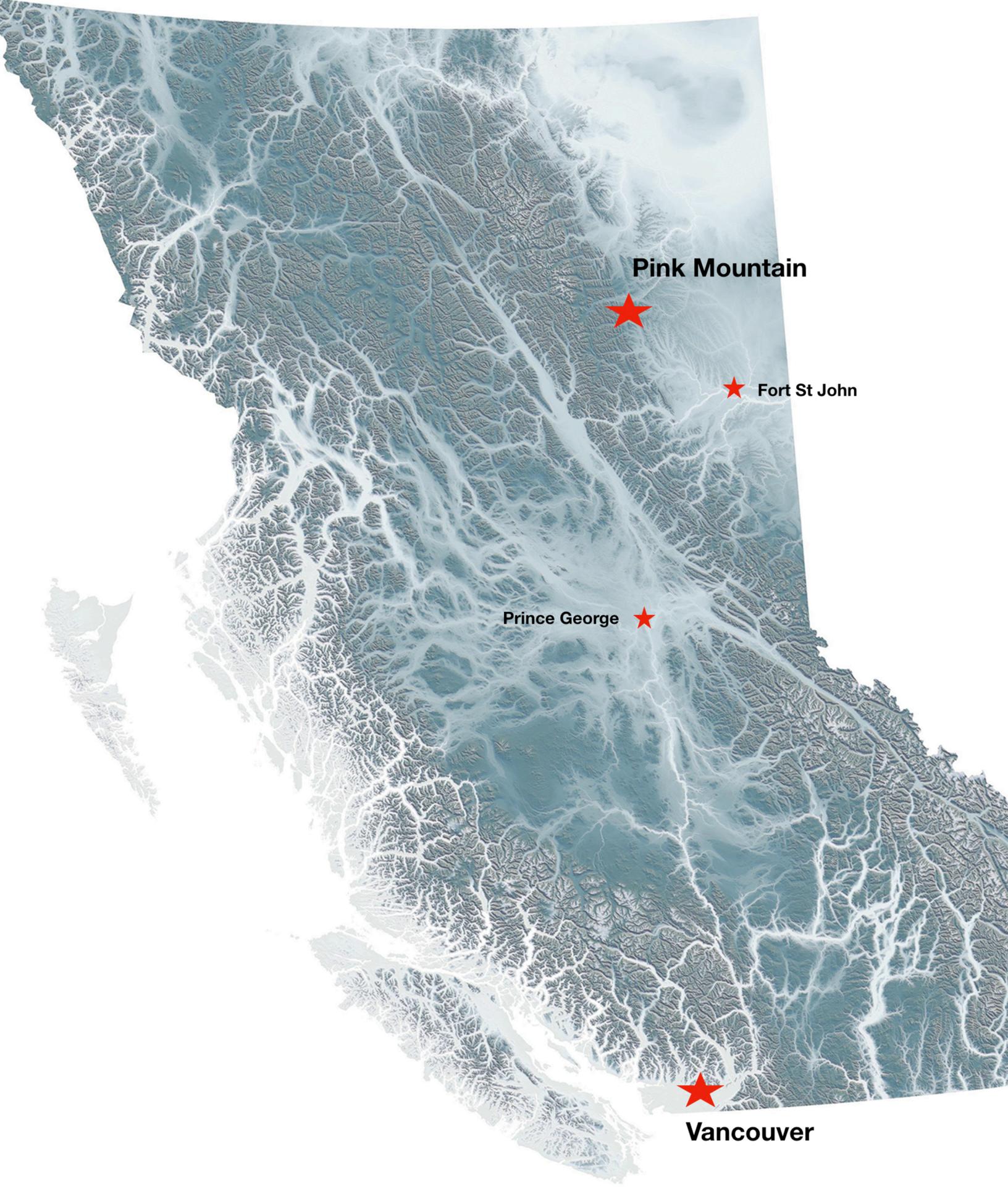


# The Unique Biodiversity of Pink Mountain

Research was carried out across the entire summit

*Report and photography by Ron Long*



Pink Mountain

Fort St John

Prince George

Vancouver

# The Pink Mountain Biodiversity Research Initiative

## **Executive summary**

The Pink Mountain Biodiversity Initiative is a privately funded study developed in conjunction with the UBC Botanical Garden and intended as a broad survey of the biodiversity of Pink Mountain. It was the intention of the survey to provide a baseline of data that could be used to inform industrial development on Pink Mountain.

We now have good evidence that the biodiversity of Pink Mountain may not be equaled anywhere in British Columbia and certainly not in the north.

The basis of all biodiversity on Pink Mountain is the plants. A geotagging program located plant species and populations and plotted them on a custom map. Geotagging has identified a center of diversity that encloses the equivalent of 2.2 K<sup>2</sup> of the summit plateau. All species mentioned in this report occur within but are not limited to this 2.2 K<sup>2</sup> centre of diversity.

In total over **200** plant species have been recorded on or near the Pink Mountain summit.

Almost **100** species of flowering plants that are characteristic of alpine tundra have been identified within the centre of diversity. Many of these are rare. In fact no other site of its size in northern BC supports such a high number of red and blue listed species.

Numerous other plant species are considered rarely seen because of their normally inaccessible habitat. This plant diversity represents an accessible bonanza for researchers.

Botanical surveys carried out on nine similar peaks to the west of Pink Mountain plus collections by the BC Provincial Museum throughout northern BC have shown that no other mountain has anywhere near the plant diversity found on Pink Mountain.

Directly related to plant diversity is the extraordinary population of butterflies. Pink Mountain supports almost 30% of the butterfly species in British Columbia. British Columbia has more butterfly species than any other province or territory in Canada. This makes Pink Mountain a butterfly hotspot for all of Canada. Butterfly diversity alone justifies the preservation of Pink Mountain.

A moth collection, extrapolated over an entire season, indicates that Pink Mountain likely supports 200 species of moths. A further example of the extreme species diversity on Pink Mountain.

A mammal survey shows that Pink Mountain supports every large ungulate found in northern BC except Mountain Goats and includes the blue listed and endangered Northern Woodland Caribou that feed year round on the summit plateau. Pink Mountain also provides feed, mineral licks and safe lambing sites for a resident herd of Stone's Sheep which are also blue listed.

Our bird survey recorded an unusually high number of raptors using the Pink Mountain summit.

The abundant fruit-bearing plants on Pink Mountain support six of the seven grouse and ptarmigan species that occur in BC. Bird experts consider this an extraordinary concentration.

A bumble bee collection contained every known species of Alpine bumble bee that is found in BC and Alberta which offers a uniquely accessible opportunity for researchers.

The environmental assessment for the Site C dam identified 28 red and blue listed species within the 30K<sup>2</sup> reservoir plus the 80K transmission corridor.

Within the 2.2K<sup>2</sup> center of diversity on Pink Mountain we have 22 red and blues listed species plus 9 first records, 2 second records and 1 third record for British Columbia as well as seven endemic sub species of butterflies .

We are recommending that the summit of Pink Mountain be designated as a protected area.

However, the significance of Pink Mountain goes far beyond the protected area. The entire mountain should be set aside to protect endangered species and to preserve an intact northern ecosystem for future research and serve as a benchmark for future reference.

**Pink Mountain** is located 180 Kilometers north of Fort St John in northern BC. The mountain is 1700 meters at its highest point but is so far north the summit plateau is uniformly alpine tundra. (Cover)

Pink Mountain is the very easternmost of the Rocky Mountain foothills and is isolated from the main body of the Rockies by a wide valley. This isolation may be the reason for the unique biodiversity that is found there.



Industrial activity in the immediate area could impact this ecosystem which appears to be unique in British Columbia.

In 2011 private funds were raised and a research plan was developed. The object of the research was to quantify the biodiversity of the mountain which we suspected was high.

Surveys were conducted during the years 2012 – 2015 and although we do not consider the results complete, enough is now known to indicate that Pink Mountain not only has an extensive biodiversity **it is very likely that no other site in British Columbia matches that biodiversity.**



*Pedicularis capitata*

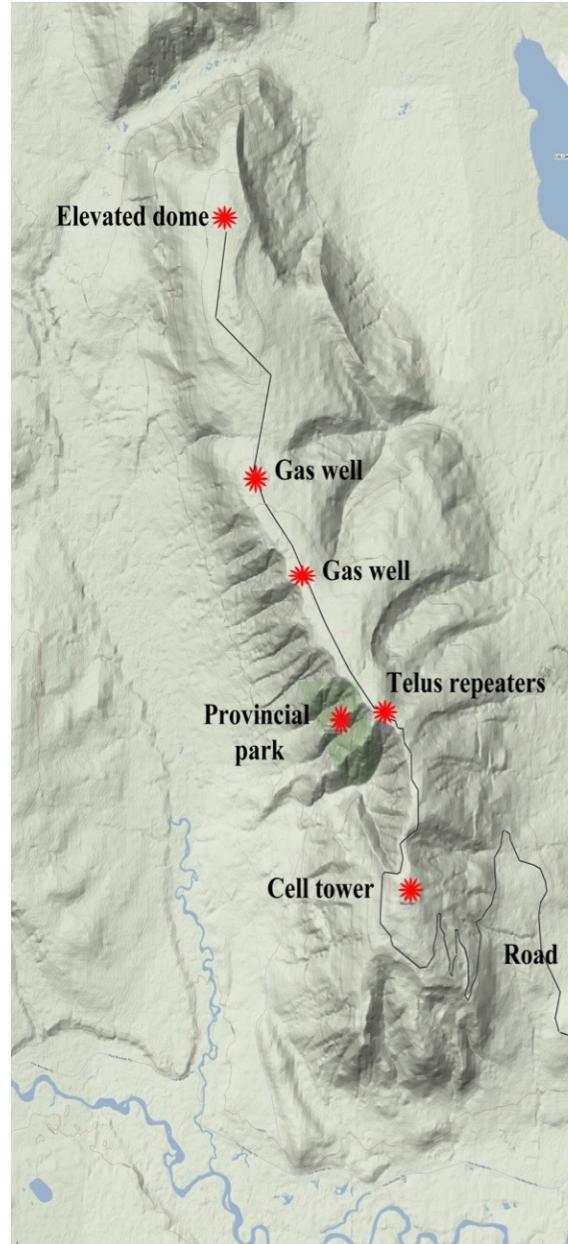
## History and current status

In 1962 a road was completed to and along the full length of the Pink Mountain summit plateau to facilitate oil and gas exploration. Fourteen test wells were drilled and two had possibilities.

The un-maintained road is very rough and approaches the mountain on its southeast end. A cell phone tower occupies the first high point on the south end of the summit. The second (highest) high point holds several Telus repeater towers. Pink Mountain Provincial Park lies on the steep slope below the Telus towers. Beyond the second high point lie the first and second capped gas wells.

In 2019 these wells were declared abandoned. Rehabilitation of the well sites has caused extensive damage to tundra plants that had begun to reclame the sites.

**It is critical that no additional rehabilitation be attempted on Pink Mountain.**



The roadsides across the summit have become critical plant habit and several of the blue listed species grow on the roadside. **Any redevelopment of the road would devastate the plants.**

We have been visiting Pink Mountain since 1983 because of the unique Arctic/Alpine plants that grow there. Other botanists have made occasional brief visits to Pink Mountain over the last three decades and an on line search in 2010 (Daniel Mosquin UBC) revealed a small number of voucher specimens in the herbaria of the Royal British Columbia Museum and the University of British Columbia. The collection was small but very significant. Further checking revealed, within the collection, two red listed species and four blue listed species

**- an early indication that Pink Mountain was a special place.**

A more comprehensive plant collection in 2010 (Ron Long) added several

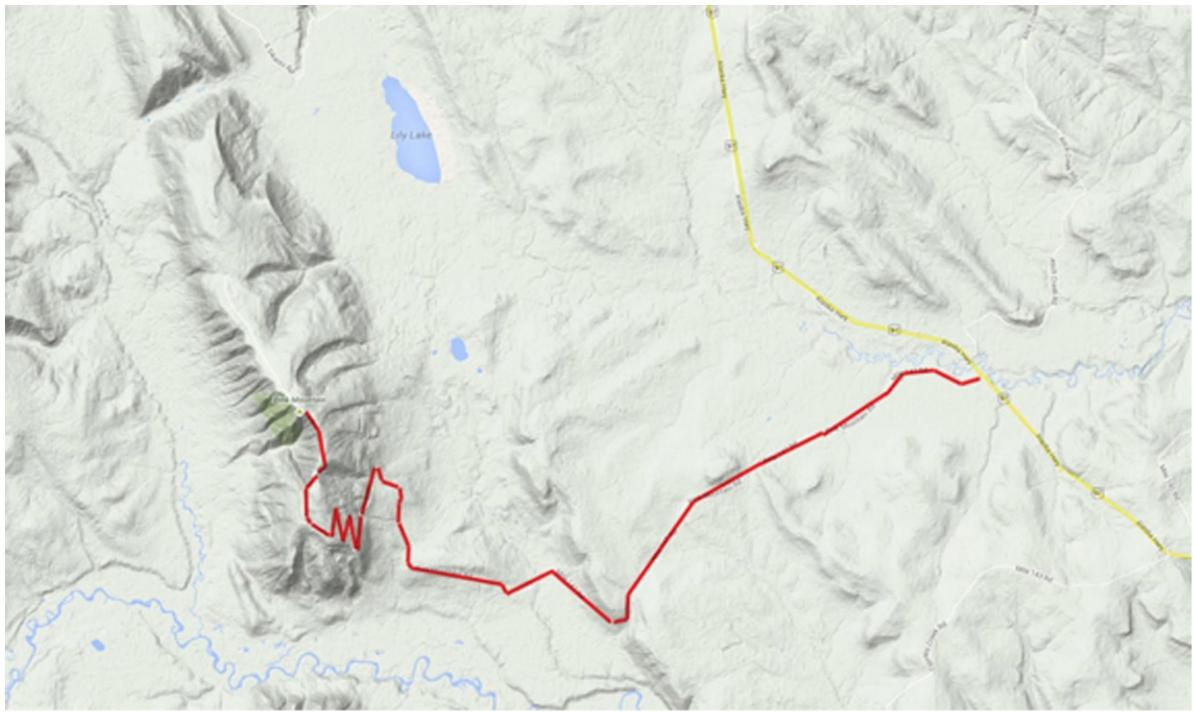
more blue listed specimens. Other than these plant collections no biological survey had been carried out on Pink Mountain.

We felt that a more comprehensive survey of the biodiversity on Pink Mountain would be valuable in guiding commercial development on the summit plateau. To that end the **Pink Mountain Biodiversity research Initiative** was developed in collaboration with the **UBC Botanical Garden**.

To the extent that our funding allowed our work was completed in 2015 and the results are nothing less than astonishing.



**Pink Mountain is only 1700 meters at its highest point but is so far north that the summit plateau is uniformly alpine tundra.**

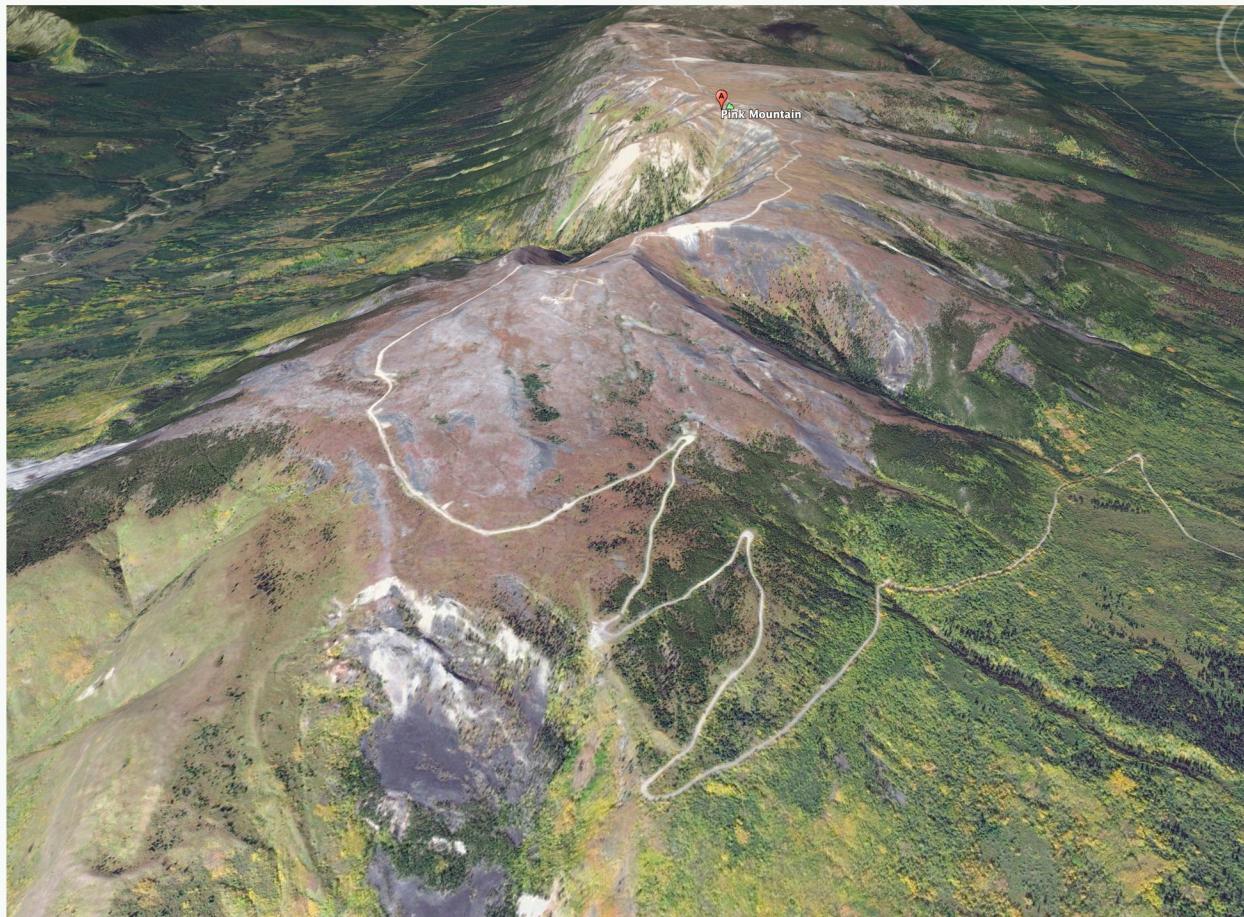


**The highest point on the Pink Mountain summit is 44 kilometers from the Alaska Highway.**

**Pink Mountain summit plateau**



## The Pink Mountain Road



The summit of Pink Mountain is easily accessible by road but the road must be treated with a great deal of respect. The road is unmaintained, is very rough, can be dangerous in bad weather and can cause severe damage to vehicles. Broken tires are common. Four wheel drive is not required but high clearance is a must. This road should not be attempted in an ordinary street vehicle or by drivers without experience in off-pavement driving. On the mountain itself a safe driving speed is 10K/h and overall the 44 K trip from the Alaska Highway can be expected to take about one and a half hours.



In 2010 a planned wind farm on Pink Mountain prompted the creation of the **Pink Mountain Biodiversity Research Initiative**. The Site C Dam will reduce the need for wind power in BC and at present plans for the Pink Mountain wind farm are on hold.

An examination of wind farms has shown that wind is anything but green energy. The huge amounts of concrete and steel that are used produce volumes of greenhouse gasses that would take many years of wind production to compensate. Worse is the heavy toll on birds and bats that is characteristic of windfarms.

The original Pink Mountain wind farm plan would have destroyed the natural habitat on the entire summit of Pink Mountain which we now know to be one of the most biodiverse sites in British Columbia.

The immediate threat of wind development on Pink Mountain is on pause but discussions of small scale power projects, including wind, continue.

**There is no part of the Pink Mountain summit that is suitable for wind turbines - even on a small scale**

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### **Pink Mountain Biodiversity Research Initiative**

#### **The Research**

Various experts were recruited to voluntarily visit Pink Mountain and carry out surveys in their areas of expertise. In this way a great deal was learned at little cost. Our program was intended as a broad survey of biodiversity and in no way can be considered definitive. In spite of this limitation results have exceeded all expectations.

## **Geology**

We received information (Kees Visser, P/Geol) that an erosion window exists on the south end of Pink Mountain within which the sandstone and shale (Jurassic) that overlies most foothills in northern BC has been removed. This has exposed a layer of limestone (Triassic) to the south and left a high dome of sandstone/shale on the north end of the mountain.

Egan Davis (UBC) has collected and analyzed soil samples from the Pink Mountain plateau and five other similar mountains to the immediate west of Pink Mountain.



**Egan Davis collected and analyzed 65 soil samples from all locations**

The soil samples from the high dome on the north end of the plateau showed low pH values in the 2-3 range. This indicates low nutrient content and a parent rock of sandstone. These results are consistent with on-the-ground observations of very few plants and with the Geologist's prediction.

Samples from the south end of the summit plateau, where all of the plants of interest are found, showed pH values of 6-7 indicating high nutrient content and a parent rock of limestone.

## Plants

The **basis for all the biodiversity** that we have found on Pink Mountain is the **extreme diversity** of plants.

Our plant list cannot be considered complete but already includes one red listed grass, one red listed rush, one red listed moss, one red listed Sorrel, 12 blue listed vascular plants and one blue listed moss

<i>Alopecurus magellanicus</i>	<i>Luzula rufescens</i>
<i>Tortula systyla</i> (moss)	
<i>Androsace chamaejasme</i>	<i>Oxytropis campestris ssp jordalii</i>
<i>Astragalus umbellatus</i>	<i>Polemonium boreale</i>
<i>Carex rupestris</i>	<i>Ranunculus pedatifidus ssp affinis</i>
<i>Festuca minutiflora</i>	<i>Silene involucrata ssp involucrata</i>
<i>Lozula confusa</i>	<i>Mnium arizonicum</i> (moss)

### Red and Blue listed plants

In addition to the listed species we have another group of plants that we refer to as rarely seen. These are not listed but they are rarely seen because of their normally remote habitat. On Pink Mountain they are abundant and accessible for research. This list includes 31 species.

<i>Aconitum delphinifolium</i>	<i>Pedicularis langsdorffii</i>
<i>Androsace septentrionalis</i>	<i>Pedicularis oederi</i>
<i>Arnica lessingii</i>	<i>Pedicularis sudetica</i>
<i>Campanula lasiocarpa</i>	<i>Polemonium acutiflorum</i>
<i>Campanula uniflora</i>	<i>Pyrola grandiflora</i>
<i>Cassiope tetragona</i>	<i>Rhododendron lapponicum</i>
<i>Corydalis pauciflorav</i>	<i>Saxifraga adscendens</i>
<i>Gentiana glauca</i>	<i>Saxifraga cernua</i>
<i>Gentiana prostrata</i>	<i>Saxifraga cespitosa</i>
<i>Ledum decumbens</i>	<i>Saxifraga flagellaris</i>
<i>Oxytropis splendens</i>	<i>Saxifraga nivalis</i>
<i>Papaver radicatum</i>	<i>Saxifraga oppositifolia</i>
<i>Parnassia kotzebuei</i>	<i>Saxifraga tricuspidata</i>
<i>Pedicularis capitata</i>	<i>Silene uralensis</i>
<i>Pedicularis labradorica</i>	<i>Taraxacum ceratophorum</i>
<i>Pedicularis lanata</i>	

### Rarely Seen Plants occurring on the Pink Mountain Summit

A third list contains 7 species (including three Orchids) that rarely occur in tundra habitats.

<i>Potentilla fruticosa</i>
<i>Coeloglossum viride</i> *
<i>Corallorrhiza trifida</i> **
<i>Epilobium latifolium</i>
<i>Platanthera obtusata</i> ***
<i>Veratrum viride</i>
<i>Zigadenus elegans</i>

### Plants not normally found on tundra

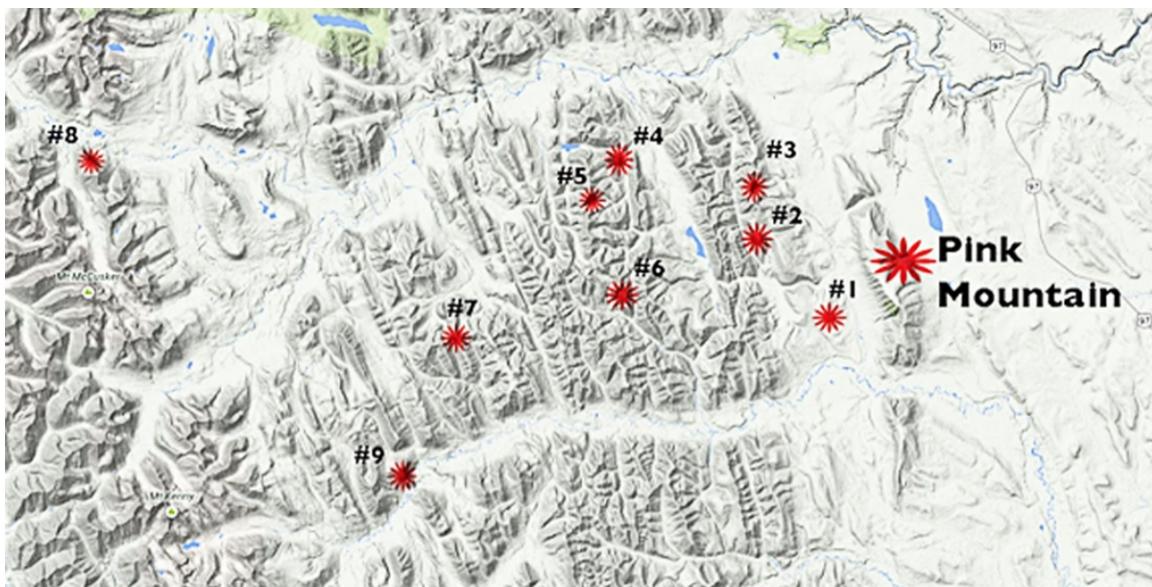


Our fourth list contains 66 species of flowering plants that occur within a  $2.2\text{K}^2$  boundary.

<i>Antennaria alpina</i>	<i>Dryas integrifolia</i>	<i>Oxytropis nigrescens</i>
<i>Anemone narcissiflora</i>	<i>Dryas octopetala</i>	<i>Oxytropis podocarpa</i>
<i>Antennaria cf. microphylla</i>	<i>Empetrum nigrum</i>	<i>Oxytropis splendens</i>
<i>Antennaria monocephala</i>	<i>Erigeron compositus</i>	<i>Oxytropis nigrescens</i>
<i>Antennaria rosea</i>	<i>Erigeron grandiflorus</i>	<i>Orthilia secunda</i>
<i>Arctostaphylos alpina</i>	<i>Erigeron humilis</i>	<i>Phyllodoce empetrifolia</i>
<i>Arctostaphylos uva-ursi</i>	<i>Erigeron nivalis</i>	<i>Polygonum viviparum</i>
<i>Arnica angustifolia</i>	<i>Erigeron peregrinus</i>	<i>Potentilla nivea/hookeriana</i>
<i>Arnica mollis</i>	<i>Fragaria virginiana</i>	<i>Potentilla uniflora</i>
<i>Artemisia norvegica</i>	<i>Galium boreale</i>	<i>Potentilla diversifolia</i>
<i>Artemisia tilesii</i>	<i>Hedysarum alpinum</i>	<i>Ribes lacustre</i>
<i>Aster sibiricus</i>	<i>Heracleum lanatum</i>	<i>Salix reticulata</i>
<i>Astragalus alpinus</i>	<i>Hieracium gracile</i>	<i>Sedum lanceolatum</i>
<i>Astragalus canadensis</i>	<i>Ledum palustre ssp decumbens</i>	<i>Senecio lugens</i>
<i>Epilobium angustifolium</i>	<i>Linnaea borealis</i>	<i>Sibbaldia procumbens</i>
<i>Epilobium latifolium</i>	<i>Loiseleuria procumbens</i>	<i>Silene acaulis</i>
<i>Castilleja occidentalis</i>	<i>Lupinus arcticus</i>	<i>Solidago multiradiata</i>
<i>Cerastium beeringianum</i>	<i>Mertensia paniculata v. pan.</i>	<i>Stellaria longipes</i>
<i>Delphinium glauca</i>	<i>Myosotis alpestris</i>	<i>Vaccinium vitis-idaea</i>
		<i>Veronica wormskjoldii</i>

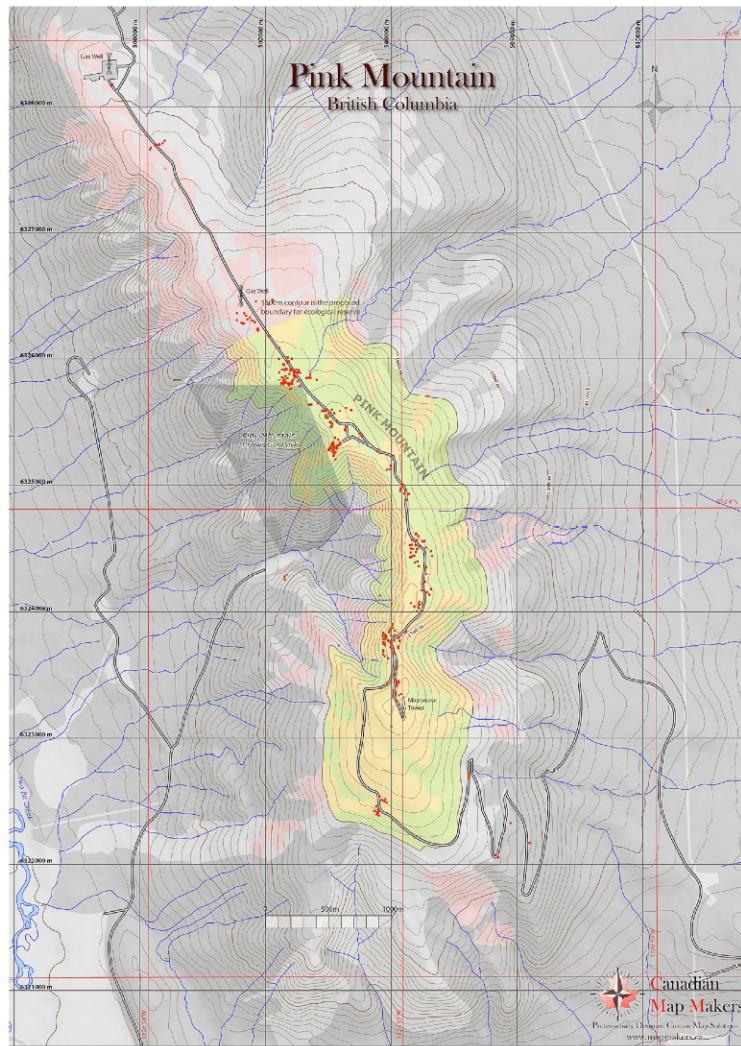


The **Plant surveys** that we have carried out on nine similar peaks to the west of Pink Mountain plus the extensive alpine collections made by Ken Marr (PhD, RBCM) and Richard Hebda (PhD, RBCM) **indicate very strongly that no other mountain in northern British Columbia** *comes even close to matching the diversity found on Pink Mountain.*



**Pink Mountain Biodiversity Research Initiative surveys**

We have identified a **centre of diversity** that encompasses just  **$2.2\text{K}^2$** .  
**All species** mentioned in this report are centred on this  $2.2\text{K}^2$  area.



**Red dots represent geotagged locations of plants of interest. Geotags were used to determine the centre of diversity.**

The Sikanni Chief Ecological Reserve and the Ospika Cones Ecological Reserve both lie about 80 Kilometers west of Pink Mountain. Extensive plant collections have been carried out in these two existing reserves by Ken Marr et al in 2015.

Both reserves were found to be rich in plants but there is very little overlap of species with Pink Mountain.



**Existing Eco-Reserves in the Pink Mountain area**

We are speculating that the extraordinary diversity on Pink Mountain is due to an **extended range of microhabitats** that other mountains do not possess. Two of the Orchids that are unexpected occurrences on Pink Mountain are described as requiring wetland habitats. There are no wetlands on Pink Mountain yet these species are finding niches that allow them to survive.

The microhabitat diversity may be related to the geographic location, elevation and isolation of Pink Mountain. This is a question to be pursued by future researchers.

We have established that Pink Mountain was re-colonized, after the last glaciation, by plants from refugia to both the north and south. This is a partial explanation for the plant diversity.



The rarely seen *Rhododendron lapponicum* (above) was previously not known to occur as far south as Pink Mountain



The only population of the red listed *Alopecurus alpinus* is threatened by off road vehicles on Pink Mountain.

## Moss

A short two-day collection (Ernest Wu UBC) resulted in 68 moss species. As remarkable as this high number is it cannot be considered a complete picture of moss diversity. Further collections are necessary.

Analysis of the collection revealed **a surprising number of rare species**. The list includes two red listed species, one blue listed species and one first record for the province. All first, second and third records are likely to make the red lists in future. The Pink Mountain record for the Arctic species *Polytrichum hyperboreum* represents the farthest south it has been found and also the highest elevation it has been found. The Pink Mountain moss collection is housed in the UBC herbarium.

<i>Tortula systyla</i>	Red listed
<i>Mnium arizonicum</i>	Blue listed
<i>Polytrichum hyperboreum</i>	First Record
<i>Tayloria hornschurchii</i>	First record

**Rare mosses on Pink Mountain**

Plant collections to-date do not include definitive collections of grasses, mosses, lichens or liverworts so the diversity of plants is likely to prove considerably more extensive than is presently known.

**The diversity of the known flora represents an accessible bonanza for botanical researchers.**



**York University researcher on Pink Mountain**

## **Butterflies**

For decades Pink Mountain has had a worldwide reputation as a place to collect rare butterflies. However, until now the full significance of the butterflies has not been recognized.

**Pink Mountain supports 55 species and sub species of butterflies.** (Peter Jakubek)

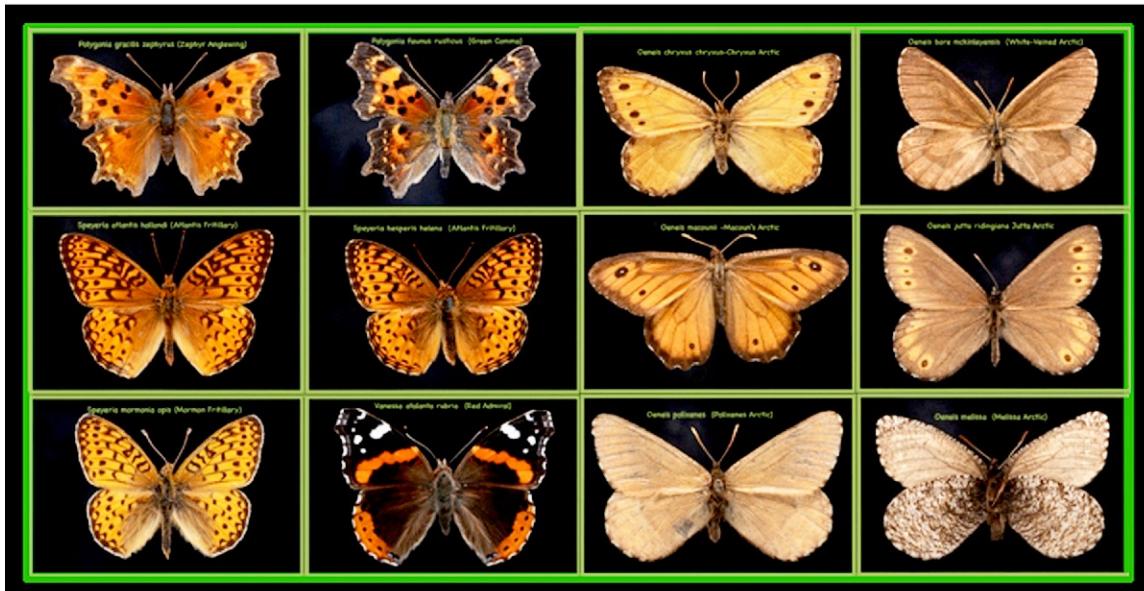
### **Butterflies on Pink Mountain**

1. **Erynnis icelus** (Scudder & Burgess, 1870)
2. **Hesperia comma manitoba** (Scudder, 1874)
3. **Parnassius eversmanni pinkensis** Gauthier, 1984 (TYPE LOCALITY )southern segregate)
4. **Papilio zelicaon** Lucas, 1852 (northern segregate)
5. **Papilio machaon aliaska** Scudder, 1869 (southern segregate)
6. **Papilio canadensis** Rothschild & Jordan, 1906
7. **Pontia occidentalis nelsoni** (W. H. Edwards, 1883) (southern segregate)
8. **Pieris marginalis tremblayi** Eitschberger, [1884]
9. **Pieris oleracea oleracea** (T. Harris, 1829)
10. **Euchloe ausonides mayi** F. Chermock & R. Chermock, 1940 (northern segregate)
11. **Euchloe creusa creusa** (E. Doubleday, [1847])
12. **Colias philodice vitabunda** Hovanitz, 1943 (southern segregate)
13. **Colias christina christina** W. H. Edwards, 1863
14. **Colias meadii elis** Strecker, 1885 (NEW RECORD from 2009 FOR CANADA at PINK MT.- personal observation of Mgr. PJ) (northern segregate)
15. **Colias canadensis** Ferris, 1982 (southern segregate)
16. **Colias nastes streckeri** Grum-Grshimailo, 1895 **trans ad aliaska** O. Bang-Haas, 1927
17. **Colias palaeno chippewa** W. H. Edwards, 1870 (southern segregate)
18. **Colias interior** Scudder, 1862 (northern segregate)
19. **Colias gigantea mayi** F. Chermock & R. Chermock, 1940
20. **Lycaena phlaeas arethusa** (Wolley-Dod, 1907)
21. **Lycaena dorcas dorcas** W. Kirby, 1837
22. **Lycaena mariposa penroseae** W. D. Field, 1938
23. **Cupido a. amyntula** (Boisduval, 1852)
24. **Celastrina ladon lucia** (W. Kirby, 1837)
25. **Glaucopsyche lygdamus couperi** Grote, 1873

26. ***Lycaeides idas scudderii***
27. ***Plebejus saepiolus amica*** (W. H. Edwards, 1863)
28. ***Agriades glandon megalope*** (McDunnough, 1927) trans ad ***lacustris*** (T. Freeman, 1939)
29. ***Polygonia faunus rusticus*** (W. H. Edwards, 1874)
30. ***Polygonia gracilis zephyrus*** (W. H. Edwards, 1870)
31. ***Nymphalis antiopa*** (Linnaeus, 1758)
32. ***Aglais milberti milberti*** (Godart, 1819)
33. ***Vanessa atalanta rubria*** (Fruhstorfer, 1909)
34. ***Speyeria atlantis hollandi*** (F. Chermock & R. Chermock, 1940)
35. ***Speyeria hesperis helena*** dos Passos & Grey, 1957
36. ***Speyeria mormonia opis*** (W. H. Edwards, 1874 with high density of melanistic male/female forms)
37. ***Boloria alaskensis*** alaskensis (W. Holland, 1900)
38. ***Boloria eunomia dawsoni*** (W. Barnes & McDunnough, 1916) trans ad ***nichollae*** (W. Barnes & Benjamin, 1926)
39. ***Boloria selene atrocostalis*** (Huard, 1927) trans ad ***albequina*** (W. Holland, 1928)
40. ***Boloria bellona jenistai*** D. Stallings & Turner, 1947
41. ***Boloria improba youngi*** (W. Holland, 1900) (southern segregate)
42. ***Boloria polaris polaris*** (Boisduval, [1828]) (southern segregate)
43. ***Boloria freija freija*** (Thunberg, 1791)
44. ***Boloria astarte astarte*** (E. Doubleday, 1847)
45. ***Boloria chariclea grandis*** (W. Barnes & McDunnough, 1916) trans ad ***butleri*** (W. H. Edwards, 1883)
46. ***Phyciodes cocyta cocyta*** (Cramer, 1777)
47. ***Phyciodes pratensis*** (Behr, 1863)
48. ***Limenitis arthemis rubrofasciata*** (W. Barnes & McDunnough, 1916)
49. ***Erebia epiphile sineocellata*** Skinner, 1889
50. ***Oeneis macounii*** (W. H. Edwards, 1885) (northern segregate)
51. ***Oeneis chryxus chryxus*** (E. Doubleday, [1849]) (northern segregate)
52. ***Oeneis bore mckinleyensis*** dos Passos, 1949 (southern segregate)
53. ***Oeneis jutta ridingiana*** F. Chermock & R. Chermock, 1940
54. ***Oeneis melissa atlinensis*** C. Guppy & J. Shepard, 2001 (southern segregate)
55. ***Oeneis polixenes luteus*** Troubridge & Parshall 1988 (TYPE LOCALITY)

In addition 7 sub species have been identified that await description.

**The Pink Mountain butterfly species list includes 2 blue listed species and 7 endemic subspecies.**



**A few of the 55 species/subspecies of Butterflies on Pink Mountain**

A total of 187 butterfly species occur in all of British Columbia thus **Pink Mountain has nearly 30% of the provincial total.**

British Columbia has more butterfly species than any other province or territory **thus Pink Mountain is a Butterfly Hotspot for all of Canada that is likely not equalled anywhere else.**

Pink Mountain	55 species	British Columbia	187 species
Yukon	87 species	Manitoba	144 species
NWT	92 species	Ontario	158 species
Nunavut	32 species	Quebec	135 species
Alberta	173 species	New Brunswick	83 species
Saskatchewan	165 species	Nova Scotia	73 species
PEI	60 species	NFLD & Lab	31 species

### **Butterfly species in Canada**

## Moths

A 30-hour collection on the summit of Pink Mountain produced 49 species. Extrapolated through an entire season experts (Greg Pohl MSc and Dave Holden MSc) calculate that **200 species of moths** could occur on Pink Mountain. So little is known about moths in general that we cannot draw any conclusions about rare species. However the very high number of potential species is a further indication of the extreme biodiversity of Pink Mountain.



**A few of possibly 200 species of moths on Pink Mountain**



**Greg Pohl and Dave Holden on Pink Mountain**

## Spiders

A very short visit by Claudia Copley (MSc) and her colleagues from the RBCM resulted in some surprising spider collections. The 31 species they collected included **two second records, one third record and two very significant range extensions**. More complete collections are needed.

**Rare Spiders on Pink Mountain**

Scotinotylus alienus	Second record for BC
Diplocephalus sphagnicola	Second record for BC
Oreoneta leviceps	Third record for BC
Scotinotylus Protervus	Southeastern most sp record
Ozyptila arctica	Southwestern-most sp record

## Insects

As a whole this is the least known group of species. It is going to take a great deal of future work to establish the real diversity of insects on Pink Mountain. However, what is known is enough to indicate that this is an ecosystem that needs to be protected for further study. We already have a first record of the Mason Bee *Osmia aquilonaria*



**Unidentified**

## Mammals

Large and small mammal surveys were carried out by Bob Long MSc. Live traps were used to sample small mammals but additional work needs to be done to establish a complete picture of small mammal occurrences on Pink Mountain.

The large-mammal list for Pink Mountain includes **every ungulate that occurs in Northern British Columbia** with the exception of Mountain goats.



**Blue listed Northern Woodland Caribou make daily, year round, use of the abundant feed on Pink Mountain.**

Elk	Black Bear
Stone Sheep	Hoary Marmot
White tailed Deer	Porcupine
Caribou	Silver Fox
Wolves	Least Chipmunk
Wolverine	Pack Rat
Grizzly Bear	Field mice

Rocky Mountain Mule Deer

**Mammals on Pink Mountain**



**Stone's Sheep (above) are permanent residents of the Pink Mountain summit which provides safe lambing sites, abundant feed and mineral licks.**

The Hoary Marmot (*Marmota caligata*) was once numerous on Pink Mountain. These animals are naive and readily approach people and vehicles. Indiscriminate shooting has reduced the population to +/- six animals. This is the most urgent conservation issue on Pink Mountain.



## Birds

Our bird list (far from complete) shows 27 species using the summit.

Golden Eagle
Bald eagle
Osprey
Red Tailed Hawk
Kestrel
Sharp-shinned Hawk
Northern Harrier
Raven
Townsends Solitaire
Horned Lark
Dark-eyed Junco
Red Crossbill
American Pipit
Bohemian Waxwing
American Redstart
Pine Siskin
Savannah Sparrow
Chipping Sparrow
Robin
Rock Wren
Bairds Sandpiper
Dusky Grouse
Ruffed Grouse
Spruce Grouse
Rock Ptarmigan
Willow Ptarmigan
White tailed Ptarmigan

### Bird species of note are:

**Seven Raptors** (a remarkable number for such a small area) almost all of which would be endangered by wind turbines and habitat disturbance.

**Sandhill Cranes** nest in the area and would be endangered by wind turbines.

**Townsends Solitair** is considered uncommon everywhere in BC and likely breeds on Pink Mountain. Threatened by turbines.

**Horned Larks** breed on Pink Mountain. They are the small bird most often killed by wind turbines.

**Robins** use the Pink Mountain summit, where abundant fruit is available, as a food stop during migration. Robins are statistically at risk from wind turbines.

**Bairds Sandpiper** nests on Arctic tundra and uses tundra resting sites on its migration to South America. The removal of Pink Mountain as a migration stop would have unknown consequences for the species.

**Rock Wrens** were previously not known to occur on Pink Mountain. Breeding pairs are rare in Northern BC

**Grouse.** Pink Mountain hosts 3 of a total of 4 grouse species in BC.

**Ptarmigan.** Pink Mountain supports all three ptarmigan species that occur in BC.

**Out of a total of 7 Grouse and Ptarmigan species in the province Pink Mountain supports 6. This is a remarkable concentration according to birders.** It is the abundant year-round fruit supply that makes this possible.

## **Rare Species**

The environmental assessment for the Site C Dam has identified 28 red and blue listed species within the 30K<sup>2</sup> reservoir plus the 80 Kilometer transmission corridor.

**On Pink Mountain, within the 2.2 K<sup>2</sup> centre of diversity we have recorded 22 red and blue listed species plus 6 first, second and third records for BC plus 7 endemic sub species.**

## **Pink Mountain supports 44 significantly rare species**

### **Significantly rare species on Pink Mountain**

#### **Plants**

##### **Red Listed**

Alopecurus alpinus	UBC Herbarium
Luzula rufescens	RBCM herbarium
Tortula stylvia	UBC herbarium
Polytrichum hyperboreum	UBC herbarium
Southernmost and highest world record	

##### **Blue Listed**

Androsace chamaejasme	UBC herbarium
Ranunculus pedatifidus	UBC herbarium
Astragalus umbellatus	UBC herbarium
Festuca minutiflora	UBC herbarium
Luzula confusa	UBC & RBCM herbarium
Polemonium boreale	UBC herbarium
Oxytropis jordalii ssp jordalii	UBC herbarium
Mnium arizonicum	UBC herbarium

#### **Butterflies**

##### **Blue Listed**

Agriades glandon megalon and Colias meadii elis

**New ssp described 2021:** Colias nastes muskwa, Colias hecla lydia,  
Parnassius eversmanni pinkensis.

#### **New ssp identified but not described:**

Boloria astarte ssp, Colias elis ssp, Boloria eunomia ssp, Boloria polaris ssp.

#### **Blue Listed**

#### **Mammals**

Northern Woodland Caribou, Stone's Sheep

#### **First Record for BC**

#### **Moss**

Tayloria hornschuchii

#### **Mason Bee**

Osmia aquilonaria York University insect collection

#### **Second Record for BC**

#### **Spiders**

Scotinotylus alienus and Diplocephalus sphagnicola RBCM insect collection

#### **Third Record for BC**

#### **Spiders**

Oreoneta leviceps RBCM insect collection

## **Summary of Rare species on PM**

**44 in total as of 2021**

**The environmental assessment for the Site C Dam identified 28 red and blue listed species within the 30 square kilometer reservoir plus the 80 kilometer transmission corridor.**

**Within the 2.2 square kilometer ‘centre of diversity’ on Pink Mountain we have so far identified 44 significantly rare species. This number includes 22 red and blue listed species plus numerous first, second and third records as well as a number of new-to-science species and subspecies.**

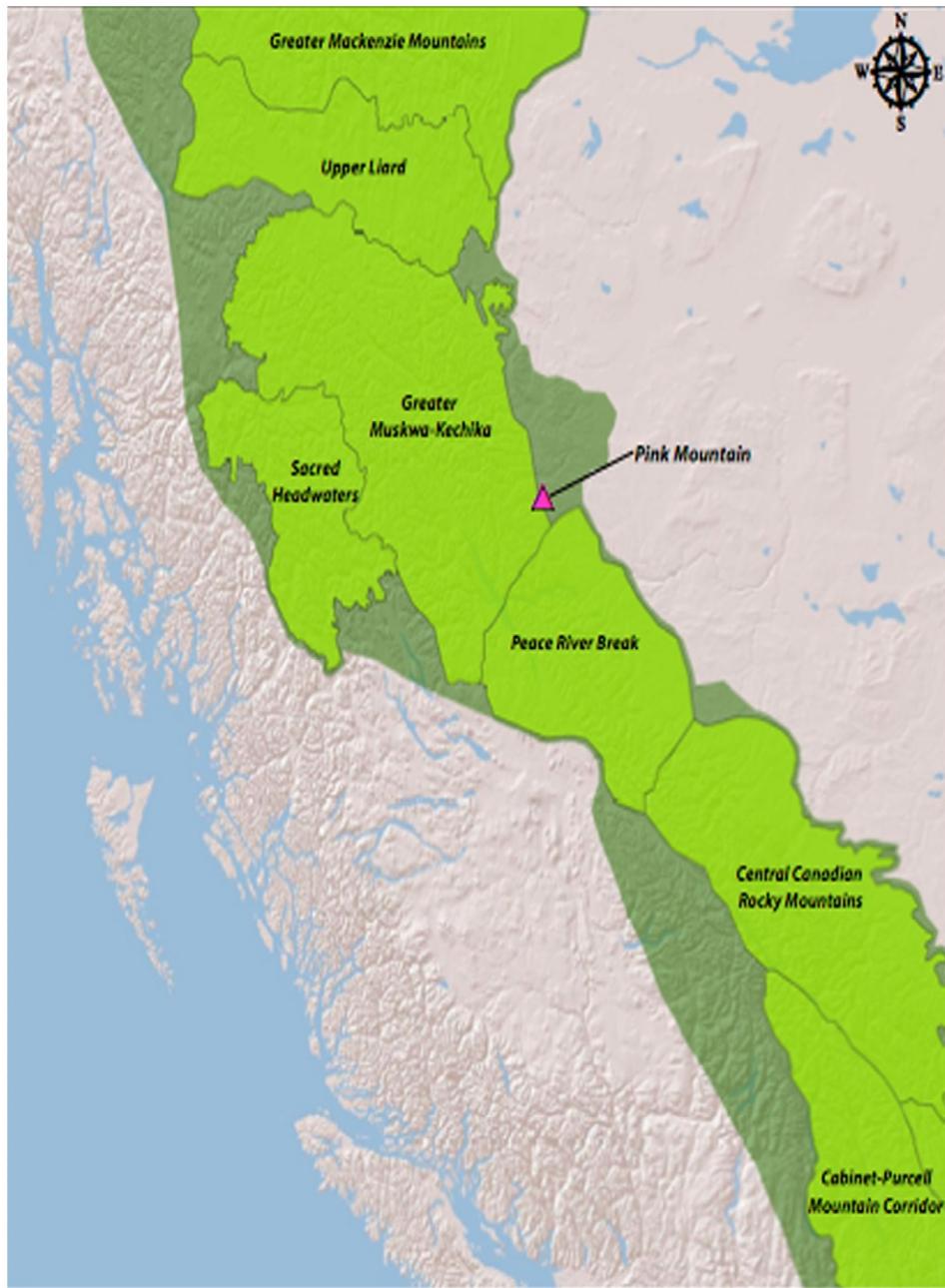
**The list of rare species continues to grow.**

<b>Rare species</b>
<b>Grass - 1 red listed</b>
<b>Rush - 1 red listed</b>
<b>Moss - 1 red listed</b>
<b>Sorrel - 1 red listed</b>
<b>Flowering plants - 12 blue listed</b>
<b>Moss - 1 blue listed</b>
<b>Butterflies - 2 blue listed</b>
<b>Northern Caribou - blue listed</b>
<b>Stone’s Sheep - blue listed</b>
<b>Barn Swallow - blue listed</b>
<b>Moths - 5 first records for BC</b>
<b>Insects - 1 first record for BC</b>
<b>Insects - 1 first record for Canada</b>
<b>Moss - 2 first records for BC</b>
<b>Mason Bee - 1 first record for BC</b>
<b>Spiders - 2 second records for BC</b>
<b>Spiders - 1 third record for BC</b>
<b>Butterfly ssp - 7 endemic to PM</b>
<b>Ants - 2 species new to science</b>

***No other site of this size in northern BC has as many recorded rare species***

## **Yellowstone to Yukon**

Pink Mountain lies within the protected wildlife corridor that the Yellowstone to Yukon project is attempting to establish. The preservation of Pink Mountain would significantly assist the Y2Y effort.



**Y2Y Protected Wildlife Corridor**

## **The Research Potential of Pink Mountain**

The research potential of Pink Mountain cannot be overestimated. Much of the work that now requires researchers to travel to the Yukon or the Arctic can be done on Pink Mountain at much lower cost.

Tundra features such as solifluction terraces, frost boils and rock rivers, all associated with melting permafrost, indicate good potential for geomorphology studies without the need to travel further north.

Studies involving tundra botany are unlimited in scope. Most Canadian tundra plants are available on Pink Mountain for studies on adaptations to harsh conditions, pollination and pollinators, microhabitat requirements and plant associations, among many other topics. Such studies can be carried out easily and cost effectively.

Pink Mountain hosts plants that are at the extreme northern edge of their range, the extreme southern edge of their range and at the extreme altitudinal edge of their range. This makes Pink Mountain ideal for long and short term climate change studies. Also related to climate change is the opportunity to monitor methane released by melting permafrost.

Many years of existing data from meteorological stations on the summit of Pink Mountain and at the base of Pink Mountain not only provide important information on climate change but also would contribute to studies of plant responses to changing atmospheric conditions from year to year.

Pink Mountain offers opportunities for life cycle and behavioral studies of large ungulates such as Stone's Sheep and the endangered Northern Woodland Caribou.

Many tundra birds such as Horned Larks are available for nesting, feeding and behavioral studies.

The concentration of Ptarmigan and Grouse on Pink Mountain offers unique opportunities for study.

Pink Mountain presents research opportunities for generations of Masters and PhD students as well as ongoing research for university faculty across Canada. However, ongoing research requires a stable environment which a protected area would provide.

Road access to all parts of the summit plateau eliminates the need for costly helicopter transport to research sites.

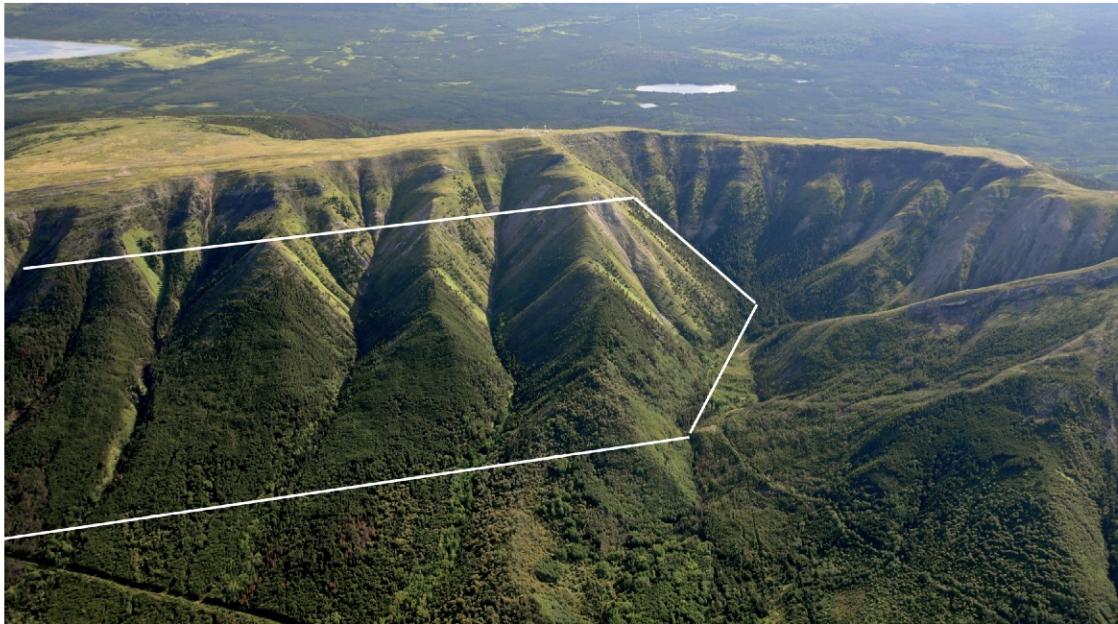


**Solifluction terraces**



**How do plants survive harsh tundra conditions?**

## Pink Mountain Provincial Park



**Pink Mountain Provincial Park** was established to protect the site of the Pink Mountain Ichthyosaur fossil. This fossil was in fact excavated along Sikanni Chief River some 30 miles north of Pink Mountain. The fossil now is held at the Tyrrell Museum. (Dr. Victoria Arbour RBCM)

There was never a reason for a park on Pink Mountain and ironically the park now constitutes the biggest immediate threat to habitat on the Pink Mountain summit.

The threat comes from casual visitors who are unaware of the sensitive nature of tundra or of the rare plants. We have seen large groups of picknickers trampling the surface and kids picking handfuls of wildflowers which we later found in wilted clumps on the ground. Its a classic case of loving a place to death.

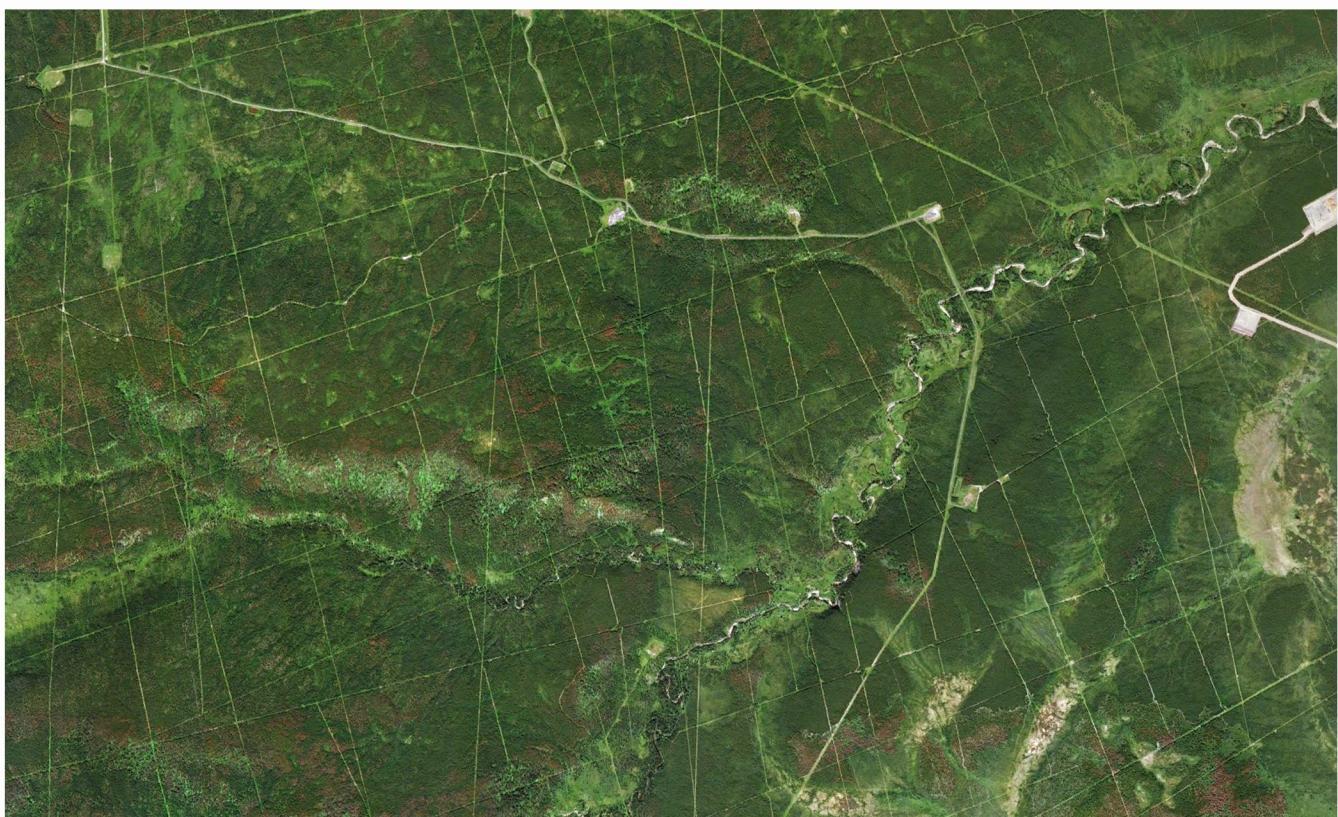
We encourage naturalists to visit but unknowing casual visitors are attracted by the BC Parks Website. That website is wrong in almost every respect and misleading at best. For example, there is no warning about the dangerous road so visitors are put at risk.

**Tundra habitats are extremely vulnerable to trampling and cannot tolerate this kind of abuse**

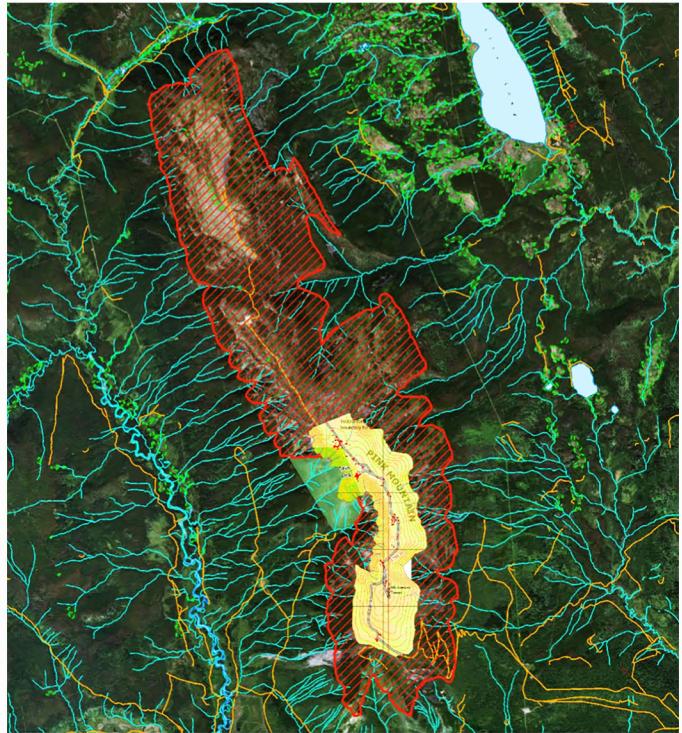
**We urge that the park status be rescinded and the Pink Mountain page removed from the BC Parks website**



Considering the habitat fragmentation created by new roads, seismic lines and pipelines and large clear cuts that cumulatively cover many hundreds of square kilometers in the vicinity, wildlife is severely threatened. Pink Mountain could be declared a protected area and preserved as such.



## **Ungulate Winter Range**



**Centre of diversity - - yellow  
Ungulate winter range - - red**

**Pink Mountain currently holds an Ungulate Winter Range designation  
which protects only against logging.**

**We suggest that the minimum protection for Pink Mountain that would be useful  
would be the upgrading of the Ungulate Winter Range to protected area status  
which would provide complete protection to this rare and sensitive ecosystem.**

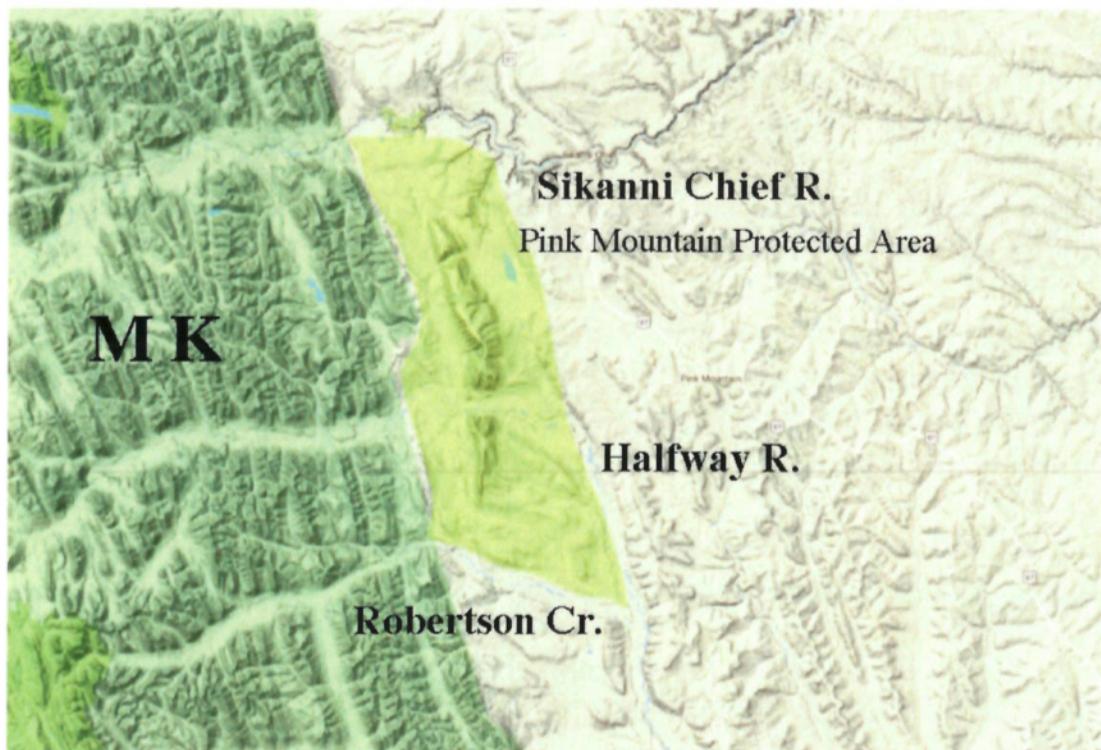
**Pink Mountain has tremendous potential for University scientists and  
a protected area would provide a stable site for research.**

Upgrading the Ungulate Winter Range status to Protected Area would ensure that the unique biodiversity on Pink Mountain would remain intact for future research. However, more than that is needed.

A much larger protected area around Pink Mountain would allow wildlife populations to recover and eventually spread to adjacent habitat. The benefit of protected areas to wildlife harvesting generally has been well documented.

As we have reported, there has been a noticeable decline in wildlife sightings in the Pink Mountain vicinity during the period of our surveys. The proposed protected area would be a major assist to wildlife in general and to local hunters.

**We propose that a large protected area be established around Pink Mountain. (pale green).**



The Peace River Regional District supports 60% of all bird species known to occur in British Columbia, and 46% of all species known to breed in the province.  
[\(http://www.env.gov.bc.ca/ecology/ecoregions/polareco.html\)](http://www.env.gov.bc.ca/ecology/ecoregions/polareco.html).

A protected area around Pink Mountain would preserve a significant portion of the rich wildlife diversity of the Peace River District.

If preserved now while it's ecology is still intact Pink Mountain would serve as a benchmark that could be important in the future in judging the cumulative impact of human activity in the district.



**Pink Mountain Protected Area (proposed)**

## **Summary**

There are strong indications that the biodiversity of Pink Mountain may be unmatched in British Columbia.

It is recommended that the summit of Pink Mountain be protected to

- preserve rare species,
- provide a year round food supply for ungulates,  
including endangered Woodland Caribou,
- preserve the enormous research potential of the mountain

It is further recommended that the entirety of Pink Mountain, including a wide area around the mountain, be preserved as a refuge for wildlife being displaced by human activity in the vicinity.

It is well established that protected areas in other parts of the world are very effective in restoring wildlife populations within the protected area and beyond the boundaries of the protected area.

## **Appendix 1**

Letter from Geologist Kees Viser

### **Some simple notes on the geology of Pink Mountain, NE BC**

Pink Mountain is formed as being one of the asymmetrical folds paralleling the Rocky Mountain thrust belt. All along the east side of Rocky Mountains from South Alberta into the Yukon you have an area between 10 to 150km wide with a number of folds or anticlines, paralleling the mountain range, commonly called the foothills.

Without going into detail about the formation of the Rockies and the foothills, it will suffice here, and I simplify enormously, to say that the Rockies are a thrust from west to east, forming a major mountain range. As a result of this thrusting some “rippling” occurred at its front forming the foothills. This thrusting is called the Laramide Orogeny and happened in late Cretaceous time (about 60 to 70 million years ago).

Often you have a large number of ripples or folds in this 10 to 150 km belt, but the largest ones happen, as you might expect, close to the Rockies and the smallest ripples the farthest away from the Rockies.

At the time of the rippling, the Upper Cretaceous rocks were the last ones to be deposited, so you see these rocks at the surface, and older ones, obviously below them, and these are often exposed where rivers or creeks cut through the upper most rocks.

In many instances the youngest Cretaceous rocks will have eroded completely away, but there is still sufficient Middle and Lower Cretaceous present, so that almost all of the foothills are covered by Cretaceous rocks, which mainly consists of sandstone and shale.

In a few instances, where the ripple or fold is large and high enough, the erosion can take away all of the Cretaceous and even some of the underlying Jurassic and Triassic rocks. This is the case in Pink Mountain.

Geologists call this a fenster or window (because you look through surrounding younger rocks into an older rock)

In Pink Mountain, erosion cut through to the Lower Triassic Montney Formation, which is exposed at the top. The area surrounding Pink Mountain consists of Jurassic Fernie and Montieth shales and sandstones.

The interesting thing about all of the Triassic rocks that they were deposited during arid and warm times, so many have considerable amounts of dolomite ( a Ca-Mg carbonate), limestone, phosphate (base of the Halfway ), halite (salts) and even shell beds (Coquina) in them . The Baldonnel is even pure dolomite and limestone.

This means that the soil derived from these rocks on Pink Mountain will have a considerable amount of Mg ,Ca , P and salts ,which the other foothills don't have. The

nearby Rocky Mountain front usually has sandstone and shale on the lower outcrops, and also Devonian carbonates, but only at the very high tops, where no soil is formed.

I am not a flower expert, but it is quite possible that the soil on Pink Mountain, which is so different from the other mountain, plus its unique location (high and close to the Rockies), microclimate? is the main reason for its unique flora.

Having said this, there is no similar situation close by.

The north part of Pink Mountain is only Jurassic, which could explain that there are no flowers there

Unfortunately these ripples are major targets for the oil industry, because deeper down in Devonian and Carbonaceous rocks, gas is often trapped in anticlinal folds, such as the Elbow Creek field.

Most of the wells are dry or almost dry now, so the major companies are not interested in them anymore, but some of the very small 10- people companies may buy 1 or 2 wells and will try to produce again. As you know oil companies buy subsurface rights and the surface owners who usually are not the oil companies, has the obligation to give them access.

I worked in the past for Petro-Canada, and for a short time in 1986-7 I worked on the geology of NE BC .

Hope this helps,

Kees Visser, P/Geol

## **Appendix 2**

### **Pink Mountain plant species list to-date UBC, RBCM Herbaria**

1. *Abies lasiocarpa*
2. *Achillea millefolium*
3. *Achillea millefolium* L. var.  
*borealis*
4. *Achnatherum nelsonii* ssp. *dorei*
5. *Aconitum delphinifolium* ssp.  
*delphinifolium*
6. *Adoxa moschatellina*
7. *Agoseris glauca* var. *glauca*
8. *Agoseris glauca* var. *dasycephala*
9. *Agoseris glauca*
10. *Alnus viridis*
11. *Alopecurus magellanicus*
12. *Androsace septentrionalis*
13. *Anemone drummondii* var.  
*lithophila*
14. *Anemone multifida*
15. *Anemone narcissiflora* var.  
*interior*
16. *Anemone parviflora*
17. *Anemone richardsonii*
18. *Antennaria alpina*
19. *Antennaria microphylla*
20. *Antennaria monocephala*
21. *Antennaria rosea*
22. *Arctagrostis latifolia*
23. *Arctostaphylos uva-ursi*
24. *Arctous alpina*
25. *Arnica angustifolia* ssp.  
*angustifolia*
26. *Arnica angustifolia* ssp. *attenuata*
27. *Arnica angustifolia* ssp.  
*lonchophylla*
28. *Arnica lessingii* ssp. *lessingii*
29. *Arnica mollis*
30. *Artemisia norvegica*
31. *Artemisia tilesii*
32. *Aster sibiricus*
33. *Astragalus alpinus*
34. *Astragalus alpinus* var. *alpinus*
35. *Astragalus canadensis*
36. *Astragalus robbinsii* var.  
*robbinsii*
37. *Astragalus umbellatus*
38. *Betula glandulosa*
39. *Botrychium lunaria*
40. *Botrychium minganense*
41. *Botrychium pinnatum*
42. *Bromus carinatus*
43. *Bromus inermis*
44. *Bromus pumpellianus*
45. *Calamagrostis lapponica*
46. *Calamagrostis purpurascens*
47. *Calamagrostis stricta*
48. *Calamagrostis stricta* ssp.  
*inxpansa*
49. *Campanula lasiocarpa* ssp.  
*lasiocarpa*
50. *Campanula uniflora*
51. *Carex albonigra*
52. *Carex anthoxantha*
53. *Carex atratiformis*
54. *Carex brunnescens*
55. *Carex capitata*
56. *Carex dioica* var. *gynocrates*
57. *Carex disperma*
58. *Carex limosa* L.
59. *Carex macloviana*
60. *Carex media*
61. *Carex obtusata*
62. *Carex phaeocephala*
63. *Carex pluriflora*
64. *Carex rossii*
65. *Cassiope tetragona*
66. *Castilleja miniata* var. *fulva*
67. *Cerastium arvense*
68. *Cerastium beeringianum* ssp.  
*beeringianum*
69. *Ceratodon purpureus*
70. *Chrysosplenium tetrandrum*
71. *Coeloglossum viride*
72. *Cornus canadensis*
73. *Corydalis pauciflora*

74. *Cynodontium strumiferum*  
 75. *Dactylina arctica*  
 76. *Deschampsia caespitosa*  
 77. *Dicranum acutifolium*  
 78. *Draba aurea*  
 79. *Draba cinerea*  
 80. *Draba lonchocarpa*  
 81. *Dryas integrifolia*  
 82. *Dryas octopetala* ssp. *octopetala*  
     *Elymus alaskanus*  
 83. *Elymus alaskanus* ssp. *latiglume*  
     *Elymus repens*  
 84. *Elymus trachycaulus* ssp.  
     *violaceus*  
 85. *Elymus* [*Leymus*] *innovatus*  
     *Empetrum nigrum*  
 86. *Epilobium angustifolium*  
 87. *Epilobium latifolium* ssp.  
     *latifolium*  
 88. *Epilobium palustre*  
 89. *Equisetum arvense*  
 90. *Equisetum scirpooides*  
 91. *Erigeron compositus*  
 92. *Erigeron compositus* var.  
     *glabratus*  
 93. *Erigeron grandiflorus*  
 94. *Erigeron humilis*  
 95. *Erigeron peregrinus*  
 96. *Eriophorum callitrix*  
 97. *Eurybia sibirica*  
 98. *Festuca altaica*  
 99. *Festuca baffinensis*  
 100.     *Festuca brachyphylla*  
         *Festuca cf. minutiflora*  
 101.     *Festuca rubra* ssp.  
         *richardsonii*  
 102.     *Festuca saximontana*  
 103.     *Fragaria virginiana*  
 104.     *Gentiana glauca*  
 105.     *Gentiana prostrata*  
 106.     *Gentianella amarella*  
     *Gentianella propinqua*  
 107.     *Hedysarum alpinum*  
     *Heracleum maximum*  
 108.     *Hieracium gracile*  
 109.     *Hieracium umbellatum*  
     *Hierochloe alpina*  
 110.     *Hylocomium splendens*  
 111.     *Hypnum callichroum*  
 112.     *Hypnum cupressiforme*  
 113.     *Juncus biglumis*  
 114.     *Juncus castaneus*  
 115.     *Juncus drummondii*  
 116.     *Juncus triglumis*  
 117.     *Juniperus communis* var.  
     *depressa*  
 118.     *Kobresia myosuroides*  
     *Lathyrus ochroleucus*  
 119.     *Ledum palustre* ssp.  
     *decumbens*  
 120.     *Linnaea borealis*  
 121.     *Loiseleuria procumbens*  
     *Lupinus arcticus*  
 122.     *Luzula confusa*  
 123.     *Luzula nivalis*  
 124.     *Luzula parviflora*  
 125.     *Luzula spicata*  
 126.     *Lycopodium annotinum*  
     ssp. *Lycopodium* cf. *clavatum*  
     *Mertensia paniculata* var.  
     *paniculata*  
 127.     *Micranthes nelsoniana*  
     var. *porsildiana*  
 128.     *Minuartia biflora*  
 129.     *Minuartia elegans*  
 130.     *Minuartia rubella*  
 131.     *Orthilia secunda*  
 132.     *Orthotrichum anomalum*  
 133.     *Oxytropis deflexa* var.  
     *sericea*  
 134.     *Oxytropis jordalii*  
 135.     *Oxytropis jordalii* ssp.  
     *jordalii*  
 136.     *Oxytropis maydelliana*  
     *Oxytropis nigrescens*  
 137.     *Oxytropis nigrescens* ssp.  
     *bryophila*  
 138.     *Oxytropis splendens*  
     *Papaver lapponicum*  
 139.     *Papaver radicatum*  
 140.     *Parnassia kotzebuei*

- |      |                              |      |                           |
|------|------------------------------|------|---------------------------|
| 141. | Pedicularis capitata         | 174. | Rhododendron              |
| 142. | Pedicularis labradorica      |      | groenlandicum             |
|      | Pedicularis lanata           | 175. | Rhododendron              |
| 143. | Pedicularis langsdorffii     |      | lapponicum                |
| 144. | Pedicularis oederi           | 176. | Rhytidium rugosum         |
| 145. | Pedicularis sudetica         | 177. | Rosa acicularis           |
| 146. | Penstemon albertinus         | 178. | Rubus arcticus            |
|      | Petasites sagittatus         | 179. | Rubus idaeus              |
| 147. | Philonotis fontana var.      | 180. | Rumex acetosa             |
|      | pumila                       | 181. | Salix arctica             |
| 148. | Phleum alpinum               | 182. | Salix barrattiana         |
| 149. | Phyllodoce empetriformis     | 183. | Salix glauca              |
|      | Pinus contorta               | 184. | Salix polaris             |
| 150. | Poa alpina                   | 185. | Salix reticulata          |
| 151. | Poa arctica                  | 186. | Salix stolonifera         |
| 152. | Poa glauca                   | 187. | Saxifraga adscendens var. |
| 153. | Poa glauca ssp. rupicola     |      | oregonensis               |
| 154. | Poa lettermanii              | 188. | Saxifraga adscendens      |
| 155. | Polemonium acutiflorum       | 189. | Saxifraga bronchialis     |
|      | Polemonium boreale           |      | Saxifraga cernua          |
| 156. | Polygonum aviculare ssp.     | 190. | Saxifraga flagellaris     |
|      | aviculare                    |      | Saxifraga nivalis         |
| 157. | Polygonum viviparum          | 191. | Saxifraga oppositifolia   |
| 158. | Polytrichum piliferum        | 192. | Saxifraga tricuspidata    |
| 159. | Populus balsamifera          | 193. | Sedum lanceolatum var.    |
|      | Potentilla bipinnatifida     |      | lanceolatum               |
| 160. | Potentilla diversifolia var. | 194. | Senecio lugens            |
|      | diversifolia                 | 195. | Senecio pauperula         |
| 161. | Potentilla diversifolia      | 196. | Senecio streptanthifolius |
|      | Potentilla fruticosa         | 197. | Silene acaulis            |
| 162. | Potentilla nivea             | 198. | Silene involucrata ssp.   |
| 163. | Potentilla                   |      | involucrata               |
|      | nivea/hookeriana             | 199. | Silene uralensis          |
| 164. | Potentilla uniflora          | 200. | Silene uralensis ssp.     |
| 165. | Potentilla villosa           |      | uralensis                 |
| 166. | Potentilla villosula         | 201. | Silene uralensis ssp.     |
| 167. | Puccinellia nuttalliana      |      | attenuata                 |
| 168. | Pulsatilla patens            | 202. | Solidago multiradiata     |
| 169. | Pyrola grandiflora           |      | Stellaria graminea        |
| 170. | Pyrola grandiflora           | 203. | Stellaria longipes        |
| 171. | Ranunculus inamoenus         | 204. | Sympyotrichum             |
| 172. | Ranunculus nivalis           |      | ciliolatum                |
| 173. | Ranunculus pedatifidus       | 205. | Taraxacum ceratophorum    |
|      | Rhinanthus minor             | 206. | Taraxacum officinale      |

- |      |                               |      |                              |
|------|-------------------------------|------|------------------------------|
| 207. | <i>Thalictrum occidentale</i> | 210. | <i>Vaccinium uliginosum</i>  |
| 208. | <i>Trisetum spicatum</i>      | 211. | <i>Veronica wormskjoldii</i> |
|      | <i>Vaccinium membranaceum</i> |      | <i>Woodsia scopulina</i>     |
| 209. | <i>Vaccinium vitis-idaea</i>  |      |                              |
|      | ssp. <i>minus</i>             |      |                              |

### Appendix 3

#### Pink Mountain Mosses

Collected by D. Mosquin and E. Wu, 2014.

<i>Abietinella abietina</i>	<i>Jungermannia (Solenostoma) cf. confertissima</i>
<i>Anthelia juratzkana</i>	<i>Lophozia longidens</i>
<i>Aulacomnium palustre</i>	<i>Lophozia ventricosa</i>
<i>Aulacomnium turgidum</i>	<i>Mnium arizonicum</i>
<i>Barbilophozia barbata</i>	<i>Orthotrichum anomalum</i>
<i>Barbilophozia hatcheri</i>	<i>Orthotrichum speciosum</i>
<i>Brachythecium cf. erythrorrhizon</i>	<i>Paraleucobryum enerve</i>
<i>Brachythecium coruscum</i>	<i>Plagiomnium ellipticum</i>
<i>Brachythecium sp.</i>	<i>Pleurozium schreberi</i>
<i>Brachythecium turgidum</i>	<i>Pogonatum dentatum</i>
<i>Bryum (Ptychostomum sp. subg. Cladodium)</i>	<i>Pohlia cf. annotina</i>
<i>Bryum (Ptychostomum) cryophilum</i>	<i>Pohlia nutans</i>
<i>Bryum (Ptychostomum) pallens</i>	<i>Polytrichastrum alpinum</i>
<i>Bryum (Ptychostomum) pseudotriquetrum</i>	<i>Polytrichum commune</i>
<i>Cephalozia bicuspidata ssp. ambigua</i>	<i>Polytrichum hyperboreum</i>
<i>Ceratodon purpureus</i>	<i>Polytrichum juniperinum</i>
<i>Cynodontium sp. (capsules in poor condition)</i>	<i>Polytrichum piliferum</i>
<i>Cynodontium strumiferum</i>	<i>Polytrichum strictum</i>
<i>Dicranum acutifolium</i>	<i>Pseudeoleskea atricha</i>
<i>Dicranum cf. elongatum</i>	<i>Ptilidium ciliare</i>
<i>Dicranum groenlandicum</i>	<i>Ptilium crista-castrensis</i>
<i>Dicranum spadiceum</i>	<i>Racomitrium (Niphotrichum) canescens s.s.</i>
<i>Didymodon sp.</i>	<i>Rhytidium rugosum</i>
<i>Distichium capillaceum</i>	<i>Sanionia uncinata</i>
<i>Drepanocladus aduncus</i>	<i>Scapania sp. (scrappy material)</i>
<i>Encalypta sp. (sterile)</i>	<i>Syntrichia norvegica</i>
<i>Grimmia longirostris</i>	<i>Syntrichia ruralis</i>
<i>Grimmia ovalis</i>	<i>Tayloria hornschuchii</i>
<i>Hylocomnium splendens</i>	<i>Tomentypnum nitens</i>
<i>Hypnum cf. holmenii</i>	<i>Tortula hoppeana (syn. Desmatodon latifolius)</i>
<i>Hypnum plicatulum</i>	<i>Tortula systyla</i>
<i>Hypnum revolutum</i>	<i>Warnstorffia fluitans</i>
<i>Hypnum vaucheri</i>	

## Appendix 4

### pH Values of soil samples

pH 6-7 prime nutrient availability Parent material Limestone  
 pH 3-4 poor nutrient content Parent material Sandstone

Sample	Latitude	Longitude	Altitude	Texture	Organic	pH	Notes
S1-01-07-03-14	N 57 03.388	W122 52.108	5600	coarse sand	moderately	6.2	w side saddle
S1-02-07-03-14	N 57 03.461	W 122 52.148	5620	coarse sand	very	6.5	"
S2-01-07-03-14				coarse sand	very	6.3	east side of saddle
WS-01-07-05-14	N 57 03.741	W 122 51.826	5740	coarse sand	moderate	4.4	Weather station
WS-02-07-05-14	N 57 03.800	W 122 51.756	5670	medium sand	very	5.8	"
MR-01-07-05-14	N 57 05.205	W 122 53.728	5400	fine sand	mineral	5.3	Mid Road
MR-02-07-05-14	N 57 05.205	W 122 53.728	5400	fine sand	slightly	4.4	"
PN-01-07-04-14	N 57 07.470	W 122 54.740	5393	coarse sand and gravel	slightly	3.0	North End
PN-02-07-03-14	N 57 07.656	W 122 54.771	5367	coarse sand and gravel	slightly	4.3	North End
PN-03-07-03-14	N 57 07.042	W 122 54.652	5300	coarse sand and gravel	Slightly	3.8	North End
PN-04-07-03-14	N 57 07.005	W 122 54.727	5330	coarse sand	moderately	3.7	North end

Sample	Latitude	Longitude	Altitude	Texture	Organic	pH	Notes
S1-01-07-03-14	N 57 03.388	W122 52.108	5600	coarse sand	moderately	6.2	
S1-02-07-03-14	N 57 03.461	W 122 52.148	5620	coarse sand	very	6.5	
S2-01-07-03-14				coarse sand	very	6.3	east side of saddle
WS-01-07-05-14	N 57 03.741	W 122 51.826	5740	coarse sand	moderate	4.4	
WS-02-07-05-14	N 57 03.800	W 122 51.756	5670	medium sand	very	5.8	
MR-01-07-05-14	N 57 05.205	W 122 53.728	5400	fine sand	mineral	5.3	
MR-02-07-05-14	N 57 05.205	W 122 53.728	5400	fine sand	slightly	4.4	
PN-01-07-04-14	N 57 07.470	W 122 54.740	5393	coarse sand and gravel	slightly	3.0	
PN-02-07-03-14	N 57 07.656	W 122 54.771	5367	coarse sand and gravel	slightly	4.3	
PN-03-07-03-14	N 57 07.042	W 122 54.652	5300	coarse sand and gravel	Slightly	3.8	
PN-04-07-03-14	N 57 07.005	W 122 54.727	5330	coarse sand	moderately	3.7	

PN-04-07-03-14	N 57 07.005	W 122 54.727	5330	coarse sand	moderately	3.7	
W01-01-07-08-14	N 57 01.579	W 123 02.736	5600	coarse sand	mineral	6.1	Mt. Wright
WNES-01-07-08-14	N 57 03.221	W 123 04.628	5725	coarse sand	slightly	7.2	
WNES-02-07-08-14	N 57 03.216	W 123 04.563	5711	coarse sand	very	6.9	lots of P. borealis
WNES-03-07-08-14	N 57 03.266	W 123 04.519	5500	coarse sand	slightly	6.5	diverse plant community
HS-01-07-08-14	N 57 08.639	W 123 03.687	6226	coarse sand / calcification	mineral	6.7	fossilized seashells
GM-01-07-08-14	N 57 10.408	W 123 15.862	5677	coarse sand	moderately	4.6	
AB-01-07-08-14	N 57 09.945	W 1223 16.555	6494	coarse sand	Mineral	2.01	

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## Appendix 5 Geotags 2014

Aconitum  
delphinifolium  
57 04 595 122 52 943  
57 04 421 122 52 400  
57 04 269 122 52 559  
57 03 291 122 52 061  
57 03 259 122 52 120  
57 03 203 122 52 081  
57 03 227 122 52 073  
57 02 869 122 51 477  
57 02 705 122 51 530  
57 03 372 122 52 139  
57 03 465 122 52 142  
57 03 462 122 52 061  
57 03 448 122 52 033  
57 03 439 122 52 064  
57 03 658 122 51 775  
57 03 756 122 51 870  
57 04 346 122 52 556  
  
Alopecurus alpinus  
57 04 354 122 52 551  
  
Anemone narcissiflora  
57 04 398 122 52 599

<i>Arnica lessingii</i>	Campanula uniflora
57 03 237 122 52 165	57 04 557 122 52 930
57 03 273 122 52 060	57 04 417 122 52 490
	57 04 809 122 53 217
	57 04 349 122 52 562
<i>Androsace chamaejasme</i>	57 04 630 122 52 890
57 04 365 122 52 553	57 03 489 122 52 095
	57 03 492 122 52 074
<i>Androsace septentrionalis</i>	57 03 458 122 52 155
57 03 747 122 51 824	57 03 495 122 52 084
57 03 461 122 52 090	57 03 387 122 52 063
57 03 652 122 51 828	
	<i>carex rupestris</i>
	57 04 398 122 52 564
<i>Campanula lasiocarpa</i>	
57 04 430 122 52 440	
57 04 863 152 52 973	<i>Cassiope tetragona</i>
57 03 601 122 51 842	57 04 360 122 52 548
57 03 319 122 52 061	57 03 445 122 52 136
57 03 075 122 52 313	57 03 652 122 51 851
57 03 204 122 52 056	57 03 799 122 51 765
57 02 863 122 51 480	57 03 577 122 51 873
57 02 660 122 51 547	
57 02 597 122 51 904	<i>Erigeron grandiflorus</i>
57 02 723 122 52 193	57 04 037 122 51 965
57 02 672 122 52 083	57 03 452 122 52 028
57 02 993 122 52 335	57 03 592 122 51 829
57 03 644 122 51 826	57 04 321 122 52 329
	57 04 598 122 52 859

57 04 040	122 51 966			57 03 182	122 52 047
Erigeron humilis		Pedicularis labradorica		57 04 260	122 52 547
52 04 550	122 52 910	57 04 887	122 53 148	57 03 446	122 52 148
Gentiana glauca		57 03 585	122 51 876	57 03 251	122 52 123
57 03 720	122 52 910	57 03 210	122 52 009	57 03 327	122 52 054
57 04 804	122 53 177	57 02 859	122 51 478	57 03 072	122 52 089
57 04 389	122 52 602	57 03 634	122 51 788	57 03 446	122 52 150
57 04 617	122 52 934	57 07 040	122 54 650	57 03 473	122 52 104
Gentiana prostrata		57 07 023	122 54 575	57 03 493	122 52 085
57 04 835	122 53 240	57 07 038	122 54 580	57 03 776	122 51 880
57 04 346	122 52 555	57 07 057	122 54 593	57 04 815	122 53 194
57 03 742	122 51 823	57 07 024	122 54 619	57 04 387	122 52 585
57 04 874	122 53 050	57 07 091	122 54 714	Ranunculus pedatifidus	
57 03 472	122 52 152	57 07 082	122 54 721	57 04 597	122 52 861
57 03 465	122 52 139	57 07 038	122 54 733		
57 03 457	122 52 067	Pedicularis lanata		Rhododendron	
57 03 437	122 52 023	57 03 390	122 52 152	lapponicum	
57 03 700	122 52 925	Pedicularis oederi		57 03 723	122 51 809
57 03 644	122 51 803	57 04 558	122 52 901	57 03 593	122 51 860
Ledum palustre		57 04 243	122 52 543	57 03 205	122 52 028
57 03 268	122 52 063	57 03 509	122 52 080	57 03 563	122 51 886
57 02 849	122 51 480	57 03 363	122 52 113	57 03 432	122 52 152
57 03 658	122 51 774	57 03 395	122 52 152	57 03 644	122 51 809
57 03 317	122 52 054	57 03 465	122 52 142	57 03 595	122 51 873
57 07 037	122 54 748	57 03 409	122 52 033	57 07 027	122 54 630
Oxytropus jordalii		57 03 605	122 51 867	57 07 018	122 54 580
57 03 455	122 52 025	57 03 772	122 51 900	Saxifraga cernua	
Papaver radicatum		57 04 641	122 52 866	57 03 459	122 52 157
57 04 284	122 52 489	57 04 423	122 52 552	57 03 481	122 52 059
57 03 651	122 51 829	Polemonium boreale			
57 04 598	122 52 860	57 04 277	122 52 484	Saxifraga flagellaris	
Pedicularis capatata		57 04 320	122 52 329	57 04 561	122 52 945
57 03 072	122 52 089	57 04 406	122 52 576	57 03 508	122 52 080
57 03 408	122 52 034	Polemonium		57 03 398	122 52 151
57 03 631	122 52 177	acutiflorum		57 03 418	122 52 502
57 03 711	122 52 927	57 04 892	122 53 018		
57 03 299	122 52 060	57 04 825	122 53 226	Silene uralensis	
57 04 346	122 52 557	57 04 647	122 52 900	57 04 394	122 52 583
		57 04 576	122 52 886	57 04 406	122 52 534
		57 03 751	122 51 811	57 03 596	122 52 085
				57 03 481	122 52 099
				Silene involucrate	

57 03 479	122 52 104		Zygadenus elegans
57 03 507	122 52 080	Taraxicum ceratophorum	57 03 429 122 52 139 57 03 379 122 52 152
Silene acaulis		57 03 403 122 52 084	57 03 425 122 52 151
57 04 551	122 52 919	57 04 077 122 51 973	
57 03 390	122 52 152	57 03 435 122 52 096	
57 03 465	122 52 150	57 04 836 122 53 298	
57 03 820	122 51 774	57 04 740 122 53 051	
57 03 413	122 52 034	57 04 598 122 52 862	
57 03 652	122 51 828	57 04 080 122 51 972	

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## Appendix 6

### Spiders collected on Pink Mountain to date

Philodromus	rufus	Scotinotylus	alienus
Lepthyphantes	turbatrix	Improphanes	complicatus
Sisis	rotundus	Titanoeca	nivalis
Crustulina	sticta	Leptphyantes	alpinus
Ozyptila	arctica	Pardosa	podhorskii
Diplocephalus	sphagnicola	Leptphyantes	rainieri
Scotinotylus	protervus	Misumena	vavia
Walckenaeria	karpinskii	Drassodes	neglectus
Cryphoeca	exlineae	Pardosa	groenlandica
Erigone		Poeciloneta	variegata
Coreorgonal		Islandiana	princeps
Gnaphosa	orites	Pardosa	concinna
		Lathys	alberta
Mermessus	trilobatus		
Phlattothrata	flagellata		
Scotinotylus	sacer		
Xysticus	emertoni		
Scotinotylus	alpinus		
Enoplognatha	intrepida		

## Appendix 7

### Ospica Cones Ecological Reserve plant list

Abies lasiocarpa	Arabidopsis lyrata ssp. kamchatica	Artemisia norvegica
Achillea millefolium	Arctagrostis latifolia	Astragalus alpinus
Aconitum delphiniiifolium	Arnica angustifolia ssp. angustifolia	Boechera stricta
Agoseris auraantiaca	Arnica latifolia	Botrychium lunaria
Agoseris glauca	Arnica lessingii	Calamagrostis canadensis var. langsdorfii
Anemone drummondii	Arnica mollis	Caltha leptosepala
Anemone parviflora		Campanula lasiocarpa
Anemone richardsonii		

<i>Cardamine oligosperma</i>
<i>Carex nardina</i>
<i>Carex atrosquama</i> (probably)
<i>Carex incurviformis</i>
<i>Carex lachenalii</i>
<i>Carex lenticularis</i> var. <i>dolia</i>
<i>Carex nardina</i>
<i>Carex phaeocephala</i>
<i>Carex pyrenaica</i>
<i>Carex spectabilis</i>
<i>Cassiope mertensiana</i>
<i>Cassiope tetragona</i>
<i>Castilleja rhexifolia</i>
<i>Castilleja unalaschensis</i> (probably)
<i>Cerastium beeringianum</i>
<i>Crepis nana</i>
<i>Cystopteris fragilis</i>
<i>Delphinium glaucum</i>
<i>Diphasiastrum alpinum</i>
<i>Draba alpina</i>
<i>Draba borealis</i>
<i>Draba crassifolia</i>
<i>Draba incerta</i>
<i>Draba juvenilis</i> (formerly <i>D. longipes</i> , misapplied)
<i>Draba stenoloba</i>
<i>Draba aurea</i>
<i>Dryas integrifolia</i>
<i>Epilobium anagallidifolium</i>
<i>Epilobium angustifolium</i>
<i>Epilobium latifolium</i>
<i>Equisetum arvense</i>
<i>Equisetum scirpoides</i>
<i>Equisetum variegatum</i>
<i>Erigeron glacialis</i>
<i>Erigeron humile</i>
<i>Festuca altaica</i>
<i>Festuca baffinensis</i>
<i>Festuca brachyphylla</i>
<i>Festuca minutiflora</i>
<i>Festuca viviparoidea</i>
<i>Gentiana glauca</i>

<i>Gentiana prostrata</i>
<i>Gentianella propinqua</i>
<i>Hedysarum alpinum</i>
<i>Heracleum maximum</i>
<i>Hieracium triste</i>
<i>Huperzia haleakalae</i>
<i>Juncus biglumis</i>
<i>Juncus drummondii</i>
<i>Lupinus arcticus</i>
<i>Luzula parviflora</i>
<i>Luzula spicata</i>
<i>Minuartia biflora</i>
<i>Minuartia elegans</i>
<i>Minuartia rubella</i>
<i>Myosotis asiatica</i>
<i>Oxyria digyna</i>
<i>Oxytropis nigrescens</i>
<i>Papaver radicatum</i>
<i>Parnassia fimbriata</i>
<i>Parnassia kotzebui</i>
<i>Pectiantia</i> (formerly <i>Mitella</i> ) <i>pentandra</i>
<i>Pedicularis bracteosa</i>
<i>Pedicularis capitata</i>
<i>Pedicularis langsdorffii</i>
<i>Pedicularis sudetica</i>
<i>Pentaphylloides</i> <i>floribunda</i>
<i>Petasites frigidus</i> var. <i>nivalis</i>
<i>Phleum alpinum</i>
<i>Phyllodoce empetrifloris</i>
<i>Picea glauca</i>
<i>Poa alpina</i>
<i>Poa arctica</i>
<i>Poa cusickii</i> ssp. <i>epilis</i>
<i>Poa glauca</i>
<i>Poa paucispicula</i>
<i>Poa secunda</i> ssp. <i>secunda</i>
<i>Polemonium acutiflorum</i>
<i>Polygonum viviparum</i>
<i>Potentilla diversifolia</i>
<i>Potentilla hyparctica</i>
<i>Potentilla subgorodkovii</i>
<i>Potentilla villosa</i>

<i>Pyrola grandiflora</i>
<i>Ranunculus eschscholtzii</i>
<i>Ranunculus nivalis</i>
<i>Ranunculus occidentalis</i>
<i>Ranunculus occidentalis</i>
<i>Ranunculus pygmaeus</i>
<i>Rhododendron albiflorum</i>
<i>Rumex lapponicus</i>
<i>Sagina saginoides</i>
<i>Salix alaxensis</i>
<i>Salix arctica</i>
<i>Salix barratiana</i>
<i>Salix commutata</i>
<i>Salix niphoclada</i>
<i>Salix polaris</i>
<i>Salix reticulata</i>
<i>Salix richardsonii</i>
<i>Saxifraga adscendens</i>
<i>Saxifraga aizoides</i>
<i>Saxifraga cernua</i>
<i>Saxifraga hyperborea</i> (used to be <i>Saxifraga</i> <i>rivularis</i> )
<i>Saxifraga nelsoniana</i>
<i>Saxifraga nivalis</i>
<i>Saxifraga occidentalis</i>
<i>Saxifraga oppositifolia</i>
<i>Saxifraga tricuspidata</i>
<i>Sedum lanceolatum</i>
<i>Senecio lugens</i>
<i>Senecio triangularis</i> x <i>lugens</i>
<i>Sibbaldia procumbens</i>
<i>Silene acaulis</i>
<i>Silene uralensis</i>
<i>Solidago multiradiata</i>
<i>Stellaria calycantha</i>
<i>Stellaria longipes</i>
<i>Taraxacum alaskanum</i>
<i>Trisetum spicatum</i>
<i>Vaccinium caespitosum</i>
<i>Valeriana sitchensis</i>
<i>Veratrum viride</i>
<i>Veronica wormskjoldii</i>

## Appendix 8

### Sikanni Chief Ecological Reserve plant list

Achillea millefolium	Epilobium anagallidifolium
Aconitum delphiniiifolium	Epilobium angustifolium
Agoseris aurantiaca	Epilobium clavatum
Agoseris glauca	Epilobium hornemannii
Anemone parviflora	Epilobium latifolium
Anemone richardsonii	Equisetum arvense
Antennaria pallida (formerly within A. alpina)	Equisetum scirpoides
Antennaria pulvinata (formerly within A. alpina)	Equisetum variegatum
Arnica latifolia	Erigeron glacialis
Arnica lessingii	Erigeron humile
Artemisia norvegica	Festuca altaica
Astragalus alpinus	Festuca baffinensis
Botrychium lunaria	Festuca viviparoidea
Botrychium minganense	Gentiana prostrata
Botrychium pinnatum	Gentianella amarella
Calamagrostis canadensis var. langsdorffii	Gentianella propinqua
Campanula lasiocarpa	Hedysarum alpinum
Campanula uniflora	Hedysarum boreale
Carex albonigra	Heracleum maximum
Carex capillaris	Hieracium triste
Carex fuliginosa (= C. misandra)	Huperzia haleakalae
Carex incurviformis	Juncus biglumis
Carex lachenalii	Juncus castaneus
Carex nardina	Juncus drummondii
Carex scirpoidea	Lupinus arcticus
Carex spectabilis	Luzula multiflora ssp. frigida
Cassiope tetragona	Luzula parviflora
Castilleja rhexifolia	Luzula spicata
Cerastium beeringianum	Mertensia paniculata
Crepis nana	Minuartia biflora
Cystopteris fragilis	Minuartia elegans
Delphinium glaucum	Minuartia rubella
Diphasiatrum alpinum	Oxyria digyna
Draba crassifolia	Oxytropis campestris
Draba juvenilis (formerly D. longipes, misapplied)	Oxytropis deflexa
Draba lonchocarpa	Oxytropis nigrescens
Draba macounii	Packera (Senecio) pauciflora
Dryas integrifolia	Parnassia fimbriata
	Parnassia kotzebui
	Pectiantia (formerly Mitella) pentandra
	Pedicularis bracteosa

<i>Pedicularis capitata</i>	<i>Salix niphoclada</i>
<i>Pedicularis langsdorffii</i>	<i>Salix polaris</i>
<i>Pedicularis oederi</i>	<i>Salix reticulata</i>
<i>Pentaphylloides floribunda</i>	<i>Salix richardsonii</i>
<i>Petasites frigidus ssp. nivalis</i>	<i>Salix commutata</i>
<i>Phleum alpinum</i>	<i>Salix richardsonii</i>
<i>Phyllodoce empetriformis</i>	<i>Saxifraga adscendens</i>
<i>Phyllodoce glanduliflora</i>	<i>Saxifraga aizoides</i>
<i>Picea glauca</i>	<i>Saxifraga caespitosa</i>
<i>Poa alpina</i>	<i>Saxifraga cernua</i>
<i>Poa arctica ssp. lanata</i>	<i>Saxifraga lyallii</i>
<i>Poa cusickii ssp. epilis</i>	<i>Saxifraga nivalis</i>
<i>Poa glauca ssp. glauca</i>	<i>Saxifraga rivularis</i>
<i>Poa paucispicula</i>	<i>Saxifraga tricuspidata</i>
<i>Poa pratensis ssp. alpigena</i>	<i>Senecio lugens</i>
<i>Polemonium acutiflorum</i>	<i>Senecio triangularis</i>
<i>Polygonum viviparum</i>	<i>Sibbaldia procumbens</i>
<i>Potentilla diversifolia</i>	<i>Silene acaulis</i>
<i>Potentilla hookeriana</i>	<i>Silene uralensis</i>
<i>Potentilla subgorodkovii</i>	<i>Solidago multiradiata</i>
<i>Potentilla subvahliana</i>	<i>Stellaria calycantha</i>
<i>Pyrola asarifolia</i>	<i>Stellaria longipes</i>
<i>Pyrola minor</i>	<i>Taraxacum alaskanum</i>
<i>Pyrola minor</i>	<i>Taraxacum ceratophorum</i>
<i>Ranunculus eschscholtzii</i>	<i>Tofieldia pusilla</i>
<i>Ranunculus nivalis</i>	<i>Trisetum spicatum</i>
<i>Ranunculus occidentalis</i>	<i>Vaccinium caespitosum</i>
<i>Ranunculus pygmaeus</i>	<i>Vahlodea atropurpurea</i>
<i>Rubus arcticus</i>	<i>Valeriana sitchensis</i>
<i>Sagina saginoides</i>	<i>Veratrum viride</i>
<i>Salix alaxensis</i>	<i>Veronica wormskjoldii</i>
<i>Salix arctica</i>	<i>Zygadenus elegans</i>
<i>Salix barclayi</i>	
<i>Salix barratiana</i>	

## **Appendix 9**

**Research already undertaken on Pink Mountain.**

Katherine Parker PhD, UNBC. Caribou feeding studies.

Christopher Lortie PhD, York U. Plant associations.

Erick DeChaine PhD, Western Washington U. Plant DNA studies.

Daniel Mosquin, Ron Long, UBC Botanical Garden. Pink Mountain Biodiversity Research Initiative.

Anna Maria Csergo PhD, UBC Botanical Garden. Climate Change study



**For more information about Pink Mountain or about this report please see [www.pinkmountain.ca](http://www.pinkmountain.ca) or contact Ron Long at [rphoto@shaw.ca](mailto:rphoto@shaw.ca)**

## Appendix 10a

### Pink Mountain gas well 01330 Status report

Well Detail			
WA Number:	01330	Well Name:	CNRL HUSKY ELBOW D-013-E/094-G-02
Operator ID:	0237	Well Operator:	Canadian Natural Resources Limited
Location:	NTS: D-013-E/094-G-02	OGC File #:	9612965
Tenure File #:	9612965	Surf(NAD83) Latitude:	57 05' 53.25"
Surf(NAD83) Longitude:	122 54' 18.56"	Proposed Ground Elevation (m):	1,587.8
UTM Zone Num:	10	UTM83 Northing(m):	6,328,312.8
UTM83 Easting(m):	505,745.2	Certificate of Restoration:	N
Casing Cut Off:	Y	Cancel w Surface Disturb:	N
Well Status:	ABANDONED	Fluid Type:	UNDEFINED
Operation Type:	UNDEFINED	Area Code:	9000
Area Name:	OTHER AREAS		

Click on the WA Num below to display a Drilling Event for this Well.

Wa Num	Drilling Seq#	Drilling Event UW#	Total Depth (m)	CF Elevation (m)	Spud Date	Rig Rels Date	Rentry Date
01330_001		200D013E094G0200	1,204.5		08/May/1963	19/Oct/1963	
01330_021		200B022E094G0202	2,171.1		08/May/1963	19/Oct/1963	



#### Details of Drilling Event

WA Number:	01330	Drilling Event Sequence Number:	00
Drilling Event UW#:	200D013E094G0200	Well Data Confidential:	No
NTS Bottom Hole Location:	D-013-E/094-G-02	DLS Bottom Hole Location:	
Well Classification:	EXPLORATORY WILDCAT	Drilling Event Status:	ABANDONED
Fluid Type:	UNDEFINED	Operation Type:	UNDEFINED
Total Depth (m):	1,204.5	Spud Date:	08/May/1963
Re-entry Date:		Rig Release Date:	19/Oct/1963



Wa Number And Completion Seq#	Completion Event UW#
No Completion Event information for this Drilling Event.	



## Appendix 10b

### Pink Mountain gas well 16868 status report

Well Detail			
WA Number:	16868	Well Name:	CNRL HUSKY ELBOW D-A013-E/094-C-02
Operator ID:	0237	Well Operator:	Canadian Natural Resources Limited
Location:	NTS: D A-013-E/094-C-02	OGC File #:	9813972
Tenure File #:	9812965	Surf(NAD83) Latitude:	57 05' 51.80"
Surf(NAD83) Longitude:	122 54' 18.28"	Proposed Ground Elevation (m):	1,589.41
UTM Zone Num:	10	UTM83 Northing(m):	6,328,268.1
UTM83 Easting(m):	505,751.4	Certificate of Restoration:	N
Casing Cut Off:	N	Cancel w Surface Disturb:	N
Well Status:	SUSPENDED	Fluid Type:	GAS
Operation Type:	PRODUCTION	Area Code:	9000
Area Name:	OTHER AREAS		

Click on the WA Num below to display a Drilling Event for this Well

Wa Num	Drilling Seq	Drilling Event Uw	Total Depth M	CF Elevation M	Spud Date	Rig Rel Date	Reentry Date
16868 001		200C012E094C0200	2,655.0	1589	19/Nov/2003	15/Jan/2004	

Click

#### Details of Drilling Event

WA Number:	16868	Drilling Event Sequence Number:	00
Drilling Event UW:	200C012E094C0200	Well Data Confidential:	No
NTS Bottom Hole Location:	C-012-E/094-C-02	DLS Bottom Hole Location:	
Well Classification:	DEVELOPMENT	Drilling Event Status:	SUSPENDED
Fluid Type:	GAS	Operation Type:	PRODUCTION
Total Depth (m):	2,655.0	Spud Date:	19/Nov/2003
Re-entry Date:		Rig Release Date:	15/Jan/2004

Click

Click on the WA Num below to display a Completion Event for this Drilling Event

Wa Number And Completion Seq	Completion Event Uw
16868 001	200C012E094C0200

## Appendix 10c

### Pink Mountain gas well 06506 Status report

Details of Drilling Event			
WA Number:	06506	Drilling Event Sequence Number:	00
Drilling Event UW:	200D092D094G0200	Well Data Confidential:	No
NTS Bottom Hole Location:	D-092-D/004-G-021	DLS Bottom Hole Location:	
Well Classification:	EXPLORATORY WILDCAT	Drilling Event Status:	SUSPENDED
Fluid Type:	GAS	Operation Type:	UNDEFINED
Total Depth (m):	3,000.0	Spud Date:	08/Feb/1986
Re-entry Date:		Rig Release Date:	18/Jun/1986

Click on the WA Num below to display a Completion Event for this Drilling Event.

Wa Number And Completion Seq:	Completion Event UW:
<a href="#">06506.00</a>	200D092D094G0200

Details of Completion Events			
WA Number:	06506	Completion Event Sequence Number:	00
Drilling Event Sequence Number:	00	Completion Event UW:	200D092D094G0200
Area Code and Name:	3453 - ELBOW CREEK	Pool Code and Name \ Pool Sequence:	7400 - DEBOLT \ A
Project Code:	00	Completion Event Status:	SUSPENDED
Fluid Type:	GAS	Operation Type:	UNDEFINED
Initial Production Date (Year / Month):	N / A	Last Production Date (Year / Month):	N / A

# Appendix 11

## Bumble Bee Species on Pink Mountain

The collection represents nearly one third of BB fauna for all of British Columbia and includes all alpine species that occur in the province.

The usually remote habitat of alpine BB species presents a problem for researchers due to lack of access. On Pink Mountain all alpine species are easily accessible for study.

Bombus	bifarius female
Bombus	cryptarum female
Bombus	flavifrons female
Bombus	frigidus female
Bombus	frigidus male
Bombus	kirbiellus female
Bombus	kirbiellus male
Bombus	melanopygus female
Bombus	melanopygus male
Bombus	mixtus female
Bombus	rufocinctus female
Bombus	sandersoni female
Bombus	sandersoni male
Bombus	sitkensis female
Bombus	sylvicola female
Bombus	sylvicola male