UNIVERSITY OF CALGARY

MANAGEMENT AND PLANNING OF RECREATION ACCESS ON CROWN LAND IN BRITISH COLUMBIA

by

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One of the great dreams of man must be to find some place between the extremes of nature and civilization where it is possible to live without regret.

- Barry Lopez

Abstract

Management and Planning of Recreation Access on Crown Forest Land in British Columbia

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Prepared in partial fulfillment of the requirements of the M.E.Des. (Environmental Science) Degree in the Faculty of Environmental Design
University of Calgary

Managing recreation access on Crown Forest Land that is accessed by logging roads or helicopters is a topic that is gaining importance and interest in British Columbia. Unmanaged recreation access can cause conflicts between user groups and conflicts between user groups and the biophysical environment. This project uses a case study approach to identify and discuss the major issues related to recreation access in British Columbia. The case study is a timber harvesting area called TFL #14, located in southeastern British Columbia, in the East Kootenays. The recreation interests and issues arising from unmanaged access in TFL #14 are similar to other areas in British Columbia. This project also identifies the tools available to managers in addressing recreation access. The tools have the potential to be applied to the case study area, and to other areas experiencing similar problems in British Columbia. Long term options for the management of recreation access into TFL #14 are provided, as are interim recommendations for actions that must occur before long term management and planning of recreation access can take place. It is intended that the sit specific recommendations provided for TFL #14 may be useful to other managers in other forest districts in British Columbia who are interested in initiating a process or strategy to address recreation access on Crown Forest Land.

Key words: **backcountry recreation, recreation management, forestry management, wildlife conservation, user conflict, access management, access planning, logging roads, forestry roads, human disturbance.**

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To the visionaries who value wild places for their intrinsic values...

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Table of Contents

Page Number

Forward
Abstract
Acknowledgements

List of Abbreviations 3
1.0 Project Overview 4
1.1 Background 4
1.2 Context 5
1.3 Project Objectives 7
1.4 Document Organization 8
2.0 Study Methods 10
2.1 Overview 10
2.2 Study Methods 10
2.2.1 Field Visit 10
2.2.2 Literature Review 11
2.2.3 Questionnaires 12
2.2.4 Key Informant Interviews 14
2.3. Study Limitations 15
3.0 Rationale 17
3.1 Overview 17
3.2 The Effects of Access 17
3.3 Ecological Effects 19
3.3.1 Soil Erosion and Alteration of Hydrological Patterns 19
3.3.2 Introduction of Exotic Species, Pests, and Pathogens 21
3.3.3 Pollution 22
3.3.4 Sensory Disturbance & Aversion 23
3.3.5 Habitat Fragmentation 26
3.3.6 Wildlife Mortality 28
3.4 Social Effects 29
3.4.1 User Conflicts 29
3.4.2 Compromised Public Safety 30
3.5 Economic Effects 30
3.5.1 Unplanned Disposition of Commercial Licenses 30
3.6 Cumulative Effects 31
3.7 Goals of Access Planning and Management 32
4.0 Access Management in British Columbia and TFL #14 34
4.1 Overview 34
4.2 Access Management in British Columbia 34
4.3 Case Study: TFL #14 38
4.3.1 Environmental Setting 38
Vegetation & Wildlife Habitat 38
Landscape Ecology 42
4.3.2 Users and User Activities 43
4.3.4 The Nature of Conflicts in TFL #14 45
4.3.5 Planning and Managing Access in TFL #14 48
4.4 Summary 49
5.0 Tools to Manage Access 51
5.1 Overview 51

5.2 Legislative Jurisdiction 51
5.2.1 British Columbia Forest Service 52
5.2.2 BC Environment 52
5.2.3 British Columbia Assets and Lands 53
5.3 Legislative Tools 53
5.3.1 *Forest Practices Code of British Columbia Act* (*Forest Practices Code*) 53
5.3.2 Higher Level Planning under the *Forest Practices Code* 55
5.3.3 *Wildlife Act* and *Hunting Regulations* 57
5.3.4 *Land Act* 58
5.3.5 *Motor Vehicle (All Terrain Vehicle) Act* (*ATV Act*) 59
5.4 Non-Legislative Tools 60
5.4.1 Background to Land Use Planning in British Columbia 60
5.4.2 Regional Land Use Plans: Kootenay Boundary Land Use Plan and Implementation Strategy 62
5.4.3 Sub-Regional Land Use Plans: Land and Resource Management Planning 63
5.4.4 Local Level Plans: Landscape Unit Planning 64
5.4.5 Commercial Recreation on Crown Land Policy (CRCL Policy) 65
5.4.6 User Agreements, Conflict Resolution, & Zoning 66
5.4.7 Recreation Opportunity Spectrum (ROS) 69
5.4.8 Public Advisory Group 71
5.4.9 Information Dissemination 74
5.5 Road Engineering Measures 75
5.5.1 Physical Obstructions and Signage 75
5.5.2 Water Bars 76
5.5.3 Cross-Ditches and Tank Traps 76
5.5.4 Road Deactivation 76
5.6 Summary 78
6.0 Options, Recommendations, & Conclusions 79
6.1 Overview 79
6.2 Recreation Access Management Themes 79
6.2.1 Setting Goals and Objectives 80
6.2.2 Local public involvement 81
6.2.3 Interagency Cooperation 81
6.2.4 Consistency 82
6.2.5 Equity 82
6.2.6 Flexibility 83
6.2.7 Strategy 83
6.2.8 Landscape level 83
6.3 Options & Recommendations for Recreation Access Management & Planning 84
6.3.1 Long-Term Options 85
6.3.2 Interim Recommendations 96
6.4 Conclusions 100
7.0 References 103
7.1 Literature Cited 103
7.2 Personal Communications 106

Appendix A: Ethics Approval Letter
Appendix B: Sample Questionnaires

List of Abbreviations

In order of appearance

MDP	Master's Degree Project
BC	British Columbia
LUCO	Land Use Coordination Office
BC Environment	also known as the Ministry of Environment, Lands and Parks
TFL	Tree Farm License
CFI	Crestbrook Forest Industries Limited
ORV	Off-Road Vehicle
CAMP	Coordinated Access Management Planning
LRMP	Land and Resource Management Plan (Planning)
ICH	Interior Cedar Hemlock
IDF	Interior Douglas Fir
MS	Montane Spruce
ESSF	Englemann Spruce Sub-Alpine Fir
AT	Alpine Tundra
BCAL	British Columbia Assets and Lands
CMH	Canadian Mountain Helicopters
KBLUP-IS	Kootenay Boundary Land Use Plan and Implementation Strategy
ROS	Recreation Opportunity Spectrum
BCRC	Backcountry Conflict Resolution Committee
BCFS	British Columbia Forest Service
LG in C	Lieutenant Governor in Council
CRCL Policy	Commercial Recreation on Crown Land Policy
ATV	All Terrain Vehicle
RCMP	Royal Canadian Mounted Police
CORE	Commission on Resources and the Environment
CAOC	Calgary Area Outdoor Council

1.0 Project Overview

The purpose of this chapter is to give a brief overview of this Master's Degree Project (MDP) by outlining the background and objectives of this project, and the document's organization. The audience of this document is specific: the document is intended to appeal to those parties involved in access management and planning on public land in *British Columbia*.

1.1 Background

Population growth in many parts of British Columbia (BC) has lead to a greater demand for public access to Crown Land. Approximately 94% of land in British Columbia is publicly owned, or Crown Land, and theoretically managed according to multiple use principles, whereby economic, social and environmental values are integrated into management strategies (LUCO 1999; Scott-May n.d.). The British Columbia Government leases much of this publicly owned land to industrial interests (*e.g.*, forestry, mining, ranching, and agriculture) to develop and harvest natural resources for profit. In order to access resources, industrial interests, such as forestry or mining companies, have built and are continuing to build extensive networks of roads and trails into previously unroaded wilderness areas (Province of British Columbia 1998). In recent years, Crown Land has come under increasing pressure from commercial and non-commercial recreation interests using backcountry and front country areas for their activities and tenured operations. The demand for outdoor recreation opportunities on public land is growing as the tourism industry in British Columbia is expanding (Province of British Columbia 1995b; Government of British Columbia 1999). Statistics indicate that outdoor recreation use of public land in provincial forests by locals and visitors to British Columbia is increasing and exceeding use in provincial, national, and regional parks (Province of British Columbia 1995b). In addition, commercial backcountry recreation on public land is the fastest growing sector of the tourism industry in British Columbia (Province of British Columbia 1995b). Thus, any attempts to control and manage recreation access may have an effect on the outdoor recreation sector of the tourism industry in British Columbia.

Pressure from recreationists, in addition to increasing industrial development, has lead to the increased use of resource roads, trails, and helicopters in previously remote areas. Access to previously inaccessible areas has lead to a number of user conflicts and increasing environmental damage.

The extent and location of resource roads, as well as the level and type of activity using these roads, in addition to increasing recreation activity on Crown Land, have effects on wildlife and watershed health. For example: 1) the risk of landslides and sedimentation of streams increases with the extent and location of roads in a watershed, which in turn can have a negative effect on fish habitat and water quality; 2) grizzly bears are sensitive to human use of roads, particularly near denning and feeding sites at critical times of the year; and 3) mountain caribou are sensitive to the use of snowmobiles in their winter habitats (LUCO 1997). In addition to adverse environmental effects, increased recreation access facilitated by roads or helicopters has also lead to commercial and non-commercial recreation user conflicts in popular backcountry areas. However, access to backcountry areas can also bring benefits to users through enhanced wilderness experiences and increased environmental stewardship and activism resulting from knowledge of wilderness areas. The advantages and disadvantages of increased access to backcountry areas must be weighed in considering the issues arising out of unmanaged access; these issues are discussed in-depth in chapters 4.0 and 5.0.

1.2 Context

Defining the terms "access" and "access management" is difficult because these terms are value-based and imply different things to different groups of people. For example, to a forestry company, access management concerns building, maintaining, and deactivating logging roads and forestry recreation sites. To a recreationist, access management implies access, or in some cases, limited access to areas of recreation significance. To a physically disabled recreation user, access management implies barrier-free access at recreation sites and trails. To some environmental groups, researchers, and BC Environment (also known as Ministry of Environment, Lands, and Parks) access management implies restricting or limiting human access to conserve and protect wildlife populations and habitat. In terms of this project, access management refers to management and planning of recreation activities on roaded and unroaded Crown Forest land (publicly owned land).

Throughout this document, I discuss recreation access management in the context of forestry management for the following reasons:

- Recreation access is facilitated, to a great extent, by logging and forestry service roads in British Columbia.

- Many popular backcountry areas, commercial recreation tenures, and wildlife habitat that occur on Crown Land also occur in provincially owned forested land which is leased to forestry companies for management. Thus, forestry management decisions have the potential to overlap and affect recreation access.
- The study area of this project is managed by a forestry company for timber harvesting.
- The BC Forest Service, other government agencies, and to a certain extent, forestry licensees, have the responsibility to manage public land with a consideration of other values, including recreation and wildlife.

The BC Forest Service is responsible, to a certain extent, for managing recreation resources on public land. However, managing human access and recreation resources on public land is not only the responsibility of the BC Forest Service; several other government agencies are involved in managing different aspects of human access and access-related issues. BC Environment, BC Assets and Lands, and the Interagency Management Committee (a committee from the Land Use Coordination Office (LUCO)) are all involved in different facets of access management and planning. Access management and planning is truly an interagency exercise.

Although I focus on recreation access, I recognize that industrial access also has a significant effect on social, economic, and environmental values. As well, the effects of industrial access on recreation users, wildlife, and water quality have the potential to act cumulatively with the effects of recreation access to the detriment of the landscape. I chose to focus on recreation access because the scope of this project would be too large and unwieldy to offer useful recommendations had I focused on both industrial and recreation access.

To illustrate the challenges and opportunities resulting from access management, I use a case study of a timber harvesting area (Tree Farm License) in southeastern British Columbia (see chapter 4.0). A Tree Farm License (TFL) is a stewardship agreement between a private company and the Province of British Columbia that provides for the establishment, management and harvesting of timber on a perpetual yield basis (Interfor 1999). I selected TFL #14 as case study for the following reasons:

- my knowledge of the study area resulting from an earlier project;
- the extensive network of logging and forestry service roads;
- the number of commercial tenures in the TFL;

- the type of commercial and non-commercial recreation activities taking place on the landscape; and
- the diversity of wildlife, wildlife habitat, and terrain features within the TFL boundaries.

In addition, the forestry licensee (Crestbrook Forest Industries Ltd.), the Forest District (Invermere Forest District), other government agencies, environmental groups, commercial recreation users, and non-commercial recreation users in the area surrounding TFL #14 have expressed concern about the effects of access and are seeking management tools to address these issues in an equitable and inclusive manner.

Managing access on public land in British Columbia is a current issue for the forest industry because licensees and the BC Forest Service are mandated to manage public land and license areas for recreation values. However, managing access is also a concern for other government agencies, for environmental groups, and for concerned citizens because it has implications that reach far beyond forestry management in British Columbia. The intensity of competing uses, coupled with technological advances that facilitate commercial and public access to lands which were previously inaccessible to humans, is increasing demands for access management and planning, and resolution of the growing conflicts resulting from competing interests and overlapping rights and tenures (Scott-May n.d.). However, there is little guidance available to stakeholders with respect to managing access.

1.3 Project Objectives

The primary objective of this project is to identify tools available to manage access (commercial and non-commercial recreation) and to address access-related issues in British Columbia. In addition to achieving this primary objective, I recognize there will be a number of secondary objectives achieved by this project, which include:

- identifying the main issues arising out of recreation use of TFL #14;
- identifying the main issues arising out of the recreation use (commercial and non-commercial recreation, traditional) of public land in British Columbia;
- developing a rationale for managing human access;
- describing and critiquing the legislative and non-legislative tools available to manage non-industrial access; and

- providing recommendations to people in the vicinity of the case study area who are concerned with, or mandated to address access management.

1.4 Document Organization

This document is organized into the following five chapters:

Chapter 1: Project Overview

Chapter 1 provides a brief overview of the background and context of this project. The objectives of the project are identified.

Chapter 2: Study Methods

The methods used to achieve the objectives outlined in Chapter 1 are identified and discussed in Chapter 2. In addition, study limitations are identified and techniques used to address and overcome these limitations are discussed in the context of the project.

Chapter 3: Rationale

Chapter 3 establishes a rationale for the necessity of access management and planning. The ecological, social, and economic effects of human access are discussed using references found from the literature review. The benefits of access management and planning are identified in addressing these effects.

Chapter 4: Access Management in BC & TFL #14

The intent of Chapter 4 is to provide a case study of TFL #14 that illustrates the issues related to access on public land. Background to access-related issues and trends in the province of BC is provided to establish a context for the case study.

Chapter 5: Tools to Manage Access

The purpose of Chapter 5 is to identify the tools available to manage access on public land, using examples, where appropriate. The tools are divided into three categories:

- legislative tools;
- non-legislative tools; and
- road engineering measures.

The advantages and disadvantages of each tool are discussed. The intent of identifying tools is not to provide a cookbook recipe for access management and planning in BC. Rather, different combinations of the tools will be appropriate to different geographic areas and changing circumstances in BC.

Chapter 6: Options, Recommendations, and Conclusions

Chapter 6 represents the intervention component of this MDP. The purpose of Chapter 6 is to recommend options for access management and planning in TFL #14 and in the Invermere Forest District. The recommendations are presented in terms of long term options and interim actions. Conclusions are provided to summarize the major findings of this project.

2.0 Study Methods

2.1 Overview

The purpose of this chapter is to identify and discuss the study methods employed to achieve the objectives outlined in Chapter 1. In addition, the limitations of this study are identified and techniques used to address and overcome these limitations are discussed.

2.2 Study Methods

Four methods were used to accomplish the objectives set out in section 1.3, including the following:

- field visit;
- literature review;
- questionnaires; and
- key informant interviews.

These methods were overlapping and ongoing throughout the life of the project. Prior to involving human subjects in my research, I received ethics approval for the research design of my study by the Environmental Design Ethics Committee at the University of Calgary. A copy of this letter is included in Appendix A.

2.2.1 Field Visit

As a result of a project in the summer of 1998, I was introduced to my case study area, TFL #14. Although the purpose of the field work at that time was unrelated to my MDP, it allowed me to meet with the forestry planner at Crestbrook Forest Industries (CFI) to discuss the issues arising from recreation access. I familiarized myself with the recreation attributes of the TFL; the roads; major access points into the TFL; neighbouring protected areas; and the types of commercial and non-commercial recreation activities occurring in the area. In addition, I observed wildlife habitat in most of the landscape planning units. I spent approximately six weeks in TFL #14 and collected data in 14 out of the 23 major watersheds in the area. The observations I collected formed the foundation for the case study area description in chapter 4.0 and for many of the options and recommendations I developed in chapter 6.0.

2.2.2 Literature Review

The literature review supported two purposes:

- to develop a rationale for managing recreation access by researching the effects of human disturbance on wildlife, wildlife habitat, and water quality (see chapter 3.0); and
- to identify legislative and policy tools in British Columbia relevant to recreation management and land use planning (see chapter 5.0).

I relied on the following sources and methods to obtain relevant literature:

- Internet search;
- CD-ROM search;
- University of Calgary library services and inter-library loans;
- previous MDPs, theses, and dissertations;
- academic journal articles;
- CFI internal reports and publicly available forest development plans;
- BC Forest Service and BC Environment publications; and
- other forestry jurisdictions' publications, policies, and legislation (*e.g.*, US Forest Service, environmental non-governmental organizations *etc.*).

Using the key words "access management" did not produce any significant literature finds while searching the CD-Rom, library catalogue, and Internet. Instead, the literature review was focused on several key words related to access management, including:

- human access
- backcountry recreation management;
- accessibility of recreation facilities;
- forestry roads;
- wildlife management (*e.g.*, habitat requirements, responses to human disturbance *etc.*);
- user conflicts; and
- legislation and policies in British Columbia relevant to recreation management.

In addition, I obtained several relevant documents, reports, website addresses, and maps, previously unknown to me, as a result of following up on returned questionnaires and as a result of the key informant interviews.

2.2.3 Questionnaires

Several conversations with the forestry planner at CFI for TFL #14, initial telephone inquiries, and a preliminary Internet search were useful to develop a list of people, government agencies, environmental non-governmental organizations, and recreationists (commercial and non-commercial) to contact. I determined that the most efficient and effective way of reaching all the participants was to develop a self-directed questionnaire (Robson 1993). In total, 62 participants agreed to respond to the questionnaire. Participants included representatives from the following groups, organizations and agencies:

- commercial heli-skiing and heli-hiking companies;
- non-commercial recreationists (*e.g.*, hunters, hikers);
- non-commercial recreation organizations (*e.g.*, rod and gun clubs, snowmobile clubs);
- backcountry hut societies;
- forestry companies (British Columbia and Alberta);
- BC Parks;
- Parks Canada;
- environmental non-governmental organizations;
- naturalist societies;
- US Forest Service (Oregon, Washington, Idaho, Utah, Montana, Colorado, Utah, and Wyoming);
- Forest Districts in British Columbia (19 out of 40 forest districts were contacted and agreed to participate);
- registered hunting/guide outfitters and trappers in TFL #14; and
- BC Environment (Invermere, Cranbrook).

The participants were organized into three categories:

- users of TFL #14 (18 participants, 11 respondents);
- forest districts and forestry companies in British Columbia (31 participants, 23 respondents); and

- jurisdictions involved in managing access, but not involved in forestry management (*e.g.*, environmental groups, federal and provincial parks agencies *etc.*) (13 participants, 4 respondents).

As a result, I developed three questionnaires with similar questions, but each with a slightly different focus to address each group of participants. Questionnaire #1 was directed at TFL #14 users and those agencies mandated to manage access in the TFL; questionnaire #2 was directed at jurisdictions outside of forestry management, but who were involved with managing non-industrial use; and questionnaire #3 was directed at other forestry jurisdictions in British Columbia, but outside TFL #14. A sample of each questionnaire is included in Appendix B. I designed the questionnaire to be a combination of check-lists; categorical questions (*e.g.*, yes or no; ranking a list of choices from 1-5, *etc.*); and open ended questions (*e.g.*, if a respondent answered yes to a question, they were prompted to describe their answer in more detail, in an open-ended format).

The purpose of the questionnaire was threefold:

- to identify recreation activities by season in TFL #14;
- to identify types of user conflicts resulting from non-industrial activities in TFL #14 and in British Columbia;
- to identify tools currently used to manage issues arising from non-industrial access in TFL #14, in other areas in British Columbia, and in other areas of Canada and the Pacific Northwest United States.

The questionnaires were sent out by post and, where possible, by email in early February 1999, to be returned by the end of March 1999. Sending the questionnaires electronically, by email, was an advantage over regular post because I could confirm the participant had received the questionnaire; I experienced faster response rates from respondents who had used email; and I was able to clarify issues arising from the interpretation of some parts of the questionnaire immediately.

Most of the questionnaires were returned by mid-April. Out of 62 questionnaires sent, I received 38 completed questionnaires (63% return rate). The responses to the open-ended questions were grouped into similar categories for further organization. Examples from other jurisdictions were

also drawn from the open-ended answers in the questionnaires. There is no separate "results" section, as the results of the questionnaires are completely integrated into the document to support various assertions and conclusions. Most importantly, the results formed the basis of the case study and the characterization of current trends in access management in British Columbia (chapter 4.0), and the description and critique of tools to manage access (chapter 5.0). Throughout the document, references (in brackets) are made to the questions and the questionnaires where information was taken. For example, Table 4.3 was the result of the answers to questionnaire #1, question #2 (Q1, q2). The results obtained from the questionnaire results and interviews also guided the development of the recommendations in chapter 6.0, as these recommendations were formulated to address the gaps and problems in the current approach to recreation access management and planning. Ultimately, the initial questionnaire responses, the initial phone calls, and emails lead me to identify appropriate key informants for the interview phase of this project.

2.2.4 Key Informant Interviews

As a result of the questionnaires, I was able to identify numerous people who had previous experience dealing with access management in and around TFL #14. Participants included representatives from the following agencies, companies, and organizations:

- non-commercial recreation users;
- East Kootenay Environmental Society (EKES);
- Crestbrook Forest Industries;
- BC Forest Service (Invermere Forest District, Golden Forest District, and Cranbrook Forest District);
- BC Environment (Invermere and Cranbrook);
- Golden Rod and Gun Club; and
- Canadian Mountain Holidays (CMH).

I conducted eight interviews in the communities of Golden, Invermere, Radium Hot Springs, and Cranbrook, British Columbia during the week of March 8-12, 1999. All of the interviews except for one included one interviewee. One interview included five participants, not including the interviewer. The purpose of the interviews was to gather additional information regarding recreation use and access management from people who are involved with decision-making and managing the issues arising from recreation access on public land. In addition, the interviews enabled me to:

- determine the status of access management in southeastern British Columbia;
- identify past initiatives in southeastern British Columbia to address access-related issues;
- collect additional unpublished documents and GIS-based maps for the Invermere and Golden Forest Districts; and
- understand the concept of access management in a broader, strategic, land-use planning context.

The interviews were not formal or rigidly structured. Although I used an interview guide tailored with questions specific to each group, I adopted an informal approach allowing conversation regarding the issues surrounding recreation access management to develop naturally (Robson 1993). As a result of digressing from my original interview guide, I was able to reveal details about current access management initiatives in the vicinity of the study area that I may not have discovered had I adhered to a formal interview process. I did not record the exact content of the interviews, as some of the participants were unwilling to be directly quoted. Instead, I took detailed notes during the interview and reviewed them for clarification immediately after the meeting. I followed up with the participants on any points raised in my notes that needed clarification. The information I collected during the interviews was used to develop my recommendations (chapter 6.0), and to identify and describe tools to manage access (chapter 5.0).

2.3. Study Limitations

As with any research project, (especially with projects involving human subjects), there are factors which may limit the success of the research and the interpretation of the results (Robson 1993). In this MDP, these factors included:

- financial and temporal constraints on the researcher;
- scope of the project (*e.g.*, considering only recreation and not industrial use);
- rate of return for questionnaires;
- interpretation of open-ended questions in the questionnaires;
- difficulty categorizing and coding open-ended responses;
- questionnaire respondents' bias;
- interview participant bias;
- reliability of questionnaire responses;
- group interview dynamics (more than one participant);

- temporal constraints on interview and questionnaire participants; and
- reliability of secondary data and site-specific inventories/information for TFL #14, completed prior to 1998.

I took several measures to overcome any obstacles encountered during this study, including the following:

- I applied for and received funding for study-related expenses from the University of Calgary and the Mountain Equipment Co-op Environment Committee.
- I followed up on any vague questionnaire responses and interview notes. In addition, I followed up on any interview notes where I needed to clarify the interviewees' responses.
- I submitted chapters of the MDP draft to relevant people involved in the interview phase to review in order to determine the accuracy of the assertions I made.
- Where possible, I compared interview and questionnaire responses to current information collected during the literature review, to reveal participant bias.
- Where possible, I limited group interviews to two participants. However, in some cases, due to participant's time restraints, I included more than two participants.
- I recognize there are effects from industrial access that may act cumulatively with the effects from recreation access; however, I have determined the scope of this project to focus only on recreation access management.

There are some study limitations that were beyond my control to correct; however, I took these factors into consideration when interpreting the questionnaire responses, my interview notes, and other data collected using the methods set out in sections 2.2.1-2.2.4. and while developing my recommendations.

3.0 Rationale

3.1 Overview

The purpose of this chapter is to provide a rationale for access management and planning. A comprehensive literature search of contemporary research formed the basis of the information presented within this chapter.

3.2 The Effects of Access

Human access into remote areas, facilitated by logging roads or aerial transportation, can result in numerous direct and indirect effects on wildlife, habitat, water quality, public safety, and recreation users' experiences. These effects can interact cumulatively or incrementally to the detriment of the physical environment, society, and the local economy. Table 3.1 summarizes the potential negative ecological, social, and economic effects resulting from unmanaged access, in addition to identifying the receptors and possible consequences of each effect. Ecological effects can be direct, as a result of the presence of roads, or indirect, as a result of human activities facilitated by the presence of roads. The effects identified in Table 3.1 are discussed in the following sections.

Table 3.1
Summary of the Potential Effects
Resulting from Unmanaged Access

Ecological		
Effect	**Receptor**	**Consequence**
soil erosion and alteration of hydrological patterns	• terrestrial habitat • aquatic habitat • aquatic wildlife • domestic water users	• loss of topsoil • sedimentation of water bodies and aquatic habitat • decline in quality of fish habitat • decrease in fish populations • diminished water quality
introduction of invasive species	• wildlife • terrestrial habitat • aquatic habitat	• reduction in native biological diversity
pollution	• atmosphere • wildlife • terrestrial habitat • aquatic habitat • domestic water users • recreationists	• diminished water quality • poor air quality • soil contamination in the long term • chronic or acute health problems in wildlife and humans • contamination of aquatic habitat

Table 3.1
Summary of the Potential Effects
Resulting from Unmanaged Access

sensory disturbance to wildlife, and wildlife aversion to human activities and development (*i.e.*, noise)	• wildlife	• increased physiological stress on wildlife • wildlife displacement and avoidance of optimal habitat and movement corridors • increased habituation of wildlife to human activities
habitat fragmentation	• wildlife • terrestrial habitat • aquatic habitat	• habitat loss • isolation of wildlife populations in smaller patches • decreased movement across the landscape • increased opportunity for predation and parasitism • reduced genetic viability in isolated populations over the long term • diminished biological diversity
wildlife mortality	• wildlife • commercial and non-commercial recreationists	• locally decreased wildlife populations • potential for local extinction with implications on a greater ecosystem scale • potential for local extinction of wildlife species with low fecundity rates • economic effect on commercial, recreation activities dependent on game species
Social		
Effect	**Receptor**	**Consequence**
user conflicts	• commercial and non-commercial recreationists	• exclusion of some users whose activities are incompatible with those of others • threat to safety of users • decreased enjoyment of recreation activities • diminished wilderness experience for users
compromised public safety	• commercial and non-commercial recreationists • industrial users • forestry licensees • government agencies	• increased potential for vehicular collisions when recreation vehicles share logging roads with industrial vehicles • extended length log loads pose an additional hazard to vehicles parked on the side

Table 3.1
Summary of the Potential Effects
Resulting from Unmanaged Access

		of logging roads • liability for licensees and government agencies responsible for maintaining logging roads on public lands in the interest of public safety
Economic		
Effect	**Receptor**	**Consequence**
unplanned disposition of commercial recreation tenures	• commercial and non-commercial recreationists	• conflicts between overlapping recreation tenures • over use of areas of recreation value • conflicts between commercial and non-commercial recreationists in areas of high use • management uncertainty for commercial tenure holders • threat to economic viability of commercial recreation operations when in conflict

3.3 Ecological Effects

3.3.1 Soil Erosion and Alteration of Hydrological Patterns

Soil erosion and alteration of hydrological patterns in forested watersheds can result from the presence of logging roads (Noss 1990; Moore 1994). Road construction alters the hydrology of watersheds through changes in water quantity and quality, stream channel morphology, and groundwater levels (Noss 1990; Province of British Columbia 1994). When a roadbed is raised above the surrounding land surface, it acts as a dam and alters surface water flow patterns, restricting the amount of water reaching downstream or downslope areas (Noss 1990). Road surfaces can also concentrate surface water flows, increasing the capacity of surface water to move sediments into water bodies (Noss 1990).

Logging roads that are usually constructed on valley hillsides or in riparian areas on valley bottoms intersect slopes and can increase water flow travelling downslope, especially under extremely wet conditions. Road cuts into hillsides can intercept subsurface water flow, and, unless the water permeates the soil, it becomes surface flow. As roads convert ground water seepage into surface stream flow, the rate of water movement downslope increases significantly (Noss 1990; Province of British Columbia 1994). Additionally, roadside ditches capture and

concentrate small, intermittent streams and overland flow between engineered drains, increasing the delivery of surface water downslope (Province of British Columbia 1994).

Roads constructed in valley bottom riparian areas usually cross streams or rivers. Where a logging road is constructed to cross a stream, engineers usually divert, channelize, or alter the stream channel to accommodate road construction (Noss 1990). Culverts and bridges can be built to minimize the alteration of the stream channel; however, they still can affect flow patterns and can restrict the passage of fish (Noss 1990). Channelization removes naturally diverse substrate materials in the stream bed, increasing sediment loads, simplifying current patterns, and reducing the stability of banks (Noss 1990). Low gradient stream banks and stream beds have historically been used for stream crossings where the construction of a bridge is not required (Province of British Columbia 1995a). Occasional use of natural crossings, such as shallow stream beds, can result in stream bank erosion and destabilization, increased sediment deposition, changes to channel morphology, and diminished water quality (Province of British Columbia 1995a).

As unpaved roads alter the nature and rate of surface and sub-surface water flow, more sediment is washed downslope and into water bodies. Soil erosion can affect water bodies through increased sedimentation, in turn, diminishing the quality of aquatic habitat (O'Loughlin 1994). For example, increased sediment loads in roaded watersheds in British Columbia have contributed to declines in fish density (Moore 1994). Salmonids are vulnerable to sedimentation since they lay their eggs in gravel and small rubble with water flow sufficient to maintain a constant supply of oxygen. Increased siltation reduces the availability of oxygen to the eggs and mortality increases. Direct contact with stream beds through road/bridge construction or through repeated crossings can destroy spawning habitat (Moore 1994). Critical fish habitat can be affected in other ways as a result of road and trail construction. As roads and bridges are constructed in riparian areas, vegetation is removed to accommodate construction activities. Without the shade of trees and shrubs around water bodies, water temperature increases, reducing the amount of dissolved oxygen in the water and increasing oxygen demands by some species of fish (Moore 1994).

In extreme cases of soil erosion and increased water flow down slope, landslides can occur in roaded watersheds (Province of British Columbia 1994; Wilson 1998). In British Columbia, increased rates of landslides in roaded areas are attributed to the following factors (Province of British Columbia 1994):

- Roads disrupt and concentrate sub-surface drainage, often creating areas of water concentration.
- Road sidecast can overload and oversteepen already steep slopes.
- Removal of vegetation to construct roads increases the amount of rain that reaches the soil since there is no canopy to intercept precipitation.
- The removal of trees to construct roads destroys roots that anchor the soil.

In forested landscapes undisturbed by road construction or industrial activities, soil erosion rates are slow and landslides are rare since the vegetation canopy intercepts and disperses precipitation and anchors the soil, reduces surface water flow and soil erosion (Province of British Columbia 1994). Human activities on unpaved roads can also contribute to accelerated rates of soil erosion (McLellan and Martin 1991; Moore 1994). Soil can be removed by tire treads, shoe treads, and horses' hooves.

Road construction in forested watersheds and the associated decline in water quality due to sedimentation are also a concern for water users in British Columbia because forested watersheds provide 80% of the domestic water supply (Meidinger and Pojar 1991).

In summary, the construction and use of logging roads in forested watersheds can accelerate natural rates of soil erosion, increasing sedimentation of water bodies (Province of British Columbia 1994). In turn, increased sedimentation can diminish the quality of drinking water and the quality of fish habitat. The physical construction of roads in riparian areas and through streambeds can alter stream hydrology and can destroy or disrupt fish habitat.

3.3.2 Introduction of Exotic Species, Pests, and Pathogens

An exotic, invader species of plant or wildlife is an organism that is able to colonize and persist in an area where it has never been before (Ebersberger 1999). Invasive species are often generalists and thrive in a wide range of habitats (Andrews 1990). Invasions by exotic species can alter native habitat composition and ecosystem processes by outcompeting native species, preying on native species, or spreading new diseases, thus posing a serious threat to native biodiversity (Ebersberger 1999).

Logging roads provide access for the dispersal and introduction of invasive, exotic species (Ebersberger 1999). Invasions and dispersal are usually facilitated by disturbances such as road construction and human activity (Ebersberger 1999). Invasive species are easily introduced into the interior habitat of forested landscapes through roads since roads provide easy travel routes for wildlife (Andrews 1990). Roads also create edge habitat on the periphery of interior habitat that favours species with generalist requirements; therefore, invasive plant species thrive along road side edges and have more opportunity to colonize the interior habitat of forested landscapes (Andrews 1990). Lastly, humans using roads can inadvertently precipitate the spread of invasive species by dispersing fungal spores or seed pods from other areas that may be attached to tire treads, shoes treads, watercraft, horses' hooves, or articles of clothing.

3.3.3 Pollution

Recreation activities requiring the use of motorized vehicles can pollute the air, water and soil. Air emissions from off-road vehicles (ORVs), snowmobiles, and motorized watercraft include carbon monoxide, carbon dioxide, unburned hydrocarbons, and particulates (Smith 1999; Wood 1999). Additionally, motorized vehicles can release oily residues and heavy metals such as lead, zinc, copper, nickel, and chromium (Andrews 1990). Compared to a typical car, ORVs have relatively inefficient engines and release higher levels of carbon dioxide and unburned hydrocarbons into the atmosphere (Smith 1999). Since ORVs are not regulated the same way as cars and trucks, they are rarely equipped with pollution (air and noise) control equipment. Areas where ORVs and other motorized vehicles operate in large numbers, or under certain climactic and topographic conditions, are prone to higher than ambient levels of air pollution (Smith 1999).

Most of the emissions and particulates released by motorized vehicles directly pollute the atmosphere and then settle on snow, soil, or water surfaces, indirectly contaminating the ground and water bodies (Smith 1999). Eventually, all contaminants that settle on terrestrial surfaces are washed into waterways as a result of surface water flow, soil erosion, or snow melt. The small amount of toxins that settles on the ground or enters waterways may at first seem innocuous; however, over time, toxins can bio-accumulate in the tissues and organs of plant and wildlife species, eventually affecting every part of the food chain (Smith 1999).

In summary, pollution, as a result of the use of motorized vehicles for recreation activities, can diminish water quality, reduce air quality, and contaminate aquatic and terrestrial habitats.

3.3.4 Sensory Disturbance & Aversion

Anthropogenic noise from recreation and industrial activities in roaded and unroaded areas can result in sensory disturbance of wildlife (McLellan and Shackleton 1989; Knight and Cole 1995; Neu and Taylor 1995; Smith 1999; Mychasiw and Hoefs n.d.). Wildlife exhibit three types of reactions to human-made noise (Bowles 1995):

- Aversion/avoidance;
- Attraction; and
- Tolerance.

In combination with the sensory disturbance associated with human activities on roads, the physical existence of a road can also trigger avoidance behaviour in some wildlife species (McLellan and Shackleton 1989).

Aversion/Avoidance

In response to motorized human activity in roaded and unroaded areas, wildlife can exhibit the characteristics of aversion. Studies have indicated that ungulates and large carnivores change their movements in response to helicopter overflights, snowmobile approaches, traffic on logging roads, construction noise, and non-motorized human activity (McLellan and Shackleton 1989; Bowles 1995; Smith 1999). In extreme cases, wildlife exhibit strong panic and flight responses to the noise produced by motorized activities (Knight and Cole 1995). Panic and flight results in physiological responses such as increased heart rate, increased metabolic rate, and increased release of stress hormones (Noss 1990; Knight and Cole 1995). For example, helicopter overflights have been noted to evoke strong panic responses in groups of ungulates with offspring; and the heart rate of bighorn sheep increased 2-3 times when a helicopter passed directly overhead at a low elevation (Calef *et al.* 1976; Knight and Cole 1995). As wildlife alter their movement patterns to avoid sources of noise, they expend energy reserves intended for reproduction, migration, and overall good health and survival (Calef *et al.* 1976). If wildlife are continually stressed to the point that they require more energy than they take in, overall health declines and reproductive success and survival in the long term may be compromised (Geist 1971; Calef *et al.* 1976; Bowles 1995). A study of bighorn sheep in the Grand Canyon indicated that sheep alerted more when feeding in the presence of helicopters than when undisturbed (Bowles 1995). When helicopters approached more closely, the sheep stopped feeding and fled (Bowles 1995). A constant decrease in food consumption, coupled with increased energy

expenditures was predicted to result in decreased body mass and decreased fecundity of exposed bighorn sheep relative to unexposed individuals (Bowles 1995).

It has already been determined that exposure to motorized activity can evoke panic and escape responses in some wildlife species in the short term. However, in the long term, continuous motorized use of the landscape over the course of a winter, or several seasons can lead to wildlife displacement from optimal habitat or established migratory routes (Calef *et al.* 1976; Bowles 1995; Smith 1999). As a result, wildlife may alter their traditional home ranges or migration routes to avoid areas with a continuous source of human generated noise.

Despite the amount of traffic or the motorized noise and disturbance associated with a road, some species of wildlife avoid roads and the zone of influence surrounding a road right-of-way, even when the road is closed to traffic (Brody and Pelton 1989; Andrews 1990; Noss 1990; McLellan and Martin 1991; Mace *et al.* 1996; Weaver *et al.* 1996). Species such as wild turkey, mountain lion, grizzly bear, and black bear tend to avoid roads and the areas surrounding them (Noss 1990). Grizzly bear movement can be disrupted within 4 km of a road, lynx will not generally cross a road wider than 100 feet, and bobcats avoid roads and associated habitat within 100 m of a road corridor (Havlick 1999).

In a study in the Flathead area of Montana and British Columbia, results indicated that grizzly bears used habitat within 100 m of a road corridor less than what was anticipated (McLellan and Shackleton 1988; Noss 1990). Overall, habitat avoidance surrounding roads in the Flathead area resulted in an 8.7% loss of habitat for grizzlies (McLellan and Shackleton 1988). Avoidance of habitat represents a significant loss of critical habitat to grizzlies in this area since some areas close to roads contain high quality spring and fall grizzly forage (McLellan and Shackleton 1988). In the Flathead study, avoidance of roads and the associated habitat was independent of traffic volume, suggesting that even a few vehicles can contribute to the displacement of bears (McLellan and Shackleton 1988).

In Yellowstone National Park, studies have indicated that grizzlies avoid areas near roads, especially by day, even when preferred habitat and forage is located there (Noss 1990). Some studies have indicated that the natural movement of grizzly bears may be deflected by linear development, such as roads. However, other studies indicate that grizzly bears may prefer to use

road corridors as travel routes, particularly when off road travel would be difficult due to dense brush or logging slash (Noss 1990).

Attraction

Human-made noise can attract some wildlife to areas of human activity, with potentially negative effects. Wildlife may be attracted to human-made noise because they associate the noise with reward (Bowles 1995). For example, predators may be attracted to humans due to the noise they generate because they associate humans with an easy source of prey (Bowles 1995). Deer are attracted to the motorized sound of chainsaws that they associate with increased browse from downed trees (Bowles 1995). As wildlife species are attracted to sources of human noise, they are continually drawn into contact with humans, potentially resulting in negative human-wildlife encounters, especially involving predatory wildlife species, such as cougar and bear.

Despite the human disturbance associated with roads, some wildlife species are attracted to roads and road edges, to their detriment. Wildlife can be attracted to road surfaces and edge habitat for a number of reasons (Noss 1990):

- Snakes and reptiles are attracted to warm surfaces to bask.
- Birds eat roadside gravel to aid digestion of seeds.
- Mammals are attracted to de-icing salts and summer dust control agents.
- Deer and browsing herbivores are attracted to the dense vegetation of roadside edge habitat.
- Rodents proliferate in grasslands and scrub at road edges.
- Some large animals find roads to be efficient travel routes.
- Scavengers are attracted to road kill and become road kill themselves.

Wildlife species that are drawn to roads and edge habitat suffer higher rates of predation, parasitism, and direct mortality from hunting or vehicle collisions than their counterparts in unroaded habitat (Noss and Csuti 1997).

Tolerance

Wildlife can become habituated to human-made noise and human presence (Bowles 1995). As wildlife become habituated to human disturbance on roads, they may use roads and road edges for travel routes and browsing, increasing the potential for wildlife-vehicular collisions (Bowles 1995). While habituation permits more complete use of habitats for wildlife, there is an increased

potential for humans and wildlife to come into contact, resulting in adverse human-wildlife interactions (McLellan and Martin 1991).

Lastly, sensory disturbance can interfere with wildlife species that communicate with auditory signals, resulting in the disruption of behaviours such as territorial establishment and defense reactions (Noss 1990). Other wildlife behaviours that can potentially be affected by sensory disturbance include courtship and mating, predation, social communication, and parental care (Bowles 1995).

In summary, aversion to roads and sensory disturbance of wildlife from human made noise can result in short term and long term consequences that have direct implications for wildlife health and survival.

3.3.5 Habitat Fragmentation

Habitat fragmentation occurs in areas where human developments and disturbance dissect the landscape, dividing it into smaller remnants of habitat. The pieces of landscape left over are generally reduced in size and physically disconnected from adjacent, continuous habitat (Noss 1987; Collinge 1996; Fahrig 1997). Some species of wildlife refuse to cross barriers as wide as a road. For these species, a road effectively cuts a population into smaller groups (Brody and Pelton 1989; Noss 1990; McLellan and Martin 1991; Mathysen *et al.* 1995). Increasing networks of roads into previously unroaded wilderness fragments wildlife and plant populations further. The remaining populations residing in the habitat fragments are vulnerable to the following problems associated with isolation (Andrews 1990; Mathysen *et al.* 1995; Noss and Csuti 1997):

- Genetic deterioration from inbreeding;
- Random drift of gene frequencies;
- Heightened vulnerability to environmental catastrophes;
- Fluctuations in habitat conditions;
- Chance variation in age and sex ratios;
- Crowding effect; and
- Local extinction.

Studies in southeastern Ontario and Quebec found that small forest mammals such as eastern chipmunk, gray squirrel, and white footed mouse rarely ventured onto road surfaces when roads

exceeded 20 m in width (Noss 1990). Narrow, unpaved logging roads, closed to traffic constituted a barrier, even when animals were physically capable to cross the opening (Noss 1990). Wildlife species with larger home ranges than rodents, such as cougar and black bear, may also hesitate to cross road openings. These species react to increasing road density by shifting their home ranges to areas of lower density (Noss 1990).

Road corridors also introduce the edge effect into previously intact areas (Andrews 1990; Noss 1990; Reed *et al.* 1996). The edge is a human artifact introduced to forested landscapes through road construction, where two contrasting habitats suddenly change without natural gradation (Andrews 1990). Edges introduce potentially detrimental micro-climactic and biological changes relative to the intact interior habitat (Reed *et al.* 1996). Changes include increased blowdowns, increased evaporation, increased temperature, increased solar radiation, decreased available soil moisture, increased air pollution, and increased soil erosion (Noss 1990; Reed *et al.* 1996). Road edges tend to exist over the life of a road as vegetation is cut back along roadsides to accommodate logging trucks. The human-made edge is usually inimical to most wildlife species. However, some edge-adapted species are drawn to edge habitat, to their detriment, as they suffer increased rates of predation, parasitism, and disturbance by human activity (Noss and Csuti 1997). Some wildlife species, such as the Northern spotted owl, gray wolf, and pine marten, are dependent upon large patches of intact interior forest habitat for survival and are excluded from edge habitat (Reed *et al.* 1996).

As more roads are built, the landscape may become largely edge habitat relative to interior habitat (Noss and Csuti 1997). If the landscape is fragmented too much, the ratio of edge to interior favours the edge habitat, to the detriment of interior dependent species. Thus, increased habitat fragmentation will eventually result in loss of critical interior habitat. As favourable interior habitat decreases, wildlife species will be forced into patches of sub-optimal habitat. Reproductive success will decline, leading to decreasing population densities, and perhaps local extinction. Increased habitat loss through fragmentation could lead to increased wildlife mortality as species are alienated from, or abandon habitat due to road construction and human disturbance. For the greater ecosystem, over the long term, these effects will result in regional species extinction, diminished species diversity, and a loss of critical, intact habitat.

3.3.6 Wildlife Mortality

Wildlife mortality is the eventual consequence of some of the effects listed in the previous sections, most notably habitat fragmentation and loss, aversion, pollution, and soil erosion. These effects can interact cumulatively over the short and long term to reduce some species of wildlife populations. Increased access to sensitive wildlife habitat and increased human activity and disturbance facilitated by logging roads and aerial transportation can exacerbate wildlife mortality. Directly, wildlife mortality can increase due to interactions with humans, such as vehicular collisions or hunting (Andrews 1990; McLellan and Martin 1991). Indirectly, wildlife mortality can increase due to habitat fragmentation, habitat loss, or loss of prey species, for example.

Typically road kill of wildlife increases proportionally with the volume of traffic. Therefore, on busy roads, such as highways, there should be higher levels of road kill than on secondary roads, such as logging roads. However, road kill on unpaved logging roads contributes significantly to accelerated rates of wildlife mortality (Noss 1990). Different species of wildlife are attracted to road surfaces (paved or unpaved) for the reasons listed in section 3.3.4, usually to their detriment.

Wildlife species, such as cougar and grizzly bears, which are not attracted to roads for the above reasons, still seem to suffer higher mortality rates in roaded areas than in unroaded areas. More roads create greater access for legal and illegal hunting activities. Studies have indicated that most grizzly bear mortalities (hunting and non-hunting related) happen within one mile of a road (Noss 1990). More adult female grizzlies with cubs are killed near roads since they use these areas to avoid interactions with adult male grizzlies, resulting in unfavourable changes in demographics for local grizzly bear populations (McLellan and Shackleton 1988; McLellan and Martin 1991). These studies indicate that the ability of a region to maintain viable populations of grizzly bears is related to road density and the ability to manage human access to sensitive habitat (Noss 1990).

Road density has also been used as an indicator of wolf habitat suitability. As road density increases, wolf populations decrease. However, roads do not deter wolves, as they often use them to facilitate easier travel or to prey on edge adapted species such as white-tailed deer (Noss 1990). Roads facilitate human access into wolf habitat, allowing people to shoot, trap, and harass wolves, thereby decreasing their populations (Thiel 1985; Mech 1988; Mech 1989; Noss 1990).

Wildlife mortality can increase indirectly through habitat fragmentation and loss, and through changes in predator-prey dynamics. The consequences of habitat fragmentation and loss are expressed in greater detail in section 3.3.5. Predator-prey dynamics are influenced by roads that facilitate greater human access (McLellan and Martin 1991; Havlick 1999). Predator populations can decline as a result of increased vehicle collisions or increased hunting pressure, as mentioned before. Prey species, such as elk, moose, and deer, are sensitive to road densities and increased hunting pressure near roads; as their populations decline, the population of predator species drops accordingly (Havlick 1999).

Increased wildlife mortality has some obvious implications for the health of ecosystems. Over the long term, individual wildlife mortality in fragmented or isolated areas can result in localized extinction of wildlife communities. Ultimately, the biological diversity and functioning of ecosystems becomes irreversibly impoverished.

3.4 Social Effects

3.4.1 User Conflicts

Road construction into forested areas has increased in the past few decades (Scott-May n.d.). As a result of increased access facilitated by primary roads and unpaved logging roads, there has been exponential growth in the number and type of recreation activities in areas that were previously unvisited by humans. Additionally, commercial recreation ventures and guided tours have also grown in popularity; demands for increased access to, and disposition of publicly owned land to accommodate commercial tenures have also intensified. As a result of more recreationists using popular backcountry destinations and the unplanned disposition of public land to commercial operators, conflicts between different users groups have erupted. This phenomenon is not specific to British Columbia -- it has happened in other provinces and in areas of the United States. User conflicts can occur as a result of the following circumstances (Scott-May n.d.):

- Incompatible recreation activities in the same area;
- Conflicting interests between commercial and non-commercial recreationists;
- Conflicting interests between local and visitor use of backcountry areas; and
- Overlapping commercial recreation tenures.

User conflicts that result from unplanned and unmanaged access can potentially diminish the wilderness experience for all users, threaten the safety of some users, exclude incompatible users

from popular backcountry areas, and threaten the economic viability of commercial recreation operations.

3.4.2 Compromised Public Safety

As recreation access into forested areas increases, more non-industrial vehicles will use logging roads and trails to reach popular backcountry destinations. As these roads and trails are used frequently by logging trucks, especially during the spring and summer months, there is a potential for increased collisions between recreationists using vehicles and logging trucks on roads to popular recreation sites or commercial lodges/tenure areas. Logging trucks with extended length log loads pose an additional hazard to vehicles parked on the side of the road or on landings (Cairn Consultants Ltd. 1995).

The public safety of recreation users can be further compromised through user conflicts. Some recreation activities create hazardous conditions for other recreationists. For example, snowmobile tracks harden when exposed, creating dangerous downhill conditions for heli-skiers and snowboarders. In addition, snowmobile tracks and ski tracks can undercut or weaken unstable snowpack, increasing avalanche danger for all users.

In light of unplanned and unmanaged access, public safety will continue to be compromised, raising the question of corporate responsibility and of licensees and government agencies assuming the liability for public safety on logging roads, forestry service roads, and in backcountry areas.

3.5 Economic Effects

3.5.1 Unplanned Disposition of Commercial Licenses

Increasing disposition of commercial recreation tenures on publicly owned land in BC has occurred in response to the growth in commercial recreation ventures and to increased access to popular backcountry areas. If the disposition of tenures is unplanned and unmanaged, and access to popular backcountry areas by commercial and non-commercial recreationists increases, problems will inevitably occur (Scott-May n.d.; pers. comm. Jacqueline Pinnsoneault). These problems include:

- Conflicts between incompatible and overlapping recreation tenures;
- Conflicts between commercial and non-commercial recreationists in popular recreation areas;

- Over use of areas of recreation value; and
- Management uncertainty for commercial recreation tenure holders.

3.6 Cumulative Effects

The effects of human access, by roads, helicopters or other modes of transportation, and the ecological effects of roads have the potential to interact cumulatively. Over the long term, if unchecked, the consequences of these effects interacting cumulatively will diminish the biological diversity of ecosystems and the quality of recreation experiences. The complexity of the interactions of potential effects is illustrated in the following scenario described by conservation biologist Reed Noss (1990):

> *A network of roads is built into prime gray wolf habitat in a northern hardwood forest. Hunters flock into the area, depressing the wolf population. Some wolves are killed by vehicles. Eventually, the wolf becomes extinct in this region. In the absence of wolf predation, and with the abundance of brushy roadside edge habitat, the white-tailed deer population explodes. Fires started by humans along roadsides create even more deer habitat. Hunters and vehicles take some of the deer, but they cannot keep up. The burgeoning deer population overbrowses the forest, eliminating regeneration of favoured eastern hemlock, arbor vitae, Canada yew, and a number of rare herbaceous plants. As a result, the floristic composition and vegetation structure of the forest gradually change. With reduced understorey density due to heavy browsing, many warblers and other forest songbirds undergo serious declines. With wolves gone, opportunistic medium-sized predators ("mesopredators") such as opossums and raccoons increase in abundance and feed on the eggs and nestlings of songbirds, many of which nest on or near the ground, further depressing their numbers. Brown-headed cowbirds parasitize these beleaguered songbirds within 200 metres or so of road edges. Cutting of snags for firewood along the roadsides decimates cavity-nesting bird populations. Populations of insect pests now cycle with greater amplitude, resulting in massive defoliation. The roads also bring in developers, who create new residential complexes, and still more roads. Roadside pollution from increased traffic levels poisons the food chain. The original forest ecosystem has been irretrievably destroyed.*

Although this scenario is fictitious, each element of the story characterizes a situation that is occurring or has already occurred somewhere in North America (Noss 1990). It illustrates the complex interaction of the effects of unmanaged human access and road construction in forested landscapes. Additionally, the ecological effects of unmanaged access can interact cumulatively with social and ecological effects to the detriment of commercial and non-commercial users.

3.7 Goals of Access Planning and Management

Access management can involve closing existing roads, planning the construction of new roads, planning the disposition of recreation tenures, limiting the number of users in some areas, and zoning conflicting uses, among other tools. Addressing the effects of road construction and human activities that are encouraged by these roads are the goals of access planning and management. These goals are summarized according to the effects and concerns introduced in section 3.2 in Table 3.2.

Table 3.2
Summary of the Goals of
Access Management and Planning

Ecological	
Effects or Concerns	**Goals**
soil erosion and alteration of hydrological patterns	• reduce the amount of sediment entering waterways by reducing the rate of anthropogenic soil erosion • reduce the effect of sedimentation on fish habitat and populations • reduce the effect of sedimentation on domestic water users • reduce the number of landslides
introduction of invasive species	• reduce the number and the extent of invasive species in forested landscapes
pollution	• reduce the effect of human generated air, water, and soil pollution • prevent long term health ailments and accumulations of toxins in wildlife, plants, and humans
sensory disturbance to, and aversion of wildlife	• reduce the displacement of wildlife from roads, road edges, and from areas of high use • prevent the habituation of wildlife to human activities • reduce the physiological stress on wildlife, especially during critical periods of the year
habitat fragmentation	• prevent habitat loss resulting from over fragmentation of forested landscapes • reduce the effects of isolation of wildlife populations in fragmented habitats • prevent barriers to wildlife movement across the landscape • prevent long term decline in biological diversity
wildlife mortality	• prevent the potential for local and regional extinction of wildlife species • prevent the economic downturn of commercial activities dependent on large game species that may be vulnerable to increased rates of wildlife mortality • prevent the decline of biological diversity

Table 3.2
Summary of the Goals of
Access Management and Planning

Social	
Effect	**Benefit**
user conflicts	• reduce conflicts between incompatible and overlapping users • prevent over use of popular backcountry destinations • reduce threats to user safety • preserve the wilderness experience for all users
compromised public safety	• reduce the threat to public users on logging roads, forestry service roads, and in areas of high use • manage risks and liability for licensees and government agencies responsible for maintaining logging roads on public lands • create a due diligence defense for licensees and government agencies responsible for maintaining logging roads on public lands
Economic	
Effect	**Benefit**
Unplanned disposition of commercial recreation tenures	• reduce the potential for conflicts between overlapping commercial tenures • reduce the potential for conflicts between commercial and non-commercial users • prevent over use of popular areas • increase management certainty for commercial tenure holders.

4.0 Access Management in British Columbia and TFL #14

4.1 Overview

The purpose of this case study is to characterize the issues in TFL #14 related to outdoor recreation and access. An overview of access management issues in British Columbia is provided to give context to the case study. Information obtained as a result of questionnaires, key informant interviews, a literature review, and numerous informal conversations with the forestry planner at CFI, form the basis of this chapter. As I noted in chapter 3.0, section 2.2.3, questionnaire and question numbers are noted next to tables and in the text to support the information presented therein. For example, questionnaire #3, question 11 is noted as Q3, q11.

4.2 Access Management in British Columbia

Natural forested landscapes in British Columbia are an integral factor in the health of the tourism industry because they draw recreationists to the province from across the country and worldwide (Hammond 1991). In fact, recreation use of provincial forests by both visitors and locals is growing and has exceeded recreation use in protected areas in British Columbia (Province of British Columbia 1995b). In addition, forested landscapes are significant to First Nations for traditional activities and because they encompass heritage sites. Table 4.1 summarizes the types of commercial and non-commercial recreation activities and traditional activities that occur in provincial forests in British Columbia. The demand for the recreation use of public land has grown in British Columbia due to the increased growth of the commercial backcountry recreation industry, the increase in the local population, and the growth of the tourism industry province-wide (Province of British Columbia 1995b).

Table 4.1
Recreation and Traditional Activities
in Forested Areas in British Columbia (Q1, q2; Q2, q6; Q3, q4)

Activity	[illegible]	[illegible]	[illegible]	[illegible]
Commercial				
Heli-skiing		x	x	x
Heli-hiking	x			x
Guide outfitting	x	x	x	x
Guided snowmobiling		x	x	x
Guided angling	x	x		x
Guided mountaineering	x	x	x	x
Non-Commercial				
Hunting		x		x
Fishing/angling	x	x	x	x
X-C skiing		x	x	

Table 4.1
Recreation and Traditional Activities
in Forested Areas in British Columbia (Q1, q2; Q2, q6; Q3, q4)

Ski touring		x	x	x
Snowshoeing		x	x	x
Mountaineering	x	x	x	x
Activity				
Rock climbing	x			x
Hiking	x	x		x
Kayaking/canoeing	x	x		x
Camping	x	x	x	x
Snowmobiling		x	x	x
Dirt biking	x	x		x
4x4/ quad driving	x	x		x
Mountain biking	x	x		x
Horseback riding	x	x		x
Wildlife observation	x	x	x	x
Photography	x	x	x	x
Traditional				
Hunting		x		x
Trapping	x	x	x	x
Plant harvesting	x	x		x
Bee keeping	x	x		x

As the forestry industry grows and more timber is harvested, logging roads are constructed and maintained, encouraging recreation access into previously unroaded areas. Increased demand, access to, and use of public land for recreation purposes has lead to conflicts between competing interests in the province (Scott-May n.d.). It is unlikely that these conflicts will diminish with time, given that demand is increasing for backcountry recreation opportunities (Province of British Columbia 1995b). These competing interests can be grouped into three general themes: social, economic, and environmental. A summary of the concerns over recreation and access related to these themes is presented in Table 4.2.

Table 4.2
Summary of Access Issues in BC
(Q1, q8; Q1, q12; Q2, q8; Q2, q9; Q2, q11; Q2, q12; Q3, q6; Q3, q7; Q3, q10)

Social
• First Nations concerns over access to traditional village sites and archaeological sites;
• Belief that public land should be accessible to all, and that restrictions/closures should be used as a last resort;
• Conflicts between incompatible year-round recreation uses (usually motorized and non-motorized uses); and
• Concerns over access in community watersheds and resulting domestic water quality.
Economic
• Uncertainty for tenured commercial recreation users and industry in the face of unplanned and unmanaged access;

Table 4.2
Summary of Access Issues in BC
(Q1, q8; Q1, q12; Q2, q8; Q2, q9; Q2, q11; Q2, q12; Q3, q6; Q3, q7; Q3, q10)

• Overlapping commercial tenures and conflicts between industrial use and recreation use may jeopardize the economic viability of commercial backcountry operations; and
• Health of the tourism industry in BC depends on healthy forest ecosystems and certainty of a diversity of modes of access.
Environmental
• Concerns that human use (motorized and non-motorized) of sensitive wildlife habitat may cause undue stress on wildlife during critical times of the year (*e.g.*, gestation, winter feeding, breeding);
• Concerns that road construction and motorized use in commercial watersheds may threaten domestic water quality;
• Concerns that roads may dissect wildland areas, leading to habitat loss and fragmentation, and a loss of wildlife movement;
• Concerns that human use (motorized and non-motorized) of forested landscapes can lead to displacement of wildlife; and
• Concerns that non-native plant species will be introduced into previously untouched wilderness by increased access.

The intensity of competing uses and the concern for conservation of wild areas, coupled with an absence of access planning in the province of British Columbia, are driving demands for strategic access management and planning to resolve growing conflicts. Forestry licensees, such as Crestbrook Forest Industries, are slowly embracing their corporate responsibility to manage resources on public land, not only for profit, but also for the intrinsic value they hold for the surrounding communities and for their employees who work on the landscape. In addition, forestry licensees are also recognizing that there are liabilities inherent in creating and maintaining access on public land.

Many agencies are involved with management of recreation use on public land. BC Environment, the BC Forest Service, and BC Assets and Lands are involved, to a certain extent, in managing recreation use on public land. The BC Forest Service, as the appointed steward of forest resources, manages recreation resources and public use on public land. Provincial forests make up approximately 85% of the provincial land base (Meidinger and Pojar 1991). Since recreation activity within provincial forests is concentrated on designated trails and recreation sites, as well as dispersed throughout the backcountry, the management of recreation issues on public land is integrated into forestry management. TFL #14 is an example of recreation issues on public land being coordinated with forestry management.

Access management and planning are largely addressed in forested areas in the context of road construction, maintenance, and deactivation planning by forestry companies and forest districts. Resolving contentious user conflicts and concerns over environmental degradation as a result of

unmanaged access is slowly becoming a priority in forestry management in British Columbia. Increasingly, forestry licensees are compelled to consider access management issues as they have the potential to affect daily forestry operations (pers. comm. George Richardson). In the past five years, forestry companies and forest district personnel have tried a number of different initiatives to address the issues outlined in Table 4.2. These initiatives have included legislated road closures, user agreements, and conflict resolution committees. However, none of these initiatives has been completely successful at strategically planning non-industrial access, resolving current conflicts, and preventing new conflicts from occurring. In the early 1980s, BC Environment and the BC Forest Service collaborated to develop a comprehensive planning process to encourage public involvement, increase awareness, and provide flexibility of access management for all recreation and industrial interests (McLellan and Martin 1991). The process, called Coordinated Access Management Planning (CAMP), has been used in several areas of the province. The CAMP process was adopted provincially as a planning tool and has evolved over the past decade to suit different circumstances in different forest districts. The CAMP process was replaced in part by the *Forest Practices Code*; however, the essence of the CAMP process provides direction to current access management initiatives (pers. comm. Gordon Erlandson). Most recently, recommendations for recreation access management planning have resulted from Land and Resource Management Plans (LRMP) in the Vanderhoof, Kamloops, and Bulkley-Cassiar Forest Districts. Since access is a key component of land use planning, requirements for recreation access management plans are often embedded within broader scale land use plans, such as LRMPs or regional land use plans.

More detailed information was obtained from the Vanderhoof Forest District regarding the LRMP developed there. As a result of the Vanderhoof LRMP, an access management plan was developed for the entire forest district. The Vanderhoof Access Management Plan (December 1998-April 2000) was recently developed by forestry planners within the Vanderhoof Forest District, in coordination with other government agencies and in consultation with the affected public in the district. The plan uses a number of different tools to manage access and the issues resulting from human use, such as road closures, road deactivation, signage, and conflict resolution for recreationists. The plan is currently being implemented and its effectiveness will be reviewed in April 2000.

4.3 Case Study: TFL #14

4.3.1 Environmental Setting

Location

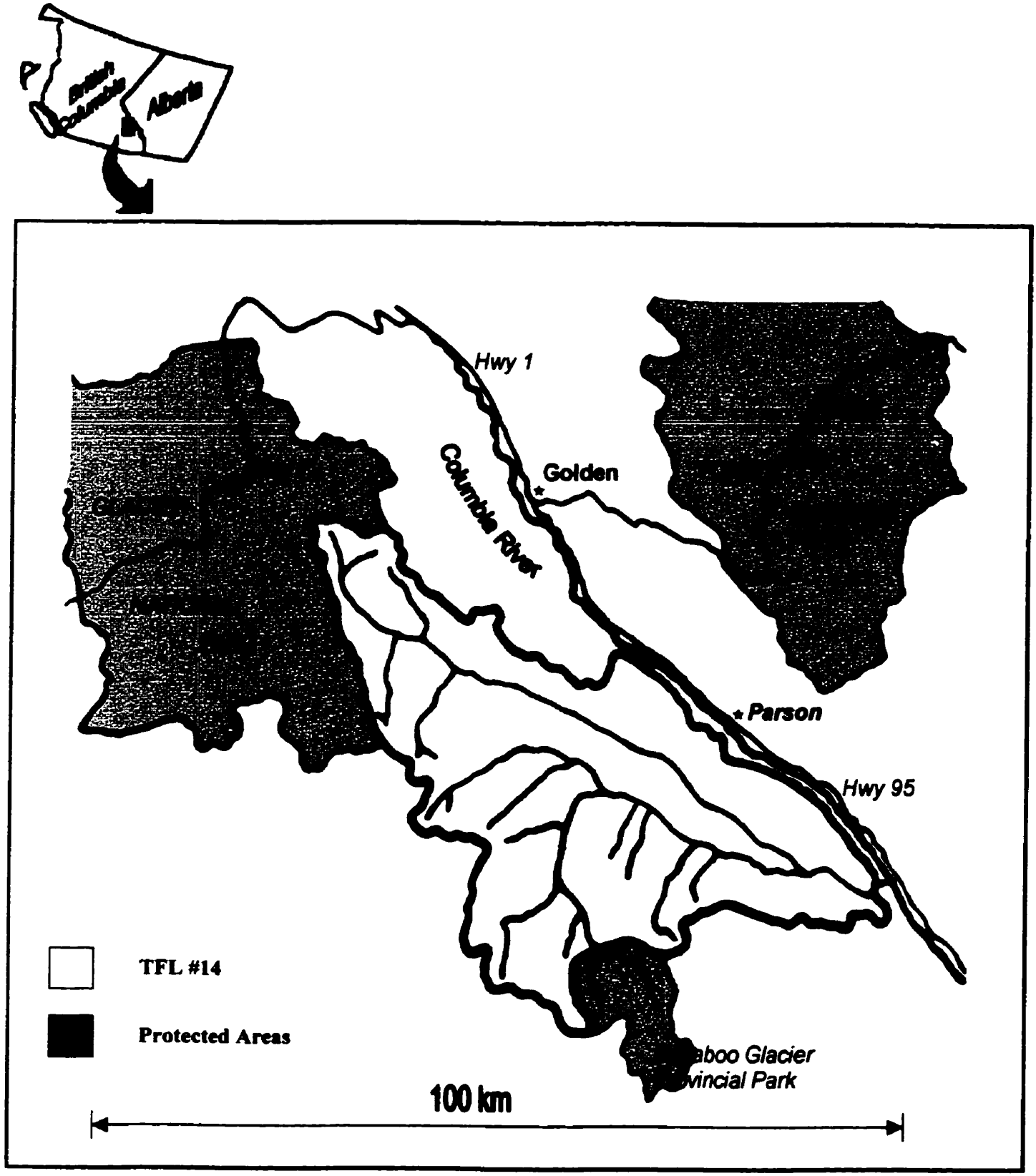
TFL #14 is located on the eastern slopes of the Purcell Mountain range in southeastern British Columbia. The area lies southwest of Golden, British Columbia and forms the northern portion of the Invermere Forest District (British Columbia is divided into 40 forest districts). Glacier National Park borders on the northwest of TFL #14; Bugaboo Provincial Park and Recreation Area borders on the southwest; the Columbia Valley and Highway 95 border on the east; and the Golden Forest District borders on the north (Figure 4.1).

The Purcell Mountain range forms part of the Western Cordillera and is separated from the Rocky Mountains (Eastern Cordillera) to the east by the Columbia River valley, situated in the Rocky Mountain Trench (Cannings and Cannings 1996 ; pers. comm. Bill Ayrton). Terrain features in TFL #14, which have been shaped by the process of glaciation, include steep-sided hanging valleys, glaciers, icefields, and interconnecting ridges and passes (Holland 1976). Other predominant features include forested land, alpine meadows, alpine forests, scree slopes, and avalanche paths. In addition, on the eastern border of the TFL and in other low-lying areas, are wetlands. The Spillimacheen River and tributaries (*e.g.*, Bobbie Burns Creek and Vowell Creek) form the major waterways in the TFL. The terrain features in TFL #14 dictate the type and variety of seasonal and year-round recreation activities that can occur in the area. In addition, the mild climate in southeastern BC, the generous snow accumulations in the winter, and the variety of terrain draw locals and visitors to the TFL for numerous recreation experiences (Cairn Consultants Ltd. 1995).

Vegetation & Wildlife Habitat

According to the provincial ecosystem classification system, there are five different biogeoclimatic zones represented in the forested areas of TFL #14 (Cairn Consultants Ltd. 1995):

- Interior cedar hemlock (ICH);
- Interior Douglas fir (IDF);
- Montane spruce (MS);
- Engelmann spruce-sub alpine fir (ESSF); and
- Alpine tundra (AT).



Source: Crestbrook Forest Industries Ltd.

Figure 4.1 Study Area

Each zone contains representative plant associations that have developed in response to the soil, terrain, elevation, sub-climate, and successional stage of the area. A comprehensive list of representative plant associations and species for each biogeoclimatic zone is provided in Meidinger and Pojar (1991).

In each zone, the plant associations, terrain, sub-climate and a number of other factors combine to create a variety of wildlife habitats. Currently, there is no accurate inventory of wildlife species in TFL #14 (Bob Ferguson pers. comm.); however, a resource inventory program was initiated by Crestbrook Forest Industries in the winter of 1995/96 (Corbett and Pritchard 1996). In addition, terrestrial ecosystem mapping was recently completed for TFL #14, which indicates types of ecosystems and habitats in each biogeoclimatic zone. The following sections describe the vegetation, climate, and habitat features that characterize each zone in TFL #14. The descriptions are intended to indicate the diversity of different wiidlife habitat in TFL #14, not to be an exhaustive inventory of all wildlife habitat features in the TFL.

Interior cedar hemlock

Cool snowy winters, warm dry summers, and dense forests of western hemlock and red cedar influence the type of wildlife species present in the ICH zone. Plant communities in the ICH zone provide the necessary forage, such as berry patches, critical to a bear's late summer diet. Large ungulates such as mule deer, white-tailed deer, and elk use the ICH zone year round. Riparian areas and waterbodies in this zone provide summer habitat for a variety of mammals and birds in TFL #14. In addition, these areas also serve as calving areas for moose and mule deer. The ICH zone is predominantly found on the lower slopes and valley bottoms in TFL #14 (Cairn Consultants Ltd. 1995).

Interior Douglas fir

Factors that influence the type of species in the IDF zone include short, cool winters, and extensive Douglas fir forests with variable canopy closure (Meidinger and Pojar 1991). As a result, the IDF zone provides winter range habitat for ungulates such as mule deer, elk, and white-tailed deer. The IDF zone also supports a diverse array of bird species that feed on conifer seeds and bark insects. In addition, as a result of topographic variation and a diversity of over storey and under storey vegetation, there is a wide range of habitat niches for small wildlife such as voles and squirrels. The IDF zone dominates the low to mid elevation areas of TFL #14 (Cairn Consultants Ltd. 1995).

Montane spruce

The MS zone occurs at mid-elevations, typically above the IDF zone in TFL #14 (Cairn Consultants Ltd. 1995). Cold snowy winters, short warm summers, and sloping mountainous topography characterize this zone. In the winter, caribou and moose use this zone for foraging habitat. Other ungulates use this zone during the remaining seasons, but seek lower elevations during the winter to avoid deep snow. Steep, south-facing slopes are locally important foraging areas for bighorn sheep and mule deer (Meidinger and Pojar 1991). Avalanche paths are typical in the MS zone and provide feeding habitat and cover for Grizzly bear, black bear, mountain goats, elk, and moose. Talus slopes in the zone provide denning opportunities for pika and ground squirrels.

Engelmann spruce-sub alpine fir

The ESSF zone covers most of TFL #14 (Cairn Consultants Ltd. 1995). It is the uppermost forested zone, above the MS zone, and is characterized by wet, cool summers, long, snowy winters, and rugged terrain. Ungulates such as moose, mountain goat, caribou, and mule deer are found throughout this zone; however, elk, bighorn sheep, and white-tailed deer are restricted in their distribution. Grizzly and black bears are well adapted to this zone as the numerous avalanche tracks and berry patches provide forage and cover during the spring, summer, and fall. Avalanche tracks also provide summer ungulate range. Sub-alpine parkland is a common habitat at the upper reaches of the ESSF zone. Arboreal lichens in the area are important for caribou, and associated sub-alpine meadows provides variable summer range for mule deer, elk, mountain goat, caribou, moose, bighorn sheep, Grizzly and black bear (Meidinger and Pojar 1991).

Alpine tundra

The Alpine Tundra (AT) biogeoclimatic zone is the highest elevation zone in TFL #14. This zone occurs at elevations above 2250m in the Purcell mountain range and is above the ESSF zone in TFL #14 (Meidinger and Pojar 1991). The climate in the AT zone is harsh, cold, windy, and snowy, characterized by low growing season temperatures and a short, frost-free period. Dominant vegetation includes shurbs, herbs, bryophytes, and lichens; however, some trees do occur, in krummholz form, at lower elevations (Meidinger and Pojar 1991). A range of wildlife species use habitat in this zone for denning, forage, and travel between connecting valleys and mountain ranges.

In summary, the variety of terrain and plant associations within each interconnected biogeoclimatic zone in TFL #14 provide important, year-round habitat for a number of wildlife species. Because of the extensive range of wildlife habitat in each biogeoclimatic zone and at every elevation level, there is a potential for human use in each zone to overlap wildlife habitat throughout TFL #14.

Landscape Ecology

Landscape ecology is partially defined as the study of spatial patterns in landscapes. In addition, landscape ecologists study the connections of these spatial patterns on a greater ecosystem level, as opposed to a site-specific level (Eng 1998). The connection of spatial patterns can be described as connectivity, an ecological term that describes linkages among habitat, species, communities, and ecological process. Connectivity enables the flow of energy, nutrients, water, disturbances, and organisms, at many spatial and temporal scales (Bennett 1990; Harrison and Voller 1998). In terms of wildlife movement, connectivity is measured by the probability that a species will move between areas in the landscape; wildlife movement depends on how close the areas are and how well they are connected (Harrison and Voller 1998).

In the context of a greater ecosystem, TFL #14 is located at a crossroads between a number of well-established protected areas and known wildlife migratory routes in the Central Rockies Ecosystem (Komex International 1995). TFL #14 is a network of linking mountain passes and valleys between Glacier National Park, Bugaboo Provincial Park, and the Columbia River Valley. The TFL has many low passes that serve as corridors for wildlife moving throughout this region. For example, part of the Upper Spillimacheen (Fool Hen) was designated as a special management zone in the recent Kootenay Boundary Land Use Plan because of its unroaded wilderness characteristics. It also provides an intact link for wildlife moving between Glacier National Park and the Columbia Valley through Canyon Creek (LUCO 1997). Preliminary identification of potential wildlife corridors on maps of the TFL occurred about three years ago; however, none of these corridors have been field-checked for accuracy (Bob Ferguson pers. comm.).

It is because of the type and level of human activities, and the location of TFL #14 in a greater ecosystem context that the results of any decisions regarding land use and access to the TFL have a tremendous potential to affect wildlife health and movement throughout the area.

4.3.2 Users and User Activities

The physical features of TFL #14 described in the preceding section, along with the surrounding parks and ease of access have resulted in valuable recreation resources attracting thousands of visitors and local recreation users every year (Cairn Consultants Ltd. 1995). As a result, TFL #14 supports numerous recreation activities year-round.

Commercial backcountry tenure holders in TFL #14, under the license and administration of British Columbia Assets and Lands (BCAL) include:

- Canadian Mountain Holidays (CMH) Bobbie Burns Lodge (heli-skiing, heli-hiking);
- Purcell Heli-Skiing Ltd. (heli-skiing, heli-hiking);
- ABC Wilderness Adventures, Purcell Lodge (skiing, hiking); and
- Silent Mountain Outfitters (3 cabins, guided hunting).

It is also suspected that other unlicensed commercial recreation ventures operate in TFL #14 on a casual, intermittent basis, primarily for guiding and snowmobiling purposes (Cairn Consultants Ltd. 1995).

Non-commercial recreation activities and the seasons in which people participate in these activities in TFL #14 are summarized, as a result of questionnaire responses, in Table 4.3.

Table 4.3
Non-commercial recreation activities in TFL #14
(Q1, q2)

Activity	[illegible]	[illegible]	[illegible]	[illegible]
Hunting		x	x	x
Fishing	x	x	x	x
Backcountry skiing		x	x	x
X-C skiing			x	x
Snowshoeing		x	x	x
Mountaineering	x	x	x	x
Hiking	x	x		
Rock climbing	x	x		x
Kayaking/canoeing	x	x		x
Camping *	x	x	x	x
Snowmobiling			x	x
Dirt biking	x	x		x
4x4/quad driving	x	x		x
Mountain biking	x	x		x
Wildlife observation	x	x	x	x

Table 4.3
Non-commercial recreation activities in TFL #14
(Q1, q2)

Activity	Summer [illegible]	Fall [illegible]	Winter [illegible]	Spring [illegible]
Photography	x	x	x	x
Plant harvesting/collecting	x	x		

* on established British Columbia Forest Service sites and backcountry camping, on random sites.

In addition to commercial and non-commercial recreation activities, traditional activities and academic research also occur in TFL #14. Currently, there is no list of people conducting research in TFL #14. However, the field visit component of this project revealed a number of researchers (academic and non-academic) working within the TFL boundaries. The activities noted in the previous paragraphs coexist with industrial timber harvesting and mining/mining exploration activities in TFL #14.

A number of stakeholders in the area previously were involved in initiatives to manage access or to resolve conflicts arising from recreation use. Stakeholders who have expressed interest and concern regarding access to TFL #14, either through questionnaire responses or through previous access management initiatives include:

- Forestry industry (Crestbrook Forest Industries);
- Mining industry;
- Parks Canada (Glacier National Park);
- BC Parks (Bugaboo Provincial Park);
- BC government ministries (BC Forest Service, BC Environment);
- Unaffiliated non-commercial recreation users;
- Organized non-commercial recreation groups (Columbia Valley Hut Society, Golden Snowmobile Club, Windermere Valley Snowmobile Club, Golden Rod and Gun Club, Windermere Rod and Gun Club *etc.*);
- Local environmental groups (East Kootenay Environmental Society); and
- Advocates for physically challenged recreationists.

The TFL can be accessed by motorized means through a network of forestry service roads and logging roads that join Highway 95 at Parson and Spillimacheen. In addition, helicopters leave from Parson, Golden, Invermere, and from the CMH Bugaboo Lodge on the southern boundary

of the TFL, in order to access commercial lodges; for heli-skiing and heli-hiking; or to transport researchers and workers. Hiking trails on the border of Glacier National Park and the TFL, or on the border of Bugaboo Provincial Park and the TFL, can also be used to access TFL #14. (Q1, q3; Q1, q4).

Although there is an extensive network of logging roads to access backcountry areas in the TFL, there are still some areas such as the Upper Spillimacheen and the Purcell divide that remain unroaded, but still experience recreation use. Other areas that also experience high recreation use in TFL #14 include: (Q1, q5)

- Bobbie Burns Creek;
- Vowell Creek;
- Crystalline Creek;
- McMurdo Creek;
- International Basin;
- Silent Pass;
- Bald Mountain;
- Conrad glacier and neighbouring icefields;
- Jubilee Mountain;
- Columbia River wetlands; and
- the lakes within the TFL boundary with boat launches and/or BC Forest Service campsites.

In addition to the commercial lodges in the TFL, the Columbia Valley Hut Society in association with the Forest Service, tends a cabin in the McMurdo drainage, below Spillimacheen glacier. The Columbia Valley Hut Society has also identified International Basin as the preferred location for an additional backcountry hut in TFL #14 (Cairn Consultants Ltd. 1995). In the roaded, lower elevation areas closer to the Columbia River Valley, the Forest Service has developed a number of walk-in or drive-in campsites around some lakes in the TFL. Jubilee Mountain, overlooking the Columbia Valley, has been developed as a Forest Service viewpoint with wheelchair accessibility.

4.3.4 The Nature of Conflicts in TFL #14

There has been tremendous growth in commercial and non-commercial recreation activities, and the development of logging roads in TFL #14 in the past 10 years (Cairn Consultants Ltd. 1995).

Due to the topography, ease of access, and the ideal weather conditions on the eastern slopes of the Purcell Mountains, users are drawn to the area year-round for outdoor recreation experiences. As a result, conflicts have occurred between different user groups, and between users and the environment for the following reasons:

Incompatible recreation activities in the same area: Activities that preclude other users from using an area, or activities that disrupt the enjoyment and safety of other users can be considered incompatible. For example, snowmobiling and backcountry or heli-skiing are incompatible activities in the same area. New technology has allowed snowmobiles to reach remote backcountry areas that were previously exclusive to skiers. Snowmobile tracks can make areas unsafe for skiers and snowboarders since they harden and sometimes undercut unstable snow pack, increasing the avalanche hazard. The noise from snow machines has also been noted to detract from the solace and tranquility of a non-motorized backcountry experience (Knopp and Tyger 1973; Devall and Harry 1981; Scott-May n.d.). (Q1, q11; Q1, q12)

Competing interests between commercial and non-commercial recreation users: Intensive public use within a commercially tenured area may compromise the economic viability of a commercial operation (Scott-May n.d.). Alternatively, the existence of commercial tenures, including the associated use of helicopters and snowcat machines, can negatively affect the opportunities for wilderness backcountry skiing, snowboarding, and snowmobiling. While commercial operations provide direct economic benefits to local communities, opportunities for public recreation are also economic assets that attract investment and professionals to the nearby communities of Golden, Parson, Invermere, and smaller communities in between.

Competing interests between local and visitor use of backcountry areas: Scott-May (n.d.) suggests that restrictions on recreation activities in other jurisdictions, such as Alberta and the United States, have resulted in increased recreation visitors to TFL #14. Government and local communities are promoting opportunities for more backcountry recreation facilities and activities in the East Kootenays, and in some areas, this is exacerbating existing user conflicts. In addition, visiting recreationists are often unaffiliated with local recreation groups and, therefore, have no incentive to comply with local user agreements negotiated to manage user conflict (pers. comm. Jon Wilsgard). However, while visitor and local backcountry recreationists may sometimes be in conflict, local hotels, restaurants, and other tourism-associated businesses benefit from increased activity.

Overlapping commercial recreation tenures: Although there is a referral procedure for future disposition of Crown Land for commercial recreation tenures under the British Columbia Assets and Lands (BCAL) process, there is no resolution process for existing conflicts between overlapping and incompatible commercial recreation tenures. Currently, there are two overlapping commercial tenure holders in TFL #14; however, incompatible and overlapping commercial recreation tenures have the potential to affect the economic viability of operations.

Recreation users encroaching on wildlife habitat: As the number of logging roads and skid trails into and near previously unroaded valleys in TFL #14 increases, the ability of humans to access previously remote wilderness areas has also increased. As a result, the potential for humans to disrupt wildlife populations and degrade wildlife habitat has also increased. For example, motorized activities in low-lying ungulate winter range in TFL #14 have the potential to exclude ungulates from using this habitat; and any human activity (motorized or non-motorized) in high elevation vaccinium (berry) patches can exclude Grizzly bears from using this critical late summer habitat (pers. comm. Peter Holmes). In addition, human activities in areas also used by wildlife can increase the potential for adverse wildlife-human encounters. (Q1, q7; Q1, q8)

As a result of the questionnaire responses from TFL #14 users, I have summarized the most frequent types of user conflicts in Table 4.4.

Table 4.4
Most Frequent User Conflicts in TFL #14
(Q1, q6)

Type of User	Both Parties Affected	Season	Area within TFL #14
heli-hiking - hunting	both hikers and hunters	summer, fall	throughout TFL #14
heli-skiing - backcountry skiing	both groups of skiers	winter, fall, spring	Bald Mountain, International Basin
heli-skiing - snowmobiling	heliskiers	winter, fall, spring	Bald Mountain, Vermont Creek, International Basin
backcountry skiing - snowmobiling	backcountry skiers	winter, fall, spring	Bald Mountain, McMurdo Creek, International Basin, Caribou Creek
hiking - heli-hiking	both groups of hikers	summer, spring	Spillimacheen, Silent Lake, McMurdo, International Basin, Vermont Creek
guided hunting - commercial lodge operations	both hunters and lodge operators	spring, summer, fall	Spillimacheen, Malachite

4.3.5 Planning and Managing Access in TFL #14

Attempts have been made by both staff at the Invermere Forest District and BC Environment, and by Crestbrook Forest Industries to resolve the conflicts outlined in section 4.3.4.

BC Environment has invoked ss. 111 *Wildlife Act* closures to restrict motorized access in winter ungulate habitat. In addition, parts of the Upper Spillimacheen were recommended as a special management zone in the Kootenay Boundary Land Use Plan (KBLUP) as the area provides a critical wildlife corridor between Glacier National Park and the Columbia Valley wetlands through Canyon Creek. Although the recommendations set out in the KBLUP are intended as strategic direction, they are not legally binding on forest management decisions in the region.

In 1997, the Invermere Forest District initiated an access management strategy for Crown Land within its jurisdiction (including TFL #14). The district recognized that access issues were increasing in the area and that conflicts had the potential to affect the operational planning of forestry licensees (pers. comm. Invermere Forest District (b)). Using a method based on Recreation Opportunity Spectrum (ROS) classifications, the Invermere Forest District classified and mapped each landscape unit in the district according to the type of access provided within it. In addition, traditional uses, resource values, and wildlife values were also considered when determining the class for each landscape unit. For example, a landscape unit classified as "A2" provides semi-primitive non-motorized access. A landscape unit classified as "A5" provides access for both motorized and non-motorized users. To date, the map generated by this classification exercise has not been circulated among the general public and users, and the classifications are largely unenforceable by law unless restrictions under the *Wildlife Act* or the *Forest Practices Code* are imposed.

The Invermere Forest District established a backcountry conflict resolution committee (BCRC). The purpose of the committee was to resolve winter recreation conflicts in areas of overlapping and incompatible use. For example, on the southern boundary of TFL #14, the BCRC negotiated to establish alternate snowmobile access in order to eliminate the conflict between snowmobile users and a tenured commercial heli-ski operator in the Bugaboos. However, use in two contentious areas outside of TFL #14 could not be resolved by negotiation and the Forest District Manager was forced to impose legal restrictions on snowmobile use in the areas.

Crestbrook Forest Industries, the forestry operator in TFL #14, has also attempted to plan for and manage access on a local scale. Crestbrook Forest Industries was party to an initiative launched by the Golden Forest District to resolve backcountry recreation conflicts in and on the southern border of their district. The Golden Forest District established a backcountry conflict resolution committee (BCRC) formed of representatives from industry, organized recreation groups, and commercial backcountry tenure holders. The purpose of the committee was to resolve winter recreation conflicts in popular backcountry areas between incompatible user groups through negotiation, education and user agreements. The Golden BCRC achieved conflict resolution by successfully zoning activities in areas of contention and negotiating user agreements for the zones. The BCRC produced a colour-themed polygon map to illustrate the different zones of use. Areas of use within TFL #14 (the northern portion of the Invermere Forest District) included in the Golden Forest District BCRC negotiations were the Upper Spillimacheen River, Bobbie Burns Creek, McMurdo Creek, Vowell Creek, Crystalline Creek, and Warren Creek. For example, negotiations surrounding a conflict between a heli-skiing operation and local snowmobile operators on the Grizzly Ridge area of Warren Creek and the Bugaboos resulted in an alternate area being created for the use of snowmobiles. These areas experience tremendous snowmobiling activity, ski touring, and heli-skiing during the winter season. (Q3, q17; Q3, q18; Q3, q6)

4.4 Summary

The issues relevant to access management and planning in TFL #14 are illustrated in Figure 4.2. Many of the issues specific to TFL #14 are similar in nature to the concerns summarized in Table 4.2, for all of British Columbia. Logically, any recommendations made to address the issues specific to TFL #14 may be adapted on a broader basis to address the issues common to other forest districts in British Columbia.

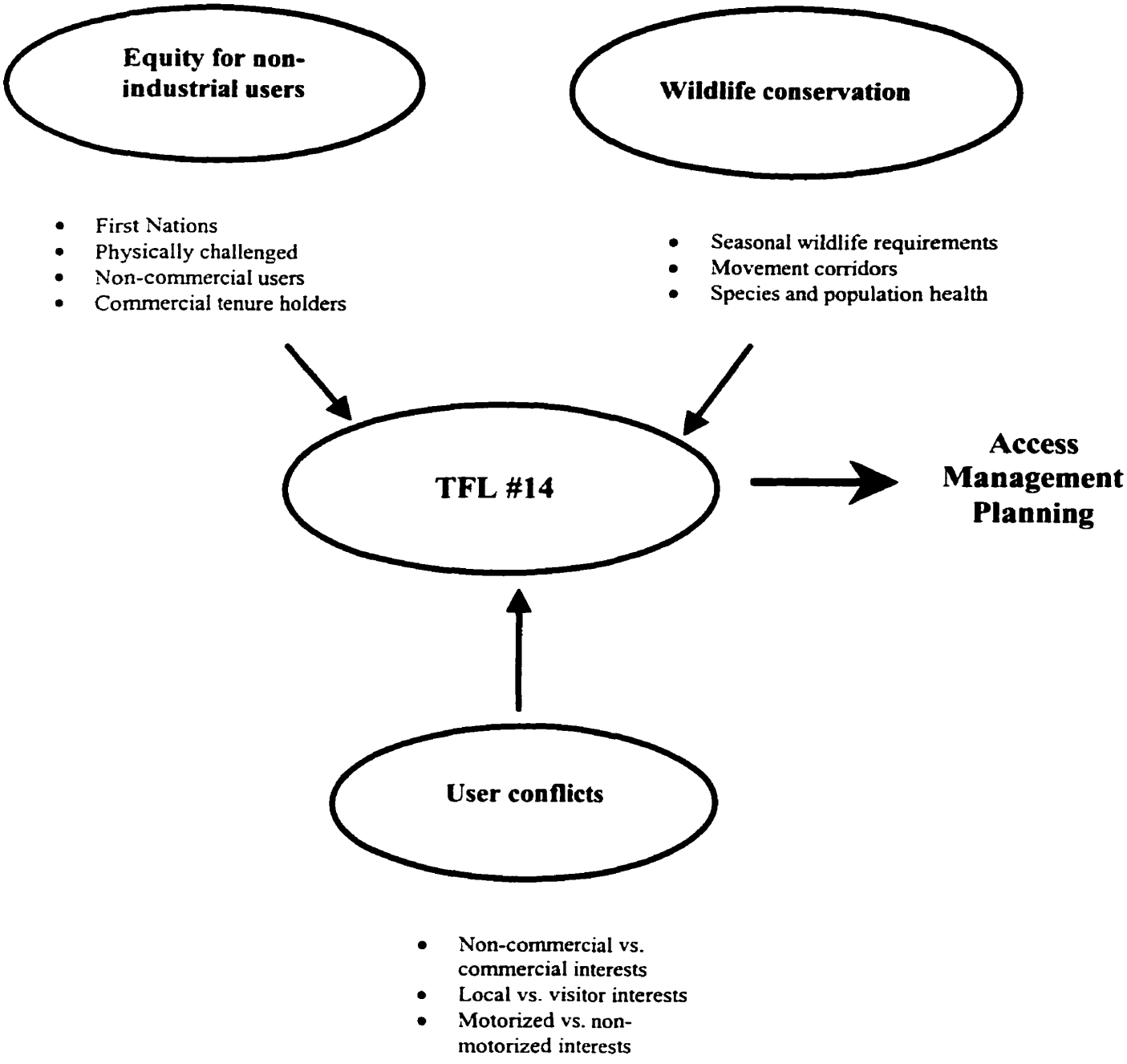


Figure 4.2
Access Issues in TFL #14

5.0 Tools to Manage Access

5.1 Overview

This chapter identifies and describes tools available to manage recreation access. The available tools are described using information collected through the literature search of access-related legislation and policy in British Columbia; questionnaires distributed to other Forest Districts in British Columbia and to National Forests in the Pacific Northwest United States; and interviews with key informants in southeastern British Columbia. In addition to identifying and describing each tool, the potential advantages and disadvantages of applying each tool are noted in tables following the description of each tool, in the context of this project. Examples are included where appropriate, drawn from questionnaire responses, the literature review, and interview notes, to illustrate the use of each tool. As I noted in chapter 3.0, section 2.2.3, questionnaire and question numbers are noted next to tables and in the text to support the information presented therein. For example, questionnaire #3, question 11 is noted as Q3, q11.

The tools are grouped into the following three categories:

- Legislative tools (section 5.3);
- Non-legislative tools (section 5.4); and
- Road engineering measures (section 5.5).

Some tools were developed directly in response to access-related issues (*e.g.*, user agreements), while others were not intended to manage access, but have resulted in controlling access and deterring motorized use (*e.g.*, water bars, permanent road deactivation).

5.2 Legislative Jurisdiction

The context for managing recreation access is provided below, through a brief description of provincial government agencies that administer relevant legislative and non-legislative tools. The government agencies include:

- The British Columbia Forest Service;
- BC Environment; and
- British Columbia Assets and Lands.

5.2.1 British Columbia Forest Service

According to the *The Ministry of Forests Act*, the British Columbia Forest Service (BCFS) is mandated to:

- Encourage a competitive world timber processing industry in British Columbia;
- Manage, protect, and conserve forest and range resources on Crown Land for short and long-term economic, social and environmental benefits;
- Manage forest and range resources in consideration of other non-timber values on Crown Land, such as fisheries, wildlife, wildlife habitat, water quality, and recreation; and
- To consult and cooperate with other ministries, agencies, and the private sector with respect to forestry management decisions (Province of British Columbia 1979).

With regard to its stated mandate, the BCFS is responsible for administering legislation such as the *Forest Practices Code* and any sections in it related to access management. In addition, the British Columbia Forest Service is mandated to ensure user compliance with the *Forest Practices Code* on Crown Land. The authority to enable the sections of the *Forest Practices Code* pertaining to access is vested in the District Manager for each forest district in British Columbia. The District Manager is the statutory decision-maker for the district and liaises between the provincial government in Victoria, and the district. Forestry management decisions are made on a local level, within each Forest District.

5.2.2 BC Environment

The BC Environment, Lands, and Parks (BC Environment) is divided into three administrative units: environment, land, and parks. Only the sections administering environment and land are relevant to this project. According to the *Wildlife Act*, the BC Environment is mandated with the protection and management of wildlife and wildlife habitat. As such, the BC Environment is responsible for administering area closures or restricting access to wildlife resources. In addition, officers appointed under the *Wildlife Act*, are responsible for ensuring compliance with the *Wildlife Act* and with any regulations made pursuant to the act (*e.g., Hunting Regulations*).

According to the *Land Act*, BC Environment is responsible for the management of public land before and after it has been disposed under the BCAL process (see section 4.3.4 of this document), in coordination with any other acts or regulations that may apply to Crown Land (*e.g., Parks Act, Highway Act*). In the case of both the *Wildlife Act* and the *Land Act*, local BC

Environment representatives only invoke relevant access-related closures or restrictions through an Order in Council of the Lieutenant Governor. In effect, decision making under the *Wildlife Act* and the *Land Act* is not conducted at a local level.

5.2.3 British Columbia Assets and Lands

British Columbia Assets and Lands (BCAL) administers the disposition of public land to commercial recreation organizations, according to the Commercial Recreation Policy, through *Land Act* tenures. BCAL reviews applications for tenure and refers them to other tenure holders in the area, in order to address potential issues arising from overlapping tenures. BCAL is also responsible for approving tenure applications. BCAL, a crown corporation, has replaced the branch of the BC Government known as Crown Lands. As a crown corporation, BCAL is responsible for generating revenue through commercial tenure applications and approvals.

5.3 Legislative Tools

The tools to manage recreation access identified and described in this section can be implemented through enacting the following pieces of legislation:

- The *Forest Practices Code of British Columbia Act (Forest Practices Code)*;
- The *Wildlife Act* and *Hunting Regulations*;
- The *Land Act*; and
- The *Motor Vehicle (All Terrain) Act*.

5.3.1 *Forest Practices Code of British Columbia Act* (*Forest Practices Code*)

The *Forest Practices Code of British Columbia Act* (*Forest Practices Code*) came into force on June 15, 1995. The *Forest Practices Code* consists of the Act, and numerous regulations. In addition, a number of guidelines, in the form of Guidebooks, were also generated to explain applications of the *Forest Practices Code* and regulations, such as higher level planning, visual quality objectives, risk management, and biodiversity objectives. Except where specifically referred to in the regulations, these guidebooks do not have the force of law.

Several parts of the *Forest Practices Code* relate to access management issues (*i.e.*, managing user conflicts, conservation of recreation values, planning for public safety on roads), either from an operational perspective (*i.e.*, road or area closures) or from a strategic, planning perspective. Prior to the 1998 amendments of the *Forest Practices Code*, licensees, such as Crestbrook Forest

Industries, were required to prepare an annual access management plan, in addition to a forest development plan. The access management plan was to include, for the area under the plan, maps and schedules for all road construction, modifications, maintenance, and deactivation activities proposed. The plan was not required to include any information regarding recreation use or access. To gain administrative efficiency, this requirement was repealed under the 1998 amendments and access management planning content requirements were incorporated in the forest development plan. Currently, licensees are not required to prepare a separate access management plan.

Under subsection (ss.) 57(1) of the *Forest Practices Code*, the public may use forestry service roads for recreation purposes, without charge. However, the District Manager may restrict the use of the road (*e.g.*, seasonal restrictions) if she/he determines that use of the road will cause significant damage to the road or to the environment. This section can be used to manage recreation access, if the District Manager determines that the recreation use of the road is a threat to the integrity of the road or the environment. Similarly ss. 55 of the *Forest Practices Code* can be used to restrict access on roads under road permit.

From a recreation perspective, ss. 105 of the *Forest Practices Code* can be used by a District Manager to restrict recreation use on public land. If the District Manager determines that a recreation resource needs to be protected or that user conflicts need to be managed in an area, a closure can be invoked to restrict the access of some types of users. This type of closure has not been widely used as a response to recreation conflicts due to enforcement and monitoring constraints. In fact, in the Golden Forest District, a ss. 105 closure has never been invoked to resolve user conflicts (pers. comm. Jon Wilsgard). In the Invermere Forest District, a ss. 105 closure was used to restrict snowmobile access twice when negotiations of the local, user conflict resolution committee failed (pers. comm. Peter Holmes). (Q3, q18)

Advantages of the *Forest Practices Code* [illegible] tool
• District Manager makes decisions regarding closures and restrictions on a local level; and
• District Manager is able to make closures and restrictions in response to user conflicts or in response to environmental degradation.
Disadvantages [illegible]
• A reactive approach, not a proactive approach to user conflicts;
• Closures require monitoring and enforcement to ensure user compliance; and
• Due to staff restrictions, closures have not been used frequently to resolve user conflicts.

5.3.2 Higher Level Planning under the *Forest Practices Code*

In a broad sense, higher level plans refer to plans, agreements or objectives declared by the District Manager, Chief Forester, or through an order by the Lieutenant Governor in Council (LG in C). Higher level plans establish a strategic, planning context for operational plans, providing objectives to determine the mix of forest resources (*e.g.*, wildlife, biodiversity, timber harvesting, recreation facilities, *etc.*) to be managed in a given area (Province of British Columbia 1996). Higher level plans can be declared under the *Forest Practices Code* and become binding on licensees and the BCFS.

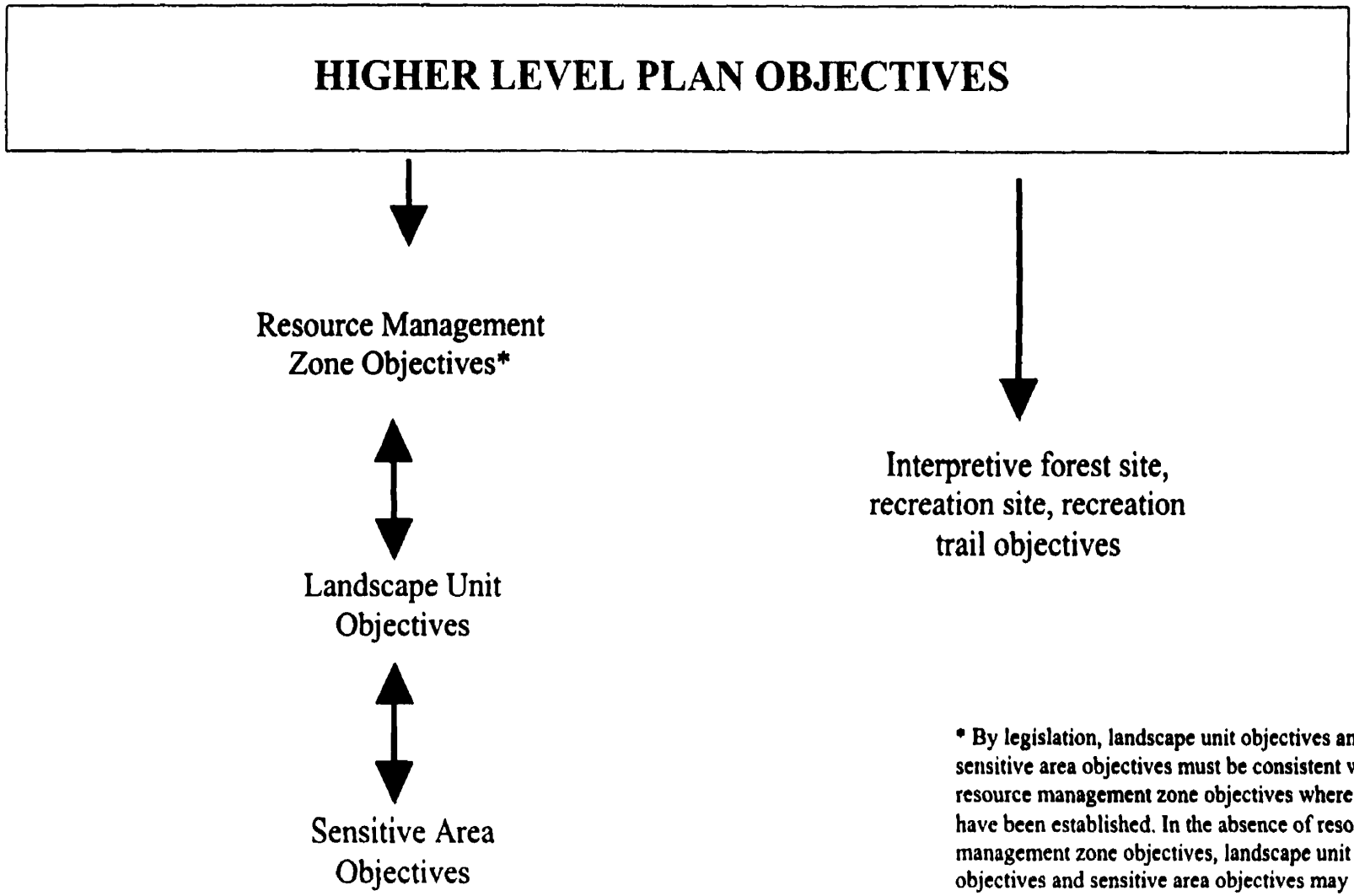
Pursuant to ss. 3 through ss. 6 of the *Forest Practices Code*, higher level plans include the development of management objectives for:

- Resource management zones;
- Landscape units;
- Sensitive areas; and
- Interpretive forest sites, recreation sites, and recreation trails.

The *Forest Practices Code* does not set up a hierarchy among higher level plans. For instance, landscape unit objectives do not have to be set for an area before recreation site objectives are developed for the same area. Figure 5.1 indicates how different higher level plans relate to each other and to higher level plan objectives.

Of the higher level plans described above, only two types of plans under the *Forest Practices Code* can apply to managing recreation access: landscape units, and interpretive forest sites, recreation sites, and recreation trails.

Landscape unit objectives, established pursuant to ss. 4 of the *Forest Practices Code*, form the basis for landscape-level planning of forest resources (*e.g.*, wildlife, biodiversity, recreation attributes, and timber volume). Boundaries for landscape units are usually on the watershed scale. For example, TFL #14 is divided into 4 landscape planning units, roughly corresponding to the dominant watersheds and terrain features. Landscape unit objectives may be designated by the District Manager, or the establishment of these objectives may be recommended through regional land use plans (*e.g.*, Kootenay Boundary Land Use Plan, see section 4.4 below). Access management strategies and planning could be developed in accordance with landscape unit



* By legislation, landscape unit objectives and sensitive area objectives must be consistent with resource management zone objectives where they have been established. In the absence of resource management zone objectives, landscape unit objectives and sensitive area objectives may still be established.

Figure 5.1
Hierarchy of Higher Level Plans

objectives. For example, for the Upper Spillimacheen landscape unit in TFL #14, the licensee could determine objectives for zoning recreation activities to avoid critical spring grizzly bear habitat on avalanche paths in the drainage. To date, landscape unit objectives have not been developed with access management or recreation management as a focus. Currently, landscape unit planning is directed at the retention of old growth forest and wildlife trees in British Columbia (pers. comm. Terje Vold).

According to ss. 6 of the *Forest Practices Code*, recreation site, interpretive forest site, or recreation trail objectives can be established as higher level plans. This allows forest districts and licensees to manage and protect recreation resources on a site-specific level (*e.g.*, river, lakeshore, cross-country ski trail, campground). Since these objectives would be developed on a narrower, site-specific scale, they may not be appropriate for achieving broader, recreation access management planning objectives on a sub-regional scale (*i.e.*, a TFL-level scale). These objectives may be set by the District Manager, or they may be established as a result of recommendations through another higher level plan (*e.g.*, landscape unit objectives), or regional land use plan (*e.g.*, Kootenay Boundary Land Use Plan).

Advantages of higher level planning as an access management tool
• Strategic, long-term approach to land use planning to avoid user conflicts and conserve wildlife habitat (proactive *vs.* reactive);
• Landscape unit objectives could be developed using the landscape units designated by the District Manager of the Invermere Forest District;
• Higher level plans could be integrated into, or the result of, current land use planning initiatives;
• Higher level plans could be adapted to include objectives to manage recreation access; and
• Once higher level plans are declared, they become binding on forestry management decision-making, and therefore, are enforceable with legislative penalties.
Disadvantages of higher level planning as an access management tool
• Require an investment of time and money on behalf of the forestry licensee to plan the development and implementation of a higher level plan; and
• Not all higher level plans are appropriate for the integration of access management objectives.

5.3.3 *Wildlife Act* and *Hunting Regulations*

The *Wildlife Act* came into force in 1982, but was subsequently amended in 1994 and again in 1995. In accordance with the *Wildlife Act*, the Minister of Environment makes regulations restricting or allowing access by the public to designated areas of the Province, for the purposes of wildlife management. The Act contains a range of powers to constrain access including spatial and temporal restrictions on use, and restrictions on the type of vehicle used. In addition, the Minister can approve the temporary closure or restrictions on the use of a highway or road by vehicular access, with the approval of the minister responsible for the highway or road. Closures

and restrictions, once approved by the minister, are published annually in the *Hunting Regulations*. Since this section of the *Wildlife Act* is intended for wildlife management and protection, it is not an appropriate tool, by itself, to manage all recreation access-related issues (*e.g.*, user conflicts). In addition, a *Wildlife Act* closure is difficult to enact since the decision to enable this piece of legislation is not made at the local or regional level. A closure requires an Order in Council from the provincial LG in C (Provincial Backcountry Skiing-Snowmobiling Committee 1997). (Q3, q18)

Advantages of the [illegible]
• Can be applied in areas where recreation activities have an adverse effect on wildlife populations and habitat.
Disadvantages of the [illegible]
• Cannot be applied to resolve user conflicts;
• Complex to enable the legislation because the authority to enact a closure is vested in the LG in C in Victoria, and not on a local level; and
• A reactive, not a proactive approach.

5.3.4 *Land Act*

The *Land Act* came into force in 1979 and was further amended in 1995. The *Land Act* establishes legislation upon which the disposition of Crown Land was established for British Columbia. The agency that reviews applications for the disposition of Crown Land is a crown corporation called British Columbia Assets and Lands (BCAL). In compliance with of the *Land Act*, the Minister, through BCAL, may dispose of Crown Land through one of the following means:

- sale of Crown Land;
- granting a lease to Crown Land;
- granting a right of way or easement over Crown Land; or
- granting a licensee permission to occupy Crown Land.

Businesses that offer commercial recreation experiences to clients on Crown Land, (*e.g.*, in TFL #14: Silent Mountain Outfitters, Purcell Heli-Skiing Ltd., CMH), are required to submit an application to BCAL under the *Land Act* for a License of Occupation and Lease. These applications are issued with respect to the *Commercial Recreation on Crown Land Policy (CRCL Policy)* for British Columbia, which was recently developed in May 1998 (see section 5.4 of this document). BCAL has the authority to grant more than one commercial tenure for the same area; therefore, tenures are not granted for the exclusive use of an area.

Businesses or operators granted tenure to Crown Land cannot exclude other non-commercial recreation activities from their operating areas. However, if other non-commercial recreation users' activities directly conflict with the business under tenure, the tenure holder may request to use ss. 60 of the *Land Act* to resolve the conflict. According to ss. 60, a tenure holder may "take proceedings against any person for recovery of possession of or for trespass to the interest in the land" in the case of a user conflict (Province of British Columbia 1979a). In response, the LG in C (upon referral from the BC Environment) may prohibit the conflicting use in the operating area of the tenure holder pursuant to ss. 61 of the *Land Act*. Application of ss. 60 and ss. 61 has not been tested to date as a tool to resolve recreation conflicts or to manage non-commercial recreation access on Crown Land. In fact, to date, ss. 60 and ss. 61 have only been enacted to protect environmentally sensitive areas prior to invoking a *Wildlife Act* closure (Backcountry Skiing-Snowmobiling Committee 1997). The application of ss. 60 and ss. 61 requires an Order-in-Council from the LG in C before it can be enacted and enforced, and is, therefore, a relatively complex and inflexible tool to manage recreation access.

Advantages of the *Land Act* [illegible]
• Can be used to resolve recreation use conflicts.
Disadvantages of the *Land Act* [illegible]
• Closures cannot be made in consideration of wildlife values;
• Complex to enable legislation because the decision to enact a closure is made by the LG in C in Victoria, and not at a local level;
• A reactive, not proactive approach;
• Does not consider the interests of non-commercial recreation users;
• Requires monitoring and enforcement to ensure compliance; and
• To date has not been used as a tool to resolve user conflicts between commercial and non-commercial recreation interests.

5.3.5 *Motor Vehicle (All Terrain Vehicle) Act* (*ATV Act*)

The *ATV Act* came into effect in 1996. An all terrain vehicle (ATV) is defined under the act as any motorized vehicle capable of travelling off highway. Pursuant to ss. 2 of the act, all ATVs must be registered and marked with an identification decal in British Columbia. However, this section of the act is rarely enforced; only 1/2 of an estimated 120 000 snowmobiles are registered in British Columbia (Backcountry Skiing-Snowmobiling Committee 1997). Out-of-province ATVs may enter and operate in BC for up to 30 days provided they display an identification decal of their home jurisdiction or have obtained a special permit through the Fish and Wildlife Branch of BC Environment. The presence of out-of-province machines is significant in areas such as Pemberton-Whistler, Robson Valley, and the southern and eastern borders (Backcountry Skiing-

Snowmobiling Committee 1997). Since visiting users usually have no connection or affiliation to local user groups, they have no incentive to comply with local user agreements. The RCMP and the Attorney General (Police Services Branch) are responsible for the administration and enforcement of the act. However, regulations made under the Act can be enforced by conservation officers, peace officers, park officers, forest officers, or anyone else designated by the LG in C. The act is user specific and would not be appropriate, by itself, to manage all issues arising out of recreation access.

Advantages of the [illegible]
• Can be enforced on a local level by a number of different agencies; and
• If applied consistently, has the potential to let local users recognize when out-of-province users are violating local user agreements.
Disadvantages of the [illegible]
• User specific tool and would not be suitable to resolve all recreation access management-related conflicts; and
• Has rarely been enforced as a tool to manage snowmobile access.

5.4 Non-Legislative Tools

There is no single, comprehensive policy or strategy in British Columbia that deals with all the issues surrounding access management on public land. However, there are a few land-use policies and user-based initiatives that resolve some issues surrounding access management.

5.4.1 Background to Land Use Planning in British Columbia

The land use planning system in British Columbia is often referred to as having a hierarchical or sequential structure, within which each level of planning provides direction to subsequent, more detailed levels (LUCO 1999). Although this structure accurately describes the overall land use planning philosophy in British Columbia, it does not reflect what actually takes place on the ground. Currently, in British Columbia, land use plans exist at different levels. For example, in the East and West Kootenays, there is a regional land use plan (the Kootenay Boundary Land Use Plan) and local level plans, but no sub-regional plans (*e.g.*, land and resource management plans). Figure 5.2 shows the theoretical, hierarchical, sequential order of land use plans.

Plans that cover a wide geographical area (*e.g.*, regional plans) provide the broad vision and objectives for land and resource use. It is usually the responsibility of more detailed plans (*e.g.*, land and resource management plans, local level plans) to interpret this broad, regional land use direction.

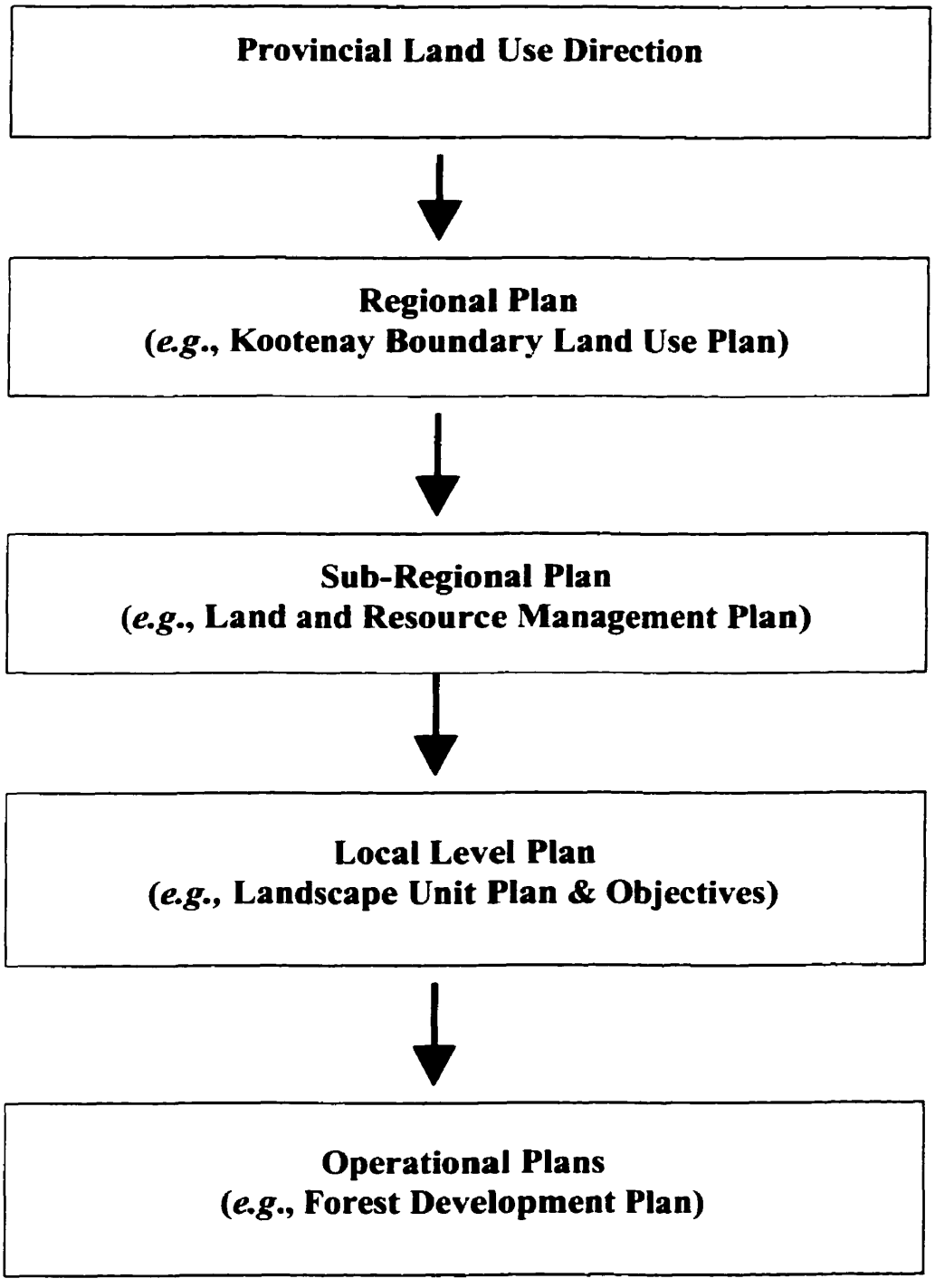


Figure 5.2
Land Use Planning in British Columbia

In the context of this project, there is a regional land use plan governing land use decisions in the region within which TFL #14 is located. There are no sub-regional plans for this area. Site level or local level plans exist in the form of a Forest Development Plan for TFL #14; however, Forest Development Plans, in their current form, do not address access management issues.

5.4.2 Regional Land Use Plans: Kootenay Boundary Land Use Plan and Implementation Strategy

The Kootenay Boundary Land Use Plan and the subsequent Implementation Strategy (KBLUP-IS) is the result of a land use planning effort that took place in the East and West Kootenays between January 1993 and June 1997. The Committee on Resources and the Environment (CORE) was the previous agency that coordinated land use planning in BC. In 1993, CORE initiated a shared, decision-making, land use planning process in the East and West Kootenays in response to increasing land use conflicts. Stakeholders and government representatives prepared a strategic land use plan and implementation strategy for the East and West Kootenay region.

The KBLUP-IS contains guidelines for resource management and land use planning with respect to the following values:

- biodiversity;
- landscape connectivity;
- grizzly bears;
- ungulate winter range;
- mountain caribou;
- domestic and community watersheds;
- human settlement;
- visual aesthetics;
- backcountry recreation;
- range land;
- timber enhanced resource management;
- access management; and
- sub-surface resources.

Some of these guidelines pertain directly to recreation access in and around TFL #14; others pertain to issues that arise out of recreation use of the landscape, and are, therefore, indirectly relevant to recreation access management. The KBLUP-IS can be considered a tool to manage

recreation access because it contains recommendations and guidelines to plan land use in order to avoid conflicts between users and to conserve wildlife populations and habitat. However, the strength of the KBLUP-IS as an access management tool or framework for access management planning, in the context of forestry management, lies in its potential to have components of the plan declared a higher level plan under *Forest Practices Code* legislation. Higher level plans, (also described in section 5.3 of this document) refer to objectives defined in the *Forest Practices Code*. They are "higher level" relative to operational plans and are the primary source of objectives that play an important role in determining the forest practices described in operational plans (Province of British Columbia 1996). A plan such as the KBLUP-IS may be approved as a land use plan by government policy; however, this approval does not make it a higher level plan. A portion of the plan must be declared by the LG in C as a higher level plan before it becomes binding on forestry management decisions.

Even if the KBLUP-IS does not generate a higher level plan, it still contains land use recommendations to guide decisions regarding:

- Commercial backcountry recreation tenures; and
- Non-commercial recreation activities.

Advantages of the KBLUP-IS
• Can be declared a higher level plan pursuant to the *Forest Practices Code* and become binding on forestry management decisions;
• Proactive, strategic approach to land use planning and allocation to avoid user conflicts and conserve wildlife values;
• Inclusive: included stakeholder interests throughout the development of the plan and implementation strategy; and
• Serves as a source of land use planning direction for more detailed land use plans.
Disadvantages of the KBLUP-IS
• Land use guidelines recommended in the plan and implementation strategy may be too broad to apply at the TFL-level to resolve recreation access management issues.

5.4.3 Sub-Regional Land Use Plans: Land and Resource Management Planning

A land and resource management plan (LRMP) is an integrated land use strategy developed on a sub-regional scale. An LRMP considers all resource values and requires public participation and government interagency coordination to facilitate consensus-based land and resource management decisions. An LRMP usually covers a sub-regional area of approximately 15 000-25 000 km^2 and can easily encompass the study area of this project, TFL #14.

As opposed to a regional land use plan, a sub-regional plan provides more detailed resource management objectives to guide operational activities on a smaller geographic scale. Within the land use planning framework in British Columbia, there is no requirement for an LRMP to be preceded by a regional plan; however, in the context of this project, a regional plan already exists to guide the development of more detailed land use plans in and around TFL #14. An LRMP would bridge the gap between general land and resource management directions in the KBLUP-IS and geographically specific operational activities.

An LRMP, or portion thereof, can be recognized under the *Forest Practices Code* legislation as a higher level plan in order to define objectives that must be met in forestry management. The entire LRMP does not have to be declared a higher level plan; parts of the plan, such as recommendations for recreation access management and planning can be declared higher level under the *Forest Practices Code*.

An LRMP can be considered an access management tool because it contains guidelines to direct land use decisions and allocations to avoid user conflicts and to conserve wildlife and water quality values. These guidelines would be on a more detailed and narrower geographical level than the KBLUP-IS. Currently there is no LRMP for any sub-region in the East Kootenays. However, an LRMP could be initiated for an area encompassing TFL #14 (*i.e.*, the Invermere Forest District) in order to guide access management planning and decision making.

Advantages of LRMP as an Access Management Tool
• Inclusive: includes stakeholder interests throughout the development of the land use plan and implementation strategy;
• There is already a regional land use plan in place which could guide the development of sub-regional LRMPs;
• Suitable for the geographical scale of TFL #14; and
• Components of the LRMP could be declared as a higher level plan under *Forest Practices Code* and be binding on forestry management decisions.
Disadvantages of LRMP as an Access Management Tool
• Stakeholders in the area could be exhausted from the recent KBLUP-IS process;
• Interagency coordination and technical support for land use planning projects could be limited by the small number of staff/volunteers and the scarcity of other resources in some areas; and
• The immediate demand for LRMP projects may exceed the resources available to support the program, especially after the KBLUP-IS process.

5.4.4 Local Level Plans: Landscape Unit Planning

An example of a local-level land use plan that could serve as a tool to manage recreation access in TFL #14 is a landscape unit plan. A landscape unit plan places resource management and land

use decisions in the context of biophysical units at the landscape level (*e.g.*, an area the size of a watershed or a group of small watersheds).

A landscape unit plan should not be confused with landscape unit objectives under the *Forest Practices Code* described in section 5.3 of this document. Landscape unit objectives under the *Forest Practices Code* can be derived from a local-level landscape unit plan. In the absence of a local level plan, landscape unit objectives can still be developed to reflect the judgement of resource management agencies (*e.g.*, British Columbia Forest Service, BC Environment) based on an analysis of the resource values in a landscape unit.

A landscape unit plan can be recognized as a higher level plan under the *Forest Practices Code* to guide forestry management on a landscape unit level. A landscape unit plan concept can be successfully applied to TFL #14, using the four landscape units determined by the District Manager for the Invermere Forest District. Objectives can be developed for each landscape unit, with respect to recreation use conflicts, overlapping commercial recreation tenures, and the conservation of wildlife values. Landscape unit plans can be developed in the absence of an LRMP for the sub-region in which TFL #14 is located, building on the broad land use direction outlined in the KBLUP-IS.

Advantages of landscape unit plan as a resource management tool
• A regional plan already exists to guide the development of landscape unit plans;
• Landscape unit plans can be applied to land use planning on a TFL-scale using the planning units previously developed for TFL #14;
• Local level plans can be developed in the absence of a sub-regional LRMP, consistent with the direction of the KBLUP-IS;
• Recreation access management objectives can be integrated into landscape unit plans; and
• Consistent with developing landscape unit objectives under the *Forest Practices Code*.
Disadvantages of landscape unit plan as a resource management tool
• Requires additional planning and consideration by the forestry licensee to develop a landscape unit plan; and
• The immediate demand for landscape unit planning projects may exceed the resources available to support such projects.

5.4.5 Commercial Recreation on Crown Land Policy (CRCL Policy)

The CRCL Policy applies to all commercial recreation operations that provide access and/or guiding information relevant to Crown Land in British Columbia. The CRCL Policy guides all decisions made by BCAL regarding the disposition of public land for commercial recreation purposes. Theoretically, overlapping tenures, where compatible, may be considered for the same area. According to the CRCL Policy, new tenure applications are supposed to be viewed in

consideration of existing commercial tenure operators. In addition, new tenure applications are referred to existing operators for comment, in the case of an overlap. However, in practice, overlapping commercial tenures have been granted by BCAL and have resulted in user conflicts between commercial tenure holders.

Advantages of this [illegible]
• If applied consistently by BCAL, the planned disposition of Crown Land could prevent commercial user conflicts in areas of overlap between commercial tenure holders.
Disadvantages of this [illegible]
• Not a strategic, planned approach to land disposition;
• Currently, not applied consistently by BCAL; therefore, unresolved commercial user conflicts exist; and
• Policy does not include a consideration of non-commercial users in the referral process.

5.4.6 User Agreements, Conflict Resolution, & Zoning

User agreements are not legally binding agreements. They are negotiated by stakeholders in an area where land use conflicts have occurred as a result of overlapping, incompatible activities (*e.g.*, snowmobiling and heli-skiing; heli-skiing and backcountry skiing). User agreements often involve spatial zoning of a contentious area for different types of use, or involve some groups of users avoiding the area on designated days (temporal zoning). User agreements are often initiated by local organized recreation groups. However, some agreements are initiated by industry, such as forestry companies. Although compliance with user agreements is difficult to monitor and enforce, organized recreation groups are able to monitor member activities in areas of contention and to enforce user agreements with peer pressure and other membership-related penalties. User agreements can be successfully applied as an access management tool in TFL #14 to manage recreation activities in highly contentious areas.

User agreements have been initiated with some success in the Golden and Invermere Forest Districts. In response to winter conflicts between user groups and between commercial and public activities, Golden Forest District representatives initiated a roundtable consensus group in 1996 to resolve these conflicts. The Golden Backcountry Conflict Resolution Committee (BCRC) represented users from heli-skiing operations, backcountry ski clubs, snowmobiling guide operations, and a local snowmobiling club. In addition, local forestry industry representatives and government representatives participated in the discussions. The Golden BCRC successfully zoned activities in areas of contention and negotiated user agreements for the zones. The BCRC produced a colour-themed polygon map to illustrate the different zones of use. The map has been placed at prominent areas throughout communities so visiting users have the opportunity to

comply with local user agreements. The Golden Forest District is planning the next phase of the agreement and BCRC process to determine levels of use and appropriate commercial activities for each zone (pers. comm. Jon Wilsgard). Golden Forest District staff are currently looking at the application of the BCRC concept to resolve summer conflicts between recreation users as well (pers. comm. Darcy Monchak). (Q3, q6; Q3, q17; Q3, q18)

The Invermere Forest District established a similar committee, the Invermere Backcountry Conflict Resolution Committee (BCRC), to address winter conflicts between public and commercial recreation users. BCRC members included representatives from a local snowmobile club, commercial snowmobile operators, heli-ski operators, and backcountry ski groups. The purpose of the committee was to resolve winter recreation conflicts in areas of overlapping and incompatible use. Discussions identified areas of use for each backcountry activity, while negotiations focused on high quality areas of contention for each activity in the Forest District. Alternative snowmobile access was developed in an area where competing uses did not overlap, in order to eliminate the conflict between snowmobile users and a tenured commercial heli-ski operator in the Bugaboos. In addition, the negotiations resulted in informal zoning recommendations directed to the District Manager which presently include twenty areas for joint use, sixteen areas for skiing (primarily heli-skiing), and two ski tour areas. Two areas of conflict could not be resolved within the BCRC negotiations, and the Invermere Forest District Manager was forced to enact a ss. 105 closure pursuant to the *Forest Practices Code* to restrict snowmobile access to Upper Jumbo Creek and Catamount Glacier. Enforcement of these closures has been difficult and some violations have taken place (pers. comm. Invermere Forest District(a)). In the future, local winter recreation conflict resolution committees may be used to fine tune the initial zoning recommendations made in 1996 (Invermere Forest District 1999). (Q3, q6; Q3, q17; Q3, q18)

In another case in the United States, an attempt to zone conflicting uses met with public contest. In 1997, the Forest Supervisor of Utah's Wasatch-Cache National Forest decided to grant a permit renewal to a commercial operator in the area. In response to conflicts between non-commercial backcountry skiers and the tenured commercial heli-ski operator, the permit renewal included a provision designating days on which backcountry skiers would be expected to avoid certain slopes used by the heli-ski operator. In addition, under the permit renewal, Wasatch Forest Service lands were divided into six zones. The commercial operator was expected to avoid some zones on certain days in the months of January and February and the backcountry skiers were

expected to avoid some zones on other days. Opponents of the plan were outraged at the Forest Service's attempt to restrict public access to accommodate a commercial interest (Powder Magazine 1997). The main point of difference between the Wasatch Forest Service case and the cases in Invermere and Golden Forest Districts, was that the Wasatch case did not involve both user groups in the decision making process; it could not be considered a true "user" agreement. In a similar example, the Oregon Department of Forestry is currently developing use and activity zones for motorized and non-motorized trail users in the Tillamook State Forest (pers. comm. John Barnes). However, the Oregon Department of Forestry zoning initiative cannot be considered a user agreement since the recreation users are not driving the decision-making process of trail designations. Users are providing their input regarding their use of the trails in the State Forest. (Q3, q6, Q3, q17; Q3, q18)

User agreements between forestry companies and recreation users have also been negotiated in the province of British Columbia. For example, MacMillan Bloedel (TFL #39) has agreed with recreation users of the TFL to identify and maintain recreationally important logging roads through their forest development planning process (pers. comm. Sunshine Coast Forest District). The agreement between MacMillan Bloedel and recreation users does not, however, encompass resolution of user conflicts that may arise from recreation use of logging roads. (Q3, q6; Q3, q17; Q3, q18)

Advantages of user agreements: conflict resolution and analogue access management tools
• Includes interests of all users involved in the conflict;
• Support of the users is established at the outset of agreement negotiations;
• Past agreements have been supported by British Columbia British Columbia Forest Service District staff;
• Initiated at the local, grass-roots level;
• Monitoring and enforcement to ensure compliance with agreements can be handled by organized user groups, through peer pressure and other membership-related penalties;
• Past user agreements in southeastern British Columbia have been successful; and
• Can be used in coordination with land use planning projects to achieve recreation access management objectives.
Disadvantages of user agreements: conflict resolution and analogue access management tools
• Difficult to educate visiting users about local user agreements;
• Visiting users have no affiliation with local groups, and, therefore, have little incentive to comply with local agreements;
• Usually require a voluntary effort on the part of user groups to negotiate conflict resolution;
• If peer pressure fails to ensure user compliance with agreements, usually the last resort to resolve user conflicts is a closure pursuant to ss. 105 of the *Forest Practices Code*;
• A reactive, not proactive approach to resolving user conflicts;
• Agreements require monitoring and enforcement effort to ensure compliance; and
• Does not take into consideration the effects of recreation activities on wildlife values.

5.4.7 Recreation Opportunity Spectrum (ROS)

The Recreation Opportunity Spectrum (ROS) is one type of recreation inventory used by the British Columbia Forest Service. The ROS inventory recognizes that not all recreation uses are compatible. As a result, some spatial recreation use zoning of the land base is necessary to ensure all interests have opportunities that meet their needs and can be integrated with non-recreation uses of the landscape (Scott-May n.d.). In addition, the results of ROS inventories are often used in the LRMP process to zone landscapes and set strategic objectives according to ROS classifications. The ROS classifies land according to its remoteness and natural integrity. For example, an unroaded area, such as the Upper Spillimacheen in TFL #14, is classified as "primitive". All forest and range land under the British Columbia Forest Service' jurisdiction is divided into one of six ROS classes:

- Primitive (P);
- Semi-primitive non-motorized (SPNM);
- Semi-primitive motorized (SPM);
- Resource roaded land (RRL);
- Rural (R); or
- Urban (U).

The ROS inventory classifications suggest the type of recreation experience a person would have if they used the area. The management intent of SPNM areas is to maintain the unroaded character of the area and to provide opportunities for dispersed non-motorized recreation. These areas are generally remote, alpine, subalpine, and high elevation forest, high elevation ridges, and mountains tops that cannot be accessed by roads. Human-induced landscape alterations are minimal. These areas provide an opportunity to experience a reasonable degree of isolation from the sights and sounds of motorized activity in a natural appearing setting. However, in the winter, these areas are easily accessed by snowmobiles, helicopters, and snowcats, indicating a seasonal separation in the zoning designation. Theoretically, helicopters can access SPNM areas in any season (LUCO 1997).

The management intent of SPM areas is for dispersed motorized recreation. These areas are accessed by primitive roads or trails suitable for high clearance 4x4 vehicles, ATVs, motorcycles, and snowmobiles. All forms of dispersed recreation associated with these kinds of vehicles occur. These lands have been influenced by human activities and may or may not be natural appearing

landscapes. Opportunities to get away from other recreation users and to experience solitude are good during most seasons of the year. This classification may be applied for winter use in alpine and subalpine areas used by snowmobiles, helicopters, and snowcats and is also intended for areas where roads have been deactivated, gated, or have other access restrictions (LUCO 1997).

The management intent of RRL areas is for dispersed and facility oriented recreation. These lands are accessed by better than primitive roads and are suitable for most conventional two-wheel drive vehicles. All forms of dispersed and organized recreation associated with vehicles occur. These lands have been influenced by human activities and the results are visible on the landscape. Depending on the season and the nature of the recreation activity, opportunities to experience solitude are rare. This classification is used for operable forest land that will be harvested using roads. Non-motorized activities also occur in this area such as cross-country skiing, and restrictions may apply that prohibit some conflicting recreation activities (LUCO 1997).

The management intent of rural and urban classified land does not apply to TFL #14, and, therefore, a description of these classifications is not provided.

The British Columbia Forest Service has developed criteria that define each class for conducting recreation inventories. For example, primitive areas are over 5,000 ha in size, over 8 km from the nearest road, and predominantly unaltered by human activity. Modified roaded areas are within 1 km of roads and have a landscape dominated by human activities.

An ROS inventory can be considered a tool to manage recreation access, if it is used in conjunction with other tools to set management objectives for an area. The result of an ROS inventory can be used to plan recreation or backcountry objectives within an LRMP process or for landscape units, given the current status of the area. For example, landscape unit objectives can be set for primitive areas in order to preserve their remoteness and unroaded nature.

An ROS recreation inventory was completed for TFL #14 in 1995. The inventory was intended to answer the following questions:

- Which areas in TFL #14 offer remote backcountry experiences?
- Which areas are more accessible for motorized recreation?

- How would different land use and access management scenarios affect the range of recreation opportunities in the region?

The results of the ROS inventory, or an updated version of the inventory, could be used in the process of setting landscape unit objectives for each planning unit in the TFL. In addition, the results of the ROS inventory can be used in the process of developing an LRMP for the Invermere Forest District.

Advantages of the ROS
• ROS inventory already completed for TFL #14 in 1995; and
• Can be used to support the development of land use objectives for an LRMP or a landscape unit plan.
Disadvantages of the ROS
• Not a stand alone tool to resolve recreation access issues;
• Does not consider the value of an area for wildlife use and habitat; and
• Does not consider First Nations' use of an area.

5.4.8 Public Advisory Group

A public advisory group to develop an access management and planning framework would be similar to the Invermere and Golden resolution committee models, in that it would consist of local representatives concerned about recreation access. A public advisory group would be a proactive access management initiative, developed to strategically address issues arising from increasing access and recreation use of forested landscapes. For TFL #14, Crestbrook Forest Industries or the Invermere Forest District office can initiate a public advisory group, consisting of people involved in the recreation use of the area. The public advisory group should also include representatives from government agencies involved in access management, such as the British Columbia Forest Service, BC Environment, and British Columbia Assets and Lands. In addition, industries and First Nations can be solicited for their involvement. The objectives of the public advisory committee for TFL #14 are:

- to bring a consideration of wildlife values and recreation values to forestry management and to the disposition of public land, in an adaptive and on-going manner;
- to inform and educate the public in the Invermere Forest District;
- to receive local knowledge and to determine local concerns; and
- to liaise between the affected public and government agencies.

Thus, the public advisory group would provide strategic recommendations to Crestbrook Forest Industries, British Columbia Forest Service, BC Environment, and British Columbia Assets and Lands regarding access planning and management. In addition, the public advisory group can initiate and negotiate user agreements where necessary, and provide options for monitoring and enforcing local agreements.

A public advisory group can be used in coordination with other land use initiatives to manage recreation access. Conceivably a public advisory group can initiate an LRMP or landscape unit planning process, especially in the case of TFL #14; a public advisory group could drive the development of recreation access objectives under these land use planning processes.

The Kamloops Forest District involved and advisory-type group to develop an access management strategy for a landscape until within their jurisdiction. The Nehalliston Access Management Plan (1996-1997) was developed by a consensus-based group, similar to the public advisory group model described above. The Nehalliston area has numerous lakes for recreation activities and is also used for timber harvesting. The Kamloops Forest District recognized the potential for recreation user conflicts, conflicts between recreation users and industry, and environmental degradation in the absence of a coordinated access management strategy. The forest district representatives encouraged interested stakeholders to participate in a consensus-based group to develop an access strategy. The goal of the process was to develop a plan for the Nehalliston landscape unit consistent with the land use planning goals of protecting, preserving, and ensuring sustainable utilization of the area for all users. Once the group was established, their objectives were to:

- identify existing roads in the landscape unit that could be deactivated;
- identify existing roads to be maintained for recreation uses; and
- set the strategic direction for future access development in unroaded areas.

Recommendations, agreed upon by the group, were forwarded to the Kamloops District Manager for consideration and approval. Where the group could not agree on issues, options were forwarded to the District Manager for review. The District Manager then decided which options to include in the access management plan. Ultimately, the group produced maps of the Nehalliston landscape unit, illustrating different zones of use and the status of roads. Access management goals were developed for each zone. Roads were classified as permanent,

temporary, or to be reclaimed, with a consideration of past, current, and planned harvesting activity and the recreation importance of each road. (Q3, q11)

The Calgary Area Outdoor Council (CAOC) provides another example of a public advisory-type group for access management. The CAOC is an umbrella organization for groups with a common interest in outdoor recreation, conservation, education, and leadership. The CAOC's mission is to identify and address the interests and needs of the outdoor community through representation on various ad-hoc or standing committees and review boards within the City of Calgary. A similar council could be established for TFL #14 to ensure that recreation access planning and management is considered as a component of forestry management. The council members would consist of representatives from government, industry, First Nations, recreation groups, environmental groups, commercial tenure holders, and concerned citizens. Conceivably, the council would provide recommendations to all levels of land use and forestry management, at the local (*e.g.*, Crestbrook Forest Industries) and regional level (*e.g.*, British Columbia Forest Service, BC Environment, British Columbia Assets and Lands).

Access management initiatives involving public advisory working groups focusing on recreation issues in forested areas have also taken place in southern Alberta. As a result of the Castle River sub-regional land use planning process, the Castle River access management plan was initiated in 1986 by the Southern Regional Managers Committee in the Bow/Crow Forest District. The purpose of the access management plan was to focus on and provide field-level direction for the recreation use of on and off highway vehicles in the Castle River area in order to protect wildlife habitat and migratory wildlife populations (Bow/Crow Forest District 1992). Due to their mandate to manage recreation on forested landscapes, the Bow/Crow Forest of the Alberta Forest Service coordinated the project. Rather than the Forest Service developing a plan for public for review and comment, the access management plan was developed by a twenty-three member working group consisting of public interest and user organizations, local businesses, industry representatives, and the Provincial Government, on a cooperative basis. Decision making by the working group was undertaken on a consensual basis, involving opportunities for each representative to advocate the position of their organization and allow the working group to consider and adopt a position on each matter by consensus. Decisions made on that basis did not require the unanimous opinion of the entire group. General public meetings were held in local communities (Pincher Creek, Blairmore, and Lethbridge) to provide an opportunity for those not directly involved in the working group process or affiliated with any user organizations to express

their opinions. The working group used the information from the initial public meetings to refine the access management plan recommendations and use designations. In the end, the access management plan consisted of a set of maps, one for winter use and one for summer, which express the core intent of the access management plan. As well, a set of implementation recommendations involving education, enforcement, and engineering were provided by the group. The resulting access management plan was acknowledged by the group as the best that could be achieved by the group as a whole, but it was understood that it may not meet the aspirations of the individual organizations (Bow/Crow Forest District 1992). A second series of public meetings were held in 1992 to introduce the access management plan to the public. The working group ratified the access management plan in 1992 and the plan was subsequently approved by the Southern Regional Resource Managers Committee.

Advantages of a public advisory group as access management tool
• Crestbrook Forest Industries has an existing relationship with British Columbia Forest Service, BC Environment, and commercial and non-commercial recreation users in the vicinity of TFL #14, which can provide a basis to initiate a public advisory group;
• Inclusive: considers the interests of all stakeholders;
• Proactive, strategic, long term planning approach; and
• Can be used in coordination with other tools to achieve access management goals.
Disadvantages of a public advisory group as access management tool
• Requires a commitment of time, and perhaps money, to establish and sustain a public advisory group;
• Requires a commitment of time and energy to establish a mutually respectful and beneficial working relationship between the public advisory group and agencies who would receive recommendations; and
• Given the recent regional land use planning process, people may be reluctant to commit time and energy to a public advisory group unless reasonably compensated.

5.4.9 Information Dissemination

Disseminating information regarding road access and recreation attributes can be used as a tool to direct recreation activity away from sensitive wildlife habitat and previously overused areas, thus managing access. In addition, information dissemination regarding access can be used to increase compliance with user agreements. Forestry companies, the British Columbia Forest Service, and environmental non-governmental organizations regularly prepare recreation and logging road maps for TFLs in all areas of British Columbia. These maps are usually distributed, upon request, to local and visiting recreationists. In the case of the Golden BCRC, maps illustrating zoning and conflicting uses were distributed throughout the town of Golden and to snowmobile clubs from Calgary and Invermere in order to educate visiting users about the local user agreement between snowmobilers and backcountry skiers (pers. comm. Darcy Monchak).

Advantages of [illegible]
• Can be used as a tool to increase visiting users compliance with local agreements; and
• Distribution of maps can be used in coordination with other access management tools to illustrate decisions and objectives.
Disadvantages
• Ethical concerns over the power and authority of decision makers to withhold information or consciously direct public use of Crown Land.

5.5 Road Engineering Measures

Road engineering measures are used to prevent the negative effects on the natural environment resulting from roads that were outlined in chapter 3.0. Road engineering measures, such as culverting, road layout, side ditches, sub-grade construction, have been implemented with the purpose of stabilizing a road against the effects of rain, stream, and snow melt run-off. However, these measures do not deter or prevent human access on logging roads. Road engineering measures, such as cross-ditches, water bars, and road deactivation, also are implemented with the purpose of stabilizing a road against the effects of rain, stream, and snow melt run-off. These measures have usually not been implemented with the intention of restricting recreation access on logging roads; however, these measures can result in deterring and limiting some forms of motorized access (*e.g.*, non-4x4 vehicles). Gates and other physical obstructions, such as debris piles and boulders, are implemented to restrict recreation access to a road for the purposes of wildlife conservation or public safety. (Q1, q1; Q3, q17)

Road engineering measures, which deter or prevent human access on logging roads are:

- gates and signage;
- water bars;
- cross-ditches and tank traps; and
- road deactivation (temporary, semi-permanent, and permanent).

5.5.1 Physical Obstructions and Signage

Physical obstructions, such as gates, debris piles, and boulders, are infrastructure usually placed at the initial point of entry on a logging road, which deny access to some users. Gates are generally requested and constructed by industrial users (*e.g.*, forestry, mining, or petroleum companies) to restrict recreation access in the interest of public safety. In addition, gates can also be erected in conjunction with a *Wildlife Act* closure to deny access to critical wildlife habitat; to prevent wildlife poaching; to prevent public access to First Nation's treaty areas; to prevent access to community watershed; and to prevent vandalism of logging equipment at harvesting areas

(pers. comm. Western Forest Products). Signs are occasionally posted with gates to explain the nature of the closure and the penalty for non-compliance. For instance, high visibility signs have been posted at key backcountry locations in the Invermere Forest District to inform winter recreationists about snowmobile closure areas and local agreement use areas.

5.5.2 Water Bars

A water bar is a shallow ditch dug across a logging road or trail at an angle that will prevent excessive water flow down the roadway. In essence, a water bar captures water off the road surface and diverts it into ditches running parallel to the direction of the road. The location and number of water bars installed in a road is determined by the grade, slope, length of the road, and the nature of the road surface materials (Moore 1994). Water bars are often widened and flattened in order to accommodate some vehicular traffic; however, water bars deter vehicles with low clearance and without 4x4 capability.

5.5.3 Cross-Ditches and Tank Traps

A cross-ditch is similar to a water bar except that it is not constructed to accommodate motorized traffic. A cross-ditch is dug across a logging road at an angle to facilitate the diversion of both surface water and ditch water. Both cross-ditches and water bars prevent road surface erosion that could result from rain, stream, and snow melt run-off. A number of factors including water run-off volume and velocity, soil types, hill slope aspect, elevation, vegetation, rainfall intensity, and down slope conditions determines ditch placement (Province of British Columbia 1995a).

Tank traps are access control structures usually placed at one point of a road to deter motorized use. Using a backhoe, a tank trap is dug with a substantially sharp edge at a sufficient depth and width to discourage vehicular use. Cross-ditches can also render a road inaccessible to motorized vehicles since they are not constructed to accommodate access.

5.5.4 Road Deactivation

Road deactivation is an activity that may involve one or all of the above road engineering measures to close and stabilize an unused or abandoned logging road. Deactivation may also be implemented as part of the British Columbia Watershed Restoration Program, to close unused roads in a watershed. There are three levels of deactivation defined in the *Forest Practices Code* which reflect the length of time a road will remain inactive:

- temporary (seasonal);
- semi-permanent; and
- permanent.

Road deactivation is planned for the following purposes:

- to minimize the risk of road-related failures, such as landslides and stream sedimentation;
- to maintain the integrity of the surrounding environment;
- to control access for public safety and wilderness conservation; and
- to protect the initial road investment during times when use of the road is suspended for the future when vehicular access may be required.

Temporary deactivation is planned for a road when regular, industrial use of the road is to be suspended for up to three years. Semi-permanent deactivation is planned for winter roads or for roads where industrial use is suspended as a part of a regular rotation period, for up to three years. Permanent deactivation is planned for abandoned roads or road that will not be used for industrial activities.

Deactivation may involve some or all of the following activities, depending on the level of deactivation:

- installing gates at the point of entry to prevent vehicular access during deactivation;
- replacing existing road culverts with water bars or cross-ditches to restore natural hydrological flow patterns and stream channel stability;
- pulling back sidecast fill, which was initially removed and placed down slope of the road during construction;
- re-contouring the road surface to original contours; and
- ripping, tilling, and re-vegetating the road surface.

Any level of deactivation must be formally approved through a Forest Development Plan by a District Manager. Pursuant to ss. 64 of the *Forest Practices Code*, any person or licensee who uses a road under the authority of a road permit, or other relevant permit, must deactivate the road temporarily, semi-permanently, or permanently, in accordance with an approved Forest

Development Plan, regulations and standards, a road permit, or a special use permit. If the road is permanently deactivated, the government (*e.g.*, British Columbia Forest Service, BC Environment) must maintain the stability of the area that was deactivated. This section of the *Forest Practices Code* can be used to limit, restrict, or deter access in areas where logging roads, no longer under permit, could be deactivated.

Forest service roads, as opposed to logging roads, are built, maintained and managed by the British Columbia Forest Service; logging roads are built and maintained under road permits by licensees, such as Crestbrook Forest Industries. Permanent deactivation of a road often renders the road inaccessible to some form of motorized traffic.

Advantages of road [illegible]
• Serves a dual purpose of preventing road-related failures and deterring some forms of motorized access.
Disadvantages of [illegible]
• Expensive to construct;
• Signs and gates are sometimes vandalised;
• Must be approved in a Forest Development Plan by the British Columbia Forest Service District Manager; and
• May trigger the requirement for federal approvals or a federal environmental impact assessment, especially where navigable waterways or fish habitat could be affected by construction, maintenance or deactivation activities.

5.6 Summary

The list of tools described in this chapter is not intended to be a prescription to remedy all access management issues. Instead, the tools are to be applied singularly, or in appropriate combinations, to address the issues related to access. The tools are to be applied with a consideration of the management objectives of the forest district, the site-specific social and environmental issues, and the history of relations between recreation users. Lastly, the tools are to be applied adaptively -- as the objectives of an access management strategy are achieved, new tools must be applied to realize additional objectives. In addition, if tools prove to be ineffective given an evolving access management situation, other tools can be applied to manage access, which are more appropriate to the situation.

6.0 Options, Recommendations, & Conclusions

6.1 Overview

The purpose of this chapter is to provide options and recommendations for recreation access management and planning in southeastern British Columbia, particularly in TFL #14. This chapter is not intended to be a definitive "how-to" guide to resolve all the access management issues identified in chapter 4; rather, this chapter identifies some options to address access management and planning in TFL #14 and in the surrounding forest district. Some of the recommendations are specific to facilitating a recreation access management process in TFL #14. However, given the context of TFL #14 in the greater ecosystem, many of the recommendations have implications on a larger scale. Lastly, conclusions are provided to illustrate the challenges and opportunities for access management in British Columbia. As I noted in chapter 3.0, section 2.2.3, questionnaire and question numbers are noted next recommendations to support the information presented therein. For example, questionnaire #3, question 11 is noted as Q3, q11.

6.2 Recreation Access Management Themes

Given the issues and potential ecological, social, and economic effects arising out of unmanaged recreation access outlined in chapters 3 and 4, the following elements have been developed to guide recreation access management and planning. The list was developed largely as a result of an analysis of information obtained from key informant interviews, questionnaires, and a literature review. In part, the list reflects elements of recreation access management initiatives in southern Alberta and three other forest districts in British Columbia. These elements serve as themes for the suggested options and recommendations to achieve access management in British Columbia

A publication concerning access management in southeastern British Columbia by the former Interagency Management Committee (Kootenay Region) chairperson, Cathy Scott-May (n.d.) and ecosystem management themes described in an article by Grumbine (1994) were also useful background to this list of access management elements. The ecosystem management themes discussed by Grumbine are similar to elements of recent recreation access management plans developed in the Kamloops, Vanderhoof, and Bulkley Forest Districts, and to access management initiatives in other forest districts. For example, Grumbine (1994) describes increasing interagency cooperation as a dominant theme of ecosystem management; interagency cooperation

has played a key role in the three Land and Resource Management Plans and subsequent recreation access management plans.

The elements are:

- Setting goals and objectives;
- Local public involvement;
- Interagency cooperation
- Consistency
- Equity
- Flexibility
- Strategy; and
- Landscape level.

Each element is briefly described in the following sections.

6.2.1 Setting Goals and Objectives

General goals and specific objectives for recreation access management and planning must be developed at the outset of the project in order to define a reasonable scale and scope for subsequent plan development. Clearly defined goals and objectives lend a sense of direction to plan development; provide a foundation for decision-making, especially within groups; and provide a reference point for monitoring plan implementation, effectiveness, and compliance (Noss 1987; Grumbine 1994). Primary, philosophical goals need to be expressed so that specific management objectives and action plans can follow smoothly. Goals and objectives need to be sensitive to both ecological and human values, and be based on a defensible ethical position (Noss 1987; Grumbine 1994). No recreation access management strategy can be value free. In fact, access management is possibly as value-laden, or more so, than any other management philosophy. However, integrating values into access management is not a handicap to plan development; values provide direction to the development of goals, objectives, and subsequent action plans. Values, such as wildlife conservation, or increased recreation development, can be expressed as the goals and objectives of recreation access management and will direct the development of subsequent action plans.

6.2.2 Local public involvement

Recent recreation access management initiatives in the Invermere Forest District, Golden Forest District, and as a part of land use planning have involved local users and communities, in varying capacities, to develop, implement, and monitor access management. The rationale for public involvement is based on the widely held belief that workable and lasting solutions require broad public and community-level support (Scott-May n.d.). Such broad base support can eliminate the need to pursue legislated solutions which are difficult to implement and costly to enforce. The level and type of public involvement can vary from information dissemination to shared power and decision-making authority. As public involvement increases and more decision-making power is given to local users, the likelihood of successful access management increases. Public involvement provides a forum for all affected users' interests to be represented and provides a mechanism for liaison, cooperation, and trust between community members, government representatives, and industry.

6.2.3 Interagency Cooperation

Interagency cooperation, in terms of recreation management, refers to cooperation between the provincial, regional, and/or the local management agencies that have a legal mandate with implications for recreation management. Recreation access management planning is not the jurisdiction of one agency in British Columbia. Instead, several agencies have decision-making power and legal mandate with respect to recreation access management. Table 6.1 summarizes the agencies and their mandates, as they have implications for recreation access management.

Table 6.1
Provincial Agencies

Agency	Mandate
BC Forest Service	• manage recreation resources in provincial forests • higher level planning • road construction, maintenance, deactivation, with respect to timber harvesting • ss. 105 (*Forest Practices Code*) closures to resolve recreation user conflicts
BC Environment	• conservation and protection of wildlife and wildlife habitat • *Wildlife Act* closures to restrict access to sensitive wildlife habitat • management of Crown Land with respect to commercial recreation tenures
British Columbia Assets and Lands	• disposition of Crown Land to commercial recreation tenure applicants

Interagency Management Committee	• manage strategic land use planning • coordinate and direct ministry staff in all aspects of the preparation of land use plans • provides a forum for cooperation and communication for provincial agencies on a regional basis where land use planning is concerned

Management relationships have the potential to become competitive rather than cooperative (Grumbine 1994). Competition grows out of a mix of divergent legal mandates, objectives for land and resource management, agency history, organizational structure, and conflicting personal and professional norms. In order for recreation access management to be successful in British Columbia, cooperation rather than competition must characterize relationships between agencies involved in access management.

6.2.4 Consistency

Recreation access management and planning will be consistent with higher-level land use plans and with relevant regulations, statutes and provincial policies (Scott-May n.d.). In terms of TFL #14 and southeastern British Columbia, recreation access management and planning will be consistent with the direction of the Kootenay Boundary Land Use Plan (KBLUP) (1997) and the Commercial Recreation on Crown Lands Policy (1998). As well, recreation access management and planning will be consistent with all applicable acts and regulations (*e.g.*, *Forest Practices Code*, *Wildlife Act*). The access management guidelines described in the KBLUP recognize that access issues are best dealt with at a local or operational scale (LUCO 1997). However, the guidelines set out in the plan provide both strategic direction on access management to guide lower level planning and also interim direction until lower level planning can be completed.

6.2.5 Equity

Recreation access management will strive to balance the opportunities for access for all stakeholders, so that no user group will be completely excluded. Recreation access management also has implications for non-recreation users. For instance, a decision to construct a new road may have consequences for traditional use by First Nations of a specific area. Recreation access management will consider the views and values of all stakeholders potentially affected by access, including First Nations, users who are physically challenged, and industrial interests, such as forestry, mining, and agriculture. Although some activities may be restricted in some areas at some times, recreation access management will provide opportunities for all activities, balancing areas of constraint with areas of opportunity.

6.2.6 Flexibility

Recreation access management and planning will capitalize on the remaining flexibility that currently exists on the land base by providing interim and long term direction for road construction and resulting access. Interim recreation access management and planning will provide guidance during the lag time when long term direction is being developed. Interim management will preserve the flexibility and current access options on the land base for future management and planning direction.

Flexibility also refers to the adaptability and responsiveness of recreation access management to incorporate and respond to new directions, new tools, and evolving circumstances. Recreation access management and planning will happen within an adaptive management framework. Adaptive management involves monitoring compliance with management objectives, and monitoring the effectiveness of access management tools and decisions. The resulting information from monitoring is used to improve management and adjust objectives. Flexibility, monitoring, evaluation, and feedback are critical to improving access management. Imagination and creativity in applying these elements are critical to dealing effectively with change and complexity

6.2.7 Strategy

Many access management tools are implemented to treat only the symptoms of a larger management issue. For example, conflict resolution between recreation users deals only with conflicts as they arise; it does not seek to prevent conflict. Recreation access management and planning will focus on providing a long-term, planned and adaptive framework for recreation human use of public land.

6.2.8 Landscape level

Although some recreation access management tools, such as conflict resolution, may resolve issues on a site-by-site basis, strategic, recreation access management and planning will take place on a larger, landscape level. This is especially important in southeastern British Columbia, where forest districts share borders with recreationally significant areas (*e.g.*, Invermere and Golden forest districts) and protected areas (*e.g.*, Glacier National Park, Kootenay National Park, and Bugaboo Provincial Park). Logging roads, skid trails, and hiking trails link valleys and watersheds, creating a variety of access opportunities across the landscape. The boundaries of forest districts, land use planning regions, and municipalities are arbitrarily set for administrative convenience, with no consideration of greater ecosystem processes. Many of the effects of human

access, such as habitat fragmentation, do not recognize these administrative boundaries. Therefore, recreation access management and planning must be coordinated between each administrative unit and between protected areas and non-protected areas, across the landscape.

6.3 Options & Recommendations for Recreation Access Management & Planning

The following options and recommendations have been developed as a result of an analysis of the information obtained from the questionnaires, the key informant interviews, numerous informal telephone conversations, and the literature review. The recommendations are divided into two parts: long term recommendations for recreation access management and planning; and interim recommendations to prepare for a process of long-term, strategic access management and planning. The long-term recommendations are presented as options for a framework for access management and planning in southeastern British Columbia, encompassing the case study area, TFL #14. The long-term options draw on recent examples of recreation access management plans in the Vanderhoof, Kamloops, and Bulkley forest districts. Each option contains recommended action(s), divided into the elements presented in sections 6.2.1-6.2.8. The interim recommendations outline the activities that must take place in the short term in order to facilitate a long term, strategic approach to access management and planning.

The recommendations and options are directed at specific audiences. Each recommendation is preceded by a shaded bar that indicates which organization, user group, or government agency will be involved in any aspect of the recommendations or options. Abbreviations are used and can be identified as follows:

CFI = Crestbrook Forest Industries
BCFS = BC Forest Service
BCEN = BC Environment
BCAL = British Columbia Assets and Lands
IAMC = Interagency Management Committee (Kootenay Region)
NP = National Parks
PP = Provincial Parks
CRTH = Commercial recreation tenure holder
FN = First Nations
EG = Environmental group
R = Recreationists (affiliated with an organized group or unaffiliated)

6.3.1 Long-Term Options

Long-term, strategically developed recreation access management plans do not occur in British Columbia unless they are embedded in another land use planning process, such as land and resource management planning, or landscape unit objective planning. Below, I have outlined two long-term options for access management and planning. One option is an access management plan or planning process that results from a sub-regional land use plan, or from the guidelines in the KBLUP. The other option is setting landscape unit objectives for each landscape unit in TFL #14, with access as a priority.

The recommendations for long-term access management and planning presented below are based, in part, on the example set by three other forest districts in British Columbia, and by access management initiatives in other forest districts. The Vanderhoof, Kamloops, and Bulkley forest districts have all recently participated in a sub-regional land use planning process. Each sub-regional plan delivered recommendations concerning land use planning issues, including recreation access management planning. As a result, each district developed some type of long-term, strategic, planning framework to deal with recreation access. Another guide (Landscape Unit Planning Guide), recently published by the Province of British Columbia (1999), concerning landscape unit planning was also useful in developing the following options. Finally, the long-term recommendations include tools described in chapter 5.0, where they are relevant to the issues in TFL #14. Note, however, that TFL #14 is part of a larger landscape in southeastern British Columbia; the borders that define TFL #14 are administrative and not ecological. The recommendations recognize the TFL as a piece of a larger ecosystem.

The long-term recommendations describe options for recreation access management and planning in terms of:

- Sub-regional land use planning; and
- Developing landscape unit planning objectives.

Option 1: Sub-regional Land Use Planning

Background to Land and Resource Management Planning: Land and Resource Management Planning (LRMP) is a sub-regional integrated land and resource management planning process for the province of British Columbia (section 5.4.3, chapter 4.0). LRMP covers sub-regional areas

of approximately 15 000 - 25 000 km^2, roughly the size of a forest district. The roles of LRMP are as follows (LUCO 1999):

- LRMP guides lower level plans, just as regional plans guide LRMP;
- LRMP can be used to refine the broad allocation zones decided in a regional plan, and it can provide specific management guidelines to implement the other types of strategic direction given in the regional plan;
- LRMPs will be recognized in the *Forest Practices Code* as higher level plans that define the objectives that must be met in applying the operational rules of the act; and
- Management guidelines, such as those for biodiversity, are used in LRMP to define the primary requirements for resource management.

LRMP and Higher Level Plans under the Forest Practices Code: LRMPs can be recognized as higher level plans under the *Forest Practices Code*. As a result, the objectives contained with the LRMP must be met in the operational plans under the Act. Not all LRMPs have been declared higher level plans. Currently, the Vanderhoof LRMP and the Bulkley LRMP are not higher level plans, although there is a potential that parts of the LRMPs to be declared higher level pursuant to the *Forest Practices Code*. The Kamloops LRMP has been declared a higher level plan under the *Forest Practices Code*, and, therefore, the objectives stated within are legally binding on forestry management within that area.

LRMP and access management and planning in TFL #14: An LRMP in the Invermere Forest District could be used as a tool to facilitate a framework to address access-related issues in TFL #14. The development of an access management plan, with a recreation focus, was a recommendation of the Bulkley, Vanderhoof, and Kamloops LRMPs. A similar recommendation could be developed within the Invermere District LRMP, to guide access management and planning in TFL #14. Alternatively, a recommendation in the Invermere District LRMP could be developed for landscape unit planning in TFL #14 with recreation and access as the focus for management objectives.

An LRMP for the Invermere District is a natural progression in the implementation of the KBLUP guidelines, bridging the gap between general resource management direction and operational activities.

Resources: There are some excellent guides published by the provincial government and LRMP documents available from forest districts that have recently undergone the LRMP process. These resources include:

- The Province of British Columbia. 1993. Land and Resource Management Planning: A Statement of Principles and Process.
- Province of British Columbia. 1996. Land and Resource Management Planning: Orientation to LRMP.
- Province of British Columbia. 1996. Land and Resource Management Planning: Public Participation in LRMP.
- The Province of British Columbia. 1998. Guide to Writing Resource Objectives and Strategies.
- Vanderhoof District LRMP. 1998.
- Vanderhoof Access Management Plan. December 1998-April 2000.
- Bulkley District LRMP.
- Kamloops District LRMP.
- Nehalliston Access Management Plan (Kamloops District). 1997.

Elements of access management and planning: The following points indicate where the general elements of access management and planning described in section 6.2 are represented in LRMP. Comments and recommended actions are provided to implement these elements in TFL #14 through LRMP.

Element	Comments & Suggested Action
Setting goals and objectives	• General goals and guidelines related to access are stated in the KBLUP implementation strategy with regards to connectivity, grizzly bears, ungulate winter range, mountain caribou, and recreation • Specific resource management direction outline in Appendix 5 of the KBLUP implementation strategy: Land and Resource Management Direction in the Invermere Forest District • BCEN, BCFS, IAMC, CFI, in coordination with all affected stakeholders, can use these guidelines to direct the development

	of more specific (geographically) objectives for TFL #14, within the framework of an LRMP for the Invermere Forest District • LRMP provide strategic direction on land use and resource management for TFLs; therefore, a framework for access management and planning could be recommended within an LRMP for TFL #14

Element	Comments & Suggested Action
Local public involvement	• Public involvement in LRMP and access management and planning is required at all stages to: - identify issues and values - determine approaches to public participation - set terms of reference - determine resource units - develop and assess recommendations - review draft plans • LRMP promotes decision making on the basis of sustainability and consensus; consensus requires the involvement of all affected stakeholders • public involvement methods, objectives, and intensity will vary between LRMP projects and access management areas • public participants from the Invermere Forest District in the KBLUP process could form a public advisory group to guide the development of an LRMP and subsequent access management plan for TFL #14 • First Nations should be encouraged to participate in public involvement or the public advisory group; however, provincial government policy states that LRMP is to be without prejudice to land claims (Province of British Columbia 1993)

Element	Comments & Suggested Action
Interagency Cooperation	• previous LRMPs have involved the cooperation of all government agencies represented in the district and have been partially coordinated by the IAMC • the BCFS has played a significant role in facilitating the development and implementation of access management

	plans, but encourages users to initiate and develop the process • the success of an LRMP and subsequent access management plan in the Invermere Forest District will depend on the degree of cooperation and coordination between affected stakeholders, First Nations agencies, and locally represented government agencies • interagency cooperation, with regards to access management and planning in TFL #14 also implies cooperation by managers in Glacier National Park and Bugaboo Provincial Park, on the border of the TFL • the delineation of responsibility for access management and planning needs to be agreed upon at the outset of the process

Element	Comments & Suggested Action
Consistency	• participants in LRMP process to ensure consistency with the general guidelines stated in the KBLUP-IS; with regards to access, the guidelines of most importance are: - connectivity guidelines - grizzly bear guidelines - ungulate winter range guidelines - mountain caribou guidelines - front country visuals guidelines - backcountry recreation guidelines - access management guidelines - Appendix 5 Land and Resource Management Direction within the Invermere Forest District • Previous LRMPs with a focus on recreation access management should be used as examples in the preparation of an Invermere Forest District LRMP and subsequent access management plans; these LRMPs include: - Kamloops LRMP (Nehalliston Access Management Plan) - Bulkley LRMP - Vanderhoof LRMP (Vanderhoof Access Management Plan)

Element	Comments & Suggested Action
Equity	• An access management plan for TFL #14 should create opportunities and access for all recreationists where appropriate and

feasible

Element	Comments & Suggested Action
Flexibility	• Although LRMP is a formal process of sub-regional land use planning in British Columbia, the outcome of each LRMP reflects the personality of the district • Flexibility is inherent in the process as methods for the development of an LRMP are not standardized; methods, objectives and intensity of negotiations will differ by district • Implementation of LRMP recommendations is monitored annually for review and amendment • Monitoring for compliance and effectiveness should be a recommendation for access management and planning in TFL #14 as a result of an LRMP

Element	Comments & Suggested Action
Strategy	• LRMP is a long-term planning approach to addressing resource and land use issues • Recommendations contained with an LRMP for access management and planning with represent a proactive and preventative approach to addressing access-related issues

Element	Comments & Suggested Action
Landscape-level	• LRMPs cover sub-regional areas of approximately 15 000 - 25 000 km^2 • Recommendations for access management and planning should cover the entire sub-region or divide the sub-region into landscape units for the subsequent development of plans

Challenges to LRMP in TFL #14: Interagency cooperation and management, and technical support (*e.g.*, GIS) for LRMP is limited by the allocation of staff and the scarcity of other resources in the Invermere Forest District. The immediate demand for an LRMP project in the Invermere Forest District may exceed the resources available to support this program. Also, given the recent KBLUP process, participants may be exhausted from land use planning meetings and negotiations, and, therefore, reluctant to initiate a sub-regional land use planning process.

Summary Recommendation: The Interagency Management Committee for the Kootenay land region, in coordination with the BCFS and BCEN, and with the support of all affected stakeholders, should initiate an LRMP for the Invermere Forest District. The purpose of the LRMP will be to link the broad resource management guidelines in the KBLUP with operational activities through specific management objectives.

Option 2: Developing landscape unit planning objectives

Background to landscape unit planning: The formal process of landscape unit planing is a cooperative initiative by the BC Environment and the BC Forest Service, under the auspices of the *Forest Practices Code.* A landscape unit is a planning unit up to 100 000 ha in size, comprising a watershed or group of adjacent watersheds (Wong *et al.* 1996). There are four landscape units, designated by the Invermere Forest District Manager, for TFL #14. Objectives for management are established for each unit: it is through these objectives that long-term management of ecological needs is coordinated with resource development activities. Landscape unit objectives are used to link the general management direction set out in regional or sub-regional land use plans with operational plans, by providing details in the form of measurable management objectives.

Landscape unit planning falls into two broad categories in British Columbia (Province of British Columbia 1999):

- Biodiversity planning
    - retention of old growth forest
    - stand structure through wildlife tree retention
    - seral stage distribution
    - landscape connectivity
    - species composition
    - patch size
- Forest resources planning
    - timber
    - recreation/access
    - water
    - botanical forest products
    - wildlife

- forage
- fisheries

Currently, the provincial Chief Forester, the BC Environment, and the BC Forest Service have declared the priority for landscape unit planning over the next three years to be the development of objectives to retain old growth forest and wildlife trees (Province of British Columbia 1999; pers. comm. Terje Vold). However, in consultation with licensees and other stakeholders, the BC Environment and the BC Forest Service can develop and test draft objectives for resources other than old growth forest and wildlife trees, such as recreation and access.

Landscape unit plans and higher level plans under the Forest Practices Code: Landscape unit planning objectives can be declared a higher level plan under the *Forest Practices Code* and become legally binding on activities and operations within the landscape unit. If landscape unit objectives are declared as a higher level plan, there is legal recourse in the case of non-compliance and in the case of not meeting objectives within a stated time period. However, if landscape unit objectives are declared higher level plans, it is difficult to change or amend objectives within an adaptive management framework, if they are statutory. Whether a plan is declared higher level or not depends largely on the personality, dynamics, and planning history of the forest district. Some forest districts embrace the concept of regulating forest planning and management, while others support the belief that regulations should be used as a last resort.

Benefits of landscape unit planning: For both biodiversity planning and forest resources planning, there are numerous benefits to developing landscape unit objectives:

- focuses on ecological processes and systems;
- provides a good framework to manage multiple resource values;
- links strategic land use plans and operational plans;
- creates an opportunity for interagency cooperation and interaction;
- landscape units are a manageable scale for monitoring; and
- provides opportunity for public involvement.

Developing landscape unit objectives for TFL #14: Using landscape unit planning to develop objectives to address the issues related to access management in TFL #14 would be an appropriate tool for two reasons:

- four landscape units, based on watersheds, have already been designated by the Invermere Forest District in TFL #14 for the purposes of forest development planning; and
- a regional land use plan with management guidelines exists to guide the development of landscape unit objectives. Landscape unit objectives would provide the practical link between the guidelines set out in the KBLUP and operational activities in TFL #14.

The provincial direction for developing landscape unit objectives in the next three years is the retention of old growth forest and wildlife trees. However, CFI, the BC Environment, and the BC Forest Service could develop draft objectives for one or all of the landscape units in TFL #14 to test as a framework to address the issues related to access.

Resources: Recently, the Province of British Columbia has developed some resources to assist managers in developing landscape unit plans. In addition, the School of Resource and Environmental Management at Simon Fraser University conducted a study of six pilot projects for landscape unit planning that could also serve as a guide to developing landscape unit objectives for access. The resources include:

- The Province of British Columbia. 1999. Landscape Unit Planning Guide.
- The Province of British Columbia. 1998. Guide to Writing Resource Objectives and Strategies.
- Wong T., H. Horn, P. Georgison, P. Wright, and K. Lertzman. 1996. Landscape Unit Planning in British Columbia: A Review of Six Pilot Projects.

Although each resource was developed in response to biodiversity planning, the general principles could be adapted to apply to developing landscape unit objectives for access.

Elements of access management and planning: The following points indicate where the general elements of access management and planning described in section 5.2 are present in landscape unit planning. Comments and recommendations are provided to implement these elements through landscape unit planning in TFL #14.

Element	Comments & Suggested Action
Setting goals & objectives	• general access goals are stated in the KBLUP implementation strategy with regards to connectivity, grizzly bears, ungulate winter range, mountain caribou, recreation, and alpine & sub-alpine areas • specific goals are stated in the KBLUP Appendix 5 Land and Resource Management Direction within the Invermere Forest District • BCEN, BCFS, and CFI, in consultation with affected stakeholders, can use these general goals to guide the development of landscape-unit specific goals for TFL #14

Element	Comments & Suggested Action
Local public involvement	• developing landscape unit objectives is recognized to be a technical process; however, public involvement is necessary to identify issues specific to a landscape unit • the process of landscape unit planning builds on recent public input to identify issues specific to a landscape unit • BCEN, BCFS, and CFI can review records of public involvement from the KBLUP process to identify issues related to access relevant to TFL #14 • if previous information proves to be inadequate, BCEN, BCFS, and CFI can initiate public involvement with the relevant parties from the KBLUP process to participate in landscape unit planning • alternatively, a public advisory group could be initiated to assist BCEN, BCFS, and CFI to develop landscape unit plans

Element	Comments & Suggested Action
Interagency cooperation	• process of landscape unit planning, as described in the Forest Practices Code and in guides produced by the provincial government, is a cooperative initiative between the BCFS and the BCEN • requires the cooperation of other stakeholders that may be affected by landscape unit plans such as licensees, recreationists, First Nations, national parks, provincial parks, BC Assets and Lands, and the interagency management committee

Element	Comments & Suggested Action
Consistency	• objectives for each landscape unit within TFL #14 must be consistent with the general management direction set out in the following guidelines in the KBLUP implementation strategy: - connectivity guidelines - grizzly bear guidelines - ungulate winter range guidelines - mountain caribou guidelines - front country visuals guidelines - backcountry recreation guidelines - access management guidelines - Appendix 5 Land and Resource Management Direction within the Invermere Forest District • when preparing draft objectives for one landscape unit, consistent standards should be developed to facilitate future objectives in other landscape units in TFL #14

Element	Comments & Suggested Action
Equity	• equity for all recreationists is not expressed in landscape unit planning • BCEN, BCFS and CFI may wish to consider creating opportunities and access for all users as an objective in their draft landscape unit plan for TFL #14

Element	Comments & Suggested Action
Flexibility	• flexibility is built into the process so that objectives and subsequent strategies are appropriate to the access issues in the landscape unit • flexibility also characterizes the nature and type of public involvement (*i.e.*, different methods can be used for different circumstances) • landscape unit plans are required to be reviewed regularly and amended as required to ensure their effectiveness • reviews should occur at least every 10 years for established landscape unit objectives, and more frequently for draft objectives (approximately every 2-5 years) • a monitoring program, developed by BCEN, BCFS, and CFI will be necessary to monitor effectiveness and compliance with objectives, for the review

Element	Comments & Suggested Action
Strategy	• landscape unit plans are a long-term planning approach to addressing access-related issues

Element	Comments & Suggested Action
Landscape-level	• a landscape unit is a planning unit up to 100 000 ha in size, comprising a watershed or group of adjacent watersheds

Challenges to developing landscape unit objectives for access: There are three major challenges facing the development of landscape unit objectives for access related issues: current management direction, technical wording of objectives, and interpretation of KBLUP guidelines.

Since the management direction for the development of landscape unit objectives for the next three years has been declared, it may be difficult for licensees, the BC Forest Service, and the BC Environment to allocate staff resources to develop access-related objectives.

Following the guidebook developed by the Province of British Columbia for landscape unit planning, a landscape unit objective is a rigidly worded statement, specifying a forest resource, the geographic location of the objective, and a time frame for which the objective applies. For the purposes of access management and planning, since there are many issues involved in access management and planning, applying a rigidly structured formula may be difficult (pers. comm. Garry Reay).

Summary recommendation: The BC Environment and the BC Forest Service, in full coordination with CFI, should develop a draft landscape unit objective(s) for one or more landscape unit in TFL #14 to test with respect to access-related issues.

6.3.2 Interim Recommendations

The recommendations presented in this section are suggested actions that will facilitate the development of a long-term access management and planning framework (see options in section 6.3.1). The following actions contain some elements described in section 6.2. However, they are not intended to fulfill all the elements described in section 6.2, since these actions are not a framework in themselves, but rather they are actions to prepare for building a framework.

Recommendation	Comments & Suggested Action
Develop a provincial policy for access management, as it relates to recreation on public land	• BCEN and BCFS representatives can initiate negotiations with the provincial government, in Victoria, to develop and commit to a provincial policy for access management and planning

Recommendation	Comments & Suggested Action
Maintain the flexibility of the remaining land base in TFL #14	• Currently Upper Spillimacheen, Malachite, Crystal, Conrad, Crystalline, Caribou, Baird landscape units are unroaded • CFI should maintain the unroaded status of these watersheds by amending the current Forest Development Plan until a long-term access management and planning framework is developed • This has implications for the volume of timber harvested in TFL #14 -- if the valleys are not roaded, not as much timber can be harvested • CFI should request a lower annual cut from the provincial Chief Forester in order to maintain unroaded landscape units

Recommendation	Comments & Suggested Action
Provide opportunities for all types of recreationists in and around TFL #14 (Q1, q12)	• Currently there are 11 BCFS recreation sites in TFL #14 with camping facilities • None provide barrier-free access for physically challenged users • Five BCFS sites have good two-wheel drive access and could potentially be upgraded to wheelchair accessibility • These sites include Loon Lake, Three Island Lake, Bittern Lake, Mitten Lake, Fourteen Mile Lake

Recommendation	Comments & Suggested Action
Coordinate and continue biophysical research in TFL #14 to fill in existing data gaps	• There is no current information on wildlife corridors and movement in and through TFL #14 • There is no accurate inventory of wildlife species in TFL #14 • There is no existing list of researchers (academic, government, environmental groups) conducting research in TFL #14 • CFI and BCFS should coordinate existing and recent research projects in TFL #14 to obtain the results • The results from existing and recent

	research may help to fill in data gaps • CFI and BCFS should initiate ongoing inventory of wildlife species and wildlife movement corridors in TFL #14 and adjacent areas • New information can be used to set access management objectives and goals • New information can be used as a baseline to design a monitoring program to monitor compliance with and effectiveness of objectives and goals • New information can be used to map sensitive wildlife habitat and movement corridors within TFL #14
CFI/BCFS/NDP/OTHER	
Recommendation	**Comments & Suggested Action**
Monitor recreationists' activities in TFL #14 year-round (Q3, q19)	• No information exists on the user profile of non-commercial recreationists in TFL #14 (*i.e.*, when, where, what activity) • Commercial recreation tenure holders keep records of visitor use • CFI and BCFS can initiate a monitoring program to record the user profile of non-commercial recreationists in TFL #14 (*e.g.*, self-registration, sign-in at District Office) • CFI and BCFS should obtain records of visitor use from commercial recreation tenure holders • Visitor use is recorded in adjacent protected areas; this information can be useful, especially where users access TFL #14 from trails starting in protected areas • Information can be used to map areas of overlap between different and possibly conflicting user groups, and between sensitive wildlife areas and movement corridors and human use
CFI/BCFS/FN	
Recommendation	**Comments & Suggested Action**
Initiate communications with First Nations who use or have made claim to TFL #14	• CFI and BCFS can initiate communication with First Nations' tribal councils in the East Kootenays • First Nations should be invited to have an opportunity to participate in the development of an access management and planning framework • CFI and BCFS can collect information about First Nations' use of TFL #14, including traditional activities and heritage sites

	• Consider how recreation access could affect traditional use and heritage resources

Recommendation	Comments & Suggested Action
Commence measures to be consistent with relevant guidelines from the Kootenay Boundary Land Use Plan (1997)	• Guidelines that have relevance to recreation access management and planning from the KBLUP include: - connectivity guidelines - grizzly bear guidelines - ungulate winter range guidelines - mountain caribou guidelines - front country visuals guidelines - backcountry recreation guidelines - access management guidelines - Appendix 5 Land and Resource Management Direction within the Invermere Forest District • CFI, BCFS, BCEN, IAMC can ensure that access management measures will be consistent with these guidelines

Recommendation	Comments & Suggested Action
Amend referral process for the disposition of public land to commercial recreation operations to include affiliated and unaffiliated non-commercial recreationists' interests	• BCAL can establish a relationship with local non-commercial recreation organizations, such as the Golden Rod and Gun Club and the Columbia Valley Field Naturalists Society to refer applications for commercial recreation tenures in and around TFL #14 • The referral process may help to avoid conflicts between users by stopping overlaps between users

Recommendation	Comments & Suggested Action
Update recreation resources inventory from 1995	• Update the recreation resources inventory originally prepared for TFL #14 in 1995 to reflect changes in current commercial and non-commercial recreation activity and to predict potential recreation use • Recreation resources inventory will be used, in part, to identify what activities are taking place in each landscape unit by season • The results of the inventory could be mapped in a GIS format, with the results of wildlife inventories to indicate where there are areas of overlap between wildlife habitat/corridors and recreation activities

Recommendation	Comments & Suggested Action
Allocate staff & technical resources to deal with access management and planning on an on-going basis	• Adequacy of staff resources was an important factor for other districts initiating access management plans and landscape unit objectives • Development of plans will be hampered by staff changes and staff being unable to devote time to projects when other duties take priority • It may be necessary for the noted agencies to create extra positions for access management planning and coordination • It may be necessary for the noted agencies to create an extra position or to train existing staff on technical aspects of access management such as GIS

Recommendation	Comments & Suggested Action
Facilitate a public advisory group for the development of access management and planning in and around TFL #14 (Q3, q11)	• Building on the relationship established with recreationists who participated in the Golden and Invermere backcountry conflict resolution committee negotiations, CFI and the BCFS can facilitate a public advisory group to guide the development of future access management and planning • Representatives from commercial recreation tenure holders, non-commercial recreationists, environmental groups, First Nations, National Parks (Parks Canada), Provincial Parks (BC Parks) could be invited to participate • The public advisory group would be responsible for selecting the management direction for access planning, for developing objectives and goals, for designing monitoring programs to monitor progress and compliance, and to review the access management plan on a yearly basis for continual improvement • The public advisory group would liaise with CFI, BCFS, BCEN, and the IAMC

6.4 Conclusions

Recreation use of public land in British Columbia, facilitated in part by logging roads and a growing commercial recreation industry, has advanced to a state where user conflicts and environmental degradation are occurring unabated, and at an increasing rate. Current trends do

not indicate that recreation demands on public land will decrease in the future; in fact, the opposite is true. The demand for backcountry experiences is increasing, as the recreation and tourism sector of the British Columbia economy grows. To date, there are several legislative and non-legislative tools to manage recreation access to public land; however there is no overarching policy, framework, or guidance to direct the use of these tools. Implementing the tools and addressing the issues related to recreation use of public land and increasing human access can be reached through an access management and planning framework.

Access management and planning is not a new concept; however, it has not been developed to its potential to address the social, economic, and ecological issues related to human access and recreation use on public land in British Columbia. Access management plans, initiatives, and tools have been developed and used in several forest districts, either in response to a crisis, or in response to broad, land-use planning recommendations. These initiatives have experienced moderate and localized success in addressing access-related issues. Despite this success, it is unlikely that the concept of access management and planning will reach its potential without the commitment of the provincial government, local government representatives, industry, and other affected stakeholders. To date, local government representatives, forestry companies, and affected stakeholders in several forest districts have entertained a commitment to access management and planning to address the issues related to recreation use. Unfortunately, there is little guidance from the provincial level to direct the efforts of these parties, with respect to access management and planning.

The recommendations presented in this document are intended to assist in the development of a framework for access management and planning, within which the issues related to access are addressed. The tools identified were intended to support the recommendations and options presented for an access management and planning framework. The recommendations were directed at a specific forest district, and a specific operating area within that forest district. There is a possibility that these recommendations could be applied to another forest district or, at least, stimulate some thought towards access management and planning on public land in British Columbia. However, there is no cookbook approach to access management; every district will have a different approach to planning and managing human access, given the personality of the district, the dynamics of stakeholders within the district, and the recreation and resource attributes within the district.

In British Columbia, the building blocks exist, but are not in place, to develop an overarching access management and planning framework to address recreation issues. What is lacking is a champion with the initiative and the will to put these building blocks in place.

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Appendix A:
Ethics Approval Letter

THE UNIVERSITY OF
CALGARY

INTER-OFFICE

To: **Leslie Matthews** **Date: February 9, 1999**

From: **Dr. Richard Revel, Chairman**
Environmental Design Ethics Committee

Re: **YOUR APPLICATION FOR EVDS ETHICS COMMITTEE APPROVAL**

Thank you for your research proposal and request for review by the EVDS Ethics Committee.

We have reviewed your application to conduct human subject research dealing with "Managing Access Created by Logging Roads in B.C." and find that it is acceptable from an ethics perspective. In making our recommendation, we are satisfied that the anonymity and confidentiality of the respondents has been adequately protected, risks and benefits of the research have been clearly stated, the respondent's legal rights have not been limited, respondents may withdraw at any time and the security and eventual destruction of the data has been adequately addressed.

I would note that there are a few small editorial changes required in your informed consent letter. These will clear up matters regarding who to contact and are required as a result of personnel changes in the EVDS Ethics Committee.

You should note that approval of the research from an ethics perspective does not imply that your research design or analytical techniques are acceptable from an academic perspective. It simply implies that in the Committee's judgement, the human subjects will not be harmed by such research.

Should you require the University of Calgary to issue a Certification of Institutional Ethics Review form you should request that we forward your application, with our evaluation, to the Joint Faculties Research Ethics Committee (Office of VP Research, Karen McDermid, Loc. 5465) for review and direct response.

Richard Revel

Richard Revel,Ph.D.,

CAMPUS MAIL

cc: Prof chris Levy, Joint Faculties Research Ethics Committee.
c/o K. McDermid, A 100.

Appendix B:
Sample Questionnaires

Questionnaire #1

Name:
Address:
Date:

You may use my name in your document (yes or no):

1. Do you use TFL 14 for commercial purposes (*e.g.*, commercial guide, heli-ski operator), or for recreational purposes? Place a check mark below:

   commercial _____ recreational ____ both ____

2. In what activities have you participated in the last twelve months in TFL 14? Please indicate, with a check mark, which activities you participated in and in what season. In each box you have checked, indicate the approximate number of days you did the activity in each season.

Activity	Summer (June-Sept)	Fall (Sept.-Dec)	Winter (Dec.-March)	Spring (March-June)
Hunting (type?)				
Fishing				
Commercial guiding				
Backcountry skiing				
X-C skiing				
Snowshoeing				
Mountaineering				
Heli-hiking				
Heli-skiing				
Hiking				
Rock climbing/ scrambling				
Kayaking/canoeing				
Camping				
Snowmobiling				
Dirt biking				
4x4/quad driving				
Mountain biking				
Wildlife watching				
Photography				
Plant collecting/ harvesting				
Research				
Other (please specify)				

3. How do you access TFL 14? Please indicate, with a check mark, which mode(s) you use to gain access to the TFL on the following table:

Mode	Place check mark in this column
By foot	
Snowshoeing	
Skiing	
4x4 vehicle	
Quad	

Non-4x4 vehicle	
Helicopter	
Fixed wing plane	
Snowmobile	
Motorcycle	
Other (please specify)	

4. A) If entering by vehicle or by foot, which access point do you use to enter TFL 14? (*e.g.*, Parson, Spillimacheen, Brisco).

   B) If using an aircraft, from which town do you leave to enter TFL 14?

5. On the following table, please indicate with a check mark, which areas within TFL 14 you have used within the last 12 months. In the third column, indicate the activity in which you were engaged and the approximate number of days spent on each activity for each area you checked.

Area within TFL 14	check mark in this column	type of activity & number of days
Warren Creek		
Malachite Creek		
Chrystalline Creek		
Crystal Creek		
Vowell Creek		
McMurdo Creek		
West Spillimacheen River		
East Spillimacheen River		
Vermont Creek		
Upper Bobbie Burns Creek		
Lower Bobbie Burns Creek		
Baird Brook		
Baird Lake		
Caribou Creek		
Hough Creek		
East Shaws Creek		
West Shaws Creek		
Nixon Lake		
Mitten Lake		
Loon Lake		
Three Island Lake		
Rocky Point Lake		
Summit Lake		

Conrad Creek		
Driftwood Creek		
Dogtooth Range		
Bugaboo Creek		
Other (please specify)		

6. A) Have you interacted with other users in the same area of TFL 14?

Yes? _____ No? _____

B) If yes, please provide details of the interaction in the following space:

7. A) Have you observed wildlife while in TFL 14?

Yes? ____ No? _____

B) If you have observed wildlife while in the TFL, please fill out the following table. In the first column, indicate the type of wildlife you observed (*e.g.*, black bear, grizzly bear, ground squirrel) and the number of wildlife for each observation. In the second column, indicate in which season you observed the wildlife (*i.e.*, fall, winter, spring, summer). In the third column, indicate the activity in which the wildlife was engaged when you observed it (*e.g.*, grazing, fleeing, sleeping). In the fourth column, indicate the location where you observed the wildlife (*e.g.*, Grizzly Ridge, near Vowell Creek, the road to Vermont Creek)

Species & Number	Season	Action (i.e. grazing, fleeing)	Location

8. A) Have you had any negative interactions with wildlife in TFL 14? Negative interactions include, physical attacks by wildlife, wildlife stealing food or entering campsites/worksites to steal food, wildlife charging people *etc.*

Yes? _____ No? _____

B) If yes, please provide details of the interaction in the space provided, describing the species, your actions leading up to the interaction, the location, and the outcome.

9. A) Do you believe that access to TFL 14 should be changed from its current status? Use a check mark to answer:

Increased ____ Decreased ____ Remain the same ____

10. If you checked "increased" or "decreased", please tell me why access should be increased or decreased and to which areas access should be increased or decreased.

11. A) Do you believe there are any activities in TFL 14 that are incompatible?

Yes? ____ No? ____

B) Which activities would consider to be incompatible and why?

12. What types of activities do you believe are appropriate or inappropriate for TFL 14? In the following table, place a check mark in the appropriate column, and give your reason why you consider the activity appropriate or inappropriate in the fourth column.

Activity	Appropriate	Inappropriate	Why?
Hunting			
Fishing			
Commercial guiding			
Backcountry skiing			
X-C skiing			
Snowshoeing			
Mountaineering			
Heli-hiking			
Heli-skiing			
Hiking			
Rock climbing/ scrambling			
Kayaking/canoeing			
Camping			
Snowmobiling			
Dirt biking			
4x4/quad driving			
Mountain biking			
Photography			
Wildlife watching			
Plant collecting/ harvesting			
Research			
Other (please specify)			

13. A) Do you think all users of TFL 14 should be given the opportunity to be involved in planning and managing access to TFL 14?

Yes? ____ No? ____

B) If yes, why do you suggest involving the public?

C) How do you suggest involving the public?

Please return the completed questionnaire by **MARCH 12, 1999**. If returning the questionnaire by mail, please return it in the enclosed, self-addressed, stamped envelope. If returning this questionnaire by email, return to lesleym@direct.ca

I appreciate your participation in this study -- thank-you for your time and response.

If you would like to receive a follow-up summary of my study results and recommendations within the next 12 months, place a check mark in the box below:

☐

Questionnaire #2

Name: **Date:**
Address:

You may use my name in your document (yes or no):

1. A) What is the name and type of agency or organization are you involved with?

B) What is its mandate/mission?

C) What is your title? Describe your role in the organization/agency and your responsibilities.

2. A) Is this agency/organization involved in managing/planning activities on public or private land? Use a check mark to answer:

public ____ private ____ both ____

B) What type of land is your agency involved in managing (*e.g.*, forest, desert)?

C) Where is the land located?

3. What types of human pressures are at work on the land (*i.e.*, resource extraction, industrial development, recreation)? Place a check mark in the following table, next to the appropriate activities:

Type of Activity	Place check mark in this column
Resource extraction	
Industrial development	
Housing development/urban encroachment	
Recreation (non-commercial)	
Commercial recreation/tourism	
Other (please specify)	

4. A) Is there a network of roads on the land? Use a check mark to answer:

Yes? ____ No? ____

B) How extensive is this network of roads? (*e.g.*, # of kilometers? Road density?)

5. Do these roads facilitate recreation activities? Use a check mark to answer:

Yes? ____ No? ____

6. What activities take place on the land? Please indicate, with a check mark, which activities take place on the landscape and in what season.

Activity	Summer (June-Sept.)	Fall (Sept.-Dec.)	Winter (Dec.-March)	Spring (March-June)
Timber harvesting				
Mining				
Hunting (type?)				
Fishing				
Commercial				

guiding				
Backcountry skiing				
X-C skiing				
Snowshoeing				
Mountaineering				
Heli-hiking				
Heli-skiing				
Hiking				
Rock climbing/ scrambling				
Kayaking/canoeing				
Camping				
Snowmobiling				
Dirt biking				
4X4/quad driving				
Mountain biking				
Wildlife watching				
Photography				
Plant collecting/ harvesting				
Research				
Other (please specify)				

7. How do people access the land? Please indicate with a check mark in the following table the modes of transportation used to access the landscape:

Mode	Place check mark in this column
By foot	
Snowshoeing	
Skiing	
4x4 vehicle	
Quad	
Non-4x4 vehicle	
Helicopter	
Fixed wing plane	
Snowmobile	
Motorcycle	
Other (please specify)	

8. A) Have there been interactions between activities or user groups who may have overlapping areas of use (*e.g.*, skiers and snowmobilers)? Use a check mark to answer:

Yes? ____ No? ____

B) If you answered yes to A, please provide details of interaction (*i.e.*, types of users, location, outcome)

9. A) Do you know of any negative interactions between users (recreational, commercial, industrial) and wildlife? Negative interactions include, physical attacks by wildlife, wildlife stealing food or entering campsites/worksites to steal food, wildlife charging people *etc*. Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, or if your agency keeps records of such interactions, would you provide details of the interaction below (*e.g.*, type of user, type of wildlife, outcome of the interaction)?

10. A) Do you believe that access to the landscape should be changed from its current status? Use a check mark to answer:

Increased ____ Decreased ____ Remain the same ____

B) If you checked "increased" or "decreased", please tell me why access should be increased or decreased and to which areas access should be increased or decreased.

11. What types of activities do you believe are appropriate or inappropriate for the landscape? In the following table, place a check mark in the appropriate column, and give your reason why you consider the activity appropriate or inappropriate in the fourth column.

Activity	Appropriate	Inappropriate	Why?
Hunting			
Fishing			
Commercial guiding			
Backcountry skiing			
X-C skiing			
Snowshoeing			
Mountaineering			
Heli-hiking			
Heli-skiing			
Hiking			
Rock climbing/ scrambling			
Kayaking/canoeing			
Camping			
Snowmobiling			
Dirt biking			
4x4/quad driving			
Mountain biking			
Photography			
Wildlife watching			
Plant collecting/ harvesting			
Research			
Other (please specify)			

12. A) Do you believe there are any activities currently in the area that are incompatible? Use a check mark to answer:

Yes ____ No ____

B) Which activities and why are they incompatible?

13. A) Does your agency have a strategy or plan to manage access created by roads to the land under its jurisdiction? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, would you be able to send a copy to me for my reference?

Yes ____ No ____

14. What are the goals of your agency/organization's access management strategy?

15. What prompted your agency/organization to develop an access management strategy?

16. How often is the access management strategy updated?

17. A) Is the public involved in developing the access management strategy for the landscape under your jurisdiction? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, how is the public involved?

18. A) Do you believe the public should be given the opportunity to be involved in planning and managing access? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, why do you suggest involving the public?

C) How do you suggest involving the public?

19. A) What tools does your agency use to manage access on roads? Place a check mark in the following table next to the relevant tools:

Tools	Place check mark in this column
Gates	
Water bars	
Physical obstructions (*e.g.*, stumps, logs)	
Signs	
Voluntary compliance	
Laws or Regulations	
Seasonal closures	
Other (please specify)	

B) Which tools appear to be the most effective at managing access? Rank the tools in the following table, on a scale of one to five: 1 = effective; 2 = moderately effective; 3 = mixed results; 4 = moderately ineffective; 5 = ineffective. If these details are already provided in the material that you will send me, please skip this question.

Tools	Ranking
Gates	
Water bars	
Physical obstructions (*e.g.*, stumps, logs)	
Signs	
Voluntary compliance	
Laws or Regulations	
Seasonal closures	
Other (please specify)	

20. A) Is there any provincial, federal, county or municipal legislation, policy, or guideline that affects access management and enforcement in your area? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, would you send me a copy of the legislation, policy or guideline? Use a check mark to answer:

Yes ____ No ____

21. A) Is access on the landscape monitored? Use a check mark to answer:

Yes ____ No ____

B) If yes, how is access monitored?

22. A) Is the access management strategy for the landscape under your jurisdiction actively enforced? (if the area has no access management strategy skip to the end). Use a check mark to answer:

Yes ____ No ____

B) Who enforces the access management strategy for the landscape under your jurisdiction?

23. A) Is enforcement effective? Use a check mark to answer:

Yes ____ No ____

B) Why or why not?

Please return the completed questionnaire by **MARCH 12, 1999**. If returning the questionnaire by mail, please return it in the enclosed, self-addressed, stamped envelope. If returning this questionnaire by email, return to lesleym@direct.ca

I appreciate your participation in this study -- thank-you for your time and response.

If you would like to receive a follow-up summary of my study results and recommendations within the next 12 months, place a check mark in the box below:

☐

Questionnaire #3

Name: **Date:**
Address:

You may use my name in your document (yes or no):

1. A) Do you work for/with the government (BC Forest Service), or for a private forest company?

B) In which forest district do you work?

C) What are your position title and responsibilities?

2. What type of activities (besides timber harvesting) takes place in the timber harvesting areas of your district (*e.g.*, mining, recreation, commercial operations)? Place a check mark next to the appropriate activity in the following table:

Type of Activity	Place check mark in this column
Mining	
Hydro projects	
Other industrial developments (please specify)	
Housing development/urban encroachment	
Recreation (non-commercial)	
Commercial recreation/tourism	
Other (please specify)	

3. A) Are logging roads used to facilitate recreation activities in your forest district?

Yes ___ No ___

B) How extensive are the logging roads in your district? (*e.g.*, # of kilometers, road density)

4. What activities take place in the timber harvesting areas of your district? Please indicate, with a check mark, which activities take place on the landscape and in what season.

Activity	Summer (June-Sept)	Fall (Sept.-Dec.)	Winter (Dec.-March)	Spring (March-June)
Timber harvesting				
Mining				
Hunting (type?)				
Fishing				
Commercial guiding				
Backcountry skiing				
X-C skiing				
Snowshoeing				
Mountaineering				
Heli-hiking				
Heli-skiing				
Hiking				
Rock climbing/ scrambling				

Kayaking/canoeing				
Camping				
Snowmobiling				
Dirt biking				
4X4/quad driving				
Mountain biking				
Wildlife watching				
Photography				
Plant collecting/ harvesting				
Research				
Other (please specify)				

5. How do people access the timber harvesting areas for recreation purposes? Please indicate with a check mark in the following table the modes of transportation used to access the landscape for recreation purposes:

Mode	Place check mark in this column
By foot	
Snowshoeing	
Skiing	
4x4 vehicle	
Quad	
Non-4x4 vehicle	
Helicopter	
Fixed wing plane	
Snowmobile	
Motorcycle	
Other (please specify)	

6. A) Have there been interactions between activities or user groups who may have overlapping areas of use (*e.g.*, skiers and snowmobilers)? Use a check mark to answer:

Yes? ____ No? ____

B) If you answered yes to A, please provide details of interaction (*i.e.*, types of users, location, outcome).

C) If there is a conflict resolution process/treaty for your district, please describe the process below. Include details of why and how the process was developed, and its effectiveness to date. If you have any documents to explain the process, I would be grateful to receive them.

7. A) Do you know of any negative interactions between users (recreational, commercial, industrial) and wildlife? Negative interactions include, physical attacks by wildlife, wildlife stealing food or entering campsites/worksites to steal food, wildlife charging people *etc*. Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, or if your district keeps records of such interactions, would you provide details of the interaction below (*e.g.*, type of user, type of wildlife, outcome of the interaction)?

8. A) Do you believe that access to the timber harvesting areas in your district should be changed from the current status? Use a check mark to answer:

Increased ____ Decreased ____ Remain the same ____

C) If you checked "increased" or "decreased", please tell me why access should be increased or decreased and to which areas access should be increased or decreased.

9. What types of activities do you believe are appropriate or inappropriate for the timber harvesting areas in your district? In the following table, place a check mark in the appropriate column, and give your reason why you consider the activity appropriate or inappropriate in the fourth column.

Activity	Appropriate	Inappropriate	Why?
Hunting			
Fishing			
Commercial guiding			
Backcountry skiing			
X-C skiing			
Snowshoeing			
Mountaineering			
Heli-hiking			
Heli-skiing			
Hiking			
Rock climbing/ scrambling			
Kayaking/canoeing			
Camping			
Snowmobiling			
Dirt biking			
4x4/quad driving			
Mountain biking			
Photography			
Wildlife watching			
Plant collecting/ harvesting			
Research			
Other (please specify)			

10. A) Do you believe there are any activities currently in the area that are incompatible? Use a check mark to answer:

Yes ____ No ____

B) Which activities and why are these activities incompatible?

11. A) Does your district have an access management strategy in place to manage access facilitated by logging roads? Use a check mark to answer:

Yes ___ No ___

B) If yes, would you be able to send me a copy of the strategy or provide me with more details?

Yes ____ No ____

Details:

12. What are the goals of your district's access management strategy?

13. What prompted your district to develop an access management strategy?

14. How often is the access management strategy updated?

15. A) Is the public involved in developing the access management strategy? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, how is the public involved?

16. A) Do you believe the public should be given the opportunity to be involved in planning and managing access? Use a check mark to answer:

Yes ____ No ____

B) If you answered yes to A, why do you suggest involving the public?

C) How do you suggest involving the public?

17. A) What tools does your agency use to manage access on roads? Place a check mark in the following table next to the relevant tools:

Tools	Place check mark in this column
Gates	
Water bars	
Physical obstructions (*e.g.*, stumps, logs)	
Signs	
Voluntary compliance	
Laws or Regulations	
Seasonal closures	
Other (please specify)	

B) Which tools appear to be the most effective at managing access? Rank the tools in the following table, on a scale of one to five: 1 = effective; 2 = moderately effective; 3 = mixed results; 4 = moderately ineffective; 5 = ineffective. If these details are already provided in the material that you will send me, please skip this question.

Tools	Ranking
Gates	
Water bars	
Physical obstructions (*e.g.*, stumps, logs)	
Signs	
Voluntary compliance	
Laws or Regulations	
Seasonal closures	
Other (please specify)	

18. A) Is legislation used to enforce access management? Use a check mark to answer:

Yes ____ No ____

B) Can you recommend any improvements to current legislation to improve enforcement and the development of access management strategies?

19. A) Is access on the landscape monitored? Use a check mark to answer:

Yes ____ No ____

B) If yes, how is access monitored?

20. A) Is the access management strategy for the timber harvesting areas in your district actively enforced? (if the area has no access management strategy skip to the end). Use a check mark to answer:

Yes ____ No ____

B) Who enforces the access management strategy?

21. A) Is enforcement effective? Use a check mark to answer:

Yes ____ No ____

B) Why or why not?

Please return the completed questionnaire by **MARCH 12, 1999**. If returning the questionnaire by mail, please return it in the enclosed, self-addressed, stamped envelope. If returning this questionnaire by email, return to leslevm@direct.ca

I appreciate your participation in this study -- thank-you for your time and response.

If you would like to receive a follow-up summary of my study results and recommendations within the next 12 months, place a check mark in the box below:

☐