ECOLOGICAL REGIONS OF THE NORTHWEST TERRITORIES

CORDILLERA

Photo Credit: D. Downing

Northwest Territories Environment and Natural Resources

Healthy natural ecosystems are critical to our well-being; they provide us with clean air and clean water, a wide range of renewable resources, and the opportunity to enjoy landscapes with their rich diversity of plant and animal communities. Climate and topography act together to produce ecosystems that can range in size from lichen communities on a piece of granite to landscapes the size of Great Bear Lake. Understanding what differentiates one ecosystem from another is an important part of wisely managing the natural resources of the Northwest Territories for present and future generations. These differences can be described by dividing the vast tundra, boreal and mountain landscapes into smaller areas that have unique combinations of climate, terrain, vegetation, soils and wildlife. These are called ecological regions (ecoregions).

The Northwest Territories is developing an ecologically-based landscape classification for environmental assessment, cumulative effects management, biodiversity monitoring and reporting, forest resource analysis and planning, wildlife habitat evaluation and conservation, and protected area identification. Such a classification is essential for responding to local, regional, national and international information needs, and the Northwest Territories is working with other Canadian provinces and territories to develop a coordinated North American continental approach to ecological classification. The mountains, high plateaus and foothills of the Northwest Territories described in this poster are collectively referred to as the Cordillera. They are unique and important landscapes with highly diverse geology, climate, vegetation and wildlife features.

Ecological classification and mapping for the Cordillera is presented within an ecoregion framework for continental North America that includes four levels, from very large Level I ecoregions that represent ecosystems of global extent to relatively small Level IV ecoregions that represent ecosystems of several thousand square kilometres or less. The Northwest Territories includes parts of three Level I ecoregions: *Tundra, Taiga* and *Northwest Forested Mountains*. Eight Level II ecoregions are nested within the Level I ecoregions and 18 Level III ecoregions are grouped under the Level II ecoregions. The Northwest Territories Cordillera is unique because it contains portions of all three Level I ecoregions. The Level II ecoregions of the Cordillera include the *Tundra Cordillera*, *Taiga Cordillera* and *Boreal Cordillera*. Other Level II ecoregions, such as the adjacent Taiga Plains and Taiga Shield, occur entirely within one Level I ecoregion.

Five Level III ecoregions are nested within the Level II ecoregions of the Cordillera: the *Tundra Cordillera High Subarctic (HS)*, the *Taiga Cordillera High Subarctic (HS)*, the *Taiga Cordillera Low Subarctic (LS)*, *the Boreal Cordillera High Boreal (HB)* and the *Boreal Cordillera Mid-Boreal (MB)*. Level III ecoregions are identified primarily by regional climate differences reflected in the soils and vegetation characteristic of each ecoregion. The Level III ecoregions of the Cordillera are further divided into 36 Level IV ecoregions that are defined by a characteristic pattern of terrain and vegetation.

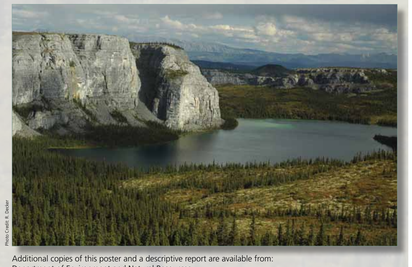

Photo Credit: A. Fisher

Additional copies of this poster and a descriptive report are available from:
Department of Environment and Natural Resources
P.O. Box 1320, Yellowknife, NT X1A 2L9
Phone: (867) 920-8064, Fax: (867) 873-0293, Web site: www.enr.gov.nt.ca

TUNDRA CORDILLERA

Photo Credit: D. Downing

Martin Creek cuts deeply into shale and sandstone plateaus east of the distant Richardson Range. The *Tundra Cordillera HS Ecoregion* contains elements of both the sparsely treed High Subarctic and mainly treeless Low Arctic ecoclimates. A few trees can grow in the valleys (dark tones) where the south slopes and river terraces are warmer and somewhat protected, but the plateau tops are windswept and cold, and only Arctic tundra plants can grow there.

Tundra Cordillera – High Subarctic (HS) Ecoregion

The *Tundra Cordillera High Subarctic (HS) Ecoregion* is the most northerly and the coldest and driest of the Cordillera Level III ecoregions. It covers just over 7,800 km^2 and includes two Level IV ecoregions between the Mackenzie Delta and the Yukon-Northwest Territories border. Elevations are only 30 mASL on the sloping plateau along the boundary with the Mackenzie Delta west of Aklavik, rising to over 1,000 mASL in the Richardson Mountains to the west. Part of the area was glaciated by the last Continental ice sheet, but the western mountains have not been glaciated for at least two million years. Lower elevations are blanketed by till deposits, but upper slopes and peaks are weathered shales, sandstones and limestones. Permafrost is continuous. Alpine tundra or non-vegetated terrain dominates, with open subalpine woodlands at lower elevations and in valleys; the Ecoregion is transitional to a Low Arctic climate at the extreme north end.

A few small rivers and streams originate in the Richardson Mountains and flow through the Ecoregion; lakes are small and scattered.

Photo Credits: D. Downing & Parks Canada

Extensive sedge and cotton-grass fens underlain by continuous permafrost cover the lower elevation foothills and plateaus in the *Tundra Cordillera HS Ecoregion*. Tall shrub thickets of dwarf birch, green alder and willow are common in somewhat protected areas, such as around the edges of ponds and in stream gullies and valleys. Bumblebees and other insects are active in the brief Arctic summer, gathering pollen and nectar from marsh ragwort (inset) and a variety of other tundra plants.

Photo Credit: J. Wilson

Cryoplanation terraces are a unique feature of the *Tundra Cordillera HS Ecoregion* and are found nowhere else on the Northwest Territories mainland. They develop in cold climates with continuous permafrost. The green-gold areas are moist sedge-cottongrass meadows; the gray steplike features are rounded lichen-covered quartzite boulders that are slowly pushed out and down by frost heaving.

Photo Credit: C. Donohue

A major migration corridor for caribou of the Porcupine Herd passes through the *Tundra Cordillera HS Ecoregion*. These caribou calve on the north slope of the Yukon and Alaska, and usually winter south of the Peel River in the Yukon. During some winters these caribou may winter east as far as the Northwest Territories Richardson Mountains and southward to the northern Taiga Cordillera.

Photo Credit: J. Nagy

American Pipits may be the most abundant alpine-inhabiting bird species in the Northwest Territories Cordillera. Pipits are insectivorous in the summer and add seeds to their diet when insects become unavailable. They are seen most often on the ground foraging for insects and are one of the few songbirds that nest exclusively in Arctic and alpine tundra.

TAIGA CORDILLERA

Photo Credit: D. Downing

The Arctic Red River is one of two major rivers that flow through the *Taiga Cordillera HS Ecoregion* in the Northwest Territories. Its valley walls provide sheltered places where spruce woodlands can develop, and well-drained river terraces that support willow, balsam poplar and spruce stands. On the adjacent uplands, tree growth is sparse and Arctic-alpine tundra forms greenish-golden patches over continuous permafrost.

Taiga Cordillera – High Subarctic (HS) Ecoregion

The *Taiga Cordillera High Subarctic (HS) Ecoregion* is part of the main mountain chain between the Taiga Plains and the Yukon-Northwest Territories border. It is roughly triangular, and contains three Level IV ecoregions with an area of over 24,000 km^2 extending east from the Yukon-Northwest Territories border; the Mountain and Carcajou Rivers form its approximate southern boundary. Rugged mountains reaching heights of over 2,000 mASL dominate the west and south. A broad dissected lower elevation plateau arcs across the northern third. The mountains and plateaus are composed of ancient Precambrian to Paleozoic shales, sandstones and limestones that are horizontally layered on the plateaus and steeply tilted, folded and faulted elsewhere. Short, cold summers and long, very cold winters retard tree growth, and open stunted spruce woodlands occupy the lower valleys, with alpine tundra or rock barrens at higher elevations. Permafrost is continuous. The Arctic Red, Mountain, Gayna, Stone Knife and Carcajou Rivers originate in or flow through this ecoregion. Lakes and wetlands are uncommon.

Photo Credits: D. Downing & Parks Canada

Arctic-alpine tundra is the dominant vegetation cover in the *Taiga Cordillera HS Ecoregion* above about 1,200 metres ASL; dwarf birch, willow, Arctic bearberry and sedges are characteristic, and appear here in late summer russet and gold colours. On middle to lower slopes, open white and black spruce woodlands are interspersed with moist sedge – cottongrass and shrub meadows. Rock cranberry (inset) is a low woody evergreen shrub that is common throughout the Northwest Territories, with berries that turn a glossy red after the first late summer frosts.

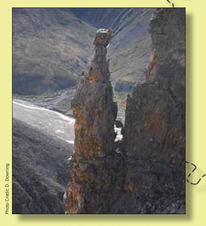

Photo Credit: D. Downing

Some areas in the *Taiga Cordillera HS Ecoregion* and elsewhere in the Northwest Territories Cordillera remained ice-free during the last glacial advance as indicated by tors (pillars of erosion-resistant rock). This sandstone tower high above the valley floor would have been sheared off if glacial ice had occupied the valley or flowed down from higher elevations.

Photo Credit: C. Donohue

The *Taiga Cordillera HS Ecoregion* provides important habitat for Dall's sheep, which range in patchy concentrations throughout the Northwest Territories Cordillera, mainly above the tree line. Rams often occur as small groups in exposed rocky terrain that provides good visibility and ready escape from predators. Although habitat appears favourable in the Franklin Mountains east of the Mackenzie River, there has never been any evidence of Dall's sheep in this area.

Photo Credit: S. Gardiner

For most of the year, Harlequin Ducks inhabit coastal salt water environments, but in spring move inland to occupy fast-flowing rivers and streams that provide suitable breeding habitat. During the breeding season, they occur in small numbers throughout the Cordillera and then winter along the British Columbia and Alaska coastlines. As agile divers, they feed on aquatic insects in turbulent streams. The striking and colourful plumage of the male, or drake, makes it one of the most attractive of sea ducks.

Photo Credit: D. Downing

The Keele River is the largest of several major rivers that flow west to east through the *Taiga Cordillera LS Ecoregion*. It originates in high mountains to the west, and its fast-flowing waters produce many narrow braided channels and bare, frequently flooded and ice-scoured gravel bars. Light green shrublands and mixed or pure spruce, paper birch and balsam poplar forests grow on higher terraces. Closed, dark green white and black spruce forests occur adjacent to the river in the valley bottoms and lower slopes, giving way to open spruce forests and alpine tundra at higher elevations.

Taiga Cordillera – Low Subarctic (LS) Ecoregion

The *Taiga Cordillera Low Subarctic (LS) Ecoregion* is the largest Level III ecoregion in the Cordillera, covering over 75,000 km^2 and including 12 Level IV ecoregions. The eastern and northern portions are a complex of valleys, plains, plateaus and foothills from 300 to 1,000 mASL. The western and southern portions include high-elevation peaks, plateaus and ridges that average over 1,500 mASL. Paleozoic and Precambrian sedimentary rocks are exposed in the mountain ranges. The higher western ranges intercept Pacific moisture and create a rainshadow to the east. Small glaciers occur on northerly slopes in the highest mountain ranges. There are several well-defined vegetation zones, with rock barrens and lichen crusts at the highest elevations, alpine tundra at middle elevations and open spruce woodlands in valley bottoms. Permafrost is continuous in the north and discontinuous in the south. The Mackenzie, Arctic Red, Mountain, Carcajou, Keele, Twitya, Gayna, Redstone, Raven's Throat, Root and Dahadinni Rivers flow through or originate within the Ecoregion. Shallow lakes and wetlands are locally common in the lower elevation plains and foothills in and adjacent to the Mackenzie River valley.

Photo Credits: D. Downing & Parks Canada

Broad, treed valleys are characteristic of the eastern parts of the *Taiga Cordillera LS Ecoregion*. Continental glaciers flowed deep into some of these valleys and left till mounds behind, sometimes high above the adjacent valleys. Some of these acted as dams and lakes formed behind them, such as Mud Lake in this image. The inset shows the south-facing slope of this till mound, which presently supports an open white spruce woodland with an understory of dwarf birch and alpine bilberry.

Photo Credit: D. Downing

Grizzly bears range throughout the Northwest Territories Cordillera, except for the Franklin Mountains east of the Mackenzie River. Some of the best habitat for grizzly bears in the Taiga and Boreal Cordillera lies within the *Taiga Cordillera LS Ecoregion*. Although grizzly bears prefer open alpine or tundra habitats, may also spend considerable time foraging in forested areas. Low grizzly bear numbers and low recruitment prompted significant hunting restrictions in 1982 that remain in effect today.

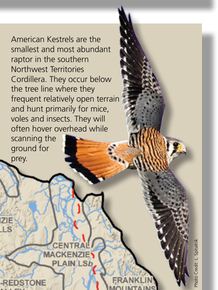

Photo Credit: D. Downing

American Kestrels are the smallest and most abundant raptor in the southern Northwest Territories Cordillera. They occur below the tree line where they frequent relatively open terrain and hunt primarily for mice, voles and insects. They will often hover overhead while scanning the ground for prey.

BOREAL CORDILLERA

Photo Credit: D. Downing

The Tetcela River meanders in broad loops through the broad valley between the Nahanni Range and Ram Plateau in the eastern part of the *Boreal Cordillera HB Ecoregion*. Dense, tall stands of aspen and balsam poplar (light green), mixed with white spruce (dark green) indicate the influence of a milder Boreal climate.

Boreal Cordillera – High Boreal (HB) Ecoregion

The *Boreal Cordillera High Boreal (HB) Ecoregion* covers about 33,000 km^2 and includes 10 Level IV ecoregions. It is a landscape of broad valleys and lowlands, deeply dissected plateaus, long ridges and rugged limestone peaks. A relatively mild climate contributes to Ecosystem diversity. Tall, dense lowland spruce and deciduous forests, lodgepole pine stands, spruce woodlands, a variety of wetlands and alpine tundra communities all occur in this Ecoregion. In the last ice age, the western third of the Ecoregion was covered by mountain glaciers and the eastern third by the westernmost extent of huge continental ice sheets, but central parts have not been glaciated for more than 350,000 years. The Ecoregion has globally significant karst (eroded limestone) terrain and cave systems, and there are several thermal springs. Permafrost is discontinuous. The Mackenzie, Root, North Nahanni, South Nahanni, Tetcela, Ram and Flat Rivers are the main rivers. Lakes and wetlands (peat plateaus, fens and veneer bogs) occur mainly in the low elevation eastern third of the Ecoregion.

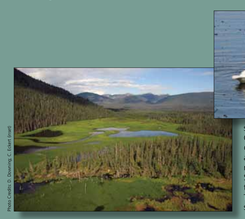

Photo Credits: D. Downing & Parks Canada

Lush horsetail and sedge fens occupy shallow water and mud flats at the east end of Carlson Lake in the southern part of the *Boreal Cordillera HB Ecoregion*. These wetland types are another indicator of milder Boreal climates that do not occur in the colder and somewhat drier Low Subarctic or High Subarctic Ecoregions further to the north. They provide high quality habitat for Trumpeter swans (inset), moose and other wildlife species.

Photo Credit: D. Downing

The range of Alaska-Yukon moose, the largest subspecies, includes the Northwest Territories Cordillera. Mature bulls often exceed 600 kg in weight and may have antler spans approaching two meters. Recent extensive burns in the *Boreal Cordillera HB Ecoregion* have created optimal habitat conditions for moose.

Photo Credit: D. Downing

Globally significant caves, sinkholes and other erosional "karst" features occur throughout the Ram Plateau in erodible Paleozoic limestones common in the southeastern portion of the *Boreal Cordillera HB Ecoregion*. Scimitar Canyon is the remarkable result of fast-flowing waters that cut down into limestones along narrow fractures, producing sheer canyon walls over 50 metres high in places.

Photo Credit: D. Downing

The deep-blue Island Lakes occupy potholes that formed when buried blocks of glacier ice melted and the overlying sediments collapsed. Dense and diverse spruce, aspen, balsam poplar and lodgepole pine forests, typical of the valley bottoms throughout the *Boreal Cordillera MB Ecoregion*, grow on terraces and eskers adjacent to the South Nahanni River south of its confluence with Little Nahanni River.

Boreal Cordillera – Mid-Boreal (MB) Ecoregion

The *Boreal Cordillera Mid-Boreal (MB) Ecoregion* includes nine Level IV ecoregions, mainly in the southwesternmost part of the Cordillera along the Yukon-Northwest Territories border, and covers about 24,000 km^2. Jagged granite spires, limestone and shale peaks, deep forested valleys, icefields and glaciers define this remarkable area. The mountains reach higher elevations in this Ecoregion than anywhere else in the Cordillera, and comb rain and snow from Pacific weather systems. The resulting moist, relatively mild climate allows the development of diverse and vigorous alpine, subalpine and boreal communities, with an array of species that do not occur elsewhere in the Northwest Territories. The largest icefields and glaciers in the Northwest Territories occur here and are remnants of the last ice age, sustained by cold temperatures and high snowfalls. Permafrost is discontinuous. The Keele, South Nahanni, Natla, Flat, Broken Skull and Caribou Rivers are the main rivers. Wetlands are locally common on the Natla Plateau in the northwest part of the Ecoregion.

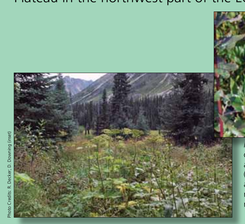

Photo Credits: D. Downing & Parks Canada

Cow parsnip, fireweed, wild red raspberry, reed bent-grass and other shrubs, forbs and grasses inhabit highly productive, diverse open meadows between groves of white spruce and alpine fir along the Flat River near Tungsten. Plant communities within the *Boreal Cordillera MB Ecoregion* have much in common with those of mountain valleys and alpine areas in Alberta and British Columbia. The arrow-leaved groundsel (inset) is common in mountains to the south and west, but in the Northwest Territories it is restricted to the southwestern corner, where relatively mild climates with snowy winters occur.

Photo Credit: D. Downing

Jagged peaks and large glaciers are defining landscape features of the *Boreal Cordillera MB Ecoregion*. The granitic tower in the foreground is part of the "Cirque of the Unclimbables" near Glacier Lake, an internationally-renowned destination for climbers. The ice-covered mountains in the distance are composed of Paleozoic and Precambrian limestones, shales and sandstones.

Photo Credit: R. Decker

Mountain goats have a patchy distribution throughout a broad area encompassing much of the southern Northwest Territories Cordillera. They are most abundant within the high elevation rugged mountain ranges in the southern *Boreal Cordillera MB Ecoregion* near the Yukon border. Mountain goats select areas above the tree line in subalpine and alpine zones that are characterized by exposed cliff faces, ledges, pinnacles and talus slopes. This habitat allows wind action to expose winter forage, and is also important as escape terrain. To access mineral licks, mountain goats will also venture well into low-elevation forested areas. Compared to Dall's sheep, mountain goats tend to occupy steeper terrain, and their distribution is thus more restricted.

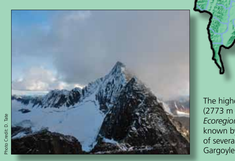

Photo Credit: D. Tate

The highest mountain in the Northwest Territories (2773 m ASL) lies within the *Boreal Cordillera MB Ecoregion*. It has no official name, but is locally known by climbers as Mount Nirvana. It is one of several peaks that together are referred to as Gargoyle Ridge.