

# ROADS TO NOWHERE

TECHNICAL REVIEW of ECOLOGICAL DAMAGE & PROPOSED RESTORATION  
RELATED to BC MINISTRY OF FORESTS  
CONTROL ACTIONS – 2003 CHILKO WILDFIRE, BC

**RE: BULLDOZED FIREGUARDS & ACCESS ROADS, PEAT MEADOW DAMAGE**

**Brittany Triangle and Nunsti Provincial Park, B.C.**



March, 2005  
Wayne McCrory, RPBio.

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## ABSTRACT

Field research, monitoring and interviews were carried out for Friends of the Nemaiah Valley (FONV) on the ecological impacts caused by the Ministry of Forests (MOF) mechanized containment efforts of the 2003 Chilko Lake wildfire. The burned zone was B.C.'s largest that year, some 29,200 hectares. The general study area was the northern Brittany Triangle (approximately 155,000 ha) within the traditional territory of the Xenigwet' in First Nations in the Chilcotin region of British Columbia.

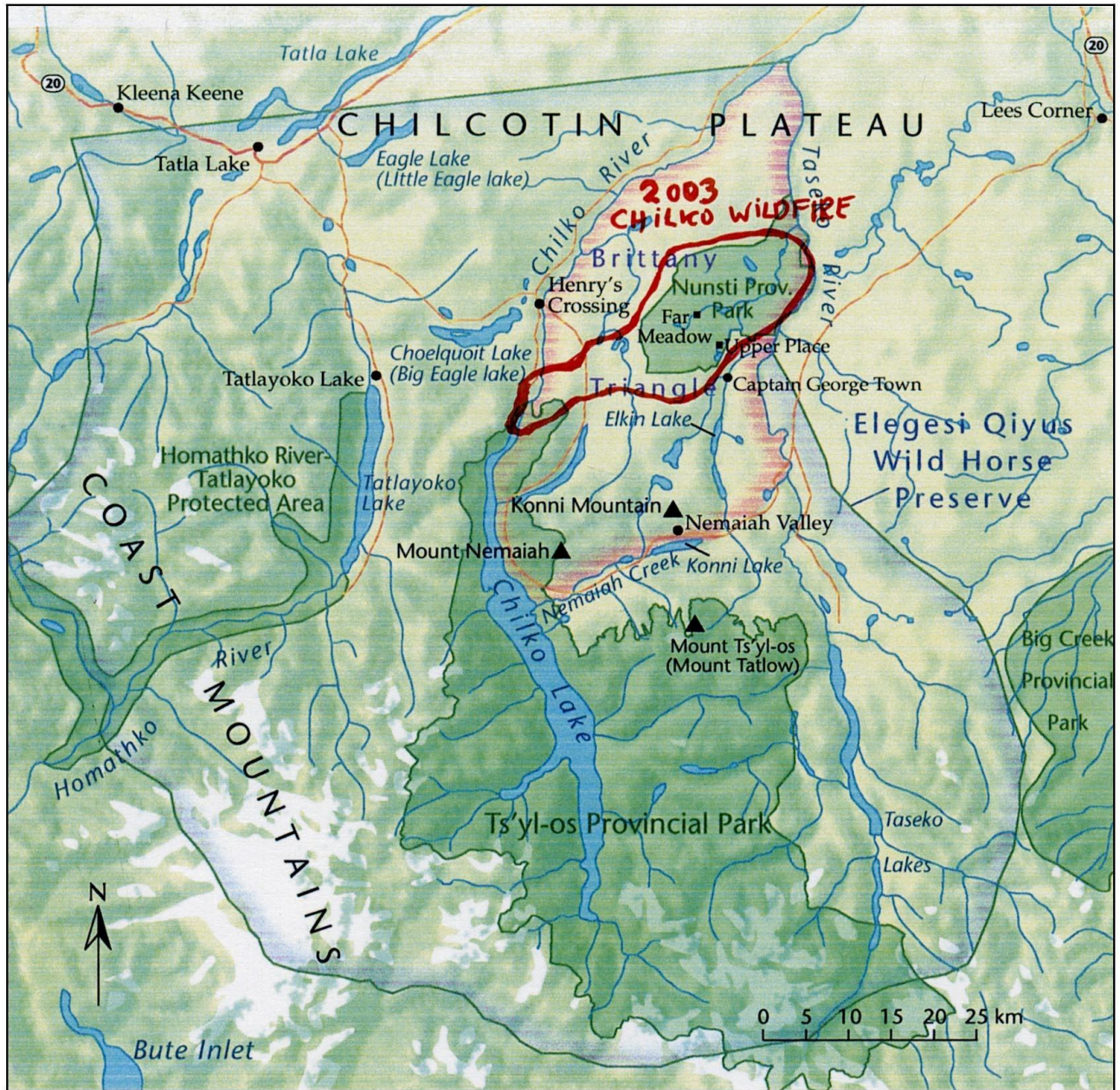
My study shows that despite some noteworthy deactivation and rehabilitation efforts by MOF after the Chilko wildfire, the extensive network of bulldozed roads/fireguards and clearings for safe areas/heli-pads related to suppression efforts had a devastating impact on the ecological integrity, pristine wildlife habitat, a protected Class A provincial park, a core area for an aboriginal horse preserve, and tourism values of this formerly pristine and mostly roadless wilderness. In 2004 the on-rush of commercial morel mushroom harvest in the burned area increased the roading and motorized access damage. The area is now almost totally open to various forms of motorized access. Recovery is highly recommended and considered quite feasible at a nominal cost of about \$90,000 to deactivate all of the roads and seed to lodgepole pine. Funding should be borne by the province and the agency that created the damage. The road deactivation estimates require more expert review. The Xenigwet' in First Nations need to be consulted at all stages and be involved in the recovery efforts. The rehabilitation/recovery should be monitored after implementation

## KEY FINDINGS

- Overall in the fire suppression efforts heavy machinery was used to build an estimated 141 km of bulldozed fireguards/roads (15 – 50 m width), 22 km of bulldozed trails, and approximately 93 large cleared areas (about 125+ m square) for safe escape and helicopter access. The fire road network extends completely across the Brittany Plateau in several places and entirely rings Nunsti Provincial Park. Not only this, but the bulk of access available is MOF style roadbeds with the south fireguard suitable for heavy vehicles. Many of the bulldozed guards did not appear to deter the main front of the fire but did help contain it on the flanks. The total roading (141 km) related to the fire is approximately the distance of the main road between Nemaiah and Williams Lake or between Vancouver and Hope, B.C.
- Studies have identified a very high biodiversity and Xenigwet' in heritage/cultural values in the Brittany. Biological values include healthy populations of salmon runs, exceptional wildlife, and wild horses numbering about 200 – 250. A tourism study has identified high economic values of local lodges in the region that are dependent on pristine wilderness including the Brittany Triangle. There are two traplines and a guide/outfitter's territory. In recognition of these high wilderness and wildlife values, a large park (Nunsti) was created by the province in 1996. In 2002, the Xenigwet' in First Nations established the “**Elegesi Qiyus Wild Horse Preserve**” (“Eagle Lake Henry Cayuse Wild Horse Preserve”) over their whole territory. All of these values are considered severely compromised by the extensive fire roading damage.
- Overall, roading and access increased in formerly pristine Nunsti Provincial Park by 500%; which bore the brunt of the wildfire and was about 80 – 90% burned. Nunsti is a legislated Class A provincial park of some 20,898 ha in which motorized access is prohibited. Fire roads now ring the whole park and also traverse the entire width of the Brittany Plateau.

- The increase in motorized access venues in Nunsti was from about 15 km lineal access lanes pre-fire to 84 km lineal access lanes post-fire. Other ecological damage included extensive subsurface peat fires that the Ministry of Forests allowed to burn uncontrolled without any sound ecological information that this would not cause excessive loss to critical wildlife and wild horse habitats. In the fall of 2003 volunteers suppressed about 100 peat fires in the core area. Subsequent anecdotal observations showed that none of the peat burns were growing back in 2004 and there was no evidence of previous burn history permanently burning out peat meadow depositions on the scale that occurred from the 2003 fire.
- Besides this overall cumulative burn access damage in the park, other impacts in and out of the park included bulldozer and vehicular damage to natural meadows, a new All Terrain Vehicle (ATV) – four-wheel drive (4 x 4) crossing of Chinook salmon spawning beds on Elkin Creek, and new ATV trails over active sphagnum bogs and wet meadows.
- Although a good attempt was made by MOF post-fire in September/October 2003 to deactivate and rehabilitate fireguards and block motorized access, only 5% of the fire roads were blocked making it easy for the public to build bypasses by chain sawing new trails for 4 x 4s and ATV trails because of the easy terrain. Aerial grass seeding efforts by MOF in October 2003 was only partially successful but also clearly represented the wrong and unnatural treatment in a provincial park and natural wilderness by attempting to create extensive lineal corridors of grasses through the pine forest plateau. The 141 km of fire roads/guards need to be restored to natural lodgepole pine.
- Extensive collateral motorized access damage occurred in 2004. No one anticipated and planned that the fire zone would become an intensive and lucrative morel mushroom harvest zone for an estimated 200 commercial pickers with about 50 camping areas. Our surveys after the 2004 harvest showed that all of the deactivated fire guards/roads (on the east side of the Tsuniah road) were violated by the cutting of bypass routes for 4 x 4s and ATVs. Old overgrown wagon trails and new ATV roads were also opened up to access mushroom picking areas. In the fall of 2003 and 2004 some motorized hunting access was also becoming evident.
- Prior to the big fire, primitive motorized access available in Nunsti Park was limited to about 10 km of very rough 4 x 4 road (old wagon trail) and 5 km of crude ATV trails. After the fire, morel mushroom pickers and possibly some hunters opened about 20 km of new ATV/4x4 access thus at least doubling this type of access within the park. This was in addition to the 32 km of bulldozed wide fireguards/roads, 17 km of bulldozed trails and 26 (large) cleared areas for escape and helicopter access built by MOF within the park.
- I am recommending a program of complete restoration through a combination of deactivation of all the roads/fireguards along with reseeding of the bulldozed areas with lodgepole pine. Based on a site damage review, a silvicultural contractor has presented several options. A program to plant lodgepole pine seedlings on the fire roads/guards would cost an estimated \$164,976. A program to seed the damaged sites with lodgepole pine would cost about \$29,585. The silvicultural contractor recommends the seeding option. A crude guess at deactivation of all of the roads/fireguards/bulldozed trails using a backhoe would be about \$30,000 but this requires a more expert opinion. This should include constructing deep cross-ditching and boulder blockages, especially in terrain where it would be difficult to bypass. This should also include cleanup and proper vegetation restoration of the fireguards/horse trail areas on the west side of the Chilko River. We are thus looking at a range of total costs of between \$88,685 and \$194,976, depending on a more accurate estimate of backhoe work. Any rehabilitation should be monitored.

- Recovery should include more natural restoration and visual quality improvement of road deactivation on the west side of the Chilko River where tourism horse trails occur.
- I concur with B.C. Parks that any further rehabilitation programs should realistically wait until after the morel mushroom harvest is over, either in 2005 or 2006. However, the south and north guards appeared not to be used by mushroom harvesters and work should begin on these specific sections in the spring of 2005.
- The Xeni Gwet'in First Nations Government should be fully consulted and be part of the rehabilitation plan and efforts, including being considered for the actual work/contracts.



Location map of 2003 Chilko wildfire, covering Nunsti Park



Fire guard near Upper Place in Brittany Triangle that has not been de-activated, and fire guard that has. The latter, which was de-activated for about 300-400 m, was by-passed by an all-terrain vehicle (ATV) trail. Only extensive de-activation will prevent this.





Research of biological values of the Brittany Triangle have been on-going for FONV for three years.

Although we lost most of our remote cameras and film in the Chilko fire, one camera survived and was able to record the exodus of wild animals eastward just ahead of the fire.



Here we see what we call the “black stallion”, then a mule deer that has been burned or has charcoal rubs, and then the fire.



We also recorded a lynx, and coyote and black bear. Many of the larger wild animals appear to have survived the fire, including wild horses.





Wild horses have been part of the Nemiah Valley and Brittany Triangle ecosystem for over 200 years, longer than moose, which are more recent arrivals. Recent DNA studies done by the University of Kentucky suggest some of Brittany horses may be related to the original mustangs or Colonial Spanish Horse (CSH) brought to the Americas in the late 1400s, but more sampling is needed. The bachelor stallion (above) barely made it through the winter after the 2003 fire, when most forage was burned off through surface burns and subsurface peat fires. We found remains of four horses that apparently starved from one band in the winter after the fire, but wild horses and other species now appear to be on the rebound as forage increases. Wild horses use old small peat burn areas for dust baths and bedding, but nowhere did we observe the extensive peat fire burns as resulted from the 2003 fire. The light brown ash area behind these horses is just one of many that we were able to contain. Deactivation and rehabilitation of the extensive fire roads and fire guards in the Brittany are needed to restore and maintain this unique and rich ecosystem.



## **1.0 STUDY AREA, OBJECTIVES AND APPROACH**

### 1.1 Study area

The general study area was the 2003 Chilko Lake wildfire. It was mainly within the Brittany Triangle (approximately 155,000 ha) and in the traditional territory of the Xeni Gwet'in First Nations. The study area includes Nunsti Park, a legislated Class A provincial park (22,898 ha). These are all part of the much larger 432,393 ha “**Elegesi Qiyus Wild Horse Preserve**” (“Eagle Lake Henry Cayuse Wild Horse Preserve”) which was declared in 2002 by the Xeni Gwet'in First Nations Government to protect their whole territory.

The wildfire study area was divided into a primary area which was the burned lands east of the Henry's Crossing – Tsuniah Lake access road as far as the Taseko River, accounting for about 9/10 of the total surface area of the 2003 fire. Another primary focus was the small area on the west side of the Chilko River. The secondary study area included the Chilko Fire west of the Tsuniah road to the Chilko River as well as fireguards/roads built along the east side of the Taseko River.

For purposes of discussion we focused most of our efforts on Nunsti Park and immediate area; as well as the burned area west of the Chilko River in the vicinity of tourist lodges and private holdings.

### 1.2 Objectives

The purpose of the initial post-fire October 2003 biological surveys was to assess the ecological changes to the Brittany Triangle – Nunsti Provincial Park area for FONV, including evidence of wildlife and wild horse mortality and survival. The other objective was to review the deactivation of some of the fireguards/roads by MOF.

As it was becoming evident in October 2003 that some of the MOF fireguard/road deactivated sites were being bypassed and violated by newly cut ATV trails, FONV objectives were expanded further in 2004 to review all motorized access created by the fireguards. Research then continued in 2004 to time periods both before and after the extensive motorized access engendered by the 2004 morel mushroom harvest. When it became obvious that extensive ecological damage and loss of wildland values were a major problem that would only accelerate over time, FONV requested I prepare this short report.

This preliminary report is not a detailed ecological analysis but is rather intended to provide a preliminary professional overview of the motorized access problem created by the MOF fireguards that is obvious and needs to be dealt with in the immediate future. The opinions expressed herein are my own but reflect those of others who assisted in my work. My previous assessment of the high inherent biological values of Nunsti Park and the Brittany Triangle are in my preliminary report (McCrary 2002) and in follow-up surveys, which have yet to be incorporated into a final document.

### 1.3 Study approach

Overall, as many fireguards and other access venues as possible were traveled by foot, ATV or 4-wheel drive. The methods included general field surveys, strip transects of habitat and walking/driving the fireguards. I recorded all evidence of wildlife, vehicular and foot access, width of fireguards, habitat damage, firefighter/mushroom pickers camps and garbage, degree of damage/rehabilitation and revegetation. I also interviewed local residents, lodge owners, First Nations

and government personnel. -A draft of this report was presented to the Xení Gwet'in band council as well as to their elders forum using interpreters.

Maps of the Chilko Lake fire were obtained from MOF and B.C. Parks including fire roads, cat trails and cleared areas for helicopters and "safe escape." An estimate was made of the extent of new lineal development and clearings. I also attempted to estimate pre-fire access by way of primitive roads and ATV trails.

Data were transferred to 1:50,000 topo. maps, 1:10,000 TRIM and the fire map sheet. Most of the analysis was based on the MOF Chilko Lake fire map sheet (C50214, August 13/03). I used some of the MOF map code names for the different fire roads and guards and bulldozed trails.

A review of peat fire damage to natural meadows was based on field work and first hand experience of working with volunteers. Sketch maps were made of study area meadows and sites and extent of peat fires and results of containment and rehabilitation efforts. An effort was also made to note peat burn areas from former wildfires in order to compare to peat meadow losses incurred by the 2003 fire. A literature review was only partially done of wild peat fires but one expert was consulted. Ecological opinions expressed are entirely my own.

## **2.0 RESULTS AND DISCUSSION**

In 2003, field research was done by myself from October 2 – 10 and 23 – 30 in association with peat fire/ fire impact surveys in and near Nunsti Park. In 2004 field research was done from May 12 – 18 by myself prior to the morel mushroom harvest and from August 31 - September 10 after the mushroom harvest. Xení Gwet'in wild horse ranger Harry Setah also provided his observations from regular patrols of the Brittany Triangle and monitoring of the mushroom harvest. Some field surveys in both years were done by Dave Williams of Friends of Nemiah Valley and Jon Huizinga of Brinkman and Associations. During the September 2004 survey period some of the survey team also spent four days in the study area west of the Henry's Crossing – Tsuniah access road, along the Chilko River portion of the burn. This included walking some of the fireguards on the west side of the River. Landscape ecologist Kalin Brockhaus of Tsy'los Lodge guided us on horseback on the fire road/guard surveys on the west side of the Chilko River and also provided her own written observations and views (see Appendix for letter).

### **2.1 Cultural heritage, ecological, wilderness and wildlife values of the Brittany Triangle**

The area affected by the burn has a large Class A provincial park (Nunsti) and is a core wild horse refuge for the "**?Elegesi Qiyus Wild Horse Preserve**" ("Eagle Lake Henry Cayuse Wild Horse Preserve") established in 2002 by the Xení Gwet'in First Nations over their whole territory.

There are two traplines and a guide/outfitter's territory.

The Brittany Triangle has very high subsistence and traditional cultural values to the Xení Gwet'in First Nations according to Chief Roger Williams (pers. comm.), Raphael Williams (pers. comm.) and others. Raphael Williams was born at Far Meadow and considers the Brittany of high value to his peoples' traditional needs including moose and deer hunting, fishing, capture of Brittany wild horses for domestic use and other aspects. One measure of this importance is the 1995 cultural/heritage inventory that identified 101 Brittany Lake cultural sites including 37 housepits/village sites, 5 seasonal camps, 6 obsidian lithic scatters, 7 single dwelling/log cabins, 12 grave or cremation sites, 24 fishing areas, 2 trap lines, 3 place names, 2 berry gathering sites and 3 sites with no information (Yip and Choquette. 1995).

My biological study of the Brittany Triangle (McCrorry 2002) identified a very high biodiversity and recommended the whole of the Triangle be fully protected as western Canada's first wild horse refuge. Biological values include healthy populations of salmon runs, exceptional wildlife, and wild horses numbering about 200 – 250.

A tourism study has identified high economic values of local lodges in the region that are dependent on pristine wilderness including the Brittany Triangle (Hammond *et al.* 2004b).

## 2.2 Extent of the wildfire

In September 2001 a small wildfire occurred N.W. of Murray Taylor Lake in the Brittany Triangle and was eventually contained by the MOF including some small bulldozer guards. Although I surveyed part of this fire zone in the spring of 2002, I did not include it in this analysis since very little new motorized access appeared to have resulted.

The huge Chilko wildfire, apparently started by a campfire, began about July 18, 2003 on the west side of the Chilko River near Canoe and quickly jumped the river. Fanned by dry, westerly wind flows and very hot temperatures, it quickly grew into an “escape” crowning fire, becoming the largest for that year in the province. By August 13, it had run across the entire width of the plateau of the Brittany Triangle, had burned down into and across lower Elkin Creek near Captain George Town and reached the west breaks of the Taseko River where it apparently stopped by itself. Although I have yet to obtain the costs, the suppression efforts were in the millions. On the south guard, I was told that 3 bulldozers running abreast through the forest created a 30 – 40 m cleared corridor with a major roadbed.

Although the bulldozed fireguards appeared to have contained the fire on the extreme west side such as on the west side of the Chilko River, as well as on some of the northwest and south flanks, none of the guards built across the fire front were at all effective as near as I could determine.

Map 1 shows that approximately 70% of the 29,202 ha Chilko Lake Fire was within Nunsti Provincial Park. Although a detailed GIS analysis has yet to be done, a crude visual estimate indicates that about 80 - 90% of the surface of Nunsti Provincial Park (22,898 ha) was subjected to the wildfire. The fire was of varying intensity that included a mosaic of high, moderate and low intensity burned sites as well as some sites that were not burned.

### *Peat fires*

In addition, major grassland fires, both surface and subsurface, occurred on many of the natural wild meadows that characterize the park and surroundings and contribute to its high biological diversity (see McCrorry 2002). In October 2003 we found that many subsurface or peat fires were still smoldering as a result of an MOF decision to leave them to burn over the winter. We felt that the amount of burning was in excess of the previous history of peat fire burns we had observed in the various study meadows. We contacted MOF and B.C. Parks and MOF stated they were going to leave the peat fires to burn as they were part of the natural process. MOF had actually attempted to put out peat fires in the meadows at the Upper Place trappers cabin area but had given up due to what they considered to be high costs.



Although Ministry of Forests claimed after the fire that putting out the peat fires in the wild meadows in Nunsti Park and elsewhere would be too costly, volunteers put out well over 100 fires in a two week period by digging trenches around the smoldering periphery with shovels, and using a bit of water to douse hot spots.

As shown in the photo at left, many such guards were successful, and this one is about to have the trench back-filled in the spring of 2004.

All trenches were rehabilitated by volunteers.

We then consulted Dr. Stan Rowe, one of Canada's foremost ecologists and he told us we had some right to be concerned but that there appeared to have been no formal studies of the issue insofar as he was aware. We decided to err on the side of caution. Subsequently, we obtained verbal permission from B.C. Parks to experiment with manually controlling some of the peat fires.

This resulted in volunteers for FONV putting out well over 100 peat fires within the core of Nunsti Provincial Park during October. Some water combined with hand-dug trenches was successfully used to contain and extinguish the peat fires. In some instances, trenches had to be dug over one metre deep.

A survey in the spring of 2004 indicated that most of the fireguard trenches did contain the fires except for some small escapes. Cold weather and precipitation likely helped put the fires out but we also feel that some were burning so hot they would have permanently destroyed many of the large, natural meadows that characterize the park. In many instances, where the peat had burned it was down to glacial till substrate and/or mineral soil and we felt that perhaps thousands of years of either organic lake or sphagnum bog deposition has been destroyed permanently. While some of this might be considered part of nature, we again were able to observe that there was very little evidence of past wildfires burning away the peat substrate to the extent that it did from the 2003 wildfire.

In the spring of 2004 volunteers backfilled with shovels and rakes all of the fire trenches dug in the meadows. It was also noted by the fall of 2004 that apparently due to acidic ash, no revegetation was occurring in the burnt out peat sites whereas the meadows that had just surface fires had grass re-growth far in excess of the unburned meadows.

While a draft report is being prepared including mapping of individual meadows and extent of peat burns, this has not been completed. We also understand that B.C. Parks has hired a botanical consulting firm and has set up vegetation plots in Nunsti Park to monitor the changes resulting from the fire, including peat fires. The results will be interesting and help us better understand the fire ecology of natural Chilcotin meadowlands.

Our anecdotal observations suggest an interesting peat ecology and history in our study area. We noted in our trenching that there were two different types of organic material underlying the meadows. There were organic layers in some meadows that appeared to be derived from sphagnum bogs and these were quite fine-grained. When they burned they left a loose, rusty type of acidic ash. Indeed we noted several sites near Upper Place where there were active sphagnum bogs forming. In another area on the east side of Goose Lake there was a dried sphagnum bog with sedges starting to grow out of the dead, brown mat. This was indicative of the bog to peat to meadow process still going on in the ecosystem.

In other peat fires, the meadows were underlain with a different organic layer that was coarser and comprised of what appeared to be compacted sedges and other material that was not decayed moss. These meadows left a different type of peat ash that was quite gray in colour that appeared to be "limnic peat".

These observations confirm the different ecological processes by which peat is known to form, either from muskeg or bog. Muskeg forms from peat moss growing on flat, poorly drained land whereas a bog forms from infilling of what was once a pond or shallow lake with "limnic peat" comprised of lake plankton and algae with sedge peat at the bottom; but overlain by moss peat (Hansen 1952).

### 2.3 Extent of fireguards, roads, heli-ports and other disturbances

The network of fireguard/roads, heli-landing clearings and cat trails created by the Ministry of Forests 2003 fire suppression activities was very extensive. Table 1 shows that an estimated 141 km of bulldozed fireguards/roads and 22 km of bulldozer trails were constructed. There was also a total of about 93 (large) cleared areas for escape and helicopter access.

During field surveys we walked or drove nearly all of the fireguards in this primary study area between the Tsuniah Road and Elkin Creek where the bulk of the wildfire and access control occurred. Within our priority study area, MOF crews built a total of 106 km of bulldozed fireguards/roads, 22 km of bulldozer trails and 82 (large) cleared areas for escape and helicopter access. Nunsti Provincial Park within this zone had a total of 32 km of bulldozed fireguards/roads, 17 km of bulldozer trails and 26 (large) cleared areas for escape and helicopter access built by MOF. However, the bulk of roading proximal (within 5 km) to Nunsti Park also will have an impact on the ecological functioning of the protected area and cannot be discounted just because it is not inside the park boundaries.

A wide cleared corridor/fire road now surrounds the core of the park. It is entirely ringed within or outside with a 106 km lineal corridor that resembles an industrial logging road, with trees cleared to a width of about 15 – 50 m and a graded roadbed that varies from 8 m to 10 m width. The total of 106 km in the primary core study area includes places where the road/guards have been built double with a wide corridor of burned forest between. The corridor is wider on the south boundary, outside of the park, than it is on the extensive guard on the N.W. side of the fire zone that is within the park.

In addition, a large wild meadow along the N.W. guard was accessed by MOF by a separate 400 m new road and then bulldozed for about 150 m square to create a heli-escape “safe zone” (likely H-Q19 on the MOF map). This severely damaged site within the park was not rehabilitated. Roads were also built across a number of wild grassy meadows to the east of this site along the guard built towards Nunsti Creek. No rehabilitation attempts were made whatsoever.

In late 2003 and 2004, the public created additional damage ancillary to MOF fireguards/roads. Other damage within the park included an ATV bypass trail along Goose Lake south of Upper Place Trappers Cabin causing damage to several large areas of wet, active sphagnum bogs. South of Far Meadow, a new ATV track was found to cross extensive wet meadow sites. East of the park, the cribbing at the road ford on Elkin Creek was destroyed allowing motorized damage to occur to the wet meadows. Additionally, we found a new ATV trail had been cut above this crossing allowing motorized access across a major Chinook spawning site. About 20 spawning salmon were noted at this latter crossing in September 2004.

Overall, lesser MOF damage occurred west of the Tsuniah Road where we estimate 22 km of bulldozed fireguards/roads and 10 (large) cleared areas for escape and helicopter access were built by MOF. However, we did not examine this area. About 5 km of the total bulldozed fireguards/roads includes guards that contained the fire near commercial lodges on the west side of the Chilko River and where at least one lodge owner identified important rehabilitation concerns along their tourism horseback riding trails.

West of the Taseko River about 13 km of guards/roads were built but likely some of these included roads already built for clearcutting. We did not survey this.

Table 1. Estimate of extent of bulldozer fireguards/roads, bulldozer trails and helicopter “spots”/“safe zones” created by heavy equipment in an attempt to contain the Chilko Wildfire in 2003. Derived from MOF Chilko Lake fire mapsheet (C50214, August 13/03).

<b>Fire Zones (Our Categories)</b>	<b>Bulldozed Fireguards (roads) in km</b>	<b>Bulldozer trails – no road or road limited</b>	<b>Heli-spots and Safety Zones</b>	<b>Comments</b>
Fire east of Tsuniah Road n.-s. boundary to Taseko R.	Cleared width varies from 15 m to 40 m. Road widths about 8-10 m to mineral soil	Most often just walked bulldozer through and pushed over trees	Large cleared areas, often bulldozed to mineral soil	
a) In Nunsti Park	32 km	17 km	26	About 80 - 90% of park within fire zone
b) Outside park	74 km	5 km	56	
<b>Total in main study area</b>	<b>106</b>	<b>22</b>	<b>82</b>	
Fire control area east of Taseko River	13 km		1	
Fire control west of Tsuniah Road, include. w. side of Chilko R.	22 km		10	Does not include Tsuniah Rd., which was widened as a fire break. 5 km are guards on w. side of Chilko R.
<b>Grand total</b>	<b>141</b>	<b>22</b>	<b>93</b>	

#### 2.4 Attempted MOF Deactivation & Aerial Grass Seeding

As a result of public pressure in the fall of 2003 from First Nations, local residents, Chilko Resort and Community Group, FONV and others, MOF carried out a partial deactivation and grass-seeding program of the Chilko Wildfire roads/guards in the later part of September and October 2003. The main fireguard/roads were rendered impassable to motorized use at various points where the fire roads exited main and primitive access roads that preceded the fire; as well, some deactivation was done along the perimeter of the south fireguard. Deactivation generally entailed using a large backhoe to in-fill 300+ m sections of fireguard and road with a criss-cross of dead trees. A small amount of cross-ditching was also done. While we did not survey all points, the following deactivation sites were noted:

- 4 fireguards on the west side of the Tsuniah Road. Not surveyed but likely about 2 km in total.
- Murray Taylor Lake & N.W. guard road, debris about 0.5 km long, near Brittany Lake.
- Guard east of Tsuniah Road several km N. of Eriksson’s Ranch, plus on the south guard near H-B15, estimated 1 km



- Upper Place along the Elkin - Far Meadow 4-wheel drive (wagon) road, about 0.5 km total, N. & S.
- Road, east of Elkin Cr. to H-D27, some cross-ditching and boulders placed in grasslands, est. 0.3 km total.
- Fireguards on W. side of Chilko River, est. about 2 km.

A conservative estimate of most but not all of the deactivation indicates that about 7 km or about 5% of the total length (141 km) for all of the fireguards. No deactivation was noted along the 22 km of cat trails or the 93 large areas cleared for safe zones and helicopter sites.

On September 10, 2004 MOF sent a large backhoe to further deactivate sections of the previously deactivated fireguards/roads which had been bypassed by mushroom harvesters in the Brittany Lake area.

In late October 2003, a helicopter spent several days re-seeding what appeared to be all of the fireguards with grass mix. This mix was sorted out by three consultants (B.C. Parks pers. comm.). The mix was comprised of:

- 25% Nordan Crested Wheatgrass
- 10% Western Wheatgrass
- 20% Hard Fescue
- 15% Creeping Red Fescue
- 10% Big Bluegrass
- 20% White Clover

## 2.5 Extent of MOF-Caused Increase in Availability of Motorized Access Venues

### *Pre-fire motorized access*

Prior to the Chilko Fire, Nunsti Park and much of the Brittany east and west of the Tsuniah Road was primitive wilderness with very little motorized public access and use. It was essentially roadless except for some primitive access. A glance at an air photo shows that it was an island of intactness protected by the natural boundaries of the Chilko and Taseko Rivers but surrounded by extensively roaded and clearcut areas beyond these natural confines.

On the west side of the Brittany, the main throughfare is the Henry's Crossing (Chilko River) to Tsuniah Lake (and beyond) gravel road. About 10 km now passes through the new fire zone, west of Nunsti Park. A small branch road (2 km) goes to Murray Taylor Lake and the Casselman Ranch property (now owned by Zilkers). On the south, a small access road is used from the Erickson Ranch to access a hay meadow (Lot 4866). The road was gated and private. Several primitive roads access Brittany Creek through the Schuk Ranch but these are also gated where they pass through private lands and essentially are north of the fire zone.

On the east side, Nunsti Park and several private in-holdings are accessed from Twin Lakes by a very poor grade road (20 km). Elkin Creek is forded at Captain George Town and prior to the fire the owners of Far Meadow (L. 5411) in Nunsti Park (and the only part-time residents besides the seasonal trapper), had built a 15 m long cribbing to drive their vehicles over the wetlands on the west side of the Elkin ford. In addition, I estimate there were about 5 km of primitive small ATV trails in the park for local hunter/trapper access from "Upper Place," the trapper's cabin. An older cat road transects the park in a n.s. direction and goes to the north of the park. Prior to the 2003 fire, this was mainly

overgrown with dense lodgepole pine. Apparently it was built in the 1950s to access a forest fire in the north end of the Brittany. From the centre of the park, near Far Meadow, this fireguard/road bed can be followed S.W. to the Casselman Ranch, a distance of about 10 km, and prior to the fire was barely passable by foot.

### *Post-fire motorized access – Nunsti Park as an example*

In all, prior to the fire I estimate about 15 km of primitive motorized access was available in Nunsti Park – about 10 km of very rough 4 x 4 road and 5 km of ATV trails. After the fire, mushroom pickers and possibly some hunters opened about 20 km of new ATV/4x4 access thus at least doubling this type of access. This was in addition to the 32 km of fireguards/roads and 17 km of bulldozed trails created by MOF fire controls. Overall, new motorized access available in the park by late 2004 had increased by 69 km to a total of 84 km, from about 15 km pre-fire. This represents a large area available to motorized access and an overall increase of nearly 500% from pre-fire conditions. Not only this, but the bulk of access available is MOF style roadbeds, with the south guard suitable for heavy vehicles beyond the deactivated sections.

### 2.6 Extent of road blockage violations by motorized access interests

Despite a noteworthy effort, Ministry of Forests deactivation of fireguards at key access points done in the fall of 2003 proved not sufficient to block all-terrain vehicle (ATV) and four-wheel drive access that appeared to be primarily related to the extensive commercial harvest of morel mushrooms in the late spring and summer of 2004. The 2004 mushroom pickers went to great lengths in some cases to chainsaw vehicular bypasses around the MOF blockages. Not only were all blocked access points into the core of the Brittany/Chilko fire area re-opened by this means, but older regrown roads and trails were also opened up.

This has now created a situation such that the large core area of the Brittany Triangle wilderness is open to motorized access on all sides, a situation that is only going to escalate as the motorized hunting community explores and “discovers” the area further. The extent of new fireguards in Nunsti Provincial Park, especially along the north boundary, combined with new ATV trails, where no deactivation has been done, severely compromises its inherent wilderness/wildlife security values and opens up the area to the potential for extensive motorized access as occurred during the last morel mushroom season.

During late October 2003 and May 2004 I observed that only a few violations of fireguard blockage areas were taking place. In October 2003, ATV violations were occurring in Nunsti Park along the east fireguard, both to the north and south of Upper Place. This involved chainsawing new routes around the deactivation sites and also developing a new ATV trail bypass along the east shore of Goose Lake which then crossed a large sphagnum bog to connect to the east fire road/guard. In May 2004 there appeared to be a small amount of ATV access into the park from the west that apparently occurred from the chainsawing of a 0.5 km bypass near Brittany Lake. However, prior to the morel mushroom harvest in the wildfire zone, which commenced in late May/June 2003, most blockages were still doing some good. After that, mushroom pickers opened up every blockage plus old overgrown roads for 4 x 4 and ATV access and the whole area was overrun. The extent of motorized access was increased by the emergency need for two organized search parties for lost mushroom pickers. The last search, involving a lost woman, involved the RCMP, about 80 volunteers and a major search camp at Far Meadow.

In order to at least have some control and clean up garbage and debris left at pickers camps, the Xenigwet'in charged a fee and monitored the area. I have no idea as to the numbers of pickers but it would be fair to say that the whole burn was over-run with pickers and their campsites, with pickers at any given time likely numbering several hundred. Most likely if this harvest had been anticipated, any deactivation should have waited. In fact, in an August 2004 meeting with B.C. Parks on this issue they suggested any further deactivation should wait until at least after the 2005, if not 2006 (final?) mushroom harvest. Apparently, the morel mushroom commercial harvest can last up to three years after a wildfire.

However, there are some sections of the fireguards as noted in the recommendation section where a recovery program could proceed in the spring of 2005 without impeding the potential morel mushroom harvest.

With respect to hunter activity, in the fall of 2003, there appeared to be little violation of access blockages in relation to the fall hunting season other than some new ATV trails and bypasses being cut out. However it is likely that most hunters avoided the area due to the wildfire that year. Although I did not monitor motorized access after the 2004 fall moose season started (Sept. 10), it is likely that little occurred as, due to a strong disagreement with the change in regulations from Limited Entry (LEH) for bulls only to a general hunt for spike bulls, the Xenigwet'in and other First Nations blockaded non-native hunters coming in from the outside. One group of non-native but local moose hunters interviewed (prior to the blockade) was going to use horses to access Nunsti.

#### 2.7 Results of MOF Fire road/guard vegetation rehabilitation

Our ad hoc surveys of the MOF aerial seeding program of mixed grasses showed some rehabilitation along the north guard but no rehabilitation along the (wider) south guard. New grasses were growing in some areas of the N.W. guard between Murray Taylor Lake and Nunsti Creek (in the park) as well as in the grassland area of the guard bulldozed on the east side of Elkin Creek. However, I walked about 8 km of the south guard on Sept. 9, 2004 and the roadbed was still mainly bare earth. According to the MOF rep. Barry Jenkins (pers. comm.), much of the aerial seeding was not very successful as it was done when conditions were too dry.

This type of revegetation attempt, if successful, offers no barrier to future motorized access from occurring where blockages are violated over time. The other issue is that seeding of the new roaded areas to grasses is not restoring areas such as Nunsti Park to natural conditions but rather, if successful, creating a large artificial lineal corridor of artificial grasses in and around the park. Since all grass seed mixes have a small amount of invasive weed species such as thistle, this is another negative factor. Besides, grass growth may also impede some of the natural regrowth of the guards to lodgepole pine.

All of the older pre-2003 wildfire roads and fireguards I noted had, over the past decades, regrown naturally to lodgepole pine. Based on this and other factors, our opinion is that seeding or planting the fireguards to pine forest would be the only way to create over the long term an effective vegetation barrier to vehicular access as well as to restore conditions to a near-natural state that mimics natural events in the ecosystem. However, this must be combined with more effective barriers such as large cross-ditches, large boulders and other barriers built intermittently throughout the fireguard/road network to achieve success (see recommendations).

One comment provided by Tsy'los Lodge with respect to the fireguards on the west side of the Chilkot River is that the guards, which cross or have obliterated sections of their tourism horse paths, should

be replanted to pine forest rather than just left with tree debris barriers that are unnatural (see letter Sept./04, APPENDIX III).

## CONCLUSIONS AND RECOMMENDATIONS

MOF control activities of the Chilko Wildfire left behind very large tracts of roads/fireguards and cleared heli-pads that have severely compromised a large, remote wilderness area including Nunsti Provincial Park. Despite some noteworthy deactivation and revegetation measures these have proven unsuccessful. Overall MOF attempts to control motorized access along the extensive network of fireguards/roads built in relation to attempts to control the Chilko Wildfire proved fruitless due largely to the large commercial morel mushroom harvest in 2004. In retrospect, deactivation efforts were minimal and should have included blocking large sections of the fireguards/roads to be effective, rather than 5% of the total near open access points. Once the short distance blockages were bypassed, motorized users had a vast network of MOF access available. The fireguards provided easy motorized access throughout the Brittany for a vast length of 178 km, including 32 km within Nunsti Provincial Park. In addition, new ATV trails and old overgrown roads were opened up, most likely by mushroom harvesters and/or search groups, creating additional motorized access venues into Nunsti Park and adjacent areas.

Attempts by MOF to deactivate small sections of the extensive fireguards/roads into the Brittany Triangle and prevent motorized access showed some success in the fall of 2003, although some ATV access bypass routes were already being chainsawed around the blockage areas. A similar situation was noted in May 2003 but this changed dramatically by early summer due to the invasion of large numbers of commercial pickers for the morel mushroom harvest. Surveys in late August/early Sept. 2004 showed that all fireguard blockages leading into Nunsti Provincial Park (core area of the Chilko Wildfire) had been violated by people chain-sawing alternative access for both 4 x 4 vehicles and ATVs past the blockages on the west, and on the east, mushroom pickers using the open 4 x 4 road to Captain George Town/Far Meadow and then cutting bypasses around the fireguard blockages. In addition, new ATV trails were created along Goose Lake and across sphagnum bogs to bypass the blockages.

Additionally, efforts to rehabilitate fireguards/roads by aerial seeding of artificial grasses were only partly successful. Also, this type of treatment facilitates unnatural green corridors when the proper treatment should be planting or seeding of lodgepole pine to mimic and accelerate natural succession of the cleared fireguard rights-of-ways. The same problem exists for the 93 areas cleared for helicopter access and "safe spots." In one natural meadow in Nunsti Park, a large area of the meadow was bulldozed into dirt piles but no effort was made to grade the berm back. Some damage has been done to salmon spawning grounds in Elkin Creek by a new ATV bypass.

In conclusion, the province and MOF have neglected their duties and responsibilities to properly restore the damage caused by extensive heavy machinery fire abatement in a large provincial park and adjacent areas. The consultant considers it to be fully incumbent upon the B.C. provincial government to rehabilitate the damage caused through an access deactivation and rehabilitation program that is sufficient to restore the ecological integrity of the Brittany Triangle, Nunsti Provincial Park and the **"Elegesi Qiyus Wild Horse Preserve."** The province should include the cost of rehabilitating extensive damage by heavy equipment used to attempt to control the Chilko wildfire as part of the overall fire control costs instead of discounting it.

## **RECOMMENDATIONS**

Since the small deactivation and grass re-seeding program was unsuccessful, a full road deactivation and recovery program is recommended.

Costs of rehabilitating extensive wildfire control damage by the Ministry of Forests must be considered by the province as part of the overall costs of wildfire control costs instead of being discounted.

Based on a site damage review and recommendations of a silvicultural contractor, there are several cost options. A program to plant lodgepole pine seedlings would cost an estimated \$164,976. A program to seed the damaged sites with lodgepole pine would cost about \$29,585. The silvicultural contractor recommends the seeding option.

A crude guess at deactivation of all of the roads/fireguards/bulldozed trails using a backhoe would be about \$30,000 but this requires further review. This should involve all of the fireguards and include deep cross-ditching and boulder blockages, especially in terrain where it would be difficult to bypass. This should also include cleanup and proper vegetation restoration of the fireguards/horse trail areas on the west side of the Chilko River. We are thus looking at a range of total costs of between \$88,685 and \$194,976, depending on a more accurate estimate of backhoe work.

I partly concur with B.C. Parks that any further rehabilitation programs should realistically wait until after the morel mushroom harvest is over, either in 2005 or 2006. However, the south and north guards appeared not to be used by mushroom harvesters and work should begin on these specific sections in the spring of 2005.

The Xenigwet' in First Nations Government should be fully consulted and be part of the rehabilitation plan and efforts, including being involved in the actual work/contracts.

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**APPENDIX 1.** Table 1. Information gathered on damage and blockage violations during surveys of fire road/guard access for 2003 Chilko Wildfire. Map code relates to fire map in this report.

<b>Map Code</b>	<b>Area</b>	<b>Location</b>	<b>Date &amp; res.</b>	<b>Comments</b>	<b>Recommendations &amp; other</b>
1	<u>N. E. side</u> – Elkin Cr., 4 km above Capt. G. Town	E.-W. bulldozed guard from Elkin Cr. to H-D27 heli-pad to east	Oct./03 May/04 Sept./04	Steep cat trail through grasslands to Elkin Creek. Erosion and access concerns. Did not inspect closely. Some deactivation	Appeared to have good grass/forb growth by fall/04. From heli-seeding. Needs inspection
2	Elkin x-sing	Main boardwalk crossing, Captain George Town	Oct./03 May/04 Sept./04	Mushroom pickers and apparently RCMP destroyed vehicle log pad on west side. Some riparian damage. Two chinook salmon spawning one m below ford and some above-Sept/04	Log pad should be replaced to minimize damage. Vehicle access should be restricted to the public beyond this point
3	Elkin x-sing, below old bridge site	New ATV crossing, about 500 m upstream from Captain George Town	Sept./04	New ATV bypass trail goes through riparian zone. 20+ chinook spawning where ATV's cross	Needs to be deactivated as damaging salmon redds, grizzly habitat
4	Goose Lake-Upper Place	ATV bypass trail using old road, 500 m new route along Goose Lake to S.E. fire lane.	Oct./03? May/04	New ATV bypass trail goes along shore of Goose Lake, crosses some small wetlands. Crosses 150 m of sphagnum bog-tracks browned up	Bypasses deactivation near Upper Place. Wetland damage. Needs to be blocked.
5	Upper Place, N. to Nunsti Creek	ATV and 4 x4 bypass cut into N.E. fireguard.	Oct./03 May/04 Sept./04	Likely done by mushroom pickers although ATV use noted in Oct./04	Ends some km north in wetlands (H. Setah).
6	Far Meadow – Cheewit Lake-Casselmann Ranch	Old fire road had been overgrown. Cut out by mushroom pickers.	Oct./03 May/04 Sept./04	Was O.K. in Oct./03 & May/04 and very impassable. Opened right up in summer/04.	

7	Far Meadow – Cheewit Lake	ATV trail created through extensive wetlands	Sept./04	Considerable damage to wetlands	Totally unnecessary. May have been part of search party for lost person
8	North Fireguard, H-Q19 to H-T30, Nunsti Creek & lakes area  Rd. jcn. W. of Far Meadow.	Approx. 15 km	May/04 Sept./04	Some damage where road crosses wild meadows in park. Heli-clearings large and need to be rehabilitated as well. Cleaned up garbage at fire-fighters camps	NO deactivation. Some vehicle use part way but very little at east end. However, road opens up whole end of north park into prime wildlife/wild horse habitat. Priority to deactivate.
9	North Fireguard, “Lucy Meadow” bulldozer damage	11 km	Sept./04	New road built 300 m. north. Meadow bulldozed 125 m square and large berm	Known wild horse/bear meadow and must be rehabilitated. In a provincial park
10	Triangle meadow		May/04 Sept./04	O.K. in spring. ATV tracks all over in Sept./04	Mushroom pickers
11	North-West Fireguards, jcn. Far Meadow road. H-Q19 – Brittany Lake	10 km, approx. Only drove the upper road in Sept. /04 as there are 2.	May/04 Sept./04	May/04 – only to Far Meadow road jcn. ATV tracks, new, going to Brittany Cr. Sept./04. High use had occurred. Cattle sign, wild horses and bears	No deactivation. Vehicle use on both, mushroom pickers main access to this side. Camps. Some heli-clearings not on small fire maps
12a	Brittany Creek crossing	Deactivation starts here. Fish spawn in outlet stream???	Oct./03 Sept./04	No bypass cut in 03. Appeared to be ATV trail cut in May/04. Major bypass for vehicles evident in Sept./04.	Kekule (pithouse) site 5 m off guard at Brittany Cr. Obviously a cultural site.
12b	Brittany Creek – Murray Taylor Lake	Deactivation for 0.5 km	Oct./03 Sept./04	Appeared to be ATV bypass in May/04. Major in Sept./04.	Lots of work to build bypass. MOF did more deactivation on Sept. 9+/04. Back-hoe

13	Casselman Ranch-Zilker property. L. 4868	Access built by mushroom pickers to both old roads	Oct./03 Sept./04	No new access bypasses in Oct./03 include. old rd. to Cheewit Lake. Opened by m.room pickers. New ATV bypass to s. road as well	Major new access created across this private land. Some wetland damage & garbage by mushroom pickers. Deactivate and gate
14	Old s. road to Erickson's hay meadow – Chaunigan Lk.	Opened up by mushroom pickers for ATV from L. 4868 and for vehicles from S. guard	Sept./04	Old road, previously impassable, opened up	
15	Brittany Cr. diversion	N51 38.318 W 123 58.182	Sept./04. WM	New diversion built over old one, after the fire. Used machine. Not diverted when viewed.	Affecting whole Brittany watershed. Drying up Murray Taylor Lake for trout, etc. Check license, impacts
16	South Flank main guard. H-D12 to H-E 20	Map seems confused as 2 guards	Sept./04. WM	ATV bypass trail not cut at H-D12 but just drove around through bush for 300+ m in two places, 500 m total	Not appear to be much mushroom picker use as away from fire. Very wide, 30 – 40 m, plus wide graded road (10 m). No re-seeding.
17	Old road to hay meadow.	Old road to L. 4866. Erickson's hay meadow. Apparently deactivation near ranch was bypassed	Sept./04. WM	Old road was opened up for rancher access. Used a fireguard	Fresh haying. Could not find guard beyond
18	Cat trail, E. side of Chilko River	West side of fire	Sept./04	Guard left in unsightly condition along river corridor	Need rehabilitation. In riparian, salmon, tourist area
19	Fireguards w. of Chilko River	West side of fire, Tsy'los Lodge horse trails for tourists	Sept./04	Some deactivation with log debris, some re-seeding. An unsightly mess	Lodge would like proper restoration.



**APPENDIX 11.** Proposed options and costs for artificial seeding or planting of lodgepole pine to restore natural vegetation of the 2003 Chilko Wildfire roads/guards and other cleared sites. Prepared by Jon Huizinga, an associate with Brinkman Treeplanting Company.

**Brinkman & Associates**

**RR# 3 Nelson BC V1L 5P6**

**Tel. 250 229 4516**

**A proposal to restore the damage done in the Brittany Triangle and Nunsti Park during the Chilko Fire. October 21/2004**

The following was prepared by myself at the request of Friends of Nemiah Valley and their wildlife consultant McCrory Wildlife Services Ltd. I made three field trips to the study area: October/03, May/04 and September/04.

During the Chilko wildfire in August 2003 a large number of cat roads, fire-guards and heli-landing pads were bulldozed into what was a completely roadless and pristine wilderness region. These fireguards have essentially created a web of access roads into the heart of the Brittany Triangle. During the spring of 2004 hundreds of mushroom pickers, who follow last years forest fires, used and improved the cat trails and fireguards to get into the Brittany and into Nunsti park with 4x4 trucks and quads. Unless these new "roads" are deactivated the very nature of the Brittany as a wilderness preserve will be permanently altered. The Brittany is home to British Columbia's only population of truly wild horses that live with a full compliment of large predators. These wild horses as well as the resident grizzly bears, wolves, cougars; they are all threatened if the Brittany is left open to 4x4 trucks and all terrain vehicles. We encourage the B.C. Forest Service and B.C. parks to repair the damage done during the containment of the Chilko Fire by fully de-activating the fireguards and then rehabilitating them to native pine vegetation. De-activating the fireguards addresses the immediate access problems and re-planting or re-seeding the bulldozed areas truly restores the damage done.

I based my estimates on the following crude measure of new roads and other cleared/scarified sites:

141 kilometers of bulldozed fireguards

22 kilometers of cat trails connecting helicopter landing pads

93 helicopter landing pads

The incursions into Nunsti park are as follows:

32 kilometers of fireguards

17 of cat trails

26 heli pads

In my proposal I looked at two options, planting pine seedlings and direct seeding.

**A. Re-Planting to Lodgepole Pine**

Fireguards - 141 km x 1660 pine seedlings/km = 234,060

at 2.4 meter spacing the fire-guards will take 4 trees across

at 2.4 meters there will be 415 seedlings per kilometer

415 seedlings X four wide = 1660 seedlings per kilometer

Cat Tracks 22 kilometers X 1245pine seedlings/km = 27,390

at 2.4 meter spacing the cat tracks will take 3 trees across

at 2.4 meters there will be 415 seedlings per kilometer

415 seedlings X three = 1245 seedlings per kilometer

Helicopter Landing Pads/Safe Spots 93 heli-pads X 900 seedling/km= 83,700

The heli pads are circular and 75 meters in diameter

at 2.4 meter spacing each heli-pad will take 900 seedlings

The fireguards, approximately 33 kilometers, are estimated to be wider and

will need 6 seedlings to cover rather than 4. At the same calculation of

415 seedlings single per kilometer this will require another

2 X 415 = 900 seedlings X 33 km. = 29,700

Total seedling required for the project 374,850

We can complete this project in 25 days:

We will supply planters, experienced supervisory staff, a self-sufficient camp that meets all the provincial standards, trucks and ATVs needed to transport people and seedlings.

The cost to complete this project for planting at \$0.28 a tree is a total cost of ----- \$105,000

The cost of the seedlings, Lodge Pole Pine, is \$0.16 each ..... \$ 59,976

The total cost of the project would be..... **\$164,976**

## **B. Direct seeding**

There is little history of direct seeding as a method for re-forestation in British Columbia. Consequently there is little information available on this practice in B.C. But direct seeding is quite widely used as a method for reforestation in Northern Ontario both by the ministry and private timber companies. Most of the information garnered for this report on the efficacy, costs and methodology of direct seeding came from foresters and silviculture experts in Northern Ontario. However the foresters and silviculturalists I talked to in B.C. expressed a lively interest in the prospect of a direct seeding project and I was asked by some of the foresters I spoke with to share the details and results of this project if we go ahead.

Direct seeding is done extensively in NW Ontario. The best results are obtained with seeding jack pine, a tree species that is considered analogous to lodgepole pine. Prior to seeding, a site is scarified so that 20 to 30% of the area is exposed mineral soil. The norm for jack pine is to broadcast 40,000 seeds per hectare with an average survival 10,000 seedlings per hectare. Seeding takes place usually in early spring, March or early April. Since lodgepole pine seeds require a minimum of 4 weeks of frost to stratify. It is essential to time the seeding so that the seeds are exposed to frost for the required time.

A drawback with on site seeding is that rodents and birds will eat the newly spread seeds. There are a number of strategies used to deal with this problem. One is to broadcast sunflower seeds after seeding the tree seeds. The "predators" go for the sunflower seeds and overlook the much smaller tree seeds. The striped sunflower seed are said to be more effective. An added benefit to this practice is that often some sunflowers come up and develop seed heads which then become a food-source for birds and rodents the following fall and winter.

It is important to seed in early spring when daytime temperatures soften the snow thus allowing the seeds to sink into the snow. This hides the seed from "predators" and has the added advantage of preventing the wind from blowing the seeds away. Also, it is effective to seed just before, or during, a snow fall so that the seeds are safely buried and out of sight.

The very small size of lodgepole pine seeds presents a problem for the seeder to deliver a relatively small amount of seed per hectare. This can be overcome by adding a filler of crushed walnut shell, which are about the same size as the tree seed, at a ratio of 90% filler to 10% tree seed. Tree seeds are commonly seeded by a helicopter with a seeder mounted underneath. Since we are seeding only fire-guards and cleared areas that are all drivable the seeding can be done at a considerable saving by mounting a seeder on an ATV or snowmobile.

The 141 kilometers of fire guard, 17 - 22 kilometers of bulldozer trails and 93 cleared helicopter landing sites make up a total of 300 hectares. Given that 100% of the area to be seeded has exposed mineral soil the seed density can be reduced by half; from the norm of 40,000 seeds per hectare to 20,000 seeds per hectare. At this density 300 hectares will require 17.5 kilos of seed.

The final costs of this project are as follows:

17.5 kilos of tree seed -----\$25,935

157.5 kilos crushed walnut shells ??? my estimate 2 or \$300

Quad rental for - 4 days \$400

4x4 pickup truck - 4 days \$600

rental of seeder \$200

mobilization \$300

gasoline and food \$350

Salaries \$1500

**Total 29,585 + contingency**

In my opinion the direct seeding of the fireguards is preferable to planting trees. Seeding is much cheaper, it is a simpler, quicker operation and for our purposes, to shut off access, we are not concerned with seedling density. This direct seeding project can be done in the late fall 2004 or sometime during that winter. I believe that we can handle this direct seeding project ourselves. I can manage the project and do the work with the assistance of one person for four days. I have not included accommodation or camp costs on the assumption that we can stay the cabin at Far Meadow. We can consider hiring a person from the Xeni Gwet'in to assist but the short duration of the project make this hardly worthwhile.

**List of people contacted/consulted for information on direct seeding of lodgepole pine**

Ken Lennon Silviculturist., Bullwater, Thunder Bay, Ontario - 807 876 4023

Neil Stocker, boreal silviculture specialist, Ministry of Forests, Ontario - 705 945 6634

Bill Smith, silviculturist, Abitibi. Thunder Bay Ont. - 807 625 7795

Sheila Aucket, silviculture specialist, NW region, Ministry of Forests, Ontario. - 807 939 3115

Tom McDunno, silviculturist. Ministry of Forests, Thunder Bay, Ont. - 705 945 6634

Al Folley, Forester, Ministry of Forests, Ont. - 705 424 5311

Cal Hartly, Forester, Kimberly Clark, Long Lac, Ont. -

Dave Colotela, Tree Seed Center Surrey B.C. - 604 541 1683

Grant Glessing, silvicultural forester, Tolko, Quesnel B.C.- 250 992 1700

Guy Newson, silviculture practices forester. Ministry of Forests, Williams Lake B.C. - 250 398 4681

Brent Olson, silviculturist, Ministry of Forests, Kamloops , B.C. - 250 371 6538

Ron Gladiuk, Western Aerial Application, Vancouver B.C. 604 792 3354

Jim Wright, forester, BCTS, B.C. 250 558 1758.

Susan Zedel, SPAR (seed planning and registry) Surrey B.C. 250 356 1598

**APPENDIX 111.** Letter of concern from Tsyl'os Lodge re- fireguard rehabilitation in their recreational operating area.

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**September 9, 2004**

To Whom it May Concern:

This letter is to address the personal and wildlife habitat concerns created by the cat track guards that were used to minimize the Chilko Lake fire in the summer of 2003.

My family has been in the Chilcotin for almost 50 years and I have lived and worked here for 20 years. My job at Ts'ylos Park Lodge is to guide our international guests through this beautiful wilderness. To everyone that comes here I have to explain to them that fire is Mother Nature's way of restoring her ecosystems. Trying to explain the destruction caused by the cat tracks is a harder task.

The maps that are used to illustrate these cat tracks do not include all of the cat tracks that have been established on the west side of the Chilko River. On the map two cat tracks are showing where in reality more than five exist. There are about five main cat tracks with a few trails that branch off. One cat track in particular is about 500 ft. in length, other tracks are established right down to the river and one even goes down our horse trail for about a 1000 ft.

The damage to the forest has been done and now the tracks have been deactivated by the Ministry of Forests. It is quite disturbing and overwhelming to bring people from all over the world to this magnificent and serene place and then to see man made cat tracks stretch far out in the distance in front of you with hundreds of trees sweeping across them.

There is still flagging tape left on trees from the fire crew all along the trails. Rocks and boulders have been dug up and live trees have been felled across the roads. This is not a proper habitat for wildlife. Wildlife have been dealing with fires for millions of years, they shouldn't have to deal with man made deactivation roads as well. I do not believe this is how this ecosystem should have been restored.

I believe this area should be restored as close as possible to its natural habitat and adjacent land. The forestry should come back in here and clean up the fallen trees and plant healthy vegetation and tree species that is equal to adjacent land. After planting is done, a conservation officer should be designated in the area to monitor proper use and ensure the area has time to restore itself.

Sincerely,

Kalin Brockhaus, Landscape Ecologist.