

**Assessment of corridors for movement of Gray wolf (*Canis lupus*) across rural land between two protected parks in south western Manitoba, Canada**



*By*  
**Ms. Linda Aidnell**

*A thesis submitted to the Faculty of Graduate Studies in partial fulfillment of the requirements of the degree of Masters of Natural Resources Management*



**Natural Resources Institute  
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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of  
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## ABSTRACT

Riding Mountain National Park (RMNP) occupies 2,974 km<sup>2</sup> of mixed wood boreal forest in southwestern Manitoba that is almost completely surrounded by agriculture. There is concern that wide-ranging, large carnivore populations in the park are genetically isolated and consequently nonviable over the long term. This study was carried out to identify areas with potential to support wolf dispersal from RMNP to the nearby Duck Mountain Provincial Park and Forest Reserve (DMPP&F) across the human disturbed land outside the park boundaries. Wolf telemetry data from RMNP provided information about preferred habitats within a protected and relatively undisturbed area. Presence of wolves between the parks was gathered from personal interviews with local landowners as well as wolf tracks. It was found that wolves avoid human disturbed areas within RMNP and select undisturbed areas outside the park boundaries. Furthermore, negative attitudes towards wolves held by local residents and its associated mortality threat comprise the major barrier to wolf-movement between the parks. A regionally connected wolf population depends on protection of remaining undeveloped land between the parks and acceptance by resident humans. Long term viability of the regional wolf population further relies on protection of wolves in the whole area and joint management amongst stakeholders at all levels.

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**“A thing is right if it tends to preserve the stability, integrity, and beauty of the biotic community. It is wrong if it tends otherwise”**

*Aldo Leopold, 1887 - 1948*

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# CHAPTER 1:

## INTRODUCTION

### 1.1 BACKGROUND

*Protecting large carnivores.*--Fragmentation of natural landscapes inhibits wildlife movement and isolates populations, which threatens survival of small populations due to loss of genetic variability (Pimm et al. 1988, Fritts & Carbyn 1995, Rosenberg 1997, Farina 2000, Duke et al. 2001). Wide ranging animals, such as large carnivores, are particularly susceptible to fragmentation effects (Paquet et al. 1996, Carroll et al. 2001, Noss 2001). Because large carnivores also are highly sensitive to human disturbance, they strongly depend on protected areas for their long-term survival (Noss 1992, Fritts & Carbyn 1995, Carroll et al. 2001). Existing protected parks are however rarely large enough to sustain viable wolf population (Fahrig & Merriam 1994, Height et al. 1998). Assuming that predators limit herbivores and therefore limits overgrazing through top-down, it is critical to maintain viable populations of large carnivores as regulators of healthy ecosystems (Terborgh et al 2001).

*Movement corridors.*--Genetic exchange between isolated populations may be promoted by corridors that connect habitats through dispersal. Because populations are unviable in isolation (Beir & Noss 1998, Maehr 1990, Duke et al. 2001, Paquet et al. 2001), it is crucial to identify suitable corridors that enhance individual exchange across fragmented landscapes (Morrison et al. 1998). Animals are known to select travel along pathways that comprise similar land cover as within their natural habitat (Harrison 1992, Rosenberg et al. 1997), although there is little information about species-specific corridor barriers (Morrison et al. 1998).

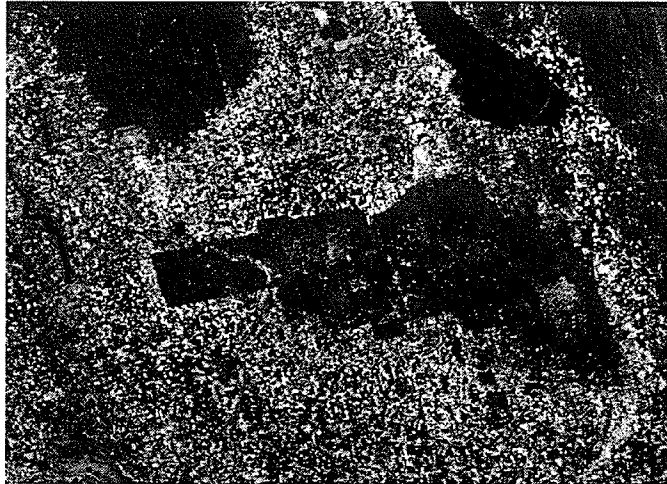
*Connecting wolf populations.*--The physical presence of vegetated corridors enhances dispersal amongst sub-wolf populations because they provide protection from human disturbance (Maehr 1990, Beir & Noss 1998, Duke et al. 2001, Paquet et al. 2001). Given extensive fragmentation of natural landscapes outside protected areas, it is however important to identify conditions that sustain dispersal in the lack of structurally connective corridors. Functional connectivity enhances the regional conservation value of core-areas that support protected but isolated wolf-populations (Carroll et al. 2003).

## **1.2 ISSUE STATEMENT**

### **1.2.1 Setting the context**

*Wolves in RMNP.*--Riding Mountain National Park (RMNP) in south western Manitoba is almost completely surrounded by land that has been modified and fragmented by human activities. The park sustains a limited population of wolves. In isolation, the sheer park size of almost 3000 km<sup>2</sup> is barely large enough to function as a viable ecosystem for large carnivores (Carbyn 1980). The size of the park would however be physically large enough to protect a core wolf population, assuming there is interchange with wolves from nearby areas (Ballard et al. 1983, Fritts 1983, Shaffer 1987, Gese & Mech 1991, Ream et al. 1991, Fritts & Carbyn 1995).

*Isolation.*--The analogy of RMNP as an island of wilderness in a sea of agriculture describes the isolated status of the park (Noss 1995). Natural vegetation is almost perfectly enclosed within the park boundary, which acts as a dividing border from adjacent human disturbed land (Noss 1995) (Figure 1.2.1-1). Transition between forest and agricultural land is exceptionally sudden in the area, given the lack of surrounding buffer zones (Carbyn 1989, Fritts & Carbyn 1995).

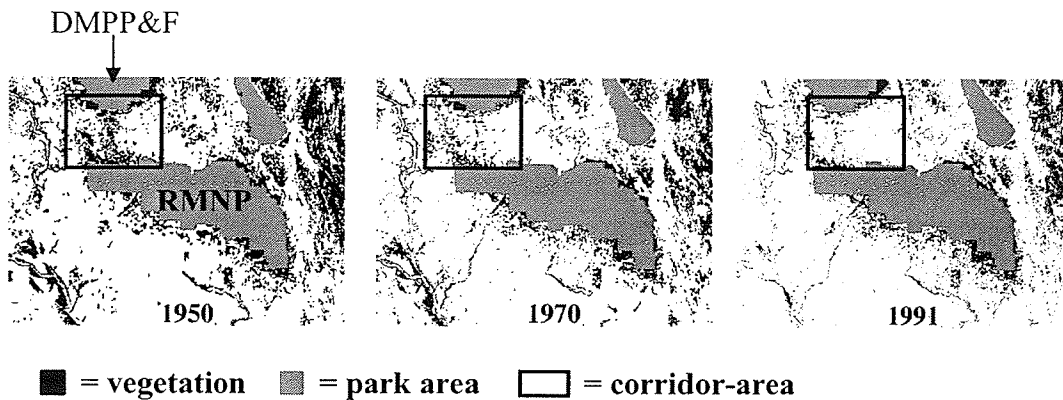


**Figure 1.2.1-1:** Vegetation within and surrounding RMNP, based on infrared Landsat 5 MSS sensor image of bands 1,2 and 4 (The Canada Centre for Remote Sensing Parks Canada, May 1986).

*Corridors.*--There are no longer continuous strips of natural vegetation that structurally connect the RMNP with the nearby Duck Mountain Provincial Park and Forest Reserve (DMPP&F) (Walker 2002) (Figure 1.2.1-2). It is however believed that wildlife travel between the parks along the Valley River (Rose Ridge corridor, Grandview) and the Pleasant Valley Creek (Squance Lake-Bluewing swamp-corridors, Boulton/Hillsberg). These presumed functional corridors mostly comprise waterways and land exempted from commercial development due to soil-type, rocks and slope (Newman 2001).

*Wildlife movement.*--It is uncertain how the isolated status of RMNP effect wildlife-populations in the park (Carbyn 1980). Movement of ungulates has been frequently reported between the parks (Carbyn 1980). However, regional genetic exchange of wolves between RMNP and the DMPP&F is regarded unlikely or rare at normal population densities (Carbyn 1980).





**Figure 1.2.1-2:** Loss of vegetation between RMNP and DMPP&F over past decades, based on satellite data (Walker 2002).

### 1.2.2 Study justification

The RMNP border presents a major mortality threat for wolves that attempt to leave the park, due to conflicting human interests on surrounding land (Noss 2001). Because the island effect of RMNP presumably confines movement to within the boundaries, there is concern that the wolf population of the park is genetically isolated (Carbyn et al. 1975, Wilson 2000). Large carnivores serve a critical role in top-down control of ecosystems (Peterson 1984, Mladenoff et al. 1995) and have the potential to serve as natural regulators of regional Bovine tuberculosis (TB) by their ecological role as predators (Stronen et al 2007). It is therefore crucial to endorse conditions that sustain wolves in functional ecosystems (Peterson 1984, Mladenoff et al. 1995).

Immigration is a requirement for any small or isolated wolf populations to overcome loss of genetic variability (Theberge 1983, Fritts & Carbyn 1995, Haight et al. 1998). Long-term survival of wolves in RMNP is therefore dependent on exchange with individuals of nearby wolf populations (Carbyn 1980). Although the DMPP&F reserve is only approximately 30 km from RMNP, the two parks are separated by vast human

developed land. Because structurally connective corridors no longer exist between the parks, there is a need to identify conditions that sustain functional connectivity among the regional wolf population. This includes identification of specific barriers to wolf movement between the parks

### **1.3 PURPOSE & OBJECTIVES**

*Purpose.*--The overall aim of the study was to promote long-term viability of the regional wolf population in western Manitoba by assessing dispersal of wolves to and from RMNP and DMPP&F

*Objectives.*--Major study objectives included to:

- Identify habitats selected by wolves within the protected RMNP
- Identify land cover composition between RMNP and DMPP&F
- Identify land cover types between the parks with greatest potential to sustain wolf movement
- Identify barriers to wolf movement in the area
- Assess the prospect that wolves travel between RMNP and DMPP&F
- Map land identified as high quality dispersal areas and provide recommendations for corridor management between the parks

### **1.4 SCOPE OF STUDY**

#### **1.4.1 Riding Mountain National Park**

*Location.*--RMNP (50°11'-51°26' N, 99 °06'-101°38' W) in southwestern Manitoba is 2,974 km<sup>2</sup> in size (Walker 2002). At it's broadest point, the park measures 115 km in the east-west direction and 60 km from north to the south (Walker 2002).