

Committee  
on the Status  
of Endangered  
Wildlife  
in Canada

Comité sur le  
statut des espèces  
menacées  
de disparition  
au Canada

Ottawa, Ont. K1A 0H3  
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## **STATUS REPORT ON THE KANANASKIS WHITLOW-CRESS**

**DRABA KANANASKIS G.A. MULLIGAN**

**BY**

**BONNIE SMITH**

**STATUS ASSIGNED IN 1992**

**ISIAWBD\***

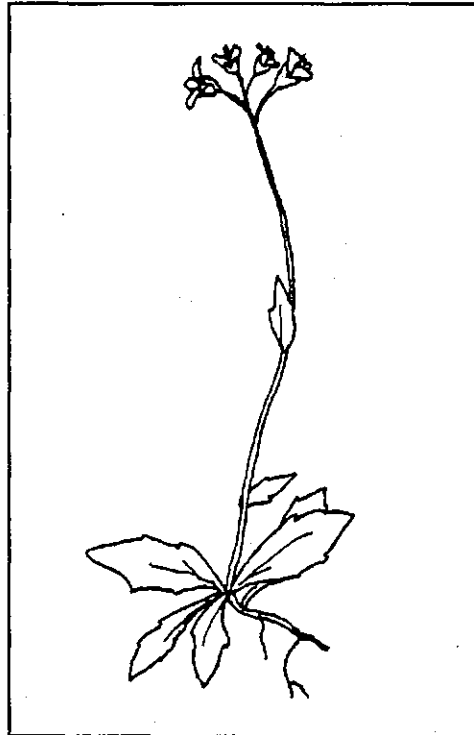
**REASON: AN INCONSPICUOUS ENDEMIC OF THE  
CANADIAN ROCKIES WITH FEW KNOWN  
LOCALITIES AND LIMITED DOCUMENTATION  
ON POPULATION SIZE AND OCCURRENCE.**

**OCCURRENCE: SEVERAL SITES IN CANADA AND ONE IN ALASKA.**

**\* INSUFFICIENT SCIENTIFIC INFORMATION AVAILABLE ON WHICH TO BASE A  
DESIGNATION.**

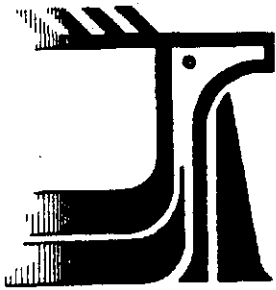
**STATUS REPORT  
ON ENDANGERED WILDLIFE  
IN CANADA**

**Kananaskis  
Whitlow-cress**



**COMMITTEE ON THE STATUS  
OF ENDANGERED WILDLIFE  
IN CANADA**

**COSEWIC**



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JUNE 1990

Ottawa, Ont. K1A 0S2 (819) 997-4991  
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#### NOTES

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**VULNERABLE SPECIES:** Any indigenous species of fauna or flora that is particularly at risk because of low or declining numbers, occurrence at the fringe of its range or in restricted areas, or for some other reason, but is not a threatened species.

**THREATENED SPECIES:** Any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.

**ENDANGERED SPECIES:** Any indigenous species of fauna or flora that is threatened with imminent extinction or extirpation throughout all or a significant portion of its Canadian range.

**EXTIRPATED SPECIES:** Any indigenous species of fauna or flora no longer known to exist in the wild in Canada but occurring elsewhere.

**EXTINCT SPECIES:** Any species of fauna or flora formerly indigenous to Canada but no longer known to exist anywhere.

**STATUS REPORT ON KANANASKIS WHITLOW-CRESS**

**DRABA KANANASKIS G.A. MULLIGAN**

**IN CANADA**

**BY**

**BONNIE SMITH  
459 - 30TH AVENUE N.W.  
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**1991**

**STATUS ASSIGNED IN 1992**

**ISIAWBD\***

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DESIGNATION**

## TABLE OF CONTENTS

page

### I. Species Information

1. Classification and Nomenclature	
2. Description	1
3. Biological and Economic Significance	2
4. Distribution	2
4.1 Populations of Unknown Status	4
5. General Environmental and Habitat Characteristics	4
5.1 Climate	7
5.2 Physiography, Hydrology and Edaphic Factors	10
5.3 Biological Characteristics	10
6. Population Biology and Ecology	11
6.1 Reproductive Ecology	11
7. Land Ownership and Management Responsibility	12
8. Management Practices and Experience	12
8.1 Habitat Management	12
8.2 Cultivation	12
8.3 Current Management Policies	13
9. Evidence of Threats to Survival	14
9.1 Tourism and Recreation	16
10. Present Legal or Other Formal Status	17

II	Assessment of Status	
11.	General Assessment	18
12.	Status Recommendation	18
13.	Recommended Critical Habitat	18
III	Information Sources	
14.	References Cited in Report	20
15.	Collections Consulted	22
16.	Fieldwork	22
17.	Knowledgeable Individuals	22
IV	Authorship	
18.	Initial Authorship of Status Report	23
19.	Maintenance of Status Report	23

**Note:**

*Draba kananaskis* is a small, inconspicuous plant of alpine areas. It is known only from several sites in Canada and one in Alaska. Little information is available on population sizes and recent occurrences at the few historic sites except for that at the type locality.

As well, the genus is a difficult one taxonomically, with some question of the validity of this species as a distinct segregate from another, more widespread species.

In view of these facts, COSEWIC members felt that there was insufficient information available to designate status for this taxon.

Erich Haber  
Chairman, Plants Subcommittee (COSEWIC)

## I. Species Information

### 1. Classification and Nomenclature

The scientific name for Kananaskis whitlow cress is *Draba kananaskis* G.A. Mulligan. The species is a member of the family Brassicaceae (formerly Cruciferae) in the order Capparales (subclass Dilleniidae). The name *Draba* is the ancient Greek one for cress. The Brassicaceae is found in temperate and warm-temperate parts of both the Northern and Southern hemisphere. It is a very large family containing some 3000 species (in 350 genera) worldwide (Cronquist 1981, Everett 1981).

The genus *Draba* is a large genus. As early as 1883, Bentham and Hooker listed 150 species worldwide. Everett (1981) recognizes approximately 300 species of *Draba*. Neither Scoggan (1978) nor Hitchcock *et al.* (1964) list *Draba kananaskis*, although Scoggan does list 26 native species as occurring within Canada. Kananaskis whitlow cress is not included in *A Revision of the Drabas of Western North America* (Hitchcock 1941).

The species was recognized only recently and first described by Gerald A. Mulligan in Can. J. Bot. 48:1897-1898 in 1970. The type location is listed as "Near Snow Ridge Ski Resort, 25 miles south of Highway 1 on Kananaskis-Coleman Road, eastern slope of Kananaskis Range, about 50°48'N, 115°12'W, altitude 7250 ft, n = 32, G.A. & D.G. Mulligan 3477, August 8, 1969 (holotype DAO)."

### 2. Description

*Draba kananaskis* is a loosely tufted perennial species. Stems are 0.3-2 dm tall, with sparse simple, forked or stellate hairs. Basal leaves are 0.5-2.0 cm long, 2-9 mm wide, with slender petioles. The leaves are obovate, entire to denticulate, with nearly sessile, mostly cruciform hairs (mostly 4-rayed) above and below. The margins have simple, forked or stellate hairs. There are 1-2 ovate to narrowly ovate cauline leaves. Sepals are about 2.0 mm long, glabrous or with a few simple hairs. The yellow petals are 3.5-4.0 mm long and spathulate-oblongate. Fruit is a narrowly ovate (6-10 mm long, 2-3 mm wide) pod-like capsule or silicle. The fruit has only a few simple hairs and is longer than the pedicels. The fruit is 20-24 seeded in two rows in two compartments. The seeds are ca. 1.3 mm long. Styles are 0.3-0.5 mm long.  $2n=64$ . Flowering occurs from mid-July to early August, July 14, July 23, August 8 - actual flowering dates (Moss 1983, Mulligan 1970, Everett 1981). See Figure 1.

There are 23 species of *Draba* in Alberta, the only province in Canada in which Kananaskis whitlow cress is known to occur. The species is characterized by its yellow flowers, one or two stem leaves, loosely tufted rosette, and nearly sessile cruciform hairs on the surface of the basal leaves. It is not particularly related to any other species of *Draba*. These characteristics



separate Kananaskis whitlow cress from all other Alberta species. Kananaskis whitlow cress most closely resembles *Draba longipes* Raup from which it is separated by its sessile leaf hairs and yellow petals. *Draba longipes* has short-stalked leaf hairs and white petals (Moss 1983, Mulligan 1970). Reed C. Rollins revised the identifications of all known specimens from *D. kananaskis* to *D. longipes* in 1986 (specimen label information).

### 3. Biological and Economic Significance

The family Brassicaceae is of great importance economically. For example, canola or rapeseed (*Brassica*) is a member of this family as are cabbage, cauliflower and many other food crops. As well as containing many edible plants the family also contains many troublesome weeds. Many ornamentals are members of the Brassicaceae.

The genus *Draba* is recognized as one of the important groups of spring-flowering plants for the alpine garden. Some *Drabas* are very pretty dwarf compact alpine plants with small but numerous flowers admirably adapted for the rockery or front part of a sunny border (Bailey 1942).

### 4. Distribution

The genus *Draba* is confined to temperate and alpine regions of the Northern Hemisphere as well as Peru, New Zealand, Africa, Chili, Fuji, Australia and the Falklands. They are chiefly denizens of mountains and other cool-climate, including arctic, parts of the Northern Hemisphere (Bentham and Hooker 1883, Everett 1981).

*Draba kananaskis* is restricted in Alberta to the eastern slopes of the Kananaskis Range at the type location (Mulligan 1970) and two other nearby locations (listed as new to the flora of Alberta, Packer and Dumais 1972; collected by Peter Lee, 1980 from the Upper Evans Thomas Valley, Kananaskis Country). It has also been found once at a site near Maligne Lake in Jasper National Park, an extension of 250 km northwest from the Kananaskis Range (Achuff and Corns 1985). Other than these Alberta sites the species has only been found once near Hope on the Kenai Peninsula, Alaska. This is the limit of its presently known distribution. Moss (1983) and Argus and White (1978) list the species as an endemic (Maps 1, 2).



Figure 1. *Draba kananaskis* type locality, Fortress Mountain,  
Kananaskis Valley, Alberta.

Mulligan (1970) states that *Draba kananaskis* is found in the rain shadow of the Rocky Mountain. The type location lies just north and west of an area that is shown as unglaciated during the Wisconsin by V.K. Prest on his 1969 map of the Retreat of the Wisconsin and recent ice in North America (map 1257A, Geological Survey of Canada). He states that it is quite possible that *D. kananaskis* may occur in an area which was unglaciated during the Wisconsin and that it may be an endemic with a very restricted distribution.

Precise locality data and land ownership, if known, is on file with COSEWIC and the appropriate provincial/territorial jurisdictions. This information is generally available unless the localities are considered to be publicity-sensitive.

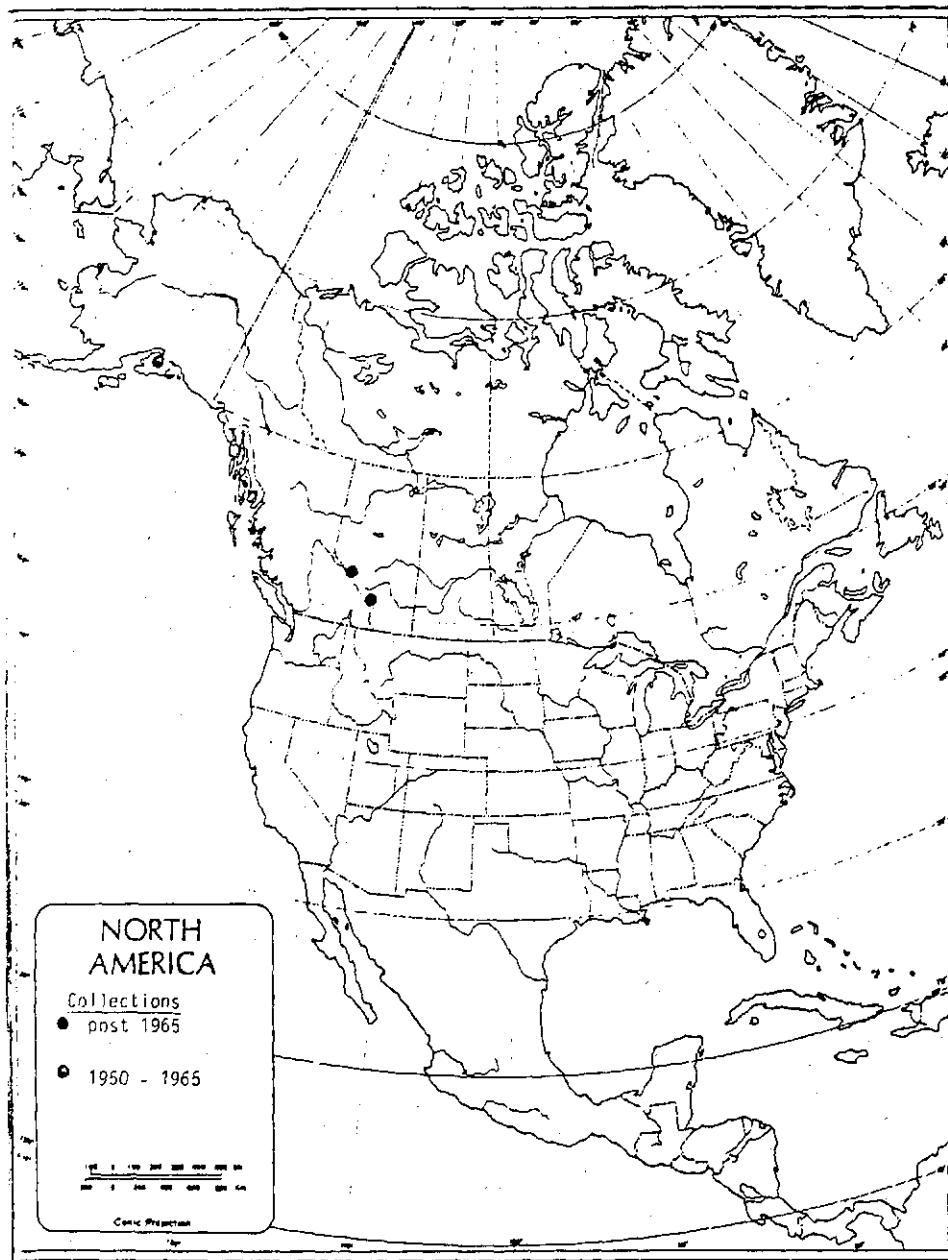
#### 4.1 Populations of Unknown Status

Williams (1990) cites *Draba kananaskis* as occurring in Peter Lougheed Provincial Park on Mt. Indefatigable. It is cited as rare and known only from this one location within the park. The specimen was reidentified as another species of *Draba* by Smith (1991).

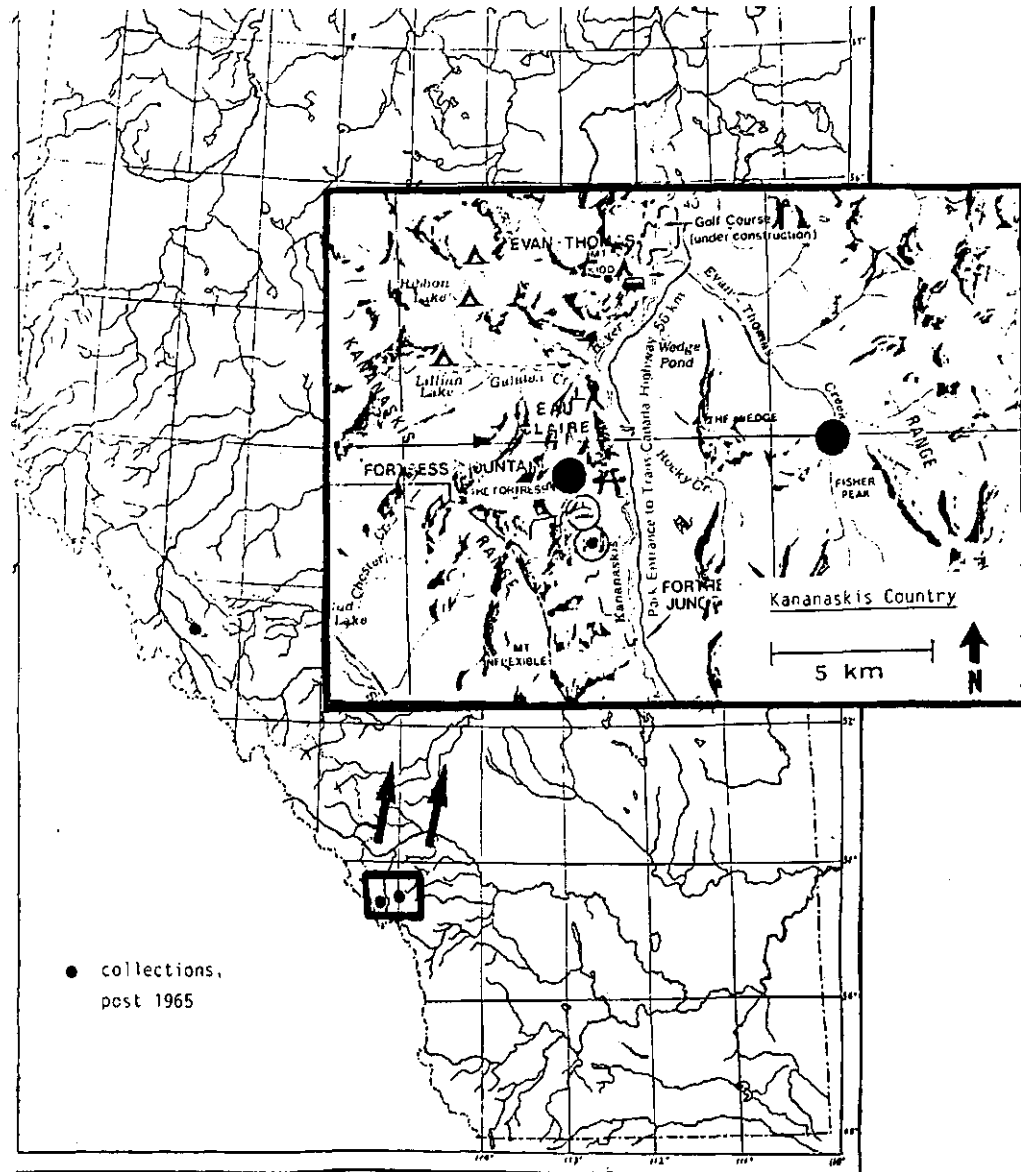
#### 5. General Environment and Habitat Characteristics

The vegetation of the Kananaskis Valley is primarily determined by elevation, topographic position, substrate and fire. Vegetation can be thought of as being divided elevationally into four zones: montane, lower subalpine, upper subalpine and alpine. *Draba kananaskis* occurs in the alpine zone on dry slopes and elevations around 2200 m (Wallis *et al.* 1987). The alpine flora of the Eastern Slopes of the Rockies is species-poor when compared to other Alberta Ecoregions but species-rich when compared to other alpine floras. Perhaps 400 species are present in the whole Ecoregion (The Kananaskis Country Environmental Education Library, n.d.)

At Fortress Mountain (Figure 2), Kananaskis whitlow cress occurs on upper portions of scree slope, mostly in amongst loose rocks, at the base of a mountain peak, SSW of the lodge buildings on NNE-facing slopes (Smith 1991). Trees, if present at all, are reduced to a low shrubby growth-form. Treeline varies: higher on moderate moisture sites and lower on drier sites (Johnson and Fryer 1991, unpublished). The elevation given on the type specimen was 7250 ft. It is noted to occur on upper, rocky ledges and on bare shale at the Alaska site (plant label information). Rock, talus and avalanche communities are described as "permanently immature" in the most commonly used vegetation classification system (Environmental Science Centre Kananaskis 1974).



Map 1. Distribution of *Draba kananaskis* in North America.



Map 2. Distribution of *Draba kananaskis* in Alberta.

The Kananaskis Valley flora includes at least 484 species of vascular plants; about half are circumpolar in range and half have North American ranges. Of the North American group of species, the boreal forest and cordilleran elements are most abundant, showing the close ties that Alberta Rocky Mountain flora has with the widespread boreal forest flora. Almost equal numbers of North American cordilleran species (54) and North American boreal species (68) occur in the valley. The cordilleran species form a complex group which is found only in the Rocky Mountains. Their geographical ranges vary according to present environmental conditions and past history. For example, the rare Kananaskis mitrewort (*Mitella kananaskis*) is actually a cordilleran species, but it has evidently been restricted to or only survived the Pleistocene glaciation in an ice-free area which included parts of the Valley, or it existed on the east slope area at the zone of impingement of the cordilleran ice tongues and the Laurentian ice sheet (Environmental Science Centre Kananaskis 1974, Finlay and Finlay 1987).

There are 14 alpine plant associations in the Valley. Those least susceptible to disturbance are located on bare rock-lichen sites. White spruce and lodgepole pine are the most abundant forest tree species in areas of lower elevations. Subalpine fir and Engelmann spruce dominate the high country (Environmental Science Centre Kananaskis 1974, Finlay and Finlay 1987).

The Jasper National Park site (Maligne Pass) is characterized by open shrubby alpine meadows with a rich variety of wildflowers. Rocky talus slopes meet the edges of the meadows within the pass (Patton and Robinson 1971).

## 5.1 Climate

Kananaskis Country has a drier climate than the main ranges of the Rocky Mountains. The climate of the Kananaskis Valley is transitional between the continentality of the plains to the east and wetter and milder climate on the other side of the Continental Divide. The Kananaskis Valley has continental conditions at its mouth and increasingly cordilleran conditions moving (south) up the valley. *Draba kananaskis*, a cordilleran species, is found in the transition zone between continental and cordilleran areas.

Consequently, climate of the Kananaskis Watershed can be divided into two parts. The Front Range (north end) of the valley has a transitional plains-cordilleran climate with cold winters, warm summers and well-defined summer precipitation maximum and winter minimum. The Main Range (south end) of the valley has a more cordilleran climate of cold winters, cool summers, winter and summer peaks in precipitation and poorly defined minimas in February to March and September to October. Both ranges have elevational affects on temperature and precipitation,

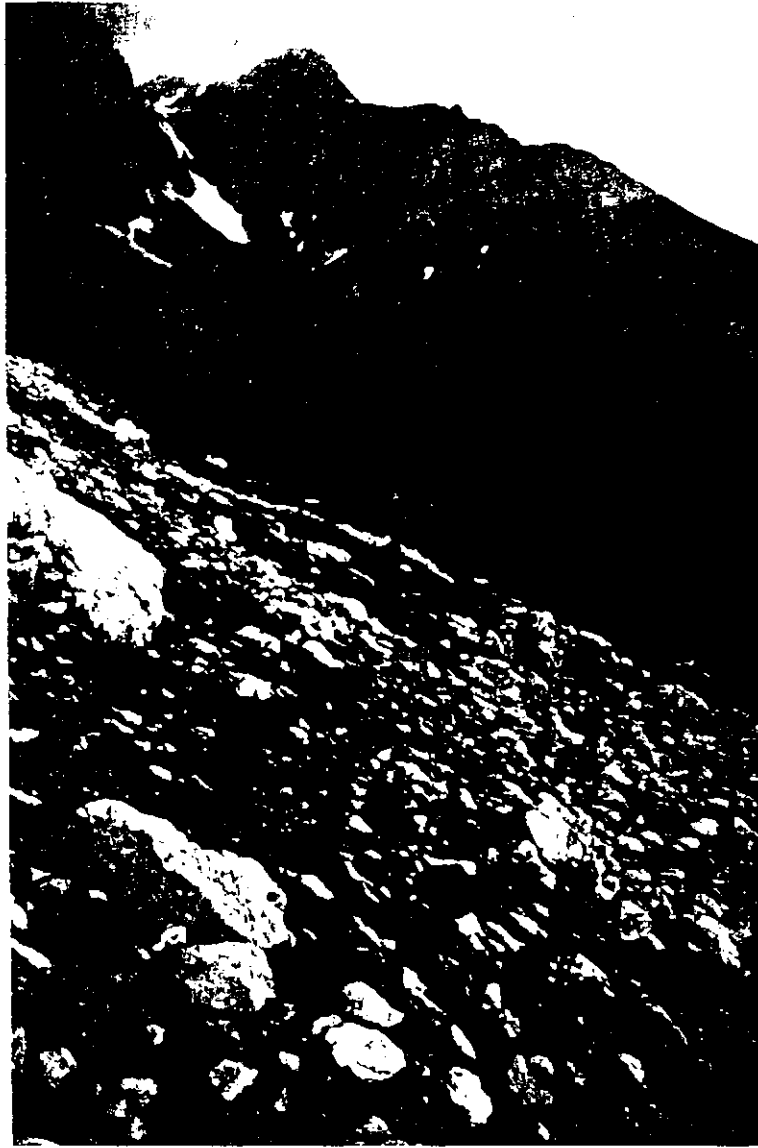


Figure 2. *Draba kananaskis* type locality habitat.

however, the Main Range because of its higher mountains and more westerly position intercepts the Pacific air masses first. Thus, the Main Range has increased precipitation and creates a rain shadow in the adjacent Front Ranges. Glaciers (icefields) are common in the Main Range, but non-existent in the Front Range in the Kananaskis. The Smith-Dorian Valley and Kananaskis Lakes receive both runoff from the glaciers, and greater precipitation because the North and South Kananaskis Passes allow the moister Pacific air mass to enter more directly. Peter Lougheed Park, in central western Kananaskis Country, gets the most snowfall. The *Draba kananaskis* sites are just north and east of the borders of the park.

The average temperature in January is -10°C and in July is 14°C in the more continental areas and, comparatively, -14°C and 12°C in more cordilleran areas. A temperature inversion on windless nights can be found about 100 m above the valley floor. Slopes with closed forest show little slope or aspect differences in temperature or humidity. However, open south facing slopes are warmer, while open north slopes are cooler and moister.

Precipitation in the Kananaskis Valley reflects the transitional position between the plains and Cordillera. The Continental climate of the Front Range has a single summer maximum and winter minimum of precipitation, while in the Main Range only the summer maximum is well-defined. At higher elevations the June peak occurs in May. October and November are the months of lowest precipitation. More continental areas have a peak precipitation in June of 98.9 mm and in August of 67.5 mm, a minimum in November of 28.4 mm, and a total average precipitation of 618.1 mm. The total precipitation in more cordilleran areas is 550.9 mm, with peak precipitation in May (68.8 mm), August (69.1) and December (59.2). The October minimum is 22.9 mm. In general, the amount of precipitation increases by about 20 mm for each 100 m increase in elevation in the Valley.

Chinook winds recur on average 25 times per year, primarily during the winter. Because of the SW-NE alignment of the main valley and the passes in the south, the dry effects of the chinook winds are most pronounced on the west-facing slopes at approximately 1700 m (Kananaskis climate data from Johnson and Fryer 1991, unpublished).

The Canadian Rockies, including Jasper National Park, have average maximum (minimum) temperatures as follows: May - 14°C (1°C), July - 22°C (7°C), October - 9°C (-1°C). High country temperatures start to drop in August. The climate in the alpine zone above timberline is severe. Average yearly temperatures are below -4°C. The growing season is usually less than 60 days. Plants are exposed to both low temperatures and strong winds. The first snowfall can be expected in early September. The initial storms are usually short-lived, however, and the latter part of September and early October often are characterized by beautiful Indian Summer weather. Precipitation is high, mostly as snow that is blown away. Frost action disturbs the soil and sorts out the particles into polygons and stone stripes. The average rainfall in May is 51 mm, in July 48 mm, in October 36 mm. The average number of days of rain in May is 9, in July 9, in October 8. Drainage is often poor and "soil creep" downhill may occur. The Maligne Lake site (Maligne Pass), Jasper National Park lies buried under deep snow until the latter part of July (Patton and Robinson 1971, Finlay and Finlay 1987).



## 5.2 Physiography, Hydrology, and Edaphic Factors

Geological features within Kananaskis Country are varied - ranging from rocks and features from the last ice age through Tertiary sandstones on Cochrane Hill back to Cambrian limestones on Mount Yamnuska. Kananaskis Country is part of the Rocky Mountains which form one of the longest continuous ranges in the world. The western part of Kananaskis Country sits in the front ranges of the Rockies. The rocks found in the extreme west are the oldest and consist of those formed over 550 million years ago. These are of Cambrian age. They consist mainly of limestones and dolomites that are exposed as you move east. The foothills also contain younger rocks again that are from 75 to 135 million years old and are made up of shales, siltstones, and sandstones.

About 75 million years ago pressures began to force a huge downward folding of the rocks to the west in British Columbia, which resulted in the Rocky Mountain Trench. The junction between the foothills and the front ranges is known as the McConnell Fault. Glacial sediments cover much of the eastern area with some in the foothill and mountain valleys (Finlay and Finlay 1987). The richness of the alpine flora can in part be attributed to both the nature of the rock and the North-South continuity of the Rockies. The limestones and shales of this portion of the Rockies yield deeper and more nutrient-rich soils than the igneous rocks of the B.C. Coast Range (The Kananaskis Country Environmental Education Library, n.d.).

Both Kananaskis sites lie within the Kananaskis and Spray drainages which, although they comprise only five per cent of the Bow River Basin, supply 17% of the waterflow (Alberta Forestry 1986).

The Maligne Range in Jasper National Park is composed of Precambrian and Cambrian sandstones, and it represents the easternmost of the main ranges of the Rockies (Spalding 1980). The geology of Jasper National Park is very similar to that of Kananaskis Country (Finlay and Finlay 1987).

## 5.3 Biological Characteristics

The Fortress Mountain type location was located on a NNE-facing scree slope at the base of a rock face. The talus slope has been stabilized with alpine meadow vegetation established amongst the rocks. The site was characterized by small *Larix lyallii* Parl. (1-3 ft. height), and a few small willows. Common vegetation include the following: *Saxifraga lyallii* Engler, *Anemone occidentalis* S. Wats., *Carex* spp., *Oxyria digyna* (L.) Hill (Mountain Sorrel), *Castilleja occidentalis* Torr., *Myosotis alpestris* Schmidt, *Senecio triangularis* Hook., *Phyllodoce glanduliflora* (Hook.) Coville, *Androsace septentrionalis* L., *Arabis drummondii* A. Gray, *Saussurea nuda* Ledeb., and *Luzula spicata* (L.) DC. Mosses, willows and mountain sorrel are

the dominant vegetation. Two species of *Draba* other than *Draba kananaskis* were found at the site. *Draba kananaskis* was mostly restricted to the upper talus slopes amongst loose rocks (Figures 1, 2).

Vegetation in the Evans-Thomas Valley is likely to be similar to that from the Fortress Mountain site. In Jasper National Park timberline occurs at about 2200 m. Alpine plants have a distinctive low growth form with an abundance of roots and leaves with little stem. Species include moss campion, umbrella plant, mountain avens, several species of willow, prickly saxifrage, and alpine dandelion (Finlay and Finlay 1987).

## **6. Population Biology and Ecology**

Four specimens of *Draba kananaskis* were found at the Fortress Mountain site. The loose talus slopes are fairly extensive in the area. It is estimated that 10-20 specimens might be present on the entire slope (Smith 1991).

Preliminary surveys did not produce any specimens from the upper Evans-Thomas Valley site or the Jasper National Park site. The sites must be pinpointed with more accuracy. Because of the vast land area extensive hiking will probably be required to properly survey the area. Overnight hikes may be required (Smith 1991).

### **6.1 Reproductive Ecology**

*Draba kananaskis* is a normally self-fertilized species in nature and is octoploid with the common base number of the genus,  $x = 8$ . Some strictly North American species of *Draba* have higher base numbers. *Draba kananaskis* is  $2n = 64$ .

## **7. Land Ownership and Management Responsibility**

The Fortress Mountain site is under private ownership and is operated as a downhill ski resort. The Evans-Thomas site lies on provincial land and included in Kananaskis Country, a tourism designation. The Maligne Lake site is located within Jasper National Park.

## **8. Management Practices and Experience**

The oldest evidence found of man in Kananaskis Country is from 6000 to 11000 BC. The Kootenay and Stoney Indians were the first human inhabitants of the Kananaskis Valley. They occupied the area primarily as a seasonal corridor between their summer and winter camps. Neither tribe seems to have been intrusive of their environment.

The first visit of Europeans to the Kananaskis Valley was in the 1850's. Again the area was used mainly as a corridor between the interior valleys of British Columbia through the Kananaskis passes. The Eau Clair and Bow Lumber Company received four timber leases in the valley in 1883. Since logging was conducted in areas only close to the river, the Kananaskis Valley sustained minimal change due to logging.

There were local coal developments in the 1940's and 1950's in the valley. Two hydro-electric dams, one on the Upper Kananaskis Lake in 1932 and another creating Barrier Lake in 1945, were constructed. These impacts were localized and did not extensively affect the vegetation in the valley.

The Kananaskis Valley was largely inaccessible to Europeans without some difficulty until construction of Highway 40 or the Kananaskis Trail. There were no farms or ranching in the valley because this had been forbidden by the Dominion Lands Act in 1879, which reserved the Front Range as a source of timber and water for settlers on the Plains. The deep snow and lack of forage and agricultural potential also discouraged permanent European settlement (above from Johnson and Fryer 1991, Finlay and Finlay 1987).

### **8.1 Habitat Management**

The type location at Fortress Mountain, Kananaskis Country is managed as a major commercial downhill ski resort. According to Eastern Slopes Policy the resort lies in the Facility Zone. Hunting, camping and primitive campgrounds are prohibited in this zone (Alberta Forestry 1986).

The Evans-Thomas Valley lies in an area with a policy zoning as critical wildlife habitat. The Evans-Thomas Creek area provides year-round habitat for bighorn sheep, elk and mountain goats. In 1986, management objectives were listed as follows: "to maintain an elk herd of at least 200, a sheep herd of 50, and a goat herd of at least 50". Recreational trails and non-motorized use will be limited as well as transportation and utility corridors within the Evans-Thomas Creek area. Range enhancement for increased forage production by means of selective cutting, prescribed burns, or other non-mechanized will be considered for the area. The following activities are incompatible with the intent of the Critical Wildlife Zone and will continue to be prohibited: intensive recreation; and commercial, industrial and residential development. Hunting and fishing are considered compatible (Alberta Forestry 1986).

### **8.2 Cultivation**

*Drabas* require a sunny position and an open soil. It is important that they be well matured by the autumn sun. They like gritty soil, reasonably nourishing, and neither excessively dry or wet. Those containing lime are generally highly acceptable. Excessive wet in fall and winter is very harmful and for most kinds torrid, humid summer weather can be disastrous (Bailey 1942,

Everett 1981).

Propagation of *Drabas* is chiefly by division but also may be by seed which may be sown in the fall or spring, for convenience usually in pots or pans (shallow pots) of porous soil. The receptacles may be buried to their rims in a cold frame or outdoors and covered with a sheet of shaded glass until germination takes place, or in spring they may be transferred to a cool greenhouse or similar place. The young seedlings are transplanted to flats, pans, or individually to small pots. In pots or pans in greenhouses or cold frames they may be grown with little trouble, always provided the bogey of excessive winter wetness is guarded against (Bailey 1942, Everett 1981).

No information was found regarding cultivation potential or practices for *Draba kananaskis*.

### 8.3 Current Management Policies

Both Kananaskis sites are found within an area referred to as Kananaskis Country. Improvement District No. 5 was established by the provincial government in 1983 to facilitate the management of Kananaskis Country which was created by the Kananaskis Country Policy in 1977. The purpose of the policy was to create a unique, high-quality recreation experience for Albertans, by maximizing the recreation opportunities of a large area of accessible, attractive landscape through the planned integration of a wide variety of recreational activities with other uses (Alberta Forestry 1986).

The two Kananaskis sites lie within the area designated as Resource Management Area: Kananaskis/Spray. This resource management area has considerable coal reserves. Only two leases fall within the boundaries of the management area, neither of which is being currently developed. Petroleum and natural gas activities are not occurring within the Kananaskis/Spray. There is no domestic livestock grazing within the boundaries of the management area due to climatic and topographic limitations to forage production. The area has a history of timber management which dates back to the 19th century. The area was part of the original timber quota allocated to Spray Lakes Sawmills Ltd. in 1966. Harvesting was superseded in a portion of the quota land base in 1979 due to the announcement of the Kananaskis Country policy. Reforestation and reclamation was undertaken at this time. The area is used year-round for many types of non-motorized recreation. Auto access facilities have been developed along the highways. Backcountry areas are developed for hikers and skiers. Downhill ski facilities have been developed at Mt. Allan and Fortress Mountain. Research facilities also exist within Kananaskis Country; namely, the Kananaskis Forest Experimental Station and the University of Calgary Environmental Sciences Centre (Alberta Forestry 1986).

Management guidelines for the Kananaskis/Spray management area within Kananaskis Country include restrictions on logging, mineral dispositions, and grazing. Camping, day-use and interpretation facilities will be restricted to the transportation corridors. Trails and campgrounds in heavy back-country use areas will be designed to concentrate use (Alberta Forestry 1986).

The Fortress Mountain Ski Resort (formerly Snow Ridge Ski Resort) is the type location for *Draba kananaskis* (Figure 3). Activities include dining, limited overnight lodging, ski rentals, lessons, and slopes geared for all levels of downhill skiing ability (Finlay and Finlay 1987).

## 9. Evidence of Threats to Survival

Some of the most important watershed in Alberta occur in the Kananaskis area. Except for the enlarging of the Kananaskis Lakes through a hydro-electric project, the back country of the mountains and foothills has remained relatively undeveloped over the years, allowing wildlife to maintain relatively stable populations (Spalding 1980). Human disturbances that have affected the vegetation of the Kananaskis Valley include timber harvesting, the construction of roads, highways, dams, power transmission facilities, and institutional facilities; coal and gypsum mining, coal and gas exploration, rock quarrying, and gravel excavation; and animal grazing, and human recreational activity. Other than human recreational activity, other disturbances are mainly restricted to lower elevations (Environmental Science Center Kananaskis 1974).

Critical habitat is defined by Wallis (1987) as "most crucial to the survival of population, species, races or form. When these critical habitats are disturbed there will be major effects on the plants and animals that depend upon them." Over half of the birds and mammals now listed by COSEWIC are found in the three prairie provinces as a result of habitat loss in Western Canada (Hummell 1987).

The Environmental Science Centre Kananaskis (1974) rates talus and rock slide sites as having low susceptibility to disturbance by overgrazing, trampling, and human traffic.

### 9.1 Tourism and Recreation

Both the Fortress Mountain and Evans-Thomas Valley sites are included in an area known as Kananaskis Country, a large-scale recreational development aimed at providing controlled recreation in a potentially high-use area (Spalding 1980). The foremost threat to most sites lie in their potential use for tourism and recreation. The Fortress Mountain site is managed as a ski resort. The type location is located on an actual ski run known as "Wall Street" but since most activity occurs during winter when the site is covered by snow stress on the site would be expected to be relatively low. The area is not open for tourist use in the summer. Probably some degree of hiking occurs around the site but it is not developed for summer use. Some people reside at the lodge during the summer but the probability that they would be hiking on the upper reaches of the ski slopes is low. The upper chair lift is very close to the site (Smith 1991).

The upper Evans-Thomas Valley location has been developed as a hiking and horse riding trail. There is a potential for development at the trailhead but at present no facilities other than hitching posts have been put in place. Alberta Forestry (1986) has zoned for planned facilities

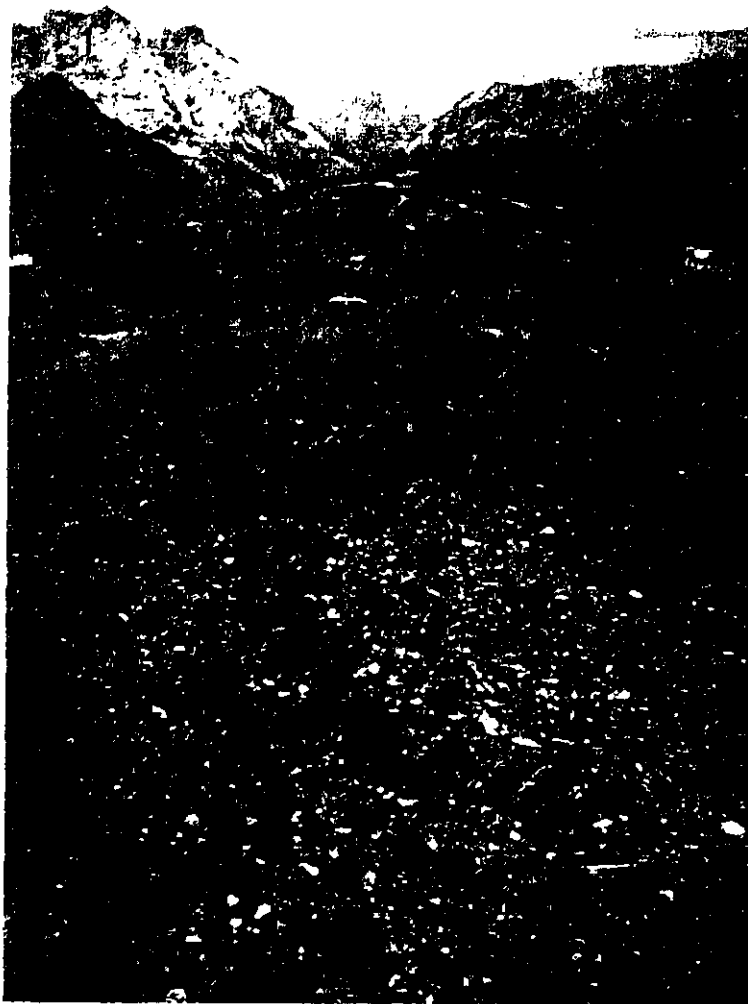


Figure 3. Fortress Mountain downhill ski resort, general disturbances.

in the Evans Thomas Facility Zone including Ribbon Creek Alpine Village, Wedge Lake and Alpine Village cross-country ski trails, and possible expansions to the Mount Kidd campground. The hiking trail runs through Evans-Thomas Pass which is the probable location for the collection site. The trail climbs to 2200 m, the elevation at which *Draba kananaskis* is found. The hike is listed as a long day hike (Daffern 1979). Any disturbance to the loose talus slopes should be avoided. Unless the hiking trails run right to the base of the rock faces or hikers stray from the trail the site should be fairly well protected as a result of its isolation.

The Maligne Lake site in Jasper National Park probably refers to Maligne Pass, elevation 2235 m, which is within the range in which *Draba kananaskis* is found. Again the hiking trail and associated disturbances of off trail hiking are the main factors to be considered. It is 15.2 km to Maligne Pass from the trailhead and is listed as a two day backpacking hike. The hike is recommended for August or early September due to heavy runoff (Patton and Robinson 1971).

## 10. Present Legal or Other Formal Status

No specific legal status is accorded *Draba kananaskis* in any part of Canada. Alberta has no legislation which covers plants or endangered species.

In Canada, *Draba kananaskis* naturally occurs only in Alberta (Map 1, 2). As a result of this limited distribution the species is considered rare from a national perspective. Argus and White (1978) and Packer and Bradley (1984) identified *Draba kananaskis* as rare in Alberta. Argus and White (1978) also notes that the species is rare in Canada.

The Nature Conservancy rank is Global G1, Canada N1, Alberta S1. The United States rank is Alaska S1. The Nature Conservancy assigns the species a Canadian Priority of 3 (Argus & Pryer 1990).

All the lists of rare species for the prairie provinces are relatively long. The most recent Alberta list (Packer and Bradley 1984) contains 360 species, representing 24% of the native flora.

Plant species with disjunct ranges and endemics (such as *Draba kananaskis*) pose a problem. How can one explain their limited or disjunct ranges in the Alberta Rocky Mountains? Four possible explanations have been advanced for their uniqueness: (1) They represent ranges that were more widespread prior to Pleistocene glaciation and, during glaciation, some populations were destroyed leaving the species in disjunct locations; (2) Recent long-distance dispersal has distributed diaspores to highly disjunct localities where they are, nevertheless, able to survive; (3) Sampling has been inadequate. That is, the species have not been commonly collected and there are only scattered records of distributions that are actually more widespread than is presently known; (4) Dispersal mechanisms have disseminated diaspores over wide areas since the retreat of Pleistocene ice but favorable ecological conditions for the species in question are found only in a few specialized localities. In fact, the explanation for these unique distribution patterns probably involves present-day as well as historical factors (Environmental Science

Centre Kananaskis 1974).

Endemic species do not provide so many options. If *Draba kananaskis* survived south of the limits of maximum glaciation, or in any other well-documented refugium, why is it not found near there today? Chances are that a few inconspicuous species of this nature (of which there are many in southwestern Alberta) died out as they re-migrated into their present restricted habitats. However, because many species are endemic to this one area, the explanation seems unlikely. Many are not ecologically similar and would not be expected to behave similarly following recession of Pleistocene ice. Apparently some unglaciated areas persisted in southwestern Alberta during the entire Pleistocene Epoch, but exactly where and when these areas remained ice-free is as yet unknown (Environmental Science Centre Kananaskis 1974).

Kershaw (1987) acknowledges three major groups of distribution patterns of rare species in the prairie provinces. Over 80% of the "rare" species in the prairie provinces appear to belong to a group composed of species extending into the provinces from nearby (non-disjunct) widespread populations. Such populations add considerably to the species diversity of the provinces, probably accounting for more than 20% of the total floras. A second group is composed of species extending into the province as small disjunct populations and is composed of less than 10% of the number of total rare species in the prairie provinces. A third group, composed of endemic species, is limited to a local area and is restricted geographically (Kershaw 1987). *Draba kananaskis* probably belong to this third group. There are three areas of potential endemism; namely, Kananaskis Country, Alberta; Jasper National Park, Alberta; and Palmer, Alaska. The high mountain ranges must be more fully explored to determine if the species is actually more extensive in its distribution. Until 1977, *Draba kananaskis* was known from only the type location at Fortress Mountain, Kananaskis. Since that time it has been found at an additional nearby Kananaskis location as well as one in Jasper National Park and at an Alaskan location. This would indicate that the species is more widely distributed than originally believed and is not as limited an endemic as originally thought.

## II. Assessment of Status

### 11. General Assessment

The following criteria have been used to assess the status of *Draba kananaskis* in Canada:

taxonomy - *Draba kananaskis* is one of 23 species of *Draba* which occur in Alberta. Although it is separable from most other species based on several features it most closely resembles *D. longipes*. In 1986 Rollins revised the identifications of all collections to *D. longipes*.

abundance - *Draba kananaskis* is known from only three sites in Canada. Only four specimens were found at the type location. More intensive surveys of alpine areas may yield further



specimens. Difficult access is a factor in collection of population data.

distribution - restricted in Canada to the southwestern Alberta foothills, Kananaskis Valley and one site in Jasper National Park, Maligne Lake.

habitat distribution - restricted in Canada and Alberta, only a particular type of high alpine habitat is preferred, apparently limited by many factors foremost of which appears to be the glacial past of various sites.

habitat stability - fairly stable as long as high alpine recreational use is controlled.

population trend - only three locations in Alberta, four specimens found at one site, other sites yet to be confirmed.

reproductive potential - insufficient data to provide an analysis.

international standing - unique in North America to Alberta and Alaska, not internationally.

protective status - low, no formal designation, uncertainty about future landowners and potential development and land use on sites. One site lies within an area managed as critical wildlife habitat. One site lies within a national park and is, therefore, given a degree of protection.

All preceding criteria are items of concern in assessing the status of this species. In Canada, *Draba kananaskis* is known only from three sites restricted to two areas in the foothills and the Rockies. Continuity of populations may be affected by many factors including changes in land use and potential habitat destruction. The lack of formal protection for two of the three known Canadian sites (including the type location) with a viable management plan is a critical problem for the species' survival in Canada.

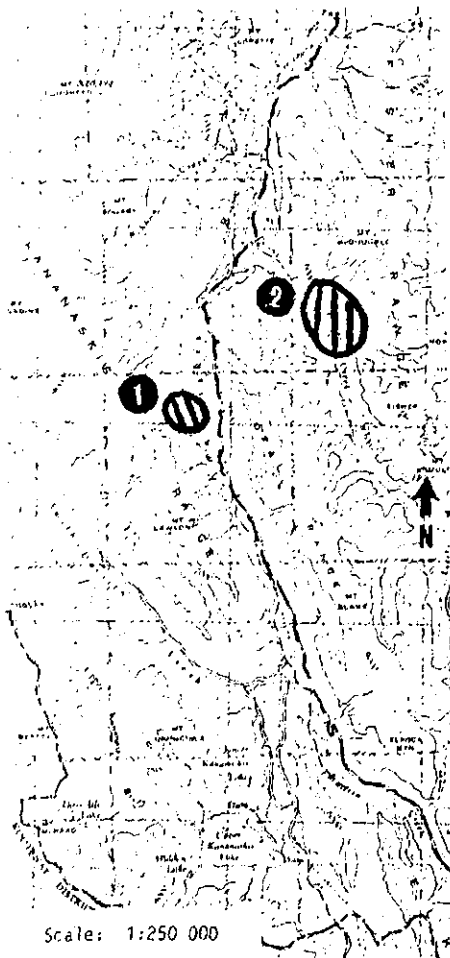
## **12. Status Recommendation**

*Draba kananaskis* Mulligan is proposed for listing as an endangered species in Canada. (The present status recommendation may be altered should additional sites be discovered.)

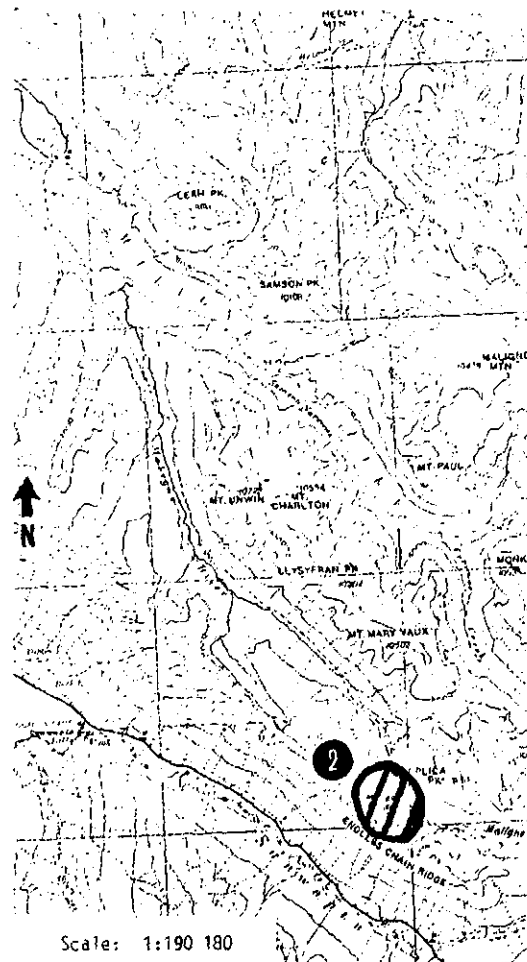
## **13. Recommended Critical Habitat**

The parallel ridges above the ski lodge at Fortress Mountain should be designated as critical habitat and given protection. It is the type location and the only site at which occurrence of the species has been verified albeit in very low numbers. Also, the Evans-Thomas Pass and Maligne Pass should be accorded secondary designation as critical habitat since they represent the only remaining Canadian sites from which the species is known (Map 2, Map 3).

A. Kananaskis Valley



B. Jasper National Park



Legend

- ① - Primary site, Fortress Mountain
- ② - Secondary sites, Evans-Thomas Pass, Kananaskis Valley  
Maligne Pass, Jasper National Park

Map 3. Critical habitat of *Draba kananaskis* in Alberta.

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## 15. Collections Consulted

The following botanical collections have been consulted:

National Museum of Canada, Ottawa, ON  
Department of Agriculture, Ottawa, ON

## 16. Fieldwork

The Fortress Mountain site was visited by B.M. Smith (1991). A small population of plants was located at this site. As a result of their remoteness, the Evans-Thomas site and Maligne Lake sites were not visited (Smith 1991).

## 17. Knowledgeable Individuals

1. Bonnie Smith, 459-30th Avenue N.W., Calgary, AB T2M 2N5. Phone: (403) 276-9197.

- author of COSEWIC report on *Draba kananaskis*. Conducted fieldwork on Alberta type location, summer 1991.

#### **IV. Authorship**

##### **18. Initial Authorship of Status Report**

The initial author of this report was:

Bonnie Smith, 459-30th Avenue N.W., Calgary, AB T2M 2N5. Phone: (403) 276-9197.

##### **19. Maintenance of Status Report**

Bonnie Smith, 459-30th Avenue N.W., Calgary, AB T2M 2N5, phone (403) 276-9197, will be responsible for receiving new information and making revisions and corrections to this status report and passing information on to COSEWIC.