

## EXECUTIVE SUMMARY

This study was carried out according to the NWT Protected Areas Strategy's Ecological Assessment Guidelines (NWT-PAS 2002). It provides an assessment of the ecological values of the Pehdzeh Ki Ndeh, Northwest Territories (NT). The objective is to provide an inventory of key ecological components in order to better plan and manage the area to maintain biodiversity and ecological processes. For the purposes of this report, the Study Area includes the Pehdzeh Ki Ndeh Area of Interest (the Area of Interest), an area of approximately 17,053 km<sup>2</sup>. The majority of the Area of Interest land area is located to the east of the Mackenzie River around the community of Wrigley, NT but incorporates a narrow corridor to the west of the river as well. The Study Area also includes the Sahtu portion of the Blackwater River watershed in addition to all of the land within a 25 km Buffer Zone around these two adjacent components.

This assessment includes the following ecological components:

- topography, geology and soils;
- general climate;
- hydrology;
- vegetation; and
- wildlife (fish, amphibians, mammals, and birds).

The report also identifies knowledge gaps and provides recommendations on potential future studies. In a last step, recommendations are made with regards to the development of long-term ecological management strategies.

### Topography

The Study Area encompasses a section of complex terrain with a range in elevation of approximately 100 m to 1,500 m. This area includes many low lying wetlands, including part of the Mackenzie River Valley as well as Blackwater Lake, Fish Lake, Greasy Lake, Keller Lake, and Tseepantee Lake and the Mackenzie River, Blackwater River, Ochre River and the River Between Two Mountains. Within the western part of the Study Area lie the Franklin Mountains. The highest point in the Study Area is the top of Cap Mountain in the McConnell Range at 1,577 m. Within the 25 km Buffer Zone, and extending to the west of the Mackenzie River, are the Mackenzie Mountains.

### Geology

Geologically, the bedrock of Pehdzeh Ki Ndeh is divided into two sections. The Franklin Mountains and west into the Mackenzie Mountains are part of the Cordilleran Orogen. The rest of Pehdzeh Ki Ndeh is part of the Interior Platform. The surficial geology of the area is mostly glacier-influenced with more recent contributions by water and other erosional forces. The majority of the Study Area, especially east of the Franklin

Mountains, is till blanket. Along the Mackenzie River valley fine-grained lacustrine deposits predominate and, on the Franklin Mountains, till veneer. There are pockets throughout the area showing a range of other types of surface geology including complex glaciofluvial deposits, plain glaciofluvial deposits, colluvial rubble and colluvial fines.

### **Soils**

In terms of soil-type arrangement, Pehdzeh Ki Ndeh can be thought of as divided into roughly three north-south aligned portions. The soils of the westernmost portion are predominantly eutric brunisols; the soils of the middle portion, brunisolic turbic cryosols; and the soils of the east portion, organic cryosols. The ground within the Study Area is believed to be generally characterized as extensive discontinuous permafrost.

### **General Climate**

The Study Area touches on nine different ecoregions. The majority of the Study Area lies in three of these: the Mackenzie River Plain, the Franklin Mountains, and the Norman Range. Climatic data are described for each ecoregion separately. Across the three dominant ecoregions, the mean annual temperature ranges from -5.5°C to -6.5°C and the mean seasonal temperature of the Study Area ranges from -25.5°C in the winter to 13°C in the summer. Mean annual precipitation ranges from 225 mm to 400 mm. In the Wrigley area, winds generally blow from the south or the east, with average wind speeds across the Study Area increasing with elevation. Reported wind speeds vary between 7 m/s (close to the ground up to 30m height) to 8.5 m/s at 80m height or over lakes.

### **Hydrology**

The Study Area has five main watersheds. The Blackwater River, Ochre River and River Between Two Mountains drain into the Mackenzie River, a part of which flows through the Study Area. Keller Lake and Tseepantee Lake drain into the Johnny Hoe River in the east of the Study Area and from there into Great Bear Lake. Blackwater Lake, Fish Lake, Greasy Lake, Paeenfee Lake, Notseglee Lake, Long Lake, Highland Lake, and Tih K'ae Lake are other notable lakes within the Study Area. The Keele River, Redstone River, Dahadinni River, Johnson River, and Wrigley River also lie within the Study Area although outside of the Pehdzeh Ki Ndeh boundary, on the west side of the Mackenzie River.

### **Vegetation**

Most of Pehdzeh Ki Ndeh is considered coniferous forest. There is a sizable portion of transitional forest in the north-east of the region and a small piece of mixed forest in the extreme south-west. Additionally, the Study Area is divided into areas with differing percentages of endemic wetlands.

Pehdzeh Ki Ndeh's vegetation is dominated by open stands of black spruce with an understory of dwarf birch, Labrador tea, ericaceous shrubs, lichen and moss. White spruce, paper birch, and aspen grow in the Study Area in drier and warmer sites. The land in the western boundary of the Study Area is occupied by tall, closed stands of black spruce and jack pine with an understory of feathermoss, berries, Labrador tea and lichen.

Lacking a published Pehdzeh Ki Ndeh specific vegetation study, the species listed in another assessment on the neighbouring Edézhíe Candidate Protected Area is used in this report as a reference for species which may occur within Pehdzeh Ki Ndeh. This list was cross-referenced with lists of species with a less than secure conservation ranking by SARA (2006), COSEWIC (2006) and the GNWT (GNWT, ENR 2006c). Neither SARA (2006) nor COSEWIC (2006) have ranked any of the plant species thought to occur in the Study Area. However, the GNWT has ranked thirty of these plant species which occur or may occur in Pehdzeh Ki Ndeh as 'may be at risk' and fifty-nine as 'sensitive' (GNWT, ENR 2006c). Seven of these plants have been characterised as 'rare species' in the NWT (McJanet *et al.* 1985).

Patches of Pehdzeh Ki Ndeh have undergone forest fires since records began in the mid 1960's, but the majority of the area has been relatively little influenced by fire. Scattered small fires through the years have helped to maintain landscape units in different successional stages – a vital ecosystem component for the perpetuation of many species of plants and animals.

### **Wildlife**

There are reportedly 308 wildlife species in the Dehcho Region including 36 species of fish, 3 species of amphibians, 56 species of mammals, and 213 species of birds.

Of the 26 more common fish species in the area, the GNWT lists three as 'sensitive' and one as 'may be at risk' (GNWT, ENR 2006c). The arctic grayling, brook stickleback, and walleye are 'sensitive' and the inconnu is 'may be at risk'. The population of each of these fish species is estimated at over 10,000, but various other environmental factors influence the conservation ranking.

Three species of amphibians possibly occur within the boundaries of the Study Area. The northern leopard frog, identified by calls in neighbouring Edézhíe in 2005, is the only amphibian species of concern. It received a 'special concern' ranking from both SARA (2006) and COSEWIC (2006) and a 'sensitive' listing from the GNWT (GNWT, ENR 2006c).

EBA and CWS (2005) list thirty-six mammal species as occurring in neighbouring Edézhíe. Five of these mammals have been rated with a less than secure conservation status by SARA (2006), COSEWIC (2006), or the GNWT (GNWT, ENR 2006c). SARA (2006) and COSEWIC (2006) list boreal woodland caribou as 'threatened' and mountain woodland caribou as 'special concern' while the GNWT lists them as 'sensitive' and 'secure', respectively (GNWT, ENR 2006c). Grizzly bear and Wolverine are not listed by SARA (2006), but are both listed as 'special concern' by COSEWIC (2006) and as 'sensitive' by GNWT (GNWT, ENR 2006c). The fisher is listed as 'sensitive' by GNWT (GNWT, ENR 2006c).

Of the 213 birds that exist in the Dehcho Region (DLUPC 2006a), 11 have been assigned less than secure conservation rankings. SARA lists the short-eared owl as 'special concern' and the *anatum* population of peregrine falcons as 'threatened' (2006). COSEWIC lists both species as 'special concern' (2006). The GNWT has ranked the trumpeter swan, long-tailed duck, short-eared owl, peregrine falcon, red-necked

phalarope, American bittern, lesser yellowlegs, white throated sparrow, American tree sparrow, boreal chickadee, and barn swallow and as 'sensitive' (GNWT, ENR 2006c).

Decreases in continental populations of long-tailed duck, red-necked phalarope, lesser yellowlegs, American bittern, white-throated sparrow, American tree sparrow, boreal chickadee, and barn swallow have been noted although data on populations in the Northwest Territories are insufficient to judge directional trends (GNWT, ENR 2006c).

### **Data Deficiencies**

The low population and limited accessibility of Pehdzeh Ki Ndeh have resulted in fewer studies being conducted in the Study Area than in more populated, more accessible areas. A variety of ongoing studies and their objectives are listed as well as data gaps identified and potential studies recommended.

### **Long-term Ecological Monitoring Strategies**

The Tourism and Parks Division of the Industry, Tourism and Investment (ITI) Department of the GNWT is responsible for the establishment, development, operation and maintenance of Territorial Parks and their facilities in the NWT. There are several possible designations of Territorial Parks, one of them being a Cultural Conservation Area, which is the proposed designation for the Pehdzeh Ki Ndeh Area of Interest.

A Cultural Conservation Area protects a culturally significant site or landscape. Industrial activity may be prohibited (GNWT, Department of Justice 2003). According to the Territorial Parks Act, a designated park representative may issue a park use permit authorizing a person to use resources within the park boundaries. There are no restrictions for the purpose of subsistence hunting and fishing in a Cultural Conservation Area for Aboriginal people.

Long-term management strategies should be developed that take into account both the management of resources as well as resource uses. One way to control activities within park boundary is the requirement of park use permits. Additionally, permits can entail specific conditions aimed at the protection of valuable or sensitive resources that play an integral role in the park ecosystem.

In addition to including permit conditions, there are steps that can be initiated through ITI to protect valuable resources within the park:

- Establish a full range of trail routes that may be used by visitors;
- Monitor any damage caused by visitors and recommend rerouting or closing trails;
- Develop and make available appropriate signage and interpretive material;
- If necessary limit the numbers of visitors to certain areas or at certain times;

- No commercial harvesting of trees from within the boundaries of the park should be permitted; and
- Firewood should be provided at campsites in the park.

## PLAIN LANGUAGE SUMMARY

### Why an Ecological Assessment?

The Northwest Territories Protected Areas Strategy (NWT-PAS) is a process for making decisions about protecting areas of land. A very important step in the process is to gather all the information about an area so that good long-term decisions can be made. This Ecological Assessment has all the information that is known about things like plants and animals in Pehdzeh Ki Ndeh.

### What is in an Ecological Assessment?

The specific topics that were studied for this report are:

- topography, geology, and soils;
- general climate;
- hydrology;
- vegetation (plants);
- wildlife (fish, amphibians, mammals, birds);
- data deficiencies; and
- long-term management strategies

### The Study Area

The community of Wrigley drew the boundary around Pehdzeh Ki Ndeh. The Study Area of this report looks at that area, plus the rest of the Blackwater Lake watershed in the Sahtu Region, and an extra buffer area around both.

### Shape of the Land

The land in the Study Area rises to 1,500 metres above sea level. It includes part of the Franklin and Mackenzie Mountains as well as many low-lying wetlands. The Study Area has five main watersheds. The Blackwater River, Ochre River and River Between Two

Mountains drain into the Mackenzie River, a part of which flows through the Study Area. Keller Lake and Tseepantee Lake drain into the Johnny Hoe River and then into Great Bear Lake. Blackwater Lake, Fish Lake, Greasy Lake, Paeenfee Lake, Notseglee Lake, Long Lake, Highland Lake, and Tih K'ae Lake are other important lakes within the Study Area. The Keele River, Redstone River, Dahadinni River, Johnson River, and Wrigley River also lie within the Study Area, but outside of the Pehdzeh Ki Ndeh boundary, on the west side of the Mackenzie River.

## **Earth and Air**

Glaciers formed the surface of the land thousands of years ago, moving most of the soil that is now to the east of the Franklin Mountains. However, most of the soil in the Mackenzie River valley has been moved around by the river. There is permafrost underneath most of the Study Area. The temperature ranges from -25.5°C in the winter to 13°C in the summer.

## **Plants**

Most of Pehdzeh Ki Ndeh is wetlands. There have been some forest fires, and plants and animals that like open spaces have moved into burnt areas. Of all the types of plants in Pehdzeh Ki Ndeh, the territorial government says that thirty types 'may be at risk' and fifty-nine are 'sensitive.' Researchers say that seven types are 'rare species.'

## **Wildlife**

Biologists estimate that there are 308 types of animals in the Dehcho Region, including 36 types of fish, 3 types of amphibians (frogs), 56 types of mammals (bears, caribou, wolf, etc.), and 213 types of birds. They have concerns about the population numbers of many of these animals. The federal and territorial governments compiled lists of animals and plants that may need some sort of protection. These lists include four types of fish (arctic grayling, brook stickleback, walleye, and inconnu), one type of frog (northern leopard frog), five types of mammals (boreal woodland caribou, mountain woodland caribou, grizzly bear, wolverine, and fisher), and eleven types of birds (trumpeter swan, long-tailed duck, short-eared owl, peregrine falcon, red-necked phalarope, American bittern, lesser yellowlegs, white-throated sparrow, American tree sparrow, boreal chickadee, and barn swallow).

## **What We Do Not Know**

Because Pehdzeh Ki Ndeh is difficult to get to and not many people live there, there have not been many studies of the area. During the last years, several studies were started but more information is needed to determine how to use and manage the land. Some ways to gather information are: take photos from the air; count fish numbers; do surveys on health, numbers, pregnancies, and ranges of animals and birds. Traditional Knowledge could be the basis for this information.

## **Thinking Long-Term**

If Pehdzeh Ki Ndeh becomes a protected area by law, subsistence hunting and fishing will continue to be allowed. Other uses of the land will be written into a management plan. In the final section, this report makes some specific suggestions about how to manage the land so that the water stays clean and the wildlife stays healthy.