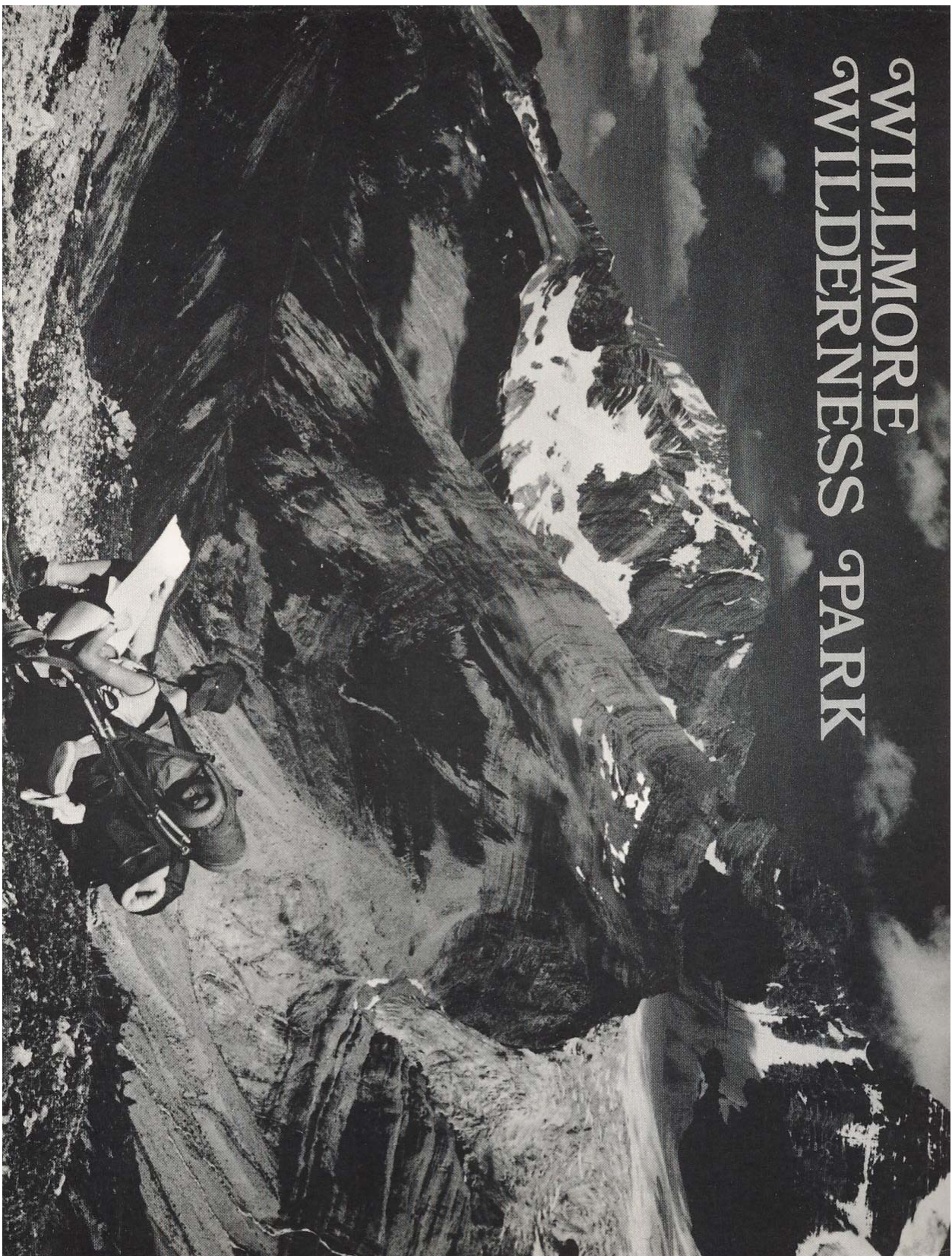
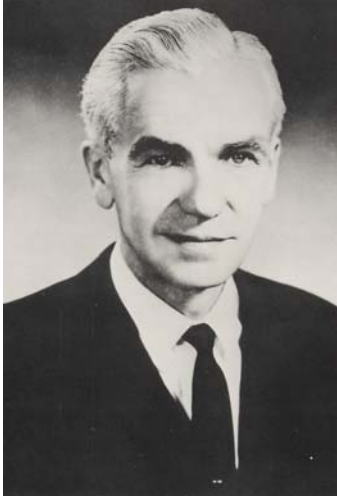


WILLMORE
WILDERNESS PARK





“The broad basic problem is whether or not the Government should condone and encourage the industrialization of Alberta at the expense of the rivers, the air and the countryside of our Province through a lack of policy and foresight, or should we endeavour to promote industrialization in an orderly manner which will bring the greatest possible benefits to all the people in Alberta without necessitating the improper exploitation of our greatest natural resources - which are the air we breathe and the water and the soil.”

Public address by Norman Willmore to the Edson community on February 25th, 1955.

This Book is dedicated to the Late Honourable Norman A. Willmore

Mr. Willmore was born in Fessenden, North Dakota and came to Canada as a teenager with his parents in 1915. He received his education in Edmonton, Alberta and later moved to Edson, Alberta to work as a clothing and shoe merchant. Mr. Willmore began his public life as a member of the Edson town council in 1942 and two years later was elected to the Alberta Legislature as Social Credit member for Edson. After winning five subsequent elections, he was appointed Minister of Industries and Labour in the Hon. E. C. Manning's Cabinet. He remained in that position until appointed to the position of Minister of Lands and Forests on August 2, 1955. Mr. Willmore died in an automobile accident en route to deliver a speech at Robb, Alberta on February 3, 1965.

In the words of Premier Manning, Mr. Willmore was "an extremely capable and conscientious Minister who gave many years of his life to public service in the province."

During his Lands and Forests portfolio, Mr. Willmore directed the administration of the natural resources of the Province with the exception of mines and minerals. He was opposed to the upland bird game farms, an issue of considerable debate in the 1960's. In 1964, he set up the Hunter Training Program and Wildlife Damage Scheme, the latter a program, which allowed farmers to apply for compensation for damage to crops by wild animals and waterfowl.

The Alberta Legislature gave approval to Bill 102 in 1965 to amend the Wilderness Provincial Park Act. In doing so, the 1,775 square mile Park near Grande Cache was renamed in memory of the late Norman Willmore, Minister of Lands and Forests. It is now known as the Willmore Wilderness Park.

INTRODUCTION

The Willmore Wilderness Park, Alberta's last great mountain wilderness, stands today at a crossroads. Protected by an Act, which in reality gives no protection, it has been reduced in size twice since its inception in 1959. Notwithstanding its dedication to wilderness recreation, exploration reservations and leases for coal and oil and gas have been let. In the past, seismic trails have intruded into almost every drainage, but spring floods and time are healing these scars. Inappropriate resource development still threatens the Willmore. Potential coal exploitation competes with bighorn sheep and Rocky Mountain goats for the critical winter pastures of the Persimmon, Hoff and Berland Ranges.

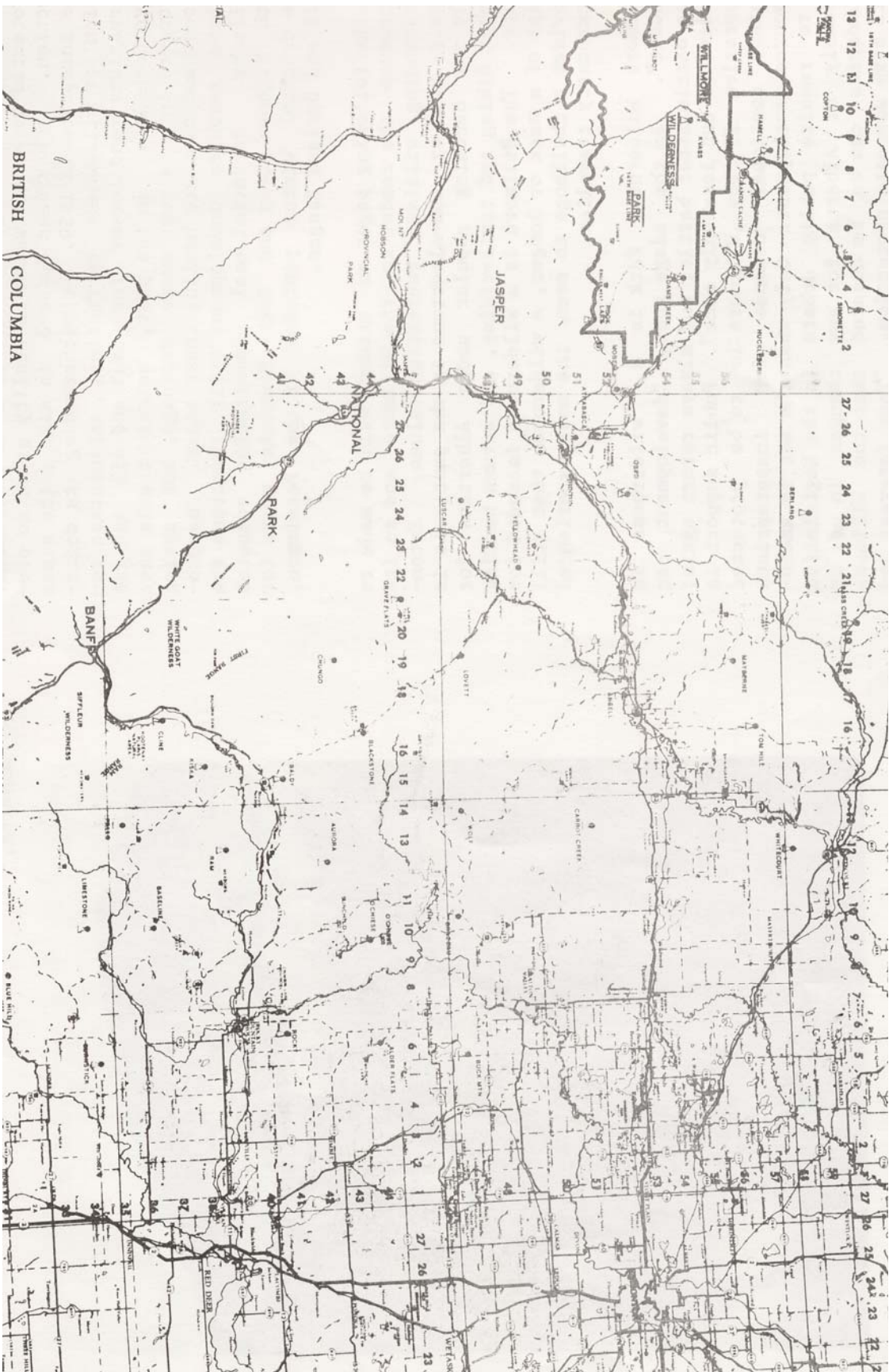
In the following pages an attempt will be made to introduce the reader to the Willmore and to its outstanding wildland recreation values. Extensively used by non-Albertans in the past, it is only now becoming popular among Albertans for summer hiking and trail riding, and autumn hunting trips. The Willmore is a wilderness intended for trips of a week or longer, a wilderness that still provides a challenge to even the most experienced backcountry traveller.



Anne Bronson

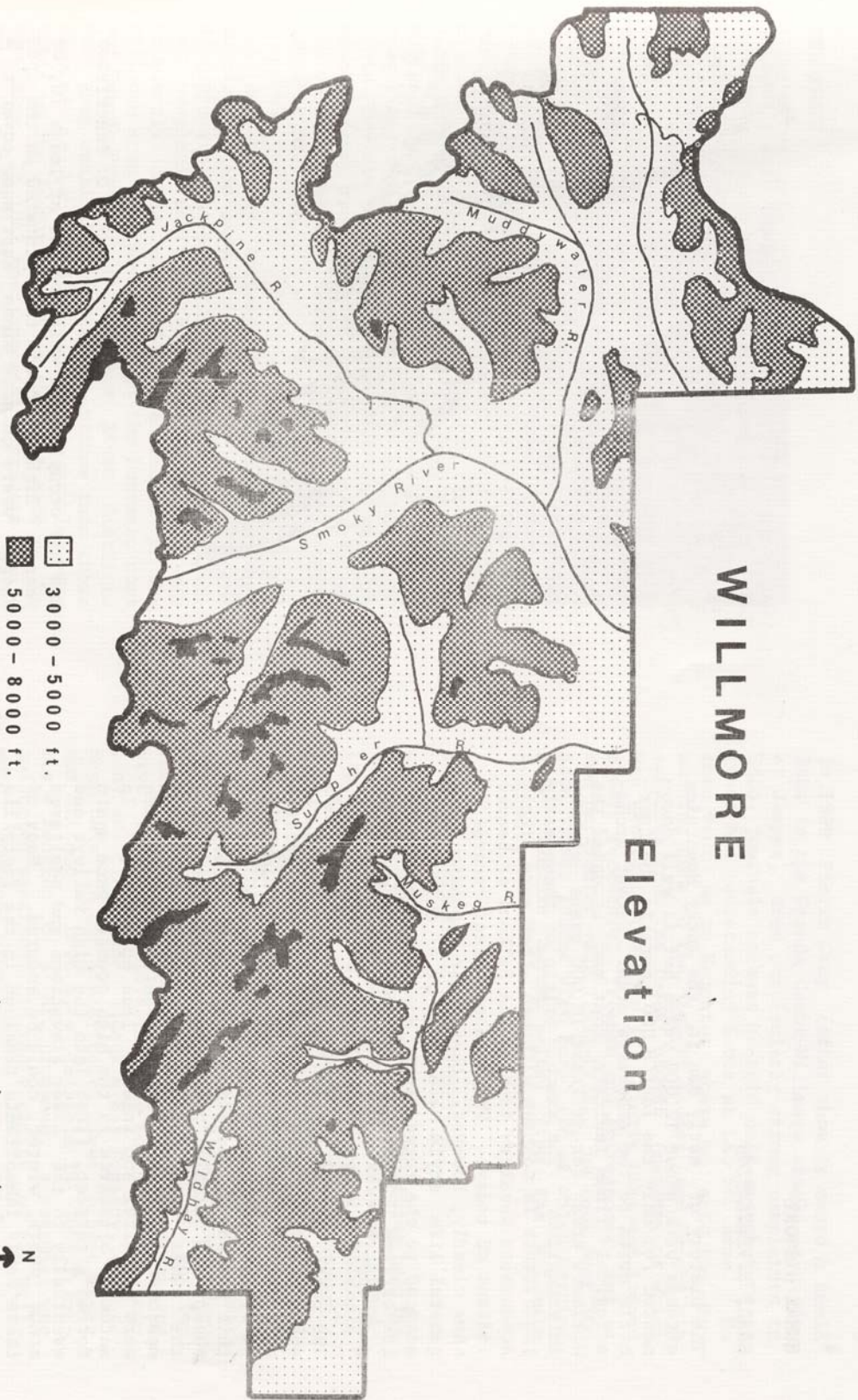
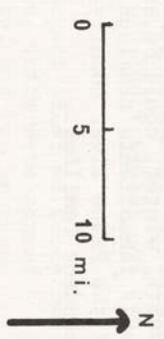
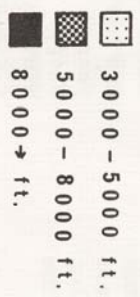
*The tranquility of wilderness near
Eagle's Nest Pass*

Willmore Wilderness Park is a "wilderness in trouble". As the adage goes, "development can lose battle after battle, and always return again; wilderness can lose only once". Public support is imperative if the Willmore is to be protected against continued demands for inappropriate resource development. Only when the Act is amended to require public debate in the Legislative Assembly of Alberta for any changes in use or boundaries can we be assured that the Willmore will have adequate protection. Your interest and support for this protection should be expressed not only at the forthcoming East Slope Hearings, but as well to your Member of the Legislative Assembly and the Minister of Lands and Forests, The Honourable Dr. Allan A. Warrack, Edmonton, Alberta.



WILLMORE

Elevation



HUMAN HISTORY

EARLY CIVILIZATION

The history of early man in the Rocky Mountains extends back about 12,000 years but is well documented for only the last 8,000 years in the foothills north to the Athabasca area. Recent archaeological finds indicate that man occupied the Willmore area for at least 10,000 years without interruption. The exact origin of these early inhabitants is unknown although they were likely Athabascan speakers such as the Selkoni or Beaver Indians of today. The archaeological records do show clearly, however, that their migrations and general life style were ones of a culture well adapted to the rugged Rocky Mountain environment, its extreme climate and seasons, and uncertain game supply.

The basic living pattern of the people was to spend the long, cold winters in the lower valleys or adjacent slopes where snow cover was diminished by the Chinook winds. For the same reason this was where the game animals such as bighorn sheep and buffalo overwintered. In the spring the camps were moved into the higher alpine meadows and river valleys where game and fish were plentiful and insects less bothersome.



D.Shackelton

In autumn, blizzards in the high country once again forced a retreat, first into the high valleys and eventually to the lower elevations and sheltered areas where winter could be endured. Many of these early inhabitants remained in the foothills south of the Peace River country leaving present-day descendant families.

Man has occupied the Willmore for at least 10,000 years. Bighorn sheep that wintered on the open slopes where Chinook winds kept snow cover to a minimum were an important source of food and clothing for the early Indians.

FUR TRADE

In more recent times the fur trading industry has had the greatest impact on the human use and development of the Willmore area, most of which is recorded in published and unpublished journals of the Hudson's Bay Company. A letter from Colin Robertson, a clerk at St. Mary's House (an early HBCo. post at the junction of the Smoky and Peace Rivers) mentions that the "Smoking River", or Smoky River as its known today, was a well-used trade route for the fur freeman. Apparently the northern traders laden with lynx, marten and beaver pelts walked or rode horses up to the Smoky River to Grande Cache, so named because of its sizeable fur depot. They then continued up the Smoky Valley to Jasper House via today's Jasper National Park, or over into the Holmes River (or Beaver River as it was called then) and McBride on route to Tete Jaune Cache. Depending upon the price offered for the furs, the freeman sometimes veered southeast to the Lac St. Anne post into the Edmonton District.

The Hudson's Bay Company frequently considered abandoning the Jasper House post south of the Willmore area for a number of reasons. The difficult overland route to the Edmonton District was frequently causing enough for the freeman in the Willmore area to travel north to the Dunvegan post and Grande Prairie in the Peace River District. Here they could also get higher prices than those allowed in Lac St. Anne. Another problem was trade in the Jasper area from the west side of the mountains. In 1882 most opposition traders apparently travelled to Jasper. Six years later it was complained that the Jasper freemen would sell the furs of Willmore for cash at Lac St. Anne and, despite a large inventory of goods at the post specifically stocked to entice them, would travel west again to Kamloops, B.C. to purchase goods and supplies.

In 1889 Pierre Grey (after whom is named a small lake in the Grande Cache-Willmore area), a trader at Jasper, drew particularly strong complaints in HBCo. journals because he sold only enough fur to cover his outstanding debts at Lac St. Anne. He then went on to Edmonton where he sold the remaining furs to the highest bidder and bought his supplies from the lowest bidder (neither of which was generally the HBCo.). Pierre Grey was indeed a very successful freeman and entrepreneur and in one particular year (1921-1922), he took over 100 packhorses loaded with furs (26 of which carried only valuable marten pelts) from Willmore trappers.

HUNTING, EXPLORATION AND ADVENTURE

Hoofed animals, as well as those creatures bearing valuable furs were also a useful resource commodity for travellers, traders and early residents of the Willmore area alike. George Simpson's diary mentions, for instance, that while travelling up the Athabasca River valley 1824, he relied upon the abundance of both small and large game. Surprisingly enough, some of his game meat may have been wood buffalo. Legend passed down by Vicent Wanyandi, an old Iroquois who settled early in Grande Cache, tells that the Athabasca River Indians, employed by the Northwest Fur Company and later the Hudson's Bay Company, came to Rock Lake via the Snake Indian River to hunt moose and buffalo. Even more reliable is John Franklin's mention of a Mr. Drummond, a botanist who collected specimens in vicinity of the Willmore. Drummond wrote:

“On the 21st (August 1826) we found two young porcupines, which were shared amongst the party, and two or three day afterwards, a few fine trout were caught. We arrived in the Smoking River on the 5th of September where the hunter killed two sheep and a period was put to our abstinence, for before the sheep were eaten, he shot several buffaloes.”¹

In 1910 and 1911, Professor J.N. Colie and Mr. A.L. Mumm (after whom two creeks are named in the eastern Willmore) accompanied by two other members of the Alpine Club of London made lengthy expeditions into the Continental Divide, west of the Smoky, for the purpose of pioneering, mountaineering and adventure. Their first ascents of a number of difficult peaks have been documented in old journals of the Alpine Club.

¹ Narrative of a Second Expedition to the Shores of the Polar Sea in the Year 1825, 1826 by John Franklin, page 211, London, 1828.

In the years following 1912, Fred Brewster, a well-known Alberta guide from Jasper Park and F. Prescott Fay, an explorer and naturalist, rode the trails and valleys of the Smoky River and Sheep Creek both for personal adventure and scientific discovery. The record of remote sheep herds, primitive trails, spectacular waterfalls and a good collection of birds and mammals for the American National Museum were a few of their rewards and accomplishments.²

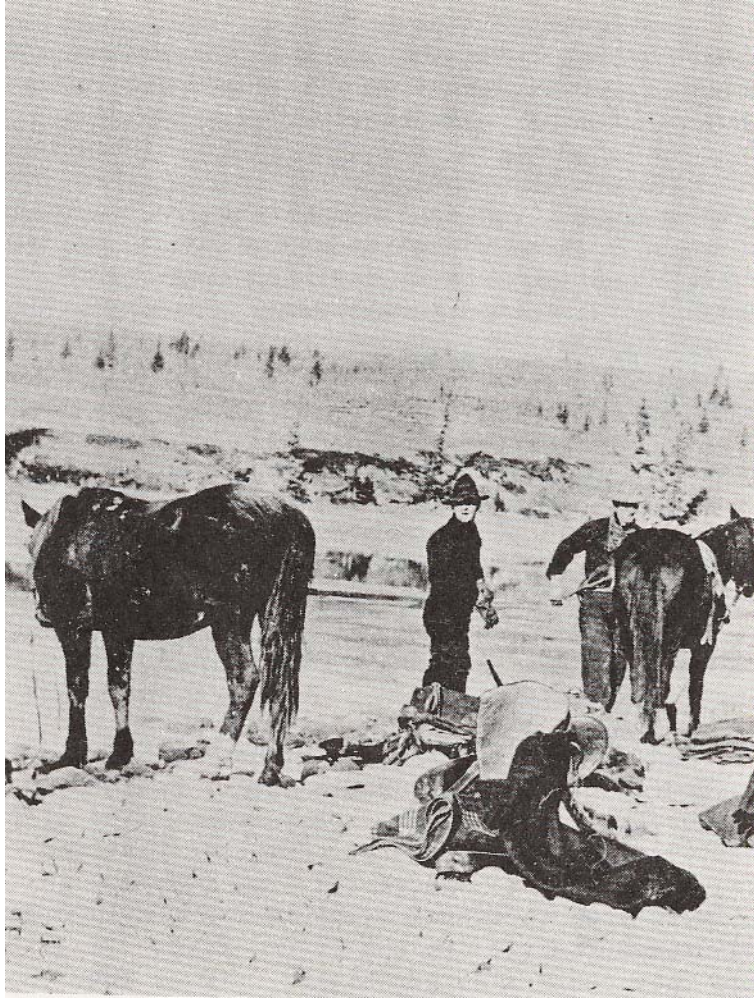


Photo Courtesy of Alberta Glenbow Institute

*George Brewster and Dick Harrington unsaddle horses
on the Old Smoky Trail in October 1911*

² Journal of S. Prescott Fay of 1914 Expeditions
Hunting Sheep and other Big Game Between the Yellowhead Pass and the Peace River (along
the Continental Divide of the Rocky Mountains in Alberta and British Columbia). Available at
Glenbow Archives, Calgary, Alberta.

TRAILS

Four trails used by the Indians, explorers and fur traders are still important today, both to men and animals. The “Lower Trail” parallels more or less the present Grande Cache highway, from Old Entrance to Muskeg Creek and Grande Cache. Evan Moberly, originally of Jasper House, moved his family and friends along with 200 head of livestock (mostly horses) and machinery over this trail in 1910. Moberly (after whom is named a creek in eastern Willmore) and the Findlay, Joachim and Swift families had originally homesteaded in the Athabasca Valley in the late 1800’s and were forced to move to the Willmore area when the government decided a National Park was to be created. There is a mention in J.G. MacGregor’s book “Pack Saddles to Tete Jaune Cache” of the establishment of a winter road in 1912 from Prairie Creek (Hinton) to the mining claims on the Smoky River. It was probably this “Lower Trail” that was followed.

The “Indian Trail” connected Old Entrance and Grande Cache by a more direct route through the intervening mountain passes and river valleys. The trail began up the valley of Solomon Creek (named after Solomon Caracote, an Iroquois settler of Old Jasper House) situated at the north end of Brule Lake. The route continued northwest to Rock Lake, up the North Fork of the Wildhay River to Eagle’s Nest Summit. It crossed both forks of the Berland River before passing along Muskeg River to A la Peche Lake and Grande Cache.

There is a third trail known as the “Mountain Trail” which went in the same general direction as the other two but penetrated the Persimmon Range even further. This route was commonly used by the early outfitters in the Willmore area and latter by government forestry agencies. It also started from Old Entrance, passed up Solomon Creek to Rock Lake and Eagle’s Nest Summit, but then forked southwest through the picturesque Eagle’s Nest Pass, up Rock Creek, past Mile 58 Summit and on down the Sulphur River to Big Grave Flats. Here the traveller had two route choices – north to Grande Cache or west via Kvass Creek to the Smoky River. At the Smoky the trail again divide – north to Grande Cache or west to Sheep Creek, and the British Columbia border through good hunting. This latter trail required the sometimes dangerous fording of the Smoky River at Clarke’s Crossing.

The fourth trail was said to start at Grande Cache and it obviously was a trading and communication route used by travellers to and from the Peace River Country. It proceeded south to the upper reaches of the Smoky River. One-route branches west over Bess Pass - from this point the route through British Columbia is vague. Some freemen went south, following the Continental Divide into the Jasper area.

GRAVES OF REMEMBERD SETTLERS

There are a few gravesites of early residents who pioneered and homesteaded in the Willmore area. The grave of the mother of Adam Joachim, born in 1837 of an Iroquois woman, lies near Adams Creek on a big river flat about four miles below the old Forestry cabin. She died soon after the Joachim’s move from the Athabasca Valley. At Sunset Meadows on the North Fork of the Berland River is the marked grave of the sister of Dolphus Agnes, another early settler of Grande Cache. A baby Delorme girl is buried at Little Grave Flats” near the fork of the Sulphur

River while farther down the same river at “Big Grave Flats” is buried Pierre Caraconte, the Iroquois relative of Solomon. Caraconte’s grave is fashioned out of logs and stone, piled above the ground in the form of a coffin. The ground was frozen at the time of his death. George Hargreaves, an outfitter from Jackman, B.C., died on a hunting trip into the rugged Sheep Creek area in the fall of 1937 and is buried at a headwater tributary called Casket Creek. Legend has it that at the start of this trip he insisted on packing along a shovel saying, “You never knew when someone might die”.



~~~~~Len Jeck

*From Brewster’s Wall*

### ***EARLIER GOVERNMENT ADMINISTRATION***

In 1910, the federal government created the Athabasca Forest Reserve, an area of about 4,000 square miles extending from Prairie Creek to the 15th base line and west to the British Columbia boundary. In 1912, James Shand-Harvey was hired by the government in the capacity of District Ranger; it was his duty to patrol the district of Rock Lake and Grande Cache. There were no forestry cabins or any recognized forestry trails up until this time. However, over the succeeding years cabins were built, trails improved, bridges built and even 65 miles of telephone line installed between Old Entrance and Muskeg Cabin.

The major Forestry cabins, a few of which still stand in an abandoned state, were the Headquarters Cabin at Old Entrance, one at Brule, and ones within the Willmore Wilderness Park at Rock Lake Eagle’s Nest, Mile 58, Big Grave Flats, Sheep Creek, Adams Creek, Muskeg Creek, Little Berland River, Moberly Creek and to the north at A la Pêche and Grande Cache.

This entire area was under the charge of one man, Mr. Shand-Harvey, until about 1940 when an Assistant Ranger was added. During the hunting season from 1935 until World War II, a Mounted Policeman of the Game Patrol Branch assisted in supervising the Willmore area and could be expected to drop in on outfitters at any time of the day or night on routine and licence checks.

With the addition of the assistant ranger, Shand-Harvey's territory was somewhat reduced, the cabin at Clarke's Crossing being his most distant. Clarke's Crossing was so named because of an enterprising outfitter from Old Entrance, Stan Clarke, who took a flat-bottomed riverboat, piece by piece, to the Smoky River packhorse. He bolted the vessel together and could then ferry his hunters and supplies across the river while the horses swam. In later years, the government also provided a boat for the opposite bank in order to permit crossing from both directions.

Even with two men, the Rangers were on the trail the entire summer and fall months seeing that trails were kept clear of deadfall and rock, bridges repaired and campgrounds serviced for the hunting season. In addition they undertook game counts, maintained cabins, watched for fires, checked the telephone line and also patrolled, throughout the hunting season. Up until 1968, the Alberta Forest Service performed many of these same tasks. Since that time, except for fire patrols, the area has been essentially ignored; trail maintenance, where necessary being accomplished by outfitters.



L.Jeck

*Hunting Parties, here seen in Gunsight Pass between Hardscrabble and Rockslide Creeks, have traditionally made the most use of the Willmore.*

### *OUTFITTING AND TRAPPING*

The Willmore area once supported many outfitters and guides; many more in number than are guiding dudes of today. Guided hunting was most popular immediately after World War II at which time approximately twenty outfitters hunted the area. This number however included the outfitters from the Jasper-Brule-Entrance area, others from northern and southern districts, as well as four outfitters from British Columbia who obtained special permits to hunt in Alberta.

During the winter, the Willmore area supported a lucrative trapping industry and sometimes involved seventeen to eighteen trappers. In the Depression years, an average trap line could gross the ambitious trapper between \$1,500 and \$2,000. The post-war period, 1945 to 1948, showed even higher prices in the European markets; one of the larger lines is said to have produced fifteen thousand more dollars in one season. After 1950, lower fur prices caused a decline in the industry, a decline that has lasted until only recently. In the early 1970's, a few trap lines in the Willmore area once more yielded a fur harvest of lynx and beaver in the thousands of dollars.

### *MINING AND QUARRYING*

Other uses of the area's natural resources have been mineral extractions, both within the Willmore Wilderness Park and near-by. Prior to the establishment of the area as a provincial park (1959), commitments existed for mineral exploration and development. These commitments were honoured, and as well, additional leases and reservations were granted to applicants in following years, notwithstanding its dedication as a "Wilderness Provincial Park". The principle minerals of interest are coal, gypsum, oil and gas.

The Act of April 7, 1959, established the area as a Wilderness Provincial Park of 2,149 square miles of mountain peaks, glaciers, alpine meadows and broad river valleys. Prior to establishment, this area was part of the Athabasca Forest and the few roads, trails and service cabins were closed to general public. The administration of the area continues to be the responsibility of the Alberta Forest Service rather than the Provincial Parks Division.



L.Jeck

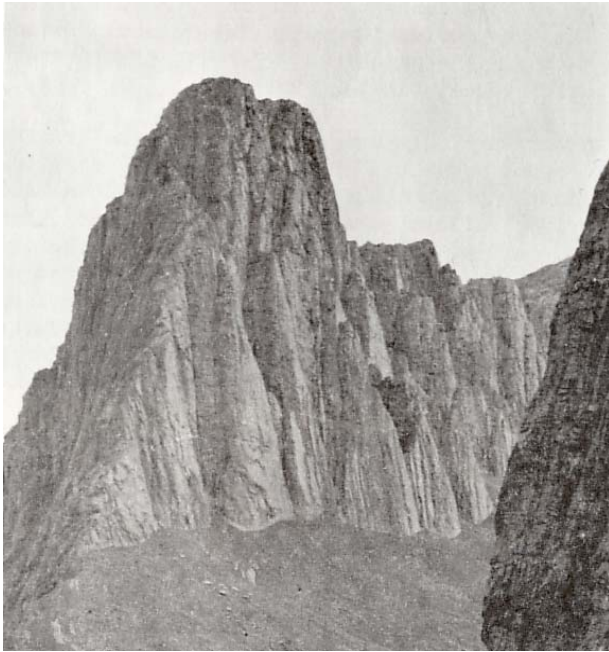
Regrettably, the original 2,149 square mile park has undergone two reductions in size (1963 and 1965) to its present area of 1,775 square miles. The steep mountain slopes and alpine meadows of Grande Mountain and Mount Steam in the north and the Rock Lake area in the east were removed from Provincial Park status for the purpose of coal exploration and extraction. The McIntyre-Porcupine Mine at Grande Cache and the town of Grande Cache are situated on what used to be Wilderness Park. These lands were once the overwintering range of bighorn sheep and elk from the Smoky River, Roddy, and Malcolm Creek vicinity.

In 1965, the remaining 1,775 square miles was renamed the Willmore Wilderness Park in memory of Norman Willmore, who as Minister of Lands and Forests (1955-1965), promoted the establishment of the Wilderness Park for the recreational enjoyment of Albertans.

*Rock columns like the one near Dinosaur Pass are part of the unique scenery of the Willmore.*

## GEOLOGY

The Willmore Wilderness Park is an area of northwest trending mountain ranges with many peaks exceeding 8,000 feet. Elevation and local relief increase as one goes westward. The summit of Resthaven Mountain (10,165 ft.) is the highest peak while the valley of the Smoky River where it leaves the northern boundary of the Willmore is less than 3,200 feet. The total local relief in the area is thus about 7,000 feet.



L.Jeck

*The diverse scenery in the Willmore is a product of different Rock types, complex folding and faulting and erosion by running water and glacial ice. In Eagle's Nest Pass, resistant Paleozoic limestone which were thrust-folded into a vertical position, have eroded to form rugged mountain peaks.*

Geological surveys have not been completed for most of the Willmore area but maps and reports prepared by the Geological Survey of Canada are available for the northern portion of Jasper National Park (Mountjoy, 1962) and for the foothills to the north and east (Irish, 1965). General information from these sources can be extrapolated across the Willmore area.

Three physiographic units can be recognized: the Foothills, the Front Ranges and the Main Ranges of the Rocky Mountains. Although these units are not always easily defined or separable from each other, there are characteristic rock types and patterns of folding and faulting. The differences in turn affect both local scenery and the potential for mineral extraction in the area.

The Foothills unit is poorly represented and occupies only the eastern corner of the Willmore. South of the Muskeg River it is bounded by the Berland and Hoff Ranges on the southwest while north of the river the boundary is the more westerly Persimmon Range. The Foothills are underlain by rocks of Mesozoic<sup>3</sup> age, which have been folded and faulted into a number of northwesterly trending ridges and steep-sided valleys. Strata in the Foothills are primarily sandstone, shale and conglomerate, which are easily eroded; thus the ridges have a rounded appearance. Of special interest is the Luscar formation, which contains a number of coal seams.

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<sup>3</sup> The geological time scale is divided into four major periods:

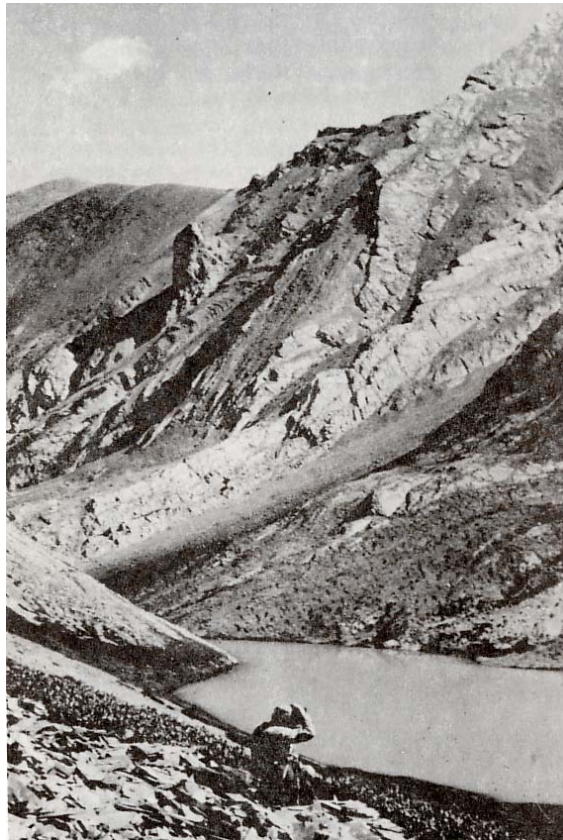
Cenozoic — 0 to 70 million years ago.

Palaeozoic – 220 to 600 million years ago.

Mesozoic – 70 to 220 million years and older.

Praterozoic – 600 million years and older

This coal-bearing formation extends westward into the Front Ranges with exposures along the Hoff, Berland and Persimmon Ranges. The Foothills are underlain by rocks of Mesozoic<sup>4</sup> age, which have been folded and faulted into a number of northwesterly trending ridges and steep-sided valleys. Strata in the Foothills are primarily sandstone, shale and conglomerate, which are easily eroded; thus the ridges have a rounded appearance. Of special interest is the Luscar formation, which contains a number of coal seams. This coal-bearing formation extends westward into the Front Ranges with exposures along the Hoff, Berland and Persimmon Ranges.



L. Jeck

*Southwest dipping strata resulting from thrust-faulting are  
Typical of the Front Ranges in the Willmore*

The Front Ranges of the Rocky Mountains is the main physiographic unit in the Willmore extending southwest from the Foothills to approximately French, Famm and Hardscrabble creeks. The Front Ranges are characteristically Palaeozoic limestones and dolomites that have

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<sup>4</sup> The geological time scale is divided into four major periods:

Ceneozoic — 0 to 70 million years ago.

Palaeozoic – 220 to 600 million years ago.

Mesozoic – 70 to 220 million years and older.

Praterozoic – 600 million years and older

been thrust-faulted into a number of northwest-trending mountain ranges. Each mountain range represents a major thrust sheet, which has been displaced to the northeast resulting in a steep northeast-facing scarp. Dip slopes to the southwest are generally less steep. For example the Persimmon Range is part of the Persimmon Thrust Sheet, which has been pushed about 8,000 feet to the northeast along the Rocky Pass Fault. Resistant Palaeozoic limestone and dolomites that were thrust over softer Mesozoic strata are exposed along the scarp and, in places, form cliffs up to 1,500 feet high. The general structure of these large thrust sheets is complicated by the presence of numerous smaller faults and folds formed prior to and subsequent to faulting. This complex of folding and faulting has produced numerous anticlines, synclines and other structures, which contribute to the spectacular scenery of the Front Ranges.

The Main Ranges of the Rockies cover the remainder of the Willmore. They are characterized by essentially flat-lying Palaeozoic and Praterozoic quartzite and carbonates, which have been, uplifted a great vertical distance. The actual amount of uplift in the Willmore is not known but it has been suggested that the Main Ranges west of Banff were uplifted a vertical distance of over two miles above the corresponding strata in the Front Ranges and over five miles above similar rocks of the Alberta Syncline below the Prairies. As a result of this great uplift the highest and most impressive mountains occur in the Main Ranges where the oldest rocks are exposed.



L. Jeck

*Typical glaciated country in the Willmore with U-shaped valleys and stepped or 'pater-noster" lakes.*



The complex lithology and patterns of folding and faulting in the three physiographic units have been acted upon by the erosive agents of running water and glacial ice to produce the spectacular scenery we now find in the Willmore Wilderness Park. Although glacial erosion and deposition is responsible for the detailed form of most of the landscape features, the basic patterns of mountain ridges and stream valleys are a result of stream action over approximately 50 million years - between uplift of the Rockies and the onset of glaciation. During the Pleistocene, glacial ice covered much of the Willmore. The initial ice sheet covered the area to an elevation of at least 7,100 feet as evidenced by large erratic (boulders left by glaciers). These ice sheets had little erosive power and acted only to smooth some of the ridge tops. As the ice sheets receded, alpine valley glaciers occupied the major river valleys. These alpine glaciers gouged-out many of the valleys to their present U-shapes, truncated the spurs of intersecting ridges, and created such erosion landforms as cirques (glacial basins), arrets (sharp ridges), cols (glacial passes), and horns (sharp peaks). Most of the larger valleys such as those of Sheep Creek, Muddywater, Jackpine and Smoky Rivers have these characteristic U-shaped profiles. In some places these valleys were deepened, leaving the tributaries as hanging valleys with frequent waterfalls. Small cirques are common at the headwaters of the tributary streams that originate near the Continental Divide. Some cirques still contain small glaciers or permanent snow patches while others are occupied by small lakes called tarns. Alpine glaciers also blanketed many of the lower slopes with till, deposited small moraines along the valley sides and filled the valley bottoms with outwash. Present day streams such as the Smoky River are actively reworking the glacial deposits, leaving the coarse material as gravel bars and the silt-sized material as flood plains.

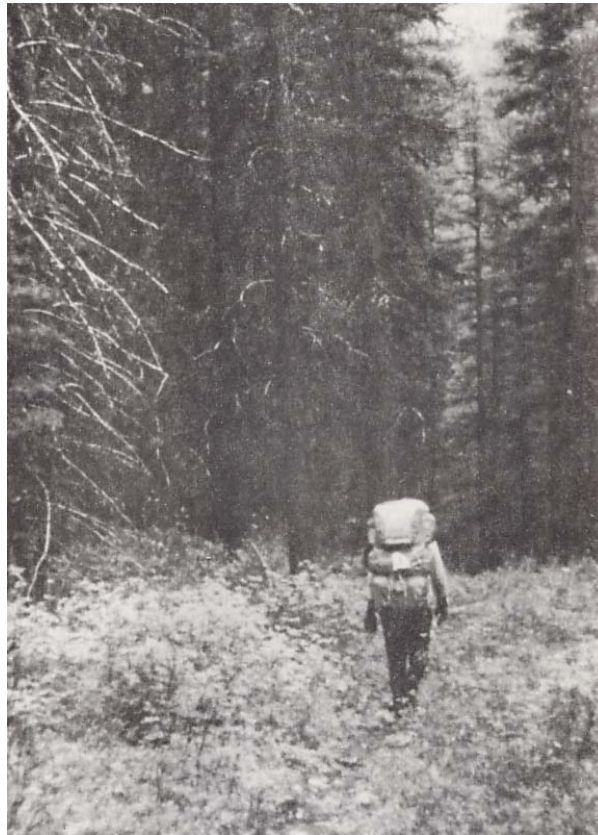


*Steep walled cirque by small tarn lakes are a common feature at the headwaters of many streams that originate near the Continental divide.*

## VEGETATION

The Willmore Wilderness Park has a number of vegetation types which enhance its scenic diversity. Included are spruce-fir and pine forests, willow-sedge meadows, open grassland, aspen, alpine meadow, sparsely vegetated rock barrens and unvegetated areas of rock, glacial ice, and permanent snowfield. Zonation of vegetation occurs primarily on an elevation basis since growing conditions become more severe with increasing altitude. Some zonation also occurs from east to west because of precipitation differences; areas near the Continental Divide receiving more than 60 inches of precipitation per year, while dry rainshadow locations in the eastern part of the Willmore receiving less than 20 inches. The conditions of the eastern Willmore are intensified by strong southwesterly Chinook winds.

The spruce-fir forests are dominated by white, or Engelmann spruce and alpine fir. They are the climax vegetation type over most of the area. These forests have an almost continuous tree cover and as a result cool, moist conditions prevail on the forest floor. Ground vegetation consists of several species of feather moss and lichens, and shade tolerant herbs such as bunchberry, twinflower, wintergreen and horsetail. Important shrubs are Labrador tea, bog cranberry and grouse'berry. Several species of lichens grow on the lower branches of mature or old trees and form a staple winter food for woodland caribou.



G. McNabb

*Fire successional stands of lodgepole pine have replaced many of the spruce fir forests, following the widespread forest fires of the 1930's. Fires are an integral part of the wilderness environment renewing pioneer successional species important to wildlife.*

Forest fires have greatly reduced the area covered by spruce-fir forests and are responsible for the widespread occurrence of fire-successional stands of lodge pole pine. Much of the Willmore was swept by fires around 1930 and today many of the valleys and slopes are blanketed with dense stands of lodge pole pine. These 40-year-old trees are now about 50 feet high. A lodge pole pine stand is much drier than the spruce-fir forest and thus ground vegetation is different. Grass, principally hairy wild rye, is important, as well as herbs such as wild strawberry, yarrow, starflowered Solomon's-seal, arnica and Indian paintbrush. Shrubs such as wild rose, bearberry, juniper and buffalo-berry are abundant below the pine canopy.

The continuity of forest cover is interrupted along the poorly drained flood plains of the Smoky, Jackpine and Muddywater Rivers, along Sheep Creek and other smaller streams as well. Here, small 'willows, bog birth, sedges, horsetails and rushes occur in abundance. Black spruce and sphagnum moss bogs are common in the wetter areas. Shrubs in the bog areas provide browse for moose, elk and deer.



A. Landals

*Bunch berry is a common flower of the forested parts of the Willmore.  
In the fall the bright red berries provide food for grouse and other birds.*

In the eastern part of the Willmore southwest facing slopes are exposed to intense sunlight and strong winds, which together create quite a dry environment. Upper slopes are covered by open grasslands of June grass, wheat grass, blue grass and various sedges. Pasture sage, pussy-toes, locoweed, cinquefoil, saskatoon, wild rose and other typical prairie species grow throughout the grasslands. On lower slopes the grasslands are gradually being replaced by stands of aspen poplar with an understudy of shrubs dominated by wild rose, shrubby cinquefoil and saskatoon.

Many of the exposed slopes remain free of snow throughout the winter because of the influence of strong Chinook winds and are heavily used as winter range by herds of bighorn sheep and goat.

Between 6,200 and 6,500 feet the continuous tree line ends and scattered clumps of dwarfed alpine fir and Engelmann spruce dot the mountainsides. Between these islands of trees the ground is covered with shrubs like dwarf willows, white, yellow and purple heathers and grouse berry.

Alpine meadows of grasses, sedges, herbs and mosses have developed in moist areas. Here many small but showy alpine flowers — red, pink and yellow Indian paint-brush, elephant head pedicularis, mountain marigold, chalice-flower, glove-flower, saxifrage, buttercup and mountain sorrel — bloom in the short growing season. The lush growth of the alpine meadows provides important summer range for mountain caribou.

At higher elevations growing conditions become too severe for all but the hardiest plants and rock barrens, or alpine tundra, occur. Only dwarf such plants such as mosses camion, mountain evens, mosses and lichens are able to survive. The sparsely Vegetated mountain slopes are inhabited only by marينات, mountain goats, picas (whose closest living relative is the elephant) and the hardy white—Tailed ptarmigan.



R. Pharis

*Mosses, lichens, and other dwarf plants  
Characterize the alpine tundra.*



R. Pharis

*The Willmore's alpine meadows, besides allowing  
easy travel and providing beautiful scenery,  
are important summer range for caribou.*

At the very highest elevations (above 7,500 ft.) only the lichens that can colonize on rock and sedges, which grow in sheltered pockets of soil, are found in any abundance. The severe climate produces harsh growing conditions, which eliminate other plant species.

## WILDLIFE

Not only are most Albertans unaware of the traditional significance of the Willmore's wildlife to the Indian residents of the past, early explorers, settlers and trappers, but they also do not realize the importance, even today, of the Willmore as an undisturbed environment for many different species of animals, including the somewhat rare Rocky Mountain goat, grizzly and woodland caribou. Outside of the National Parks to the south, no other part in Alberta offers such a diversity of habitat and climate. These in turn provide food, shelter and refuge for our magnificent native woodland caribou, grizzly bear, bighorn sheep, mountain goat and cougar.



D. Shackleton

*The Willmore contains about one-half of Alberta's Goats, a mountain species threatened with extinction in the province*



A. Landals

*Ruffed grouse, spruce grouse, blue grouse and white-tailed ptarmigan are year-round residents of the Willmore*

The key to the importance of the Willmore to wildlife is its many hundreds of square miles of crucial winter range. Biologists state that about 90 percent of elk and sheep populations spent the critical winter months on only 10 per percent of their total range. Only certain ranges are suitable as winter habitat; the snow-blown ridges where warm Chinook winds and light snowfall allow the animals to easily reach nutritious forage. The Willmore is well endowed with this special combination of physical and climatic factors. Only the western portion, along the Continental Divide, lacks good winter ranges, being covered with many feet of snow during winter and early spring. The absence of Chinooks and the high elevation make for long periods of extreme cold and such conditions make impossible the procurement of food and even movement during the winter.

However, in the summer, these western slopes and high valleys especially those of the Jackpine and Smoky River and Fetherstonhaugh Creek provide ideal forage for migrating animals such as woodland caribou and elk. The alpine and sub alpine slopes are covered by a luxuriant growth of grasses, sedges and forbs. Caribou migrate from the northeast and the bighorn sheep may move in from the adjacent mountains to the east.

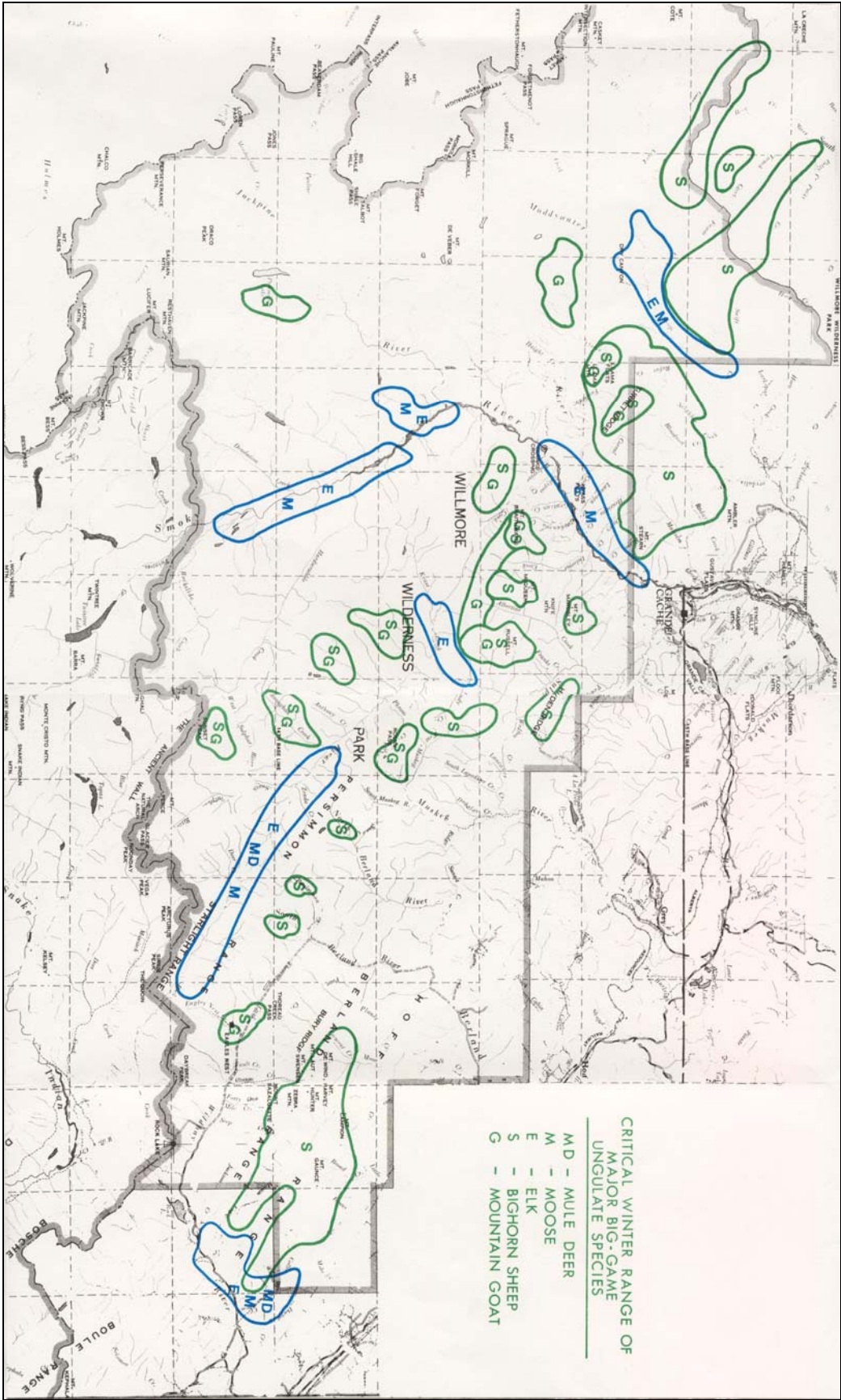
For sheep and goat, the Hoff, Berland and Persimmon ranges in the east, and Mt. Braithwaite, Mt. Russell, Mt. Stearn and Llama Mountain are the winter “hotspots” of animal concentration. The importance of these small areas is dramatically demonstrated if one realizes how sparsely the small bands of goat and sheep are distributed in Alberta. The Willmore Wilderness Park now contains at least 50 percent of Alberta’s mountain goats and approximately 20 percent of the bighorn sheep.

The mountain goat may well be considered a “threatened species” in Alberta since population estimates range between 500 and 1,000 animals for the entire province. Our mountain goat populations have declined in recent years to alarmingly low levels; partly because of excessive hunting of individual herds and partly because of winter range disturbance. One example is illustrative. Before the appearance of strip-mining at Grande Cache a survey showed that approximately 100 goats roamed the southwest-facing cliffs and alpine slopes of Mount Hamell. Then, coincidental with the advent of industrial activity, the herd size dropped precipitously. For the past 5 years it has numbered only 15 animals.

Caribou migrate to the summer range in the western high meadows and alpine slopes near the Alberta-British Columbia border. Here, the estimated 300 mountain caribou of the Willmore constitute the only significant herd outside of Jasper National Park. These specialized creatures are well adapted to deep snow, having a hoof, which splays out, acting somewhat like a snowshoe. During January and February they frequent the sub alpine forest in the Caw Creek area (north of the Willmore boundary) and the Smoky River drainage. Of prime importance to caribou, are old-growth forests with abundant tree lichens and ground mosses. A hanging variety of lichen called “old man’s beard” is a favourite food source, and replaces the grasses and forbs hidden under the winter’s snow. Forest fires or logging of these old-growth forests will decimate caribou winter range, possibly resulting in severe winterkill if alternative old-growth stands are not available. The influence of proposed clear cutting of old-growth spruce forests by Procter and Gamble Cellulose Ltd. in the areas south and west of Grande Prairie may well eliminate critical winter range of the far-ranging mountain caribou. Given this, the Willmore Wilderness Park and Jasper National Park may become the last refuge for the mountain caribou herds of Alberta.

Elk, valuable as both a trophy animal (to the photographer and the hunter), and as meat are concentrated in the broad valleys of the Smoky River near Mount Stearn, Sheep Creek, and the Wildhay River near Rock Lake. Herd sizes within the Willmore number about 500. Moose and mule deer as well as elk are a common sight to the rider or walker who travels the trails or follows the streams, even in the summer. Low shrubs and willows along stream banks are ideal browse for moose and deer whereas the elk graze on grasses and forbs.

The Sheep Creek drainage has historically contained a large number of grizzly bears and in 1965 the population density was estimated to be one grizzly per 10 square miles, an exceedingly high density for a creature whose habits demand large areas of undisturbed range. Today, numerous grizzly sightings are made in headwaters of Muskeg Creek and the Berland River. It appears, though, that many of the Sheep Creek grizzlies may have moved north to the Kakwa area. Black bears are found everywhere and travellers in the Willmore must take the proper precautions; careful garbage disposal being the most important.



**CRITICAL WINTER RANGE OF  
MAJOR BIG-GAME  
UNGULATE SPECIES**

- MD - MULE DEER
- M - MOOSE
- E - ELK
- S - BIGHORN SHEEP
- G - MOUNTAIN GOAT



S. Herrero

*Although beautiful, and enticing as photographic subjects, bears with cubs can be dangerous and should not be approached.*

Wolves are a continual source of frustration to the biologist because of their unpredictable movements, thus preventing an accurate delineation of their range. In the Willmore area, wolves are often spotted in the north near Mount Stearn, Famm Creek and along Sheep Creek, and are usually associated with the wintering herds of elk, moose and mule deer along the valleys and river courses. Wilderness travellers should be aware that heavy human usage of a hiking or riding trail in vicinity of a denning site may force the wolf pair to relocate and subject their pups to unnecessary danger during the transfer.



A. Landals

*Although many people tend to regard only large animals as important in wilderness areas, marmots, pikas, squirrels, porcupines and other small mammals are far more abundant and provide frequent enjoyment for visitors.*



Although the Willmore's larger wild animals are always a thrill to see in their natural surroundings, the smaller manuals are likely to be more common companions of the hiker or horseman, since these creatures are usually more tolerant of human activities. The pika and hoary marmot are easily recognized, if only from their distinct high-pitched whistles, which seem to float about the rockslides and talus slopes where they live. The red squirrel, chipmunk and weasel are the common dwellers of the wooded stands at lower elevations. Fox, lynx, coyote and marten are numerous in the Willmore, but are rarely observed except in the traps of the local trapper. Wolverine is not uncommon, and display little fear of humans.



D. Shackleton

*Canada jays are quickly attracted to backcountry camps in search of a handout*

Birds similar to those found in the National Parks are common to the Willmore. Ruffed and spruce grouse frequently startle the hiker when they flush right in front of his face. The white-tailed ptarmigan is a master of protective - white in the winter, and an "invisible mottled brown" when the chicks lead the hen about the alpine and subalpine slopes in the spring. Eagles and other birds of prey are often sighted high above the valley floors using the mountain air currents. A few migratory waterfowl such as Canada geese, wood ducks and dabblers use the lakes of the Willmore for nesting and raising their brood.



R. Pharis

The fishery of the Willmore is not significant, either in terms of number of fish-filled lakes and streams or the number of sport fish species available for the angler's creel and frying pan. The Dolly Varden char, or "bull trout", is the most common catch because of its large number and voracious appetite. Dolly Varden, Rocky Mountain white-fish, Arctic grayling and rainbow trout comprise the main fishery of the major river systems: Sheep Creek, Jackpine, Smoky, Sulphur, Muskeg, Berland and Wildhay Rivers. The remainder of the watercourses provide poor fish habitat because of their fluctuating water levels, lack of escape pools or bank cover, and heavy silt loads during spring melt and seasonal rains. They also have rather low productivity in terms of invertebrates, the main diet of trout. Only Rock Lake just outside the eastern boundary provides good lake angling for brook trout and white fish.



A. Landals

Mule deer are common in the eastern Willmore but are scarce in the west because of heavy snowfall.



D. Shackelton

Elk are plentiful in the Willmore, especially along the Valley of the Smoky River where nutritious grasses provide winter forage.

## RECREATION

Past recreational use of the Willmore Wilderness Park has been heavily oriented toward outfitting or private horse party use, especially in the autumn for hunting parties seeking trophy animals such as bighorn sheep, mountain goat, grizzly bear, caribou and elk. Summer outfitting is only now becoming popular, as are summer horse and hiking trips by individuals. Commercial outfitting for hunting remains important and in 1972 thirteen outfitters operated in the area. A number of big game animals were taken, including 14 trophy rams.

The increased interest in pleasure trail riding allowed four outfitters to operate throughout July and August of 1972. They cater mostly to family groups and take them into the backcountry for short trips or extended holidays. The average cost of \$25.00 per person per day for an outfitted trip in the summer includes everything necessary for a pleasurable holiday. Most of the people taking advantage of these services are from the United States or from Eastern Canada, but interest by Albertans is increasing. Besides sightseeing and relaxation, fishing for Dolly Varden trout in the numerous streams is a favourite pastime.



V. Geist

*Magnificent bighorn rams have been taken in the Willmore since the early days of hunting in Alberta and are still the most important trophy animal in the area.*

An important future use of the Willmore by outfitters may be catering to organized youth groups or conservation clubs who wish to spend long periods in the backcountry. Although these people might hike in, supplies would be brought in by packhorse so that semi-permanent base camps could be established, from which day hiking might proceed. Similarly, outfitters will undoubtedly be called upon to supply parties of mountain climbers that will be attracted by Resthaven and Saurian Mountains, Mount Pauline and other peaks along the Continental Divide.



A. Bronson

*Pack horses facilitate the establishment of base camps which permit lengthy stays in the backcountry*

Backcountry camping and long-distance hiking is rapidly increasing in popularity as evidenced by trends in trail registration in Jasper National Park and in the U.S. Wilderness areas. During the 5-year period, 1967 to 1971, trail registrations increased by 400 percent in Jasper to a total of almost 11,000. Although a number of these trail registrations were for weekend trips, most people camped for several nights and a few parties stayed in remote areas for up to a month. Of particular interest are the increasing numbers of people travelling the 120-mile "North Boundary" section of the Great Divide Trail in northern Jasper Park, adjacent to the Willmore. In 1971 approximately 150 parties made this journey. As popularity of this route increases, numbers of people can be expected to continue northward into the Willmore in the quest of new country for high adventure. Five trails connect the Great Divide Trail with the Willmore. A short trail of about eight miles leaves the Great Divide Trail near Willow Creek and exits at the popular Rock Lake campsite to the east of the Willmore Wilderness. Trails also leave Jasper along Rock Creek, Blue Creek and Smoky River providing a number of interesting circuits. The westernmost route leaves Jasper along Chown Creek, crosses Bess Pass and Jackpine Pass, then continues northward along the Continental Divide. This is a logical extension of the Great Divide Trail that hiking enthusiasts envision as stretching into the Yukon and Alaska and connecting with the proposed Continental Divide Trail that traverses the United States from the Canadian border in Waterton Lakes National Park to Mexico.



D. Wales

Ski touring is also experiencing a recent upsurge in popularity. During the 5-year period ending in 1971, the number of persons ski touring in Jasper National Park increased by 650 percent. As the numbers of cross-country skiers increase, the trails in the Willmore will experience more winter use. This mushrooming popularity of hiking and ski touring is likely to continue because of increased leisure time and the desire to get away from our crowded urban environment. Ready availability of light weight, relatively inexpensive backpacking equipment and warm down insulated clothing and sleeping bags is also a major factor in extending backcountry use to all seasons of the year.

*Many of the trails in the Willmore are ideally suited to ski touring, a sport that is rapidly gaining popularity in Alberta*

The Willmore Wilderness is ideally suited to hiking, trail riding and ski touring because of the existing network of trails. Besides these five trails that enter from Jasper Park there are routes along most of the streams, which provide access to the Willmore from all directions. Access to the northern Willmore can be gained from the town of Grande Cache, which is connected with Highway 16 by an 80-mile gravel road that is scheduled for paving in the near future. The second focal point of vehicle access to the Willmore is the Alberta Forest Service campsite at Rock Lake, reached by a good gravel road from the Grande Cache highway. This campsite has developed facilities for about 30 units with adequate room for expansion. Travel into the Willmore must, of course, take place on foot or by horse as all use of motorized vehicles is prohibited.

Access can also be gained from the Berland or Muskeg Rivers. The roads are in fair condition for vehicles with reasonable clearance. Every valley system and most passes in the eastern

portion of the Willmore have good horse trails and many interesting routes for cross-country travel exist along the high ridges and over many of saddles and unnamed passes. Good campsites occur along all of the major streams, and the cross-country traveller can always find water and a bit of timber for shelter in the upper valleys bordering on the alpine.

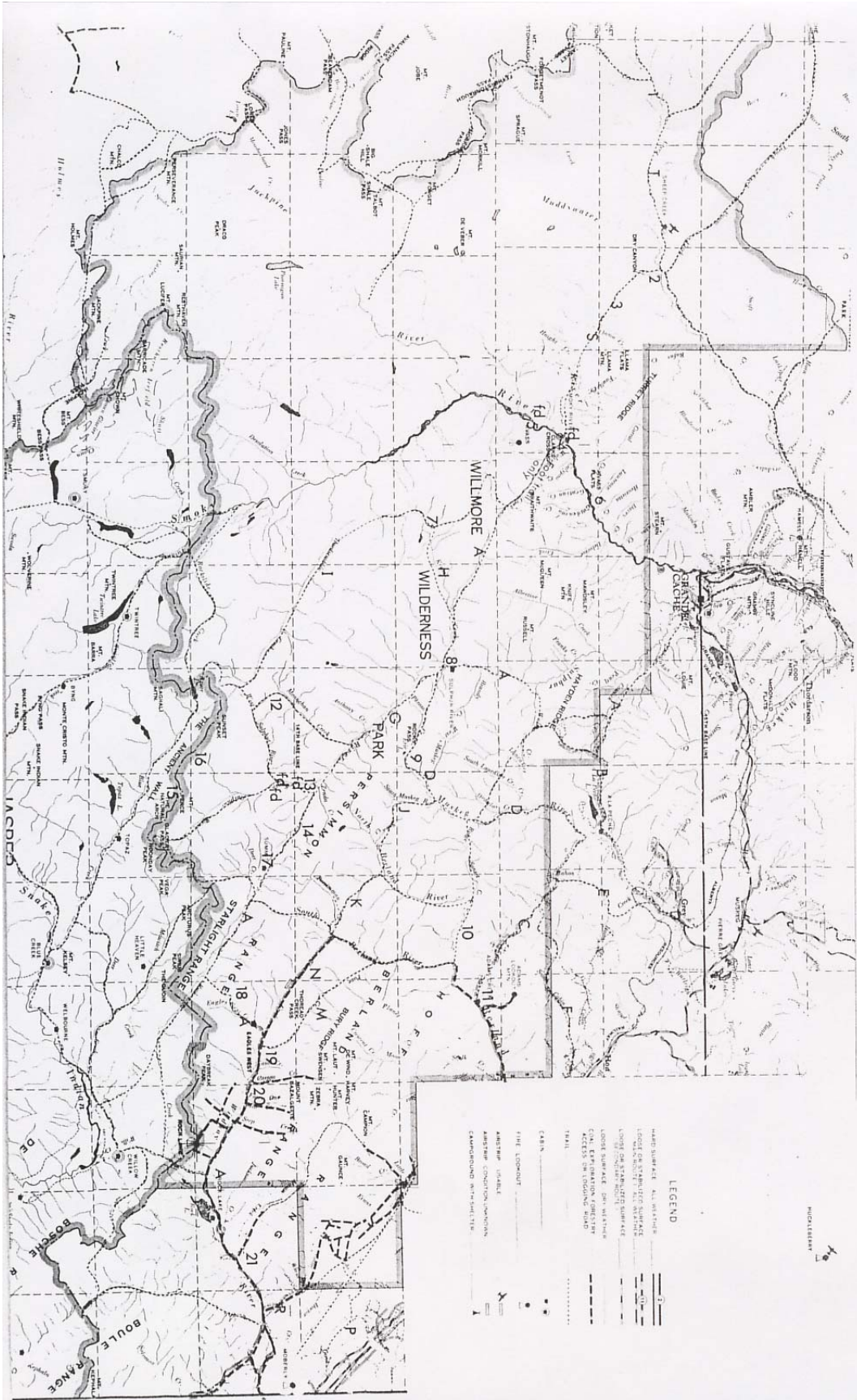
Access from B.C. can be gained from Mt. Robson Provincial Park via Jasper Park and from the Holmes (Beaver) River logging road. In this latter case, a way trail to the Continental Divide region near the headwaters of Charcoal Creek (see Recreation Map) exists. Hiking along the Continental Divide of the western border of the Willmore is an experience not to be forgotten soon. Below timberline of the west lie a virtual rain forest, and the absence of trails and abundance of deadfall and brush alder make travel within B.C. regions rigorous to say the least. However, if one stays high and follows the old Divide Trail (where it can be found), travel into the upper Kakwa of British Columbia is feasible this Great Divide route. From there the traveller can proceed down the Kakwa, Torrents, or Narraway Rivers, or back into the Sheep Creek drainage the Willmore via Trench and Farm Creeks.



L. Jeck

*Hunting parties, here seen travelling up the Sulphur River to Glacier Pass, have traditionally made the most use of the Willmore*

Travel in the western portion of the Willmore off the Continental Divide is arduous. Crossings on the Smoky are swimming fords for horses, and only in late summer or autumn would the foot traveller be able to cross. Even then, only crossing at select places where the Smoky is heavily braided would be feasible, and fords would be chest deep.



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Trails, Paths, and Roads

- A Mountain Trail
- B A La Pêche Trail (renamed portion of Indian Trail)
- B Adams Creek Trail
- D Muskeg River Trail (renamed portion of Indian Trail)
- E Mahan Creek Trail
- F Cabin Creek Trail
- G Grave Falls Trail
- H Kwass Creek Trail
- I Hardscrabble Trail
- J Snow Trail (renamed portion of Indian Trail)
- K Indian Trail
- L Berland River Trail
- M Pope Creek Trail
- N Persimmon Creek Trail (renamed portion of Indian Trail)
- P Ewan Trail
- R Collie Creek Trail
- S Dry Canyon Trail
- T Sheep Creek Trail

Sites of Interest

1. Grave of George Hargreaves
2. Sulphur springs
3. Dry canyon
4. Clark's Crossing and Cache
5. The Swim
6. Kwass Flats
7. Winnifred Flats
8. Big Grave Flats
9. Mount Leonard
10. Grave of Dolphus Agnes' sister
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12. Dinosaur or Totem Pole Pass
13. Little Grave Flats
14. Trapper's Grave
15. The Natural Arch
16. Brewster's Wall
17. Mile 58 cabin
18. Eagle's Nest Pass
19. Old Coal Mine Cabins
20. Old Coal Mine Cabins
21. Site of buffalo jump



The wildland recreation potential of the Willmore is high, and future development on more accessible Forest Reserve lands of facility-oriented recreation or mineral and timber resources can only enhance the value of this, Alberta's "last great wilderness". Statutory protection for the Willmore Wilderness Park must be forthcoming.

## **CLIMATE**

The rugged topography of the Willmore profoundly influences both long-term climatic conditions and day-to-day weather patterns. Local climate conditions are quite variable and almost unpredictable. This variance in local climate influences vegetation patterns and wildlife distribution throughout the Willmore. It is also important in terms of comfort and safety of the backcountry traveller and in no small part controls the type of recreational use to which the Willmore can be put.



Climate in the Willmore is generally cool and the risk of freezing temperatures increases with elevation. Although the July-September period is mild (mean maximum temperatures in the mid 60's), freezing temperatures may occur at any time. For example, the Willow Creek, area just south of the Willmore experiences frost on about one-quarter of the nights during July-



September. At high elevation and along the Continental Divide warm clothing and down sleeping bags are mandatory for the hiker and horse rider throughout the year.



The short snow-free period for the high elevation country restricts use of many of the passes such as Jackpine and Shale and the high trails to July, August and early September in most years. Even during these months snow may be a physical barrier to both man and horse.

R. Pharis

*In the high country along the Divide snow patches persist into August making warm clothing and down sleeping bags a necessity.*

Precipitation also influences recreational use of the Willmore. The eastern part of the Willmore is relatively dry, receiving only about 20 inches of precipitation per year. The western part of the area, however, receives about 60 inches and thus rain gear is always advisable. Rainfall along the low, poorly drained trails of the Muskeg and Berland Rivers often creates muddy conditions that are unpleasant to the hiker. Swarms of mosquitoes and biting flies plague both people and horses, although by August insects are less of a problem, especially in the high country.

Climate directly influences stream flow; a factor which is of prime importance to travellers in the Willmore since few of the streams are bridged. Mountain stream flow is quite variable but three main flow regimes can be recognized. These are stream flow caused by spring snowmelt, by rainfall runoff, and by the melting of glacial ice.

Streams such as Muskeg, Berland and Wildhay Rivers which receive most of their water from spring snowmelt can be expected to peak in May. The time of this peak flow and its volume of discharge are controlled by winter snowfall and spring temperatures. These and similar streams in the eastern portion of the Willmore may be easily forded in late summer but are a definite risk to early spring hikers.

Streams like the Smoky River that derives their greatest flow from glacial melt will generally peak in July. As mentioned in the recreation section, fording of the Smoky is difficult throughout the summer and at peak flows the Smoky is almost impossible to cross, even for horses.



R. Pharis

*Drying rain soaked clothing over a campfire is often necessary as  
Showers are frequent throughout the summer.*

Intense rainstorms can produce high flow peaks of short duration at any time in the summer, leaving the hiker stranded between major tributaries of the larger rivers for a day or longer, or necessitating long detours until water levels subside. Mumm Creek, Seep Creek and similar deeply incised intermittent streams flowing from rocky areas with very little storage capacity can become rushing torrents within a very short time. Many of the smaller streams in the high country of the Willmore fall into this category.

## ECONOMIC VALUES

How does one place a dollar value on the recreation resources of the Willmore area, its diverse landforms, unique vegetation types, endangered wildlife, pristine landscape and wilderness aesthetics? Alberta's recreation demands and needs are obviously increasing as its citizens gain additional leisure time and money. At the same time our recreational resources become fewer, both in terms of supply and in quality. The Willmore Wilderness Park offers a true wilderness environment, a contrast with mechanized civilization for modern man - a rare commodity today, even in Alberta. As such, the recreational value of the area cannot be measured just by personal benefits of the user (although these benefits must be taken into account), but must be viewed as a benefit to our entire society and its future generations through the preservation of a unique and scarce commodity.

What are some of the personal benefits, which accrue to the user of this 1700 odd square miles of contrast, solitude, and wilderness? They range from the physical challenge of "practising the primitive art of wilderness travel" to the thrill of a trout strike in a quiet pool of the Muskeg River, to the high adventure of a stalk along the open ridges of the Persimmon Range, to the stories and tales spun around the campfire. They last long after the trip has ended, and may be visible to society in a more relaxed behaviour and increased productivity of the "recreated individual" after his return to civilization. These benefits extend to the "anticipatory pleasure that the individual, and indeed entire family will derive in planning their next (or first) wilderness adventure into the Willmore, a pleasure that all of those who have spread out a the map before the fireplace on a cold and snowy winter night will not soon forget. And finally, the vicarious pleasure of the Canadian who is satisfied just knowing that the Willmore still exists as an inviolate part of North America's wilderness heritage must not be discounted. The above are benefits, which currently defy the assignment of dollar values, although some enterprising economist of the future may well succeed in their quantitation. For the time being, though, they must continue to exist, and perhaps they should always exist, as benefits of inestimable value.

Competing resource uses for our wildlands take many forms. Obvious uses are timber, coal, oil, gas, and quartz mineral exploitation, and dollar values can readily be attached to the cost and benefits of these. A similar situation exists with regard to commercial outfitting, guiding, and trapping. Other uses are more speculative (such as backcountry travel for pleasure) as mentioned above, and have defied the assignment of a dollar value.

The Willmore has been, and is now subject to demands from the natural resource industries. Even though some of the benefits of a wildland recreation classification may be inestimable, it should be possible to discuss the costs and benefits of certain compatible uses (e.g. outfitting, guiding, trapping) and contrast them with those of the extractive resource industries and facility oriented recreation facilities, given the necessary information about past trends and economic practices. An attempt will be made to do this in the following paragraphs.

*COSTS AND BENEFITS OF RETENTION OF THE WILLMORE AS  
A RECREATIONAL WILDERNESS*

There are certain costs borne by government in administration of any crown lands, although in past for Alberta's de facto wilderness these costs have been negligible (with the exception of fire detection and suppression) since trail maintenance and backcountry patrols were discontinued some years ago. We can expect an increase in administrative costs concomitant with increasing interest in the Willmore for wilderness recreation. Signing, trail maintenance, bridging, and backcountry patrols by rangers will become routine expenses in the future operation of the Willmore Wilderness Park. However, if the tendency to over-regulate were resisted and if all users of the Willmore were made aware of any necessary regulations, then self-policing with minimal enforcement personnel should be effective as long as user density remains low. Increased regulation (and thus administrative costs) may have to accompany increased usage, but then an economic analyzing of the dollars spent within the Province by the additional wilderness users should provide a rationale for these increased government expenditures.

Fire protection costs for the Willmore could be reduced significantly by eliminating fire patrols and allowing forest fires to run their course in those areas of the Willmore not immediately adjacent to commercial stands of timber outside the boundaries. In no case should heavy machinery be used within the Willmore for firefighting. It is estimated that the Alberta Forest Service spends more in fire protection of its forests than it derives from the sale of timber or fiber from these lands. In many cases fire suppression efforts have been useless because of the vagaries of weather. This whole subject should be the object of serious study by the Forest Service given the significant expense of forest fire protection to the province (in excess of \$6 million/annum), the environmental damage resulting from suppression, and the positive role of wildfire in providing high quality range for wildlife. Wildfire in the Willmore is a natural phenomenon and man can seldom be other than a passive observer when it occurs.

Resource economists can predict certain benefits from recreational use of the Willmore, and where the user travels with a commercial outfitter, these benefits can be accurately accounted for. In addition to this direct economic approach one can also determine "Willingness to Pay" model (i.e. how much would each user be willing to pay for the experience). Of most value, however, might be an "Opportunity Cost" model where one calculates the values (revenues) foregone by wilderness zoning. Here, facility-oriented recreation, forestry and coal "opportunities" may well have negative revenues. Gas and oil might, or might not be positive depending on whether all costs (real, reclamation and social) were included.

In the past outfitters have guided both summer travellers and dude hunters. Most come from the U.S. or eastern Canada, in quest not only for the trophy sheep, mountain goat and caribou of the Willmore, but also in search of high adventure, of contrast, of escape from the hectic pace of modern life. These outfits are completely equipped and the dude is almost assured a memorable and satisfying experience.

The bighorn sheep is the most important animal to the guiding industry. In 1972, the Willmore supported almost one-third of the non-resident sheep permits issued by Alberta. About half of the hunters were successful in obtaining a trophy ram. Since each licensed non-resident hunter

spends about \$5,000 in Alberta for his hunt (outfitter fees, travel, game licence, food, etc.), the economic importance of trophy hunting is obvious. An approximate figure for the total revenue derived by Alberta annum from non-resident hunters in the Willmore, is \$200,000 and this figure reflects only one season of sheep hunting. Likewise a few permits were issued in 1972 for mountain goat. The hunter success was poor because of the late season, cold weather and hazardous travel. Even so, a specific dollar return accrued to Alberta from resident hunters of mountain goat and woodland caribou within the Willmore.

Hunting is of course a consumptive use of the wildlife resource as opposed to photography or nature painting. However big game hunting can be sustained year after year if wise principles of game management based on accurate biological and census data are followed. Mountain goats, woodland caribou and, to a lesser degree, bighorn sheep are threatened species in much of Alberta. Under wise management the Willmore herds can continue to be cropped, but only if given a strict degree of protection, which must include the preservation of their range. The dollar value of outfitted hunting should be added incentive to protect this range from inappropriate uses. Licence and fee income derived by the Province from the regulated harvest of trophy animals can more than pay for regulation and census costs, and can be used for habitat improvement and transplanting projects such as the one where live trapped goats from Mount Hamel (near Grande Cache) were moved to traditional goat ranges in the south where populations had declined. These southern herds are now given complete protection and appear to be adapting to their new surroundings. Had the vast area of the Willmore not provided protection in the past from poaching and the indiscriminate hunting that seems to accompany road access, we would not have had this reservoir of mountain goat herds, which are now being used to re-stock the depleted southern ranges.

In the past, summer has been a slack season for outfitting, but recently four outfitters have begun to promote summer trail-rides. On the average, each outfitter can fit about four trips into the months of July and August, and about 10 people are guided for each trip, which lasts ten days. The cost per person is thus about \$250, and the gross income derived by these four outfitters should be in the order of about \$40,000. For the traveller, the experience is most worthwhile, and the expense is moderate; food, equipment, shelter, instruction and guiding are included in the fee. These trips are popular and are booked well in advance, clients most often being Americans and eastern Canadians although Albertans are gradually learning of this unique opportunity for a guided wilderness trip into the unique backcountry of the Willmore. The potential for summer outfitting is largely untapped, especially when one considers the popularity of horse-assisted backcountry hiking (i.e. heavy supplies are carried by a few horses for a party of 20 -25 hikers) which is becoming so popular in the wilderness areas of the U.S.A. A conservative estimate on the summer outfitting potential of the Willmore would be in the order of \$250,000/annum. Together with the income derived from fall outfitting and hunting, the Willmore is worth at least \$500,000/annum to the province from outfitting alone.

The fur resource of the Willmore was of paramount importance to the early settlers as mentioned previously. Although today's trapper rarely becomes wealthy from the trap lines, the sale of marten, lynx and beaver pelts does comprise a significant portion of their annual income. During the 1971—1972 season, twelve registered trap lines were held in the Willmore. However, it is

apparent that these lines are not being worked to their full potential (i.e. the total value of furs was only \$3,400 in 1972).

By far the most important animal to the trapper was the beaver, of which a total of 96 were taken for a value of \$1,600. The skins of red squirrels and lynx gross trappers \$580 and \$455 respectively. Ermine, marten, mink, muskrat, coyote and Wolverine comprised the remainder of the harvest. The highest income for any individual trap line was less than \$800. There is no indication that fur bearing animals are being over-trapped, and trapping could, in the future, contribute significantly to the income of local residents, especially the native people living near Grande Cache.

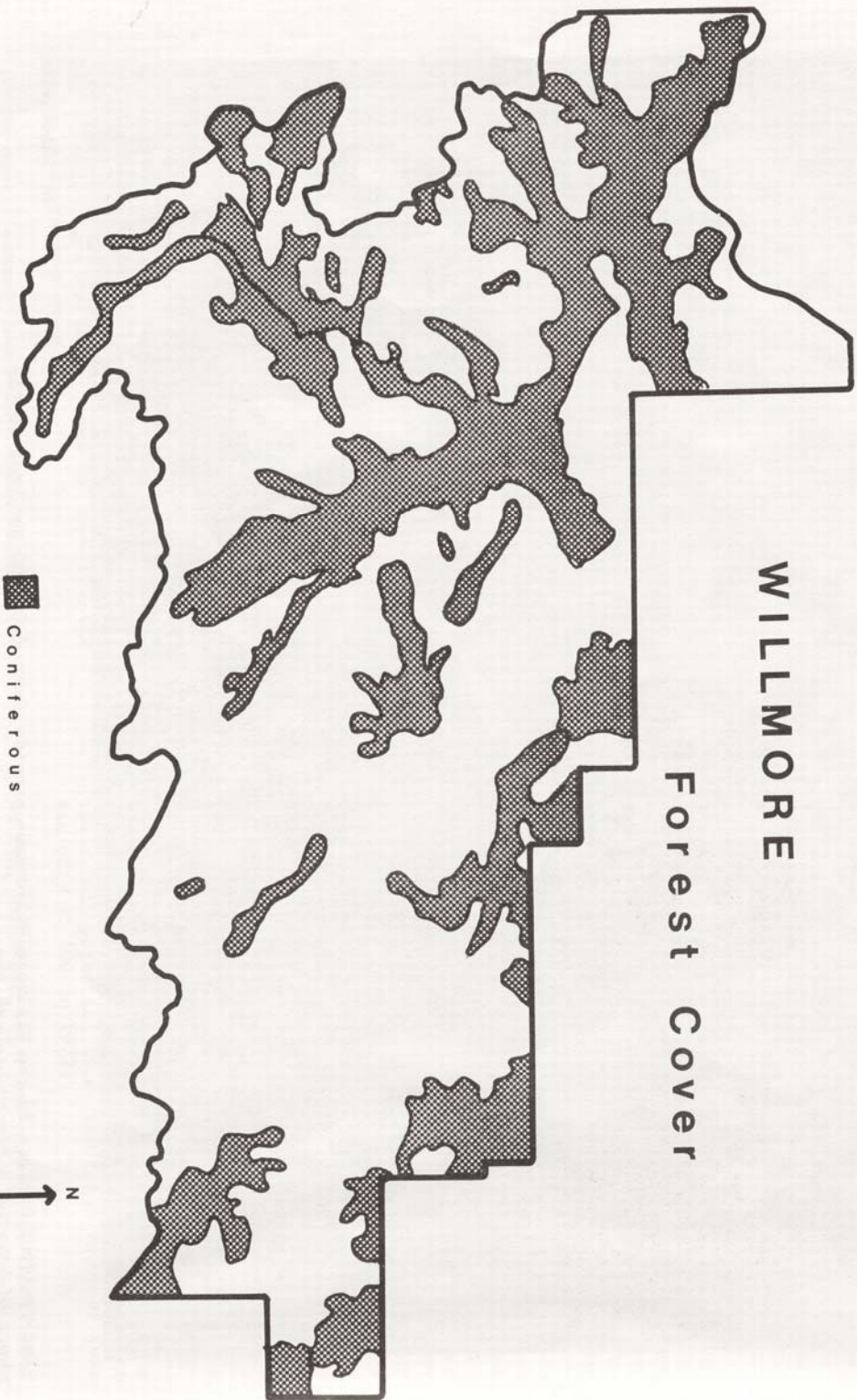


D. Shackelton

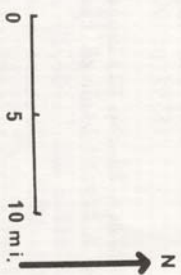
*Non-Resident hunters in the Willmore Wilderness provide about \$200,000 per year in the hope of bagging a trophy bighorn ram.*

# WILLMORE

## Forest Cover



Coniferous



## WATER

To understand the importance and value of the watersheds, one must consider not only the headwaters or origin of the stream flow. The Smoky River and its major tributaries (Sulphur, Jackpine, Muddywater and Muskeg Rivers) are the main drainages of the Willmore Wilderness Park. Although the Smoky drainage begins high in the ice fields and glaciers of the remote Continental Divide, it drains many miles of the Peace River country to the north. The Berland and Wildhay Rivers to the east flow into the Athabasca River. Eventually all streamflow originating in the Willmore flows into the Mackenzie River system.

The most important areas for water production are the alpine and sub-alpine meadows and the edges or margins of the high elevation forest stands. In particular the north and east-facing slopes are critical sites for winter and spring snow accumulation. Here the moderating influence of the sun and warm Chinook winds is minimal. Snow, which is blown from the bare alpine areas, accumulates along the tree line or in minor depressions. Spring meltwater is slowly released from these accumulations into the streams and rivers long after the general snow pack has melted, thus helping to equalize as streamflow. In general an extra foot of snow added to these high elevation snowfields will result in an additional week's runoff, a fact which may have real importance to spawning trout, nesting waterfowl, muskrats and beaver, or even pasture irrigation.

Use of the water resource differs from that of wildlife, forests, or coals in that the photographer, or hunter, or logger or miner, for example, utilizes the resource at its source, "in situ". In contrast streamflow from the high mountains of the Willmore is of paramount importance to downstream users as well as to the fisheries and wildlife of the area. Alberta's East Slope Rivers are of importance as an industrial and domestic water supply, recreation, irrigation, hydroelectric power, transportation and wildlife habitat. These waters, of which we now have a surplus, are clean and of high quality. Today, most of us tend to take water for granted but this most essential resource may be, in the future, more precious than oil, gas, or other resources currently held to be of great value. Since the fragile alpine meadows and mountain slopes are the major source of water, the sensitive balance of soil and vegetative cover, which regulates water release, must be conserved by protection from unduly disruptive exploitation. Continued protection of the Willmore as a recreational wilderness can ensure the lasting quality of this most important resource.

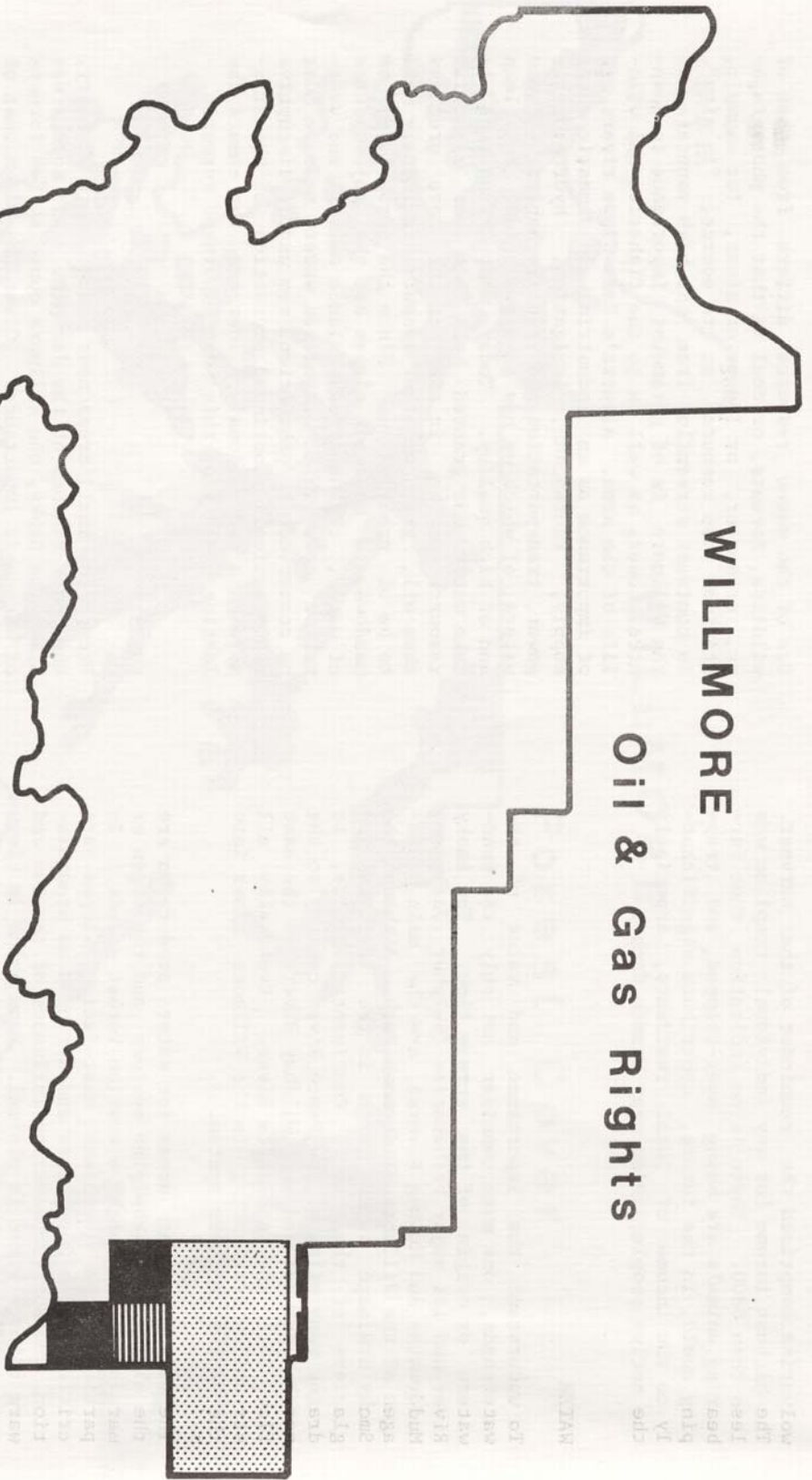
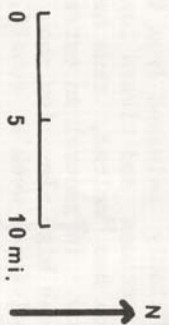
## *FORESTRY*

Except for small areas near the eastern boundary, the lower reaches of the Jackpine, and some areas along the Smoky, the Willmore contains few forests of economic importance. Given the high cost of road construction, it is unlikely that the forests of the Smoky and Jackpine could be harvested at a profit. Rather, the stands of spruce, pine and aspen within the Willmore are of far greater value as wildlife habitat, watershed protection, and for the aesthetic benefit of the human user.



# WILLMORE Oil & Gas Rights

- Lease
- ▨ Reservation
- ▨ Crown Reserves



*PETROLEUM AND NATURAL GAS: ITS COSTS AND BENEFITS  
TO THE WILLMORE*

Only a relatively small portion of the Willmore Wilderness Park is connected under lease or reservation for the purpose of exploration, drilling and extraction of gas or oil by the geophysical industry. The geological pattern of the sedimentary fold and faults in the area suggests that natural gas is the more likely find rather than oil. The Crown petroleum and natural gas leases (issued for a period of 10 years) provide the holder with rights to the gas and oil. Four companies hold such leases, although Canadian Ashland Exploration Ltd. and Can Del Oil Ltd. are the more significant lessees in terms of Crown revenues. The four companies together hold about 12,600 acres under lease in the vicinity of Carson, Seep and Forty One Mile Creeks and along the Wildhay River (Twp52, Rge. 3, W6). To date the revenues obtained by the Crown from fees and rentals have amounted to about \$18,000. Two of the leases do not expire until 1982.

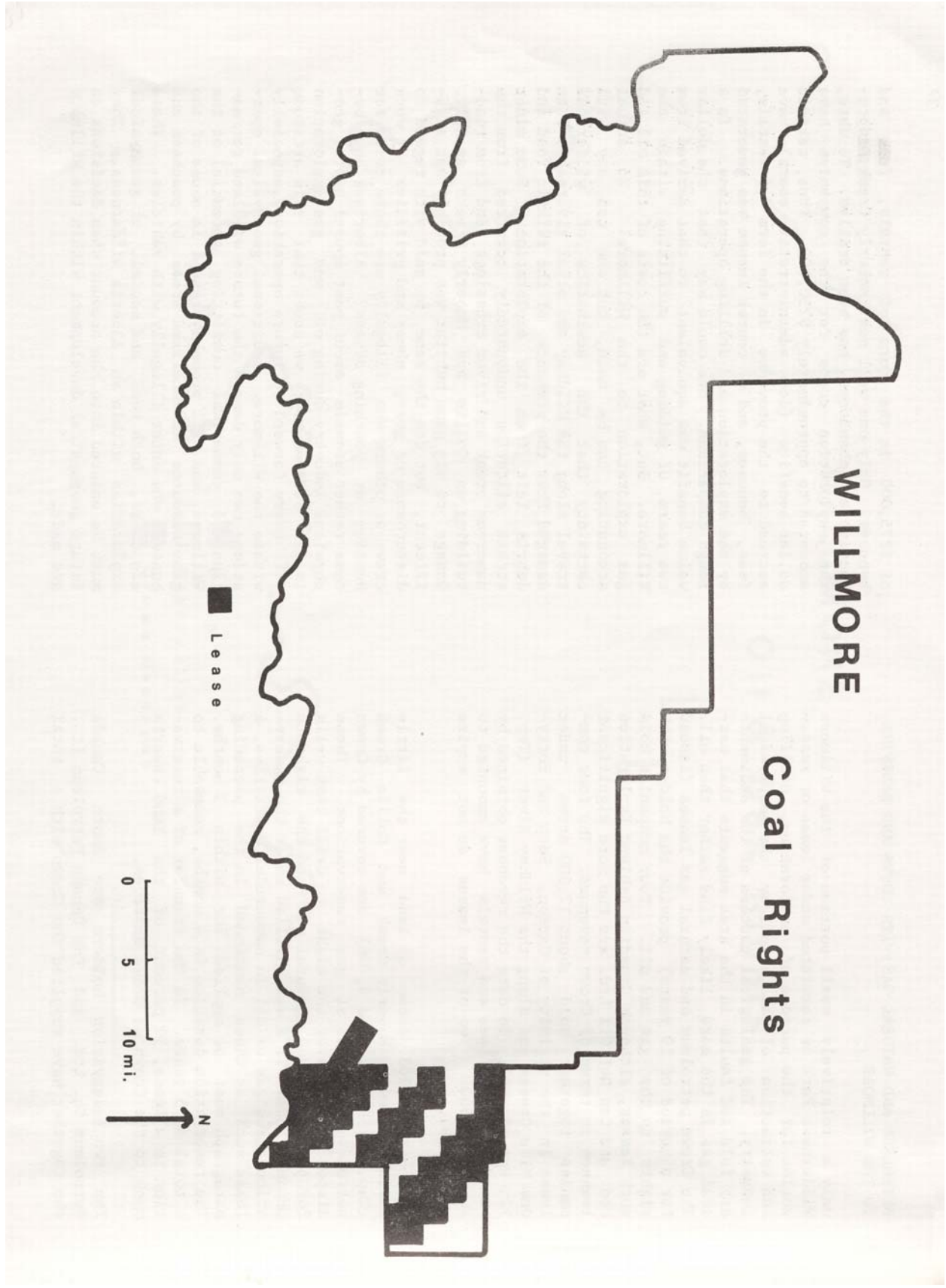
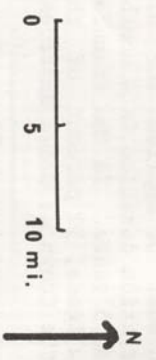
At least 50,000 acres of land near the Little Berland River, Moberly Creek and Collie Creek (Twp. 53, Rge's. 2 and 3, W6) are covered by Crown petroleum and natural gas reservations. These dispositions convey the right to drill test wells for petroleum and natural gas and the right to produce them. If a well drilled under the reservation shows gas or oil in commercial quantities, a lease such as those mentioned in the preceding paragraph must be applied for within 3 months. The reservation duration is 4 months, renewable to a total of 5 years. In the transfer of a reservation to a lease, 50 percent of the land reverts back to the Crown as Crown Reserves.

The two reservation holders are Amoco Canada Petroleum Co. Ltd. and Pan Canada Petroleum Ltd. who together have supplied the Crown with a total of \$275,000 in the form of rentals, fees and bonuses. Only one near Moberly Creek, unproductive and abandoned, has been drilled. To date, the exploration costs for companies have amounted to approximately \$250,000. Thus, certain dollar benefits (less administrative costs) have accrued to the province in the form of rentals, fees, bonuses, and of course income was generated by the exploration and drilling operations. In a rough comparison, one could say that the dollar value benefit was equivalent to that derived from two years of guiding and outfitting within the Willmore. But, what are the costs of this oil and gas exploration to the Willmore? No actual accounting can be made, but one can say with certainty that the aesthetics of wilderness travel along the Wildhay and other rivers has been damaged from the presence of the seismic road and debris left from the exploration. Some minor stream salutation undoubtedly occurred from the numerous creek and river crossings and from road building up Collie and Moberly Creeks as well. Damage to big game habitat was probably not significant, but can the same be said with regard to disturbance of goat, sheep and grizzlies by work crews or others who illegally use these roads for hunting or poaching access? Albertans have become rather prosaic about past abuses by the geophysical industry during oil and gas exploration in our backcountry; we doubt that this attitude will carry forward to future operations, especially within the Willmore. Additional geophysical operations can only damage the future wildland recreation and commercial outfitting potential of the Willmore, and will probably result in abuse of the game resource in localized areas by poachers and hunters who enter illegally with vehicles. These are costs, both real and social, of geophysical exploration within an Alberta wilderness. They must be entered into the account when decisions on future geophysical development within the Willmore are made.

**WILLMORE**

**Coal Rights**

■ Lease



## COAL

Coal leases, like the reservations and leases for rights to oil and gas, cover only a small area of the eastern Willmore Wilderness Park. Unfortunately this same small area of land (which includes the Persimmon, Hoff and Berland ranges) is also held under a "natural lease" by approximately 25 percent of the Willmore's mountain goats (this is 10 to 12 percent of all the goats in the Province).

The coal leases, when mapped, form obvious shapes or patterns, which coincide with the northwest trending seams of coal. The three main coalfields lie beneath the headwater basins of the Sulphur, Muskeg, Little Berland, Berland and Wildhay Rivers. The seams are commonly exposed and are readily accessible on the high slopes of the mountains, frequently at elevations in excess of 6,000 feet.

The most northern lease is held by McIntyre-Porcupine Mines Ltd. (who also operate open-pit and underground operations near the town of Grande Cache about 25 miles to the northwest). Their lease within the Willmore covers the Lascar formation. Bituminous coal mined by McIntyre outside the present boundaries of the Willmore (but within the original boundaries) is sent almost exclusively to Japanese markets where it is used in the coking of steel. McIntyre's Willmore lease has three mineable seams between 6 and 20 feet in thickness, which may contain about 470 million tons of coal. However, only 9 percent (or 4 million tons) is at a depth, which could be economically removed by strip mining.

The middle lease belongs to Manalta Coal Ltd., and is believed to contain 80 million tons of coal. However, most of this is not mineable by stripping. The southern coal lease is really two leases, one by McIntyre-Porcupine and the larger of the two by Denison Mines. The two leases taken together have an estimated 500 million tons of coal. Denison Mines apparently wishes to conduct further exploration (involving extensive road building) on its holdings with the intention of commencing an underground mining operation. The reserves of the specific area in question are estimated at 20 million tons of recoverable coal.

A mining technique, which may be considered and attempted by Denison, is known as "hydraulic mining". Greatly simplified, the operation uses great volumes of water shot from a nozzle under high pressure to break the coal apart. Mining begins at the bottom of the seam, which preferably is at a 30 to 45 degree angle to the horizontal. The fractured coal, now mixed into a slurry with water, slides down into the collecting pit created at the base of the seam and is piped to washing facilities and settling tanks. The source of the mining water would be the nearby Wildhay River, and a pipeline would probably transport the coal to the Alberta Resources Railroad about 20 miles to the east. Denison Mines has spent approximately \$1 million in preliminary exploration, in trenching; drilling and audit work to date. Other leases have spent much less in preliminary exploration. The Crown revenues from rentals, fees, bonuses and royalties on these leases have amounted to about \$250,000.

Thus, coal exploitation is a real threat to the future of the Willmore, not only to its wilderness solitude and potential for wildland recreation but to the very existence of its valuable goat and

sheep herds. We were told in the past, when the Willmore was reduced in size by almost 400 square miles, that Alberta needed the new jobs that this industrial encroachment on our wildlands would bring. Yet now, looking back on the experience, we know that this venture cost Albertans over \$100 million to build an access railroad which loses over \$5 million each year and whose construction caused tremendous environmental damage. We know that the new town of Grand Cache was subsidized by the Alberta taxpayer to provide housing and the amenities of civilization to miners of a company that claims that it is losing millions of dollars each year. We know that the jobs promised to Albertans often went instead to miners brought in from other provinces and other countries. We know that the promise of permanency given to these miners could not be met, as evidenced by recent lay-offs. With this perspective, is Alberta now to embark on a second industrial adventure into the wilderness?

Alberta must decide, and decide soon, whether exploitation of these non-renewable resources of coal (and possibly gas) within the Willmore is to take place for the benefit of short-term gain (although when one looks at the role of the tax-payer in subsidizing certain of these operations it is questionable whether any gain actually occurs) against the long-term benefits of preserving the wildlands and wildlife habitat of the eastern Willmore.

Mining of coal seams along the Berland, Hoff and Persimmon Ranges can only result in the loss of our valuable bighorn sheep and mountain goat herds and the eventual demise of grizzly native to the area. Disturbance by human activity combined with the inevitable poaching of goat and sheep and illegal shooting of grizzly will ensure these losses no matter how diligent the policing. While only underground mining is proposed for now, the inevitable demand for stripping, as the only "economical" method will not be far behind. With strip mining comes the final demise of invaluable goat and sheep range. Even though Alberta now has what promises to be a unique and far-sighted surface reclamation law, the reclaiming of fragile alpine areas, even at costs in excess of \$5,000/acre, has never been demonstrated.

Must Albertans again permit inappropriate resource development within our last great Wilderness, the Willmore? We think not, yet it will take continued citizen interest and vigilance, for the decision is a political one. Our elected representatives must not only know that their decision is a correct one for the long-term good of Alberta, but that it is also a decision which has the full support of the informed citizens.

### *QUARTZ MINERAL RESOURCES*

Is small mineral lease (E 1/2, Sec. 20, Twp. 55 Rge. 13 W6) is held by Mountain Gypsum Ltd. near Mount Fetherstonehaugh. At present, no exploration of the gypsum deposit has been attempted to prove-up the reserve. Gypsum is usually quarried and used as the main component of building materials such as plasterboard. The key to successful gypsum mining has been road or rail access, neither of which exists today.

## CONCLUSION

The above discussion is unfortunately inadequate as an economic analysis of the pros and cons of non-renewable resource development versus wilderness preservation. We have not even touched on facility-oriented recreation developments, or timber harvesting; these are demands on the Willmore, which if they come, will arrive on a later day. We have only alluded to the need for considering all costs (and real benefits) of non-renewable resource development within the Willmore when attempting to reach land-use policy decisions that affect the wilderness and wildlife values of this magnificent country. Some of the costs are social in nature, and thus currently defy the easy assignment of dollar values. Some costs involve reclamation of disturbed environments, reclamation that if it is to be successful, even within several generations, may reach astronomical costs. Some costs are evidenced in direct environmental damage to streams, and watersheds, and wildlife; these costs, ignored in the past, must now be included. All of these costs must be calculated and balanced with the benefits accruing to Albertans and other Canadians from any and all future resource developments on our Crown lands, and especially those most valuable Crown lands we know as the Willmore Wilderness Park. With such knowledge, and with information provided by environmental impact assessment studies, Albertans will now know the true cost to their environment of resource development and exploitation schemes. With this knowledge will come a new responsibility, a responsibility that can no longer be delegated? The future of the Willmore, our other East Slope Lands, and the quality of the environment throughout our province and country, rest on how well we accept the obligations inherent within this responsibility. The decision is ours.



B. Horejsi

*Woodland Caribou*

## **ACKNOWLEDGEMENTS**

The Association acknowledges with sincere thanks the following individuals who gave of their time and knowledge to make this study possible: Anne Bronson, Ric Careless, Len Jeck, Grant McNabb, Tom Oliver and Dick Pharis.

Cartography was the contribution of Karen Kunelius and Bill Matheson, and Bill Matheson designed the cover. The skill of Andy Jaremko was responsible for the high quality of the photographs and the patience and accuracy of Linda Bellavance; our typist is most appreciated. Llyn Hippard accomplished the excellent printing by photo-offset.

CANADIAN MINES AND TECHNICAL SURVEY MAPS

|                               | <u>1:50,000</u> | <u>1:250,000</u>                                          |
|-------------------------------|-----------------|-----------------------------------------------------------|
| Holmes River                  | 83E/5 E & W     | Mt. Robson 83E<br>and a small<br>portion on<br>Wapiti 83L |
| Twin tree Lake                | 83E/6 E & W     |                                                           |
| Blue Creek                    | 83E/7 E & W     |                                                           |
| Rock Lake                     | 83E/8 W         |                                                           |
| Moberly Creek                 | 83E/9           |                                                           |
| Adams Lookout                 | 83E/10 E & W    |                                                           |
| Hardscrabble Creek            | 83E/11 E & W    |                                                           |
| Pauline Creek                 | 83E/12 E & W    |                                                           |
| Dry Canyon                    | 83E/13 E & W    |                                                           |
| Grande Cache                  | 83E/14 E & W    |                                                           |
| Pierre-Greys Lakes            | 83E/15          |                                                           |
| Kakwa River Drainage Maps:    | Copton Creek    | 83L/3                                                     |
|                               | Chicken Creek   | 83L/6 E & W                                               |
|                               | Prairie Creek   | 83L/7 E & W                                               |
|                               | Kakwa River     | 83L/4 E & W                                               |
|                               | Jarvis Lakes    | 931/1 E & W                                               |
| Torrens River Drainage Maps:  | Two Lakes       | 83L/5                                                     |
|                               | Jarvis Lakes    | 931/1 W                                                   |
| Narraway River Drainage Maps: | Two Lakes       | 83L/5                                                     |
|                               | Jarvis Lakes    | 9 31/1 W                                                  |

Provincial Access Maps

1" = 4 miles

83E/D; 83N/L

Canadian Mines and Technical Survey Maps are available in Calgary from the Geological Survey of Canada, Institute of Sedimentary and Petroleum Geology at 3303 33rd St. N.W.; the single sheets are \$.50\*.

Alberta Provincial Access Maps are available in Calgary in the Maps Room, Department of Lands and Forests, John Bowlen Building, 7th Ave. S.W. or at the Alberta Forest Service Bow River Forests 5425 85th St. N.W. In Edmonton, they can be purchased at the Department of Lands and Forests, Natural Resources Building. Prices are \$1.00\* each.

\*Prices may have changed since initial printing.



## INDEX TO RECREATION MAP

### Trails, Paths, and Roads

- A Mountain Trail
- B A la Peche Trail (renamed portion of India rail)
- C Adams Creek Trail
- D Muskeg River Trail (renamed portion of Indian Trail)
- E Mahan Creek Trail
- F Cabin Creek Trail
- G Grave Flats Trail
- H Kvass Creek Trail
- I Hardscrabble Trail
- J Snow Trail (renamed portion of Indian Trail)
- K Indian Trail  
mother
- L Berland River Trail
- M Pope Creek Trail
- N Persimmon Creek Trail (renamed portion of Indian Trail)
- P Evan Trail
- R Collie Creek Trail
- S Dry Canyon Trail
- T Sheep Creek Trail

### Sites of Interest

- 1. Grave of George Margraves
- 2. Sulphur springs
- 3. Dry canyon
- 4. Clark's Crossing
- 5. The Swim
- 6. Kvass Flats
- 7. Winifred Flats
- 8. Big Grave Flats
- 9. Mount Leonard
- 10. Grave of Delphos Agnes' sister
- 11. Grave of Adam Joachim's
- 12. Dinosaur or Totem Pole Pass
- 13. Little Grave Flats
- 14. Trapper's Grave
- 15. The Natural Arch
- 16. Brewster's Wall
- 17. Mile 58 cabin
- 18. Eagle's Nest Pass
- 19. Old Coal Mine Cabins
- 20. Old Coal Nine Cabins
- 21. Site of buffalo jump



Front Cover : Jack Pine Pass  
Inside Back Cover : Along the Continental Divide