values, traditional land uses and other community-specific knowledge to identify priorities;

    - Be based on mandatory demonstrable integrated land and footprint management.

2. To manage development footprint, operators in the 10KMZ will be required to include a reclamation component in their Project-level Conservation Reclamation and Closure Plan that addresses any reclamation needs in order to meet the interior habitat criteria.

    - Seek and (if provided) incorporate input from FMFN based on cultural values, traditional land uses and other community-specific knowledge to identify priorities;

    - Apply best management practices and standard operating procedures for reclamation of legacy footprint and progressive reclamation of specified lands. Seek and (if provided) incorporate FMFN cultural values.

    - Build on previous regional studies, such as Cumulative Environmental Management Association (CEMA) State-and-Transition Model, Stony Mountain access work and Disturbance and Recovery Trajectory (DART) tool and the CEMA Indigenous Traditional Knowledge Framework.

    - Re-establishment of traditional land use capability as an outcome will be included in reclamation plans;

    - Seek to engage FMFN in reclamation planning and monitoring, including

        o designation of reclamation planning units

- o designation of end land uses
- o reviewing avoidance and mitigation plans for wetlands;

- Establish a seed and plant material cooperative (Oil Sands Vegetative Cooperative – COSIA) for the 10KMZ and collect seed and plant material from the proposed areas of disturbance.

3. Reclamation planning, reporting and monitoring data collected and reported as part of an approved activity or monitoring program will be open, transparent and publicly accessible (including the Technical Advisory Committee – see Section 4.2).

Criteria and Directives

Culturally relevant reclamation criteria, indicators, practices, end land uses and certification criteria will be developed for the 10KMZ. It is expected that the Technical Advisory Committee (GOA and FMFN) will develop these in collaboration with industry and Indigenous groups and in building on previous regional studies listed above. The target timeline to develop these is within one year of implementation of the plan. Once developed these would apply to reclamation in the 10KMZ.

The following criteria (including any future updates) will apply to the 10KMZ until such time as the culturally relevant reclamation criteria, indicators, practices, end land uses and certification criteria are established:

- *Guidelines for Reclamation to Forest Vegetation for the Athabasca Oil Sands* Regions 2nd Ed (Alberta Environment 2010).
- *Coal and Oil Sands Exploration Reclamation Requirements* (Alberta Environment and Parks 2015).

The following directives (including any future updates) will continue apply to the 10KMZ. Industry will be required to seek FMFN input as identified in the management requirements listed above.

- Specified Enhancement Direction 001, Direction for Conservation and Reclamation Submissions; Under and Environmental Protection and Enhancement Act Approval for Enhanced Recovery In Situ Oil Sands and Heavy Oil Processing Plants and Oil Production Sites (Alberta Energy Regulator 2016).
- Alberta Wetland Mitigation Directive (Alberta Environment and Parks 2016).

3.2. Infrastructure

Management Intent

To prevent industrial infrastructure impacts within the 10KMZ for the purposes of preserving and enhancing the ability for FMFN to exercise its Treaty rights, traditional uses and cultural practices. Infrastructure, for the purposes of this section of the plan, is defined as processing facilities, including central processing facilities, aerodromes/air strips, permanent or temporary worker camps, and landfills.

Further Industry Engagement

Government is considering whether infrastructure as defined above should be permitted within the 10 km Management Zone. Further engagement is sought on the impacts of a potential infrastructure prohibition. The public consultation process on the draft plan will provide the forum to gather this additional information prior to a final decision on this significant point.

3.3. Air

Management Intent

The Moose Lake air management criteria will include enhanced air quality management and monitoring for the 10KMZ and facilities developed within 2 km of the 10KMZ. The intent is to ensure air quality on the reserves and in the 10KMZ is rigorously protected and is supported by the LARP Air Management Framework principle of keeping clean areas clean.

- In addition to the fundamental principle of keeping clean areas clean, management intent will also adhere to the other framework principles of:
- Pollution prevention through Best Available Technology Economically Achievable (BATEA); and
- Emission minimization through best management and control practices

The following management criteria will apply with respect to air management for 10KMZ:

1. Ambient air quality on Moose Lake Reserves

    1.1 GOA will provide technical and/or financial support for the establishment of the continuous ambient air quality station on Moose Lake Reserve.

    1.2 If monitoring and reporting* (as described in section 6) shows Interim Moose Lake Reserves Ambient Air Quality Targets** as set out in Appendix B are not being met, the GOA will initiate an investigation to determine reasons for the exceedances. Depending on the results of the investigation, appropriate additional emission management action might be identified. In consultation with FMFN and input from industry GOA will take management actions as they deem appropriate to address the exceedance**.

*Note: These targets are not intended as regulatory numbers for EPEA approvals and do not replace Alberta Ambient Air Quality Objectives. However, if a target is exceeded, the GOA would investigate why, and then consider appropriate management action that might be required. If the results do show a breach of approval or other legal requirement, that would be reported to the appropriate investigators.

**Note: These Ambient Air Quality Targets could eventually be considered as part of the Lower Athabasca Region (LAR) Air Quality Management Framework (AQMF).

1.3 Operators will be required to include in their project application or environmental impact assessments, an assessment of project-specific and cumulative air emissions on the Moose Lake Reserves.

1.4 Once five years of monitoring data is available from the ambient air quality monitoring station located on the Moose Lakes Reserves, the Government of Alberta will review the targets in collaboration with FMFN. Final Moose Lake Reserves Ambient Air Quality Targets will be considered for incorporation into the LAR AQMF through Alberta's established regional planning process.

2. Management and monitoring requirements for facilities within 2 km beyond the boundary of the 10KMZ

2.1 GOA will establish management and monitoring requirements for facilities and infrastructure for the area located within 2 km beyond the boundary of the 10 km SMZ in accordance with the following:

2.2 Facility-related (i.e. project specific) ambient air quality monitoring based on facility type and size (Appendix B).

2.3 Minimum air emission control requirement based on BATEA such as, but not limited to: the following:

2.3.1 100 percent of compressor redundancy as part of vapour recovery unit designs;

2.3.2 selective catalytic reduction on co-generation units with a gas turbine capacity equal to or greater than 85 MW;

2.3.3 sulphur recovery rates of 90 percent for inlet sulphur rates between 2 tonnes/day and 5 tonnes/day; and

2.3.4 the design, selection and operation of boilers and heaters based on the performance targets in AEP's Policy 2 with alternate gaseous fuel (AGF)

2.3.5 performance targets only applying when the AGF contains less than 90 percent methane consistent with the definitions in the Federal Multi-sector Air Pollutants Regulations (SOR/2016-151, current to November 20, 2017).

2.4 Establish Perimeter Ambient Air Quality Targets (PAAQT) for the 10KMZ based on the Fort McKay Ambient Air Quality Permissible Target Levels by requiring facilities to:

a) Provide modelling to determine if emission controls beyond BATEA required to meet the "Fort McKay By-Law" air quality targets at the perimeter of the SMZ as well as to minimize effect on the project on baseline conditions at the Moose Lake Reserves.

b) report ambient monitoring results against the PAAQTs to GOA; and

c) Determine whether further management and emissions controls could be initiated or installed if monthly reports show targets are not being met, with FMFN engaged to an appropriate degree in the investigation.

2.5 Implement Best Control and Management Practices required to minimize light pollution, odour emissions, dust and noise.

3.4. Water

Management Intent

To protect surface and groundwater to maintain watershed function and integrity. To protect FMFN drinking water supply and other drinking water uses from Buffalo (Namur) Lake, Moose (Gardiner) Lake and the Ells River watershed and to manage water resources in consideration of FMFN cultural practices.

3.4.1. Water Quantity Management Requirements

With the exception of specifics noted below, evaluation of water allocation decisions in Buffalo Lake, Moose Lake and the Ells River will be defined using the draft Surface Water Allocation Directive* (the directive), as amended or replaced from time to time. This is an evolution of the Alberta Desktop method for protecting rivers and streams by recommending instream flow requirements. This directive provides science-based guidance on applications for *Water Act* licences to ensure impacts to the aquatic environment and fish and wildlife resources are minimized. The draft directive has been developed to recommend protective water withdrawal limits including for water bodies for which there is no recorded data. Monitoring can be established to further validate and refine initial limits that were informed by the directive.

Water quantity management requirements apply within, and cumulatively within, the Ells watershed and include the lakes that are of specific interest, which have their own specific limits identified through the process outlined below. The 10KMZ is a non-watershed based area that may outline additional considerations that are unique to that area.

*If the Surface Water Allocation Directive is not finalized prior to this draft Plan being finalized the Alberta Desktop method would apply until the Directive is finalized.

1. Direct surface water withdrawals from Buffalo Lake, Moose Lake and the Ells River are prohibited for thermal injection purposes.

2. For all other water allocation purposes, preliminary allowable water allocation amounts will be determined for Buffalo Lake, Moose Lake and the Ells River using the draft Surface Water Allocation Directive rule sets*. Rule sets can be validated over time if new monitoring stations are funded and actual streamflow data becomes available.

    2.1 Within allowable volumes derived using the draft directive, determine objectives that allow for an acceptable minimal reduction in stream flow and/or lake level by indirect groundwater diversions.

    2.2 Establish the objectives of 2.1 (Section 3.4) through a process mutually acceptable to GOA and FMFN, including the determination of climate change scenarios and how they can be incorporated.

3. Water allocation amounts within the 10KMZ will be subject to volumes that are protective of the lakes and reflect cumulative allocation limits for the Ells River.

4. In order to establish objectives for groundwater diversions that are protective of Moose Lake, Buffalo Lake and the Ells River, integrated groundwater-surface water modelling is needed to assess the degree of hydraulic connection between groundwater and surface water. However, if a significant connection between groundwater and surface water is suspected, groundwater may be assumed to be surface water.

    4.1 For groundwater diversion applications within the 10KMZ that exceed pumping rates of 20.5 m^3/day or 7,500m^3/year, groundwater-surface water modelling must demonstrate that the objectives established in 2.1 and 2.2 (Section 3.4) for Buffalo Lake, Moose Lake and the Ells River are adhered to.

    4.2 To facilitate independent review and verification of model results, promote the use of a common model amongst the relevant stakeholders and regulators for the purposes identified, to be regularly updated and validated with new monitoring and calibration information. The model should be constructed to standards acceptable to the GOA, determined in collaboration with FMFN. The electronic input and output files from the model shall be made available to all stakeholders

    4.3 In the absence of common model as described in 4.2 (Section 3.4), groundwater-surface water modelling of impacts of withdrawals will be required by project application proponents to assess the potential stream flow or lake-level reduction impacts by the proposed groundwater diversion. The Alberta Energy Regulator will determine if the modelling is appropriate for the purpose of assessing impacts of groundwater diversions.

5. Licences are permitted for temporary surface water or groundwater diversions and for other purposes (e.g. drinking water) within the 10KMZ as long as they adhere to the rule sets set out by the draft surface water allocation directive. Permits would be evaluated taking into account the actual water levels at Namur Lake and Ells Rivers.

3.4.2. Water Quality Management Requirements

1. Deep well injection of hazardous and oil field waste, landfills or on-site disposal of project domestic waste is prohibited within the 10KMZ.
2. Well-pads must be designed to capture 1-in-100 year precipitation event and any captured water from well-pads must be trucked off-site.
3. The draft (as of February 2017) directive Assessment of Thermally Mobilized Constituents in Groundwater for Thermal In Situ Operations, as amended or replaced from time to time, will be applied to the 10KMZ.
4. Groundwater monitoring wells will be used on at least 50 percent of well pads within the 10KMZ unless disturbance thresholds dictate otherwise.

3.5. Wetlands

The Alberta Wetland Policy (Alberta Environment and Sustainable Resource Development 2013) and the Alberta Wetland Mitigation Directive (Alberta Environment and Parks 2016) will apply to the 10KMZ. Any amendments or replacements to the referenced policy and directive will also be applicable to the 10KMZ.

1. Offset protocols and in-lieu fees established under the *Alberta Wetland Policy* will apply.
2. Activities involving wetlands, such as avoidance and mitigation planning, will seek and (if provided) incorporate input from FMFN based on cultural values, traditional land uses and other community-specific knowledge.
3. Identification of priorities for restorative activities, such as replacement, reclamation, and non-restorative activities, such as research and Best Management Practices will seek and (if provided) incorporate input from FMFN based on cultural values, traditional land uses and other community-specific knowledge.
4. In-lieu fees collected for wetlands can be used to support both restorative and non-restorative priorities identified by GOA and FMFN that would align and subject to priorities within the 10KMZ identified by GOA and FMFN.
5. FMFN will be engaged in reclamation planning, including reviewing avoidance and mitigation planning for wetlands.

3.6. Fish and Wildlife Management

Management Intent

To maintain sustainable and healthy fish and wildlife populations, including species defined under the *Species at Risk Act* (SARA), and consideration of culturally relevant species.

Guidelines

1. In collaboration with FMFN, develop a fisheries management plan and fisheries management objectives for the 10KMZ based on the principle that Treaty rights are a priority.
2. Wildlife Management Unit (WMU) 531: As a sub-unit or in coordination with WMU 531, a wildlife management plan for the 10KMZ (to be developed) will continue to be based on the principle that Treaty rights are a priority. This plan will include a review of hunting allocations and monitoring with the goal of restoring and/or maintaining population numbers.
3. In collaboration with FMFN, a wildlife monitoring plan will be developed and implemented for the 10KMZ.
4. Operators are required to develop and implement a wildlife mitigation and monitoring plan.
5. Identify recommendations from *Setting Alberta on the Path to Caribou Recovery* (Denhoff 2016) that are relevant to the 10KMZ. Collaborate with FMFN and affected stakeholders in the development of the Red Earth Caribou Range Plan.
6. Avoid old-growth forest where feasible.

3.7. Birch Mountains Wildland Park

Management Intent

Support eventual expansion of the Birch Mountains Wildland Park (Park) within the 10KMZ in order to preserve and restore biodiversity and ecological integrity. Note that this Park is a priority for a cooperative management approach to be developed by Parks and interested Indigenous communities such as Fort McKay First Nation.

Management Requirements

1. Incorporate the two untenured parcels on the north side of the Park into the Park. These two parcels are identified in Appendix C.
2. Consider incorporation of the untenured lands adjacent to the Park within the SMZ into the Park, as they become available.*
3. Maintain current surface restrictions relating to leases within the portion of the Park located within the 10KMZ.

4. No new surface rights will be granted within the portion of the Park located within the 10KMZ (for resource development).

5. If an operator cannot reasonably operate within their assigned disturbance threshold, that operator may undertake reclamation in the Birch Mountain Wildland Park. Reclamation offsets may occur in the Park as outlined in Appendix A and under the authority/oversight of Alberta Parks.

* As Crown land (e.g. current untenured leases, expired leases) becomes available, these Crown lands can be held under section 7 of the *Parks Act* until there is sufficient land area available to begin the process to incorporate that land into the adjoining Wildland Park. Agreement holders would be able to access sub surface resources providing they are able to without any surface access or disturbance (i.e. using directional drilling and production technology). At some point, when those lands are incorporated into the Park, they will be subject to the same legislation as applies to the existing park into which it is incorporated.

Initiatives

1. Develop a plan for reclaiming legacy disturbances in the Park.

3.8. Moose Lake Trail

Management Intent

To provide unfettered access for FMFN members between the Fort McKay townsite and their Moose Lake Reserves.

Guidelines

1. Designate a trail from the Fort McKay townsite to the Moose Lake Reserves with the intent that it be used by FMFN members in accordance with laws of general application. The route of this trail may be the existing Moose Lake Trail or the identification of a new route.

2. The disposition for this designated trail is anticipated to be issued in accordance with laws of general application, to a corporation indicated by FMFN or other alternatives that meet the same purpose.

3. Government, FMFN and Industry will initiate meetings to explore collaborative opportunities with the objective of providing unfettered access to FMFN members.

4.0 MANAGEMENT AND MONITORING

4.1. Plan Management

The Moose Lake Technical Advisory Committee (TAC) (as described below) will develop a plan to track the 10KMZ Plan's implementation progress and provide periodic reports to GOA and FMFN. GOA and FMFN may agree to provide direction with respect to the implementation of the 10KMZ Plan.

4.2. Technical Committee

Management Intent

Establish a cooperative management technical committee to facilitate technical cooperation, effective management of the 10KMZ, and day to day implementation of the management plan for the 10KMZ.

The Technical Committee will be comprised of an equal number of technical representatives of the Government of Alberta and Fort McKay First Nation.

- Representatives of operators who hold leases within the 10KMZ may participate in meetings.
- The committee will involve others, such as representatives of affected Indigenous communities, to attend and participate in meetings of the committee, as appropriate.
- The Committee would annually provide report updates to the Minister(s) and Chief and Council. Meetings may be scheduled, if required between Minister and Chief for the purposes of supporting work of the Technical Advisory Committee.
- Technical Committee roles will be developed through a Terms of Reference during plan implementation and will reflect the intent and purpose of this committee.

4.3. Performance Management and Monitoring

A monitoring program, including community-based monitoring, will be established through the activities of the Technical Advisory Committee to evaluate the effectiveness of implementation and to achieve the principles, objectives and management intents of this plan.

Monitoring includes:

Surface and groundwater monitoring

a) Establish additional baseline monitoring of water balance, water levels and water quality in Buffalo (Namur), Moose (Gardiner) and the Ells River, subject to resource availability.

b) Prioritize expansion of the regional groundwater monitoring network within the 10KMZ.

Wildlife monitoring

GOA and FMFN will collaborate on developing and implementing a wildlife monitoring plan for the 10KMZ .

Air Monitoring

Continuous ambient air quality monitoring station on the Moose Lake Reserve. GOA will provide technical and/or financial support.

Development Footprint and Reclamation Monitoring

Resource development footprint and reclamation monitoring as described in Section 3 and Appendix A (*Standards and Guidelines for Footprint Management in the Moose Lake 10 km Management Zone*) and linked to wildlife monitoring, as applicable. The aim of this monitoring is to evaluate the effectiveness of interior habitat, footprint management and reclamation in attaining objectives for wildlife, biodiversity and FMFN ability to exercise Treaty rights, traditional uses and cultural practices. This monitoring will be used to support the review and evaluation of implementing disturbance limits within this management zone.

Community based monitoring

Monitoring programs described above may be linked to community based monitoring, as applicable.

Linkage of Monitoring to Plan Implementation

Monitoring results will be used to evaluate plan implementation and provide rationale for improvements and or revisions of the plan that may be considered by GOA.

4.4. Plan Review

The plan will be reviewed at least once every five years or earlier as required. Plan review could potentially be done but not constrained by the publicly available regional planning reporting process for the Lower Athabasca Regional Plan. Modification from time to time of management intent and management requirements as stated within this plan will be considered by government as the need dictates. The results from monitoring programs will be linked to plan review and adaptive management to ensure that objectives of the plan are being met and to refine and adjust the plan if necessary.

At least once every ten years, a comprehensive review will be completed which could result in the plan being amended, replaced, or renewed.

5.0 FUNDING AND RESOURCES

Management Intent

To establish mechanisms and partnerships to provide funding and resources required to support the implementation of the management plan for the 10KMZ including but not limited to the following:

- establishing and operating the Technical Committee;
- monitoring and community-based monitoring;
- developing culturally relevant reclamation criteria, indicators and practices;
- developing the Moose Lake Trail; and
- undertaking certain activities, including habitat enhancement measures, studies and research, within the 10KMZ.
- The Technical Committee would recommend activities and projects for funding.

6.0 POLITICAL OVERSIGHT AND STEWARDSHIP

Management intent

To define an ongoing role for the Minister(s) and Chief and Council to provide political oversight, accountability and stewardship with respect to implementation of the 10KMZ.

- The Minister(s) and Chief and Council may, at intervals as mutually agreed to, meet to discuss the status of the 10KMZ and, among other matters, review whether the plan is being implemented in a timely manner and the principles, objectives and management intents of each component of the plan are being realized.
- The Minister(s) and Chief and Council may at intervals as mutually agreed to, meet with the TAC to review its reporting and recommendations, or to deal with specific or exigent matters.
- Where appropriate, the Ministers and Chief and Council will provide guidance or new direction or tasks to the Technical Committee or their officials to ensure that the vision and management intent of the 10KMZ plan is addressed effectively.

7.0 APPENDICES

Appendix A: Standards and Guidelines for Footprint Management in the Moose Lake 10 km Management Zone

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1.0 TERMINOLOGY

Allowable Buffered Footprint: refers to the total buffered footprint allowed within the 10KMZ's disturbance limit at any one time per operator, per section, or throughout the 10KMZ as a whole.

Biodiversity: The assortment of life on earth—the variety of genetic material in all living things, the variety of species on earth and the different kinds of living communities and the environments in which they occur (*Land-use Framework*, 2008).

Buffered Footprint: is the the combined area of the physical footprint and the functional footprint. This area includes any direct and indirect impact(s) of the physical footprint on ecosystem functioning which may extend beyond and include the physical footprint. This is the metric used to assess the disturbance limit for operators and the 10KMZ as a whole.

Conservation Offset: is an action taken to counteract impacts from development that remain after efforts have been taken to avoid and minimize those impacts.

Functional Footprint: is the area of the indirect impact(s) on ecosystem functioning that extends beyond the physical footprint, and is reflected when applying the 50m buffer and the 200m buffer to the physical footprint.

Interior Habitat: is the proportion of native habitat that is distant from (or outside of) the edge effects of human footprint.

Mixed Use Area: Mixed use area means the Green Area-Mixed Use Area as referred to in the Lower Athabasca Regional Plan. In the 10KMZ this is the lands outside of the park

Non-Resource Related Development Footprint: is a classification of footprint that refers to physical footprint created for the purposes of traditional, recreational, or commercial (excluding resource development) land uses.

Offset Credit: is a term used to describe the additional hectares of buffered footprint that an operator recieves after undertaking any of the eligible actions to generate a conservation offset.

Physical Footprint: is the temporary or permanent transformation of native ecosystems to support residential, recreational or industrial land uses. Under this definition, human footprint includes the geographic extent of the area under human use that either have lost their natural cover for extended periods of time or whose natural cover is periodically reset to earlier successional condition by industrial activities.

Resource Development Footprint: is a classification of footprint that refers to physical footprint created by an industrial operator for the purposes of resource extraction.

2.0 INTRODUCTION

The Government of Alberta supports establishing disturbance limits as one of the primary mechanisms for managing resource development footprint within the Moose Lake 10km Management Zone (10KMZ). This document, *Standards and Guidelines for Footprint Management in the Moose Lake 10km Management Zone* provides the rationale for, and a summary of, the operational approaches to be used to manage human footprint within the 10KMZ and the regulatory processes required to administer the disturbance limits inside the 10KMZ.

The *Human Footprint Management Guideline for the Moose Lake 10km Management Zone* provides context for development and related regulatory processes and to facilitate sustainable resource management. This framework is a policy document that will be implemented and given legal authority as specified in the regional plan, and through Alberta Environment and Parks' and potentially other departments' mandates and legislation.

Human Footprint is the temporary or permanent transformation of native ecosystems to support residential, recreational or industrial land uses. Under this definition, human footprint includes the geographic extent of the area under human use that either have lost their natural cover for extended periods of time (i.e., cities, roads, agricultural land and surface mines) or whose natural cover is periodically reset to earlier successional condition by industrial activities (i.e., forest harvest areas and seismic lines).[1]

2.1 Application of These Standards and Guidelines

These Standards and Guidelines provide standards and recommended practices for managing footprint in the Moose Lake 10km Management Zone.

Within this document the terminology "shall" and "must" indicates a standard (i.e. disturbance limits within 10KMZ) which is regulation that is binding.; "should" and "may" applies to management practices which are highly recommended and provide direction to land users, decision makers and the Alberta Energy Regulator in their review of resource development applications.

1 Alberta Biodiversity Monitoring Institute, 2017.

3.0 KEY CONCEPTS AND PRINCIPLES

3.1 Cumulative Effects Management and Management Frameworks

The proposed disturbance limit, if approved, would be a meaningful effort by government to address cumulative impacts of resource development. This would be the first application of a 'land disturbance limit' in Alberta related to environmental and traditional land use needs, which also provides opportunity for the development of oil sands resource in that area. Maintaining intact landscapes supports traditional use interests and practices of Indigenous peoples; a key management objective for the 10KMZ.

3.2 Integrated Land Management

Integrated Land Management (ILM) is a strategic, planned approach to restore, manage and reduce human footprint on the landscape. This approach aims to balance values, benefits, risks and trade-offs when planning and managing resource extraction, land use activities, and environmental conservation and management.

Without strategic planning and management, land use activities will often result in damage to the environment and/or conflict among users. The use of ILM, for managing footprint in the 10 km Management Zone facilitates:

- On-the-ground planning that consider past, current, and potential future land and resource demands, cumulative effects, historic uses, and land-use goals;
- New and innovate adaptive approaches to land and resource development are required and these may differ across the landscape;
- Opportunities for meaningful engagement must be provided to potential users of public lands and associated natural resources;
- Timely and comprehensive information sharing is required to ensure all needs, perspectives and relevant data are identified; and
- Successful management of public land depends on the collaborative commitment and actions of all participants.

The use of Integrated Land Management will be required in the 10KMZ, and operators within the 10KMZ must demonstrate the implementation and use of ILM practices throughout the lifecycle of their respective activities and projects. Operators must follow and employ ILM principles such as multi-use corridors, low impact seismic, and shared roads. ILM principles reduce footprint and related pressures on the landscape and biodiversity, therefore provide an opportunity to reduce buffered footprint counted under this disturbance limit.

3.3 Interior Habitat

Habitat loss due to human disturbance is a primary threat to biological diversity. The (draft) Lower Athabasca Region's Biodiversity Management Framework (BMF) recognizes the importance of habitat loss by using the proportion of native habitat outside of and adjacent to human footprint as a central indicator for regional monitoring and management of biodiversity. Human footprint can have impacts on biodiversity beyond the directly impacted site and into the adjacent native vegetation; these impacts are called edge effects. These edge effects are particularly important in Alberta's boreal forest, where the mix of industrial activities produces widespread footprint across the landscape. Although the area directly impacted by human footprint may be low in many regions, little of the remaining native vegetation is distant from these disturbances[2].

Human footprint decreases Interior habitat by creating edge effects that alter predation patterns and competition, and fragment species' habitats. Interior habitat is a tier two indicator established in the BMF, and is defined as the percent of native terrestrial and aquatic cover that is a specified distance from human footprint; this distance is referred to as a buffer. Interior habitat refers to the proportion of native habitat that is distant from (or outside of) the edge effects of human footprint. For a given area, human footprint plus the buffers—referred to as buffered footprint—is the inverse of Interior habitat. The Interior habitat indicator is designed to measure landscape intactness with the underlying intent of managing towards the maintenance of larger areas of contiguous habitat by minimizing human-caused habitat fragmentation.

Landscape intactness can also be considered as one indicator for traditional land use in the sense that it allows larger areas of intact forest to be used by First Nations and Metis communities to harvest and practice traditional land use. In the 10KMZ, a limit will be placed on the total amount of allowable buffered footprint used for industrial resource development purposes. This limit is intended to maintain Interior habitat levels throughout the 10KMZ at a level that will support Alberta's and Fort McKay First Nation's (FMFN) biodiversity and traditional land use objectives for the area.

Interior habitat is calculated as the percent of the area—in this case the 10KMZ—that is beyond a defined buffer distance from human footprint. To ensure the indicator is sensitive across areas with varying levels of human footprint, the buffer is calculated as the average area of a 50 metre and a 200 metre buffer from human footprint (Figure 1; Figure 2). Buffer widths are also reduced for footprint of width under 20 m (i.e. seismic lines), as well as the successional recovery of

2 Recommendations for Habitat Interior and Old-Forest Indicators, Huggard and Kremsater, 2015

human footprint. Buffered footprint refers to the area directly impacted by human footprint (i.e. the physical footprint) as well as the average area of both buffers, and is the inverse of Interior habitat. In the 10KMZ, calculations of areas will be conveyed using hectares (ha). The calculation of buffered footprint is shown below[3]:

$$\text{Buffered Footprint (ha)} = \frac{\text{50m Buffer (ha)+200m Buffer (ha)}}{2}$$

$$\text{Interior Habitat (\%)} = \frac{\text{Total Area (ha) - Buffered Footprint (ha)}}{\text{Total Area (ha)}}$$

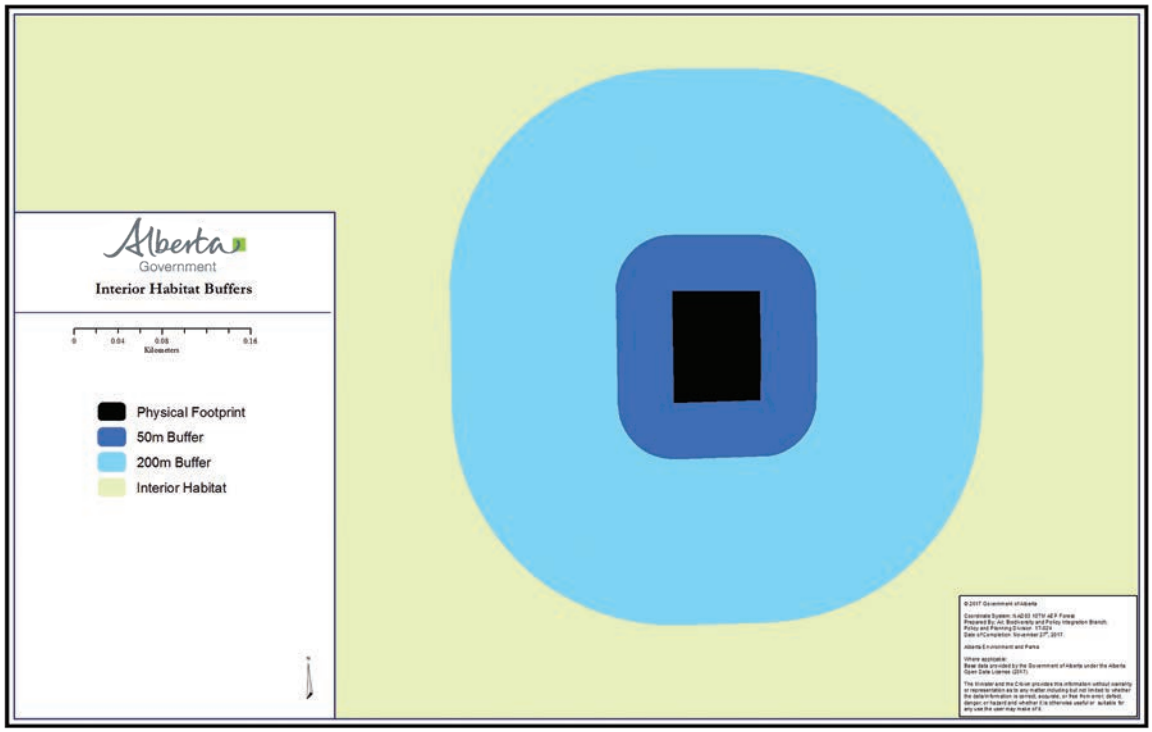


Figure 1 Interior habitat buffers applied to a polygonal feature.

3 Methodology to calculate buffered footprint in ESRI ArcMap (geospatial software program) will be made available to operators within the 10KMZ.

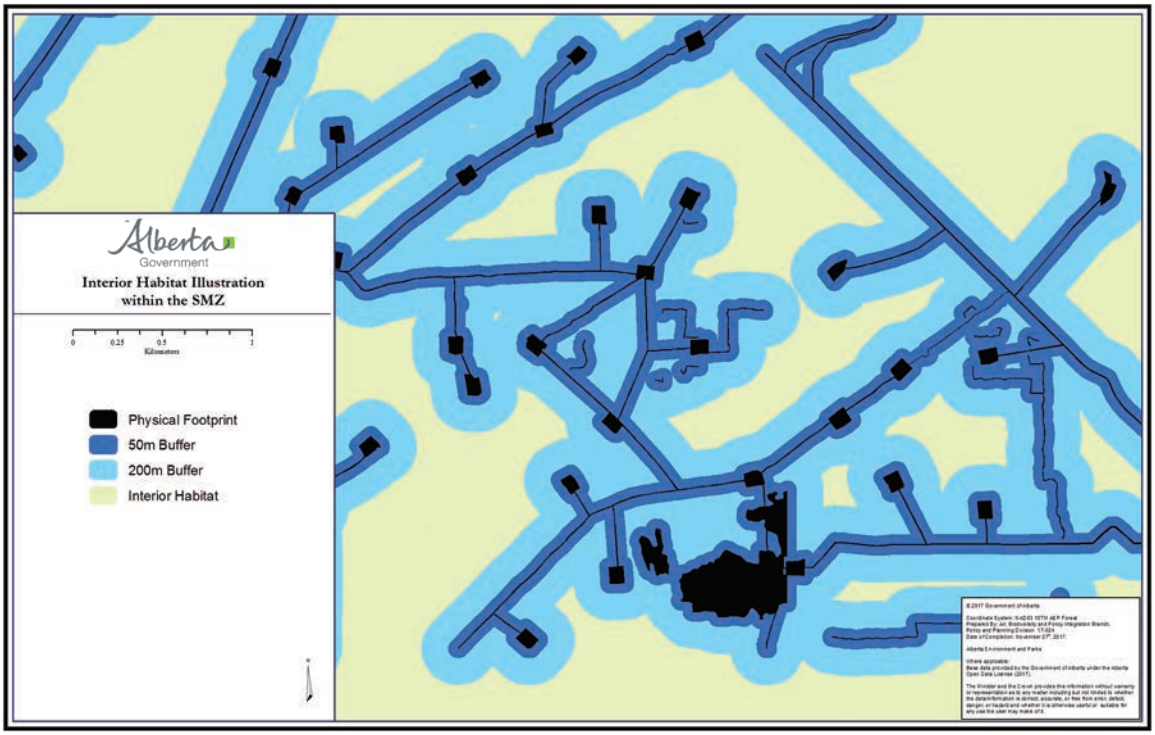


Figure 2 Interior habitat buffers applied to a variety of linear and polygonal features within the 10KMZ.

To determine the adjusted buffers applied to physical footprint of width less than 20m, the following formula applies to the original 50 and 200 metre buffers:

$$\text{Buffer (m)} = 50 * [0.25 + 0.75 * \frac{\text{Footprint Width (m)}}{20}]$$

$$\text{Buffer (m)} = 200 * [0.25 + 0.75 * \frac{\text{Footprint Width (m)}}{20}]$$

4.0 MANAGING INTERIOR HABITAT

The Moose Lake 10km Management Zone is under pressure from a range of activities expected to occur in the area that can be categorized as either non-resource development footprint or resource development footprint as outlined below. Within this plan, non-resource development footprint is exempt from disturbance limit calculations and associated land management strategies, while resource development footprint will adhere to both.

4.1 Non-resource Related Development Footprint

Footprint created as a result of activities not related to resource development (i.e., trails and Indigenous traplines) is minimal within the 10KMZ. The maintenance of existing footprint to support these activities is important for Indigenous communities, such as Moose Lake Trail which is used by Fort McKay First Nation.

It is likely that there are instances of legacy footprint in the 10KMZ that Indigenous communities could use for their traditional land use activities. Therefore, industry is able to consult with Indigenous communities regarding specific access routes that they want to maintain available for use. In these specific situations, the disturbances will not be subject to the disturbance limits, nor counted against the resource development disturbance limits for industrial activities. If an industrial operator is unable to restore legacy footprint being used for these purposes, the operator must submit a summary and the relevant spatial shapefiles to Alberta Environment and Parks (AEP) and Alberta Energy Regulator (AER). AEP may remove the identified footprint from the operator's disturbance limit, up until a limit of 20 per cent buffered footprint—as compared to the operator's limit—has been reached.

a) Non-resource development activities include the physical and functional footprints associated with:

    i. Dispositions issued under the *Public Lands Act* with the exception of the formal dispositions associated with activities listed in Section 4.2 a-c.

4.1.1 Management of Registered Fur Management Area Activity

Trapping is a long-standing activity in Alberta that reflects traditional cultural lifestyles. Registered Fur Management Areas (RFMAs) identify the locations where commercial trapping occurs. Commitments to trappers in the 10KMZ will continue to be honoured. Footprint associated with RFMA activity is minimal and primarily consists of access corridors.

a) RFMA holders within the 10KMZ are not required to operate within the disturbance limits for all resource development footprint.

b) RFMA holders will use existing linear features to access the landscape within the 10KMZ where available.

c) If the creation of new linear features is required, lines must be meandering, under-canopy hand-cut and using tree avoidance techniques (that is, no trees with a diameter at breast height greater than 10 cm to be removed).

4.1.2 MANAGEMENT OF COMMERCIAL RECREATIONAL ACTIVITY

Within the portion of Birch Mountains Wildland Provincial Park that falls within the 10KMZ, is the Namur Lake Lodge; which provides opportunities for recreational fishing in the area. Footprint associated with commercial recreational activity in the 10KMZ is not expected to increase.

a) Commercial and recreational developers with existing crown-issued dispositions within the 10KMZ are not required to operate within the disturbance limits for all resource development footprint.

b) No new commercial and recreational developments will be permitted to occur within the 10KMZ and all rights will be reserved from disposition.

4.2 Resource Development Footprint

Industrial footprint types such as roads, pipelines, and electrical distribution or transmission lines must avoid the creation of new footprint within the 10KMZ; and those disturbances must be re-routed around the 10KMZ. A third-party operator who does not have tenure within the 10KMZ, may only create footprint if it is needed by an operator with the 10KMZ for resource development purposes; in which case the footprint will fall within the operator's disturbance limit. Although not all of the following types of footprint are found, nor would be approved, within the 10KMZ, these are examples of resource development footprint that would be subject to the calculation of disturbance limits:

a) Specified lands, as defined within the Conservation and Reclamation Regulation.

    i. Examples include: wellsites, pipelines, transmission lines, oil production sites, oil sands exploration.

b) Exploration, as defined within the Exploration Regulation.

    i. Examples include: seismic.

c) Forest Harvest Areas, as defined within the *Forest Act*.

    i. Examples include: harvest areas and in block roads.

d) Any other footprint associated with resource development that is not explicitly described here but disturbs the native vegetation and/or soils in the 10KMZ, is also considered to be resource development footprint and will be subject to the disturbance limits.

4.2.1 Management of Oil Sands Activity

Oil sands resource exploration and development is expected to be the main driver of resource development footprint in the 10KMZ. In-situ SAGD development typically disperses throughout large expanses of the landscape and persists on the land for decades. Historical methods of oil sands exploration and development can create a fragmented landscape impacting the biodiversity and ecological integrity of the area, as well as the ability of First Nations to undertake traditional activities and cultural practices in the area. Currently, within the 10KMZ, there has been no actual resource production activity, however the area does show characteristic pre-resource development footprint related to exploration activity including seismic lines, access roads, and exploration wells. Currently, the 10KMZ landscape remains relatively intact and there is currently an opportunity to manage future resource development in a way that will minimize disturbance to the landscape.

As of November 2017 there are 11 oil sands designated representatives with 156 full or partial agreements within the 10KMZ. The expectation is that in situ oil sands development activity will continue, and likely increase, within the 10KMZ as the bitumen resource continues to be developed. Common oil sands in-situ footprint is composed of borrow pits, roads, seismic lines, and well pads. It is expected that footprint types associated with in situ development will comprise the majority of future footprint in the 10KMZ. The following management direction will apply:

a) Oil sands operators with existing mineral agreements within the 10KMZ will be required to operate within the disturbance limits for all resource development footprint.

b) Oil sands operators (designated representatives) with existing mineral agreements within the 10KMZ will receive a calculated operator specific disturbance limit according to the operator's total agreement area within the 10KMZ. When an oil sands agreement holder applies to develop, their applications will have to consider their existing disturbance relative to their proposed disturbance and allocated limit.

    i. Any physical footprint, regardless of available buffered footprint, remains subject to *Oil Sands Conservation Act*, EPEA, and *Public Lands Act* Approvals.

c) All footprints associated with directly, or used indirectly to support, oil sands extraction will be subject to EPEA and *Public Lands Act* Approvals and counted under the operator's disturbance limits.

d) No new oil sands agreements will be issued within the 10KMZ.

4.2.2 Management of Petroleum and Natural Gas Activity

Within the 10KMZ, all active petroleum and natural gas (PNG) operations in the 10KMZ were shut in by the Alberta Energy and Utilities Board's (now Alberta Energy Regulator's) Interim Directive (ID) 99-01. The directive stops any PNG extraction if it is in a position to compromise the extraction of the surrounding bitumen. The operators' agreements have been continued indefinitely, and activities may resume if or when the directive is lifted or the bitumen has been extracted.

PNG activities have the potential to fragment the landscape with long-term persistent footprint in a similar fashion as oil sands activity, through the development of well pads and supporting linear features. The previously active PNG footprint has remained within the 10KMZ and consists of roads, pipelines, and well pads. As of November 2017 there are 5 PNG operators with 23 full or partial agreements in the 10KMZ.

a) PNG operators are required to operate within the disturbance limits for all resource development footprint created within the 10KMZ.

b) PNG operators with existing mineral agreements within the 10KMZ have been allocated a portion of the overall disturbance limits.

c) All suspended PNG pipelines within the 10KMZ will be required to re-establish forest cover on top of the underground pipelines within 5 years of the coming into force of this plan.

    i. Any residual linear corridor must be 2.75m wide or less, with line of sight limited to 50m or less.

    ii. If human or predator access is still possible (insufficient vegetation height and density), access must also be effectively managed on the pipeline corridors, using methods such as berms, woody debris, gates, or another suitable strategy.

    iii. If the above standards are adhered to, any new or existing PNG pipeline footprint under the disturbance limit may be removed.

d) All energy operators with existing roads under a license of occupation (LOC) disposition not used to access suspended PNG well pads must undertake initial reclamation within 5 years.

e) All existing roads under a license of occupation (LOC) disposition used to access a suspended PNG well pad may be modified when oil sands production begins in the area in order to transition to a more optimal road network.

    i. The new optimized access corridor will provide the most efficient access possible to the suspended PNG well pad if required by the PNG operator.

f) Existing PNG agreements will be honoured within the 10KMZ, and development for existing agreements may proceed when the Directive is lifted in alignment with established disturbance limits.

g) No new PNG agreements will be issued within the 10KMZ.

4.2.3 Management of Geophysical Exploration Activity

All resource development footprint types are counted and buffered under the disturbance limit, according to the BMF methodology, with the exception of low impact seismic. Low impact seismic footprint is not counted under the limit due to expectations that the disturbance will recover naturally, except for when it occurs in a bog or a poor fen ecosite. If seismic is required within a bog or a poor fen ecosite, hand-cut practices must be employed as described below.

Improvements in geophysical exploration methods over the past decades have been important for minimizing disturbance. Historical methods of obtaining seismic data included creating line widths of 4 metres or greater, vegetation removal, and top soil removal or compaction. Current practices generally employ low impact techniques, with narrower line width and reduced effects on vegetation and top soil. Therefore, for the purposes of not adding human footprint to the disturbance limit, all future geophysical seismic programs within the 10KMZ must adhere to the following standards:

a) Where existing disturbances occur (i.e. clearings and cleared lines with vegetation heights less than 1 metre in height and within 200 metres of proposed seismic program line), the creation of new lines is prohibited, and the existing lines must be reused.

b) Where existing disturbances are not available, new clearings must adhere to the following standards:

   i. Receiver lines must be meandering, under-canopy hand-cut and using tree avoidance techniques (that is, no trees with a diameter at breast height greater than 10 cm to be removed). Receiver lines must not be spaced closer than 200 metres apart.

   ii. Source lines not within a bog or a poor fen ecosite must be meandering and may not exceed 2.75 metres in width and employ tree avoidance techniques to limit line of sight to less than 50 metres. Source lines must be at least 200 metres from each other.

   iii. Source lines within a bog or a poor fen ecosite must be meandering, under-canopy hand-cut and using tree avoidance techniques (that is, no trees with a diameter at breast height greater than 10 cm to be removed). Source lines within a bog or a poor fen ecosite must not be spaced closer than 200 metres apart.

   iv. Doglegs must be employed at all intersections with other linear features to limit line of sight.

   v. Existing source or receiver lines that do not meet the specified criteria above, must employ the above practices for any future geophysical seismic activities, using the same lines, to ensure no additional vegetation

is impacted and partial recovery is given the opportunity to occur. If the above standards are adhered to, any new or existing low impact seismic footprint under the disturbance limit may be removed.

c) Vehicles employed in seismic exploration will have a low ground pressure configuration.

d) Shrub and tree regeneration on existing lines must be protected through avoidance techniques.

e) Mulching techniques must not be used.

f) Helipads must use natural open areas or existing clearings where available. If helipads are prepared, they must not exceed 35 metres in diameter.

g) Heli-portable programs must have shot hole drop zones no greater than 4 metres in diameter.

4.2.4 Management of Forestry Activity

Forest management activities have evolved over many decades with an array of strategies, from multiple pass harvesting system (to minimize opening size and spread disturbance across the landscape over many decades) to current practices that emphasize the use of natural disturbance patterns. Current forest management practices take into account non-timber values, such as wildlife habitat, watershed integrity, and soil productivity. Future forest harvesting within the 10KMZ will take a similar approach as described in *Alberta's Draft Provincial Caribou Range Plan* and focus on localizing forestry activities to minimize the overall extent of forestry-related disturbance, which helps create larger patches of intact habitat as the forest regrows, and attempts to emulate natural disturbances. Aggregating harvest areas further reduces the amount of access required during any given timeframe and therefore increases Interior habitat – with potential benefits of reducing construction and maintenance costs.

The 10KMZ is not considered to contain high volumes of merchantable timber and has also been subject to significant fire activity in recent decades. Forest harvesting activities are not expected to place significant pressures on the landscape with the 10KMZ for the foreseeable future. Forest harvesting inside the 10KMZ will be deferred for 30 years with a 10-year review period after plan implementation to review potential areas for small eco-based harvesting operations that may benefit moose browsing habitat or support other traditional uses. This deferral will help resource development footprint to be managed within the 10KMZ without any significant impact from harvesting activities. Current levels of physical footprint within the 10KMZ that have been created as a result of forestry activity is considered to be relatively low. Alberta-Pacific Forest Industries (AlPac) is the Forest Management Agreement (FMA) holder in the 10KMZ, which also includes one quota holder for coniferous timber (Northland Forest Products).

a) Forest harvesting inside the 10KMZ will be deferred for 30 years with a 10-year review period after plan implementation to review potential areas for small eco-based harvesting operations that may benefit moose browsing habitat or support other traditional uses.

b) After the 30-year deferral, forestry activity will be required to operate within the disturbance limits for all resource development footprint created within the 10KMZ.

c) Forestry operators with existing FMAs or Quotas within the 10KMZ have been allocated a portion of the overall disturbance limits.

d) Forestry activity will adhere to eco-based sustainable forestry practices based on best available science at the time.

e) Forestry operators must use existing linear corridors to access the resources where available, and use winter roads to access areas outside of existing linear corridors.

4.2.5 Management of Coal, Metallic and Industrial Minerals Activity

Coal and metallic and industrial minerals (MIMs) agreements are not present within the 10KMZ, as such there has not been, nor is there expected to be, any footprint created within the 10KMZ for the purposes of extracting coal or MIMs.

a) No new coal or MIMs extraction activities will be permitted to occur within the 10KMZ and all rights will be reserved from disposition.

4.2.6 Management of Sand and Gravel Actvitiy

Exclusive of the roads they require, sand and gravel operations have a relatively small disturbance footprint compared to other industrial users and are generally located in association with the industrial developments they service. Existing sand and gravel agreements will be honored, and sand and gravel extraction will follow approval processes and requirements in place at the time of surface approvals.

Current levels of physical footprint created as a result of aggregate extraction within the 10KMZ, including sand and gravel is negligible. This activity within the 10KMZ is expected to be primarily associated with the industrial footprint used for oil sands extraction. There are currently two Surface Material Leases (SMLs) for sand and gravel extraction in the 10KMZ, held by the same operator.

a) Sand and gravel operators are required to operate within the disturbance limits for all resource development footprint created within the 10KMZ.

b) Sand and gravel operators with existing agreements within the 10KMZ have been allocated a portion of the overall disturbance limits.

c) Existing sand and gravel agreements will be honored, and sand and gravel extraction will follow approval processes and requirements in place at the time of surface approvals.

d) No new sand and gravel extraction activities will be permitted to occur within the 10KMZ and all rights will be reserved from disposition.

4.2.7 Management of Peat Activity

Alberta has completed a directive entitled the *Allocation and Sustainable Management of Peat Resources on Public Land*. This directive identifies no further allocation of peat resources within caribou ranges. Peat agreements are not present within the 10KMZ, as such there has not been, nor is there expected to be, any footprint created within the 10KMZ for the purposes of extracting peat. Considering that most of the 10KMZ falls within a caribou range, the management direction within the directive will apply across the entire 10KMZ.

a) No new peat extraction activities will be permitted to occur within the 10KMZ and all rights will be reserved from disposition.

4.2.8 Management of Transmission Lines

Transmission Lines carrying high voltage from generating facilities to substations are distinguished from lower voltage distribution lines that provide electrical service to customers and would be required to support operational activities within the 10KMZ. There are currently no transmission lines within the 10KMZ however, distribution lines may be required in order to support oil sands or PNG extraction within or surrounding the 10KMZ. The management direction for planning and routing distribution lines will follow optimized corridors to minimize creating additional footprint within the 10KMZ.

a) No new transmission lines will be permitted to occur within the 10KMZ and all rights will be reserved from disposition.

b) Distribution lines servicing oil sands or PNG extraction activities within the 10KMZ will use optimized access corridors and be required to follow ILM principles to avoid creation of additional footprint.

5.0 DISTURBANCE LIMIT

The current Interior habitat in the 10KMZ is 86.5 per cent and a proposed 1.5 per cent decrease (based on a Co-Lead recommendation of between 1 and 2 per cent) is allowed before the disturbance limit is reached, which would bring the 10KMZ to 85.0 per cent Interior habitat. The lakes, parks, and reserves are currently at 93.5 per cent Interior habitat with the assumption that this will not change as resource development footprint is not expected to be added in this zone. The mixed use area is currently at 80.6 per cent Interior habitat and this will decrease to 77.8 per cent if the limits are reached; assuming all new resource development footprint occurs within this area. Due to the fact that the mixed use area is slightly over 50 per cent of the 10KMZ as a whole, this means that the mixed use area can decrease by about 3 per cent when the 10KMZ's interior habitat value as a whole is considered.

The buffered disturbance limit within the 10KMZ is calculated to be 15,537 ha. Therefore, the buffered footprint limit for the mixed use area will be 12,471 ha.

The 10KMZ has a total land base of 103,565 ha and is divided into the "mixed use" (56,203 hectares), and the "lakes, parks, and reserves". For resource development footprint management purposes, the mixed use area is described as the crown lands with the 10KMZ that are outside of the park, but also includes the sub-surface area that has been sold under Alberta Energy's tenure system beyond the boundary of crown lands within the 10KMZ. The lakes, parks, and reserves not overlying agreement areas compose the remainder of the 10KMZ and comprise 47,362 hectares (Appendix 1).

The 10KMZ is currently composed of 86.5 per cent Interior habitat. The proposed disturbance limit for the 10KMZ permits up to 1.5 per cent of additional buffered footprint to occur; which would limit Interior habitat levels from falling below 85.0 per cent (i.e. a 1.5 percent decline in Interior habitat). The reduced potential for loss was designed to keep the area intact and capable of sustaining both biodiversity and traditional land use. Assuming a small amount of new footprint may occur in Birch Mountain Wildland Park, most of the new buffered footprint will occur on the Public Lands within the 10KMZ (Table 1). Buffered footprint (human footprint and the buffers defined by the Interior habitat metric) is the inverse of Interior habitat, and is how the disturbance limit will be implemented.

Table 1 Current state of Interior habitat and buffered footprint within the 10km Management Zone and mixed use area, as well as the proposed disturbance limits calculated using a 1.5 per cent interior habitat decrease (based on the Co-lead recommendation of between 1 and 2 per cent).[4]

		10 km Management Zone		Mixed Use Area	
		Hectares (ha)	Per cent	Hectares (ha)	Per cent
Total Area		103,565	100%	56,203	54%
Current State	Interior Habitat	89,581	86.50%	45,285	80.57%
	Buffered Footprint	13,984	13.50%	10,918	19.43%
Disturbance Limit	Interior Habitat	88,028	85.00%	43,732	77.81%
	Buffered Footprint	15,537	15.00%	12,471	22.19%

5.1 Buffered Footprint Distribution

Footprint allocations by sector are designed to apportion buffered footprint limits to specific sectors or operators to enable independence in their operations. As the majority of the buffered footprint within the 10KMZ is expected to come from oil sands activity, the oil sands operators have been allocated the majority of the available buffered footprint. PNG, forestry, and sand and gravel have also been allocated portions of the available buffered footprint. The buffered footprint allocations by sector are described below (Table 2). Other sectors not mentioned above, or those who do not have tenure or crown-issued dispositions within the 10KMZ, are not allocated buffered footprint and therefore not permitted to create resource development footprint within the 10KMZ.

Oil sands operators have been allocated operator-specific amounts of buffered footprint based on total agreement size. These limits are derived from a 1.5 per cent decrease in the current condition of Interior habitat throughout the 10KMZ which would give each oil sands operator a 20.7 per cent buffered footprint limit before the limits are reached; which is the inverse of 79.3 per cent Interior habitat (Table 2). The 20.7 per cent buffered footprint available to each operator translates into hectares by calculating 20.7 per cent of the total size of the operator's sub surface agreement holdings within the 10KMZ. The formula for determining total hectares of allowable buffered resource development footprint for oil sands operators is below.

$$\text{Allowable Buffered Footprint (ha)} = \text{Total Agreement Area (ha)} \times 0.2072$$

PNG operators with agreements in the 10KMZ have been allocated buffered footprint based on existing footprint; assuming PNG activity will not expand in the near future. Forestry operators with quotas or the FMA have been allocated buffered footprint based on existing and projected future harvest areas. Sand and gravel operators with existing crown-issued dispositions in the 10KMZ have been allocated buffered footprint based on the disposition and access. Other

4 Draft numbers may not fully balance due to rounding and are subject to change.

resource development footprint not related to those identified above have not been allocated buffered footprint, however could be assessed in the future based on their capacity to operate within the 10KMZ's disturbance limit.

Table 2 Distribution of proposed buffered footprint within the 10KMZ.[5]

Sector	Buffered Footprint Allocation (ha)	Buffered Footprint Allocation (per cent of whole)
Forestry[5]	738	~6%
Oil Sands	11,204	~90%
Petroleum and Natural Gas	200	~2%
Sand and Gravel	330	~3%
Total	12,471	100%

5.2 Buffered Footprint Accounting

The 10KMZ contains existing footprint and potential future footprint from multiple operators and a variety of sectors. In order to account for the spatial distribution, potential overlap, and ownership of this footprint, the following rules will apply to attribute footprint to operators under the buffered footprint disturbance limit within the 10KMZ:

a) Oil sands operators with agreements in the 10KMZ are accountable for the following footprint under the disturbance limits:

   i. Legacy seismic lines (e.g. 2-D), cutlines, and trails—not under disposition by another operator within the 10KMZ—within the boundaries of the operator's sub-surface agreement;

   ii. Public Lands dispositions within the 10KMZ attributed to the operator;

   iii. Exploration footprint within the 10KMZ attributed to the operator; and

   iv. Specified lands as within the 10KMZ attributed to the operator.

b) PNG operators with agreements in the 10KMZ are accountable for the following footprint under the disturbance limits:

   i. Public Lands dispositions within the 10KMZ attributed to the operator;

   ii. Exploration footprint within the 10KMZ attributed to the operator; and

   iii. Specified lands within the 10KMZ attributed to the operator.

5 Draft numbers may not fully balance due to rounding and are subject to change.
6 Distribution of buffered footprint for forest harvesting will be re-evaluated after the deferral period as SAGD resource development in this area will be in a more mature phase where redistribution of footprint can be considered.

c) Forestry operators with quotas or the FMA in the 10KMZ are accountable for the following footprint under the disturbance limits:

   i. Legacy seismic lines, cutlines, and trails—not under disposition by another operator within the 10KMZ—within the boundaries of the 10KMZ's untenured crown lands; and

   ii. Forest harvest areas and related roads within the 10KMZ attributed to the operator, and not overlapped by existing buffered footprint.

d) Sand and g`ravel operators with existing crown-issued dispositions in the 10KMZ are accountable for the following footprint under the disturbance limits:

   i. Public Lands dispositions within the 10KMZ attributed to the operator.

e) Overlapping buffers from different operators will be accounted for through a reduction in buffered footprint equal to the amount of overlap divided evenly between the amount of overlapping operators.

5.3 Recovery Milestones

Resource-development footprint buffers will be reduced (i.e. discounted) in phases if the operator meets specified criteria for restoration or reclamation; called "Recovery Milestones" This will create room for new buffered footprint within an operator's disturbance limit. Achievement of recovery milestones will be based on specific and delineated areas where restoration/reclamation success is demonstrated and documented.

The intent of the Recovery Milestones is to provide clear check-points during stages of the successional recovery of human footprint, which will ultimately lead to full recovery. The milestones are designed to ensure that any re-established vegetation is on the trajectory to be considered as equivalent to the adjacent vegetation thereby eventually eliminating footprint and edge effects. The incentive for operators is to obtain the buffer reductions around any reclaimed or restored physical footprint associated with achieving the criteria specified in the milestones, in order to make room for additional buffered footprint they may require for resource development.

Conceptually, buffers will be reduced by a fixed amount per milestone once all of the criteria associated with each Recovery Milestone have been met. As a first step, draft Recovery Milestones for legacy seismic lines have been defined (Appendix 3). These are consistent with Alberta's draft *Provincial Restoration and Establishment Framework for Legacy Seismic Lines in Alberta*, and it is intended that operators would follow the planning, monitoring, auditing, and documentation procedures found in this framework. Each operator would be able to use any reductions in buffered footprint resulting from seismic line restoration activities to increase their available disturbance in accordance with the detailed provisions specified below. Once the physical footprint meets the criteria established under any of the four milestones, the

operator is required to submit documentation verifying this, prior to receiving any additional buffered footprint credit or receiving regulatory approval. This documentation must adhere to the requirements and guidelines outlined in the (draft) *Provincial Restoration and Establishment Framework for Legacy Seismic Lines in Alberta*. For legacy seismic lines, the physical footprint will be removed upon meeting criteria in the final Recovery Milestones as noted in appendix 3 (Draft Recovery Milestones for legacy seismic lines).

Recovery milestones for activities described under specified lands (for which reclamation certificates under the Conservation and Reclamation guidelines are required prior to discounting of physical footprint) will be developed and may be tailored for different types of resource development footprint. The TAC will develop these in collaboration with industry as part of plan implementation. Recovery milestones may need adjustment to reflect findings from monitoring programs and/or periodic reassessment of the efficacy of this Plan to achieve its intended objectives. Until this development is completed, the Recovery Milestones for legacy seismic lines can be used.

When undertaking restoration on physical footprint where the buffered footprint is split among parties for ILM purposes, or for overlapping buffers in general, the proponent may only receive credit for the total buffered footprint removed when factoring in another operator's remaining footprint. For example, if one operator restores a road beside another operator's active pipeline, buffered footprint received as credit for the restoration work would be reduced to factor in the buffer around the active pipeline. This will ensure that any buffered footprint credits reflect actual reductions in edge effects, or improvements in Interior habitat, as experienced on the ground.

5.4 Conservation Offsets

A conservation offset is a tool that enables industry to offset adverse effects of their activities and development by supporting conservation efforts on other lands. Within the 10KMZ, there are two applicable eligible actions for conservation offsets specified in the (draft) *Framework for Designing Conservation Offset Programs in Alberta*: restoration and reclamation of disturbances; and conservation and protection of habitat at risk of loss or degradation. Operators within the 10KMZ who have reached their disturbance limit and require additional buffered footprint must offset the additional disturbance through one of the following actions, in order of the hierarchy listed below:

a) Restore or reclaim any buffered footprint for which the operator is accountable for managing, as described under the Buffered Footprint Accounting section above;

b) Refinement of existing development scheme to reduce footprint requirement (including further use of Integrated Land Management Tools);

c) Other available options include:

- Restore or reclaim any buffered footprint in Birch Mountains Wildland Provincial Park;
- Obtain additional allowable buffered footprint from another operator within the 10KMZ.

If an operator undertakes any of the actions identified above, the operator will generate an "offset credit" in the form of hectares of buffered footprint, which can enable additional buffered footprint to be created by discounting the buffered footprint held by an operator. In order to maintain Interior habitat levels throughout the 10KMZ, offset credits may only be generated based on the reduction in buffered footprint that occurs after achieving the specified criteria in the recovery milestones. All offsets occurring within the 10KMZ are subject to approval by, and must be documented to, AEP and AER for monitoring and reporting purposes; and in order to receive regulatory approval with the offset credits. For purposes of tracking and monitoring overall footprint disturbance within the 10KMZ, the TAC will also be provided information related to offset credits.

If an operator wishes to restore human footprint in Birch Mountains Wildland Provincial Park, the operator must submit a request to AEP to do so. Any offset credits generated from restoring the legacy disturbances in the park could be applied to the operator(s) who undertake the restoration activities. There are approximately 2,000 hectares of buffered footprint in the park, which could potentially be available for restoration. Operators may also obtain or purchase additional buffered footprint credits from other leaseholders within the 10KMZ. Operators within the 10KMZ who have been allocated buffered footprint may trade buffered footprint credits to other operators who have been allocated buffered footprint, or to third parties. In order to allow offset credits to be generated, the operator selling the credits must have a surplus of buffered footprint when factoring in the footprint the operator is accountable for, relative to the operator's disturbance limits. Following an exchange, the operator selling offset credits would subsequently forfeit the ability to use the traded buffered footprint originally allocated for their own purposes.

6.0 ROLES AND RESPONSIBILITIES

6.1 Policy and Regulatory

6.1.1 Alberta Energy Regulator Role - Review of Project Applications and Disturbance Limits

Oil Sands developers applying for projects within the 10KMZ will be required to submit their project scheme and footprint to the Alberta Energy Regulator who will, as part of their comprehensive project application review process, assess the proposed project against available footprint for that operator.

The Regulator, using available information from a standardized database will review current footprint, proposed footprint and available footprint specific to the applying agreement holder's aggregate agreement holdings within the 10km Management Zone. That information will be used in assessing whether a development scheme can meet the required disturbance limit for that operator.

An operator that does not have the available footprint will be unable to receive Regulatory approval for that project and must consider other alternatives to access and develop the oil sands resource.

6.1.2 Alberta Environment and Parks

Alberta Environment and Parks will be the lead department in plan implementation including tracking, monitoring and reporting on buffered footprint across all sectors. Additional roles will include but not limited to:

- Tracking conservation offsets
- Participating in the Technical Advisory Committee
- Plan review and evaluation

6.1.3 Alberta Energy

Alberta Energy mirrors notation in the Alberta Mineral Information system to ensure sub-surface and surface requirements are aligned, and that the Alberta Energy Regulator has access to the most current information to make regulatory decisions.

6.2 Surface and Sub-surface Agreement Holders

6.2.1 Agreement Holders

Each operator will be required to annually track and report disturbance footprint for the purposes of evaluating Interior habitat. Operators will also be required to maintain records and track any disturbance credit trading that may take place with other agreement holders in the 10KMZ.

This information will be used to advise the Alberta Energy Regulator and other decision-making bodies in their review and evaluation of all new applications.

6.3 Moose Lake Technical Committee

- Review the interior habitat/land disturbance limits and their implementation, in conjunction with monitoring programs, and if required, make recommendations to GOA on refinements and/or adjustments to the disturbance limits, and standards and guidelines and to AER on implementation.
- Develop culturally relevant reclamation criteria and reclamation certification criteria, indicators, practices and end land use goals.
- Advise on areas of priority reclamation and end reclamation goals within the Birch Mountains Wildland Park and remainder of the 10KMZ .
- Recommend funding for projects and activities to support implementation of the 10KMZ plan such as habitat enhancement measures, studies and research within the 10KMZ .

7.0 MONITORING AND REPORTING

Calculations for the current state of Interior habitat within the 10KMZ were derived from an ArcGIS shapefile that pulled from multiple sources to ensure the information was the most current available. ABMI's 2012 Human Footprint Inventory of Alberta was used as the base assessment and was merged with Alberta Environment and Parks' DIDs Plus dataset. The dataset was then merged with GreenLink Forestry Inc.'s Moose Lake Access Management Plan Linear Footprint Inventory, which was developed for this plan. The output of the previous mergers was then enhanced by digitizing any additional footprint that was visible through Planet Labs Geomatics Corp.'s 2015 SPOT6 Imagery.

Industry is responsible for updating the current state of resource development footprint and legacy footprint in their agreement areas, as well as any footprint belonging to the operator within the 10KMZ. Any restoration undertaking by an operator must also be tracked and reported by the operator. Current amounts of buffered footprint are to be submitted by an operator as a condition of an approval under the *Public Lands Act* or *Environmental Protection and Enhancement Act*; along with the corresponding ArcGIS shapefiles. Alberta Environment and Parks and the Alberta Energy Regulator will report on the current levels of Interior habitat and buffered footprint throughout the 10KMZ on an annual basis.

7.1 10KMZ Data Cooperative

The governance for the 10KMZ Data Cooperative is set out through the 10KMZ Management Plan. The 10KMZ Data Cooperative would be a subcommittee of the 10KMZ Technical Advisory Committee.

A data cooperative for the 10KMZ will serve as the repository for regulatory (once submitted) and community based monitoring data. Data collected through these programs will be required to be open, transparent and publically accessible. The role of the 10KMZ Data Cooperative can include, but is not limited to the following:

- Management and collection of data from permanent sampling plots established within reclamation treatment areas;
- Supporting operator based regulatory-based monitorint and/or assessment programs; and,
- Other identified roles.

7.2 Baseline Data

Planning, reporting, and monitoring data collected and reported as part of an approved activity or monitoring program will be required to be open, transparent and publically accessible.

The baseline dataset used in the development of the 10KMZ Management Plan was developed through the integration of a number of different datasets including: data from the GreenLink Linear Footprint Inventory of the Moose Lake Access Management Plan; Alberta Human Footprint Monitoring Project and AEP's Digital Integrated Dispositions (DIDs) Plus; and, manually digitized visible footprint using 2015 SPOT6 satellite imagery. This dataset was used to determine the current state of Interior Habitat within the 10KMZ.

Operators did not submit any physical footprint data to supplement or verify the baseline footprint data compiled above. As a result, the baseline footprint is comprised of primarily visual interpretations or estimates of actual interpretation of disturbance boundaries, and may not accurately reflect the actual physical footprint boundaries created by the activity. This dataset will serve as the baseline dataset for the physical footprint present in the 10KMZ as of the date this plan is implemented.

7.3 Monitoring

Monitoring will be a key component to the sustainable implementation of this management plan. Monitoring within the 10KMZ will consist of a combination of community-based and regulatory-based monitoring programs.

These programs will also include the establishment of permanent sampling plots representative of reference conditions and various reclamation treatments and to track reclamation success and milestones.

Coordination of the community-based monitoring program developed for the 10KMZ should be one of the tasks and outcomes delivered through the Data Cooperative.

7.4 Reporting

Upon implementation of this plan, the accuracy of the physical footprint data reported within the 10KMZ will improve. As a result, it should be noted that early on in the Plan, there will likely be differences in physical footprint values which need to be accounted for.

Upon implementation of the Plan, disposition and approval holders will be required to report any physical footprint created as a result of their activity on a frequency defined within the conditions of their disposition, or approval.

7.4.1 Frequency

Operators holding dispositions and/or EPEA approvals are responsible for the ongoing reporting of the planned, physical and functional footprint occurring within the boundary of their agreement area (i.e., Sub-Surface Mineral Lease(s)); this can include planned, physical, and functional footprint created by other operators.

Operators within the 10KMZ must use the Reclamation Information System (RIS) for reporting of their activities. Operators must provide this information as part of one or more of the following (which ever occurs most frequently) reporting events:

- Application for a new or, renewal of an existing,
    - Public Land Disposition (*Public Lands Act)*; or,
    - Approval under EPEA or the *Water Act*.
- Annual reporting of conservation and reclamation activities under an EPEA Approval;
- Application to cancel a Public Land Disposition (*Public Lands Act*); or,
- Reclamation Certificate Application (EPEA Approval).

7.4.2 Format

Operators within the 10KMZ must use the Reclamation Information System (RIS) for their annual reporting of their activities. Operators should use the following sources of data as a baseline for the cumulative footprint within the 10KMZ:

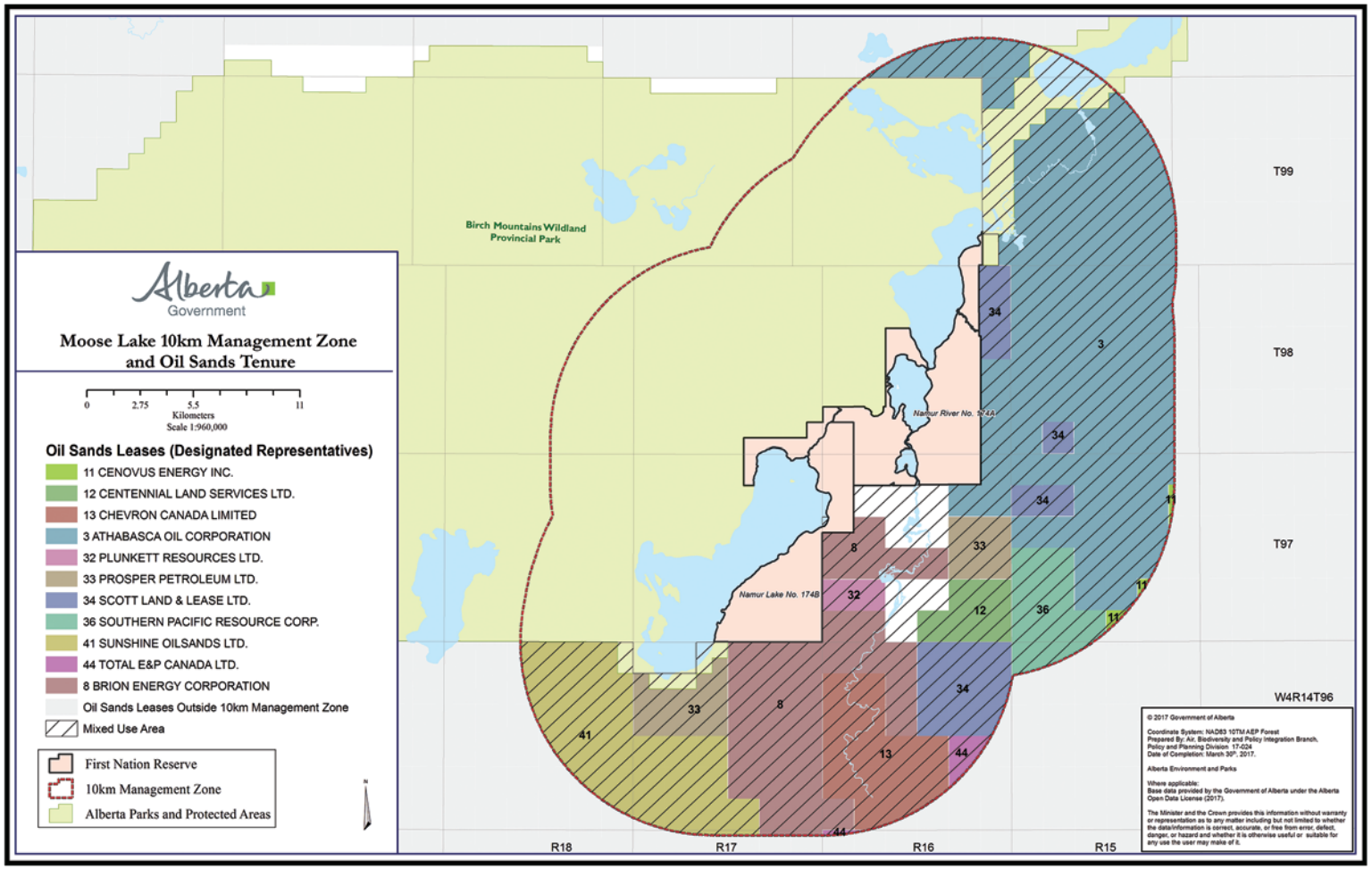
- Most current version the Alberta Human Footprint Inventory layer produced by the Alberta Biodiversity Monitoring Institute;
- Data from the Alberta Human Footprint Management Project (AHFMP); or,
- Footprint data released by the Government of Alberta for the 10KMZ.

Reports must contain the following information:

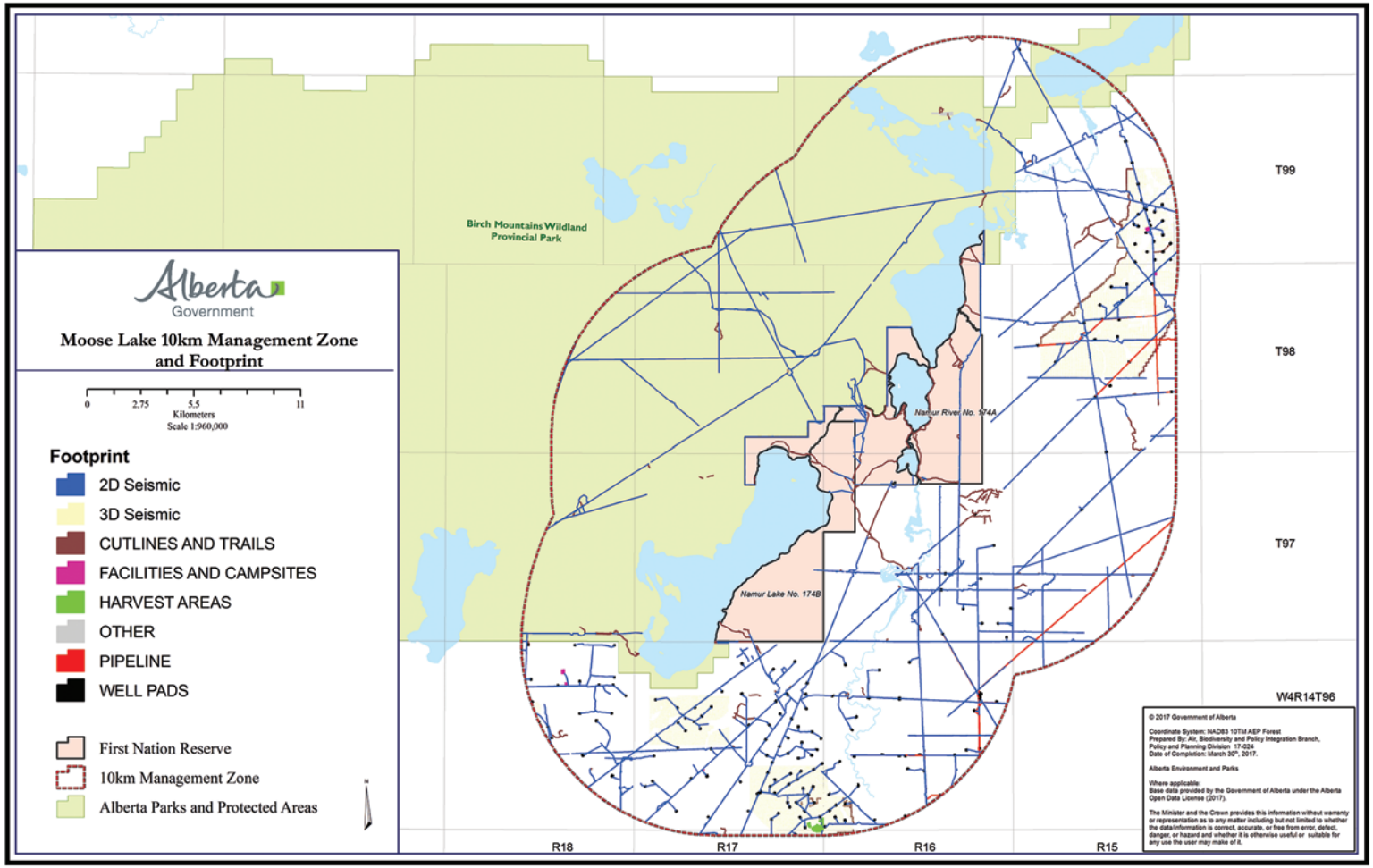
- The operators existing combined footprint plus, any new combined footprint created by the operator for the current year;
- The planned combined footprint expected to be created by the operator for the following year; and,
- The cumulative footprint for the area for the current year.
- Status of the cumulative footprint relative to the disturbance limits defined in section 5 for the 10KMZ;

- Status of the Interior Habitat relative to the allowable Interior Habitat limits defined in section 5 for the 10KMZ;
- Descriptions of any conservation and reclamation activiites that have or are being implemented;
- Description of any input that was sought from FMFN on on cultural values, traditional land uses and other community-specific knowledge to identify priorities; and,
- Description, including list of collaborating partners, of any demonstrable integrated land and footprint management activities that have or are being implemented.
- Description of any partnership/collaboration agreements with respect to any demonstratable integrated land and footprint management activities that have, or are being implemented.

Appendix 1 – Moose Lake 10KMZ Oil Sands Tenure



Appendix 2 – Current Footprint in the 10KMZ



Appendix 3 – Draft Recovery Milestones for Legacy Seismic Lines

- Metrics within "Treed Sites" and "Natural Recovery" are established in the draft Provincial Restoration and Establishment Framework for Legacy Seismic Lines in Alberta. The Framework provides additional details on monitoring, reporting, and evaluating success that operators will be required to follow; the above table is for summary information only.
- The physical footprint is removed upon meeting the criteria under Milestone #4 for non-specified lands under the Environmental Protection and Enhancement Act (EPEA).
- When restoring or reclaiming human footprint in the 10KMZ, the type of vegetation used must match the adjacent vegetation.
    - Sites restored or reclaimed with treed vegetation must be re-established with similar treed species; and
    - Sites restored or reclaimed with non-treed vegetation must be re-established with similar non-treed species.

	Milestone #1 **25 per cent Buffer Reduction**	**Milestone #2** **50 per cent Buffer Reduction**	**Milestone #3** **75 per cent Buffer Reduction**	**Milestone #4** **100 per cent Buffer Reduction and Physical Footprint Removal**
Treed Sites (planted)	**Initial Treatment** (0 years) • Initial treatment (determined by professional) is planned, with engagement of Fort McKay First Nation • Initial treatment completed and documented • Access is effectively restricted on linear features, with documentation	**Survival Survey (2-5 years)** • 70 per cent survival of winter-planted trees • 80 per cent survival of summer-planted trees • 4,000–5,000 stems/ha of seeded or naturally regenerated trees in upland and transitional or lowland treed sites • 2,500–4,000 stems/ha of seeded or naturally regenerated acceptable trees in upland dry or lowland low density treed sites	**Intensive Establishment Survey (6-10 years)** • Tree species match adjacent stand type • <10 per cent of sites have human access • >70 per cent stocking of acceptable tree species with no less than 50 per cent stocking on each side of line in upland and transitional or lowland treed sites >50 per cent stocking of acceptable tree species or stocking at levels that can achieve adjacent stand density, with no less than 40 per cent stocking on each side of line in upland dry or lowland low density treed sites	**Canopy Closure Survey** • Height of 3.0 metres has been achieved

	Milestone #1 25 per cent Buffer Reduction	Milestone #2 50 per cent Buffer Reduction	Milestone #3 75 per cent Buffer Reduction	Milestone #4 100 per cent Buffer Reduction and Physical Footprint Removal
Non-treed Sites (planted)	**Initial Treatment (0 years)** • Initial treatment (determined by professional) is planned, with engagement of Fort McKay First Nation • Initial treatment completed and documented • Access is effectively restricted on linear features, with documentation	**Survival Survey (2-5 years)** • Composition of woody/shrub and herbaceous species are comparable to adjacent vegetation • Heights of comparable shrub and forb species are at least 50 per cent of the adjacent vegetation	**Establishment Survey (6-10 years)** • Composition of woody/shrub and herbaceous species are comparable to adjacent vegetation • Heights of shrub and forb species are at least 75 per cent of the adjacent vegetation	**Canopy Closure Survey** • Composition of shrub and forb species are comparable to adjacent vegetation • Heights of shrub and forb species are equal to the adjacent vegetation
Natural Recovery	**Regeneration Verification** • Validation and documentation that site meets criteria for advanced regeneration, i.e. does not require treatment for successful recovery • Access is restricted on linear features, or verification that there are pre-existing access restrictions, that eliminate human access and protect the advanced regeneration (must be documented)	**Survival Survey** • Not applicable	**Establishment Survey** • >70 per cent coverage of species that are capable of reaching a height of 5.0 metres with no less than 50 per cent coverage on either side of the line • <10 per cent of sites have human access	Canopy Closure Survey • Height of 3.0 metres has been achieved

Appendix B: Air Quality Targets

Table 1. Air Quality Monitoring at the Moose Lake Reserves

FMFN will be locating and operating a continuous ambient air monitoring station, at the southern end of the Moose Lake Reserves. The parameters to be analyzed will include:

Continuously monitored parameters:

- Sulphur Dioxide (SO2),
- Nitrogen Oxides (NOX) (NO2 – nitrogen dioxide & NO – nitric oxide),
- Hydrogen Sulphide (H2S),
- Ozone (O3),
- BTEX (benzene, toluene, ethyl benzene and xylene), and
- Particulate Matter < 2.5µm in diameter (PM2.5).

Meteorological Parameters:

- Wind speed,
- Wind direction,
- Relative Humidity, and
- Temperature.

Possible Integrated monitored parameters (under consideration for possible future inclusion):

- Volatile Organic Compounds (VOCs),
- Reduced Sulphur Compounds (RSCs),
- Polycyclic Aromatic hydrocarbon (PAH)s,
- PM2.5 & PM10 composition,
- Ion exchange resin sampling,
- Passive sampling (SO2, NO2, O3, Ammonia (NH3) & Nitric Acid (HNO3)), and
- Precipitation (amount and composition).

Table 2. Interim Moose Lake Reserve Ambient Air Quality Targets ("MLRAAQT")

Parameter	Interim MLRAQT (ppb except $PM_{2.5}$ which has units µg/m³)		
NO_2	15	N/A	2
PM2.5 (these limits exclude wildfire events and on-reserve activities)	15	10	4
SO_2	15	8	1
TRS	0.75	N/A	0.4
THC	2.1	N/A	1.9

Table 3. Special Management Zone Perimeter Ambient Air Quality Targets (PAAQTs) for CPFs Located within 2 km outside the boundary of the Special Management Zone

Substance	Averaging Period	Target Level[1]	Basis	Comment
Sulphur Dioxide (SO_2)	1 hour	130[1,2] (50 ppb)	Draft Canadian Ambient Air Quality Standard (CAAQS) for SO_2 (2015)	The level is based on a 50 ppb concentration which is the proposed concentration level separating the "yellow" and "orange" management levels. The permissible level is not to be exceeded on more than 4 days per year.
	24 hour	20[3] (7.6 ppb)	WHO (2005)	Not to be exceeded more than 6 times per year.
	Annual	8[1] (3 ppb)	Draft Canadian Ambient Air Quality Standard (CAAQS) for SO_2 (2015)	The level is based on 3 ppb which is the proposed concentration level separating the "yellow" and "orange" management levels. The permissible level is a never to be exceeded level
Nitrogen Dioxide (NO_2)	1 hour	135[3,4] (72 ppb)	Modification of WHO (2005) Guideline	The level is two-thirds of the Guideline value which reflects the approach used in setting CAAQS management levels. The permissible level is not to be exceeded on more than 4 days per year.
	Annual	27[3] (14.4 ppb)	Modification of WHO (2005) Guideline	The level is two-thirds of the Guideline value which reflects the approach used in setting CAAQS management levels. The permissible level is a never to be exceeded level.

1 (µg/m³ at 25°C and 101.325 kPa unless noted) (ppb values in brackets)

Substance	Averaging Period	Target Level[1]	Basis	Comment
Ozone (O^3)	8 hr daily maximum mean (May – September period)	110[5] (56 ppb)	Canadian Ambient Air Quality Standards (CAAQS) for Ozone	The level is based on 56 ppb which is the proposed concentration level separating the "yellow" and "orange" management levels. The permissible level should not be exceeded on more than 4 days per year excluding influences from forest fires
Particulate Matter ($PM_{2.5}$)	24 hr	19[5] (N/A)	Canada Ambient Air Quality Standard (CAAQS) for $PM_{2.5}$	The level is based on 19 µg/m^3 which is the concentration level separating the "yellow" and "orange" management levels and is a level that should not be exceeded on more than 8 days per year excluding influences from forest fires
	99th per cent 24 hr annual value	25[3] (N/A)	WHO (2005)	A never to be exceeded level excluding influences from forest fires
	Annual	6.4[5] (N/A)	Canada Ambient Air Quality Standard for $PM_{2.5}$	The level is based on the concentration level separating the "yellow" and "orange" management levels which is 6.4 µg/m^3. The permissible level is a never to be exceeded level excluding periods when there are forest fire influences
Particulate Matter (PM_{10})	99th per cent 24 hr	50[1] (N/A)	WHO (2005)	A never to be exceeded level excluding influences from forest fires
	Annual	20[1] (N/A)	WHO (2005)	A never to be exceeded level excluding influences from forest fires
Carbon Monoxide (CO)	1 hour	15,000[6] (13,000)	AAAQO (2013)	A never to be exceeded level
	8 hours	6,000[6] (5,000)	AAAQO (2013)	A never to be exceeded level
Benzene	1 hour	30[6] (9.0)	AAAQO (2013)	A never to be exceeded level
	Annual	3[6] (0.9)	AAAQO (2013)	A never to be exceeded level

Substance	Averaging Period	Target Level[1]	Basis	Comment
Total Reduced Sulphur (TRS) and Odour Events	1 hour	1 ppb[7]	Fort McKay's Experience with Odours and TRS Levels	Level is based on experience in Fort McKay that odours are generally present when TRS levels are above 1.0 µg/m^3 and are often present at lower TRS levels

1 Based on the 2015 Canadian Council of Ministers of the Environment (CCME) Draft Canadian Ambient Air Quality Standards (CAAQS) for SO_2

2 The USEPA limit for SO_2 was considered in setting the permissible level but the proposed SO_2 CAAQS is more stringent than the USEPA 1 hour standard (see EPA. 2010. Primary National Ambient Air Quality Standard for Sulfur Dioxide. US Environmental Protection Agency. 40 CFR Parts 50, 53, and 58. [EPA-HQ-OAR-2007-0352; RIN 2060-A048. http://www.epa.gov/air/sulfurdioxide/pdfs/20100602final.pdf

3 Based on 2005 WHO Air Quality Guideline update (www.euro.who.int/__data/assets/pdf_file/0008/147851/E87950.pdf)

4 The USEPA limit for NO_2 was considered in setting the number (see EPA 2010. Primary National Ambient Air Quality Standards for Nitrogen Dioxide. US Environmental Protection Agency. 40 CFR Parts 50 and 58 [EPA–HQ–OAR–2006–0922; FRL 9107–9] RIN 2060–AO19 http://www.epa.gov/ttn/naaqs/standards/nox/s_nox_cr_fr.html

5 Based on the Canadian Ambient Air Quality Standards for Ozone and $PM_{2.5}$ announced for 2020 (December 12, 2012) (http://ec.gc.ca/default.asp?lang=En&n=56D4043B-1&news=A4B2C28A-2DFB-4BF4-8777-ADF29B4360BD)

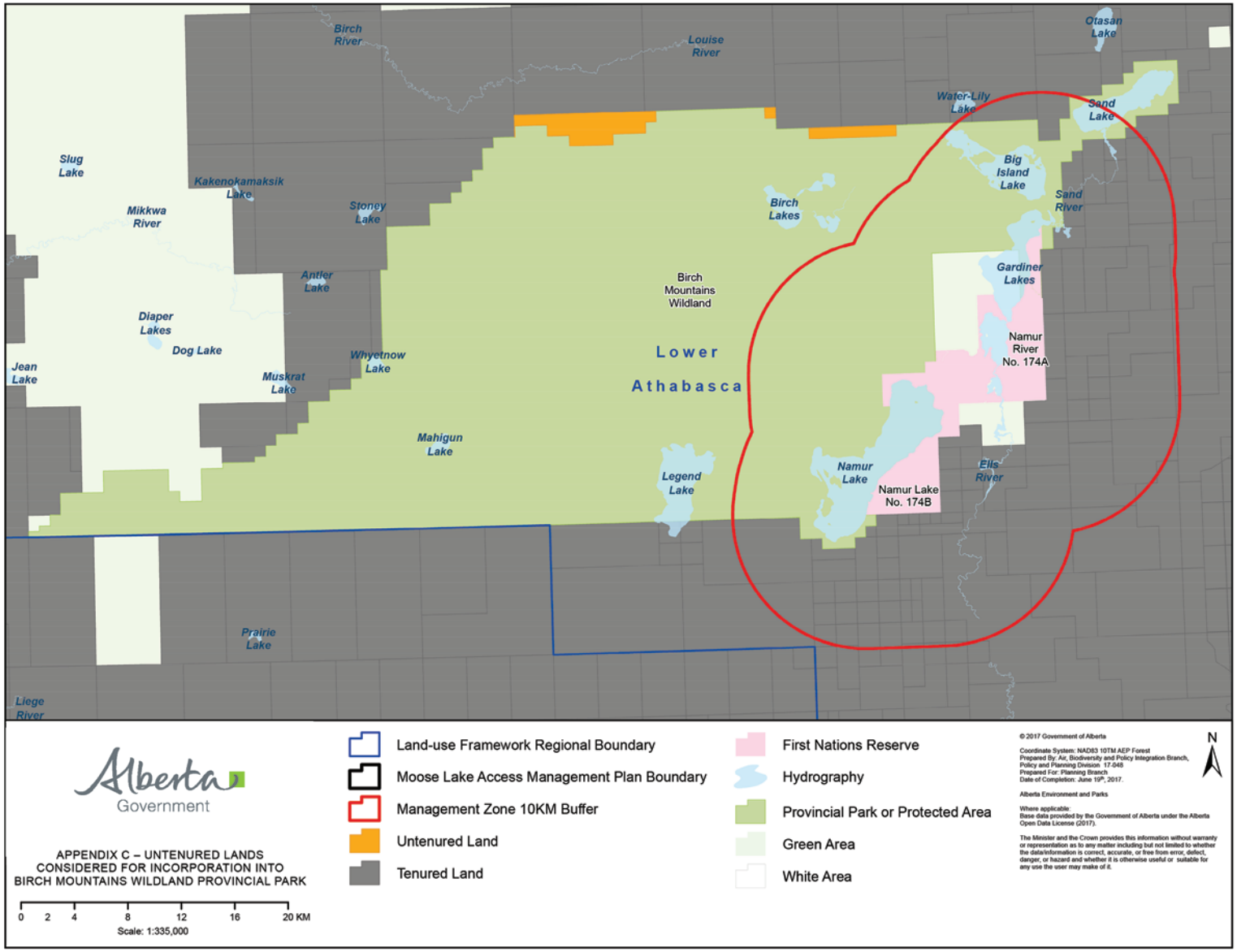
6 Based on Alberta Ambient Air Quality Objectives (August 2013) (http://aep.alberta.ca/air/legislation/ambient-air-quality-objectives/documents/AmbientAirQualityObjectives-Aug2013.pdf)

7 The TRS permissible level is an indicator of when odours would generally be expected to occur based on a correlation between noted odour events in Fort McKay and TRS readings at WBEA air monitoring station #1 in Fort McKay. Depending on the nature of the odorants emitted, odours may occur at TRS levels below the permissible level and TRS is therefore a very imprecise measure of odour potential and the possible intensity and character of odours. The general criteria and expectation for odours in Fort McKay is that nuisance odours related to industrial emissions will be infrequent and only occur during plant upset events or short-term planned and managed non-routine plant emission events.

Table 4. The following table details required passive and/or continuous based ambient air quality monitoring at the perimeter of the Special Management Zone.

Type of Facility	Facility's Production (bbl/d)	Passive Monitoring (O_3, NO_2, SO_2, NO_3, NH_3, H_2S, VOCs)	Continuous (NOx, SO_2, TRS, $PM_{2.5}$ and THC and NMHC, and basic meteorological monitoring) and # of months of monitoring per year
SAGD	<10,000 bpd	Yes	No
	10,000-30,000	Yes	Yes – 3 months
	30,000-60,000	Yes	Yes – 6 months
	60,000-100,000	Yes	Yes – 9 months
	>100,000	Yes	Yes – 12 months
SAGD w/Upgrading	<10,000	Yes	Yes – 3 months
	>10,000	Yes	Yes – 12 months

Appendix C: Birch Mountains Wildland Park



Appendix D: Glossary of Terms

Biodiversity – The assortment of life on earth—the variety of genetic material in all living things, the variety of species on earth and the different kinds of living communities and the environments in which they occur (Land-use Framework, 2008)

Best Management Practices – Operating practice that enhances the sustainability of the resource to which the practice relates. Must be practical and economically achievable (Glossary of Reclamation and Remediation Terms Used in Alberta 7th Edition, 2002)

Conservation – The responsible preservation, management and care of our land and of our natural and cultural resources (Land-use Framework, 2008)

Conservation Offset – is an action taken to counteract impacts from development that remain after efforts have been taken to avoid and minimize those impacts.

Corridor (Wildlife) – A physical linkage, connecting two areas of habitat and differing from the habitat on either side. Corridors are used by organisms to move around without having to leave the preferred habitat (Biodiversity Management Framework DRAFT, 2017)

Crown Land – Crown land includes all provincial and federal government lands. Provincial parks (administered under the *Provincial Parks Act*) and surface and subsurface of public land (administered under the *Public Lands Act* and the *Mines and Mineral Act*) are examples of provincial Crown land (South Saskatchewan Regional Plan, amended 2017)

Cumulative Effects – The combined effects of past, present and reasonably foreseeable land-use activities, over time, on the environment (South Saskatchewan Regional Plan, amended 2017)

Designated Trail – A linear feature which, through regional and sub-regional planning processes or management plans, is identified for a specific activity or activities. Trails are mapped, signed, and maintained

Disturbance – In respect of public land, means human activity that moves or removes one or more of the following features of the public land or that alters or results in the alteration of the state of one or more of those features from the state in which it existed before the human activity occurred, and includes any change in the intensity, frequency or nature of the human activity (Public Land Administration Regulation, 2011):

(i) vegetation;
(ii) soil;
(iii) subsoil;
(iv) bedrock;
(v) landform;
(vi) wetland;
(vii) water body or watercourse;
(viii) air flow or wind currents;
(ix) ambient sound volumes;
(x) light or shade

Ecosystem Function – Processes that are necessary for the self-maintenance of an ecosystem such as primary production, nutrient cycling, decomposition, etc. The term is used primarily as a distinction from values (South Saskatchewan Regional Plan, amended 2017)

Ecosystem Services – are the benefits such as food, timber and fibre; water quality maintenance, source water for communities and industries; outdoor recreation spaces, and cultural heritage provided by nature to people.

Ecosystems – The interaction between organisms, including humans and their environment. Ecosystem health/integrity refers to the adequate structure and functioning of an ecosystem, as described by scientific information and societal priorities (South Saskatchewan Regional Plan, amended 2017)

Footprint – The impact or extent of a disturbance and includes the intensity, frequency and nature of any uses or activities related to the disturbance (Public Lands Administration Regulations, 2011)

Headwaters – The source and upper tributaries of a stream or river (South Saskatchewan Regional Plan, amended 2017)

Indigenous Peoples – For the purposes of the present document, "Indigenous Peoples" means "aboriginal peoples of Canada" within the meaning of Section 35 of the Constitution Act, 1982.

Limit – A transition point beyond which an unacceptable risk to a desired objective (or outcome) occurs. The limit is the value of an indicator, which represents the point, if exceeded, that the system moves to an undesirable state and cannot recover. The point, line, or edge where something ends or must end, which if exceeded has unacceptable consequences to society

Low Impact Seismic – See Appendix A (Section 4.3.2).

Management Actions – Includes strategies, initiatives, plans, and specific products (outputs) that are the responsibilities of appropriate agencies of the government of Alberta to implement or to ensure are implemented by other parties

Public Land – Land owned by the provincial government, which makes decisions about how it is used and managed, including for agriculture, forestry, resource development, habitat conservation and protection of watersheds and biodiversity (South Saskatchewan Regional Plan, amended 2017)

Reclamation – The process of reconverting disturbed land to its former or other productive uses (Glossary of Reclamation and Remediation Terms Used in Alberta 7th Edition, 2002)

Restoration – The process of restoring site conditions as they were before the land disturbance (Glossary of Reclamation and Remediation Terms Used in Alberta 7th Edition, 2002)

Spatial – Relating to, or occupying, space (Biodiversity Management Framework DRAFT, 2017)

Target – The desired level of performance. It must be quantifiable and specify a period of time

Temporal – Relating to time (Biodiversity Management Framework DRAFT, 2017)

Threshold – Has the meaning given to it in a regional plan and may include a limit, target, trigger, range, measure, index or unit of measurement (Alberta Land Stewardship Act, 2009)

Watershed – All lands enclosed by a continuous hydrologic-surface drainage divide and lying upslope from a specified point on a stream (South Saskatchewan Regional Plan, amended 2017)