
Riding Mountain Aspen Parkland Conservation Plan¹:

Status of Conservation Targets Summary of Threat Assessment Identification of Knowledge Gaps



¹ All information presented forms part of NCC's Riding Mountain Aspen Parkland Natural Area Conservation Plan.



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PROJECT TEAM AND KEY PARTNERS

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Conservation Planning Workshop Participants

A conservation planning workshop was held in Dauphin, Manitoba on November 22, 2007, jointly organized by NCC and the Parkland Habitat Partnership. Participants working in small groups and in plenary sessions discussed Conservation Targets, Dominant Ecological Processes, Target Viability/Trends, Threats, Goals, and Conservation Actions.

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Acknowledgements

Nature Conservancy of Canada, Manitoba Region would like to thank the NCC Manitoba Scientific Advisory Committee for their invaluable input and expert advice:

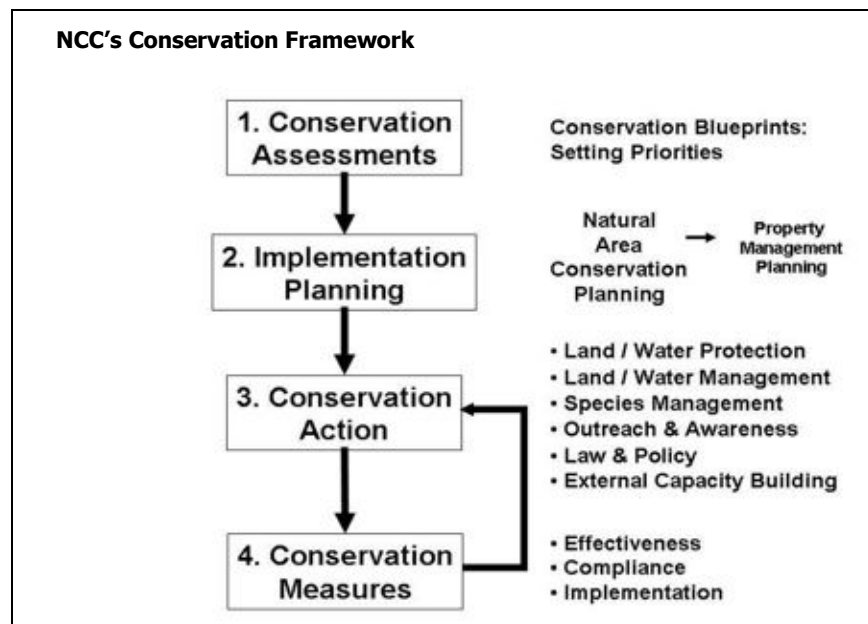
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A. Conservation Planning at the Nature Conservancy of Canada

Planning is the foundation of all conservation actions at the Nature Conservancy of Canada (NCC). Effective planning allows the organization to target resources to the places where they are most needed. This allows us to have the greatest conservation impact, and assures our supporters that we are making the best use of their resources.

NCC plans at different geographical scales, ranging in size from ecoregions to properties. While each of these plans has a different purpose, they are inherently linked and nested within one another. Conservation Blueprints (or Ecoregional Assessments) identify the Natural Areas where we work, and Natural Area Conservation Plans identify strategic actions necessary to conserve the biodiversity targets found within the Natural Area. We develop Property Management Plans for key places that identify property-specific actions that need to be done. These three planning processes interrelate to form NCC's Conservation Framework.



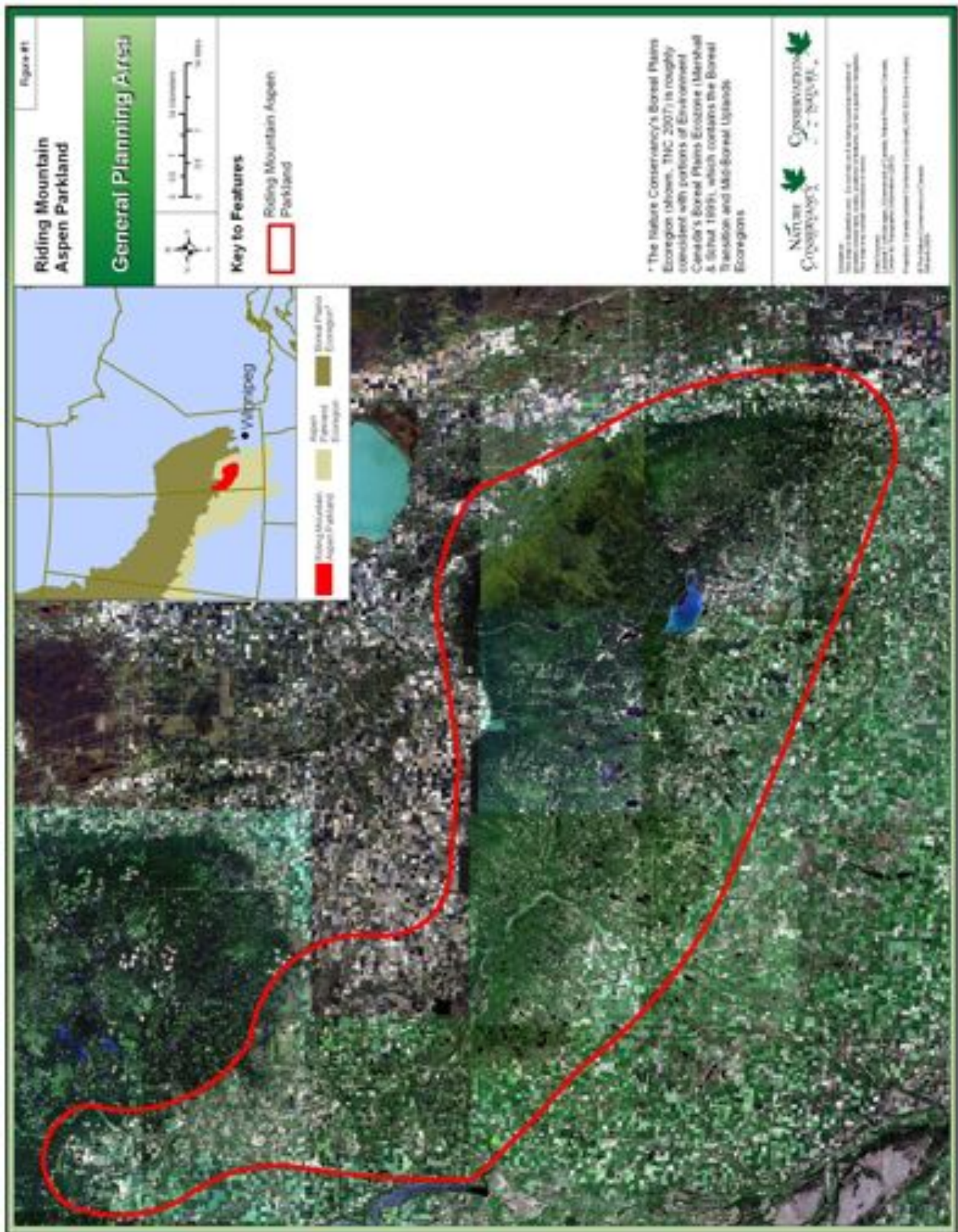
Natural Area Conservation Planning provides a scientifically sound framework to guide NCC's conservation actions across five year periods. The process involves the identification of a suite of distinct conservation 'targets', determining the key ecological factors contributing to the maintenance of these targets, and summarizing target 'health'. Threats to these targets are identified, then a set of conservation actions to improve target health and/or reduce threat magnitude are designed. Targets and threats are then monitored to ensure that actions are effective.

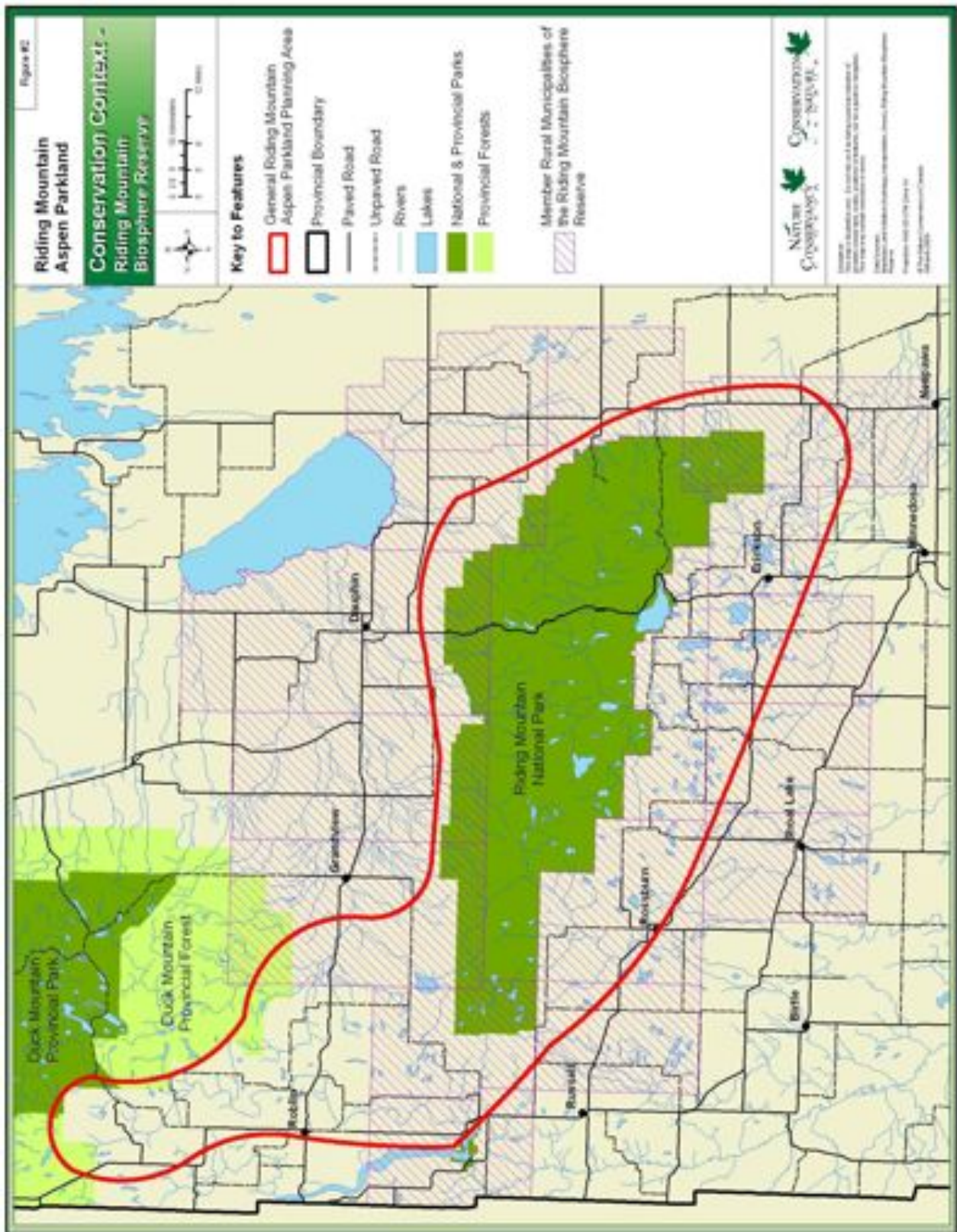
NCC recently completed a conservation plan for what it terms the Riding Mountain Aspen Parkland Natural Area (Figures 1 and 2). The plan identifies several distinct conservation goals, including:

- maintaining the ecological integrity of the Riding Mountain upland;
- maintaining and enhancing the functional ecological linkage between Riding Mountain and Duck Mountain;
- enhancing the viability of native grasslands, forests, wetlands, rivers and associated riparian areas;
- engaging local communities in landscape-scale conservation;
- maintaining and recovering viable populations of Species At Risk.

The conservation plan identifies 22 distinct conservation actions, ranging from land protection, stewardship of conservation lands (including the expansion of invasive species control programs and native prairie restoration), monitoring the health of key ecosystems and species as well as the threats to them, and reinforcing relationships with local communities. A number of actions will be implemented in cooperation with NCC's numerous conservation partners, including private landowners, Riding Mountain National Park, the Riding Mountain Biosphere Reserve, the Parkland Habitat Partnership and its member organizations, and Conservation Districts.

This document summarizes some key information from NCC's 5-year Conservation Plan for the Riding Mountain Aspen Parkland.





B. Biodiversity Targets and Associated Threats

i. Biodiversity Targets

Biodiversity targets are the biological entities (i.e., ecosystems, communities and/or species) that a Natural Area Conservation Plan is aiming to conserve. Biodiversity targets for the Riding Mountain Aspen Parkland (RMAP) were identified through the project team, a multi-partner conservation planning workshop, past studies and a review of the literature. Eight biodiversity targets were identified (Table 1).

Six of the targets represent distinct ecological communities; conservation targets that represent, in theory, the complete suite of species, communities, and ecological systems found in the RMAP. The conservation of these biodiversity targets will ensure the conservation of all the native biodiversity that these ecological communities support. Two additional targets, Corridor Dependent Mammals and Grassland Birds, were included as separate biodiversity targets. The project team felt that despite the application of effective conservation actions to the six ecological community-based targets, certain aspects of the region's biodiversity could remain at risk. It was felt that the pressures facing wide-ranging large mammals were unlike the stresses facing other targets, and would require unique strategies. Elk, Moose, Wolves and other large mammals require large home ranges and suitable connections between habitat patches.

Declining grassland birds such as Sprague's Pipit, Loggerhead Shrike and Baird's Sparrow (*Ammodramus bairdii*) have nested at low densities in the tame grasslands in the southern portion of the Natural Area. Their rarity on the landscape may be a reflection of suboptimal conditions within these tame grasslands. Alternatively, this may reflect the fact that Riding Mountain lies at the northern edge of the current range of these species (Ken De Smet, pers. comm.). Tame grasslands may be filling the functional role of prairie for grassland bird species. The native grasslands that remain in the RMAP are likely too small and fragmented to provide habitat for area-sensitive animal species. The grasslands in the Riding Mountain area may be of more importance to breeding grassland birds in years when drought conditions prevail in areas further south and west (Ken De Smet, pers. comm.).

Numerous wetland types exist on the landscape. The vegetation communities expressed differ primarily due to differences in depth to water table, water flow and nutrient availability, but also slope position, climate and geology (Smith et al. 2007). One wetland type, Calcareous Fens, was identified as a separate biodiversity target due to rarity in the RMAP (and Boreal Plains Ecozone, Smith et al. 2007) and a unique suite of supported species. Additional wetland types are nested within the biodiversity target 'Wetlands, Small Lakes and Associated Riparian Areas'. While consideration was given to splitting this target into additional wetland biodiversity targets, it was felt that the threats to these wetlands, and thus the conservation strategies required to conserve them, were common.

All biodiversity targets identified through ecoregional planning can be nested within the Riding Mountain Aspen Parkland's eight targets, as can all species of particular local concern due to their presence on national or subnational endangered species lists or the list of RMAP species whose locations are tracked by the Manitoba Conservation Data Centre.

For each biodiversity target a viability/trend assessment was completed using three criteria; size, condition and landscape context. Table 1 summarizes the biodiversity targets and viability.

Table 1: Habitat/species type, ecological justification, viability factors and rationale, and list of nested targets for the Riding Mountain Aspen Parkland's eight biodiversity targets.

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Land- scape Context	Viability Rank	Viability Rationale ²	Nested Targets
Aspen, Mixed, and Coniferous Forest	Forest – Boreal; Forest - Temperate	Matrix community over most of Riding Mountain. Fragmented on south edge of Riding Mountain and in area between Riding Mountain and Duck Mountain to the north. In general, western portions of the Natural Area support a drier aspen parkland forest type, while eastern (moister, higher elevation) areas support mixed and coniferous boreal forest.	Good	Fair	Fair	Fair	Much of the historic forest extent remains in the Riding Mountain upland, but forest cover is fragmented outside of RMNP. Suppression of fire and past logging of targeted species in mixed-wood stands has resulted in landscape-scale shifts in forest composition and structure (Caners & Kenkel 2003, Hamel 2001).	Golden-winged Warbler (<i>Vermivora chrysoptera</i>), Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)
Wetlands, Small Lakes & Associated Riparian Areas	Wetlands: Shrub Dominated; Wetlands: Bogs, Marshes, Swamps, Fens, Peatlands; Wetlands: Permanent Freshwater Marshes/Pools; Wetlands: Seasonal/ Intermittent Freshwater Marshes/Pools; Wetlands: Permanent Saline, Brackish, or Alkaline Marshes/Pools; Wetlands: Seasonal/ Intermittent Saline, Brackish, or Alkaline Marshes/Pools; Freshwater Lakes: Permanent; Riparian Areas	Numerous wetland types exist in the area: pothole marshes and shallow lakes, Balsam Poplar swamps, Black Spruce bogs, ephemeral ponds, lake margin marshes, etc. Most are precipitation and/or surface water fed. Ephemeral wetlands may have experienced dramatic alteration and loss due to historic and ongoing agricultural practices.	Good	Fair	Fair	Fair	Much of the historic extent of wetland remains, although ephemeral & seasonal wetlands are likely less abundant. Landscape context and condition are generally good on public lands. Fair rating reflects altered riparian areas and hydrological regimes on private lands and a decline in certain successional stages.	Yellow Rail (<i>Coternicops noveboracensis</i>), Rusty Blackbird (<i>Euphagus carolinus</i>), Trumpeter Swan (<i>Cygnus buccinator</i>), Foxtail Muhly (<i>Muhlenbergia andina</i> , G4, N1, S1, COSEWIC candidate (Hamel & Foster 2005))

² Unless otherwise noted, viability rationale based on PHP/NCC (2007).

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale ²	Nested Targets
Native Grasslands	Grassland – Temperate	Fescue prairie, mixed-grass prairie, and oak savannah occur in the area. Rough Fescue-dominated prairie is a provincially (possibly globally) uncommon community type that occurs in only a few remnant pockets in Manitoba. The best remaining examples occur in RMNP, usually on well-drained benches adjacent to rivers and streams. Mixed-grass prairie and oak savannah currently occur in relatively small, isolated patches mainly limited to steep south and west facing upper slopes along the Shell River Valley.	Poor	Unknown	Fair	Fair	The extent of both prairie types is thought to have been greatly reduced by past agricultural practices (Rod Lastra, Iain Edey, pers. comms.). Prescribed fire is applied to some fescue prairies in RMNP, but by and large has been suspended as a natural disturbance. Most fescue prairies are thought to be dominated by non-native plant species (Rod Lastra, pers. comm.), while the condition of remnant mixed-grass prairie and oak savannah sites is unknown.	Plains Rough Fescue (Spear Grass (<i>Stipa</i> spp.)) herbaceous vegetation, Dakota Skipper, mixed-grass prairie, Bur Oak savannah
Calcareous Fens	Wetlands: Bogs, Marshes, Swamps, Fens, Peatlands	Regionally-rare groundwater-fed seepage slope fens that support a unique plant community (including a number of provincially rare species). Unique marl substrate formed by precipitation of calcium carbonate from water column due to highly alkaline conditions (Smith et al. 2007). Thought to be limited to slopes along the Shell River Valley.	Unknown	Good	Very Good	Very Good	Regional subsurface water flow, as it affects this target, is thought to be largely unaltered from historic conditions (C. Hamel, pers. obs.). Internal hydrology is impaired at some locations (Foster et al. 2004), but Good overall. Size is considered unknown because surveys-to-date have been limited to the northern Shell River Valley.	Provincially uncommon plants (and possibly odonates) like Loesel's Twayblade (<i>Liparis loeselii</i>), English Sundew (<i>Drosera anglica</i>)

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Land-scape Context	Viability Rank	Viability Rationale ²	Nested Targets
Eastern Deciduous Forest	Forest: Temperate	Locally uncommon community type that supports a suite of species that differs from the matrix forest target. Occurring at the base of the Manitoba Escarpment in the eastern portion of the Natural Area, often in moist, fire-protected sites. A number of species with an Eastern Deciduous affinity occur here at the northwestern limit of their range in North America.	Good	Good	Good	Good	Most of this target occurs within Riding Mountain National Park, where condition and landscape context are good. The status of stands outside the park is largely unknown. While most American Elm trees have been lost from the canopy due to Dutch Elm Disease, the system appears relatively intact. A range of seral stages is present, and large blocks of habitat remain.	Provincially uncommon species of eastern deciduous affinity, at or near northwest limit of species' range in North America (e.g. Lopseed, Scarlet Tanager, Golden-winged Warbler)

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Land-scape Context	Viability Rank	Viability Rationale ²	Nested Targets
Streams, Rivers, Springs & Associated Riparian Areas	Rivers, Streams, Creeks: Permanent; Rivers, Streams, Creeks: Seasonal/Intermittent/Irrregular; Riparian Areas; Freshwater Springs and Oases	Numerous rivers and streams flow through the area. The source of most is the uplands of Riding Mountain, although streams originating in Duck Mountain occur in the northern part of the Natural Area. The physiognomy of these streams varies; in the eastern portion of the Natural Area deep ravines have been formed where streams have incised through soft underlying shales. Less-incised valleys form further west where streams move through glacial till. In relatively flat areas meandering streams, interspersed with riparian wetlands are typical. The Shell River and Birdtail River are 'underfit streams' that occur in broad valleys formed by once-large rivers carrying glacial meltwater.	Good	Unknown	Good	Good	While localized dams and impoundments exist, most of the historical extent of this system persists. Riparian areas are thought to be degraded in a number of areas outside of RMNP, and those associated with alluvial deposits at the base of the Manitoba escarpment have been largely destroyed. The condition of aquatic biodiversity is unknown (although likely good within RMNP). While localized areas of impairment exist, overall hydrological cycles and soil/sediment stability and movement are thought to be operating within an acceptable range of variation.	Creepers (<i>Strophitis undulatus</i> , a freshwater mussel), Chestnut Lamprey (<i>Ichthyomyzon castaneus</i>), Bigmouth Shiner (<i>Notropis dorsalis</i>), Iowa Golden Saxifrage (<i>Chrysothamnium iowense</i> G3,N3,S1?, present in Duck Mtn. (Foster & Hamel 2006))

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Land-scape Context	Viability Rank	Viability Rationale ²	Nested Targets
Grassland Birds	Species Assemblage: Animals: Birds	A group of Nationally and provincially At Risk species that nest in the tame grasslands of the RMAP. Actions focussed on maintaining or improving the current extent and quality of tame grasslands, in addition to the conservation of native grasslands, are required.	Good	Fair	Good	Good	There is much tame grassland habitat on the landscape, occasionally in large patches. Size is considered Good, as individuals regularly nest in the area and populations are not expected to be large due to the RMAP's ecological characteristics. Condition is Fair, however, as there is concern that breeding success may be compromised due to land-use practices such as haying during the nesting season or over-grazing causing suboptimal vegetation structure (PHP/NCC 2007).	Loggerhead Shrike, Sprague's Pipit, Baird's Sparrow

Biodiversity Target	Habitat / Species Type	Ecological Justification	Size	Condition	Land- scape Context	Viability Rank	Viability Rationale ²	Nested Targets
Corridor Dependent Mammals	Species Assemblage: Animals: Mammals	Large mammals such as Wolves, Moose and Elk are known to move through the area between Riding Mountain and Duck Mountain. Habitat fragmentation in the area between the two mountains, in combination with human land use, government policy, and landowner attitudes, is thought to be inhibiting this movement.	Good	Fair	Fair	Fair	Elk, Moose, and Wolves persist and breed in the area, at population levels that are within an acceptable range of variation (C. Hamel, pers. obs.). Genetic condition is thought to be declining however, at least amongst Wolves, due to inbreeding depression as a result of low levels of immigration of new individuals from outside of the natural area (Vik Stronen 2007). This decline is thought to be linked to the widespread clearing of natural lands around Riding Mountain National Park, leaving few areas with the potential to act as habitat corridors. Corridors that do exist are fragmented. Animals are known to move between Duck Mountain and Riding Mountain and vice versa, but regular movement to and from other natural landscapes in southwestern Manitoba is unknown.	Elk, Moose, Gray Wolf, Cougar
		Overall Biodiversity Target Health Rank for the Natural Area:				Good		

Very Good	Optimal Health: The biodiversity target is functioning at an ecologically desirable status, and requires little management.
Good	Minimum Health: The biodiversity target is functioning within its range of acceptable variation; it may require some management.
Fair	Likely Degradation: The biodiversity target lies outside of its range of acceptable variation and requires management. If unchecked, the biodiversity target will be vulnerable to serious degradation.
Poor	Imminent Loss: Allowing the biodiversity target to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.
Unknown	Research Need: The biodiversity target is known to occur, but information on this viability criterion is currently is unknown.
NA	Not Applicable: This criterion is not significant for assessing the health of this biodiversity target.

ii. Threats

Threats are the proximate activities or processes that have caused, or are causing the destruction, degradation and/or impairment of one or more of the identified biodiversity targets. Threats impact the target's viability and/or key ecological factors. Threats were identified for each biodiversity target. Threats were ranked based on scope, scale and irreversibility using the Conservation Action Planning Workbook (TNC 2007). These threats were analyzed together to provide overall threat ranks for each biodiversity target and threat (Table 2).

The overall threat status for the Riding Mountain Aspen Parkland is high. The threat of conversion to cropland is considered a high threat to the Natural Area. Three biodiversity targets are considered to be highly threatened: Wetlands, Small Lakes & Associated Riparian Areas; Native Grasslands; and Aspen, Mixed & Coniferous Forests. Further information on threats to the RMAP is provided in Table 2.

Table 2a. Threats to the RMAP's Biodiversity Targets. Threat taxonomy is based on the IUCN's classification of direct threats (IUCN-CMP 2006).

Threats	Biodiversity Targets								Overall Threat Rank
	Streams, Rivers, Springs & Riparian Areas	Wetlands, Small Lakes & Associated Riparian Areas	Corridor Dependent Mammals	Native Grasslands	Calcareous Fens	Aspen, Mixed, and Coniferous Forest	Eastern Deciduous Forest	Grassland Birds	
2.1 Annual & Perennial Non-Timber Crops <i>2.1.1 Conversion to cropland</i>	High	High	High	Medium	-	High	High	Medium	High
8.1 Invasive Non-Native/Alien Species <i>8.1.1 Invasive alien species</i>	Low	Low	-	High	-	Medium	Medium	Medium	Medium
7.2 Dams & Water Management/ Use <i>7.2.1 Hydrological manipulation - dams, impoundments, drainage projects</i>	Low	High	-	-	-	Low	Medium	-	Medium
2.3 Livestock Farming & Ranching <i>2.3.1 Incompatible grazing practices</i>	Medium	Medium	-	Medium	Low	Medium	Medium	Medium	Medium
8.2 Problematic Native Species <i>8.2.1 Woody vegetation encroachment</i>	-	-	-	High	-	-	-	Medium	Medium
11.1 Habitat Shifting & Alteration <i>11.1.1 Climate Change</i>	Medium	Medium	-	-	Medium	Medium	Medium	-	Medium
5.3 Logging & Wood Harvesting <i>5.3.1 Incompatible logging</i>	-	Medium	Medium	-	Low	Medium	-	-	Medium
7.1 Fire & Fire Suppression <i>7.1.1 Incompatible fire management</i>	-	Low	-	Medium	-	Medium	-	-	Medium
1.3 Tourism & Recreation Areas <i>1.3.1 Cabins & other recreational infrastructure, trails, recreational vehicles</i>	Low	Medium	Low	Low	Low	Low	-	-	Low
5.1 Hunting & Collecting Terrestrial Animals <i>5.1.1 Hunting/trapping</i>	Low	-	Medium	-	-	-	-	-	Low
4.1 Roads & Railroads <i>4.1.1 Roads & Railroads</i>	-	Medium	-	-	-	-	-	-	Low
2.1 Annual & Perennial Non-Timber Crops <i>2.1.2 Incompatible haying practices</i>	-	-	-	-	-	-	-	Low	Low
Overall Threat Status for the Biodiversity Targets and the Natural Area	Medium	High	Medium	High	Low	High	Medium	Medium	High

Table 2b. Notes on the current and future condition of threats to the Riding Mountain Aspen Parkland's Biodiversity Targets

Threats	Overall Threat Rank	Notes on Current/ Future Condition
<p>2.1 Annual & Perennial Non-Timber Crops</p> <p><i>2.1.1 Conversion to cropland</i></p>	<p>High</p>	<p>Widespread conversion to cropland has occurred since European settlement; forest cover in the Rose Ridge Corridor between RMNP and Duck Mountain dropped from 44% to 14% during the period 1944-1991 (Walker 2001). Clearing of treed areas (often following logging), as well as cultivation of tame grasslands, has slowed dramatically, but still occurs (PHP/NCC 2007).</p>
<p>8.1 Invasive Non-Native/Alien Species</p> <p><i>8.1.1 Invasive alien species</i></p>	<p>Medium</p>	<p>Remnant fescue prairie sites are dominated by Awnless Brome (<i>Bromus inermis</i>) and other weeds (Rod Lastra, pers. comm.). Invasive species such as Burdock (<i>Arctium</i> spp.) and Dutch Elm Disease have impacted Eastern Deciduous forest stands (PHP/NCC 2007). Edge effects result in relatively high cover and richness of alien species 5-15 m in from the edge of boreal mixed-wood forest remnants (Gignac & Dale 2007); suggesting that increasing fragmentation will also increase the threat of invasive/alien species.</p>
<p>7.2 Dams & Water Management/ Use</p> <p><i>7.2.1 Hydrological manipulation - dams, impoundments, drainage projects</i></p>	<p>Medium</p>	<p>Ephemeral, seasonal and shallow wetlands are at risk from drainage (PHP/NCC 2007). Drainage of alluvial fans at the base of the Escarpment is expected to continue (<i>ibid.</i>).</p>
<p>2.3 Livestock Farming & Ranching</p> <p><i>2.3.1 Incompatible grazing practices</i></p>	<p>Medium</p>	<p>Uncontrolled cattle access to riparian areas and natural waterways degrades these systems (C. Hamel, pers. obs.). Overgrazing, or grazing in sensitive seasons can reduce the biodiversity of forest systems (PHP/NCC 2007). Grazing of fescue sites is thought to result in an increase in non-native species (Rod Lastra, pers. comm.).</p>
<p>8.2 Problematic Native Species</p> <p><i>8.2.1 Woody vegetation encroachment</i></p>	<p>Medium</p>	<p>The encroachment of aspen, hazelnut, and other woody species is a threat to remnant fescue grasslands in Riding Mountain National Park (Parks Canada, undated, Slogan 1997). On properties where active management (haying, grazing) ceases, tame grassland habitat is expected to become shrub and tree-dominated (especially when adjacent to aspen forest (source of vegetative suckers)), and thus less suitable for grassland birds.</p>
<p>11.1 Habitat Shifting & Alteration</p> <p><i>11.1.1 Climate Change</i></p>	<p>Medium</p>	<p>Specific nature of threat unknown, but impacts expected given the fact that local variations in climate are a major determinant of the vegetation communities that occupy various parts of the RMAP. Many conservation targets are groundwater and/or precipitation dependent and could undergo shifts if hydrologic cycle is altered due to climate change (PHP/NCC 2007).</p>

<p>5.3 Logging & Wood Harvesting</p> <p><i>5.3.1 Incompatible logging</i></p>	<p>Medium</p>	<p>Clear-cut hardwood (mostly aspen) and softwood (mostly spruce) logging occurs in the area. Causes an immediate loss of habitat for some species, habitat gain for others. Some concern that regenerated stands may support different type of forest than pre-harvest (e.g. mixed-wood stand that regenerates as hardwood, spruce stands that regenerate as mixed-wood). Past high-grade logging (for large white spruce trees) may have shifted forest types as well (Hamel 2001). On private lands, clear-cut logging is sometimes followed by clearing and conversion to tame grass for cattle or cultivation (PHP/NCC 2007). Clearcut aspen logging alters local hydrology (Verry 1987).</p>
<p>7.1 Fire & Fire Suppression</p> <p><i>7.1.1 Incompatible fire management</i></p>	<p>Medium</p>	<p>The suppression of fire is expected to result in a continued landscape-wide shift toward later-successional communities, reducing habitat available for species dependent on younger-successional species. Some early-successional forest is expected to be retained in portions of the landscape via logging followed by forest regeneration.</p>
<p>1.3 Tourism & Recreation Areas</p> <p><i>1.3.1 Cabins & other recreational infrastructure, trails, recreational vehicles</i></p>	<p>Low</p>	<p>The subdivision and purchase of property by non-locals for recreational purposes is expected to continue, especially in the southeastern portion of the Natural Area (closest to Cities of Brandon and Winnipeg). The construction of driveways, cabins, outbuildings, and recreational trails fragments habitat. ATV and snowmobile use is expected to increase as a result of increased recreational usage. ATVs are associated with the spread of invasive species along trails (C. Hamel, pers. obs.). For both Elk and Wolves, an increase in hormone levels indicative of stress is correlated with increased snowmobile activity (Creel et al. 2002).</p>
<p>5.1 Hunting & Collecting Terrestrial Animals</p> <p><i>5.1.1 Hunting/trapping</i></p>	<p>Low</p>	<p>Negative attitudes towards Wolves are expected to continue; Wolves are often shot on sight by farmers (Brook 2007). While American Beaver populations are expected to remain viable, they are actively trapped outside of Riding Mountain National Park.</p>
<p>4.1 Roads & Railroads</p> <p><i>4.1.1 Roads & Railroads</i></p>	<p>Low</p>	<p>Linear barriers to surface water movement (e.g. a road dissecting a wetland area) are expected to continue causing loss of habitat (one side of barrier dries out) and shifting vegetation communities (wetland type change on 'wet' side of barrier)(PHP NCC 2007).</p>
<p>2.1 Annual & Perennial Non-Timber Crops</p> <p><i>2.1.2 Incompatible haying practices</i></p>	<p>Low</p>	<p>Early summer haying can reduce the productivity of grassland birds (Dale et al. 1997).</p>

Very High	The threat is likely to <i>destroy or eliminate</i> the biodiversity target.
High	The threat is likely to <i>seriously degrade</i> the biodiversity target.
Medium	The threat is likely to <i>moderately degrade</i> the biodiversity target.
Low	The threat is likely to <i>only slightly impair</i> the biodiversity target.

C. Knowledge Gaps

The process of summarizing the health of conservation targets and the threats to them revealed a number of gaps in our knowledge of the Riding Mountain Aspen Parkland. Research that addresses these gaps will enable adaptive management of conservation lands and the conservation landscape. Actions to fill these gaps were identified in the Riding Mountain Aspen Parkland Natural Area Conservation Plan – they are summarized below. Most of these can only be actioned through partnerships with the many conservation organizations, research institutions, private landowners, and communities engaged in conservation in the RMAP.

The following represents a list of knowledge gaps identified through the conservation planning process for the RMAP. They are in no particular order.

- a. ***The extent and condition of remaining native grasslands and oak savannah.*** The distribution and size (acres) of this target is largely unknown outside of Riding Mountain National Park (RMNP). Where native grassland does persist outside of RMNP, is it fescue or mixed-grass prairie? what condition is it in? what are major threats to these prairies? are they restorable?
- b. ***The aquatic and riparian condition of the rivers, streams and riparian areas.*** Condition is relatively well known in some portions of the landscape, and largely unknown in others. Coordinated assessment and monitoring, from the headwaters in Riding Mountain and Duck Mountain and downstream through the working landscape is needed. Are there trouble areas? What are the threats?
- c. ***The extent of calcareous fens.*** The distribution and size (acres) of this target is largely unknown (but calcareous fens are likely a naturally rare landscape feature)
- d. ***The key ecological factors of a 'functional ecological corridor' between Riding Mountain, Duck Mountain, and other natural landscapes in southwestern Manitoba/southeastern Saskatchewan.*** What type of corridor? For what species? Where? Which corridors are the most important? Which land cover and land uses are the most beneficial/detrimental to what suite of species?
- e. ***A landscape-scale assessment of changes in land cover as compared to pre-settlement conditions.*** Will inform rates of wetland loss, forest loss (or gain), and prairie loss, and inform prairie restoration plan development.
- f. ***The condition of Eastern Deciduous Forest stands, especially those outside of RMNP.*** How have these stands been affected by invasive species and hydrological alterations?
- g. ***The status of ephemeral wetlands.*** How many have been lost, where do they persist, what are the threats to them, how do we address these threats?
- h. ***How will climate change affect the landscape.*** Which conservation targets will be affected, how do we adapt conservation strategies to give ecosystems the best chance at persisting?

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