

# **Grizzly Bear, Woodland Caribou, and Dall's Sheep**

Background Information  
for the

## **Dehcho Land Use Plan**

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**WILDLIFE CONSERVATION SOCIETY CANADA**



**January, 2006**

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### **INTRODUCTION**

The Dehcho territory covers about 215,000 km<sup>2</sup> in the southwest corner of the Northwest Territories. The Mackenzie River or Dehcho (meaning big river) and its tributaries are a major feature of the landscape. The Dehcho Land Use Planning Committee seeks to finalize its Land Use Plan (LUP) by March 2006.

One of the 30 land use zones identified in the Plan is Zone 6: Greater Nahanni Ecosystem (Nah?ā Dehé), which surrounds Nahanni National Park Reserve. The boundaries of the park reserve were established quickly in 1972 to protect the spectacular falls and canyons of the famed South Nahanni River from imminent hydroelectric development. Consequently, the Park Reserve is less than 10 km wide in some sections and encompasses only a small portion (14% or 4766 km<sup>2</sup>) of the South Nahanni River watershed.

Both the Dehcho First Nation and Parks Canada have a strong interest in providing for ecological integrity of the Greater Nahanni area. Together, they have articulated the following vision which embraces traditional ecological knowledge and principles of conservation biology:

Nah?ā Dehé will protect a wilderness watershed in the Mackenzie Mountains where natural processes such as fires and floods will remain the dominant forces shaping the park's ecosystems. Special features of the park, including waterfalls, hot springs, glaciers, plateaux, canyons, karst landscapes and cultural/spiritual sites will be preserved. Naturally-occurring plant communities will thrive and native animal species, including woodland caribou and grizzly bears, will be sustained at viable population levels.

Through a Memorandum of Understanding, Dehcho First Nations and Parks Canada have agreed to work together to expand Nahanni National Park Reserve within the Greater Nahanni Ecosystem. Under the Interim Measures Agreement (IMA) signed in 2003, approximately 85% of the South Nahanni River watershed within the Dehcho territory (excluding the present Nahanni National Park Reserve) was withdrawn from issuance of new dispositions for 5 years. The remaining 15% not withdrawn is comprised of 5 distinct blocks: (1) upper Prairie Creek, (2) upper Caribou River, (3) northwest of Tungsten, (4) Black Wolf Creek, and (5) upper Clearwater-Flood Creeks. The draft Dehcho LUP (November 2005) proposes that all of the Greater Nahanni Ecosystem (South Nahanni River watershed and the adjacent Nahanni Karstlands: 40,000 km<sup>2</sup>) be managed as a Conservation Zone (Zone 6) until new boundaries are approved for Nahanni National Park Reserve.

Wildlife species that use large, ecologically diverse areas can serve as useful ‘umbrellas’ or surrogates for conservation of other species. Specific information about the occurrence and seasonal ranges of such landscape species can provide important information for land use planning. The Nah?a Dehé Consensus Team for Nahanni identified ‘sahcho’ or grizzly bear (*Ursus arctos horribilis*), ‘medzih’ or woodland caribou (*Rangifer tarandus caribou*), and ‘doo’ or Dall’s sheep (*Ovis dalli dalli*) as pertinent species. Selection of this suite was appropriate because the problem of inadequate boundaries is especially acute for wide-ranging animals such as carnivores and northern ungulates that occur at low densities, possess lower resiliency to human impacts, and require large, secure areas to sustain viable populations. Empirical data on selected species provides a more credible basis for conservation planning than arbitrary political targets (Svancara et al. 2005).

I began surveys of grizzly bears in the Greater Nahanni area in 2002 and initiated studies on woodland caribou and Dall’s sheep in 2004. The purpose of this short report is to provide key findings of these on-going studies to the Dehcho LUP Committee. A final report will be available in the summer of 2006.

## **GRIZZLY BEAR**

Grizzly bears have low resiliency compared to other carnivores (Weaver et al. 1996). Their need for high-quality foods in spring and fall, their low reproductive rate, and their conservative dispersal (especially females) does not provide much resiliency in the face of human activities. Indeed, the drastic decline of grizzly bears throughout much of North America attests to their vulnerability and need for large, secure areas. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has designated the northwestern population of grizzly bears as one of ‘special concern’ (COSEWIC 2002a).

### **Methods**

In the late 1990’s, Canadian bear researchers and geneticists pioneered a new technique for surveying bears using non-invasive, scented stations to collect hair for DNA analysis (Woods et al. 1999). Such data can provide a rich set of information on the species, gender, individual identity, and genetic diversity of bears. I followed their basic protocols in the field (Weaver 2004); Wildlife Genetics International in Nelson, BC, conducted all DNA analyses (Paetkau 2003). During 3 seasons (2002-2004), my assistants and I established stations at 177 sites across the South Nahanni River (SNR) watershed (Map 1). We used data on grizzly visits to these stations along with digital data on terrain features and coarse classification of land cover types to construct a preliminary model and map of grizzly bear occurrence across the watershed (following Apps et al. 2004). We surveyed another 48 sites in 2005 to verify and refine the model.

### **Results**

During the June survey period (2002-2004), grizzly bears occurred at ‘high’ and ‘very high’ levels of relative abundance in the mountains and tributary valleys of the northern portion of the SNR watershed (Map 2). Grizzlies were less common in the boreal forests of the southwest sector of the watershed. Additional collection of hair at natural rub trees along the South Nahanni River revealed that grizzlies used the main river corridor,

primarily above Náǰlǰcho or Virginia Falls. We collected hair of various individuals (particularly males) at numerous sites that were 30-50 km apart. These distances suggest that these bears had home ranges perhaps as large as 2000 km<sup>2</sup>. In addition, several of the male grizzly bears detected in the Clearwater-Flood, Tungsten North, and Black Wolf grids also used the trails around Gahnǰhthah or Rabbitkettle Lake inside Nahanni National Park Reserve. Genetic analyses revealed that Nahanni grizzlies exhibit the highest level of genetic diversity (along with grizzlies in Kluane) found in grizzly bears across their North American range (Paetkau et al. 1998, David Paetkau, pers.comm.)

### **Discussion**

At present, Nahanni National Park Reserve is too narrow and too small to sustain a viable population of grizzly bears. The extensive block of boreal forest in the broadest portion of the South Nahanni River watershed does not support a high density of grizzly bears. The mountains and tributary valleys of the upper SNR watershed support high to very high occurrence of grizzlies and contribute importantly toward a viable population of grizzly bears.

Interim land withdrawals under the IMA did not protect several areas important to grizzly bear conservation, including upper Prairie Creek and upper Clearwater-Flood Creeks. Designation of Zone 6: Greater Nahanni Ecosystem as a Conservation Zone in the Dehcho LUP would protect important habitats for grizzly bears throughout the South Nahanni River watershed.

### **WOODLAND CARIBOU**

Woodland caribou in the boreal cordillera of western Canada use boreal forests in winter where they paw through shallow snow to feed on ground lichens. In spring, they migrate to alpine areas where they calve, spend the summer, rut in the fall, and stay some time during milder winters. Compared to other species of ungulates, woodland caribou have low resiliency to impacts on habitats and populations resulting from human activities (McLoughlin et al. 2003). The northern mountain population of woodland caribou has been designated as one of 'special concern' by the COSEWIC (2002b).

## Methods

I compiled locations of radio-collared woodland caribou in the SNR watershed from several sources. In March 1995, 25 adult female caribou were fitted with conventional (VHF) radio-collars near Virginia Falls; park wardens obtained locations a few times each year during 1995-1997 (Gullickson and Manseau 2000). From 1998 to 2002, 11 additional female caribou were fitted with satellite (PTT) radio-collars; locations were obtained every 5 days (A. Gunn and J. Adamczewski, personal communication). In October 2004, biologists with the Yukon Department of Environment captured 18 adult female caribou along the Yukon-Northwest Territory border and fitted them with satellite (PTT) radio-collars that provided locations every 5 days. Finally, the Sahtu Renewable Resources Board provided locations of caribou fitted with satellite radio-collars that use the SNR watershed. I thank all the caribou researchers for generous sharing of their data.

## Results

I have identified 3 distinct caribou herds that use portions of the South Nahanni River watershed: (1) Lower SNR herd, (2) Upper SNR herd, and (3) Redstone herd (Map 3).

The Lower SNR herd finds critical winter range inside Nahanni National Park Reserve below Náı́ııcho (Virginia Falls). In May, these caribou migrate quickly 100-200 km westward to the mountains of southeast Yukon where they calve and spend the summer. In early October, males and females group together for the rut along the Yukon-NT border. During milder winters, some caribou winter along the border whereas in harsh winters, they migrate eastward to lower areas in Nahanni with less snow cover. The annual home range of this herd is approximately 32,000 km<sup>2</sup>. Within the range of this herd, Yukon biologists counted 348 caribou in the LaBiche area in 1993 and 383 caribou in the upper Coal River area in 1997 (R. Florkiewicz, personal communication). Due to inclement weather during surveys, these were incomplete counts.

The Upper SNR herd winters along the South Nahanni River above Virginia Falls and in the Clearwater basin. In May, most of these animals migrate north 150-250 km to the northwest corner of the SNR watershed. Here, in the alpine areas northwest of Tungsten

to beyond Howards Pass, they calve, spend the summer, and rut during October. Afterwards, they migrate southward following the South Nahanni River or the Flat River. The annual range of this herd is approximately 16,000 km<sup>2</sup>. In 2001, biologists counted 781 animals and estimated the population size to be 940-1140 (Gunn et al. 2002).

The Redstone herd occurs mainly north of the South Nahanni River watershed in the Sahtu region. During May and June, some caribou from this herd have their calves in the headwaters region of the South Nahanni (Sahtu). During fall and winter, some Redstone caribou winter within Dehcho territory in the upper basin of the Clearwater and Cathedral Creeks in the SNR watershed and the upper basins of Thundercloud Creek and the North Nahanni River.

### **Discussion**

At present, Nahanni National Park Reserve is too narrow and too small to protect critical seasonal ranges (winter range, calving sites, rutting areas, and migratory routes) of several herds of woodland caribou. Interim land withdrawals under the IMA did not protect several areas important to woodland caribou, including alpine areas northwest of Tungsten, the upper Caribou River basin, and the upper Clearwater-Flood Creek basin. Within the Dehcho territory, designation of Zone 6: Greater Nahanni Ecosystem as a Conservation Zone would protect important caribou areas in the SNR watershed.

One of the winter ranges for the Redstone caribou, however, includes not only the upper Clearwater-Flood Creek basin but also the adjacent basins of Thundercloud Creek above Coates Lake and the North Nahanni River. Under the draft Dehcho LUP, a 3-km buffer zone along the North Nahanni River (Zone 18) is designated as a Conservation Zone. The section of the Thundercloud Basin nearest Coates Lake is designated as a Special Management Zone (Zone 25) where mining and oil and gas development would be permitted. The remainder of this wintering area for caribou is designated as a General Use zone in the draft Dehcho LUP. Recently, the Sahtu have proposed the area immediately adjacent to the north as a conservation area under the Sahtu LUP.

## **DALL'S SHEEP**

Dall's sheep are habitat specialists that use alpine tundra habitat near cliffs which provide adequate escape from predators. Moreover, in winter, sheep select sites where snow accumulation is shallow due to light snowfall or wind. Consequently, Dall's sheep occur in discrete 'islands' or patches of suitable habitat of varying size. Because suitable sites represent stable plant communities and enduring terrain features, sheep (particularly females) tend to stay 'at home' and not disperse very far (Geist 1971). Thus, sheep populations may be structured genetically by groups of related females or 'matrilines' occupying distinct, traditional ranges (Ramey 1993). During the Wisconsin glaciation (70,000 to 10,000 years BP), the Mackenzie Mountains represented the 'eastern arm' of Berengia and served as major refugia between the Laurentide and Cordilleran glaciers (Loehr et al. 2005).

### **Methods**

Based upon extensive field surveys, Simmons (1982) delineated the distribution of Dall's sheep throughout the Mackenzie Mountains. From the 1980s to present, NWT biologists and Parks Canada wardens periodically have conducted sheep surveys in the southern portion of the Mackenzie Mountains (Case 1985, Parks Canada 199?). We observed sheep from air and ground on the Nahanni Plateau, Ram Plateau, and Tlogotsho Plateau. We collected shed hair and faeces of sheep for possible DNA analysis, too.

### **Results**

Groups of Dall's sheep occur in suitable patches of alpine habitat scattered throughout the South Nahanni River watershed (Simmons 1982). Some of the larger patches of occurrence include the Tlogotsho Plateau, Nahanni Plateau, and Sunblood Range where winter snow pack is shallow and/or windblown. Recent genetic studies indicate that sheep throughout much of the Mackenzie Mountains share similar genetic structure (Worley et al. 2004). The distribution map (Simmons 1982) suggests that the mountainous divide at the head of Clearwater and Flood Creeks may serve as a landscape-level linkage for sheep in Nahanni to other sheep bands further north in the

Mackenzie Mountains. Dall's sheep on the Tlogotsho Plateau, however, exhibit a different genetic structure than sheep elsewhere in the Mackenzies (Worley et al. 2004).

During the course of sheep surveys, we discovered a concentration of caves used by sheep on the Nahanni Plateau (north of the Ram River) and others on the Ram Plateau. These karst caves on the Nahanni Plateau occur approximately 15 km to the west of the known extent of karst features (Derek Ford, personal communication). We documented 22 caves in one small basin (3 km<sup>2</sup>) and another 13 caves in the adjacent basin. We observed ewe-lamb pairs inside several of the caves. Sheep in the Nahanni Range further east also use caves (Case 1989, this study). Results from DNA analyses of the hair and faeces are pending.

## **Discussion**

Most of the important sheep ranges (i.e., Tlogotsho Plateau, Nahanni Plateau, and Sunblood Range) lay outside the present boundary of Nahanni National Park Reserve.

Discovery of sheep using the numerous caves on the Nahanni Plateau is notable in two respects. It extends the known occurrence of the Nahanni karst features which are considered the finest in the temperate latitudes of the world. Moreover, it represents the greatest concentration of wild sheep using caves documented anywhere in North America (personal communications with sheep biologists). The caves offer a moderate environment and shelter during both summer and winter. Typically, they are located in places where predators would find access very difficult. At the entrance to the caves, deep deposition of sheep faeces provides 'fertilization' whereas water dripping from the front edge of the cave roof provides 'irrigation'. Most of these cave entrances exhibited a lush growth of grass and forbs that appear as an oasis in a desert of stone. I hypothesize that this unique combination of cave and lush grass allows ewes with lambs to minimize risk of predation while having good forage, thereby increasing survivorship of lambs.

Designation of Zone 6: Greater Nahanni Ecosystem as a Conservation Zone in the Dehcho LUP would protect annual ranges of Dall's sheep in the South Nahanni River watershed as well as the continentally-unique occurrence of sheep using caves on the Nahanni and Ram Plateaus.

## CONCLUSIONS

The present boundaries of Nahanni National Park Reserve are too narrow and too small to provide for the seasonal needs and viable populations of grizzly bears, woodland caribou, and Dall's sheep. Interim land withdrawals under the IMA did not protect several areas important to these species, including

- upper Prairie Creek (grizzly bear and Dall's sheep),
- upper Caribou River (woodland caribou),
- northwest of Tungsten (woodland caribou), and
- upper Clearwater-Flood Creek (grizzly bear, woodland caribou, and Dall's sheep).

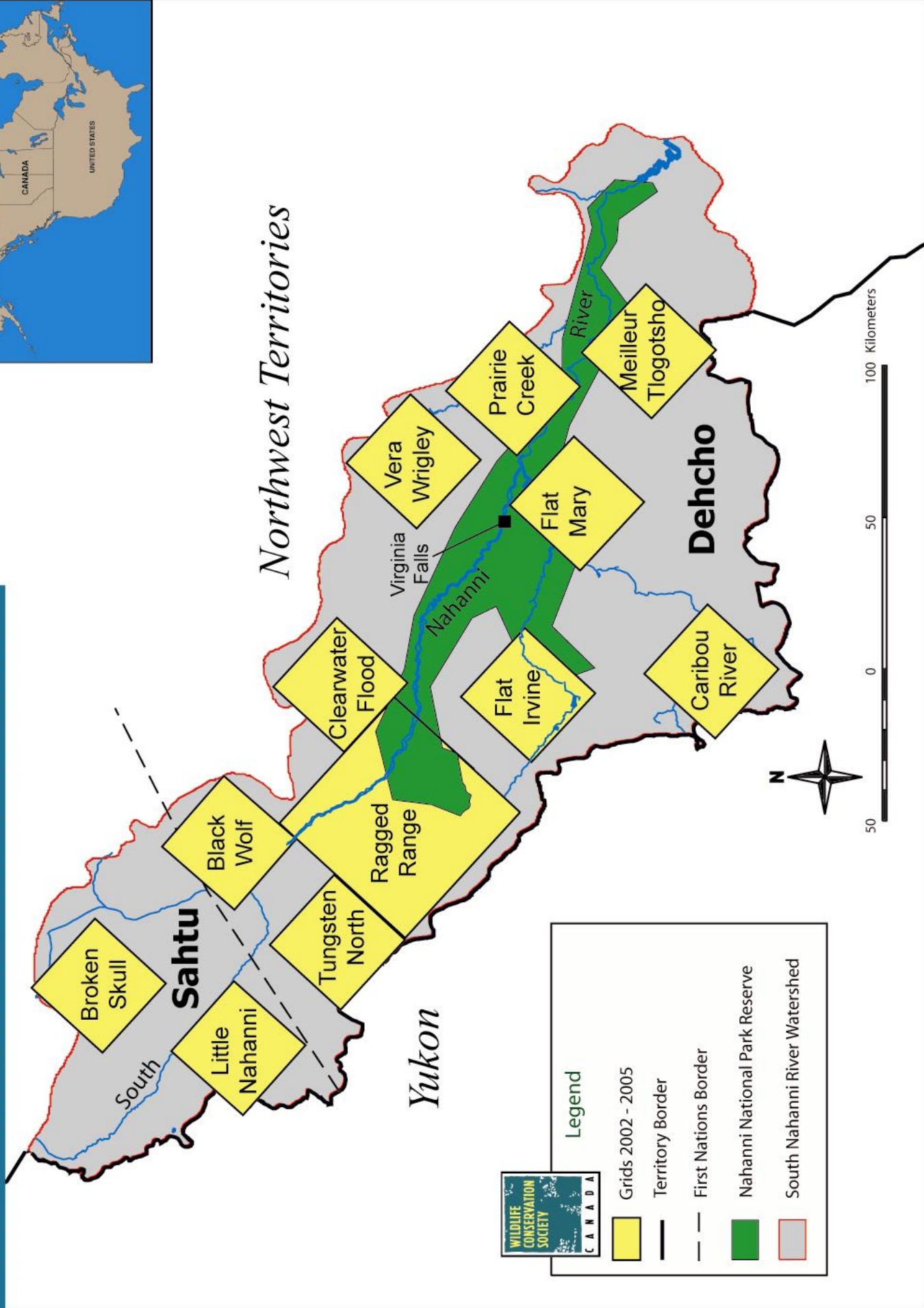
Designation of Zone 6: Greater Nahanni Ecosystem as a Conservation Zone in the Dehcho LUP would protect critical seasonal ranges, contribute substantially to sustaining viable populations, and safeguard unique phenomena for these important wildlife species.

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# Grizzly Bear Survey Grids in the South Nahanni River Watershed

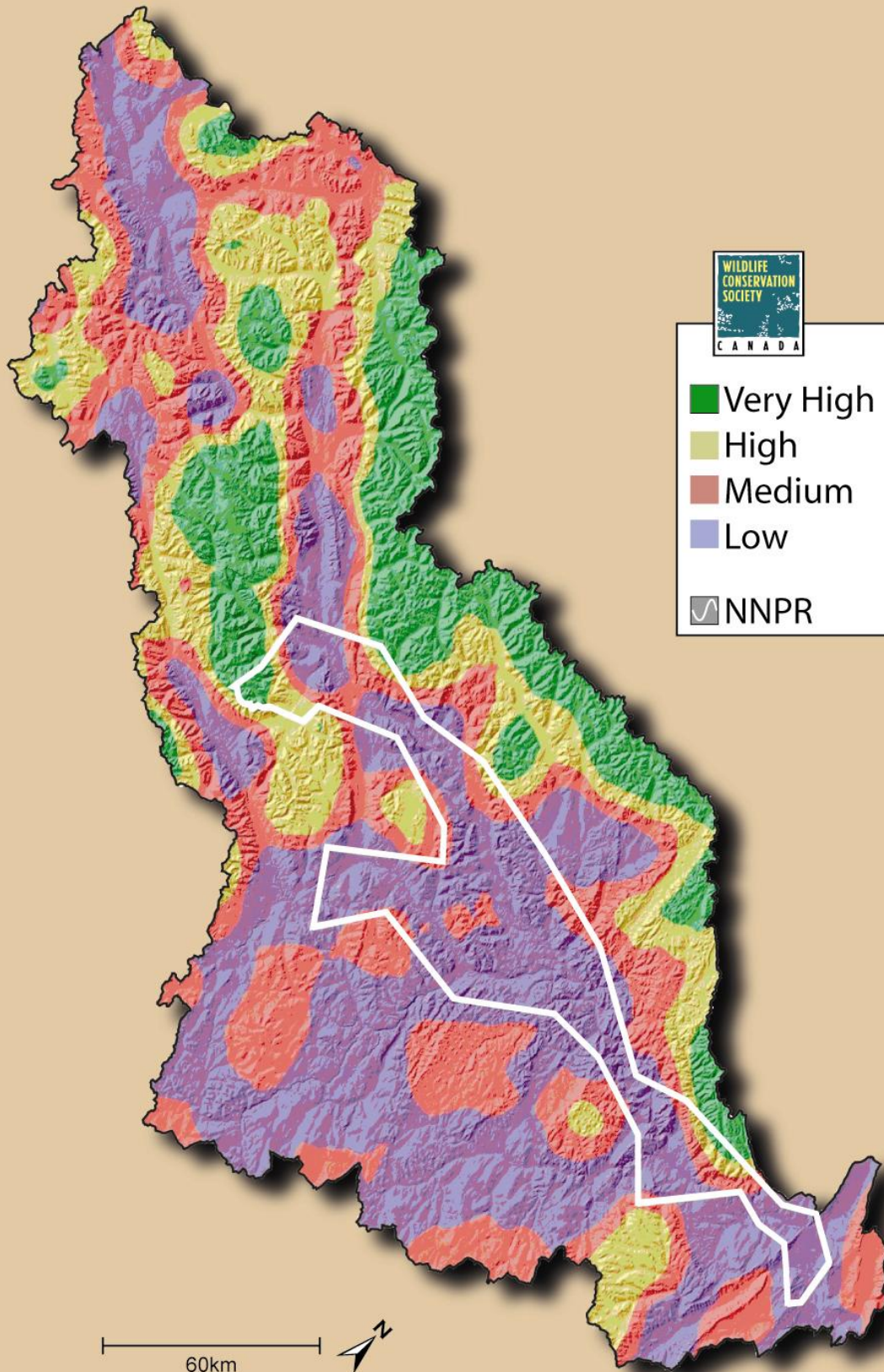


**Legend**

Grids 2002 - 2005
Territory Border
First Nations Border
Nahanni National Park Reserve
South Nahanni River Watershed



# Preliminary Model Grizzly Bear Occurrence South Nahanni River Watershed





### Legend

- Territory Border
- First Nations Border
- Nahanni National Park Reserve
- South Nahanni Watershed
- Redstone herd
- Upper South Nahanni herd
- Lower South Nahanni herd



*Northwest Territories*

