KANANASKIS COUNTRY

A STUDY OF SILTATION OF SELECTED CREEKS

BY T. CARNEY NEAVE

FOR W.R. 271

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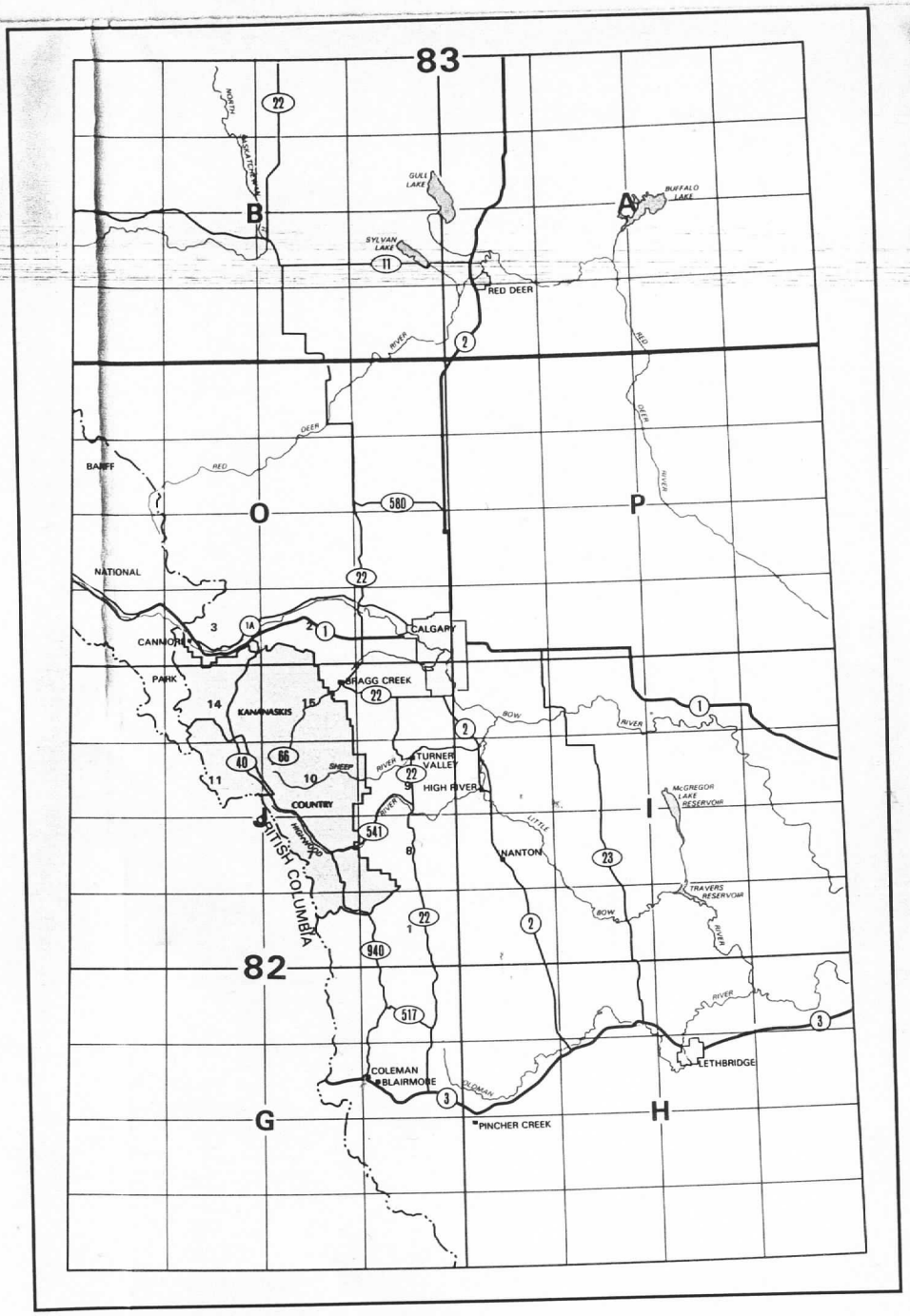

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N, RECREATION AND

● –Facilities provided

LOCATIONS	INFORMATION	PHONE	HANDICAPPED ACCESS	YOUTH HOSTEL	FIRST AID	DINING	ACCOMMODATION	FOOD	GAS	CAMPGROUND	GROUP CAMPING	BACKCOUNTRY CAMPING	WINTER CAMPING	PICNICKING	BOAT LAUNCH	HAND BOAT LAUNCH	FISHING	AMPHITHEATRE	TRAIL HEAD	DOWNHILL SKIING	OFF-HIGHWAY VEHICLE	INTERPRETATIVE EQUESTRIAN
1 CANMORE	●	●						●	●	●				●	●							
2 BOW RIVER										●				●								
3 OLD CAMP																						
4 THREE SISTERS										●				●								
5 GAP LAKE														●	●							
6 GROTTO MOUNTAIN														●								
7 LAC DES ARCS		●								●				●	●							
8 BOW VALLEY AREA	●	●								●				●								

SUMMARY

In the Kananaskis area there has been an ever increasing amount of use. History shows that there are herds of Elk and Deer as well as Black and Grizzly Bear. These animals made their trails and when cattle and horses where introduced into the area they picked up the same trails. Now these are established trails used by many different user groups and they are showing signs of their age.

Through looking at specific sites, possible solutions can be determine for each site. The solutions include non-technical operations, installing drainage tile, and more technical applications, installing a bridge and reclaiming an area.

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1.0 INTRODUCTION

In 1986 Alberta Fish and Wildlife conducted a study on ten creeks within the Elbow District of Kananaskis Country. This study showed that excess siltation is accruing in four of the ten creeks and their tributaries. These creeks are major spawning, overwintering and rearing habitats for three species of trout.

The main purpose of this project is to provide substantial information on how and where sediments are entering the four creeks.

2.0 OBJECTIVES

This projects main objective is to document where the siltation to the four creeks is originating from. The second part to this objective is to present specific recommendations on how to rectify the problem(s)

The first step in completing these objectives is to locate the areas where cattle and horses are crossing the creeks or gathering along the stream banks.

These objectives can then be fulfilled by establishing plots in both cattle and horse used areas and unused areas. In this way data can be collected as to the dif-

ferent levels of vegetation cover in the two classifications (used and unused).

Kananaskis Country has one main objective. The area is to be preserved to the best of man's ability for all Albertans, both now and in the future. Other secondary objectives include, "... a range of recreational opportunities for Albertans with a variety of tastes in outdoor pursuits." As well as "To involve the private sector in the development and operation of facilities where a viable business opportunity exists." (Landals 1986)

3.0 LOCATION

In 1974 the Alberta government announced in a speech from the throne that a park would be established in the Rocky Mountains foothills, west of Calgary and south of Canmore Alberta approximately 50 km. The name that was given to the new park was Kananaskis. In 1977 Kananaskis Country was established as a recreation area.(see key map)

4.0 PRESENT SITUATION

Within Kananaskis Country over 1500 km. of trails exist, of which approximately 850 km. are for summer use. Over 380 km. of this is for equestrian use (More 1986).

Almost all of the horse trails cross creeks. Four of the creeks have fish spawning beds in them, and the question arises whether the horses fording the creeks cause adverse damage to the spawning beds.

Three of the four creeks, Trail Creek, Canyon Creek and Ford Creek, are used by Cutthroat and Bull Trout for spawning, rearing and overwintering. The fourth creek, Prairie Creek, also has the two previous trout and Eastern Brook Trout habitat.

There are 25 of 33 crossings in the Elbow Region that require some degree of improvements. 12 of the 25 crossings that need improvements are in the horse use zone, the other 13 are in the Off Highway Vehicle (OHV) Zone.

Another factor to be considered is that much of the Kananaskis area (excluding Kananaskis Park/Peter Laugheed Park) is used by neighbouring ranchers for summer cattle range.

5.0 REVIEW OF LITERATURE

A number of studies have been conducted both in the United States and Canada. Two studies done in Oregon by Frear (1983) and Platts (1979) showed that free ranging cattle in moderate numbers do not create any adverse

effects in the water quality of the streams.

A study conducted in Oregon shows there was no increase of bacteria counts in the water from cattle feces matter (Frear 1983). However, the cattle congregating along stream banks (where it is cooler plus the vegetation is usually very lush) tend to remove the riparian vegetation. Consequently, this leads to bank failure. (Behnke and Zarn 1976 in Platts 1979)

On the other hand, the above studies show that the major damage to streams came from cattle gathering near the water where it is usually cooler and the vegetation more luscious than other parts of the range.

When cattle eat and trample the riparian vegetation along stream banks, there is no longer anything to stabilize the bank, and they start to slump into the creek. This action causes down stream siltation as well as increased water temperature. These two factors have a synergistic effect on the fish populations and their spawning grounds.

In a study conducted in Ontario, (Thornley and Bos 1985) it was determined that under very high concentrations of cattle, (ie feedlots), have a detrimental effect on both fish populations as well as human beings, in the form of

fish die-offs and rashes on the humans. The study determined that the manure being washed into the nearby creeks was causing the unfavorable problem.

Kananaskis Country encompasses 4170 km² (1610mi²). It was not forced onto the wilderness but made to work with nature to preserve the area, to the best of man's ability. There have been situations in Kananaskis Country where proposed developments were rejected on environmental grounds.

> The most dramatic rejection of a development on environmental grounds was the cancellation of a proposed trout rearing station in Bow Valley Park.... it was determined that the water requirements of the fish station would adversely affect the unique floral and invertebrate fauna assemblage of the spring environment. As a result a multi-million dollar development did not proceed. (Landals 1986)

6.0 LIMITATIONS

The major limitation to this project is time, there are only two weeks to complete the study. A minor limitation is that there is little information available in which to obtain background information.

7.0 DESCRIPTION OF PROBLEM

Over the last 100 years there have been ranchers using the Elbow and Sheep regions of Kananaskis Country for summer grazing. In the Elbow Region there are 187 (1986) animal units in the area (includes both yearlings and mature cattle). The drainages that are mainly used by the cattle are; Powderface Creek, North Elbow Creek, Prairie Creek, Canyon Creek and Ford Creek. The heaviest concentration of cattle is in the Prairie and Canyon Creek areas with 141 animal units. The cattle are in all the areas from June to October. (see Appendix B).

Over the last 100 years cattle use has remained relatively constant while recreation use has been on the increase. Before the cattle started using the area there were game trails that the wildlife used. When cattle were moved into the area they naturally started to use the game trails, and now many of the established trails in the area are descendents of the old game trails.

Resulting from the extended use of the trails, areas of soil with high water content, springs, have slowly deteriorated. The trails, when established by Recreation and Parks were in very good shape and showed minimal damage from use.

The most common factor between all of the sites is that the area has permeable soil over an impermeable layer. The soils are on steep slopes and the soils are very shallow. The problem arises because the soil can not absorb or allow the seepage to drain away. The similarity between the problems of the Elbow and the Sheep regions makes the solutions similar, which are discussed later in this report.

With respect to the suspected siltation to the creeks, there were found only a few (5-6) locations where it was evident that cattle and recreation users were crossing the creeks. Figure 1 in Appendix D shows one such crossing.

It would appear that the majority of siltation is coming from natural stream erosion. There are numerous areas along the Powderface Creek, Prairie Creek, Ranger Creek, Bragg Creek and other unnamed creeks where extensive bank undercutting and mass wasting is accruing. (see Fig 2 and 3 in Appendix D)

8.0 CONCLUSION

The Elbow and Sheep Regions of Kananaskis Country have similar problems with parts of their trails being saturated with water and causing soft spots. It is felt by

some people that the main part of the problem is from recreation users, this report should make it evident that the problem stems from poor trail location and not from one specific user group.

9.0 RECOMMENDATIONS

In the Elbow Region most of the problem areas can be solved by either installing a drainage tile (weeping tile) or relocation of the trail. It would be recommended that the weeping tile be used if there is a possibility that in a few years the same problem will arise again because of poor soils.

In the Sheep Region it would be best to relocate the trails around problem areas instead of using weeping tile. The reasoning behind this is that in the Elbow it is evident where the water is coming from because of the shallow soils. In the Sheep the soils are much deeper and the source of the water is not as obvious. Before trails are relocated the soil should be sampled to determine the best location for the new trail. The old trail location should be reclaimed as best as possible. (see appendix C for listing of specific sites)

It is recommended that two or more different systems be implemented on similar sites, that is on one site put in

drainage tile while on another try mixing in a sand and gravel mixture. In this way an evaluation can be made as to what system works best on certain sites.

APPENDIX A

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WORK CITED

Platts, William S., *Livestock Grazing and Riparian/Stream Ecosystems - An Overview, Trout Unlimited, Inc. 1979, page 39-45.*

Landals, A. G., *Kananaskis Country, A New Approach to Implementation of Outdoor Recreation and Preservation Programs, 1986, University of Alberta.*

More, Gavin, Kananaskis Country: *A Case Study in Recreational Development, 1986, Recreation Programs Branch, Kananaskis Country, Canmore Alberta.*

Frear, Samuel T., *High Country Streams, Cattle Are Compatible, Beef May 1983, page 68-69.*

Thornley, S. and Bos A. W., *Effects of Livestock Wastes and Agricultural Drainage on Water Quality: An Ontario Case Study, Journal of Soil and Water Conservation, Jan/Feb. 1985, page 173-175. vol. 40.*

APPENDIX B

Alberta

ENERGY AND NATURAL RESOURCES
Forest Service

ACTUAL RANGE USE REPORT

File No. _____

Distribution of Copies: Complete in triplicate and send one copy to Head Office, one copy to Forest Office, and one copy to Ranger.

Range Allotment ELBOW Ranger District DB2 ELBOW

Forest BOW-CROW Management Unit BO1

Livestock Association or Permittee _____

Actual Range Use Reports must be completed for each range allotment at the end of the grazing season and forwarded to Forest Headquarters within 30 days. Information should be recorded as livestock are redistributed or moved during the grazing season.

Distribution Unit	*Class and Kind	Number	Tresspass Animals	Date On	Date Off	**Animal Unit Months	Loss Number	Cause of Death or Loss
Powderface	Cows	35		Jun 16	Oct 1	122.5		
North Elbow	Cow	1		Jun 16	Aug 15	2.0	1	Struckby vehicle
Prairie Creek	Cows	136	3 M/	Jun 16	Oct 31	612.0	1 calf	Unknown
Canyon Creek	Bulls	5		Jun 22	Sept 15	22.5		
rd Creek	Yrlgs	6		Jun 17	Oct 31	18.0		
Ford Creek	Yrlgs	4		Jun 22	Sept 15	10.7		
							2 cows	
							with calves	Missing
							1 back in Spring.	
otal Mature		177.0				759.00		
Total Yearlings		10.0				28.7		
Total Stock Grazed		187.0				787.7		

Class: - Yearlings, Cows, Bulls, etc. Kind: - Sheep, Cattle, Horse

Break up herds into class groups with each group entered on a separate line.

** Animal Unit Months: - computed as follows:

Sheep	1/5	times number of months of grazing
Yearling	2/3	times number of months of grazing
2 year old Steer or Cow	1	times number of months of grazing
Bull	1½	times number of months of grazing

APPENDIX C

Site 1-9: Wet areas on the trail, caused by seepage from a single point.
Possible solution: Install a drainage tile so that water can be drained across the trail without causing damage, or re-route trail and reclaim existing trail, or mix in a sand and gravel mixture into the soil to provide better porosity.

Site 10: An area where cattle and wildlife come to drink and cross the creek. It has resulted in bank erosion.
Possible solution: Construct a bridge for the animals to cross on, this would keep most of the activity out of the creek but the cattle would still go down beside the bridge to drink, of which there is no real solution.

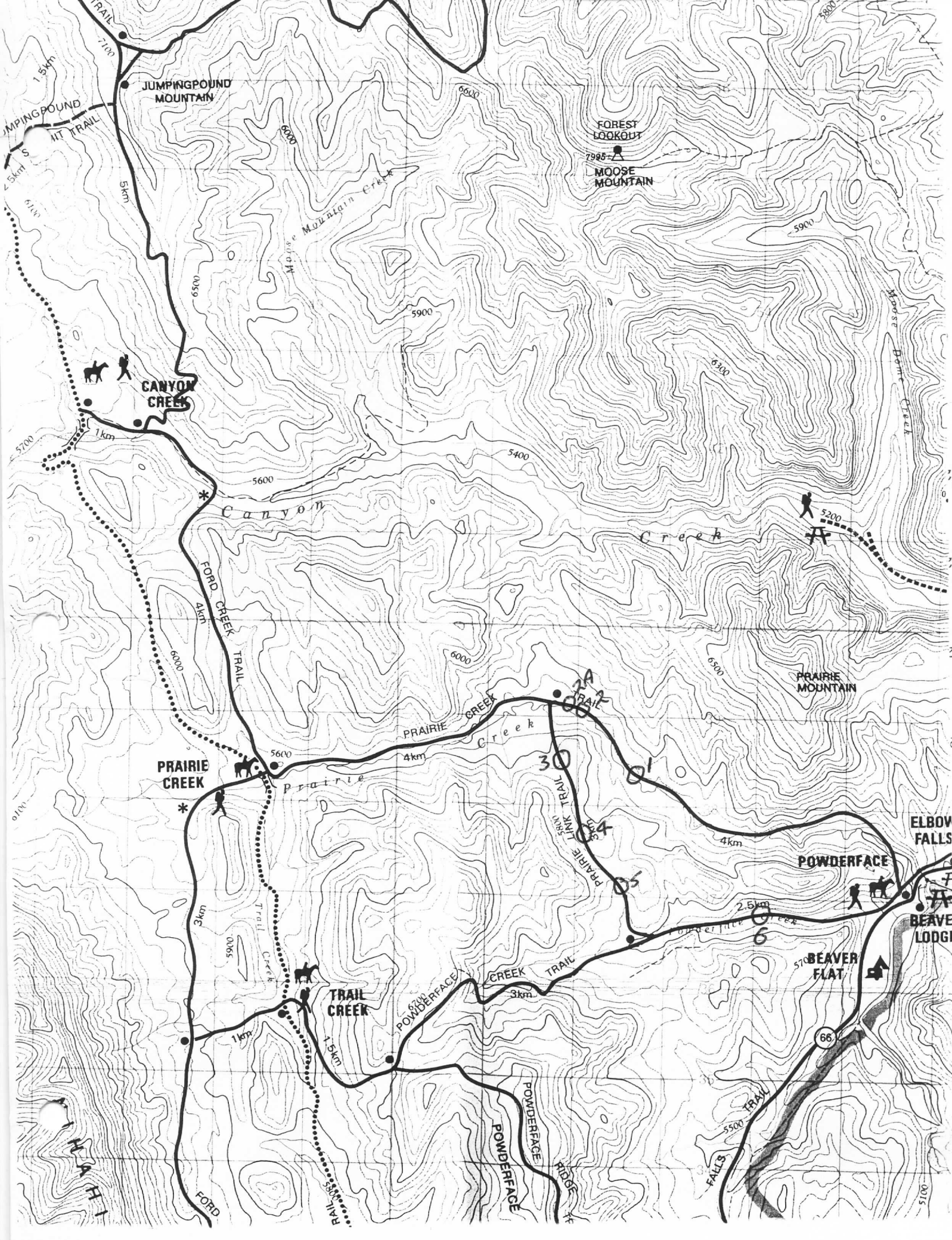
Site 11-12: Bulldozer activity has broken down the bank and at high water, back eddies erode the bank.
Possible solution: Place large angular rocks(riprap) where the banks have been eroded and surface the area with cobbles (84-250mm) so that crossing the creek is still possible.

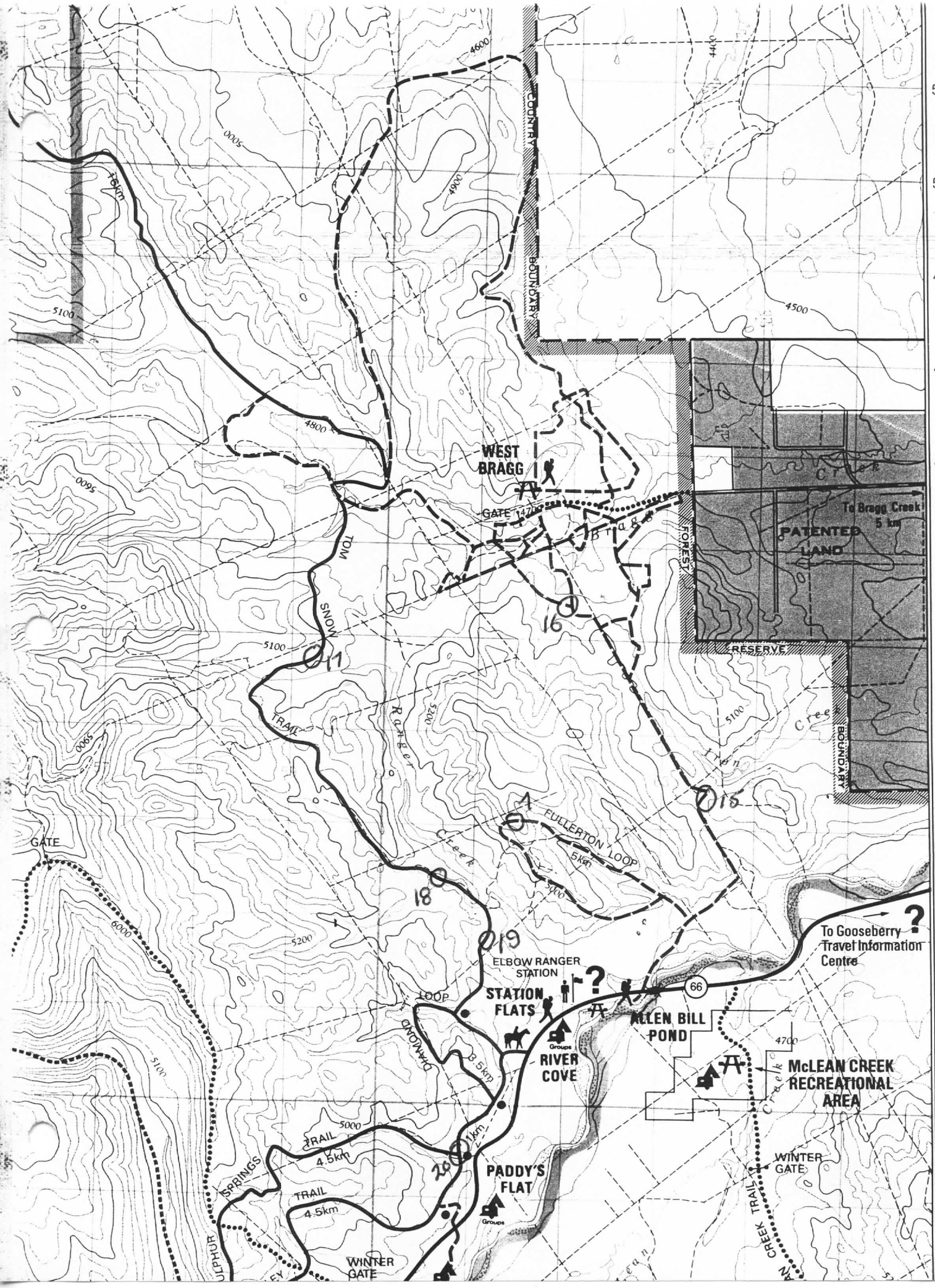
Site 13-14: Areas of saturated soils.
Possible solution: Re-route the trail and reclaim the existing trail, or install drainage tile, or mix in a sand and gravel mixture to allow better drainage of excess water.

Site 15-18: Logging operations have rutted the trails very badly, the water is channeled down the ruts causing washouts and areas of saturated soils.
Possible solution: Have logging Company rebuild the trails. The trails should be built so that they do not interrupt the water table which leads to more problems.

Site 19: Salting location is within 30 meters of above ground water.
Possible Solution: Have the salting location moved to another location so that the cattle are forced to move between the water and the salting location, therefore, making better use of the range.

Site 20: Animals going down next to the bridge to water.
Possible solution: Reclaim the present area and establish a watering area where it is easier access and the soil is stabler.


JUMPINGPOUND MOUNTAIN
FOREST LOOKOUT
7995
MOOSE MOUNTAIN
CANYON CREEK
Canyon Creek
FORD CREEK TRAIL
4km
PRAIRIE CREEK
PRAIRIE CREEK
4km
Prairie Creek
PRAIRIE MOUNTAIN
PRAIRIE LINK TRAIL
4km
POWDERFACE
ELBOW FALLS
2.5km
BEAVER LODGE
BEAVER FLAT
TRAIL CREEK
3km
1km
1.5km
POWDERFACE CREEK TRAIL
3km
POWDERFACE RIDGE
FALLS TRAIL
66
FORD
RAIL
Trail Creek
Moose Mountain Creek
Moose Home Creek
5km
1.5km
1km
3km


WEST BRAGG
GATE
To Bragg Creek 5 km
PATENTED LAND
RESERVE
FOREST
BOUNDARY
COUNTRY
TOM SNOWS TRAIL
Ranger Creek
Bragg Creek
FULLERTON LOOP 5km
ELBOW RANGER STATION
STATION FLATS
RIVER COVE
ALLEN BILL POND
McLEAN CREEK RECREATIONAL AREA
To Gooseberry Travel Information Centre
66
DIAMOND LOOP
3.5km
1km
TRAIL 4.5km
TRAIL 4.5km
PADDY'S FLAT
WINTER GATE
SULPHUR SPRINGS
CREEK TRAIL
GATE
Groups
16
17
18
19
20
4600
4900
5000
5100
5200
5600
6000
4700
51
50
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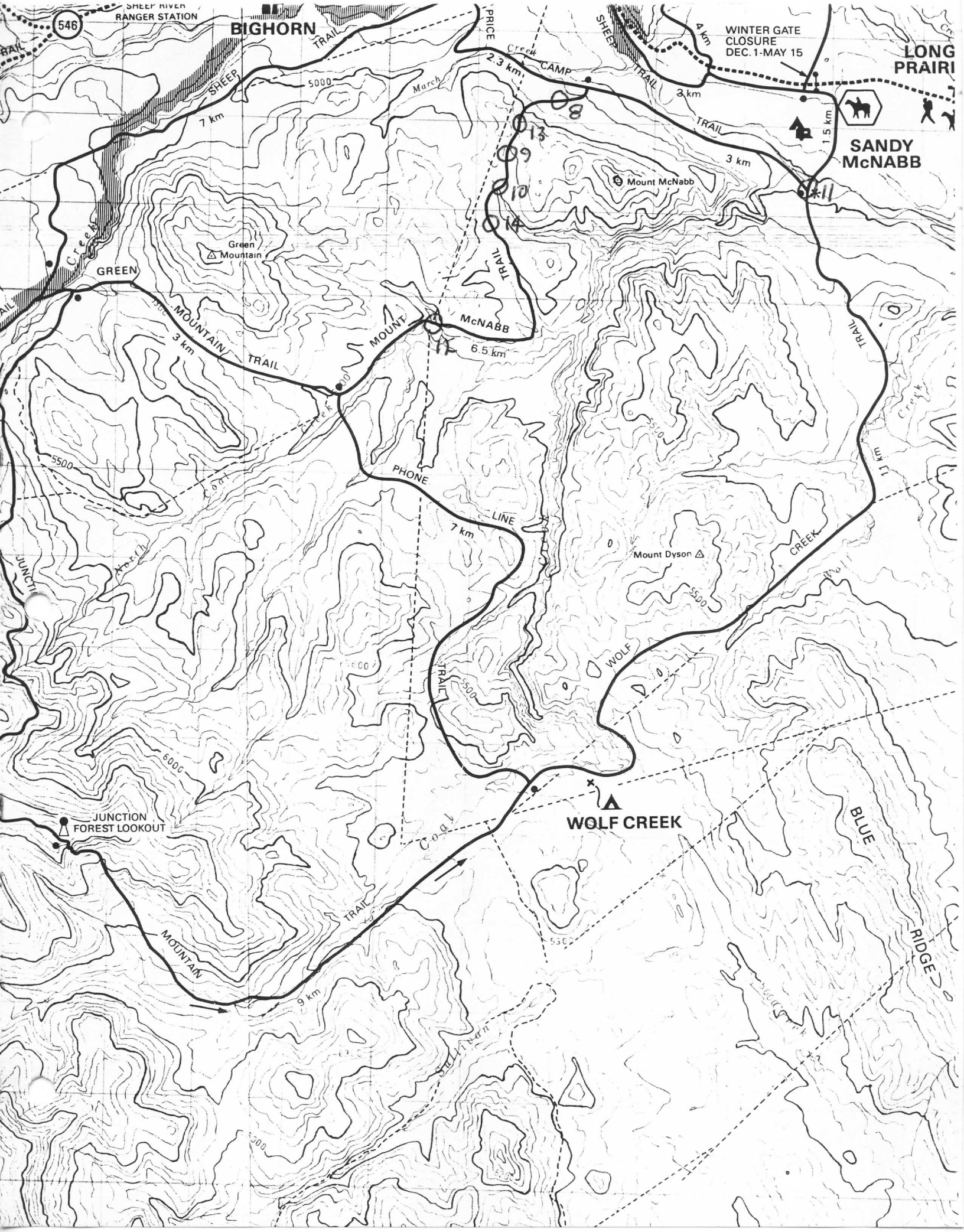
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SHEEP RIVER RANGER STATION
BIGHORN
TRAIL
SHEEP
5000
7 km
PRICE
Creek
2.3 km
CAMP
March
SHEEP
4 km
WINTER GATE CLOSURE DEC. 1-MAY 15
LONG PRAIRI
TRAIL
3 km
1.5 km
SANDY McNABB
Mount McNabb
Green Mountain
GREEN
MOUNTAIN
TRAIL
3 km
MOUNT
McNABB
6.5 km
TRAIL
PHONE
LINE
7 km
Mount Dyson
CREEK
WOLF
TRAIL
JUNCTION FOREST LOOKOUT
WOLF CREEK
BLUE
RIDGE
MOUNTAIN
TRAIL
9 km

APPENDIX D

Fig 1 Stream crossing on Prairie Creek.

Fig 2 Stream bank undercutting on Powderface Creek.

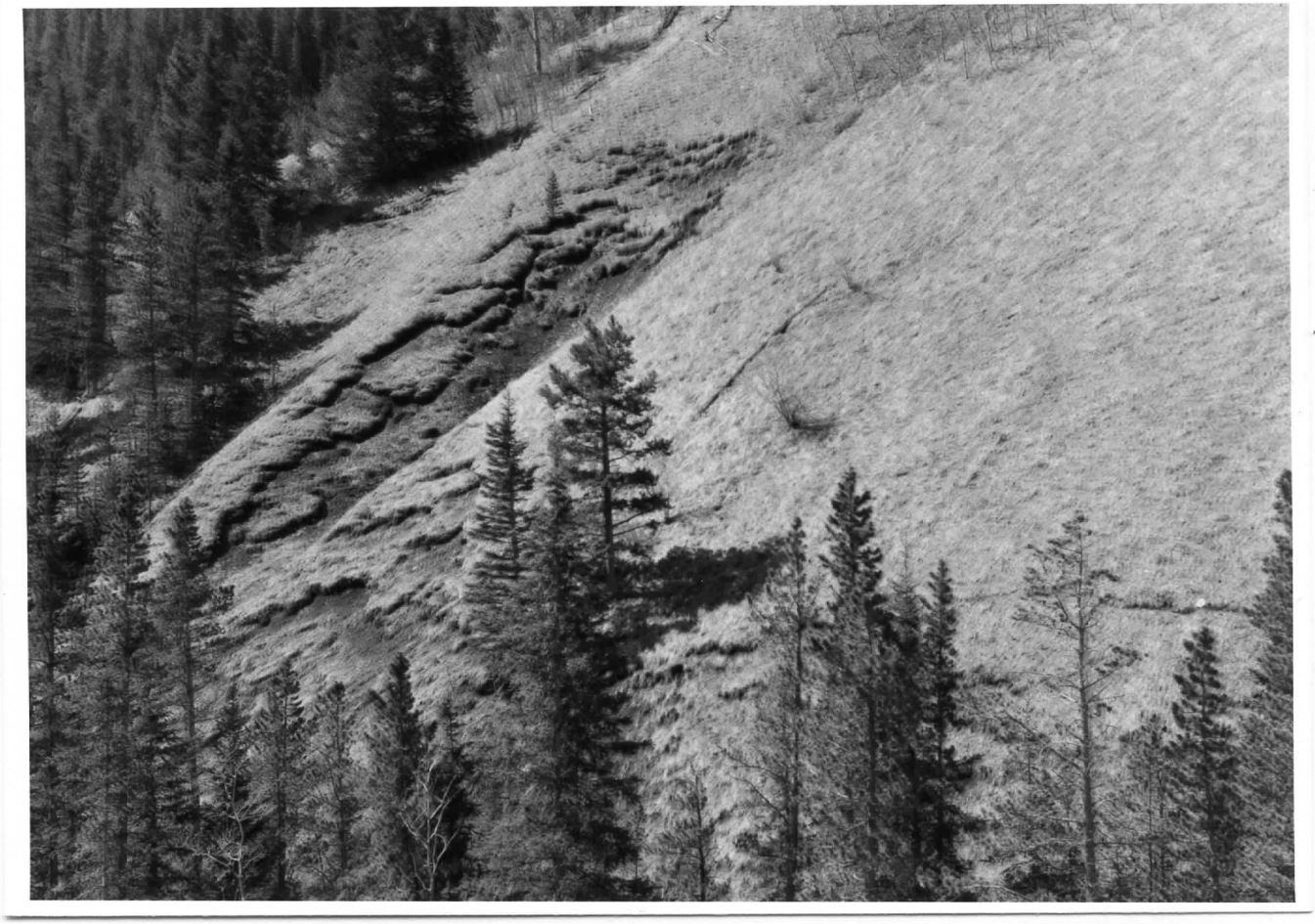

Fig 3 Evidence of mass wasting into Ford Creek.