

Southern Rocky Mountain Management Plan



Photo credit: Karl Ehrler

**Ministry of Sustainable Resource Management
August 2003**



August 2003

Dear Readers:

On behalf of Cabinet, I am pleased to confirm approval of the Southern Rocky Mountain Management Plan (SRMMP) as government policy, and convey it to all participating ministries for implementation. This document will assist government agencies by providing landscape-level strategic direction for resource management within the plan area. The SRMMP contains key management direction for resource development and conservation.

Within the plan area, compliance with the SRMMP will be considered to constitute compliance with the Kootenay Boundary Higher Level Plan Order. This plan is approved subject to continued work to accommodate Ktunaxa interests and concerns in the planning area.

The Ministry of Sustainable Resource Management will chair a Southern Rocky Mountain Advisory Committee (SRMAC) to facilitate plan implementation, monitoring, review and amendment. The SRMAC will consist of representatives from various government agencies, First Nations and stakeholders.

I am also directing staff to pursue the following initiatives:

1. Fine tuning and updating of plan direction, including specifically the Recreation Management Strategy, and updates flowing from new government initiatives such as the Working Forest Policy;
2. Moving towards establishment of the key resources objectives as legal objectives under the appropriate legislative mechanisms as they become available;
3. Expanding the plan area to include the remaining portions of the Bull River and Elk River valleys; and,
4. Initiating research proposals as required.

We recognize and appreciate the dedication and effort of government staff, First Nations and stakeholders in developing this plan. The contribution of participants toward completion of this provincial land use strategy has been significant. I encourage continued participation in plan monitoring and implementation processes.

Yours truly,

A handwritten signature in black ink, appearing to read "Stan Hagen". The signature is fluid and cursive, with the first name "Stan" and last name "Hagen" clearly distinguishable.

Stanley B. Hagen
Minister

pc: Jon O'Riordan, Deputy Minister
Ken Baker, Assistant Deputy Minister, Resource Management Division
Ken Gorsline, Regional Director, Kootenay Region

Southern Rocky Mountain Management Plan

Table of Contents

Part A – Executive Summary	1
Part B – Management Plan	
1.0 Introduction	
1.1 Plan Area/Geography	3
1.2 Planning Context and Process	4
2.0 First Nations	8
3.0 Subsurface Resources	
3.1 Minerals and Coal	10
3.2 Oil and Gas	12
4.0 Forestry (Timber)	14
5.0 Agriculture and Range	16
6.0 Trapping	19
7.0 Recreation	
7.1 Recreation Access and Development	20
7.2 Resident Hunting and Angling	28
8.0 Tourism	
8.1 General Tourism	29
8.2 Adventure Travel	30
8.3 Guide-outfitting	31
8.4 Angling Guiding	32
9.0 Conservation	
9.1 Riparian	34
9.2 Old Growth and Mature Seral Management	36
9.3 Wildlife Tree Retention	39
9.4 Wide-ranging Carnivores	41
9.5 Ungulates	43
9.6 Ungulate Winter Range	44
9.7 Species at Risk	50
9.8 Access	51
9.9 Connectivity	52
9.10 Fish	55
9.11 Grassland Communities	57
9.12 Air Quality	57
9.13 General Ecosystem Health	58
10.0 Water	60
11.0 Visual Landscapes	64
12.0 Heritage and Paleontological Resources	66
13.0 Communities, Settlement and Infrastructure	67

Part C - Plan Review and Monitoring	
1.0 Role of Provincial Government Inter-Agency Committee (IAC)	69
2.0 Advisory Committee for SRMMP (SRMAC)	69
3.0 Plan Monitoring	69
4.0 Plan Review and Amendments	70
Part D - Operational Implementation	
1.0 Agency Implementation Role	72
2.0 Private Sector Role	72
3.0 Public Role	73
Part E – List of Maps	74
Part F - Definitions	75
Part G - Action plan for Ktunaxa Nation participation in the SRMMP	79
<hr/>	
Appendices	
<i>(Appendices 2-6 are included in the main body of the plan. All other appendices are provided on the website http://srmwww.gov.bc.ca/kor/srmmp/srmmp.htm)</i>	
1.0 Maps (maps not required to implement plan direction)	81
2.0 Plan Monitoring and Issues Potentially Requiring Plan Amendment	82
3.0 Potential Implementation Projects	83
4.0 Draft Terms of Reference for the Southern Rocky Mountain Advisory Committee (SRMAC)	86
5.0 Best Management Practices	
5.1 Air Quality Management	89
5.2 Domestic Watershed Best Management Practices	95
5.3 Risk Assessment Procedure for Proposed Resource Development Activities above Alluvial and Debris Torrent Fans (<i>D.Boyer</i>)	104
6.0 Draft Statement of Commitment to Sustainable Resource Management and Governance Principles	120
7.0 Connectivity	
8.0 Ungulate Winter Range report	
9.0 Water Inventory and Water Allocation Strategy	
10.0 SRMMP Announcements – Backgrounder (Nov.2001), News Release (Nov.15, 2001), News Release (February 2003)	
11.0 Terms of Reference (Sept. 15, 2002)	
12.0 Background Report	
13.0 Open House Summary Reports – Dec. 2001, Sept. 2002, Oct. 2002	
14.0 Focus Group Summaries- List of attendees, session summaries and issues summary	
15.0 Inter-Agency Liaison Group and Project Teams	
16.0 Public Review Summary Report	
17.0 Recreation Management Strategy	
18.0 Landscape Unit Summary of Issues	

- 19.0 Socio-Economic (SEA) and Environmental Assessments (EA) – SEA Base Case, EA Base Case, SEA Public Review Draft, EA Public Review Draft
- 20.0 Kootenay Boundary Land Use Plan – Higher Level Plan
- 21.0 Kootenay Boundary Land Use Plan –Implementation Strategy
- 22.0 Subsurface Resources
 - 22.1 Management of Coal-Bearing Lands
 - 22.2 Mineral Two-Zone System Brochure
 - 22.3 Petroleum Resource Appraisal of the SRMMP Resource Evaluation Area (*M. Hayes*)
- 23.0 Old Growth and Mature Seral Deployment summaries
- 24.0 Additional Background Support Documentation
 - 24.1 Effects of Motorized Recreation on Grizzly Bears and Rocky Mountain Ungulates: An Annotated Bibliography
 - 24.2 Listed Vertebrate and Vascular Plant Species Occurring in the Cranbrook Forest District and in the SRMMP Area
 - 24.3 Wildlife Tree Retention Methodology
 - 24.4 Conservation – General Wildlife Conservation Considerations, Guide Outfitters in the East Kootenays, Riparian, Ungulate Species of Special Significance in the Plan Area, Wide-ranging Carnivores, Strategic Access Management Planning, Expanded Conservation Definitions

PART A - EXECUTIVE SUMMARY

The Southern Rocky Mountain Management Plan (SRMMP) covers the Flathead, Wigwam, the east side of the Bull River and the west side of the Elk River drainages in the southeast corner of British Columbia. Consistent with government's draft Statement of Commitment to Sustainable Resource Management and related Governance Principles, the intent of the plan is to support sustainable economic development balanced with social and environmental values for the long-term health of the economy, communities and ecosystems.

Specific resource management direction is contained in Part B. Chapters in Part B are: Introduction, First Nations, Subsurface Resources, Forestry (Timber), Agriculture and Range, Trapping, Recreation, Tourism, Conservation, Water, Visual Landscapes, Heritage and Paleontological Resources, and Communities, Settlement and Infrastructure.

Sections within the Recreation chapter cover recreation access and development, and resident hunting and angling. Tourism sections are: general tourism, adventure travel, guide-outfitting and angling guiding. Conservation topics include: riparian, old growth, wildlife tree retention, wide-ranging carnivores, ungulates, ungulate winter range, species at risk, access, connectivity, fish, grassland communities, air quality and general ecosystem health.

Individual chapters and sections address the following aspects of management of the specific resource:

- Issues
- Intent: an expression of management policy that provides context for reviewing plan effectiveness, as well as ongoing and proposed resource activities
- Resource objectives: spatial, measurable and mandatory direction; establishes the requirements for results-based regulation
- Best management practices: provides references and links to best management practices and relevant documents
- Economic benefits and opportunities
- Measures of success: parameters and trends for assessment of plan effectiveness
- Maps

The SRMMP is consistent with direction from: the 1995 East Kootenay Land Use Plan; the 1997 Kootenay-Boundary Land Use Plan Implementation Strategy; and the 2002 Kootenay-Boundary Higher Level Plan order. For the plan area, the SRMMP provides a one-stop shop for resource managers and operators to find all the information needed to appropriately conduct their activities. In the new results-based context, the SRMMP specifies those targets and objectives which need to be met.

The SRMMP does not limit, and is not intended to limit, ongoing Treaty negotiations between the Ktunaxa Kinbasket Treaty Council, British Columbia and Canada. The Ktunaxa Nation has been informed during the planning process. However, to date the Ktunaxa do not consider the consultation to have been meaningful or adequate. Consideration of the Ktunaxa's interests in the plan area will occur following approval of the plan (see Part G).

Public consultation, through informal discussions and meetings, sector focus group sessions, workshops, public meetings, open houses, a 60-day public review, and the SRMMP website, has been extensive.

Considerable significant, new technical work has gone into preparation of the SRMMP. New ungulate winter range mapping and guidance are based on the extensive work of the East Kootenay Ungulate Winter Range Committee. The emphasis has shifted from species management to habitat management, and from cover requirements to forage availability. A totally new approach to wildlife connectivity has been developed, through interaction with scientific and technical experts. The emphasis has shifted from definition of wide corridors to utilization of a matrix approach, in which specific ecological elements (e.g. ungulate habitats, grizzly bear avalanche tracks, riparian zones, old growth and mature forest areas, and inoperable forest) are managed in a coordinated manner. Riparian management for the Flathead River and its major tributaries is based on flood-plain mapping (“enhanced riparian zones”) as opposed to strict numerical setbacks. This approach will be extended to the other major rivers over time.

The Recreation Access and Development section provides management direction for various outdoor recreational activities, based on stakeholder negotiations.

Certainty for industry has been achieved through several initiatives. Old growth management areas (together with mature seral areas in certain Landscape Units and biogeoclimatic subzones) have been defined, allowing forest managers to plan effectively.

The new two-zone system for minerals is fully incorporated, addressing long-standing concerns of the mining sector in relation to the implications of land-use plan strategic objectives.

Community stability will be enhanced through establishment of a stable investment climate, which will encourage economic sectors to develop to their sustainable potential.

The SRMMP will be monitored and amended over time, through an advisory committee, as conditions and priorities change.

PART B – MANAGEMENT PLAN

B.1.0 INTRODUCTION

B.1.1 Plan Area/Geography

The Southern Rocky Mountain Management Plan area (the "plan area" or "SRMMP area") lies within the Continental and Border Ranges of the Canadian Rocky Mountains. It includes the Canadian portions of the Flathead River and Wigwam River drainages, as well as the west side of the Elk River drainage and the east side of the Bull River drainage (Maps B.1.1). The plan area extends from the B.C./Montana border north to the southern boundary of Heights of the Rockies Provincial Park. The SRMMP is a Provincial Crown land plan; no Federal lands, private lands, or protected areas are included. The plan area has a total area of 362,819 ha and includes 9 Landscape Units and a portion of one other (Table B.1.1).

Recognizing that activities outside of the plan area may influence the SRMMP, a larger area, including the complete Elk and Bull River drainages and provincial parks, was considered for resource evaluation purposes. This "resource evaluation area" has a total area of 748,938 ha within the Rocky Mountain Forest District, and encompasses 16 complete Landscape Units (Table B.1.1).

Table B.1.1: Summary of Planning Area

	Landscape Units	Total Area (ha) for Landscape Units	Plan area (i.e. Crown non-park area) (ha)
SRMMP Area	C14-C18, C23-C26, part of C27	441,099	362,819
Resource Evaluation Area	14 -28, 38	748,938	

Source: Cranbrook Forest District PCRS Reports by Landscape Unit

The plan area is unusual in its wide variety of significant resource values. These include wild-land attributes and remote landscapes, diverse and contiguous natural habitats and world-renowned populations of fish and wildlife. High conservation, scenic and recreation values of the land and waters of the plan area contribute to the quality of life for residents, and are spurring the current dramatic growth in tourism-related industries. Known subsurface resources include natural gas, minerals and coking coal; coal deposits are hosted by the same coal-bearing formation as that occurring at the coal mines that underpin the economy of the plan area. Forestry, agriculture, trapping and other resource-related activities contribute to a diversified economy. These values collectively drive the need for a comprehensive, integrated management plan.






Maps:

B.1.1 Overview

E.1.1 Overview

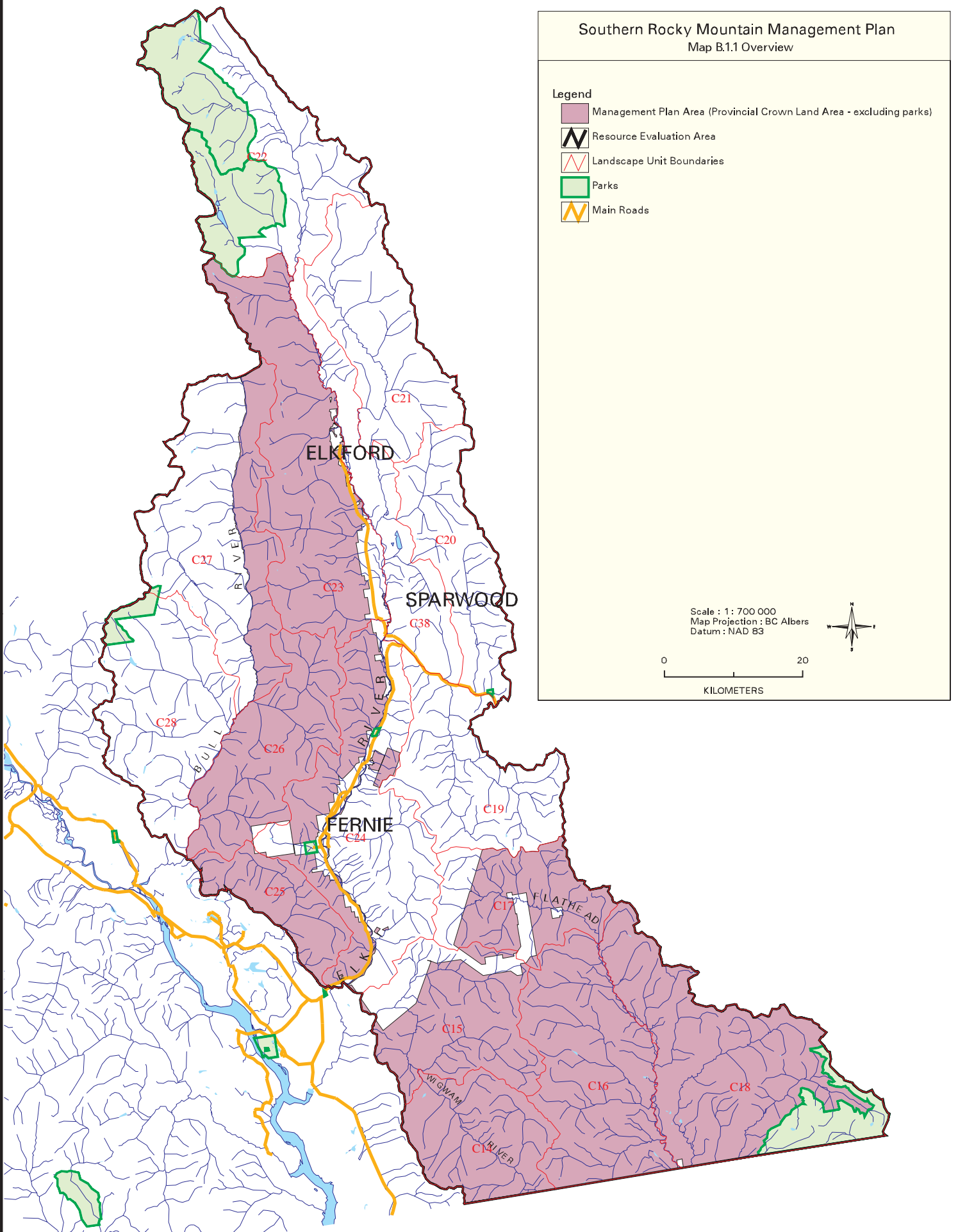
Southern Rocky Mountain Management Plan
Map B.1.1 Overview

Legend

-  Management Plan Area (Provincial Crown Land Area - excluding parks)
-  Resource Evaluation Area
-  Landscape Unit Boundaries
-  Parks
-  Main Roads

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.1.2 Planning Context and Process

In November of 2001 the B.C. government decided to rescind the Environment and Land Use Act Order-In-Council that created the former Southern Rocky Mountain Conservation Area. Kootenay regional staff of the Ministry of Sustainable Resource Management (MSRM) were directed to develop a new plan with a balanced approach for resource management in the Southern Rocky Mountain area. The plan endeavours to balance economic, social and environmental values for the long-term health of the economy, communities and ecosystems.

The SRMMP area is larger than the previous Conservation Area, which utilized the current forest-operability line as its boundary and did not include most of the operable forest land-base (generally lower-elevation lands). The SRMMP, on the other hand, includes all operable and inoperable forest lands.

Three planning cells in the Rocky Mountain Trench, covering Sheep Mountain and Wigwam Flats, which were part of the Conservation Area, have been deleted from the SRMMP, and will be included in a separate planning process.

Plan context

The SRMMP is a landscape-level strategic plan for resource management on provincial Crown lands. The SRMMP has been written so that its contents can be incorporated into a larger Sustainable Resource Management Plan (SRMP) at a future date.

As a landscape-level plan, the SRMMP is intended to be consistent with the Cabinet-approved strategic regional land-use direction for the area:

- East Kootenay Land Use Plan (EKLUP, 1995);
- Kootenay-Boundary Land Use Plan Implementation Strategy (KBLUP-IS, 1997);
- Kootenay-Boundary Higher Level Plan (KBHLP, 2002).

The first two provided policy direction, while the third established Resource Management Zones and legal Objectives for forest development under the Forest Practices Code of BC Act (FPC). The SRMMP also incorporates and builds on these broader-level plans, and is intended to provide a "one-stop shop" for clear land and resource management direction in the area; in effect it replaces all these broader-level plans for the SRMMP area.

For the plan to be successful in its overall goal of balancing economic, social and environmental values, the intent statements and resource objectives should be considered and implemented in an integrated manner.

Plan scope

In addition to the requirement of consistency with broader-level plans, there are several bounds on the scope of the SRMMP planning exercise that are consistent with its overall context and mandate. Background on some of this material can be found in Appendices 10.0 and 11.0. For example, the SRMMP will:

- be consistent with provincial draft Statement of Commitment to Sustainable Resource Management and related Governance Principles (see Appendix 6.0)
- recognize and balance resource values and uses
- consult with First Nations
- seek input from stakeholders and the public
- support sustainable economic development
- be accountable
- provide the basis for consistent decision-making in the area and create land-use certainty
- be clear and easy to implement
- help to reduce regulation
- respect existing tenures and rights in the plan area

In addition, it is recognized that certain activities outside the plan area will influence resources and their management within the plan area, but these are out of the control of the SRMMP and must await further landscape-level planning before integration can occur.

It is important to recognize that, for the plan to be effective, all resource users will need to respect and work with other users of the landbase.

First Nations consultation

The SRMMP area lies within the traditional territory of the Ktunaxa Nation, which includes Kinbasket peoples (“Ktunaxa”). The Ktunaxa are in Stage 4 of the 6-stage Treaty Process.

The Ktunaxa have been informed of the SRMMP process through:

- Meetings (presentation to Ktunaxa Kinbasket Treaty Council (“KKTC”) at their request; cross-cultural workshop; KKTC-MSRM staff meetings)
- SRMMP Public Open Houses
- KKTC staff participation on the Interagency Liaison Group (IALG)
- KKTC staff participation on the SRMMP Project Team
- Copies of maps and the Public Review draft provided to KKTC office
- Written correspondence, telephone calls, email
- Publicly-accessible website
- Discussion with, and input from, KKTC staff.

The Ktunaxa do not consider that consultation, as of August 2003, on the SRMMP has been meaningful or adequate.

Meaningful consultation with the Ktunaxa will be pursued as described in Section B.2.0 and Part G.

Stakeholder and public consultation

The SRMMP process is intended to be open and transparent, and to rely on extensive consultation with the public and stakeholder groups.

Key components of the consultation process included:

- Open Houses (Appendix 13.0)
- Public Meetings (Appendix 13.0)
- Multi-stakeholder workshops for the Recreation Management Strategy (RMS) (Appendix 17.0)
- Technical meetings of the East Kootenay Ungulate Winter Range Committee (Appendix 8.0)
- Connectivity workshops and technical meetings (Appendix 7.0)
- Website information including the Background Report, Public Review Draft and comment-submission link
- Focus Group meetings (Appendix 14.0)
- Sixty-day period for public comments on the Public Review Draft (Appendix 16.0)

Focus Groups were sector-based, and included environmental, subsurface resources, forestry, agriculture, local government and community economic development, commercial guide-outfitting, recreational hunting and fishing, and tourism interests, as well as Montana interests and the East Kootenay Residents' Land Use Coalition. Meetings with Focus Groups were intended to provide the Project Team with advice, information and perspectives on resource management issues and to update various groups on plan goals and progress.

Interagency consultation

To ensure that government agencies were kept informed and allowed the opportunity for input, an Interagency Liaison Group (IALG) was established. This group included staff of the Ktunaxa Kinbasket Treaty Council, and senior regional representatives of government agencies (Appendix 15.0), including: Land and Water BC, the Ministries of Energy and Mines, Forests, Water, Land and Air Protection and Agriculture, Food and Fisheries, the Federal Department of Fisheries and Oceans, Parks Canada, the Regional District of East Kootenay, and Alberta government. The IALG met periodically with the SRMMP and Recreation Management Strategy Project Teams (Appendix 15.0).

Socio-economic and environmental assessments

An independent socio-economic and environmental assessment (SEEA) of the plan was undertaken as part of the SRMMP (see Appendix 19.0). It examines the projected impacts of the plan on various sectors and values.

Separate socio-economic and environmental base-cases were developed, describing the pre-SRMMP situation. Similarly, a socio-economic assessment and environmental risk assessment of the Public Review Draft (February, 2003) were generated.

Plan outline

The main body of the SRMMP (the remainder of Part B) is divided into chapters based on resource values and issues. The main chapter headings are: First Nations, Subsurface Resources, Forestry (Timber), Agriculture and Range, Trapping, Recreation, Tourism, Conservation, Water, Visual Landscapes, Heritage and Paleontological Resources, and Communities, Settlement and Infrastructure. Several of the chapters are sub-divided into resource-specific sections.

Each chapter or section contains basic information needed by resource managers. The mandatory provisions, namely Resource objectives, have been made easily identifiable. More detailed and background information on many issues and resource values, including descriptions of Best management practices, can be found in the appendices.

Chapters or sections are comprised of:

- Issues
- Intent: an expression of management policy that provides context for reviewing plan effectiveness as well as ongoing and proposed resource activities
- Resource objectives: spatial, measurable and mandatory direction; establishes the requirements for results-based regulation
- Best management practices: guidance relevant to operational activities; either located in Appendix 5.0, or in separate documents (latter in italics with links where available)
- Economic benefits and opportunities
- Measures of success: parameters for assessment of plan effectiveness
- Maps

Part C contains information on plan review and monitoring, while Part D covers operational implementation.

Technical maps necessary to implement plan direction are listed in Part E and will be available online or in the Cranbrook MSRM office. Other maps used in preparation of the plan and/or considered important for background information are contained in Appendix 1.0.

Part F includes definitions that apply to Resource objectives and intent statements. Either a definition is provided for a word or phrase or the source document is named. The exception to this is in Section B.7.1 where definitions that apply to recreation access and development are presented within the section.

Part G provides an outline of the process of review and revision of the SRMMP to consider the interests and concerns of the Ktunaxa Nation in the plan area.

B.2.0 FIRST NATIONS

The SRMMP area lies within the traditional territory of the Ktunaxa Nation, which includes Kinbasket peoples (“Ktunaxa”). Of the seven bands, five are located in British Columbia and two are in the United States. The Canadian First Nations communities that make up the Ktunaxa are the Lower Kootenay Band, St. Mary’s Band, Shuswap Band, Tobacco Plains and Columbia Lake Band. The Indian Reserve lands of the Tobacco Plains Band lie closest to the plan area.

The Ktunaxa traditionally followed “a nomadic seasonal subsistence round determined by the location and timing of abundance of a broad range of animal and plant resources” (W.Choquette, personal communication). The people traveled extensively throughout the Wigwam, Elk and Flathead valleys (and elsewhere outside the plan area) hunting, trapping, fishing and harvesting vegetation. They also crossed the Continental Divide to hunt bison on the prairies.

Numerous First Nations archaeological sites are spread throughout the plan area, and are particularly concentrated in the area between Sparwood and Elkford. Archaeological sites represent only those activities that left a footprint on the landscape such as campsites or aboriginal mining. Traditional uses such as hunting, berry picking and travel routes may not be evident on the land, however are known through oral history. Traditional use studies of the Ktunaxa in the plan area are ongoing.

Issues:

- The Ktunaxa are currently at stage 4 of the 6-stage Treaty Negotiation Process.
- The Ktunaxa do not consider that consultation as of August 2003 on the SRMMP has been meaningful or adequate
- The Ktunaxa have expressed concern about their limited capacity of financial resources and staff to effectively participate in the process
- The Ktunaxa have expressed concern about the lack of Ktunaxa, and other First Nations, participation in the creation of the Provincial Policy for Consultation with First Nations.

Intent:

- Aboriginal rights will not be unjustifiably infringed upon by resource development activities of the Crown or its licensees.
- The Crown and its licensees have an obligation to consider potentially existing aboriginal rights in decision-making processes that could lead to impacts on those rights
- Consultation with the Ktunaxa will continue to be consistent with Provincial policy (see Best management practices).
- Provide for cultural, economic and environmental interests of the Ktunaxa.

The Ktunaxa and the Ministry of Sustainable Resource Management are completing a Memorandum of Understanding to create a working relationship that should result in effective Ktunaxa participation in land use planning and policy. This relationship will be used to address Ktunaxa interests in the SRMMP.

The process for review and revision of the SRMMP, to consider the interests and concerns of the Ktunaxa Nation in the plan area, is provided in Part G – Action Plan.

Best management practices:







- *Provincial Policy for Consultation with First Nations (October 2002 or most current)*

Maps:

B.2.1 Ktunaxa Nation Traditional Territory

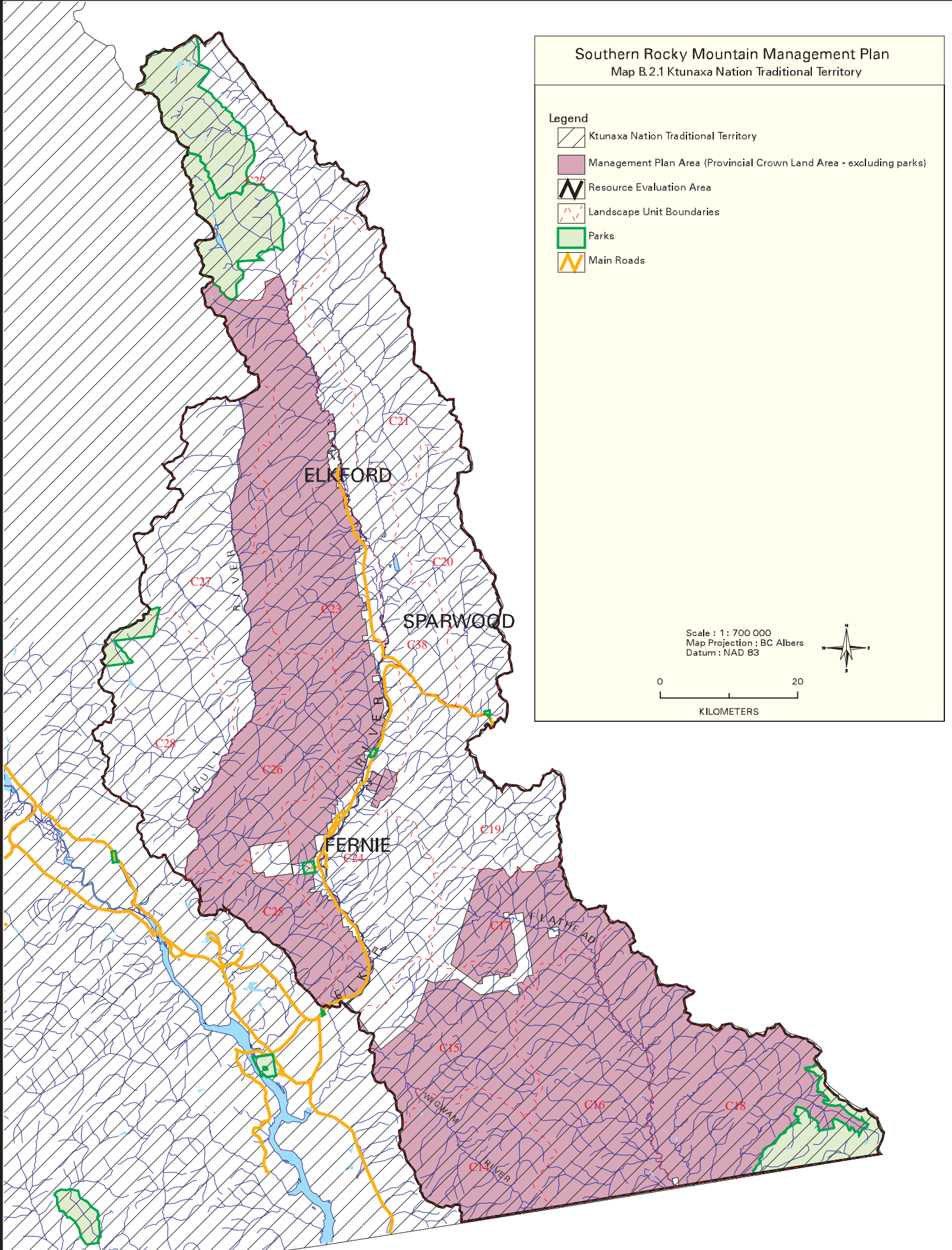
Southern Rocky Mountain Management Plan
Map B.2.1 Ktunaxa Nation Traditional Territory

Legend

-  Ktunaxa Nation Traditional Territory
-  Management Plan Area (Provincial Crown Land Area - excluding parks)
-  Resource Evaluation Area
-  Landscape Unit Boundaries
-  Parks
-  Main Roads

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.3.0 SUBSURFACE RESOURCES

B.3.1 Minerals and Coal

The SRMMP area has known resources and/or potential for coal and various minerals (see Appendix 12.0 and Maps App.3.1 and App.3.2). Aggregate resources are produced from low-elevation sites in some of the major valleys, and rock is quarried at several sites.

Five large coal mines lie just outside and to the east of the SRMMP area within the resource evaluation area. Some of the coal-bearing lands in the plan area (Map App.3.1) are within the Enhanced Resource Development Zone for coal (ERDZ-C) as designated in the East Kootenay Land Use Plan (Map B.3.1.2).

Issues:

- There is a need to confirm certainty of access for mineral and coal exploration and development in the SRMMP area, in light of:
 - previous and ongoing conservation initiatives operating outside the provincial land-use planning process; and
 - provincial land-use designations and objectives related to managing other resource values, but which potentially reduce opportunity for, and increase the cost of, mineral and coal exploration and development, and add to investor uncertainty
- Knowledge of the plan area's mineral and coal worth is incomplete, due to hidden nature of resources and relative lack of exploration to date for some commodities
- There is a current lack of clarity concerning operational implementation of the ERDZ-C designation

Intent:

- Encourage investment in exploration and development of mineral and coal resources
- Implement certainty of access for mineral and coal exploration and development; specifically, activities related to exploration and development of minerals and coal are permitted throughout all non-protected lands (see Appendix 22.2)
- Ensure activities related to mineral and coal exploration and development are conducted in a manner that respects other resource values; specifically:
 - SRMMP maps and associated management direction will provide information needed to identify and address sensitive values on a site-specific basis; and
 - standard permitting and approval processes and reclamation requirements, including bonding, will be utilized
- Recognize the seasonal requirements of many exploration activities
- Recognize that development opportunities for minerals and coal are not limited in any way to those occurrences and resources that are known at this time
- Incorporate new information concerning mineral and coal resources into plan monitoring and the evolving resource management regime
- Manage ERDZ-C lands in the SRMMP area (see Map B.3.1.2) as enhanced resource development zones for coal. The ERDZ-C designation represents a long-term priority commitment and long-term security of access for the coal industry. In ERDZ-C lands, ecosystem function may be temporarily compromised, but long-term environmental quality will be addressed through reclamation and mitigation, as determined by the permitting process (also see Appendix 22.1)

- Develop specific ERDZ-C operational and/or permitting guidelines as part of a future project addressing all ERDZ-C lands both within and outside the SRMMP area, in order to deliver previously-assured certainty for the coal sector (see Appendix 22.1)
- Ensure a continuing local supply of aggregate resources and other industrial minerals to meet development demands

Resource objectives:

Objective 3.1.1

All lands in the plan area displayed as “land open to mining” in Map B.3.1.1 are available for mineral exploration and development, subject to existing legislation.

Objective 3.1.2

Management intent and objectives for other resource values in the SRMMP (including, but not limited to, old-growth, connectivity, ungulate winter range, riparian, visual landscapes and recreation) will not preclude application for, or approval of, mining activities anywhere in the lands referred to in Objective 3.1.1

Best management practices

- *Mineral Exploration Code* and associated *Best Management Practices (in prep.)*

Economic benefits and opportunities:

- Certainty for mining
- New and continuing exploration for minerals and coal
- Large-scale production, processing and distribution
- Small-scale production, processing and distribution (including aggregate, decorative stone and other industrial minerals)

Measures of success:

- Reasonable, cost-effective and appropriate access for exploration and development of minerals and coal available throughout the SRMMP
- Increased mineral and coal tenures and overall exploration expenditures in the SRMMP (partly reflecting improved investor confidence)
- Other resource values and uses addressed appropriately through standard project approval processes
- Successful reclamation of mining-related activity sites
- Improved knowledge and data concerning minerals and coal (based on results of exploration projects)
- Improved public knowledge and awareness of minerals and coal resources and associated processes

Maps:

B.3.1.1 Mineral 2-zone


B.3.1.2 ERDZ-Coal

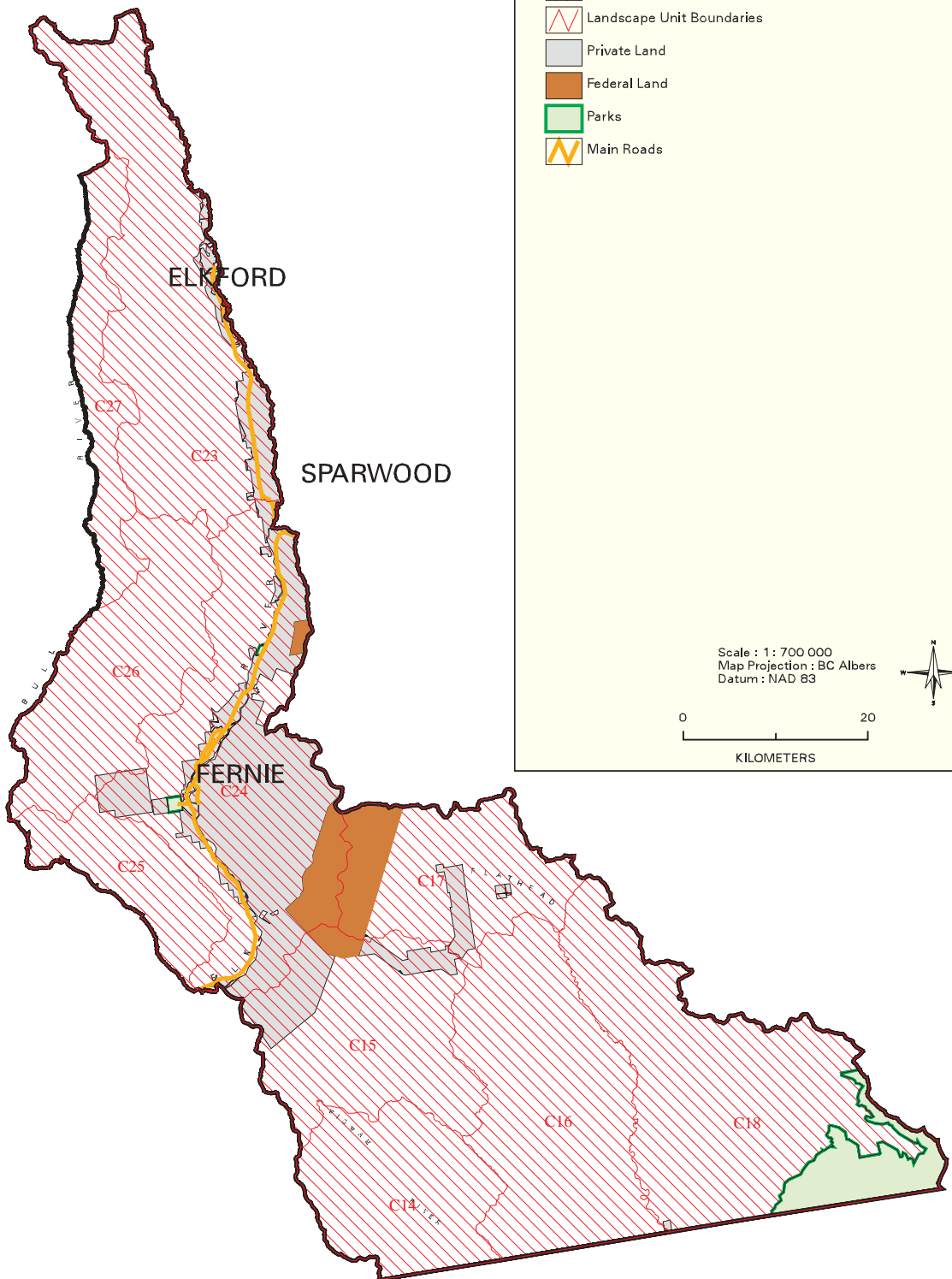
App.3.1 Coal-bearing lands

App.3.2 Mineral potential

Southern Rocky Mountain Management Plan
Map B.3.1.1 Mineral 2-Zone

Legend

-  Land Open to Mining
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads









Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Southern Rocky Mountain Management Plan
Map B.3.1.2 ERDZ-Coal







Legend

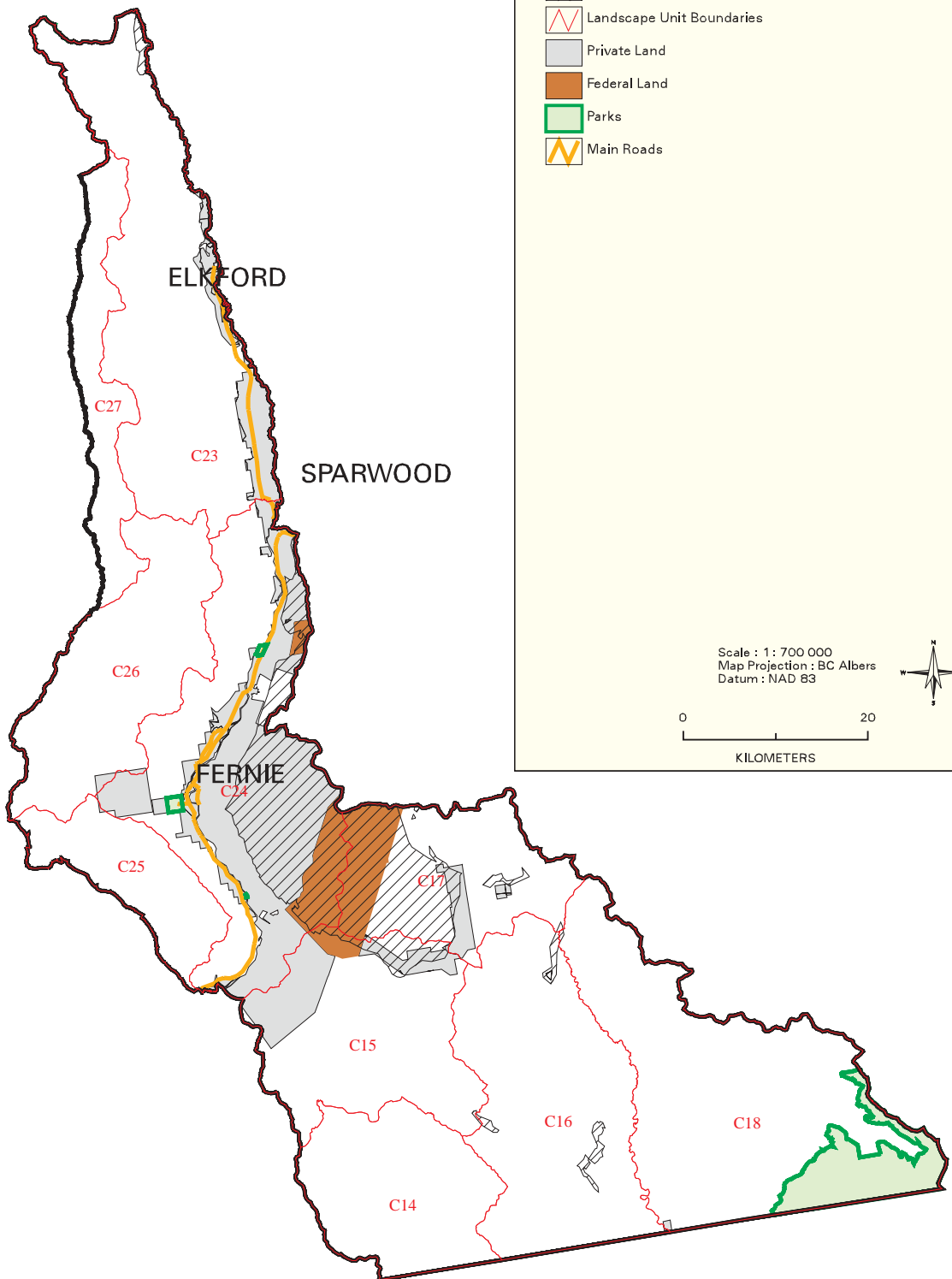
-  Coal Enhanced Resource Development Zone
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Southern Rocky Mountain Management Plan
Map App.3.1 Coal-Bearing Lands

Legend

-  Coalfields
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



















Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



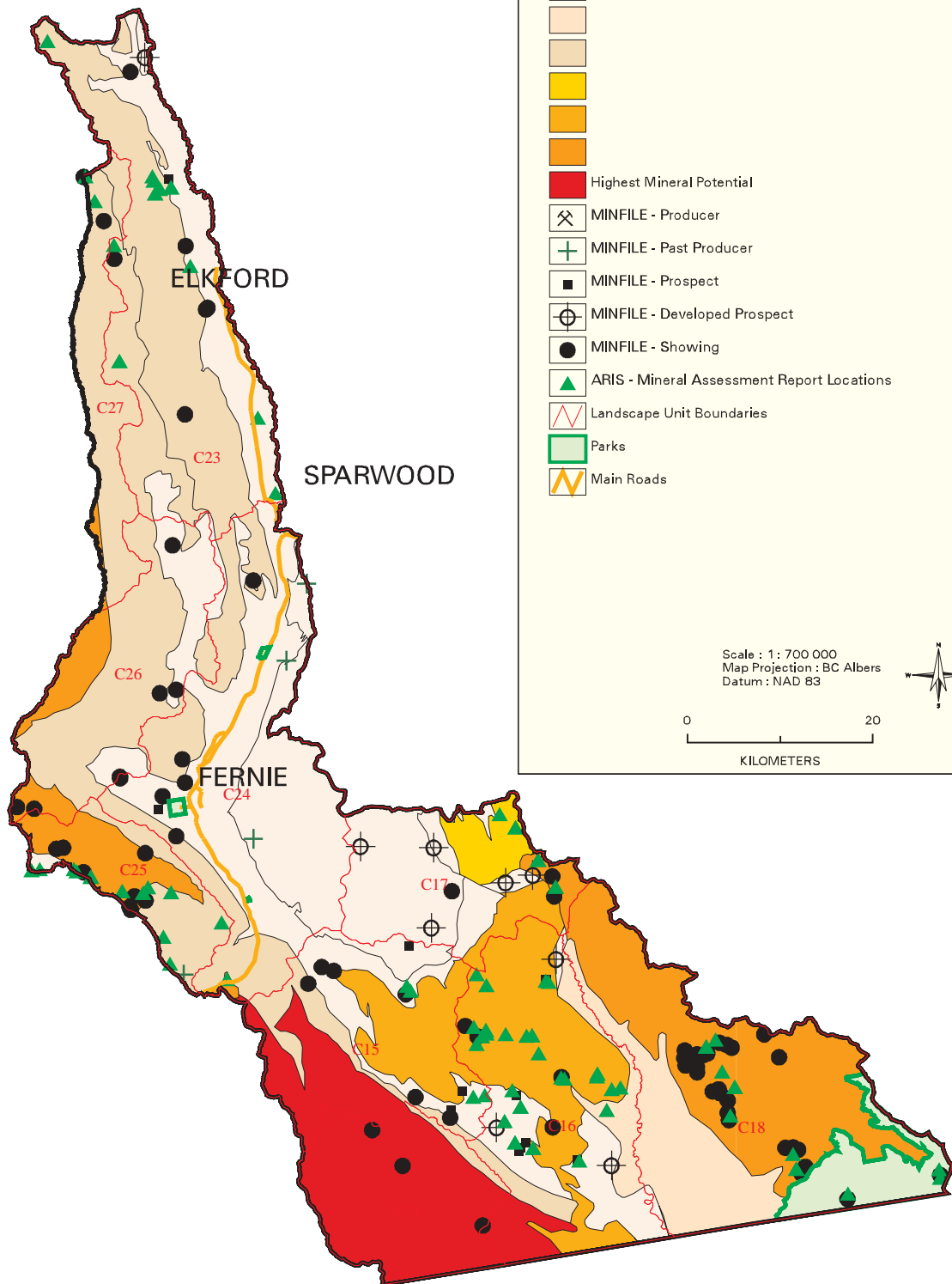
Southern Rocky Mountain Management Plan
Map App.3.2 Mineral Potential

Legend

-  Lowest Mineral Potential
- 
- 
- 
- 
- 
-  Highest Mineral Potential
-  MINFILE - Producer
-  MINFILE - Past Producer
-  MINFILE - Prospect
-  MINFILE - Developed Prospect
-  MINFILE - Showing
-  ARIS - Mineral Assessment Report Locations
-  Landscape Unit Boundaries
-  Parks
-  Main Roads

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.3.2 Oil and Gas

The SRMMP area has known resources and/or potential for coalbed methane, natural gas and oil. Appendix 22.3 contains a quantitative assessment of petroleum resource potential in the plan area.

Issues:

- There is a need to confirm certainty of access for coalbed methane, natural gas and oil exploration and development in the SRMMP area, in light of:
 - previous and ongoing conservation initiatives operating outside the Provincial land-use planning process
 - Provincial land-use designations and objectives related to managing other resource values, but which potentially reduce opportunity for, and increase the cost of, coalbed methane, natural gas and oil exploration and development, and add to investor uncertainty
- Knowledge of the area's coalbed methane, natural gas and oil worth is incomplete, due to hidden nature of resources and relative lack of exploration to date

Intent:

- Encourage investment in exploration and development of coalbed methane, natural gas and oil
- Implement certainty of access for coalbed methane, natural gas and oil exploration and development; specifically, activities related to exploration and development of coalbed methane, natural gas and oil are permitted throughout all non-protected lands
- Ensure activities related to coalbed methane, natural gas and oil exploration and development are conducted in a manner that respects other resource values; specifically:
 - SRMMP maps and associated management direction will provide information needed to identify and address sensitive values on a site-specific basis
 - standard permitting and approval processes, and reclamation requirements, will be utilized
- Recognize the seasonal requirements of many exploration activities
- Recognize the need to establish rights-of-way for pipelines and other infrastructure to support pilot and production projects
- Recognize that development opportunities for coalbed methane, natural gas and oil are not limited in any way to those occurrences and resources which are known at this time
- Incorporate new information concerning coalbed methane, natural gas and oil into plan monitoring and the evolving resource management regime
- Opportunities for access to coalbed methane, oil and natural gas on ERDZ-C lands are not diminished by the ERDZ-C designation and intent

Best management practices

- Most current version of the Oil and Gas Commission (OGC) *Oil and Gas Handbook*, or equivalent OGC documents, or equivalent OGC website information (www.ogc.gov.bc.ca), as appropriate
- *Guidelines for Coalbed Methane Projects in British Columbia* (Oil and Gas Commission, October, 2002)
- *CBM Authorization Guide EP-CBM-G-0211: A guidance document for obtaining a permit to discharge produced water from coalbed methane (CBM) operations* (MWLAP Environmental Protection, November, 2002, draft)
- *CBM Produced Water Guideline EP-CBM-G-0207: Interim guideline for the discharge of produced water from coalbed methane operations* (Stroscher and McDonald, July, 2002, draft)

Economic benefits and opportunities:

- Certainty for coalbed methane, natural gas and oil
- New and continuing exploration for coalbed methane, natural gas and oil
- Coalbed methane, natural gas and oil production, processing and distribution

Measures of success:

- Reasonable, cost-effective and appropriate access for exploration and development of coalbed methane, natural gas and oil available throughout the SRMMP
- Increased coalbed methane, natural gas and oil tenures and overall exploration expenditures in the SRMMP (partly reflecting improved investor confidence)
- Other resource values and uses addressed appropriately through standard project approval processes
- Successful reclamation of coalbed methane, natural gas and oil activity sites
- Improved knowledge and data concerning coalbed methane, natural gas and oil (based on results of exploration projects)
- Improved public knowledge and awareness of coalbed methane, natural gas and oil and associated processes

B.4.0 FORESTRY (TIMBER)

The area supports an active forest industry based largely on primary production: harvesting, saw milling and pulp production. Forest tenures include: two major forest licenses, a woodlot license, and timber sales under the BC Timber Sales Program.

Issues:

- There is a need to confirm certainty of access for forest management.
- The Working Forest policy and regulations is pending
- Adequacy, location and benefits of the ERDZ-T areas
- Much of the plan area is dominated by lodgepole pine, which is susceptible to mountain pine beetle infestation. As of January 2003, due to significant levels of mountain pine beetle infestation, landscape units C23 and C24 within the plan area have been designated as Emergency Management Units as part of the Emergency Bark Beetle Management Area for the province.
- Some markets are demanding forest certification for the forest products that they purchase

Intent:

- Implement certainty of access to the available timber harvesting land base
- Maintain a sustainable, secure long-term timber supply and ensure the availability of the short term timber supply
- Maintain and enhance the area's current contribution to regional timber supply targets
- Maintain and enhance timber productivity of the timber harvesting land base
- Maintain an ongoing environmentally sustainable and economically viable timber industry within the plan area
- Maintain seral stage targets as per Section B.9.2
- Manage forest resources in a manner that respects sensitive values and supports forest certification initiatives (see Chapter B.9.0, B.10.0 and B.11.0)

Resource objectives:

Objective 4.0.1

Enhanced Resource Development Zones – Timber (ERDZ-T) in the plan area are assigned as outlined on Map B.4.1, to support intensive forest management for the purpose of increasing volumes of merchantable timber and to reduce industry costs while maintaining adequate environmental stewardship as per Chapter B.9.0.

Objective 4.0.2

To promote intensive forest management, the green-up height for ERDZ-T's in the plan area as shown on Map B.4.1 is established as successful regeneration of cut blocks.

Best management practices:

- Current guidebooks pursuant to the *Forest Practices Code Act* and the *Forest and Range Practices Act*

Economic benefits and opportunities:

- Provides land-use certainty for operators and investors
- Helps provide continuing employment in the forest sector
- Secondary and tertiary manufacturing (value-added) operations

Measures of success:

- A sustainable forestry sector contributing to a diversified economy in the SRMMP area and surrounding areas







Maps:

B.4.1 ERDZ-Timber

E.4.1 ERDZ-Timber

Southern Rocky Mountain Management Plan
Map B.4.1 ERDZ-Timber

Legend

-  ERDZ-Timber
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.5.0 AGRICULTURE AND RANGE

Beef cattle production is the most common form of agriculture in the plan area. There is some potential for other forms of agriculture. There are Crown grazing tenures throughout the plan area, with the majority of use concentrated in the Elk River, Bull River and Sand Creek watersheds. Agriculture Land Reserve designations in the plan area are shown on Map B.5.1.

Issues:

- High quality, available forage in the plan area is limited and decreasing, largely due to forest ingrowth
- There is no incentive to rebuild roads, other than within approved cutblocks, on range lands
- The supply of available forage is influenced by forest disturbance
- Appropriately designed grazing regimes may enhance the availability and use of forage for livestock
- A sustainable and profitable beef cattle industry in the plan area is dependent on the availability of rangeland for grazing
- Class III Agriculture (*Canada Land Inventory*) is the highest classification level in the plan area because of limitations to the growing season. This classification, however, accommodates optimum perennial forage production.
- Riparian areas are important watering sites for livestock, contribute to forage productivity, and maintain a stable water supply for irrigation. Concentrated livestock use of riparian areas may impact proper functioning condition¹.
- In the Wigwam and Flathead River watersheds (LU C14 -C18) high quality, available forage is limited and of critical importance to maintaining internationally significant wildlife populations of ungulates and carnivores, as well as maintaining livestock grazing permits associated with guide-outfitting operations
- In the Elk River, Bull River and Sand Creek watersheds high-quality, available forage is limited and decreasing, and this continues to precipitate conflicts between wildlife populations and domestic livestock
- With only small areas of NDT4 in the plan area, there is limited capability to enhance range lands to address forest ingrowth
- There are conflicts between the forest industry and domestic livestock on Crown land
- Predator impacts on domestic livestock, particularly in LU C14-C18, may jeopardize maintenance of natural predator-prey relationships
- Domestic livestock grazing impacts alpine and subalpine environments

Intent:

- Maintain a healthy and profitable agricultural sector that respects sensitive environmental values, subject to terms and conditions of approved tenures and plans, and consistent with SRMMP objectives
- Maintain or enhance livestock grazing activity, subject to terms and conditions of approved grazing tenures and range use and range stewardship plans, to maintain agriculture opportunities while managing for viable populations of wildlife
- Eliminate potential for parasite and disease transfer from domestic livestock to wildlife
- Manage the Wigwam and Flathead River watersheds (LU C14 – C18) to ensure sustainable forage for wildlife

¹ Effects of Cattle Grazing near Streams, Lakes and Wetlands, FPB Special Report, FPB/SR/11, June 2002
August 2003

- In areas within the plan area designated as Agriculture Land Reserve under the *Agriculture Land Reserve Act* (Map B.5.1) and consistent with approved ecosystem restoration plans, consider sites with high forage production as a priority for forage production enhancement while maintaining grassland integrity
- Manage range land to be healthy and diverse
- Maintain and manage range land according to ecosystem management principles within the limits of its sustainable carrying capacity.
- Reduce current and historic forest ingrowth in areas with high quality range capability
- Manage recreation access in range lands to minimize alienation/loss of the resource base
- Control noxious weeds to maintain range land values including forage, shrub and tree production and biodiversity
- Manage vehicle use on range land to minimize negative effects on range land values
- Tenuring opportunities for agricultural operations will be considered to improve their viability, subject to SRMMP Resource objectives
- Maintain opportunities for water allocation for agricultural uses
- Minimize conflicts between livestock and forestry values
- Integrate grazing objectives with operational timber management activities
- Minimize conflicts between livestock and wildlife (both ungulates and predators)
- Minimize the impact of livestock grazing on alpine and subalpine environments
- Livestock use of riparian areas will comply with current and relevant legislation and regulation
- Manage riparian areas to maintain proper functioning condition as provided in Section B.9.1
- Agricultural use will be sensitive to identified wildlife habitats as provided in Section B.9.7.

Resource objectives:

Objective 5.0.1

Manage livestock grazing in the Wigwam and Flathead River watersheds (Landscape Units C14 – C18) to ensure forage quality, productivity and availability for wildlife.

Objective 5.0.2

Maintain livestock grazing at 500 Animal Unit Months or less for low-intensity horse, mule and donkey use associated with Guide Outfitter and/or backcountry tourism operations in the Wigwam and Flathead River watersheds (Landscape Units C14 – C18). Livestock grazing is subject to terms and conditions of approved grazing tenures, licences and permits issued under existing legislation, regulations and guidebooks as amended periodically by regulatory agencies. “Livestock” and “Animal Unit Months” have the same meaning as in the *Range Act*.

Objective 5.0.3

Increases in Animal Unit Months for livestock grazing under the *Range Act* in alpine and subalpine grassland ecosystems (AT, ESSFwmp and ESSFdkp) will only be considered where there is a recommendation of a qualified registered professional, indicating that conservation objectives, as defined in Chapter B.9.0, of this plan can be met. Grazing by domestic sheep, goat and llama are not permitted in identified Rocky Mountain bighorn sheep or mountain goat range.

Objective 5.0.4

Encourage livestock to use areas other than OGMA's and MMAs as per Section B.9.2 and Map B.9.2.1.

Best management practices:

- *Range Use Plan Guidebook (MOF, October 2000)*
- *Relevant sections within the Riparian Management Area Guidebook (MOF, 1995)*
- *Range Land Handbook for BC (BC Cattlemen's Association, 1998)*

Economic benefits and opportunities:

- Diversified agriculture industry
- Guest ranches and guide outfitters
- Livestock grazing
- Agroforestry
- Noxious weed control
- Riparian management

Measures of success:







- Viable agriculture industry
- Increased productivity of Crown lands used for agriculture
- New sources of water for agriculture identified
- Livestock losses due to predators minimized
- Reduced livestock-forestry conflicts
- Forest ingrowth on higher capability range reduced
- High quality forage available
- Healthy and contiguous range lands
- Riparian areas in proper functioning condition within range agreement areas
- Timber management practices that enhance forage production on areas identified for open forest and open range
- Water quality in community watersheds with livestock grazing maintained
- Noxious weeds eliminated or reduced
- Minimized range land alienation resulting from access development
- Sustainable populations of wildlife

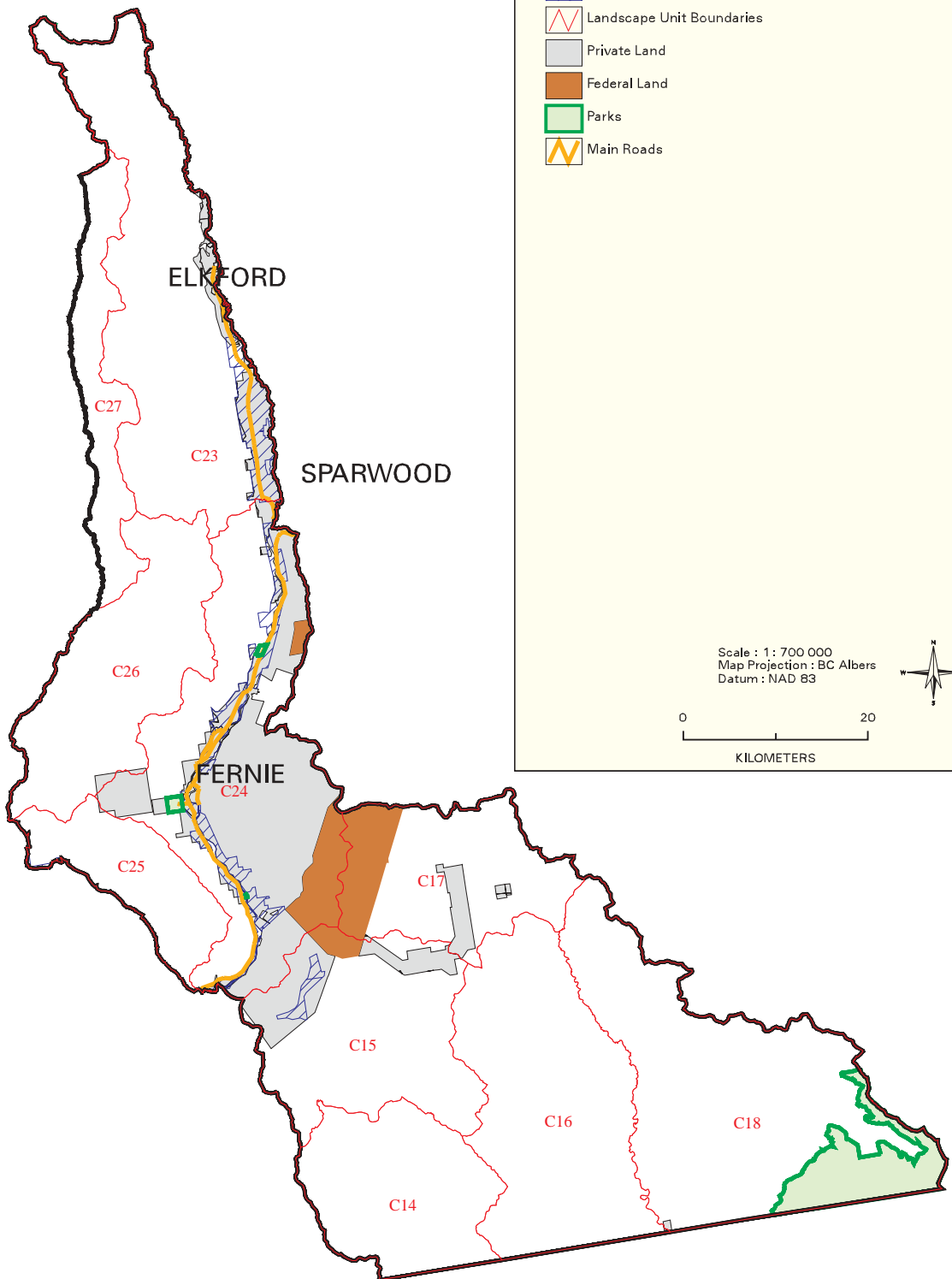
Maps:

B.5.1 Agriculture Land Reserve

Southern Rocky Mountain Management Plan
Map B.5.1 Agricultural Land Reserve

Legend

-  Agricultural Land Reserve
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.6.0 TRAPPING

Registered traplines lie within or partially within the plan area including one First Nations trapline that crosses into both the Flathead and Wigwam watersheds. Registered traplines are licensed tenures issued by the Provincial government.

Issues:

- Trapping is seasonal and generally a secondary source of income with potential for higher returns a function of consumer and market demand, harvesting effort and wildlife numbers
- The viability of the industry is dependent on the health of the wildlife and their associated habitats
- Species with low reproductive capability or rare/endangered species may inadvertently be trapped
- Access to traplines is an important issue for the sector
- Private land traplines are unregulated and may influence the activity of registered traplines licensed on Crown land

Intent:

- Maintain a viable trapping industry in the plan area subject to provisions in the *Wildlife Act*
- Manage fur-bearing animals as defined in the *Wildlife Act* and their habitat to maintain population levels that are sustainable and provide opportunities for harvest
- Trapping will be sensitive to the conservation intent and objectives expressed in Chapter B.9.0 for riparian areas, old growth, wildlife trees, connectivity corridors, and identified wildlife
- Motorized recreation restrictions (Section B.7.1) generally do not apply to licensed trappers who are engaged in activities directly related to their tenures
- Consider existing registered traplines in issuing tenures for commercial recreation and permits for resource development
- Manage trapline cabins and their use according to guidelines as established by the Ministry of Water, Land and Air Protection or appropriate agency
- Use selective trapping strategies and techniques

Resource objective:

Objective 6.0.1

Maintain the trapping industry by permitting up to 24 registered traplines in the plan area.

Economic benefits and opportunities:

- Fur tanning
- Manufacturing of fur items
- Tourist gift items
- Taxidermy

Measures of success:

- Best available information is used in resource development and management plans
- Improved information about fur bearing animals and their habitat
- Sustainable harvest of fur bearing animals
- Economically viable industry

B.7.0 RECREATION

B.7.1 Recreation Access and Development

Over the past decade the plan area has experienced a significant increase in the level of wilderness-based recreation. Changes in technology, the evolution and increasing diversity of outdoor recreational pursuits, increasing publicity of the region's wilderness attributes, proximity to major urban centres, demographic changes (i.e. an influx of lifestyle migrants) and relatively low real-estate prices have all contributed to this growth.

It is likely that, with increasing popularity of the area, this trend will continue for the foreseeable future. Such growth offers significant economic opportunities through expansion of the recreation industry and related service sector. To realize these opportunities competing demands among recreational user groups, along with environmental impacts, must be addressed.

The results of a multi-stakeholder consultation process, the Recreation Management Strategy (RMS), that provided direction to this Section, are found in Appendix 17.0.

Definitions:

The intent statements and Resource objectives contained in this section, Table B.7.1.1, Table B.7.1.2, Map B.7.1.1 and Map B.7.1.2 use the following coding and definitions to describe the recreation management direction for the plan area:

Recreation Access (RA) (ground based)

- RA1:** areas or corridors available for **non-motorized** recreation
- RA 1.1** Non-motorized (temporal conditions)
 - RA 1.2** Non-motorized (type conditions)
 - RA 1.3** Non-motorized (type and temporal conditions)
- RA2:** areas or corridors available for **motorized** recreation
- RA 2.1** Motorized (temporal conditions)
 - RA 2.2** Motorized (type conditions)
 - RA 2.3** Motorized (type and temporal conditions)

Recreation Access (RH) (aerial based)

- RH1:** areas that have a very high environmental or social sensitivity to aerial landings. Landings within areas designated as RH1 are to be discouraged.
- RH2:** areas that have a high environmental or social sensitivity to aerial landings. Use levels are low to moderate. Landings within areas designated as RH2 will be limited, based on frequency, location and timing.
- RH3:** areas that have no identified constraints to aerial landings. No limitations to frequency, location or timing within areas designated as RH3.

Recreation Management/Development (RM)

RM1: Low Development/Use

Informal structures^a are acceptable to facilitate existing and approved uses to mitigate environmental impacts:

- Low incidence of managed trails, routes or sites
- Low acceptance of recreational changes in the landscape

- Low incidence of human contact or managerial presence

RM2: Moderate Development/Use

Small-scale formal structures^b may be acceptable in specific areas:

- Moderate number of managed trails, routes or sites may be present
- Moderate acceptance of recreational changes in the landscape
- Moderate incidence of human contact or managerial presence

RM3: High Development/Use

Large^c or small-scale formal structures may be developed in specific areas:

- High number of managed trails, routes or sites may be present
- High acceptance of recreational changes in the landscape
- High incidence of human contact and managerial presence

RM4: Existing Formal Structures

Large or small-scale formal structures are present:

- No new accommodation structures are acceptable, maximum limits to non-industrial change have been achieved
- High incidence of human contact and managerial presence

^aInformal Structures include campsite facilities such as tent pads, tables, toilets and information signage

^bSmall-scale Formal Structures include public and commercial day use huts/cabins and toilets or small overnight huts/cabins

^cLarge-scale Formal Structures include commercial lodges and outbuildings associated with large or multi-day overnighing purposes

Issues:

- Conflicts among competing recreational sectors, environmental sectors and forest operations are on the increase.
- Road deactivation and other forms of closure can negatively impact motorized recreational opportunities.
- Use of existing or new roads for motorized recreation can negatively impact non-motorized recreational opportunities.
- There is a need to balance recreational demands between area residents and visitors
- Wildlife, fisheries and aesthetic values need to be conserved in order to sustain quality of recreational experiences
- There are concerns over the implications of commercial recreation
- Mechanisms to determine and allocate recreation carrying capacity and cumulative impacts are currently inadequate
- There is a lack of education and enforcement capacity concerning recreational access management
- Additional detailed work may be required beyond these objectives to address locally specific issues, including indicators and standards for limits of acceptable change
- There is potential risk to water quality in Community Watersheds as a result of recreational access and use
- There is potential for damage to forest plantations from snowmobile use

Intent:

- Promote a diversified, quality recreation experience and a viable economic, social and environmental future.
- Balance recreation and recreation development based on appropriate spatial distribution and timing of such activities to reduce conflicts between recreational groups and the potential for environmental damage
- In the plan area, roads can be assumed to be open to motorized recreational traffic with the following exceptions (see Maps B.7.1.1 and B.7.1.2):
 - roads designated as RA1 (non-motorized) in RA2 areas
 - all roads in RA1 and Alpine Non-Motorized areas, excepting those specifically designated as RA2 roads (motorized)
 - roads on which gates have been installed by permitted industrial tenure holders or operators to prevent unauthorized public access
 - roads or road systems to which access is available only by driving through water courses, which, by so doing, results in environmental degradation
- New roads in RA2 areas will be open to motorized recreational use, and, conversely, new roads in RA1 areas will be closed to motorized use, until and unless a later determination indicates otherwise.
- Access in Access Management Areas and Vehicular Hunting Closures (VAHC) is as per the Wildlife Act Regulations.
- Snowmobile use will avoid damaging forest plantations
- Ensure management direction is applied consistently to both commercial and public recreation.
- Guide the development of new commercial recreation opportunities on Crown land within the planning area
- Provincial Crown land will not be set aside in the plan area for the purposes of establishing a route for the Trans-Canada Trail.
- In applying Resource objectives 7.1.1 and 7.1.2 the following factors must be considered:
 - recreation tenures and permits, including access for guide-outfitting, will be consistent with the objectives
 - industrial access (including that needed for forestry, subsurface resource exploration and development, agriculture/ranching, and trapping) is not constrained by these objectives
- Development of public and commercial recreational facilities and aerial recreational access will be guided by Resource objectives in Chapter B.9.0, B.10.0 and the designations in Table B.7.1.1

Table B.7.1.1 Recreation designations for development and aerial access

Landscape Unit	Snowfree (Summer)		Snowbound (Winter)	
	<i>Intensity / Development</i>	<i>Aerial Access</i>	<i>Intensity / Development</i>	<i>Aerial Access</i>
LU 14	RM1	RH1	RM1	RH1
LU 15	RM1 RM2 may be permitted for a limited number of sites, subject to conservation	RH1	RM1 RM2 may be permitted for limited number of sites subject to conservation	RH1

Landscape Unit	Snowfree (Summer)		Snowbound (Winter)	
	<i>Intensity / Development</i>	<i>Aerial Access</i>	<i>Intensity / Development</i>	<i>Aerial Access</i>
	objectives of the SRMMP		objectives of the SRMMP	
LU 16	RM1	RH1	RM2	RH1
LU 17	RM1	RH1	RM2	RH1
LU 18	RM1	RH1	RM1	RH1
LU 23	RM1 RM2 for formal or informal structures authorized by the appropriate agency prior to January 1, 2003	RH1	RM1 RM2 may be permitted for a limited number of sites subject to conservation objectives of the SRMMP	RH1
LU 24	RM3	RH2 with specific landing sites to be identified consistent with SRMMP objectives	RM3	RH2 with specific identified landing sites (refer to Map B.7.1.2)
LU 25	RM2	RH2 with specific landing sites to be identified consistent with SRMMP objectives	RM2	RH2 with specific landing sites to be identified consistent with SRMMP objectives
LU 26	RM1 RM2 below 5000 feet may be permitted for limited number of sites subject to conservation objectives of the SRMMP	RH1	RM1 RM2 below 5000 feet may be permitted for limited number of sites subject to conservation objectives of the SRMMP	RH1 with potential RH2 adjacent to LU24 for specific landing sites (refer to Map B.7.1.1)
LU 27	RM1 in Norboe Creek drainage; RM2 below 5000 feet may be permitted for limited number of	RH1	RM1 in Norboe Creek drainage; RM2 below 5000 feet may be permitted for limited number of	RH1

Landscape Unit	Snowfree (Summer)		Snowbound (Winter)	
	<i>Intensity / Development</i>	<i>Aerial Access</i>	<i>Intensity / Development</i>	<i>Aerial Access</i>
	sites subject to conservation objectives of the SRMMP		sites subject to conservation objectives of the SRMMP	

Resource objectives:

Objective 7.1.1

Manage recreation access in the plan area according to the requirements of Maps B.7.1.1, E.7.1.1, B.7.1.2 and E.7.1.2:

- Where snowfree (summer) ground-based motorized recreation is permitted, such use is restricted to hardened, stable surfaces. No off-road (overland) snowfree motorized recreation is permitted anywhere within the plan area.
- Snowfree (summer) ground-based motorized recreation is not permitted in Alpine Non-Motorized areas except on RA2 roads. Alpine areas can be defined as BEC zones: Alpine, ESSFdkp, ESSFwmp and ESSFwmp1.
- Access to informal, unmanaged locations (water access sites, campsites, road pullouts) where snowfree (summer) ground-based motorized recreation has occurred prior to September 1, 2003, and which are adjacent to RA2 roads in RA1 areas, may continue. Only hardened surfaces may be used in this manner.
- On Maps E.7.1.1 (snowfree) and E.7.1.2 (snowbound), roads designated as Other Roads (i.e. not highways or those designated as RA1 or RA2 roads) are open to motorized use, subject to area-specific restrictions, in RA2 areas, and closed to motorized use in RA1 areas.
- On Map E.7.1.1 (snowfree), roads designated as Other Roads (i.e. those not designated as RA1 or RA2 roads) in area designation “RA 2.1 Motorized (Interim until detailed review)” are open for motorized use until further study is undertaken which may result in specific designations being applied.
- On Map B.7.1.2 (snowbound), where RA2 roads in RA1 areas (e.g. portions of the Elk Valley Forest Service Road) have been ploughed, motorized access is permitted within 50m on either side of the road, or on specified trail corridors (e.g. trail access to snowmobile cabin north of Elkford). This use is strictly for travel along the RA2 corridor or specified trail corridor, in order to access motorized areas.
- Ground-based motorized recreation on frozen water bodies is permitted within areas designated as RA2.
- Summer motorized water recreation is permitted in accordance with existing regulations established under federal Navigable Waters Act, the British Columbia Wildlife Act and the British Columbia Fisheries Act.

Objective 7.1.2

In the plan area, allow motorized access required to maintain or develop approved trails and facilities associated with a recreation tenure or permit, within a zone designated as non-motorized by this plan (see Maps B.7.1.1 and B.7.1.2), only when authorized by the appropriate approval agency.

Objective 7.1.3

Manage access to Ministry of Forests Recreation Sites and Trails within the plan area as provided in Table B.7.1.2.

Where a Ministry of Forests Recreation Site or BCFS Recreation Trail (as listed in Table B.7.1.2) is located within an RA1 (non-motorized) area but is currently managed for motorized accessibility, such access may continue subject to motorized access to the site or trail occurring on the existing hardened surface used to access the site, or trail.

Table B.7.1.2: BC Forest Service Recreation Sites and Trails

Project Name	Type	Size Ha.	Length km.	Objectives
40 Mile Camp/Bull River	Site	4.0		Provide a riverside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping and picnicking.
Aldridge Creek West	Site	1.0		Provide a riverside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, picnicking and equestrian use.
Baldy Lake Trail	Trail	8.0	4.9	Provide a forested/subalpine, semi-primitive non-motorized recreation experience. Maintain the trail; conserve the adjacent vegetation. Provide opportunities for hiking, viewing, equestrian use and primitive camping.
Boivin Creek Trail	Trail	7.0		Provide a forested, semi-primitive non-motorized recreation experience. Maintain the trails and day use shelters; conserve adjacent vegetation. Provide opportunities for cross country skiing, hiking, mountain biking and equestrian uses. Provide non-motorized recreation access on designated trails except for trail maintenance, grooming or track setting activities.
Fairy Creek Trail	Trail	6.0	2.9	Provide a forested, semi-primitive non-motorized recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking and viewing.
Forsyth/Quarrie	Site	16.0		Provide a forested /creekside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, picnicking, hiking, mountain biking and equestrian use.
Frozen Lake	Site	1.0		Provide a lakeshore, semi-primitive motorized recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use, picnicking and boat launching.
Hartley / Sulphur Trail	Trail	256.0	30.0	Provide a forested, roaded recreation experience. Locate seasonal snowmobile trails within natural openings and on existing out of service roads and trails. Maintain winter trails; conserve adjacent vegetation. Provide opportunities for snowmobile access, snowmobiling and viewing.

Project Name	Type	Size Ha.	Length km.	Objectives
Hartley Lake	Site	18.0		Provide a lakeside, roaded recreation experience. Maintain a day use site; conserve the shoreline and natural vegetation. Provide opportunities for day use, picnicking and boat launching.
Hornaday Pass Trail	Trail		14.0	Provide a forested, semi-primitive non-motorized recreation experience. Maintain as a heritage trail; conserve adjacent vegetation. Provide opportunities for hiking, viewing, mountain biking, equestrian use and primitive camping.
Howell Creek	Site	1.0		Provide a creekside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Krivinsky Farm	Site	30.0		
Lower Harvey Creek	Site	3.0		Provide a creekside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Matevic Trail	Trail	31.0	15.7	Provide a forested, rural recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking, viewing and mountain biking.
Mountain Walk Trail	Trail	14.0	6.4	Provide a forested, semi-primitive non- motorized recreation experience. Maintain the trail; conserve the adjacent vegetation. Provide opportunities for hiking and day use.
Mt Fernie Trail	Trail	8.0	4.1	Provide a forested/subalpine, rural recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking, viewing, mountain biking equestrian and all terrain vehicle use on the lower portion of the trail. Provide opportunities for hiking and viewing on the upper portion of the trail.
Narboe Creek	Site	4.0		Provide a forested, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Pollock Creek	Site	1.0		Provide a creek side, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Proctor Lake	Site	8.0		Provide a lakeshore, semi-primitive motorized recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use, picnicking and boat launching.
Ram Cabin Pass	Site	.25		Provide a forested, semi primitive motorized recreation experience. Provide and maintain a shelter; conserve the natural vegetation. Provide opportunities for snowmobiling, snowmobile assisted skiing and snowboarding and hut accommodations during the winter season.
Riverside	Site	1.0		Provide a forested, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping and picnicking.
Sage Creek	Site	12.0		Provide a creekside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Snowshoe Lake Trail	Trail	2.0	2.1	Provide a forested/lakeside, semi-primitive non-motorized recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking, day use and primitive camping.
Sulphur Creek	Site	1.0		Provide a creekside, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping and picnicking.
Three Sisters Trail	Trail	18.0	9.0	Provide a subalpine, semi-primitive non-motorized recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking and viewing.

Project Name	Type	Size Ha.	Length km.	Objectives
Trail Seven	Trail		6.2	Provide motorized recreation trails. Maintain the trail; conserve adjacent vegetation.
Tobermory	Site	1.0		Provide a forested, roaded recreation experience. Maintain a campsite and cabin; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Upper Elk River	Site	33.0		Provide a creekside meadow, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Upper Harvey Creek	Site	1.0		Provide a forested, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping, day use and picnicking.
Weary Creek	Site	8.0		Provide a riverside side, roaded recreation experience. Maintain a campsite; conserve the shoreline and natural vegetation. Provide opportunities for camping and picnicking.
Wigwam Lookout Trail	Trail	6.0	5.8	Provide a forested, semi-primitive motorized recreation experience. Maintain the trail; conserve adjacent vegetation. Provide opportunities for hiking, viewing, mountain biking and all terrain vehicle access.

Best management practices:

- *Interim Wildlife Guidelines for Commercial Backcountry Recreation in British Columbia (MWLAP, 2002)*
- *Recreation Management Objectives for the Elk Valley, Draft Report (Beardmore and Kaegi, Future Legacy Consulting Group, Report Commissioned by the Ministry of Sustainable Resource Management, 2002)* – where appropriate

Economic benefits and opportunities:

- Increased revenues and profitability for the local recreation service sector
- Establishment of new recreation service businesses
- Commercial recreation opportunities

Measures of success:

- Active participation in the delivery of recreation access Resource objectives by community and recreation organizations
- Recreation activities occurring within defined carrying-capacity thresholds where available
- Increased levels of cooperation between the various recreational interests and environmental organizations
- Acceptable levels of impact on conservation values

Maps:








B.7.1.1 Recreation Access - Snowfree
B.7.1.2 Recreation Access - Snowbound
E.7.1.1 Recreation Access - Snowfree
E.7.1.2 Recreation Access - Snowbound

Southern Rocky Mountain Management Plan


Map B.7.1.1 Recreation Access - Snowfree

Legend

Summer (Snowfree) Area Designations

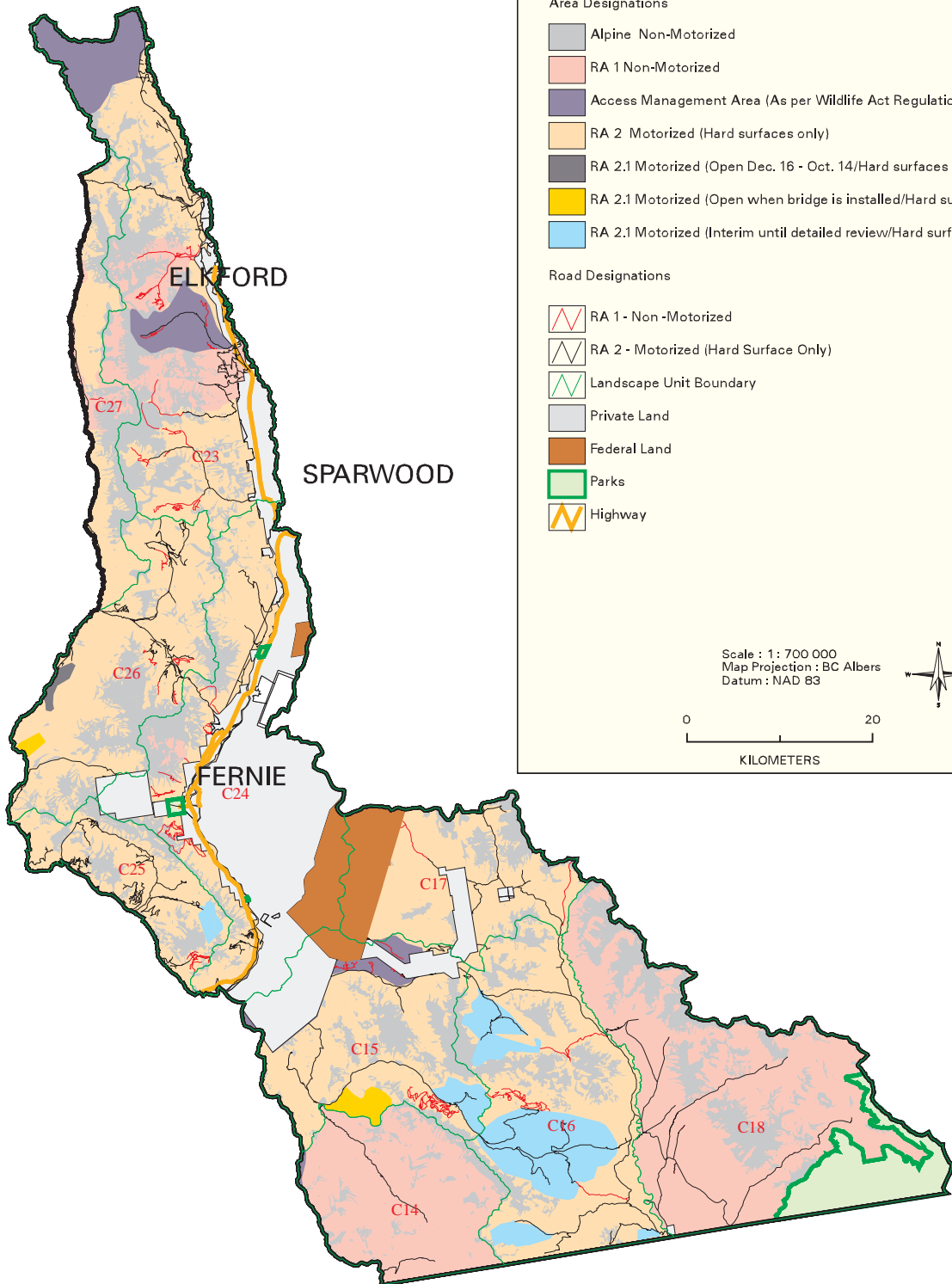
-  Alpine Non-Motorized
-  RA 1 Non-Motorized
-  Access Management Area (As per Wildlife Act Regulations)
-  RA 2 Motorized (Hard surfaces only)
-  RA 2.1 Motorized (Open Dec. 16 - Oct. 14/Hard surfaces only)
-  RA 2.1 Motorized (Open when bridge is installed/Hard surfaces only)
-  RA 2.1 Motorized (Interim until detailed review/Hard surfaces only)

Road Designations

-  RA 1 - Non-Motorized
-  RA 2 - Motorized (Hard Surface Only)
-  Landscape Unit Boundary
-  Private Land
-  Federal Land
-  Parks
-  Highway

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Hard Surfaces Only:

- Cross-country and Alpine use of Off-Highway Vehicles is prohibited.

VAHC:

- There are Vehicular Hunting Closures (Section 108, Wildlife Act) within the SRMMP area that may prohibit the use of a motorized vehicle for the purpose of hunting to protect and/or manage wildlife resources. Please refer to the Hunting Regulations for locations and further information on these closures.

Ministry of Forests Recreation Sites and Trails exist in the SRMMP area
Please refer to Table B.7.1.2 in Section B7.1 of the SRMMP for direction

Southern Rocky Mountain Management Plan

Map B.7.1.2 Recreation Access - Snowbound

Legend

Winter (Snowbound) Area Designations

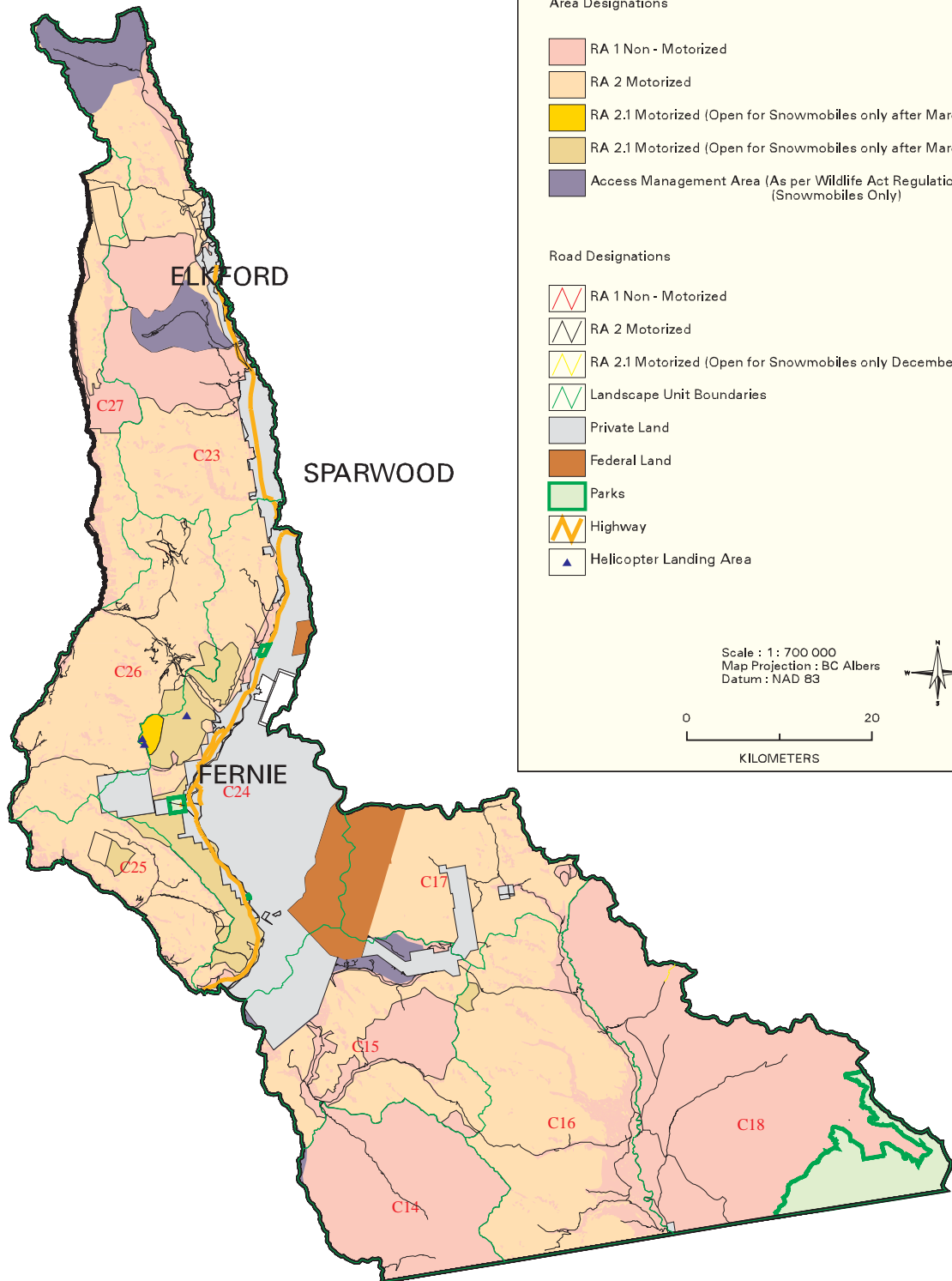
- RA 1 Non - Motorized
- RA 2 Motorized
- RA 2.1 Motorized (Open for Snowmobiles only after March 1)
- RA 2.1 Motorized (Open for Snowmobiles only after March 15)
- Access Management Area (As per Wildlife Act Regulations)
(Snowmobiles Only)

Road Designations

- RA 1 Non - Motorized
- RA 2 Motorized
- RA 2.1 Motorized (Open for Snowmobiles only December 1 until snowfree)
- Landscape Unit Boundaries
- Private Land
- Federal Land
- Parks
- Highway
- Helicopter Landing Area

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Ministry of Forests Recreation Sites and Trails exist in the SRMMP area
Please refer to Table B.7.1.2 in Section B.7.1 of the SRMMP for direction.

VAHC:

- There are Vehicular Hunting Closures (Section 108, Wildlife Act) within the SRMMP area that may prohibit the use of a motorized vehicle for the purpose of hunting to protect and/or manage wildlife resources.
Please refer to the Hunting Regulations for locations and further information on these closures.

B.7.2 Resident Hunting and Angling

Resident hunting and angling have been important historical activities throughout the Kootenay region and continue to remain popular recreational pursuits in the East Kootenay including the plan area. Hunters and anglers, through their clubs and organizations, contribute significantly to conservation of the fish and wildlife resource. Hunting and fishing are legitimate rights formally recognized by the BC government, and their regulations, including restricted areas, are set annually by Ministry of Water, Land and Air Protection.

Issues:

- There is a concern among local resident hunters that hunting opportunities may diminish.
- Viable ungulate, wide-ranging carnivore and fish populations and their habitats need to be maintained
- Competing demands for the landbase, including among recreational users, are impacting the ability to have a quality hunting and fishing experience
- There is competition between resident hunters and guide outfitter businesses for the same resources
- Levels of angling pressure on a limited fishery are increasing
- The quality of angling experience may be diminishing as a result of increased fishing pressure
- There have been increasing conflicts among resident anglers, non-resident anglers and angling guides
- There is a need for designation of classified waters in the plan area
- Carrying capacity limits and cumulative impacts resulting from other resource uses are not known
- The rapid increase in non-consumptive recreational use may result in increased conflicts between hunters and non-hunters

Intent:

- Ensure that hunting and fishing opportunities are perpetuated subject to all pertinent regulations
- Maintain resident hunting and fishing opportunities within the plan area
- Access for hunting and fishing activities will be consistent with the Section B.7.1: Recreation Access and Development.

Economic benefits and opportunities:

- Business associated with livestock, i.e. horse sales, feed, tack, farriers and veterinarians
- Vehicle, ATV, boat, and trailer sales, fuel, maintenance and repairs
- Provisions, i.e. food, clothing, hunting and fishing supplies and accessories
- Meat and fish processing
- Taxidermy

Measures of success:

- Diversified and quality hunting and fishing opportunities remain available.
- The opportunities to view or harvest wildlife and fish remain available.

B.8.0 TOURISM

B.8.1 General Tourism

The plan area and its vicinity support a diverse tourism sector ranging from front-country resorts and hospitality services to a variety of wilderness-related products. Wilderness-related products fall under three general sectors: hunting guide-outfitting, angling guiding and adventure travel.

The area's exceptional mountain setting, and its proximity to major markets and an international gateway, are the primary ingredients to the rapid growth of the tourism sector in recent years. This trend offers significant economic opportunities, but must be managed to ensure that the attributes that make the area appealing are not compromised.

Issues:

- There is increasing recreational activity in the backcountry resulting in increasing levels of conflict among users and between users and industrial activity
- Rapid growth of the City of Fernie and surrounding area (in particular, recreational residential properties) is placing additional pressure on the backcountry
- Sustaining wildlife, fisheries and wilderness values is essential to maintaining and growing the tourism industry
- Viability and prosperity of the existing tourism sectors needs to be maintained while managing increasing demands for new business opportunities in this sector
- The requirements of the various types of tourism businesses need to be integrated and balanced
- Recreation carrying capacity is difficult to measure and implement; specific carrying capacity limits and cumulative impacts have not yet been defined
- Education, monitoring and enforcement tools are needed

Intent:

- Maintain and strengthen a diverse tourism sector
- Increase length of stay and yield per visitor unit
- Development of tourism facilities, and tourist recreational access, will be guided by Resource objectives in Chapter B.9.0, B.10.0, and Section B.7.1
- Ensure the development of a healthy and diverse tourism industry by sustaining key conservation values and ensuring that existing and new tourism development does not compromise these values
- Reduce the level of conflict between the tourism sector and the public recreation and environmental sectors by ensuring tourism operations are managed in an environmentally appropriate manner and opportunities for tourism and public recreation activities are equitable
- Integrate and balance the needs of the various tourism sectors and ensure new tourism development is compatible with existing tourism activities
- Scenic wilderness and visual resources will be managed in consideration of their importance to the tourism sector (see Chapter B.11.0)
- Cultural heritage resources will be managed to respect the cultural and spiritual values of the First Nations people and to ensure that the tourism-related economic opportunities of these values are retained for the benefit of the First Nations people
- Manage tourism within acceptable carrying-capacity limits using best available information
- Backcountry commercial recreation tenures and tourism-related development within the plan area will be consistent with the Section B.7.1: Recreation Access and Development.

Best management practices:

- *Interim Wildlife Guidelines for Commercial Backcountry Recreation in B.C. (MWLAP, 2002)*

Economic benefits and opportunities:

- New tourism businesses and product lines
- Expansion of existing tourism businesses and product lines
- Increased community economic diversity and strength
- Long-term, sustained economic benefits from the growth of this sector will be realized by managing the resources and opportunities for:
 - increased yield per unit resulting from a high quality of experience
 - enhanced profile for the area resulting in increase in growth of service industries

Measures of success:

- Increased contribution of the tourism sector to area and provincial economy
- Increased tourism sector investment in the area
- Reduced levels of conflict between the tourism sector and recreation/environment sectors
- Growth in local service industry

B.8.2 Adventure Travel

The adventure travel sector encompasses a wide range of guided and independent tourism products including: ski-touring, alpine skiing, snowmobiling and All Terrain Vehicles (ATV) touring, horseback riding, hiking, mountain biking, back-country camping, mountaineering, wildlife viewing, and rafting.

With some parts of the plan area receiving an average snowfall of 10 metres per year, winter-related adventure travel has seen the most dramatic growth for the tourism industry in recent years, particularly in the Fernie area.

Issues:

- Rapid growth of the adventure travel sector is causing increased pressure on the wilderness resource
- New entrants to the sector may lack the experience, resources, and knowledge required to be successful
- There is a perception that businesses in this sector will displace residents' recreational use
- There is concern about the potential for adventure tourism activities to constrain existing traditional resource industries
- Overlapping tenures may place too much pressure on natural resources and reduce sector viability
- Overlapping activities within the sector may not be compatible
- There is an increasing level of conflict between the adventure travel sector and other tourism businesses, environmental groups and public recreationists
- Carrying capacity limits and cumulative impacts resulting from other resource uses are not known

Intent:

- Foster the development of the adventure travel sector to benefit and diversify the local communities
- Increase length of stay and yield per visitor unit
- Manage scenic values to support the adventure travel sector (See Chapter B.11.0)
- Manage wildlife and fishery values to ensure viable healthy populations that support the adventure travel sector (see Chapter B.9.0)

- Reduce the level of conflict between the adventure travel sector and other sectors of the tourism industry
- Reduce the level of conflict between the adventure travel sector and the public recreation and environmental sectors
- Ensure the viability of adventure travel businesses in the plan area
- Backcountry Commercial Recreation tenures and tourism-related development within the plan area will be consistent with the Section B.7.1: Recreation Access and Development.
- Discourage helicopter-dependent commercial recreation tenures within the plan area (see Section B.8.1)

Best management practices:

- *Interim Wildlife Guidelines for Commercial Backcountry Recreation in British Columbia* (MWLAP, 2002)

Economic benefits and opportunities:

- Rapid development of a diversity of new businesses in the sector
- Expansion of established adventure travel businesses
- Adventure travel motion picture films in the plan area
- Development of higher-end amenity services benefiting both residents and visitors
- Development of an expanded service industry to support the adventure travel sector

Measures of success:

- Increased contribution of adventure travel to area and provincial economy
- Increased sector investment in the area
- Increased levels of cooperation between the sector and recreation/environment sectors

B.8.3 Guide-outfitting

In the East Kootenays, big game guide-outfitting has been a traditional occupation with a history dating back to the late 1800's (Appendix 24.4). There are currently seven mutually-exclusive guide-outfitting tenures within the plan area. These tenures cover most of the planning area (Map B.8.3.1).

Issues:

- Decreases in habitat availability and suitability adversely impact wildlife populations
- The viability of the industry is dependent on the health of the wildlife and their associated habitats
- Increased access to, and use of, the backcountry have:
 - increased wildlife harassment and displacement
 - affected harvesting success
 - reduced the quality of the guided hunting experience
 - reduced the opportunity to provide a remote wilderness experience
- Overlapping tenures for commercial recreation activities may not be compatible with existing guide-outfitting operations
- There are resource-use conflicts between resident hunters and guide-outfitters
- Carrying capacity limits and cumulative impacts resulting from other resource uses are not known
- Introduction of diseases from livestock and domestic pack animals may adversely impact ungulate species

Southern Rocky Mountain Management Plan
Map B.8.3.1 Guide-Outfitter Territories

Legend

-  Guide Outfitter Territories
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Intent:

- Maintain the resource base to provide for an economically-viable guide-outfitting industry
- With the exception of areas closed to hunting under the *Wildlife Act* or other regulations, continue the opportunity for big game guided hunting in the plan area
- Manage the guide-outfitting industry in a manner that sustains wildlife populations, subject to all pertinent regulations
- The guide-outfitting industry will comply with Section B.7.1: Recreation Access and Development.
- Eliminate potential for parasite and disease transfer from domestic livestock to wildlife

Resource objectives:

Objective 8.3.1

Maintain the distribution of guide-outfitting territories in the plan area as per Map B.8.3.1. Expansion of existing territories into, or the establishment of new territories in, Landscape Unit 23, or in that portion of Landscape Unit 24 west of the Elk River, is not permitted.

Economic benefits and opportunities:

- Business associated with livestock, i.e. horse sales, feed, tack, farriers and veterinarians
- Vehicle, ATV, boat, and trailer sales, fuel, maintenance and repairs
- Provisions and accommodations
- Meat and fish processing
- Taxidermy
- Revenue for province through license and tenure fees
- Wildlife viewing.

Measures of success:

- The industry continues to provide a quality and successful experience to clients
- The industry remains stable and economically viable
- The wildlife attributes and characteristics of the land necessary to sustain the industry are maintained
- The industry continues to provide economic benefits to the Provincial treasury and the local economy
- The industry continues to provide employment opportunities

Maps:

B.8.3.1 Guide-Outfitter Territories

B.8.4 Angling Guiding

Guided angling has experienced a rapid growth in popularity and numbers particularly within the Bull and Elk River systems which support significant populations of species considered to be high value sport fish for angling. A Provincial review process of “Angling Guide Management System and Classified Waters” is being conducted.

Issues:

- Levels of angling pressure on a limited fishery are increasing
- The quality of angling experience may be diminishing as a result of increased fishing pressure with potential impacts on the tourist industry

- There have been increasing conflicts among resident anglers, non-resident anglers and angling guides
- There are limited regulatory tools to control the number of angling-guides operating in a given area
- There is increasing competition between resident B.C. guide anglers and angling guides residing out of province
- Carrying capacity limits and cumulative impacts resulting from other resource uses are not known
- There is a need for an angling guide management strategy and designation of classified waters in the plan area
- Post-hooking mortality is associated with intensive catch and release angling pressure
- Key industry species, west-slope cutthroat trout and bull trout, are blue-listed in BC. Bull trout is also listed as endangered in the neighbouring American jurisdictions.
- There is no legislation or regulation to manage location and maintenance of access/egress sites

Intent:

- Manage aquatic and terrestrial habitat to ensure a diverse, healthy and self-sustaining fishery
- Balance the demand among resident anglers, non-resident anglers and angling guides
- Maintain a high quality guided fishing experience
- Manage the angling guide sector in a manner that contributes to sustaining healthy fish populations and a viable angling-guide industry
- Manage access and egress points to minimize damage to riparian systems
- Recreation access direction, as provided in Section B.7.1: Recreation Access and Development, will apply to angling guides

Economic benefits and opportunities:

- Continuation of a high-value fishery
- Economically strong and dynamic guide businesses
- Guide supplies
- Client accommodations and travel
- Fish processing and taxidermy

Measures of success:

- The industry continues to provide a quality and successful experience to clients
- Angling-guide businesses are more economically viable and generate stable employment
- Reduced levels of conflict between angling-guides and resident anglers

B.9.0 CONSERVATION

B.9.1 Riparian

Riparian ecosystems typically exemplify a rich and diverse vegetative mosaic reflecting the influence of available surface water such as rivers, streams, bogs, seeps, wet meadows, swamps and lakes (Appendix 24.4). Riparian habitats are extremely important to the maintenance of healthy aquatic and terrestrial ecosystems, which in turn influence community health and the local economy. The inherently high productivity and diverse structural and functional attributes of riparian ecosystems contribute to the movement, foraging and reproductive requirements for many indigenous and migratory species of invertebrates, reptiles, amphibians, mammals and birds.

Issues:

- International water values need to be retained
- Water quality and quantity in community and domestic watersheds are influenced by riparian condition
- Increasing industrial, commercial and public access may significantly impact riparian areas
- Riparian areas may be negatively impacted as a result of the following activities:
 - Industrial, commercial recreation and public access
 - Livestock grazing
 - Forest health management
 - Hydro-electric development
 - Recreation development and use
- Riparian conservation plans are lacking
- The regional lake classification has not been completed
- Wetland seeps are extremely important for wildlife and often contain unique plant communities
- There are potential impacts of private land management on adjacent and downstream riparian values
- No regional monitoring program for riparian areas exists

Intent:

- Maintain riparian habitat in a proper functioning condition (see Best management practices)
- Manage recreational access and development (see Section B.7.1) in order to maintain riparian habitat effectiveness and proper functioning condition
- Employ management principles that maintain habitat effectiveness including:
 - riparian habitat integrity and continuity
 - terrain, bank and channel stability
 - water quality, quantity and timing of flow
 - the natural distribution, movement, foraging and reproduction opportunities of wildlife species and populations that depend on riparian ecosystems
 - structural attributes and species composition which contribute to landscape-level habitat diversity and proper functioning condition characteristics (Appendix 24.4)
- Manage riparian ecosystems for late succession deciduous, coarse woody debris attributes and coniferous old growth, through the application of biodiversity management objectives (Appendix 24.4)
- Livestock use of riparian areas will be in compliance with existing legislation and regulations

Resource objectives:

Objective 9.1.1

Riparian Management Zones and Riparian Reserve Zones are assigned for rivers, streams, lakes and wetlands in the plan area as per the *Forest Practices Code* and the *Forest and Range Practices Act* and associated regulations.

Objective 9.1.2

Within the Flathead Enhanced Riparian Zones in the plan area (Map B.9.1.1):

- **Maintain existing locations of roads and river crossings**
- **New road construction, except for temporary roads, skid trails or access trails necessary for approved resource development and extraction, is not permitted**
- **New river crossings are limited to temporary bridges with no more than two temporary bridges at any one time**
- **Roads, skid trails or access trails constructed after July 1, 2003 and no longer needed will be fully reclaimed**
- **New facility construction or expansion of existing facilities is not permitted**

Objective 9.1.3

Within Riparian Management Zones for rivers, streams, lakes and wetlands in the plan area:

- **River and stream crossings will be kept to the minimum required for resource development and extraction**
- **New or expanded facility construction is not permitted**
- **Forest and range management activities will be consistent with existing legislation and regulations for riparian management**







Objective 9.1.4

Within Riparian Reserve Zones for rivers, streams, lakes and wetlands in the plan area:

- **New road construction except for access to required river and stream crossings and temporary trails required for forest health or riparian habitat and stream enhancement is not permitted**
- **River and stream crossings will be kept to the minimum required for resource development and extraction**
- **Roads, skid trails or access trails constructed after July 1, 2003 and no longer needed will be fully reclaimed**
- **New or expanded facility construction is not permitted**
- **Forest and range management activities will be consistent with existing legislation and regulations for riparian management**

Southern Rocky Mountain Management Plan
Map B.9.1.1 Flathead Enhanced Riparian Zones

Legend

-  Flathead Enhanced Riparian Zones
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Objective 9.1.5

Until replaced by enhanced riparian zone mapping, backcountry river corridors within the plan area are defined as 500 metres either side of the Wigwam River, 500 metres east of the Bull River and 500 metres west of the Elk River. Within the backcountry river corridors:

- Existing roads and river crossings locations will be maintained
- New road construction except for temporary roads, skid trails or access trails necessary for approved resource development and extraction are not permitted
- New river crossings are limited to temporary bridges with no more than two temporary bridges at any one time
- Roads, skid trails or access trails constructed after July 1, 2003 and no longer needed will be fully reclaimed
- New or expanded facility construction is not permitted

Best management practices:

- *Riparian Management Area Guidebook (MOF, December 1995)*
- Temporary river-crossing sites on the main stem of the Bull, Elk, Flathead and Wigwam rivers will be designed such that the use of those sites as river fords is discouraged.

Economic benefits and opportunities:

- Resident and guided fishing
- Healthy ecosystems and communities
- Resident hunting and viewing
- Big game guide-outfitting business

Measures of success:

- The viability of riparian ecosystems is maintained
- Proper functioning condition of riparian habitat is sustained
- Compliance and respect for access management plans generated through public and government processes is maintained
- Functional and diversified wildlife species and populations exist within riparian zones
- Reduced riparian use conflicts and an increased degree of certainty for environmental, social, industrial and commercial interests

Maps:

B.9.1.1 Flathead Enhanced Riparian Zones

E.9.1.1 Flathead Enhanced Riparian Zones

B.9.2 Old Growth and Mature Seral Management

Old growth and mature seral forests are important to maintaining biodiversity values.

Issues:

- Old growth and mature seral forests in the plan area are in limited supply
- There is a need for recruitment of younger stands to meet old growth and mature seral targets
- All site series may not be adequately represented in old and mature forests

Intent:

- Maintain representative old growth forest and mature seral forest that contribute to sustaining biodiversity values, in particular, old growth dependent species
- Encourage livestock to use areas other than OGMA's and MMAs (see objective 5.0.4)

Resource objectives:**Objective 9.2.1**

Manage the plan area for biodiversity emphasis as follows:

LU	BEC zone	Biodiversity Emphasis		LU	BEC	Biodiversity Emphasis
C14	ESSF	High		C24	ICH	High
C14	MS	High		C24	IDF	High
C15	ICH	High		C24	ESSF	High
C15	IDF	High		C24	MS	High
C15	MS	High		C25	ICH	Intermediate
C15	ESSF	Intermediate		C25	IDF	Intermediate
C16	ESSF	Intermediate		C25	ESSF	Intermediate
C16	MS	Intermediate		C25	MS	Intermediate
C17	ESSF	Intermediate		C26	ICH	Intermediate
C17	MS	Intermediate		C26	IDF	Intermediate
C18	ESSF	Intermediate		C26	ESSF	Intermediate
C18	MS	Intermediate		C26	MS	Intermediate
C23	ESSF	High		C27	ESSF	Intermediate
C23	MS	Intermediate		C27	MS	Intermediate

BEC: Biogeoclimatic Ecosystem Classification

ICH: Interior Cedar Hemlock

MS: Montane Spruce

ESSF: Englemann Spruce-Subalpine Fir

IDF: Interior Douglas Fir

Objective 9.2.2

Manage within the plan area for mature forest seral targets as follows:

LU	BEC Subzone and variant	Mature Age Definition		LU	BEC	Mature Age Definition
C14	ESSFdk	120 years		C15	MSdk	100 years
C14	MSdk	100 years		C18	MSdk	100 years
C15	ICHmk1	100 years		C23	ESSFdk	120 years

ESSFdk: Dry Cool Englemann Spruce-Subalpine Fir subzone

ICHmk1: Kootenay Moist Cool Interior Cedar-Hemlock variant

MSdk: Dry Cool Montane Spruce subzone

Objective 9.2.3

Old Growth Management Areas (OGMA's) and Mature Management Areas (MMAs) are established within the plan area as per Map B.9.2.1.

Objective 9.2.4

Facility development in the plan area within OGMA's or MMAs, with the exception of permitted activities for mineral, coal, or oil and gas exploration, development and production, is not permitted.

Objective 9.2.5

Road construction in the plan area is permitted through OGMA's only where necessary for resource development and only where there is not an economically and environmentally reasonable alternative access route as determined by a qualified registered professional. Roads within OGMA's constructed after July 1, 2003, that are no longer needed, will be fully reclaimed.

Objective 9.2.6

Timber harvesting in the plan area may be permitted in OGMA's, for example selective removal of lodgepole pine, where it can be shown to contribute to the maintenance or development of old growth forest characteristics as determined and documented by a qualified registered professional.

Objective 9.2.7

Timber harvesting in the plan area is permitted in MMAs, for example selective removal of lodgepole pine, only where it can be shown that such harvesting will contribute to the maintenance of mature seral forest attributes as determined and documented by a qualified registered professional.

Objective 9.2.8

Timber harvesting in the plan area is permitted in OGMA's and MMAs where such harvesting is necessary for approved mineral, coal, or oil and gas exploration, development and production. Where such harvesting negates the value of an OGMA or MMA for meeting old growth or mature seral biodiversity objectives, then, based on old growth and mature attributes, as determined by a qualified registered professional, a suitable replacement OGMA or MMA will be identified and established.

Objective 9.2.9

Within the plan area, when an OGMA is damaged or destroyed by natural events (for example, fire, flood, insect infestation), the OGMA will be evaluated for its ability to continue to meet biodiversity objectives. If it is determined to still be suitable for meeting old growth biodiversity objectives, then it shall remain an OGMA. If it is no longer considered suitable for meeting biodiversity objectives, then, based on old growth attributes as determined by a qualified registered professional, a suitable replacement OGMA will be established to replace the lost OGMA.

Southern Rocky Mountain Management Plan
Map B.9.2.1 Old Growth Management Areas (OGMA)
and Mature Management Areas (MMA)

Legend

-  Old Growth Management Areas (OGMA)
-  Mature Management Areas (MMA)
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Highway



Best management practices:

- Where recruitment of OGMAs is required, consideration needs to be given to site series representation, rare site series, stand attributes, connectivity and other old growth-related resource values.

Economic benefits and opportunities:

- Provides land-use certainty for operators and investors
- Helps avert the need for protection-oriented, broadly-applied land-use designations which deter investment
- Helps in meeting the draft government commitment to sustainable resource management and avoiding high-profile boycotts of forest products
- Helps provide continuing employment in the forest sector
- Helps sustain fish and wildlife-based industries
- Supports tourism opportunities

Measures of success:

- A healthy forestry sector contributing to a diversified economy in the SRMMP area and surrounding areas
- Healthy ecosystems contributing to sustainable fish and wildlife populations
- No boycotts of forest products from this area

Maps:

B.9.2.1 Old Growth Management Areas and Mature Management Areas

E.9.2.1 Old Growth Management Areas and Mature Management Areas

B.9.3 Wildlife Tree Retention (WTR)

The importance of stand level biodiversity values has been recognized.

Intent:

Maintain stand level biodiversity values to maintain species habitats and biodiversity.

Resource objectives:

Objective 9.3.1

Wildlife tree retention will be maintained, by landscape unit (LU) and biogeoclimatic subzone (BEC), as per Table 9.3.1 below. The WTR target shall be met through:

- area in wildlife tree patches, or
 - basal area retained
- within the area under prescription.**

Table 9.3.1 Wildlife tree retention targets by LU and BEC

LU	BEC Zone	BEO	WTR Target (%)		LU	BEC	BEO	WTR Target (%)
C14	ESSF	H	0.2%		C24	ESSF	H	0.7%
C14	MS	H	3.9%		C24	ICH	H	0.4%
C15	ESSF	I	5.8%		C24	IDF	H	0.7%
C15	ICH	H	3.5%		C24	MS	H	0.5%
C15	IDF	H	4.3%		C25	ESSF	I	1.5%
C15	MS	H	2.9%		C25	ICH	I	4.9%
C16	ESSF	I	7.7%		C25	IDF	I	1.3%
C16	MS	I	4.9%		C25	MS	I	0.8%
C17	ESSF	I	1.6%		C26	ESSF	I	2.8%
C17	MS	I	5.5%		C26	ICH	I	1.5%
C18	ESSF	I	2.8%		C26	IDF	I	1.9%
C18	MS	I	7.0%		C26	MS	I	3.6%
C23	ESSF	H	0.8%		C27	ESSF	I	3.8%
C23	MS	I	6.4%		C27	MS	I	4.3%

BEC: Biogeoclimatic Ecosystem Classification

ICH: Interior Cedar Hemlock

MS: Montane Spruce

ESSF: Englemann Spruce-Subalpine Fir

IDF: Interior Douglas Fir

Best management practices:

- *Provincial Wildlife Tree Policy and Management Recommendations (MOF/MELP, Feb. 2000)*
- Retain deciduous trees, individual large diameter old trees or patches of forest habitat where species and structural diversity exist within the operable forest. Where patches are retained, patches larger than 0.3 ha have greater value for wildlife.

Economic benefits and opportunities:

- Helps in meeting the draft government commitment to sustainable resource management and avoiding high-profile boycotts of forest products
- Helps sustain wildlife-based industry

Measures of success:

- A healthy forestry sector contributing to a diversified economy in the SRMMP area and surrounding areas
- Healthy ecosystems contributing to sustainable wildlife populations
- No boycotts of forest products from this area

Maps:

B.9.3.1 Biogeoclimatic Subzones (BEC)

E.9.3.1 Biogeoclimatic Subzones (BEC)

Southern Rocky Mountain Management Plan
Map B.9.3.1 Biogeoclimatic Subzones (BEC)

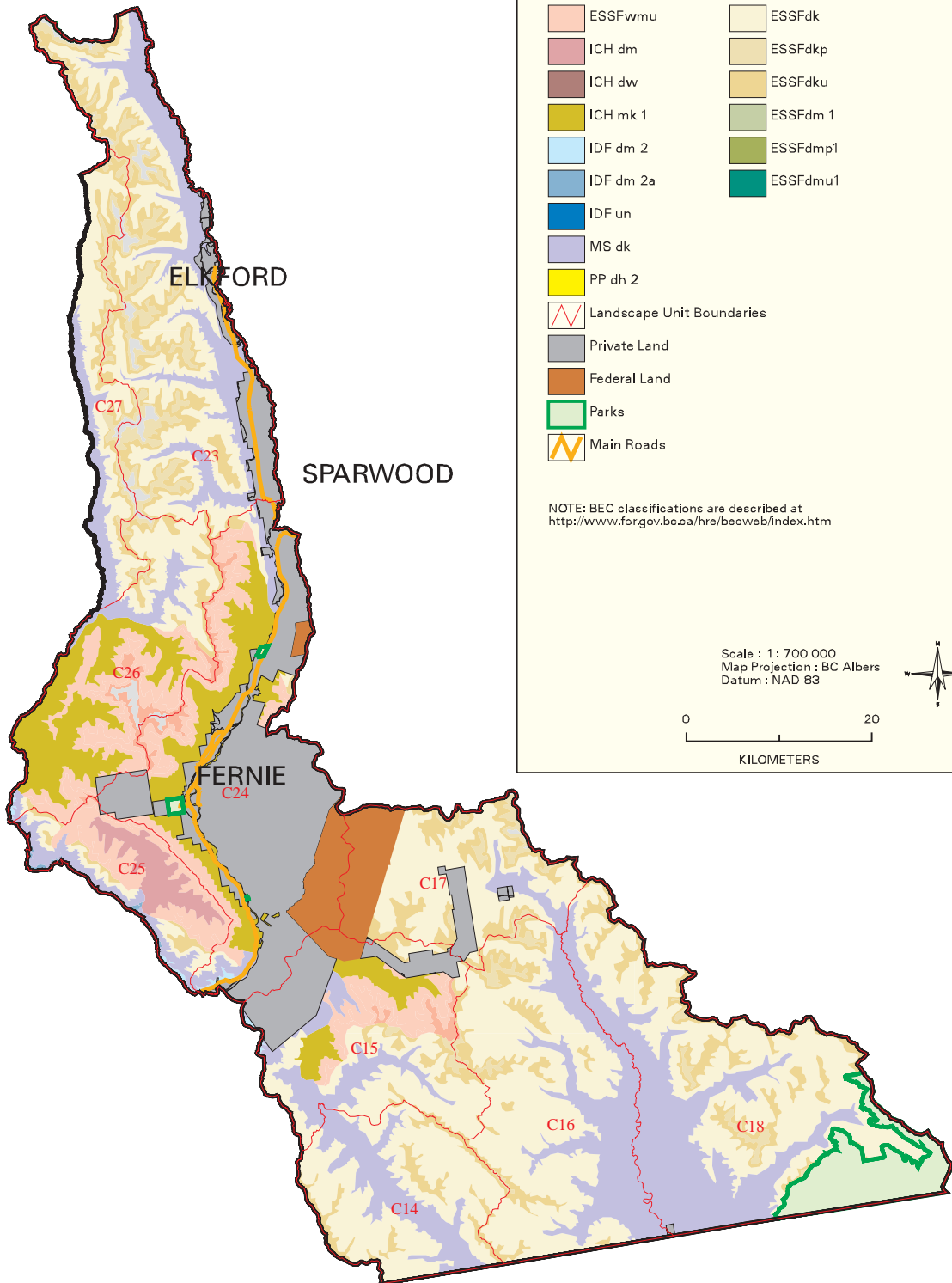
Legend

ESSFwmp	At un
ESSFwmu	ESSFdk
ICH dm	ESSFdkp
ICH dw	ESSFdku
ICH mk 1	ESSFdm 1
IDF dm 2	ESSFdmp1
IDF dm 2a	ESSFdmu1
IDF un	
MS dk	
PP dh 2	
Landscape Unit Boundaries	
Private Land	
Federal Land	
Parks	
Main Roads	

NOTE: BEC classifications are described at
<http://www.for.gov.bc.ca/hre/becweb/index.htm>

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.9.4 Wide-ranging Carnivores

The SRMMP area supports populations of eight species of large carnivores, namely black bear, grizzly bear, bobcat, lynx, cougar, coyote, wolf and wolverine. Fisher, martin, greater and least weasel and badger are also found in the area. Grizzly bear, the species with the highest international profile, exist in significantly higher numbers in the Flathead and Upper Elk River watersheds than in other areas in the interior of British Columbia (Appendix 24.4).

Issues:

- Habitat effectiveness benchmarks and suitability inventory are needed
- Proper functioning condition benchmarks are needed
- More and accurate carnivore population and carrying capacity inventories are needed
- Riparian ecosystems and habitat connectivity are integral to the health of wide-ranging carnivore populations
- Maintaining interconnected viable ecosystems, including adjacent World Heritage sites, and migratory wildlife species and populations has international implications
- Loss or rate of change of habitat and species requirements, including remote landscapes, impacts sustainability of wide-ranging carnivore populations
- Highway 3 and private land in the Elk valley present potential barriers to grizzly bear movement resulting in isolation of populations and adverse impacts to genetic exchange
- Provincial government wildlife population management strategies and regulations (Appendix 24.4) may compromise the intent of the habitat-based Resource objectives for wide-ranging carnivores
- Maintenance of wide-ranging carnivores is essential to the trapping industry, and is also important to the guide-outfitting industry

Intent:

- Increase habitat effectiveness and the opportunity for genetic dispersal, seasonal and daily movement, foraging and reproduction of wide-ranging carnivores at the landscape and stand level
- Maintain suitable habitat for, and sustainable populations of, wide-ranging carnivores
- Manage recreational access and development (see Section B.7.1) in order to reduce adverse impacts on wide-ranging carnivores
- Avoid displacement of wolves during the denning period (i.e. mid-April through mid-July)
- Maintain healthy riparian ecosystems (see Section B.9.1)
- Maintain old-growth and mature seral forest habitat (see Section B.9.2)
- Maintain habitat effectiveness of aquatic and terrestrial ecosystems by maintaining habitat connectivity (see Section B.9.9) and, in particular, core grizzly bear areas (Map B.9.4.1)
- Maintain movement opportunities for wide-ranging carnivores between the plan area and adjacent watersheds, Montana and Alberta including across Highway 3
- Enhance forage productivity and suitability of grizzly bear habitat, including huckleberry patches
- Resource development activities will be carried out in a manner that respects the habitat of wide-ranging carnivores, particularly species at risk
- Maintain remote wild-land areas to support wide-ranging carnivores
- Population management strategies and regulations should complement habitat objectives
- Maintain a balanced predator-prey relationship
- Minimize encounters between humans and wolverines and bears
- Augment the badger population through translocation projects
- Maintain coarse woody debris in known wide-ranging carnivore habitat

- Manage core grizzly bear areas (Map B.9.4.1) for high densities of grizzly bears to encourage emigration

Resource objectives:

Objective 9.4.1

Within core grizzly bear areas in the plan area (see Map B.9.4.1), the expansion of, or new, formal recreation or tourism-related structures:

- are not permitted in landscape units C14 and C18.
- are not permitted in landscape unit C23, except for specific designated sites consistent with Section B.7.1: Recreation Access and Development.
- are permitted in the remainder of the plan area where there is signed documentation by a registered professional biologist that the proposal does not adversely affect grizzly bear security.

Replacement or upgrading of existing recreation or tourism-related formal structures is permitted.

Best management practices:

- *Interim Wildlife Guidelines for Commercial Back-country Recreation in British Columbia* (MWLAP, 2002)
- *Identified Wildlife Management Strategy* (MOF, Volume 1, Feb. 1999)
- *Management of Grizzly Bears in British Columbia: A Review by an Independent Scientific Panel* (submitted to MWLAP, December, 2002)
- *A Future for the Grizzly: British Columbia Grizzly Bear Conservation Strategy* (MELP, June 1995)

Economic benefits and opportunities:

- Functional ecosystems
- Wildlife viewing
- Commercial photography
- Big game hunting
- Trapping
- National and international cooperation and financing

Measures of success:

- Functional and representative populations of carnivores continue to populate the plan area
- Habitats necessary to accommodate the life requisites of resident and migratory carnivores are maintained

Maps:

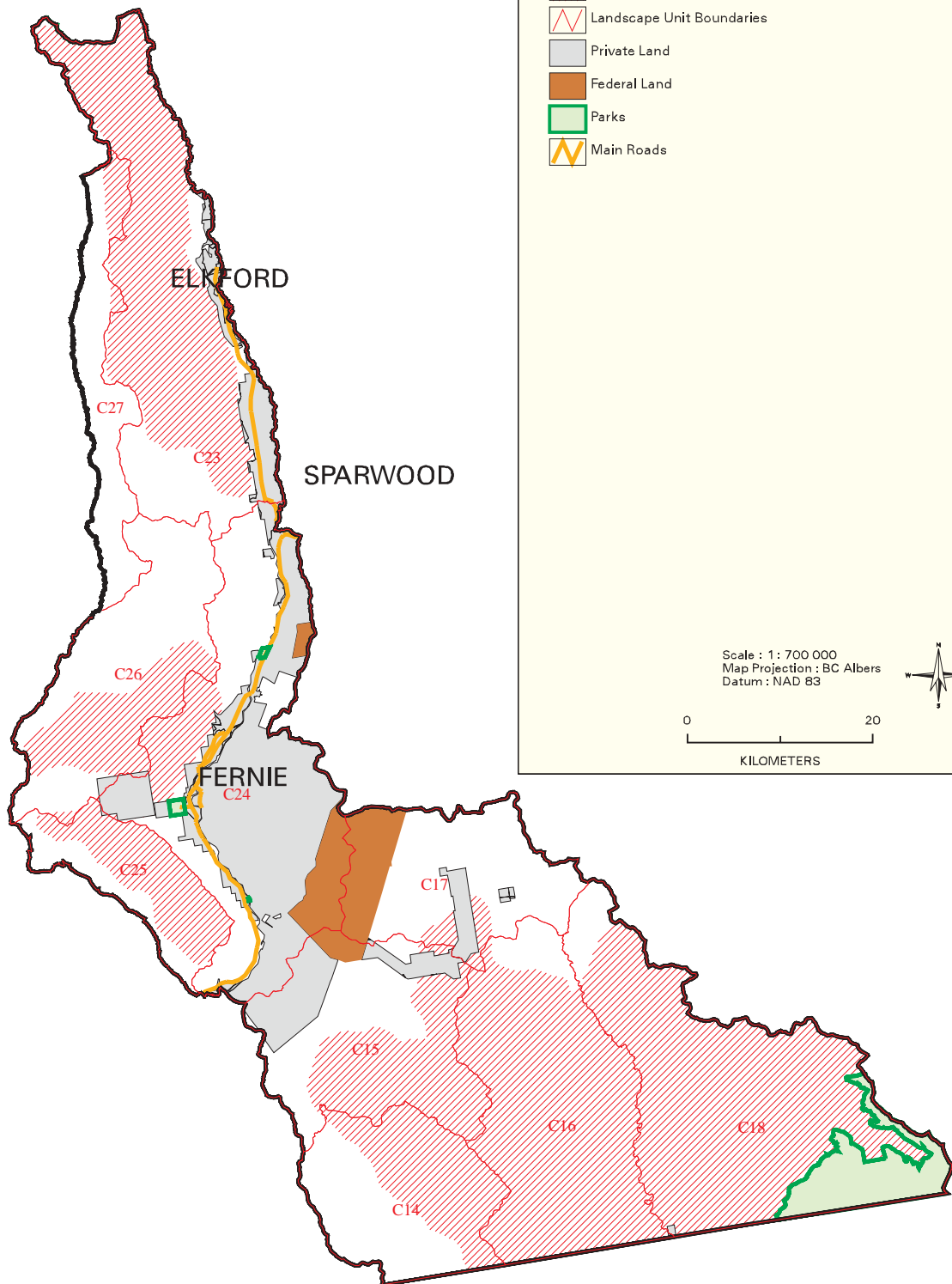
B.9.4.1 Core Grizzly Bear Areas

E.9.4.1 Core Grizzly Bear Areas

Southern Rocky Mountain Management Plan
Map B.9.4.1 Core Grizzly Bear Areas

Legend

-  Core Grizzly Bear Areas
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.9.5 Ungulates

Six species of ungulates are indigenous to the plan area. These are elk, mountain goat, moose, mule deer, white-tailed deer and Rocky Mountain bighorn sheep. Of these, mountain goat are regionally significant and Rocky Mountain bighorn sheep are provincially significant (see Appendix 24.4).

In the Flathead River watershed many of these species migrate to seasonally important habitats in Alberta and Montana.

Issues:

- Reduced ungulate habitat effectiveness and carrying capacity, habitat loss including alienation, and declining habitat suitability, are related to:
 - Forest encroachment
 - Urban expansion
 - Rural recreational development and housing
 - Industrial developments
 - Access development and use
 - Catastrophic climatic events
 - Noxious and invasive weeds
- Ungulate populations are negatively affected as a result of:
 - Disease
 - Over-harvesting and predation of ungulates
 - Habituation and unnatural behavioral responses
 - Harassment and displacement from highly suitable habitats
 - Road and railroad-related mortality
- There is a potential for disease transmission from domestic livestock to ungulate species
- Private land that is ungulate habitat is not covered by the plan

Intent:

- Maintain and enhance ungulate species populations and habitats
- Increase habitat effectiveness and the opportunity for genetic dispersal, seasonal and daily movement, foraging and reproduction of ungulates (Appendix 24.4) at the landscape and stand level
- Reduce public road and railroad-related ungulate mortality
- Manage recreation access and development (see Section B.7.1) in order to reduce impacts on ungulates
- Maintain healthy riparian ecosystems (see Section B.9.1)
- Maintain old-growth and mature seral forest habitat (see Section B.9.2)
- Manage ungulate winter range as per Section B.9.7
- Maintain habitat connectivity (see Section B.9.9), including between seasonal ranges
- Maintain and promote recreational opportunities to harvest ungulates (see Section B.7.2 and B.8.3)
- Enhance opportunities to appreciate, view and study ungulates in their respective habitats (see Section B.8.2)
- Maintain the management strategies that perpetuate ungulate species representation, abundance and distribution across the landscape
- Eliminate potential for parasite and disease transfer from domestic livestock to wildlife

Best management practices:

- *Interim Wildlife Guidelines for Commercial Back-country Recreation in British Columbia (MWLAP, 2002)*
- East Kootenay Ungulate Winter Range Capability Mapping, Management Objectives and Best Management Practices (Appendix 8.0)
- *Identified Wildlife Management Strategy (MOF, Vol.1, Feb. 1999)*

Economic benefits and opportunities:

- Resident hunting and big game guiding
- Wildlife viewing and photography
- Healthy and balanced ecosystems

Measures of success:

- Healthy and self-sustaining populations of ungulate species
- Representative, available and suitable ungulate habitat

B.9.6 Ungulate Winter Range

Suitability, capability and availability of winter range habitat are the principle limiting factors regulating ungulate carrying capacity and, accordingly, are significant with respect to ungulate species and population management (Appendix 8.0).

The spatial identification of ungulate winter range capability zones by species by biogeoclimatic subzone (BEC) and variant has been completed.

Ungulate species that winter within the plan area include elk, mule deer, white-tailed deer, mountain goat, moose and Rocky Mountain bighorn sheep.

Issues:

- Forage availability and suitability for wintering ungulates may be limited by:
 - Adequate forage carry-over
 - Domestic livestock and wild ungulate competition for available forage
 - Forest in-growth
 - Noxious and invasive weeds
 - Exclusion of fire from winter ranges
 - Land alienation
- Ability of ungulates to use winter range, may be limited by:
 - Barriers (fences, reservoirs, roads)
 - Disturbance related to commercial and public motorized recreation activity on winter ranges
 - Industrial resource development and access use during seasonal periods when ungulate energy levels are lowest
- Research and inventory related to the determination of wintering populations, distribution and habitat selection is incomplete
- Suitable cover may be unavailable
- There is a need to balance cover and forage requirements
- Private land that is ungulate winter range is not covered by the plan

Intent:

- Maintain ungulate winter forage and cover in a condition that meets the life requisites of wintering ungulates
- Maintain ungulates across their natural range
- Enhance habitat effectiveness by: minimizing barriers to movement; implementing recreation access management; and, managing habitat deployment
- Enhance suitability and forage productivity of ungulate winter range
- Employ current biological and ecological science for the development and perpetuation of ungulate winter habitat structure, suitability and functional management requirements
- Manage ungulate winter range on an ecological basis as opposed to a species-driven process
- Stand level prescriptions should be consistent with natural landscape characteristics
- Manage recreation access and development (see Section B.7.1) in order to maintain ungulate winter range habitat effectiveness
- Maintain ungulate winter range habitat effectiveness, minimize industrial activity during the winter when ungulate sensitivity levels are highest, and address road density and use issues
- Maintain old growth and mature seral targets as per Section B.9.2

Resource objectives:

Objective 9.6.1

Ungulate winter range in the plan area is established as defined on Map B.9.6.1. The landscape-level cover and forage targets will be applied by Landscape Unit by habitat type (see Map B.9.6.2) as expressed in Table 9.6.1 and 9.6.2

Objective 9.6.2

Within ungulate winter range as defined on Map B.9.6.1, the stand/site-level management objectives and stocking standard targets will be applied by habitat type as expressed in Table 9.6.3 and Map B.9.6.2. Where field examination by a qualified registered professional determines a habitat type that is different from Map B.9.6.2, the stand/site-level management objectives and stocking standard targets will be applied by habitat type as expressed in Table 9.6.3 based on the field determination rather than the map classification.

Table 9.6.1. Definitions of Habitat Types Used for East Kootenay Ungulate Winter Range Management Objectives and Best Management Practices

Minimum required management unit size is 2 hectares.

Habitat Type	Definition	Field Verified Ecosystem Units
Open Range	Lands ecologically suited to production of bunchgrasses and dryland shrub species. Snow accumulations are typically low. (includes existing open range, meadows, cultivated and similar cover classes)	PPdh2 , 02a, 02b, 01 IDFdm2, un , 02,03; IDFdm2a, un2 , 02; MSdk , 02 ICHdm , 02; ICHwk1 , 02; ICHvk1 , 02 (& Rock talus sites)
Open Forest	Lands ecologically suited for production of large crowned open forest with bunchgrasses and dryland shrub species. Snow accumulations are typically light. (typically <40% crown closure, multi-storied stand structure, and low stocking levels)	PPdh2 , 03, 04 IDFdm2, un , 01 warm, & neutral <1000m. IDFdm2a, un2 , 03 Fd leading ² MSdk , 03 Fd leading; ICHdw , 02; ICHdm , 03 Fd leading ICHmk1 , 02; ESSFdk , 02; ICHmw1 , 02
Managed Forest (Dry)	Lands ecologically suited for Fd and Py dominated forest. These provide forage values for 1-3 decades during the forest regeneration phase.	IDFdm2, un , 01 cool, and neutral >1000m 04, 05
Managed Forest (Transitional)	Lands ecologically suited for Douglas-fir climax stands often having a heavy lodgepole pine and larch component. These provide forage for 1-3 decades during the forest regeneration phase. Snowpack is typically light to moderate.	IDFdm2a, un2 , 03 Non-Fd leading, 04, 01, 05
Managed Forest (Mesic)	Lands ecologically suited to pine leading stands which provide forage values for 1-3 decades during the forest regeneration phase. Moderate snow accumulations necessitate the retention of cover.	MSdk , 03 Non-Fd leading, 04, 01, 05 where elk, deer capability mapped.
Managed Forest (Moist)	Moist ecosystems providing forage values for 1-3 decades during the forest regeneration phase. Moderate snow necessitates retention of cover.	MSdk , 03 Non-Fd leading, 04, 01, 05 where moose capability only mapped. ICHdw , 01a, 01b, 03, 04; ICHdm , 03 non-Fd leading, 01, 04, 05
Managed Forest (Wet)	Wetter ecosystems providing forage values for 1-3 decades during the forest regeneration phase. Moderate to deep snow necessitates retention of cover.	All other site series not listed above or below in ICHmk1 , ESSFdm1 , ESSFdm2 , ESSFdk , ICHmw1 , ESSFmm1 , ESSFwm , ICHwk1 , ICHvk1 ESSFwc2 , ESSFvc
Riparian, Deciduous and Shrub Lands	Lands ecologically suited as brushfields, non-productive and deciduous forest and shrub communities generally along water features. Often containing patches of Sx, Cw, Hw or Bl.	Approximately characterized by IDFdm2, un, dm2a, un2 , 06,07 MSdk , 06,07; ICHmk1 , 08; ESSFdk , 06,07; ICHmw1 , 07 ESSFmm1 , 07; ICHwk1 , 09; ESSFvc , 06 And similar wetland riparian areas in other BECs.
Avalanche Tracks	High to moderate capability avalanche tracks as rated for Grizzly bear habitat ³ . Usually characterized by lush tall shrub and forb vegetation.	Various site series.
Alpine/Subalpine	High elevation steep rocky habitats typically used by Mountain goats. Usually sparsely forested or open with sparse to moderate forage.	Various biogeoclimatic variants—rock outcrops, and non-productive forest.
Alpine Grassland	High elevation windswept ridges and warm aspect grasslands typically used by Rocky Mountain Bighorn Sheep ..	Alpine tundra with fair soils.

² Fd leading is defined as more than 30% Douglas-fir at time of harvest.³ Mowat G. and R. Ramcharita, 1999. A Review of Grizzly Bear Habitat Use and Management Options for the Kootenay Region of B.C. Final Report for MELP, Nelson.
August 2003

Table 9.6.2. Landscape Level Cover and Forage Objectives for East Kootenay Ungulate Winter Range

Habitat Type	Ungulate Winter Range Management Objective	Primary Ungulate Species	Landscape Level Minimum Requirement ⁴		Cover and Forage Definitions	Comments
Open Range	Promote preferred forage production.	Elk, Bighorn sheep	Cover	N/A See comments.	Preferred forage is climax grass and dryland shrub communities.	Cover requirements will be met by adjacent open forest stocking standards and managed forest retention areas.
		Mule deer Whitetailed deer Mountain goat	Forage	N/A See footnote.		
Open Forest	Promote preferred forage production in understory.	Elk, Bighorn sheep	Cover	N/A See comments.	Preferred forage is climax grass and dryland shrub communities.	Cover requirements will be met through open forest tree retention requirements and adjacent managed forest retention areas.
		Mule deer White-tailed deer Mountain goat	Forage	N/A See footnote.		
Managed Forest (Dry)	Maintain a component of early seral vegetation through time.	Elk Bighorn sheep Mule deer White-tailed deer	Cover	10%	Age ≥100, and Evergreen ⁵ CC ≥20% , or Layer 1 age ≥ 100 years. ≤30 year-old forest	Applies to mapped dry managed forest. Preference for Fd leading stands is encouraged.
			Forage	10%		
Managed Forest (Transitional)	Maintain a component of early seral vegetation through time.	Moose, Elk Mule deer White-tailed deer	Cover	20%	Height ≥ 15m, and Evergreen CC ≥40%. ≥100 years Fd, Sx leading ≤30 year-old forest	Applies to mapped transitional managed forest within ungulate winter range. Applies to suitable stands if available.
			Including up to Forage	10% 10%		
Managed Forest (Mesic)	Maintain a component of early seral vegetation through time.	Elk Mule deer	Cover	30%	Height ≥ 15m, and Evergreen CC ≥40% ≥100 year-old forest ≤30 year-old forest	Applies to mapped mesic managed forest. Prefer non-PI leading where available. Partial cut stands with rank 1 layer meeting these specifications can qualify.
			Including mature & old Forage	20% 10%		
Managed Forest (Moist)	Maintain a component of early seral vegetation through time.	Moose	Cover	20%	Height ≥ 15m, and Evergreen CC ≥40% ≤30 year-old forest	Applies to mapped moist managed forest within ungulate winter range.
			Forage	10%		
Managed Forest (Wet)	Maintain a component of early seral vegetation through time.	Moose	Cover	30%	Height ≥ 15m, and Evergreen CC ≥40% ≤30 year-old forest	Applies to mapped wet managed forest within ungulate winter range.
			Forage	10%		
Riparian, Deciduous and Shrub Lands	Maintain high shrub production interspersed with good snow interception cover.	Moose, Elk Mule deer Whitetailed deer	Where ecologically suited, maintain or enhance climax (non-pine) conifer and deciduous forest			Riparian stands meeting cover definition can contribute to managed forest cover objectives.
Avalanche Tracks	Retain cover along high and mod. avalanche zones.	Moose, Elk	Retain all forest within track complexes and 50m of forest outside of complexes ⁶ . Retain 100m of cover adjacent to both sides of isolated tracks. Maximum harvest 20% of basal area on one side of avalanche track.			
Alpine/ Subalpine	Retain cover along moderate to high capability habitat	Mountain goat	Retain available forested habitat patches adjacent to moderate to high value habitats.			
Alpine Grassland	Retain cover along moderate to high capability habitat	Bighorn sheep	Retain 100m wide forested habitat cover patches adjacent to moderate to high value habitats.			

⁴ Ideally manage for forage targets of 100% on Open Range and Open Forest sites, and at least 20% on managed forest sites. Forage maintenance and enhancement is a multi-jurisdictional responsibility and is not expected to be achieved by forest licensees alone. Licensees, ranchers, government, restoration committees, and other agencies are encouraged to collaborate to achieve forage objectives through slashing and burning programs.

⁵ Evergreen crown closure means all conifers except larch counted at full relative crown closure; and larch and deciduous at 50% of their relative crown closure.

⁶ Avalanche complexes are defined as a series of snow avalanche tracks alternating with strips of forest (>2 tracks/km, or <500 m between tracks).

Table 9.6.3. Stand/Site Level Management Objectives and Stocking Standards for East Kootenay Ungulate Winter Range Management⁷

Habitat Type	Target Stocking Standard (Stems/ha)	Minimum Stocking Standard (Stems/ha)	Maximum Stocking Standard (Stems/ha)	Species Preference for Residual Trees ⁸	Free-Growing Window
Open Range	20 including 5 of the largest 1/3 of the diameter range	0 0	75 20 of the largest 1/3 of the diameter range	Favour Py in PPdh2, and Douglas- fir with a component of deciduous trees where available in other BECs.	0-2 years
Open Forest	150 including 30 of the largest 1/3 of the diameter range	76 including 20 of the largest 1/3 of the diameter range	400 50 of the largest 1/3 of the diameter range	Favour Py in PPdh2, and Douglas- fir with a component of deciduous trees and Lw where available in other BECs.	1-3 years
Managed Forest (Dry)	(300, 400, 500), 600 Multi-layered stocking standards	(300, 400, 500), 600 Multi-layered stocking standards	Provincial standards ⁹	Favour climax trees, including Lw with a component of decid. trees where available.	12-20 years; 3 yrs where stocked with L1&2.
Managed Forest (Transitional)	Provincial standards	Provincial standards	Provincial standards ¹⁶	Favour deciduous and groups of climax tree species.	12-20 years
Managed Forest (Mesic)					
Managed Forest (Moist)					
Managed Forest (Wet)					
Riparian, Deciduous and Shrub Lands	Normal riparian standards. See Best Management Practices	Normal riparian standards See Best Management Practices	Normal riparian standards See Best Management Practices	Favour large crowned Fd, Sx, Act, Cw, Bl	N/A See Best Management Practices
Avalanche Tracks Reserve Zone	N/A	70% of existing stand basal area	N/A	Prefer Sx, Bl retention.	1-3 years
Alpine/ Subalpine	N/A	N/A	N/A	N/A	N/A
Alpine Grassland	N/A	N/A	N/A	N/A	N/A

⁷ Up to 10% of an operator's plans may deviate from these standards where a suitable rationale is provided and a commitment is made to do a follow-up assessment of the effectiveness of the alternative standards at achieving forage and timber objectives.

⁸ Species preference must consider other wildlife, biodiversity, silviculture and forest health factors balanced with these objectives.

⁹ "Management should not exceed the maximum stocking standard. Co-operation among licensees, government, restoration committees and other agencies will be required in circumstances where excess regeneration beyond the maximum is retained on site. Harvest activity should be consistent with ecosystem restoration objectives for that site. It is recognized that more than one entry may be required to achieve long-term objectives. Treatment plans should indicate how long-term objectives will ultimately be achieved.

Best management practices:

- East Kootenay Ungulate Winter Range Capability Mapping and Management Guidelines (Appendix 8.0)
- *Interim Wildlife Guidelines for Commercial Back-country Recreation in British Columbia (MWLAP, 2002)*
- Forest harvesting, hauling and other industrial mechanized operations within the identified UWR in the NDT4 should give consideration to reducing risk from disturbance during the period when ungulates are most susceptible to stress. This period of vulnerability most commonly extends from mid January to late March.
- Stand Site Level Best Management Practices (Appendix 8.0)

Economic benefits and opportunities:

- Commercial wildlife viewing and photography
- Resident wildlife hunting
- Guide-outfitting
- Healthy ecosystems - less management or rehabilitation costs

Measures of success:

- Suitable winter range forage and cover habitat attributes targets are achieved and sustained
- Forage productivity is enhanced
- Healthy predator-prey relationships
- The opportunity to access available forage is optimized
- The managed ungulate winter range configuration resembles the characteristics of a landscape evolved through natural disturbance events
- The reduction of unnatural movement, increased predation success and displacement of wildlife from highly suitable winter habitat is evident
- The shelter and forage value of mature and old growth forests within identified ungulate winter ranges is achieved
- The best strategic and operational management practices for winter range conservation are employed
- The growth and productivity of preferred forage species and the spatial and temporal management of forest cover is achieved (through the application of appropriate disturbance events)

Maps:

B.9.6.1 Ungulate Winter Range

B.9.6.2 Ungulate Winter Range Habitat Types *







E. 9.6.1 Ungulate Winter Range

E.9.6.2 Ungulate Winter Range Habitat Types

* Predictive Ecosystem Mapping (PEM) depicting: Site Series Stratified by Moisture Regime; Management Objectives by Site Series Distribution by BEC; Winter Range Capability Maps by Species; Optimum Winter Range Capability Maps by TSA

Southern Rocky Mountain Management Plan
Map B.9.6.1 Ungulate Winter Range

Legend

-  Ungulate Winter Range
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads













Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



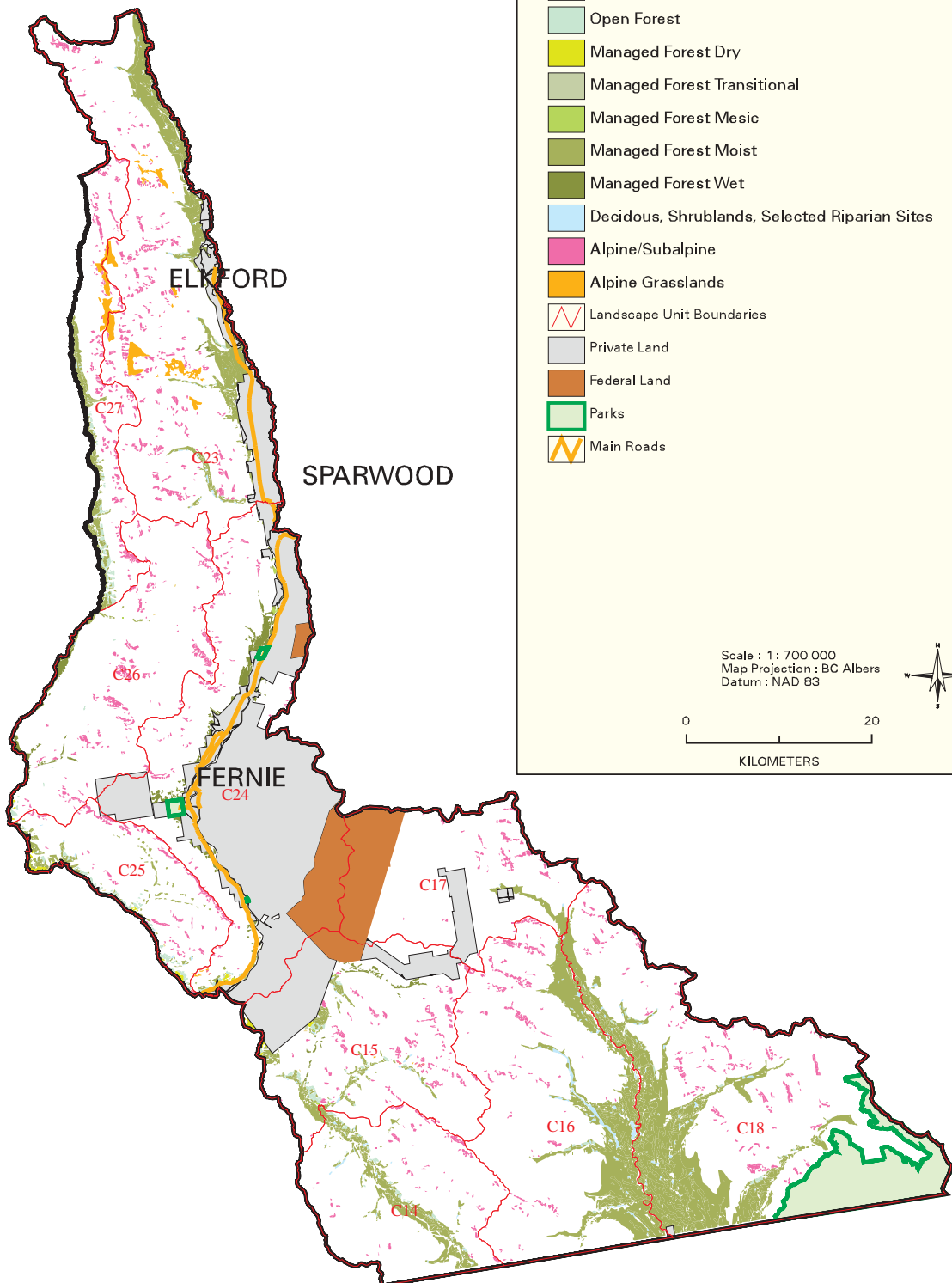
Southern Rocky Mountain Management Plan
Map B.9.6.2 Ungulate Winter Range Habitat Types

Legend

-  Open Range
-  Open Forest
-  Managed Forest Dry
-  Managed Forest Transitional
-  Managed Forest Mesic
-  Managed Forest Moist
-  Managed Forest Wet
-  Deciduous, Shrublands, Selected Riparian Sites
-  Alpine/Subalpine
-  Alpine Grasslands
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.9.7 Species at Risk

Species and plant communities listed provincially as rare and endangered (red-listed), vulnerable (blue-listed) or species of regional management concern (yellow-listed) are considered to be species at risk (see *FPC Operational Planning Regulation*). Many of these listed species are indigenous to the plan area (see Appendix 24.2 and Appendix 24.4).

Issues:

- Not all known endangered, threatened or vulnerable plant and wildlife species have been legally acknowledged through the provincial Identified Wildlife Management Strategy (IWMS) (see Best management practices)
- Measures and procedures to protect and maintain those habitats and species which are not officially approved, are lacking
- Inventory of identified wildlife species and habitats is incomplete
- There are few wildlife habitat areas (as per the IWMS) in the plan area in which general wildlife measures can be applied
- There is a lack of coordination among BC, Alberta, international and federal species- at-risk legislation
- There is a need for more species-at-risk recovery plans, including multi-jurisdictional plans
- The most significant area for species at risk in Alberta is adjacent to the SRMMP
- Accidental mortality resulting from trapping of species at risk may impact population sustainability
- Interim wildlife guidelines for management and protection of species at risk do not include all species and/or are not developed or applied

Intent:

- Maintain all endangered, threatened or vulnerable species and communities as provincially listed
- Expand, develop and implement Interim Wildlife Guidelines to include all species at risk
- Reduce habitat loss, harassment, displacement of endangered, threatened or vulnerable species and communities, as provincially listed, resulting from public and commercial recreation and resource development activities through the application of Best management practices (as listed below)
- Manage recreation access and development (see Section B.7.1), including area-based access management measures under the *Wildlife Act*, to maintain endangered, threatened or vulnerable species and communities, as provincially listed
- Maintain proper functioning condition, including ecological integrity, of habitats
- Maintain endangered, threatened or vulnerable species and communities, as provincially listed, in conjunction with private land conservation measures
- Maintain old growth and mature seral targets as per Section B.9.2
- Maintain ungulate winter range as per Section B.9.6
- Manage riparian habitat as per Section B.9.1

Best management practices:

- *Interim Wildlife Guidelines for Commercial Backcountry Recreation in British Columbia (MWLAP, 2002)*
- *Identified Wildlife Management Strategy (MELP and MOF, 1999)*

Economic benefits and opportunities:

- Wildlife viewing and photography
- National and international cooperation and financial support
- Healthy and viable ecosystems

Measures of success:

- No extirpation of species
- Stable and balanced ecosystems including species at risk populations
- Biodiversity is maintained through retention and deployment of representative species and habitats across the landscape

B.9.8 Access

Access is one of the most influential factors affecting wildlife and wildlife habitat stewardship. In the East Kootenay, access planning initiatives designed to husband and sustain habitat and wildlife habitat, species and populations have a long history (Appendix 24.4).

The implementation and enforcement of appropriate access management is essential to achieve wildlife management objectives.

Issues:

- Issues of concern related to access and road development and use are habitat alteration, fragmentation and loss, wildlife mortality, harassment and displacement, dispersal barriers and pollution.
- Section B.7.1: Recreation Access and Development needs to be implemented
- Environmental and social carrying capacity, environmental sensitivity and compatibility analysis, and cumulative impact assessments within the plan area are needed
- Unregulated, repetitive or cumulative access-related disturbances result in:
 - adverse impacts on sensitive wildlife and wildlife habitats
 - reduced vigour, reproduction capability and ultimately reduced wildlife populations (Appendix 24.4)
 - alterations of normal behavioral functions resulting in abandonment of quality habitat
 - interruption of foraging and breeding activities and intrusion on seasonal and daily movement opportunities
- There are potential impacts resulting from international and interprovincial motorized access

Intent:

- Manage recreation access and development (see Section B.7.1) in order to reduce impacts on wide-ranging carnivores
- Industrial access development and use will give consideration to ensuring habitat effectiveness

- Access management will recognize the value of retaining ecological integrity, environmental stewardship principles, and conservation goals (Appendix 24.4) to reduce the risk of:
 - habitat loss, fragmentation, damage or alienation
 - sedimentation and erosion
 - wildlife harassment and displacement and the subsequent potential for decreased habitat effectiveness
 - increased pressure on fish and wildlife resources and associated loss of populations and recruitment potential
 - noxious weed dispersal
 - exacerbating the loss of wild-land or remote habitat environments
 - increased vulnerability (from a hunting perspective there is a direct correlation between harvesting success and uncontrolled road uses and road density)
 - reducing the natural distribution, movement, foraging and reproduction opportunities of wildlife species and populations
 - unnatural behavioural response to threats
- Reclamation of roads and trails, when no longer needed, will focus on re-establishment of native species and returning the landscape to as natural a condition as possible

Economic benefits and opportunities:

- Maintains the integrity of the environmental resource base
- Enhances public recreation, wildlife-based industries and commercial recreation operations
- Reduced costs in weed control
- On reclaimed roads, increased forage and forest regrowth and reduced road maintenance costs

Measures of success:

- Successful management of access that supports conservation values
- Maintenance of effective wildlife habitats
- Maintenance of functional and diversified wildlife species and populations
- Decrease in the spread of noxious weeds
- Retention of remote wild-land characteristics

B.9.9 Connectivity

The plan area has an abundance and diversity of wildlife features. This phenomenon is attributed to the area's inherent complexity of ecological systems and connectivity with both the Great Plains in Alberta and the intermountain region of the United States. The establishment and maintenance of terrestrial and aquatic connectivity is important with respect to maintaining an opportunity for wildlife to move within and among a variety of habitats, which are required to support the life requisites of indigenous and migratory fish and wildlife species.

Discrete habitats and core wildlife areas which support the connectivity concept have been identified as old growth management areas (OGMA), riparian, mature seral forest, avalanche tracks, ungulate winter range, core grizzly bear areas, natural movement corridors (low passes), inoperable forested Crown Forest Land Base (CFLB), inoperable non-forested CFLB and operable forest habitat. A full description of the elements of connectivity is found in Appendix 7.0.

Issues:

- The SRMMP area is one of the very few large, contiguous habitat linkages in the southern part of the province that retains a functional capacity to facilitate unrestricted daily and seasonal migratory movement opportunities
- Access management is essential to the maintenance of connectivity
- Barriers (e.g. Highway 3) adversely affect genetic dispersal, seasonal and daily movement, foraging and reproduction of wildlife species (e.g. grizzly bear and black bear)
- Private land, and the activities on private land, influence connectivity effectiveness. Appropriate private land conservation measures, including conservation easements, land purchases, habitat enhancement and access management, are needed
- There is incomplete data on:
 - wildlife populations, distribution and habitat selection
 - distribution of rare ecosystems
 - habitat of species at risk
 - traditional migration and movement routes
 - carrying capacity
 - habitat effectiveness
 - proper functioning condition benchmarks
- Achieving the connectivity concept is contingent upon maintaining ecological integrity and implementing effective access management.
- Effective maintenance of connectivity is dependent on appropriate management of adjacent lands and water.
- Winter ranges in the Pickering Hills, Sheep Mountain and Wigwam Flats, which are adjacent to the plan area, are an essential component of the connectivity matrix

Intent:

- Maintain connectivity in an ecosystem-based forest matrix
- Perpetuate abundant, diverse and self-sustaining populations of fish and wildlife species
- Increase habitat effectiveness and the opportunity for genetic dispersal, seasonal and daily movement, foraging and reproduction of wildlife species (Appendix 24.4) at the landscape and stand level
- Manage recreation access and development (see Section B.7.1), including area-based access management measures under the *Wildlife Act*, to maintain connectivity
- Maintain proper functioning condition, including ecological integrity, of habitats
- Maintain connectivity in conjunction with private land conservation measures
- Maintain old growth and mature seral targets as per Section B.9.2
- Maintain ungulate winter range as per Section B.9.6
- Manage riparian habitat as per Section B.9.1
- Retain deciduous trees, individual large diameter old trees or clumps of immature forest habitat where species and structural diversity exist within the operable forest (as per Section B.9.3)
- In drainages where forest development activities must occur during periods of intensive wildlife use, timber harvesting strategies should be designed to alternate activity locations to ensure that grizzly bear can utilize drainages where undisturbed foraging and breeding opportunities can occur

- Within the inoperable connectivity, reclamation of disturbed sites no longer needed for the permitted resource development will focus on re-establishment of native species and returning the landscape to as natural a condition as possible

Resource objectives:

Objective 9.9.1

Within the plan area retain forest cover within and adjacent to avalanche track complexes as per Map B.9.9.1.

Objective 9.9.2

Retain a 50 metre minimum width of forest cover adjacent to the perimeter of avalanche track complexes in the plan area and 100 metres minimum adjacent to the perimeter of isolated tracks (see Map B.9.9.1).

Objective 9.9.3

Retain the small isolated patches of forest cover within avalanche track complexes in the plan area (see Map B.9.9.1).

Objective 9.9.4

Road construction is permitted through avalanche tracks in the plan area (see Map B.9.9.1) only where necessary for resource development and only where there is not an economically and environmentally reasonable alternative access route as determined by a qualified registered professional. Where road crossings are necessary, avoid the highly productive areas. Road access through avalanche tracks should be closed when operations are completed.

Objective 9.9.5

Schedule resource development activity in close proximity to avalanche tracks in the plan area (see Map B.9.9.1) to avoid disturbance during May and June when the most concentrated and intensive use of avalanche habitat by wildlife occurs.

Southern Rocky Mountain Management Plan
Map B.9.9.1 Connectivity

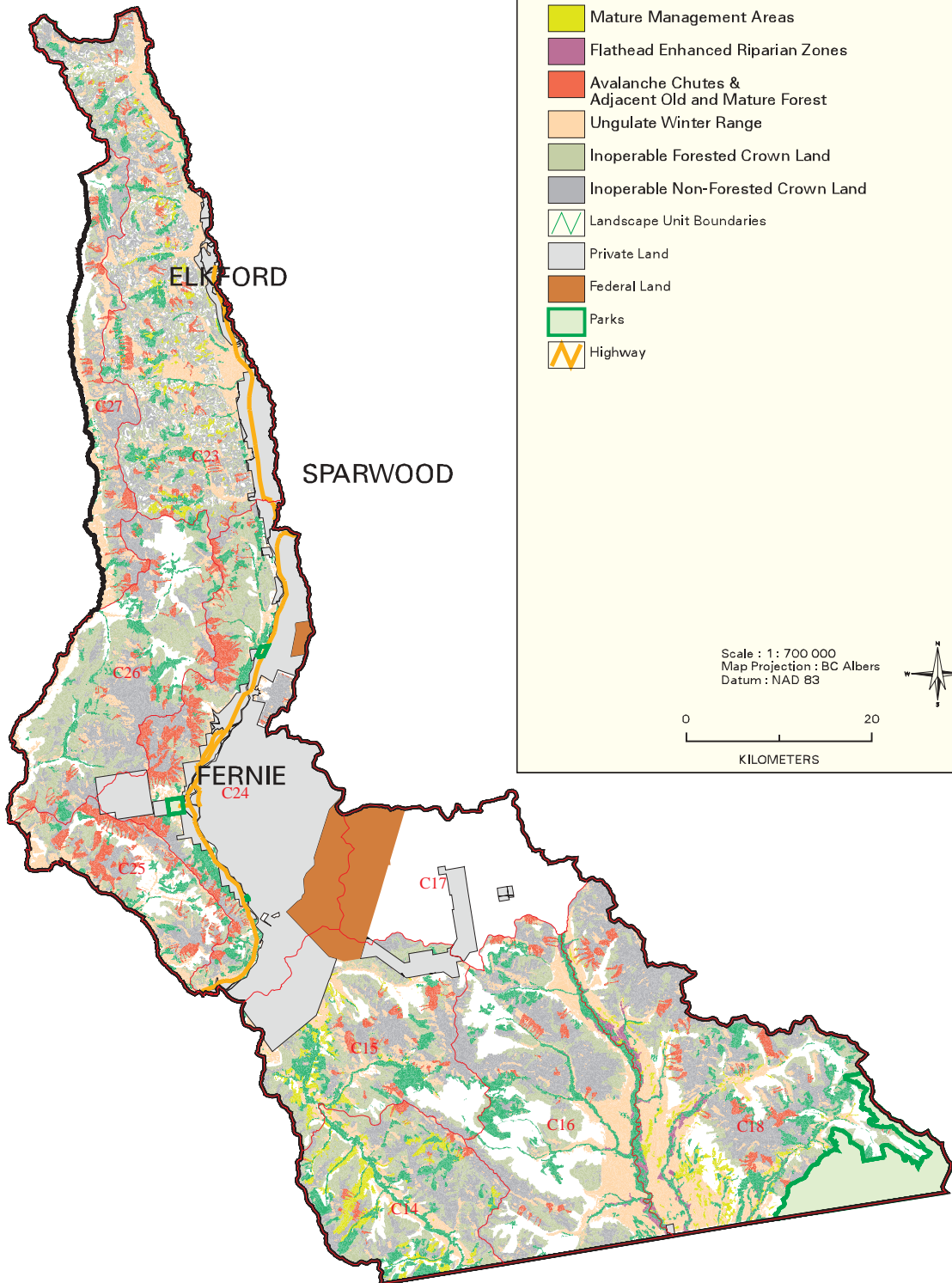
Legend

- Old Growth Management Areas
- Mature Management Areas
- Flathead Enhanced Riparian Zones
- Avalanche Chutes & Adjacent Old and Mature Forest
- Ungulate Winter Range
- Inoperable Forested Crown Land
- Inoperable Non-Forested Crown Land
- Landscape Unit Boundaries
- Private Land
- Federal Land
- Parks
- Highway

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83



0 20
KILOMETERS



Objective 9.9.6

Within the inoperable connectivity (inoperable forested and inoperable non-forested provincial Crown land) and ungulate winter range as per Map B.9.9.1, the expansion of, or new, formal recreation or tourism-related facilities in the plan area:

- are not permitted in landscape units C14, C16, C18 and C23;
- are permitted in the remainder of the plan area where there is signed documentation by a registered professional biologist that the proposal does not adversely affect the objectives and intent of connectivity.

Replacement and/or upgrading of existing formal recreation or tourism-related facilities are permitted.

Economic benefits and opportunities:

- Helps avert the need for protection-oriented, broadly-applied land-use designations which deter investment
- Helps in meeting draft government commitment to sustainable resource management and avoiding high-profile boycotts
- Helps sustain fish and wildlife-based industries
- Supports tourism opportunities
- Supports environmentally-sustainable communities

Measures of success:

- Genetic dispersal, seasonal and daily movement, and foraging and reproduction opportunities for wildlife species are maintained (see Appendix 7.0)
- Abundant, diverse and self-sustaining populations of fish and wildlife species
- Habitat diversity and availability is maintained and is effectively utilized
- Habitats are effectively interconnected and functional
- Impediments to wildlife movement and identified barriers are resolved
- Dispersal of wildlife is accommodated and natural behavioral patterns remain uninhibited
- Indigenous wildlife species are not extirpated

Maps:

B.9.9.1 Connectivity

E.9.9.1 Connectivity

B.9.10 Fish

Resident and migratory fish species within the planning area include: bull trout, west-slope cutthroat trout, mountain whitefish, mottled sculpin, slimy sculpin, large-scale sucker, rainbow trout, brown trout and brook trout. The Flathead, Elk and Wigwam systems provide important spawning and rearing habitats for these species.

Bull trout, the largest indigenous fish in the area, is a blue-listed species in British Columbia and is listed as endangered in the neighbouring American jurisdictions.

Issues:

- Aquatic and riparian habitat loss and degradation impacts sustainability of fish populations
- Water quality, quantity and timing of flow are impacted by human activities on land and water
- Fish displacement, injury and stress result from intensive angling pressure
- Post-hooking mortality is associated with intensive catch and release angling pressure
- There is a lack of success with international bull trout recovery in the Flathead watershed
- Management of fish stock in Flathead lake in Montana can have a direct impact on recovery efforts for bull trout in the upper Flathead drainage in Canada
- Proper Functioning Condition of streams, rivers and adjacent riparian habitats is dependent upon management of activities within watersheds
- Increasing angler days and intensity from resident, non-resident and guided anglers may be affecting sustainability of fish populations
- A regional angling guide strategy is pending (see Section B.8.4)
- West-slope cutthroat are hybridizing with rainbow trout

Intent:

- Maintain diverse, healthy and self-sustaining fish populations, including red and blue-listed species
- Restore bull trout populations and their habitat in the Flathead watershed
- Support fish co-management strategies for internationally-shared fish stock
- Maintain proper functioning condition of aquatic and riparian ecosystems
- Maintain a quality recreation fishing experience for resident and guided anglers
- Maintain suitable water quality, quantity and timing of flow to sustain fish populations
- Reduce the risk of disease and population pressures to native fish stocks resulting from introduction of non-native species

Economic benefits and opportunities:

- Recreational angling opportunities
- Angling equipment suppliers
- International cooperation and financial support
- Angling guide businesses
- Increased tourism

Measures of success:

- Fish population levels and habitat availability sustained
- Decreased fish mortality resulting from human activities
- Viable angling guide businesses

B.9.11 Grassland Communities

Grassland communities within the plan area include: Montane spruce (MSdk) and fire-induced and maintained Interior Douglas Fir (IDF); riparian; avalanche track; alpine (AT); and parkland (ESSFdkp and ESSFwmp) grassland habitats. These communities are important to ecosystem biodiversity and a variety of birds, small mammals, wide-ranging carnivores and wild ungulates within the plan area.

Issues:

- The grassland community inventory is incomplete.
- Forest ingrowth and encroachment results in reduced area and suitability of grassland communities in the low elevation IDF and MSdk subzones
- Fires have been suppressed and excluded
- Overgrazing has occurred
- Grassland communities have been fragmented and lost
- Grassland-dependent species have declined
- There is a need for data and assessment benchmarks for grassland community habitat effectiveness and proper functioning condition
- Degradation of grassland ecosystems has resulted from off-road vehicular use
- Noxious weeds are spreading rapidly

Intent:

- Maintain proper functioning condition, connectivity and effective use of grassland communities
- Manage grasslands toward potential natural condition and extent
- Manage recreation access and development (see Section B.7.1) in order to reduce impacts on grassland ecosystems

Economic benefits and opportunities:

- Healthy and viable grassland ecosystems
- Resident and guided hunting
- Crown land grazing

Measures of success:

- Grassland communities are functional and effectively utilized by wildlife and livestock
- Biodiversity is maintained through retention and deployment of functional grassland communities across the landscape
- Wildlife species, including populations, dependent upon grassland communities are stable and balanced

B.9.12 Air Quality

Based on results from other areas with similar climates, topography and emission sources where monitoring has been conducted, air quality in the plan area is expected generally to be good with seasonal and localized fluctuations of air contaminants.

Issues:

- Air quality is variable in the plan area
- Air quality is influenced by activities both within and outside of the plan area
- There is no air quality management plan for the province
- Thermal air inversions are common in the plan area due to topography and climate
- There is no specific monitoring of air quality in the plan area. However, based on results from other areas with similar climates, topography and emission sources where monitoring has been conducted, air quality may be predicted as follows:
 - The Flathead River watershed is expected to be very good with minimal amounts of air contaminants
 - The Bull River and Wigwam watersheds are expected to be very good with seasonal and localized fluctuations of air contaminants from vehicle emissions, agricultural and range burning, and emissions from the combustion of wood
 - For the Elk River watershed, air quality is expected to be fair with seasonal and localized fluctuations of air contaminants from vehicle emissions, industrial activity, agricultural and range burning, and emissions from the combustion of wood
- Ozone levels, from both human-related and natural causes, may be a concern in this area although there are no data to confirm this

Intent:

- Manage activity in the plan area to maintain or improve air quality, including reduction of particulate matter, within established and provincially acceptable criteria
- Manage ozone levels wherever possible within established and provincially acceptable criteria
- Visibility resulting from air quality will be maintained within acceptable social standards

Best management practices:

- Air Quality Management Principles and Objective (Appendix 5.1)

Economic benefits and opportunities:

- Desirable settlement, recreational and tourism area
- New standard technology to lower emissions

Measures of success:

- Air quality that meets established national and provincial criteria
- Visibility resulting from air quality is not impaired
- Reduction in medical clinic visits for respiratory ailments

B.9.13 General Ecosystem Health

This section is intended to address broad issues and intent related to terrestrial and aquatic ecosystem health that are related to issues not described in the foregoing sections (i.e. B.9.1 through B.9.12). These include species, habitats or features not belonging to groups or types previously covered in the plan.

Issues:

- Reduced habitat effectiveness, connectivity and carrying capacity, habitat loss including alienation, and declining habitat suitability, are related to various factors including:

- Expanding infrastructure and settlement
 - Recreational use
 - Industrial developments
 - Access development and use
 - Catastrophic climatic events
 - Noxious and invasive weeds
- Introduction of non-native species leads to changes in species composition and may negatively impact native terrestrial and aquatic flora and fauna

Intent:

- Maintain and restore healthy, functioning ecosystems that are essential to the diversity, abundance, distribution and life histories of fish, wildlife, vegetation and water resources
- Maintain biodiversity in the plan area
- Apply an ecosystem-based approach to land and resource planning and management
- Consumptive uses (e.g. hunting, angling, water allocation, waste emissions) of environmental values will be regulated within the priority to maintain healthy, functioning ecosystems and populations
- Where private lands provide an important contribution to the maintenance of terrestrial or aquatic values, coordinate public/private land planning and management and encourage appropriate conservation measures on private land
- Discourage the introduction of non-indigenous flora and fauna
- Manage deciduous-leading stands for biodiversity
- Maintain the integrity of alpine environments to support species dependent on alpine habitats

Economic benefits and opportunities:

- Businesses that depend on fish, wildlife and wildland characteristics
- Healthy communities
- Sustainable natural resources

Measures of success:

- Healthy, functioning ecosystems
- Reduced introduction of non-native species
- Alpine-dependent species are sustained
- Ecosystem values are not fragmented by private lands

B.10.0 WATER

This chapter addresses water use regulated under the *Water Act*, flood protection measures, and management of drinking water sources including groundwater and Community and Domestic Watersheds. Riparian habitat, fish and water-based recreation and tourism are addressed elsewhere in this plan. An inventory of water licenses in the plan area and resource evaluation area is provided in Appendix 9.0.

The Canadian portions of the Wigwam and Flathead River basins, as well as portions of the Bull River and Elk River basins, are included in the plan area. These are large and significant rivers with high scenic, recreation and tourism values. All of these rivers, with the exception of the Flathead River, flow into the Kootenay River in B.C. The Flathead River flows about 60 km to the border of Montana, where it crosses into the US eventually flowing into the Clark Fork River, part of the extensive headwaters of the Columbia River. The Elk and Flathead Rivers and major tributaries are mostly high gradient and fast-flowing, their hydrographs dominated by spring freshets when discharge generally increases two to three fold over base flows.

In general, water quality in the plan area is very good, with the exception of portions of the Elk River that have been impacted by settlement and mining activities¹⁰. The water chemistry of these systems is highly influenced by the limestone parent geology of the Rocky Mountains. Water is generally alkaline, and autotrophic (algal) production in these rivers is strongly phosphorus limited.

Most lakes in the plan area are alpine, headwater lakes; the plan area also includes eight lakes larger than 5 hectares in size: Snowshoe, Weber, Hunger, Marl, Beryl, Three Mile, Frozen and Proctor lakes

Issues:

- Water quality, quantity and timing of flow can be impacted by commercial, residential and industrial development, as well as naturally-occurring events
- Potential for human-related channel disruptions and waste inputs are mainly associated with municipal development, coal mining, logging and cattle ranching
- There are Domestic Watersheds and Community Watersheds (as defined under the *Forest Practices Code*) within the plan area (Map B.10.1)
- Responsibility for water (including groundwater) resource management is fragmented across a number of agencies and levels of government, and is not well integrated or coordinated
- Cumulative impacts of human-related activities on water resources are currently not well addressed
- Water shortages exist on almost one quarter of the 89 licensed streams (Appendix 9.0) in the plan area. Most of the streams with recorded water shortages are small creeks and springs that are tributary to the Elk River
- **Water** shortages are likely to occur more often as the number of licenses issued is increased. Since streams have historically been allocated to the full low flow, there is potential for no flow to be left for aquatic life in streams during the low flow period where water shortages occur

¹⁰ State of Water Quality of Elk River at Highway 93 (Phillips Bridge) 1984-1995. Feb. 1997. Water Quality Sec, Water Mgmt Br., MELP and Monitoring & Systems Br., Env.Can. Pacific/Yukon Reg.

- The Elk River basin has experienced flooding problems during May, June and July. Mapping of hazard areas and restrictions has reduced risk in the more populated areas. In recent years, most flood damage occurred along Coal and Michel creeks
- There are increasing demands for water-related tourism and recreation opportunities throughout the plan area, especially on the Elk River
- Wetlands and marshes are fairly rare and, for that reason, maintenance of water quality and quantity is particularly important for species dependent on these habitats
- The Flathead River is designated as a Wild and Scenic River in the USA
- The flows of the Wigwam and Flathead Rivers in Canada are unrestricted whereas there are small run-of-river hydroelectric facilities on the Bull and the Elk Rivers.
- There are insufficient data on groundwater resources
- Intake source of many license users is not accurately mapped
- Natural processes may result in undesirable water quality impacts

Intent:

- Maintain basic aquatic ecosystem functions and processes
- Maintain water quality, quantity and timing of flow at appropriate levels in the plan area
- Maintain water quality according to criteria established by provincial regulatory agencies
- In designated Community Watersheds in the plan area (Map B.10.1), forestry, grazing, subsurface resource exploration, infrastructure, and backcountry tenure activities will be guided by existing legislation, regulations and guidebooks (refer to Best management practices) as amended periodically by regulatory agencies.
- Apply an integrated approach to surface water quality management in Community Watersheds
- Domestic Watershed Guidelines (refer to Best management practices Appendix 5.2) will guide forestry, grazing, subsurface resource exploration, infrastructure, and backcountry tenure activities in domestic watersheds in the plan area. Currently defined domestic watersheds are shown on Map B.10.1.
- To minimize risk to lives and property from flooding, activities such as forestry, grazing, subsurface resource exploration, infrastructure, and backcountry tenures which occur in the plan area upstream of alluvial fans (Map B.10.2) will be guided by the assessment procedure described in Best management practices (Appendix 5.3).
- A Water Allocation Strategy as described in Appendix 9.0 may be used to guide water licensing decisions in the plan area
- Manage quality and quantity of groundwater in the plan area
- Identify water bodies in the plan area that may be most suitable for new economic opportunities

Resource objectives:

Objective 10.0.1

To reduce impacts of forest development on S5 and S6 streams (as defined in the *Forest Practices Code*) licensed for human consumption in the plan area, apply the following stream side management provisions:

- The stream side management zone will extend from the edge of the stream channel bank or the outer edge of the active floodplain, to a minimum distance of 30 metres on each side of the stream, or to the top of the inner gorge, whichever is greater;
- For activities within the stream side management zone, specific measures to safeguard water quality for human consumption must be described in development plans and permits;
- The provisions apply to all S5 and S6 streams upstream of a water intake licensed for human consumption (see Map B.10.1 for location of water intakes) except where the stream is within the Enhanced Resource Development Zones – Timber (Map B.4.1) or it has been established that a licensed intake is not being utilized for human consumption.

Objective 10.0.2:

To reduce risk to water supplies within designated community watersheds in the plan area (Map B.10.1), forest development activities must be preceded by:

- An assessment of watershed sensitivity and existing impacts to water quality and flow from previous development
- An assessment of the risks to water quality and flow which are posed by the proposed activity
- Where significant risks are identified, measures to mitigate the risks will be established.

This requirement may be waived by the designated official if it is felt the extent of the proposed disturbance is so minor that there will be no significant impact to water quality and flow.

Best management practices:

- Community Watersheds: *Interior Watershed Assessment Procedure Guidebook version 2.1* (MOF, April 1999)
- Domestic Watersheds Best Management Practices (Appendix 5.2)
- Risk Assessment Procedure for Proposed Resource Development Activities Above Alluvial and Debris Torrent Fans (Appendix 5.3; Boyer, 2001)

Economic benefits and opportunities:

- Small independent hydroelectric projects
- Industrial and commercial developments
- Agricultural production
- Recreation and tourism developments
- Private and public infrastructure developments
- Water monitoring
- Community development and expansion
- Sustainable fish and wildlife resource
- Cost-effective drinking water systems

Measures of success:












- Water Allocation Strategy completed and implemented
- Instream flow requirements implemented for conservation of fish habitat and aquatic ecosystems
- Water available for communities, development and licensing opportunities
- Water quality and quantity criteria are met
- Cost-effective delivery of drinking water
- Resource development plans address water quality, quantity and timing of flow
- Standards for surface water flow are met
- Standards for groundwater levels and conditions, when developed, are met
- Flood damage is reduced
- Adequate monitoring of water quality and quantity
- Riparian areas are in proper functioning condition

Maps:

- | | |
|--------|-------------------------|
| B.10.1 | Watersheds |
| B.10.2 | Designated Hazard Areas |
| E.10.1 | Watersheds |
| B.10.2 | Designated Hazard Areas |

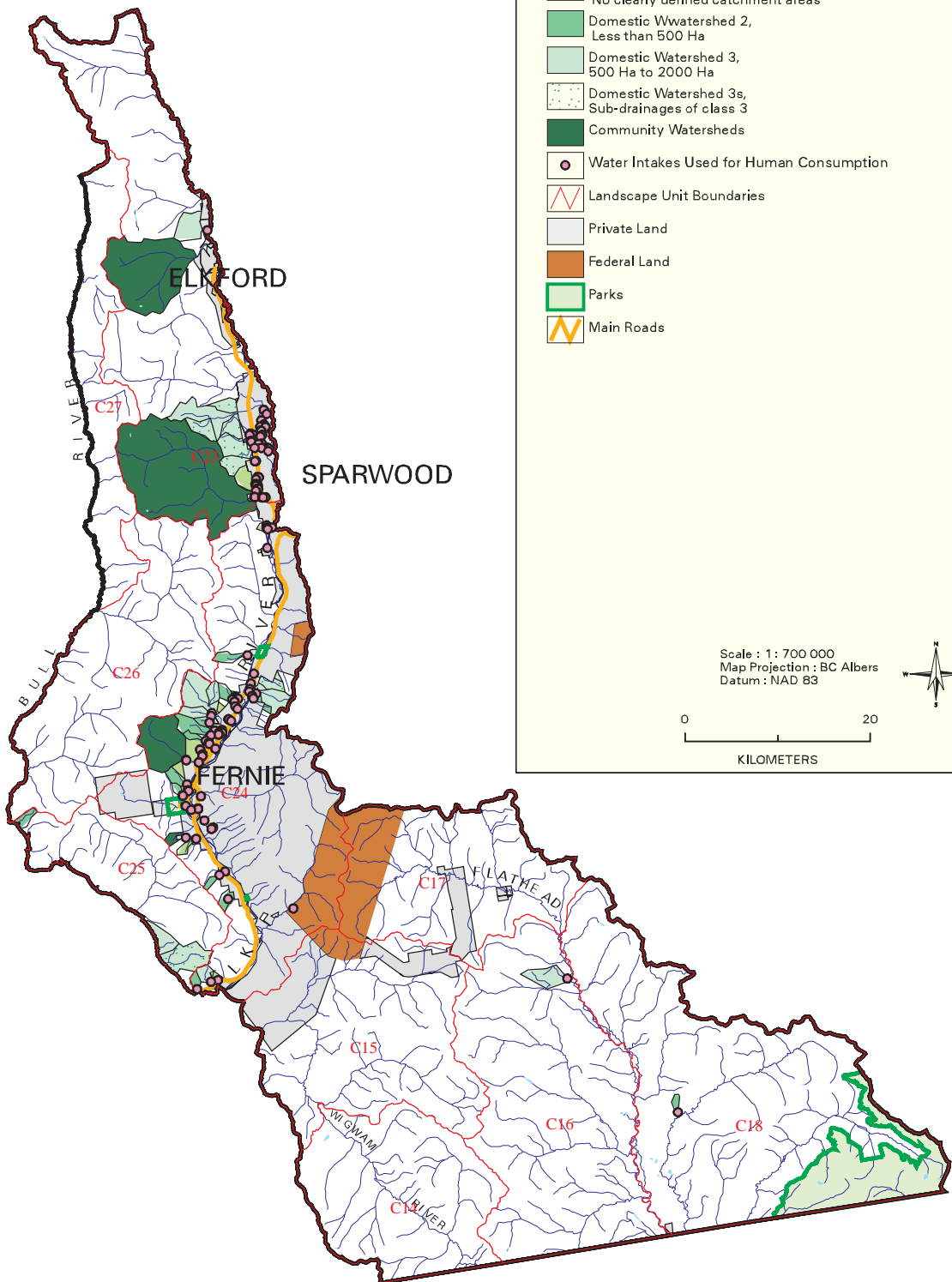
Southern Rocky Mountain Management Plan Map B.10.1 Watersheds

Legend

-  Domestic Watershed 1,
No clearly defined catchment areas
-  Domestic Watershed 2,
Less than 500 Ha
-  Domestic Watershed 3,
500 Ha to 2000 Ha
-  Domestic Watershed 3s,
Sub-drainages of class 3
-  Community Watersheds
-  Water Intakes Used for Human Consumption
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



Southern Rocky Mountain Management Plan
Map B.10.2 Designated Hazard Areas

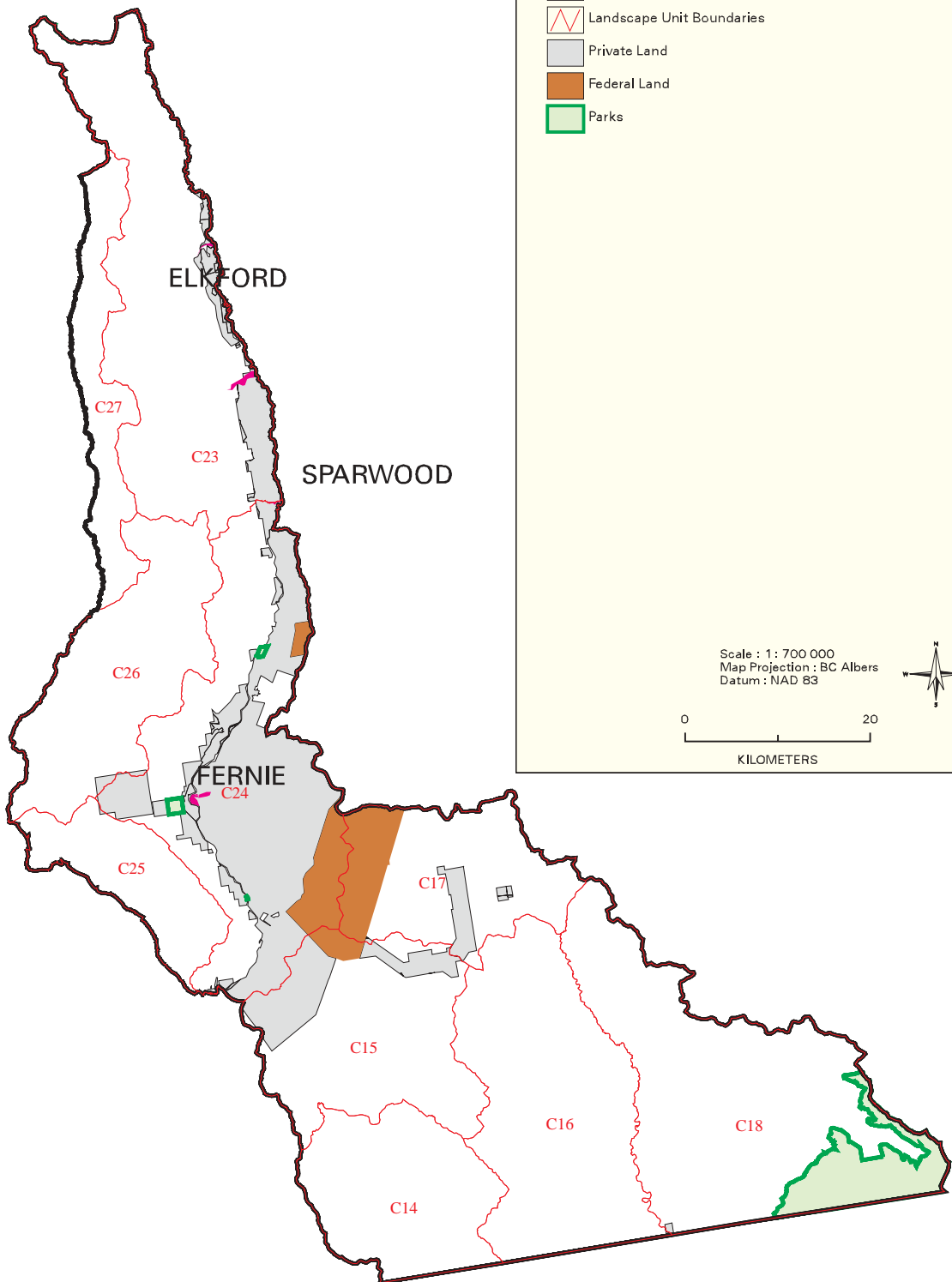
Legend

-  Alluvial Fans
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83



0 20
KILOMETERS



B.11.0 VISUAL LANDSCAPES

The scenic quality of front-country landscapes and specific backcountry locations is important to communities, recreation and tourism. Historically, the area has attracted visitors who enjoy the natural scenic setting of the area. Steady growth has taken place in the number and size of businesses that cater to these visitors. The resultant increase in activity and developments has changed the relative importance of scenic landscapes and tourism.

Issues:

- Tourism, recreation and other economic values can be affected by the scenic quality of the landscape. Resource extraction, facilities and infrastructure development that modify the natural landscape can have major impacts on visual quality both within and outside the plan area
- The increasing economic benefits to Fernie and the appeal of the plan area as a world-class destination are partly predicated on its outstanding aesthetic surroundings. A higher profile as a tourism destination has the potential to improve on investor confidence and increase tourism businesses and employment within the plan area
- Forest operations in the Upper Kishinena and Sage Creek watersheds may result in visual impacts to some views from Waterton-Glacier International Peace Park

Intent:

- Maintain scenic quality of Crown land visible from communities, highways and major lakes to reflect a range of visual sensitivity and significance to communities and tourism
- Design timber harvesting, forest management and subsurface resource exploration and development to reflect the importance of specific backcountry landscapes to commercial tourism facilities and tenure areas
- Provide for scenic rehabilitation in areas that exhibit visual impacts
- Employ operational practices and techniques to maintain visual quality
- Implement visual landscape management efficiently and cost-effectively
- While it is recognized that subsurface exploration and development and utility corridors may result in visual disturbance not conforming to Visual Quality Objectives (VQOs), visual landscape design principles will still be applied
- Forest operations within backcountry viewscapes seen from commercial recreation lodges need to consider visual landscape design principles
- Forest operations within the Upper Kishinena and Sage Creek watersheds should consider visual landscape design principles

Resource objectives:

Objective 11.0.1

Within the plan area, resource development activities will meet visual quality objectives (VQOs) from defined viewpoints as per Map B.11.1. Where a registered professional forester determines that there are demonstrated forest health or forest protection concerns sufficient to warrant a reduction in visual quality objectives, a VQO of retention may be reduced to a VQO of partial retention and a VQO of partial retention may be reduced to a VQO of modification; however, principles of good landscape design must still be employed. Approved utility corridors and approved subsurface resource exploration, development and production, may result in disturbance in excess of the VQO.

Objective 11.0.2

Within the plan area, new resource development within 200 metres of the following rivers will be designed such that modifications will remain visually subordinate: Bull River, Elk River, Wigwam River, and Flathead River. Where a registered professional forester determines that there are demonstrated forest health or forest protection concerns sufficient to warrant a reduction in visual quality, forest management activities may exceed this objective. Approved utility corridors and approved subsurface resource exploration, development and production, may result in disturbance in excess of this objective.

Best management practices:

- *Visual Landscape Design Training Manual (MOF, 1994).*
- *Visual Impact Assessment Guidebook (MOF, 2001)*
- Consultation with the backcountry tourism operators and consideration of potential visual impacts for resource developments in backcountry viewscapes seen from commercial lodges and cabins.

Economic benefits and opportunities:

- Increased certainty to the tourism industry
- Tourism initiatives that market the scenic qualities of the plan area

Measures of success:

- Best available information is utilized in resource development and management plans
- Achievement of basic definition of VQO
- Resource developments show elements of good landscape design
- Increased cooperation between resource development sectors and commercial recreation and tourism operations
- Increased economic value in the tourism sector

Maps:

B.11.1 Visual Quality Objectives

E.11.1 Visual Quality Objectives

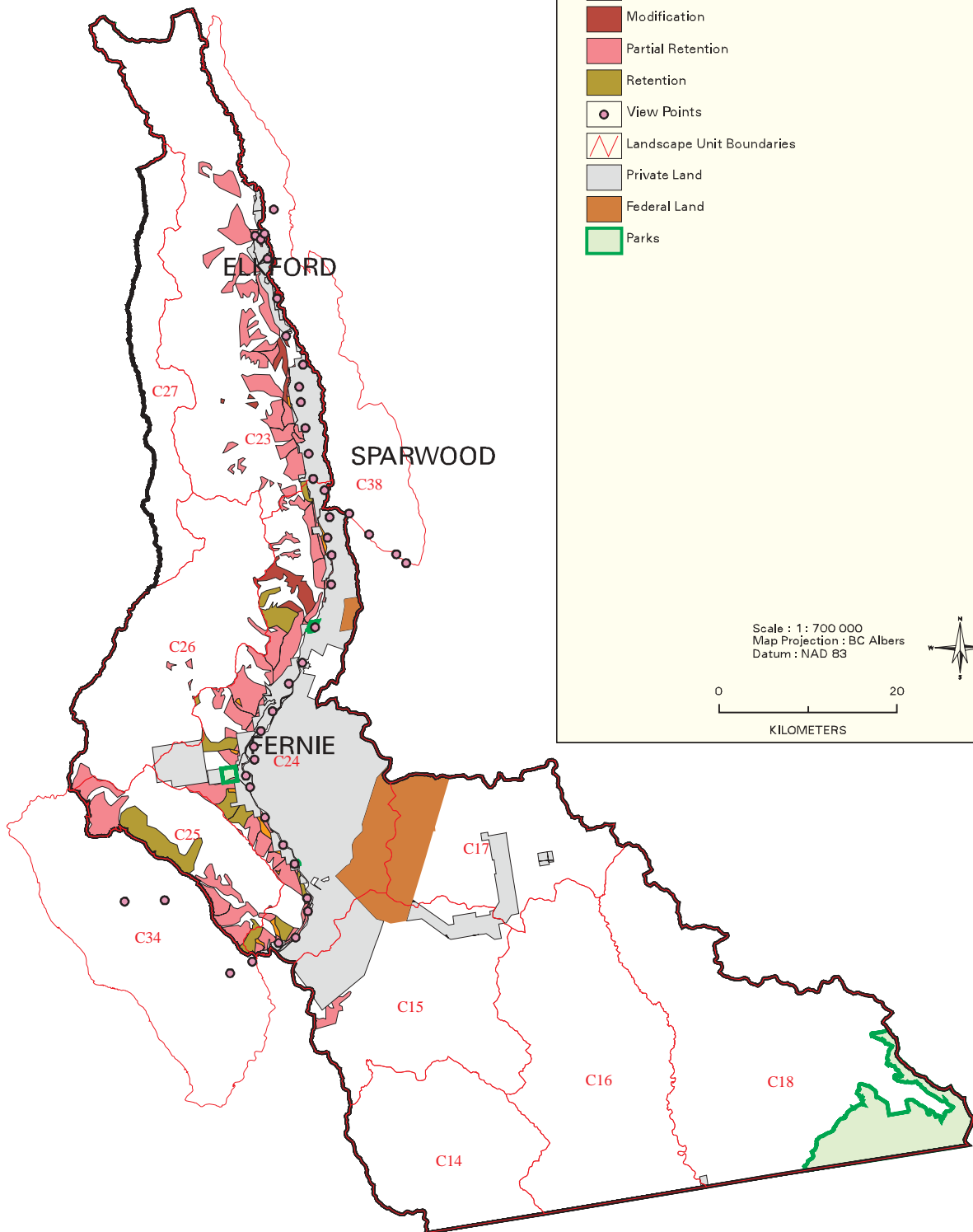
Southern Rocky Mountain Management Plan
Map B.11.1 Visual Quality Objectives

Legend

- Non-Visible
- Modification
- Partial Retention
- Retention
- View Points
- Landscape Unit Boundaries
- Private Land
- Federal Land
- Parks

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



B.12.0 HERITAGE AND PALEONTOLOGICAL RESOURCES

The plan area and resource evaluation area contain heritage resources related to First Nations, as well as early settlement, oil and gas exploration and coal development. First Nations' cultural areas and traditional use have not yet been addressed (see Chapter B.2.0) and are not included in this section.

Significant fossil localities and potential are known to exist within the plan area and resource evaluation area.

Issues:

- Significant heritage and paleontological resources need to be maintained
- There are privacy issues associated with accessing information concerning known sites on Crown land: balancing the need for confidentiality with the requirement to consider known sites in resource development
- Data collection methodology, definitions and management are not consistent
- The knowledge base concerning paleontological and heritage resources is incomplete
- There is increased interest in collecting fossils and cultural artifacts, including commercial tours
- There is potential for loss of fossils and cultural artifacts from the region, including illicit trade
- Potential scientific value of fossils and cultural artifacts is not always well realized

Intent:

- Conserve significant heritage and paleontological resources
- Maintain confidentiality of heritage and paleontological information
- Maintain or enhance economic opportunities based on heritage and paleontological resources subject to conserving the resource base

Best management practices:

- *Protocol agreements for the management of cultural heritage resources between MSRM and Ministry of Forests and MSRM and the Oil and Gas Commission*

Economic benefits and opportunities:

- Research and education
- Heritage and paleontological tours
- Interpretive facilities
- Restoration projects

Measures of success:

- Public and resource users who are knowledgeable about heritage and paleontological resources and the need to treat them with respect
- Effective mitigation measures incorporated into resource development proposals
- Sites designated under the *Heritage Conservation Act*
- Sustainable commercial ventures with a heritage or paleontological theme

B.13.0 COMMUNITIES, SETTLEMENT AND INFRASTRUCTURE

The plan area lies entirely within the Regional District of East Kootenay. There are three incorporated communities (Ferne, Sparwood and Elkford, see map B.1.1) and other unincorporated communities in the Elk valley between Elko and Elkford that are located immediately adjacent to the plan area. New settlement pressures are largely related to expanding tourism and recreation economies and are primarily, though not entirely, focused in the Fernie area.

There are currently no communities or full-time residents within the Flathead or Wigwam drainages (LU C14-C18).

Well-established infrastructure, including power lines, communications sites, rail-lines, highways, secondary roads and gas pipelines, exists within the plan area. With the closure of the Flathead US border crossing, there is no longer road access to the US within the plan area.

Issues:

- Fernie and its surrounding area is growing in response to recreation/tourism development
- There are potential discrete and cumulative impacts of communities, settlement uses and infrastructure on fish, wildlife, water, visual and other resource values
- Activities on lands owned privately and by Federal and municipal governments may have a significant impact on the plan area and potential success of plan objectives
- There is increasing community dependence on recreation/tourism development, particularly in Fernie, with resultant changes in social values
- Canadians and Americans place high value on the undeveloped character of the Flathead valley

Intent:

- Maintain community stability and opportunities for growth, while sustaining other values
- Suitable Crown land parcels will be available for settlement uses; specifically:
 - allocation of Crown land for settlement uses will primarily be delivered from Crown lands within municipal boundaries, Official Community Plan areas and settlement corridors
 - first consideration for community expansion opportunities will be in areas adjacent to existing communities
- Crown land allocations for settlement purposes will be directed away from significant environmental or resource values, such as connectivity corridors, key wildlife habitats, and high-capability agricultural lands or forest lands and areas of high subsurface values or interests
- New or expanded infrastructure will consider wildlife values including the need to maintain connectivity, particularly for grizzly bear
- New infrastructure in the Flathead, Wigwam and Bull River drainages in the plan area will be limited to areas in close proximity to existing facilities (e.g. twinning of pipelines or power-lines) unless there is a lesser environmental impact to locate elsewhere, or to that required to service and/or support approved development projects (e.g. mines, petroleum wells, tourism accommodations)
- Encourage the coordination of planning, construction and maintenance of pipelines, roads and other services
- Keep the BC-Montana border crossing in the Flathead valley closed

- Encourage cooperation among First Nations, local, Provincial and Federal governments with respect to various planning initiatives (for example, the Regional District's regional growth initiative)
- Integrate the objectives of the SRMMP with activities on privately-owned, Federal and municipal lands
- New infrastructure in community and domestic watersheds (see Map B.10.1), in those cases where an Environmental Assessment review is not required, will be consistent with Chapter B.10.0

Resource objectives:

Objective 13.0.1

Crown land will not be allocated for community or residential development within the Flathead, Wigwam and Bull River drainages (LU C14 - C18, C26 and C27) in the plan area (see Map B.1.1)

Best management practices:

- *Guidelines for evaluating, avoiding and mitigating impacts of major development projects on wildlife in BC (Harper et al, Osiris Wildlife Consulting, 2001)*
- *Current MOU's or protocol agreements between LWBC and Provincial referral agencies*

Economic benefits and opportunities:

- Community growth and related business expansion
- Infrastructure enhancements
- Tourism and recreation opportunities associated with the Flathead, Wigwam and Bull River drainages
- Resource development opportunities (e.g. mining, timber harvesting)

Measures of success:

- Community economic growth
- Well-planned, viable and vibrant communities
- Maintenance of conservation values

PART C - PLAN MONITORING AND REVIEW

Monitoring of ongoing activity and management direction is essential to determine the appropriateness of management decisions and the success of implementation methods. Monitoring provides the basis for determining whether the desired conditions for the plan are being achieved. Monitoring will also serve to indicate required amendment to implementation and plan direction.

Plan review is required to amend resource management direction as social values change and as new information becomes available. It is also recognized that adaptive resource management may lead to refinements of the plan, based on monitoring results or other factors. The Ministry of Sustainable Resource Management will co-ordinate any required review of, or amendment to, the SRMMP.

C.1.0 Role of Provincial Government Inter-Agency Committee (IAC)

The provincial government's role in plan amendments, monitoring and implementation occurs at both an individual agency level and at an inter-agency level. Inter-agency co-ordination is a critical factor in ensuring successful implementation of strategic land use plans. At the local level, inter-agency co-ordination will occur through the Southern Rocky Mountain Advisory Committee (see C.2.0 below). At the Regional level, the regional Inter-Agency Committee (IAC) will provide a venue for discussion, as necessary, of proposed plan amendments and plan implementation as they relate to other government agencies.

C.2.0 Advisory Committee for SRMMP (SRMAC)

A Southern Rocky Mountain Advisory Committee (SRMAC) will be established by the Ministry of Sustainable Resource Management (MSRM). It will have a broad and balanced representation from government agencies, the Ktunaxa Nation, the private sector, and public interests.

The Southern Rocky Mountain Advisory Committee (SRMAC) will be composed of sectors that have either participated in or are familiar with the plan's development, and represent a diverse cross-section of interests. The role of the SRMAC will be twofold:

1. To provide advice to government on plan monitoring, implementation and effectiveness
2. To recommend to MSRM changes in plan direction and content

To achieve these roles, the committee will convene on a regular basis, and will operate as per the Terms of Reference found in Appendix 4.0 of this plan.

C.3.0 Plan Monitoring

Monitoring of the Southern Rocky Mountain Management Plan should help achieve the following objectives:

- To identify if plan implementation is occurring as intended;
- To provide data for the review of the effectiveness of implemented management direction, and identify required changes to implementation methods;

- To ensure correct mapping boundaries and provide clearer interpretation for implementation and plan support; and
- To identify required changes to strategic management direction resulting from changes in social, economic and environmental conditions which may lead to the development of more detailed and appropriate management direction where necessary.

C.3.1 Monitoring Factors, Indicators and Procedures

The role of monitoring will be a function of both government and the SRMAC. Much monitoring will take the form of subjective evaluation of anecdotal information. As resources allow, this process will occur more formally via new inventories and research projects or recording of information gathered either directly or through user input regarding use patterns, public sentiment, and incidents.

An Implementation Monitoring Report, covering progress, implementation issues and/or constraints, will be prepared on a periodic basis. This report will provide an assessment of how well the direction from the Plan is being reflected in operations.

Effectiveness assessment should analyze trends based on a set of indicators to be developed and maintained by the SRMAC (see Appendices 2.0 and 4.0). The results from this monitoring will be used as a primary adaptive management tool, to indicate adjustments in the SRMMP and potentially in other government programs, policies and procedures that may be warranted in order to more effectively realize the stated objectives. An Effectiveness Monitoring Report will be prepared periodically, as resources permit, to determine whether the SRMMP is meeting its desired outcomes.

C.4.0 Plan Review and Amendments

Major or minor plan review and amendments may be initiated through scheduled plan revisions or through unscheduled plan revisions as a result of unforeseen events.

A major scheduled review of the plan will occur within five to ten years. However, local or operational planning processes may, through more detailed mapping, research or public involvement, recommend unscheduled minor or major amendments to the SRMMP. The MSRM will be responsible for assessing whether unscheduled amendment proposals should proceed and for determining what action will be taken. Examples of events that may trigger the need to consider, or proceed with, an unscheduled amendment are:

- the conclusion of a major project proposal review (e.g. an Environmental Assessment process decision) which results in a management decision that differs from the management direction expressed in the SRMMP;
- a significant disturbance to a particular area within the region (e.g., fire, insect/disease outbreak);
- the outcome of SRMAC meetings (see Section C.2.0);
- a government decision in the form of a Cabinet directive, or the adoption of new legislation or regulations.

Whether scheduled or unscheduled, proposed plan amendments will be discussed at SRMAC meetings, and then forwarded to the MSRM Regional Director for decision. The Regional Director will review the proposed amendments, assess whether it is major or minor in nature, potentially

review with IAC, and make a decision whether to: 1) adopt the amendment proposal; 2) reject the amendment proposal; or 3) if considered a major amendment, forward the amendment proposal on to the Deputy Minister for further consideration and recommendation to the Minister of MSRM.

C.4.1 Major versus Minor Plan Amendments:

Major amendments to the plan include changes that potentially result in a substantive alteration to the balance of the plan. Examples of such alteration may involve:

- amendment to a particular objective or strategy that would significantly change the priority given to the use of resources in the area for which the change is proposed (e.g. change to strategic guidelines that the forest industry must follow when harvesting timber);
- changes to recreation access or development designations in areas that are highly contentious;
- addressing future issues concerning the balance between commercial and public recreation;
- amendment of the planning area boundary to either take in or delete a substantial amount of land area.

Comment from the general public will be solicited concerning all proposed major strategic amendments to the plan.

Major plan amendments will be approved by the Minister of Sustainable Resource Management or their designate. All major changes to the plan will be documented and made available to SRMAC representatives and the general public.

Minor amendments to the plan include changes that do not result in a substantive alteration to the balance of the plan. Examples of such changes include:

- revisions of wording;
- change to recreation access or development designations in areas which are not highly contentious;
- refinement of different types of recreational motorized uses in motorized zones or between different types of recreational non-motorized uses in non-motorized zones;
- changes to the location of motorized road corridors which maintain the original plan intent
- minor changes to guidelines affecting industry - such as a minor change to connectivity matrix based upon better scientific information;
- incorporation of new resource inventory or research data

Minor plan amendments will be approved by the Regional Director of MSRM or their designate. All minor changes to the plan will be documented and made available to SRMAC representatives and the general public.

PART D - OPERATIONAL IMPLEMENTATION

The plan will be implemented through a combination of regulated (legal), policy, and unregulated (voluntary) methods. Successful implementation of the plan will depend on government funding and staffing levels and on cooperation and development of partnerships with private sector and community groups. Government, private and public sectors need to work together to achieve plan implementation.

Appendix 3.0 contains a preliminary listing of implementation tasks and projects which involve government agencies and may involve private and public sectors.

D.1.0 Agency Implementation Role

Government agencies will need to be consistent with this plan when conducting or approving operational resource management activities or plans. Resource-specific development plans or permits will take guidance from this plan.

It is recognized that, to meet the plan's overall intent, there may be extenuating circumstances that require a variance to a specific Resource objective in the plan. Such variances may be granted by the Regional Director of MSRM, or their designate, based on a submission from the appropriate government permitting agency.

Government agencies will need to develop work plans, within their funding and staffing constraints, for delivering specific operational components of this plan.

The work plan(s) should include:

- Identification of priority projects.
- Identification of key supporting actions that are necessary to complete priority projects and to deliver on the strategic direction of the plan. These include actions that require the involvement of two or more ministries and actions that are solely the responsibility of one agency, but are linked to other SRMMP Implementation Strategy projects.

Information from biennial Implementation Monitoring Reports (see section C.3.0) will also assist in formulating annual work plan items for the future.

D.2.0 Private Sector Role

Private sector operations on Crown land need to be consistent with this plan. The private sector will be encouraged to work cooperatively with government agencies and the public in ensuring that the objectives and intent of this plan are met.

At their discretion, private land owners are encouraged to manage their private land operations in a manner that is complementary to the intent and objectives of this plan.

D.3.0 Public Role

Public use of Crown lands will be expected to comply with this plan.

The public will also be encouraged to assist with monitoring the effectiveness of this plan and recommending any changes that might be needed.

PART E – LIST OF MAPS

- E.1.1 Overview
- E.4.1 ERDZ – Timber
- E.7.1.1 Recreation Access - Snowfree
- E.7.1.2 Recreation Access - Snowbound
- E.9.1.1 Flathead Enhanced Riparian Zones
- E.9.2.1 Old Growth Management Areas (OGMA) and Mature Management Areas (MMA)
- E.9.3.1 Biogeoclimatic Subzones (BEC)
- E.9.4.1 Core Grizzly Bear Areas
- E.9.6.1 Ungulate Winter Range
- E.9.6.2 Ungulate Winter Range Habitat Types
- E.9.9.1 Connectivity
- E.10.1 Watersheds
- E.10.2 Designated Hazard Areas
- E.11.1 Visual Quality Objectives

PART F - DEFINITIONS

The following terms are provided to assist in the review of the SRMMP

Term	Definition (source/where found)
Animal Unit Month	<i>As defined under the Range Act</i>
BEC	Biogeoclimatic Ecosystem Classification System; see Biogeoclimatic zones, subzones and variants.
Biodiversity	The diversity of plants, animals and other living organisms in all their forms and levels of organization, including genes, species and ecosystems and the evolutionary and functional processes that link them (<i>from Kootenay Boundary Land Use Plan- Implementation Strategy "KBLUP-IS"</i>)
Biodiversity emphasis	Biodiversity emphasis is a management decision that directs the recommended seral stage distribution for natural disturbance types. It may be assigned as high, intermediate or low. See <i>Landscape Unit Planning Guide (MOF/MELP, March 1999)</i>
Biogeoclimatic zones, subzones and variants	<i>As defined in "A Field Guide for Site Identification and Interpretation for the Nelson Forest Region", Land Management Handbook, Number 20, MoF, May 1992</i> http://www.for.gov.bc.ca/hre/becweb/index.htm
Carrying capacity	The population of a given species that can be supported indefinitely in a defined habitat without permanently damaging the ecosystem upon which it is dependent
Coarse woody debris	Sound and rotting logs and stumps that have the potential to provide habitat for fungi, plants, animals and insects and their predators, and that provide a source of nutrients for soil development (<i>from KBLUP-IS</i>)
Community Watersheds	<i>As defined under the Forest Practices Code of BC Act (FPC)</i>
Core grizzly bear areas	Areas identified as having the inherent habitat attributes that support high density grizzly bear populations
Crown Forested Land Base (CFLB)	<i>As defined in the Landscape Unit Planning Guide (MOF/MELP, March 1999)</i>
Crown Range	<i>As defined under the Range Act</i>
Domestic Watersheds	(<i>As defined in KBLUP-IS</i>) The drainage area above the downstream point of diversion on a stream which is a) licensed under the <i>Water Act</i> for human consumption; b) not classified as a community watershed under the <i>FPC</i> ; or c) usually not more than 200 km ² in drainage area
Drinking Water Sources	<i>As defined under the Drinking Water Protection Act</i>
Endangered species	<i>As defined under the Wildlife Act</i>
Enhanced Resource Development Zone for Coal (ERDZ-C)	Coal-bearing lands in the East Kootenay Land Use Plan identified for intensive coal mining.

Enhanced Resource Development Zone for Timber (ERDZ-T)	Forested lands in the Kootenay Boundary Higher Level Plan identified for intensive forestry.
Facility	Any building or structure including formal and informal recreation and tourism-related structures, except for installations required for environmental monitoring and research
Formal recreation and tourism-related structures	Public and commercial day use huts/cabins, small overnight huts/cabins, outbuildings, toilets, and commercial lodges and their outbuildings
Fur-bearing animal	<i>As defined under the Wildlife Act</i>
Guide-outfitter	<i>As defined under the Wildlife Act</i>
Identified wildlife	<i>As defined in the FPC Operational Planning Regulation</i>
Landscape Unit	A planning area established under the FPC by the District Manager, up to 100,000 hectares in size, based on topographic or geographic features such as a watershed or grouping of watersheds. Landscape Units form the basic geographical unit for integrated resource planning.
Limits of acceptable change	A planning framework for establishment of limits in the change that may occur within physical-biological and social-psychological parameters of recreational opportunity
Livestock	<i>As defined under the Range Act</i>
Mineral	<i>As defined under the Mineral Tenure Act</i>
Modification (VQO)	Management activities or alterations may be visually dominant. However, alterations must borrow from natural line and form to such an extent and on such a scale that they are comparable to natural occurrences. Design of alterations is a major consideration.
Old Growth	<i>As defined in the Landscape Unit Planning Guide (MOF/MELP 1999)</i>
Partial Retention (VQO)	Management activities or alterations will remain visually subordinate. Repetition of the form, line, colour and texture is important to ensure a blending with the landscape's dominant elements. Design of alteration is a critical factor.
Proper Functioning Condition	<i>See Appendix 24.4 and the Riparian Management Area Guidebook,</i>
Protected lands	Parks, Ecological Reserves and other lands set aside from timber harvesting and mining activity.
Qualified registered professional	A Registered Professional Forester, Professional Geoscientist, Professional Engineer, Registered Agrologist or Registered Professional Biologist, with qualifications and training appropriate to the resource objective being addressed.
Range development	<i>As defined under the Forest and Range Practices Act</i>
Range Land	<i>As defined under the Forest and Range Practices Act</i>
Range practice	<i>As defined under the Forest and Range Practices Act</i>
Range Stewardship Plans	<i>As defined under the Forest and Range Practices Act</i>
Range Use Plans	<i>As defined under the Forest and Range Practices Act</i>

Retention (VQO)	Management activities or alterations will not be visually evident. The goal is to repeat the line, form, colour and texture of the characteristic landscape. Design of alterations is an important factor.
Resident hunter or angler	<i>As defined under the Wildlife Act</i>
Settlement	Use of Crown land for residential, recreational, community, commercial and industrial purposes. (<i>KBLUP – IS, Chapter 3, page 73</i>)
Settlement corridor	Areas between existing community areas and adjacent to existing transportation routes, where there is already extensive private land or where specific settlement opportunities are known. They are often support areas for adjacent communities. (<i>Kootenay-Boundary Land Use Plan – Implementation Strategy</i>)
Site series	<i>As defined in “A Field Guide for Site Identification and Interpretation for the Nelson Forest Region”, Land Management Handbook, Number 20, MoF, May 1992</i>
Species at risk	Species and plant communities listed provincially as rare and endangered (red-listed), vulnerable (blue-listed) or species of regional management concern (yellow-listed) are considered to be species at risk (see <i>FPC Operational Planning Regulation</i>)
Stream including S5 and S6	<i>As defined in the FPC Operational Planning Regulation</i>
Subsurface resources	Resources whose presence is normally hidden from direct view, including metallic minerals, industrial minerals, aggregate, rock, coal, coalbed methane, oil, natural gas and geothermal energy. Does not include groundwater
Successful regeneration	A cutblock is considered to have successful regeneration once a stocking survey has confirmed that the cutblock is satisfactorily restocked
Sustainable Resource Management Plan (SRMP)	A landscape-level strategic land-use plan, generally based on groupings of landscape units.
Timber Harvesting Land Base (THLB)	<i>Landscape Unit Planning Guide (MOF/MELP, March 1999)</i>
Trapline	<i>As defined under the Wildlife Act</i>
Two-zone system	A 2002 amendment to the <i>Mineral Tenure Act</i> which produced two zones with respect to mining access rights. The Protected Zone is off limits to mining-related activities, while the Mineral Zone, comprised of all other lands, is open to these activities.
Ungulates	A group of terrestrial mammals that are characterized by the presence of hooves (Shackleton, 1999). The indigenous ungulate species in the plan area are elk, moose, mule deer, whitetail deer, mountain goat and Rocky Mountain bighorn sheep.
Ungulate Winter Range	<i>As defined in the FPC Operational Planning Regulation</i>
Visual Impact Assessment	An assessment that is carried out to demonstrate that resource developments are consistent with the established VQO for a scenic area. A visual impact assessment simulates, in perspective view, the visual effects on the landscape of proposed operations
Visual Quality Objective (VQO)	A resource management objective established to reflect the desired level of visual quality based upon the physical characteristics and social concern for a scenic area

Wildlife	<i>As defined under the Wildlife Act</i>
Wildlife habitat	<i>As defined under the Wildlife Act</i>
Wildlife tree	<i>As defined in the FPC Operational Planning Regulation</i>

PART G – ACTION PLAN FOR KTUNAXA NATION PARTICIPATION IN THE SRMMP

The SRMMP area lies within the traditional territory of the Ktunaxa Nation, which includes Kinbasket peoples (“Ktunaxa”). While the Ktunaxa were informed of the SRMMP throughout the planning process, they do not consider that consultation, as of August 2003, has been meaningful or adequate. This Action Plan describes the process by which the Ktunaxa will work with the Ministry of Sustainable Resource Management (MSRM) over the next year to attempt to address the Ktunaxa’s interests in the SRMMP area.

1. The Ktunaxa-Kinbasket Tribal Council (KKTC), on behalf of the Ktunaxa, will coordinate the creation of a Ktunaxa Land Use Plan (“Ktunaxa Plan”) within the SRMMP area. This plan will zone the area from the perspective of Ktunaxa interests and will be developed through members of a KKTC Planning Committee with participation of members of the Ktunaxa Nation.
2. A Technical Working Committee will be established by the KKTC and MSRM that includes representatives of the KKTC Planning Committee, and KKTC and MSRM staff. This Working Committee will review the SRMMP by Landscape Unit and integrate the SRMMP and the Ktunaxa Plan. It will liaise with the Ktunaxa through the Ktunaxa representatives on the Working Committee and with relevant line agencies, as required, to resolve issues, seek input and inform.
3. Recommendations from the Technical Working Committee will be provided to the MOU Committee established under the Memorandum of Understanding for Policy and Land Use Planning between MSRM and the KKTC (“MOU”). The MOU Committee, composed of senior KKTC and MSRM representatives, will review and approve recommendations and forward these to the Southern Rockies Management Advisory Committee (SRMAC).
4. The SRMAC (whose membership includes First Nations, stakeholders and agency representation) will consider recommendations from the MOU Committee and recommend major and minor amendments to the SRMMP as outlined in the Plan. SRMAC provides the opportunity for formal stakeholder and government agency input to the amendments recommended by the MOU Committee, and informs the public.

APPENDICES







SOUTHERN ROCKY MOUNTAIN MANAGEMENT PLAN

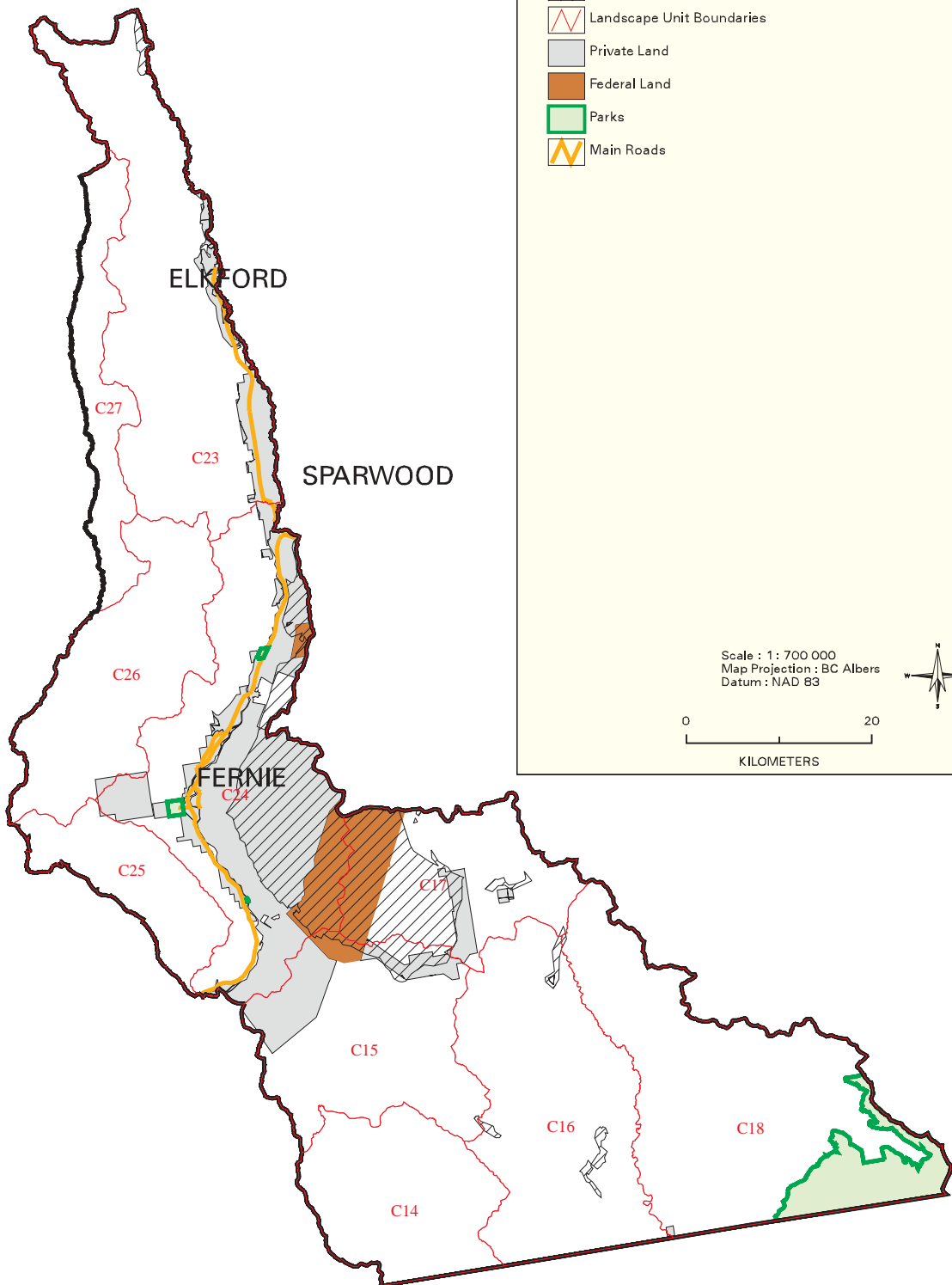
APPENDIX 1.0 Maps not required to implement plan direction

App.3.1 Coal-Bearing Lands
App.3.2 Mineral Potential

Southern Rocky Mountain Management Plan
Map App.3.1 Coal-Bearing Lands

Legend

-  Coalfields
-  Landscape Unit Boundaries
-  Private Land
-  Federal Land
-  Parks
-  Main Roads



















Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



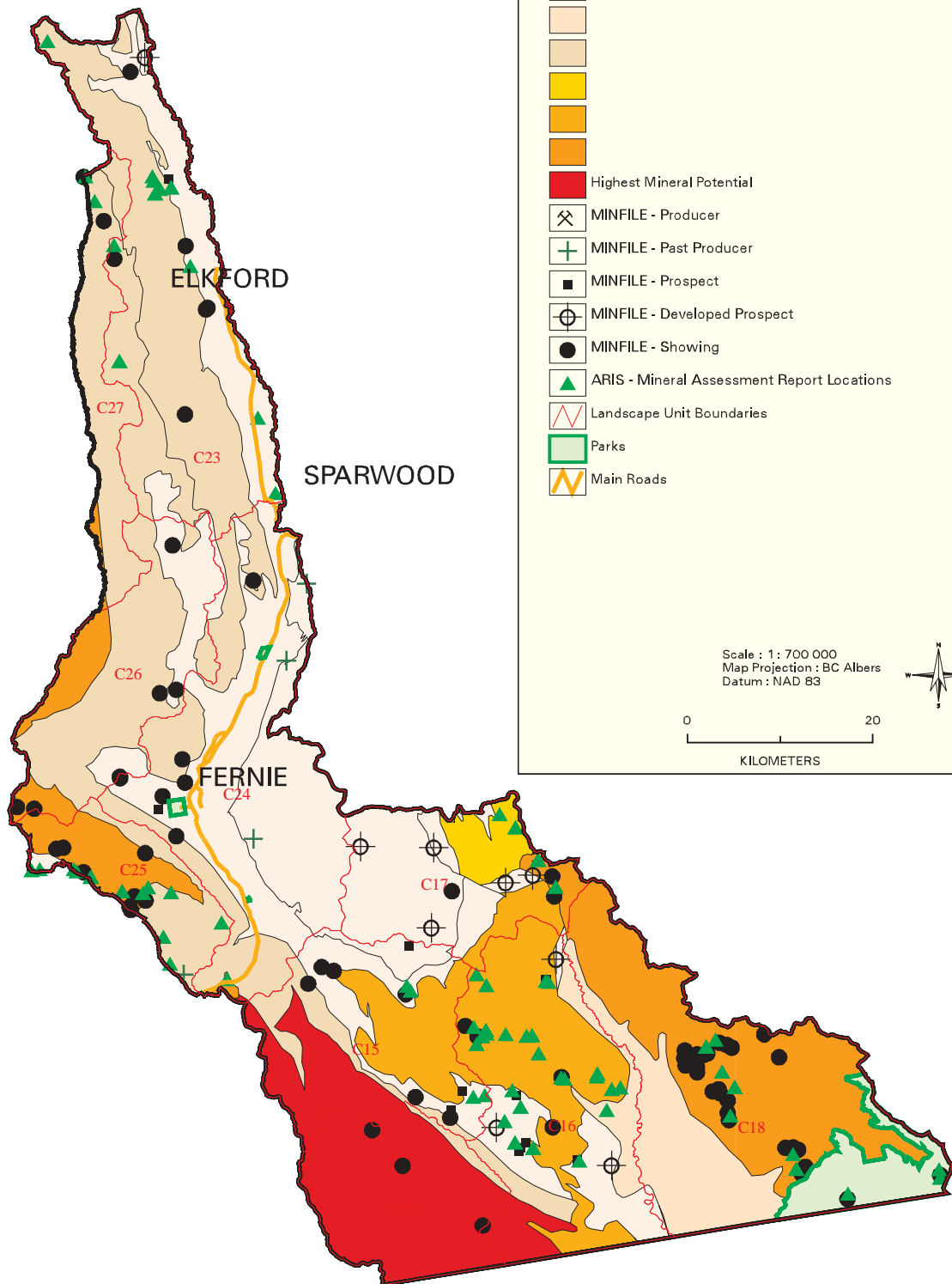
Southern Rocky Mountain Management Plan
Map App.3.2 Mineral Potential

Legend

-  Lowest Mineral Potential
- 
- 
- 
- 
- 
-  Highest Mineral Potential
-  MINFILE - Producer
-  MINFILE - Past Producer
-  MINFILE - Prospect
-  MINFILE - Developed Prospect
-  MINFILE - Showing
-  ARIS - Mineral Assessment Report Locations
-  Landscape Unit Boundaries
-  Parks
-  Main Roads

Scale : 1 : 700 000
Map Projection : BC Albers
Datum : NAD 83

0 20
KILOMETERS



APPENDIX 2.0 Plan Monitoring and Issues Potentially Requiring Plan Amendment

It is expected that the Southern Rocky Mountains Advisory Committee (SRMAC – see Appendix 4.0) will produce and maintain a comprehensive list of monitoring indicators.

Key factors to be monitored may include:

- Effectiveness of the plan in maintaining economic opportunities for resource development in the plan area.
- Effectiveness of the connectivity matrix and other conservation objectives
- Effectiveness of ungulate habitat guidelines and old growth management areas in providing habitat to ensure viable populations of species dependent on these areas.
- Effectiveness of the water management objectives
- Sustainability of social values in the plan area
- Effectiveness of Recreation Management Strategies in maintaining diversity and quality of recreational experiences.

Outstanding Issues for Consideration for Plan Amendment

Due primarily to resource and time limitations, the SRMMP has not addressed a number of key known issues. MSRM will work with the SRMAC to confirm which of these residual issues will be recommended for further work and incorporation into the SRMMP as plan amendments. This work will occur as priorities and available resources permit. Some of these key residual issues are:

- Requirement for environmental cumulative impact assessment and compatibility analyses.
- Recreational infrastructure development issues.
- Issue regarding recreational carrying capacity and allocation (e.g. on the Elk R. - angling guide pressures, backcountry recreation capacity and allocation of use levels between public and commercial)
- Coal Enhanced Resource Development Zones implementation.
- Potential expansion of the plan area to include all of the Elk and Bull River drainages.
- Delineation of the Working Forest to better define and protect the land base for industrial forestry and review of Timber Enhanced Resource Development Zones.
- Consideration of incorporation of the Living Rivers Strategy in some plan areas.
- Trans-Canada trail potential locations, feasibility and impacts.
- Management strategies for air quality
- Additional requirements and projects for plan implementation and enforcement.
- Habitat effectiveness benchmarks and proper functioning conditions for various habitats.
- Implementation of the Action Plan (Part G) which provides a process for review and revision of the SRMMP to consider Ktunaxa Nation interests and concerns in the plan area.

APPENDIX 3.0 Potential Implementation Projects

Table 3.1 contains projects intended to ensure implementation of the SRMMP (for a preliminary list of projects intended to monitor compliance with or provide information for plan amendment, see Appendix 2.0). Table 3.1 is not intended to be a comprehensive list of all projects. MSRM will work with the SRMAC to confirm which of these (or other) projects are to be incorporated into a biennial implementation work plan that identifies the priorities and necessary sequencing for implementation actions. The Nelson Regional Interagency Committee (IAC) will ensure the necessary staff and funding is available and committed by each government agency to complete these tasks before they are placed into the biennial implementation work plan. The IAC will also work with other levels of government and funding agencies, as appropriate, to ensure the biennial work plan is coordinated with other initiatives ongoing within the region.

The biennial implementation work plan will include:

1. Identification of priority projects
2. Identification of key supporting actions that are necessary to complete the priority projects, including both actions that require the involvement of two or more ministries and those that are solely the responsibility of one agency, but are linked to other SRMMP Implementation Strategy projects

Table 3.1: Potential Implementation Projects

Theme/Area	Action	Comments	Priority	Responsibility
SRMAC	Establish Committee	Determine membership, terms of reference	High	MSRM
Economic Activity	Resource Development	Ensure that opportunities supported by the plan are not encumbered	High	SRMAC and Government Agencies
Recreation Access and Development	Refinement of Mapping Products	Adjustment of recreation access and development polygon boundaries to better geographically reflect plan intent	High	SRMAC and MSRM
	Develop Print Media Strategy	Produce brochure for recreation access, snowfree and snowbound	High	SRMAC and MSRM
	Review Recreation Development Proposals	Ensure that tenure applications are only approved which are supported by this plan. LWBC will recommend that proponents consult with the SRMAC where their proposals are not supported by the plan	High	LWBC
	Establish Priority Areas for Operational Control	Identify and recommend priority areas requiring immediate signing requirements	High	SRMAC and Government Agencies
	Develop Sign Standards	Design sign standards to establish consistency in sign appearance	High	SRMAC and Government Agencies
	Access Management	Install signage in priority areas and conduct access control operations in priority areas	High	SRMAC and Government Agencies
	Interim designation	Review and assess individual roads in the Interim Motorized area (Map B.7.1.1- Recreation Access Snowfree) , and determine specific designations	High	SRMAC and Government Agencies

Theme/Area	Action	Comments	Priority	Responsibility
		Ensure that forest licensee deactivation of access roads, where feasible, is conducted to facilitate the type of road access desired in the plan	High	MOF
		Review existing legislation and identify appropriate or potential regulation to implement recreation access zoning	High	SRMAC and MSRM
		Initiate / maintain legislative or other closures to areas which are supported by this plan for wildlife reasons	High	WLAP
		Initiate / maintain legislative or other closures to areas which are supported by this plan for non-wildlife reasons		MSRM
Riparian	Enhanced riparian zone mapping	Complete mapping for Bull, Elk and Wigwam rivers.	High	MSRM or forest licensees
Biodiversity	Refinement of OGMA and Mature seral spatial locations	Adjustment, where required, of OGMA and mature seral spatial polygons to better manage for these and other values (e.g. to ameliorate isolation of timber).	High	SRMAC and MSRM
	Operational Plan Compliance	Ensure that forest licensees have provision in their harvest plans to comply with applicable plan old growth, riparian, visual and other guidelines	High	MOF
Working Forest and ERDZ-T	Review ERDZ-T areas in the context of Working Forest	Apply Working Forest policy and regulations to the SRMMP area and use to review/revise/refine ERDZ-T areas and concomitant objectives	High	SRMAC and MSRM
Various		<ul style="list-style-type: none"> • Implement research and inventory projects that contribute to management strategies that maintain the security, administration and stewardship of wildlife habitat. • Conduct sensitivity and cumulative impact assessment analysis initiatives • Increase habitat effectiveness and the opportunity for genetic dispersal, seasonal and daily movement, foraging and reproduction of wildlife species (Appendix 24.0) at the landscape and stand level • Develop benchmarks for habitat effectiveness and proper functioning condition for WRC, Ungulates, ID wildlife, fish • Undertake projects to assess environmental and social carrying capacity, environmental sensitivity and compatibility analysis and cumulative impact assessments • Consider the results of Water Use Plans, when completed, for the Aberfeldie and Elk River dams • Establish measures and procedures to protect and maintain those habitats and species at risk which are not officially approved • Additional detailed work may be required beyond these objectives to address locally specific issues, including indicators and standards for limits of acceptable change 		
Tourism	Planning	Develop a tourism opportunity strategy to define the		

Theme/Area	Action	Comments	Priority	Responsibility
		specific new products that can be supported and are compatible with the strategic direction of the SRMMP		

APPENDIX 4.0 Draft Terms of Reference for the Southern Rocky Mountain Advisory Committee (SRMAC)

Definitions

“government”:	means the Provincial Government
“MSRM”:	means the Ministry of Sustainable Resource Management
“SRMMP” or “the plan”:	means the Southern Rocky Mountain Management Plan
“SRMAC” or “the committee”:	means the Southern Rocky Mountain Advisory Committee

Objectives

The SRMAC will liaise with government primarily through the Regional Director, MSRM, or their designate. For operational implementation issues, liaison may also occur directly with other government agencies or corporations as appropriate.

The role of the committee is one of making recommendations. The responsibility for decisions on plan direction resides with government. Specific duties of the committee will include:

- Recommending changes and improvements to plan objectives and direction to reflect new information or circumstances;
- Participating in plan support and monitoring;
- Providing advice for strategic and operational implementation, including monitoring indicators, and assisting with developing implementation strategies in key areas;
- Reviewing of proposals and developments for public and commercial activities, when the proponent or reviewing agency solicits the advice of the SRMAC, and, in doing so, providing recommendations consistent with approved plan objectives and management direction.
- Reviewing plan maps to ensure technical accuracy, and assisting government in increasing the resolution of mapping data as required; and
- Assisting in securing funding for implementation and monitoring requirements.
- Ensure activities of the Committee are open and transparent to the public

It is recognized that the SRMAC will not necessarily represent all public and commercial interests. However, other key corporate, bureaucratic and public entities at the local and provincial levels will have the ability to make recommendations to government.

Membership

- The committee will be composed of sectors that have either participated in, or are familiar with, the plan’s development, and that represent a diverse cross-section of interests. Each sector will nominate a representative (and an alternate) who will act as spokesperson for that sector. Sectoral representatives may rotate with new appointments being submitted to the Chair. For the sake of continuity and efficiency, appointments for two-year terms are recommended.
- Government agencies will be represented on the committee.
- The Regional Director MSRM will determine the committee chairperson.
- MSRM shall decide which sectors are members of the committee. Nominations for additional sector membership will be submitted by the sector to the committee chairperson.

- The optimum size of the committee would be less than twenty members.
- Members of the committee shall not receive remuneration for their participation and will not normally be reimbursed for expenses associated with attending meetings.
- Sub-committees may be established, as needed, to address specific issues or projects, and may include non-committee membership if required.

Meetings and Communications

- The SRMAC shall meet on a regular basis, at least once a year, or as required, at the discretion of the chair.
- Government will provide administrative support services in the form of mapping changes, meeting locations, and communication facilitation.
- The committee shall invite area- or issue-specific stakeholders to meetings where required.
- The committee shall develop a biennial work plan, consistent with the Terms of Reference, that identifies objectives related to the implementation and monitoring goals of the plan, for the following two years.
- Government shall provide relevant new information, where possible, as it becomes available and as requested by the committee.
- The members of the SRMAC will act in an advisory role to their respective groups in regard to implementation and interpretation of the SRMMP.

Process for Making Recommendations

- In developing recommendations to government, consensus from committee members is desirable, but not mandatory. Sectoral representatives will seek a common understanding regarding issues and provide consultative advice to MSRM.
- Participants will observe the following principles:
 - representatives must be able to demonstrate accountability to the sector or organization they represent. At the same time, they must also be able to demonstrate accountability to the process (i.e., the public and one another) by agreeing to participate in the process in good faith.
 - participants accept the concerns and goals of others as legitimate
 - the focus of this process is on interests and concerns rather than positions and demands;
- Committee recommendations regarding major and minor plan amendments will be conveyed to the Regional Director of the MSRM. The committee shall be kept informed of the final disposition of each recommendation.

Roles and Responsibilities of Committee Members

Each member is expected to:

- Ensure familiarization with the approved SRMMP objectives and management direction;
- Attend scheduled meetings and serve on sub-committees when requested;
- Respect the rights and opinions of other committee members;
- Help to establish SRMAC biennial work plan goals and objectives and ways in which they can be achieved;
- Decline participation when a conflict of interest is possible; and
- Represent their constituency at all times by conveying sectoral, not personal, opinions to the

committee. Members have a responsibility to consult with their sector membership to ensure their representational participation at the committee table.

The Chair will:

- Call and co-ordinate meeting dates, and set agendas;
- Preside over meetings;
- Present reports and recommendations to government for discussion and action;
- Provide direction and serve as spokesperson for the committee; and,
- Encourage an atmosphere conducive to productive and collaborative discussion.

APPENDIX 5.0 Best Management Practices

Appendix 5.1 - Air Quality Management

Air Quality Management should be guided by the following principles:

1. Acceptable air quality is everyone's right; protecting air quality is everyone's responsibility.
2. Acceptable air quality is an important contributor to a healthy community and a sustainable economy.
3. Achieving acceptable air quality requires that local, provincial and federal government agencies work together. Public and industry involvement is also necessary.

And the following objective:

To achieve and maintain acceptable air quality by reducing the emission of those air contaminants that are causing unacceptable air quality, and by preventing future air quality problems from developing.	
---	--

Fine Particulate Management Actions

Fine particulate matter (PM₁₀ and PM_{2.5}) as the highest priority pollutant for reduction in the airsheds in interior BC. Ideally, we would be able to pinpoint the exact contribution of an individual fine particulate source to ambient levels in a particular area of the airshed. In reality, it is not possible to be so precise in establishing source priorities, because our information and understanding of contaminant actions is deficient. Also, contaminants do not move directly from source to receptor, but mix in complex patterns, particularly in the complex terrain and meteorological conditions that characterize this airshed.

The most important information that can be used to select sources for emission reductions are the emission inventory, the potential for exposure to poor air quality, the availability of more effective emission reductions technologies, and airshed meteorology.

Likely significant contributors of PM₁₀ have been as:

- road dust.
- industrial sources including wood waste operations.
- Smoke from wood burning appliances, and backyard burning.

In addition to the relative sizes of emission sources, other factors that have been considered in selecting sources for reduction are:

- the potential to contribute to ambient PM₁₀ levels;
- the potential for exposure of residents to unacceptable ambient levels; and
- the potential to upgrade emission prevention or treatment technology.

Another factor that must be weighed, particularly for small, widely dispersed sources, is the potential for local effects on air quality. This factor is particularly applicable to sources such as wood burning appliance and fireplace use, and commercial and residential open burning (land clearing and backyard burning, for example). Although individual contributions from these emissions are small relative to the industrial and road dust sources, they can have a significant effect on local air quality during poor dispersion conditions. Although direct sampling of the effect of these local sources is limited in this airshed, other jurisdictions with more significant sources have demonstrated their ability to produce high ambient fine particulate levels.

Consideration as to the availability of technology to reduce the major emission sources must be identified. When considering technology for reducing emissions from sawmill burners, pulpmill sources, road dust reduction and backyard burning, for example, it may be only necessary to look at other locations and jurisdictions to identify the potential for significant particulate source reductions. Additional reduction technology and emission prevention methods will undoubtedly be identified for subsequent management phases.

Dust from Street Sanding, Unpaved Areas and Other Sources

Recommendations:

Municipalities, the Ministry of Transportation and Highways, and contracted agencies should use winter abrasives that generate less fine particulate matter;

Frequent sweeping of municipal streets and additional dust control on unpaved high traffic routes, to further reduce dust levels;

Consider expanded hard surfacing for problem areas.

Municipalities require paving of all traffic areas permitted for new industrial and commercial developments; and

Municipalities establish guidelines and standards, for all paved commercial and public parking lots, to mitigate the release of fine dust from sanding and sweeping, and from storage and disposal of the sweepings.

Although road dust is a much less concentrated source of fine particulate than the major industrial point sources, the amount of dust that is estimated to enter the air, particularly

from street sand prior to spring cleanup, is significant. Because the significance of individual non-point sources, such as street dust, is more difficult to assess than for industrial sources, it is necessary to classify these sources according to size, proximity to residences and ease of reduction.

The highest priority is winter street sanding, given the high fine silt content of the sand, and relatively large amount of material used. Removal of the fine silt following snowmelt is often delayed because of freezing temperatures, allowing release of fine particulate into the air by traffic and wind.

Another source of dust that likely contributes to poor air quality is spring parking lot cleaning. This source is amenable to reduction through use of equipment that is readily available.

Backyard Open Burning Recommendation:

Municipalities ban all open burning on properties of less than 5 acres, and on all properties

The Regional District continue to advise residents of the hazards of open burning, and the availability of facilities to reuse, compost or properly dispose of burnable materials at the Regional Landfill.

Burning of combustible yard residues (grass, construction debris, cuttings) can be a harmful local source of smoke, wastes useful materials, and is unnecessary in this airshed. Composting of yard and garden residues can be done on site, or by delivering the compostable materials to the Regional District's Regional Landfill centralized compost site. Reusable construction materials can be placed at the Landfill for salvage and reuse by other residents.

The Regional District should support home composting efforts by funding a compost demonstrations, and by offering volunteer master composter training sessions.

The Ministry of Water, Land and Air Protection currently bans all such burning during air quality advisories and, over the past two years, the Ministry has publicized the need to eliminate burning of yard wastes and lawns.

Wood Burning Appliances

Recommendation:

Municipalities promote minimization of the use of wood burning appliances in the City;

Municipalities prohibit the burning of wood in residential

neighbourhoods during PM₁₀ air quality advisories, except where wood is the primary heating source; and

Municipalities require that any new or replacement wood burning appliance meets the standards in the *BC Solid Fuel Burning Domestic Appliance Regulation*.

Some City and Regional District residents continue to burn wood, in heaters, stoves and fireplaces, as a primary or auxiliary source of heat. In the more densely populated areas of the City, wood burning can significantly contribute to high levels of fine particulate, particularly during the temperature inversions which occur frequently in winter. While the total elimination of domestic and commercial wood burning is not recommended, restrictions are necessary to improve air quality in high density areas.

The effects of commercial wood burning in operations such as bakeries and restaurants must also be restricted where necessary to protect nearby residents from fine particulate pollution. Municipalities should review applications for new and retrofitted operations with MWLAP to determine if these operations are located appropriately or if emission controls should be installed.

Community And Regional Planning

Recommendations:

Air quality considerations be incorporated into Official Community Plans, including transportation efficiency and alternative transportation, and into the Regional District Community Plans during the next plan reviews;

The City and Regional District identify new areas for heavy industrial development, taking potential air quality effects into account; and

Municipalities refer all proposals for significant new emissions for review by MWLAP

Community development plans should also take into account the benefits and constraints of different air quality management options on economic development.

Prevention of Air Quality Problems

Recommendations:

MWLAP evaluate the acceptability of new sources of air contaminants, especially PM₁₀, TRS, SO₂ and NO_x, based on use of the "lowest achievable discharge rate" (See Glossary.); And

Municipalities promote reductions in vehicle emissions and request the Insurance Corporation of BC To conduct a mobile emission testing program.

While the main emphasis of the Management Plans is on reduction of fine particulate emission sources, actions should be taken to prevent additional air quality problems from developing. These actions should apply particularly to those types of air contaminants that have the potential to increase significantly with future developments in the airshed, even though their ambient levels are currently acceptable.

The best means of pollution prevention is to anticipate and mitigate potential air pollution problems before they develop. The difficulties and delays that have been encountered in finding ways to reduce fine particulate levels illustrate the benefits of practicing pollution prevention. Experience with eliminating beehive burners illustrates that the most cost effective methods of pollution reduction can result from the improved planning associated with a prevention approach.

Although road vehicles may not be significant sources of PM₁₀ or other contaminants that have exceeded air quality objectives in the overall airshed, they have the potential to affect air quality in high traffic areas. Road vehicles were shown to be significant sources of other contaminants, such as NO_x, carbon monoxide (CO) and volatile hydrocarbons (VOC). These emissions could be reduced through proper vehicle maintenance.

The intent of the emission testing is not to start an "Air Care" program in this airshed, but to provide information that can be used to educate the public, business and industry on ways to reduce vehicle emissions.

Management Of Poor Air Quality Episodes

Recommendations:

MWLAP require owners of the most significant fine particulate sources to provide plans for temporarily reducing emissions during air quality advisories.

The other area where prevention should be practiced is episode management. Since pollution episodes occur whenever weather conditions prevent adequate dispersion, prediction of these conditions could enable avoidance of an episode if major emission sources could be temporarily reduced. Although the frequency of episodes is expected to be reduced by the significant source reductions identified in the Plan, extreme meteorological events will likely still produce periods of unacceptable air quality.

Reduction in industrial wood burning should also be done where it is predicted to improve air quality during PM₁₀ advisories. If prediction of those meteorological events most responsible for causing episodes can be done accurately, then the major emissions could be reduced prior to the onset of episodes. Diversion of wood residuals to uses

outside the airshed may be required during episodes, and could be facilitated by a resource pooling agreement among the major source owners. Episode alleviation plans should link actions to the severity of the episodes.

Responsibilities of the Management Agencies

Recommendations:

Prior to finalizing the Management Plan, the management agencies make an agreement on the responsibilities for consultation on permitting, community planning, and other administrative and regulatory actions that will affect air quality; and

The management agencies establish an Airshed Management Steering Committee to oversee the implementation of the Management Plan Actions, and to establish subgroups as needed to manage specific tasks.

In order to ensure the effectiveness of the management actions outlined in this Plan, communication and coordination is required among the management agencies that must implement the Plan. There are many areas of decision making by the management agencies that have the potential to affect air quality, and to increase the effectiveness of the management actions prescribed in the Plan. Prior to implementing the final Plan, the management agencies should identify ways to maximize the effectiveness of the recommended actions.

Funding Needs and Cost Sharing

Recommendations:

Sharing of current and future monitoring costs will be based on emission contributions to the airshed, and other factors contributing to unacceptable air quality.

Appendix 5.2 - Domestic Watershed Best Management Practices

In watersheds which are licensed for human consumption (see map B.10.1) but which are not designated community watersheds, the following best management practices will be considered in forest and mineral exploration planning, operations and monitoring.

1.0 Watershed Classifications

Map B.10.1 shows 3 classes of watersheds which are described as follows:

Class 1 Watersheds

These watersheds are associated with springs and very small creeks, which do not have clearly defined drainage or catchment areas. Often these small water sources are located on “face units” (populated areas between major streams). Face units may encompass many small streams and springs, which support domestic licensing. Face units will often be mapped as one area because of the difficulty of defining these micro drainage areas without on-the-ground investigation. There may also be streams within the mapped face unit, which are not licensed for domestic use. It will be important for the forest/mineral proponent to identify unlicensed streams early in the process so that unnecessary assessments and notification of water users can be avoided.

Class 2 Watersheds

These are small watersheds having drainage areas which are definable on existing topographic mapping and, less than 500 ha (5 km²).

Class 3 Watersheds

These are watersheds with a drainage area of 500 ha (5 km²) to 200,000 ha (200 km²). To aide in the assessment procedure in these larger watersheds, sub-basins may be shown on the mapping.

2.0 Assessment and Detailed Mapping for Forest Activities

Forest development plans should consider applying an assessment of proposed activity for the 3 classes of watershed as follows:

Class 1 watersheds: A field mapping exercise is suggested with the main objective being to maintain the integrity of recharge areas and channels.

1. Obtain high quality topographic maps and air photos and mapping of water intake locations for the area in question.
2. Transfer the locations of the water intakes to a large-scale topographic map.
3. Confirm intake locations (by field work if necessary) and transfer to the topographic maps. If the stream courses are mapped inaccurately, indicate the correct locations on the topographic maps. In order to find the intakes, it may be necessary to interview the water licensees. It may be necessary to go on private land and appropriate permission should be obtained for doing so. Air photographs will be useful for field checking.
4. Map the streams above the water intakes on the topographic map by walking upstream of the intake. It may be possible to quickly affirm that the TRIM map is correct. If it is not correct, use compass and chain methods or GPS units to enable transfer of actual stream locations onto the topographic maps. It should be noted that many first order streams disappear and reappear as one moves upslope and a

- thorough search should be made of all field evidence of seepage zones and streamflow above the first disappearance of the streams. Indicate on the map where an actual channel exists (solid line) and where you infer flow (dashed line). Indicate evidence of flowing water and seepage separately. Mapping should be done during periods of high flow (e.g. shortly after snowmelt) when flow pathways are most evident.
5. Use the topographic map to outline the inferred drainage area contributing to each water source.
 6. Use this map to plan the location of roads and logging activity. Roads have the potential to divert water away from areas used for water supply. Harvesting activities must be planned such that the flow remains in the natural channels. Small changes in drainage patterns can affect downslope water supplies.
 7. Avoid locating roads within 50m of the water intake. If the road is constructed through a seepage area, it should be constructed in such a manner that slope seepage is maintained in its present location. Specialized road construction techniques such as a permeable road prism or use of geotextile fabrics may be necessary in selected seepage zones to maintain the natural subsurface flow patterns.
 8. When the road is surveyed in the field, crossings of each water source should be clearly ribboned with the name of the source and “domestic water supply” written on the ribbon. The locations of the crossings are to be pointed out to those doing the road construction.
 9. When the road is constructed, signs should be placed at each water supply stream crossing which name the source and “domestic water supply”.
 10. Road construction should be carried out in a manner, which minimizes impacts to water quality.
 11. The road should be designed in such a manner that road surface and ditch drainage does not directly enter a water supply stream. High quality surfacing material should be used immediately adjacent to stream crossings.
 12. All personnel doing activity in the area should be informed that they are operating in a water supply area and that all their activities including personal hygiene should respect the maintenance of the downstream water supply.
 13. In general, roads in this class of watersheds should remain open only as long as they are required. When road use is complete they should be rehabilitated with special attention given to maintaining natural drainage patterns.

Class 2 Watersheds: Areas defined as Class 2 watersheds on the mapping should undergo a detailed procedure as described in the box below. The objective is to confirm channel and intake locations and to plan upstream activities such that new sediment sources are not created. The procedure for Class 2 watersheds requires less field work because these watersheds are topographically defined. A watershed report card (see Class 3 Watersheds) is required. Since results from the report card become less dependable with smaller watersheds, the report card should not be used by itself to define hazards in watersheds under 5 km²(500 ha).

1. Obtain high quality topographic maps and air photographs and the map of water intake locations for the streams in question.
2. Transfer the locations of the water intakes on the water intake map to a large-scale topographic map.
3. Walk stream courses above water intakes. It may be possible to quickly affirm that the TRIM map is correct and further ground verification is not necessary. When mapping does not appear to be correct, use compass and chain methods or GPS units to enable transfer of stream locations onto topographic maps.
4. Use the topographic map to estimate the drainage area.
5. Overlay available terrain information to plan the location of roads and logging activity.
6. Avoid locating roads within 50 m of any water intake or on unstable terrain.
7. When the road is surveyed in the field, crossings of each water source should be clearly ribboned with the name of the source and "domestic water supply" written on the ribbon. The locations of the crossings are to be pointed out to those doing the road construction.
8. When the road is constructed, signs should be placed at each water supply stream crossing which name the source and state "domestic water supply".
9. Road construction should be carried out in a manner that minimizes impacts to water quality.
10. The road should be designed in such a manner that road surface and ditch drainage does not directly enter a water supply stream. High quality surfacing material should be used immediately adjacent to stream crossings.
11. All personnel doing activity in the area should be informed that they are operating in a water supply area and that all their activities including personal hygiene should respect the maintenance of the downstream water supply.
12. In general roads in this class of watersheds should remain open only as long as they are required. When road use is complete they should be rehabilitated with special attention given to maintaining natural drainage patterns.

Class 3 Watersheds: Watersheds defined as class 3 on the mapping should undergo an assessment utilizing a domestic watershed report card. This is a reconnaissance level analysis intended to identify several broad categories of risk from past or planned forest harvesting. When high hazard levels are indicated, it is expected that these will be addressed in the forest development plan.

The domestic watershed report card is comprised of several key indicators that were developed for the Interior Watershed Assessment Procedure (IWAP). Larger Class 3 watersheds may have sub-drainages delineated on the mapping. The report card indicators are to be generated for each sub-drainage.

The watershed report card uses the following indicators:

- a) peak flow index (including the equivalent clearcut area [ECA] calculation)
- b) road density for entire sub-basin (km/km²)
- c) no. of stream crossings (no./km²)
- d) no. of landslides (no./km²)
- e) roads on unstable slopes (km/km²)

These 5 indicators should be recorded in the following format:

Form 1. Watershed report card

Impact Indicators	Sub-basin name							
a) peak flow index (also record ECA % in this space)								
b) road density for entire sub-basin (km/km ²)								
c) # of stream crossings (no./km ²)								
d) # landslides visible on 1:20000 photos(no./km ²)								
e) roads on unstable slopes (km/km ²)*								

* Class IV and V terrain where terrain mapping is available or otherwise on slopes greater than 60%.

Hazard ratings will be determined by the following Hazard Index table:

Impact Indicators	Hazard rating		
	low	medium	high
a) peak flow index	<0.3	0.3-0.42	>0.42
b) road density for entire sub-basin (km/km ²)	<1.5	1.5-2.1	>2.1
c) no. of stream crossings (no./km ²)	<0.4	0.4-0.6	>0.6
d) no. of landslides (no./km ²)	<0.1	0.1-0.18	>0.18
e) roads on unstable slopes (km/km ²)	<0.15	0.15-0.25	>0.25

NOTE: Hazard ratings which are derived from this table may not reflect true conditions in the watershed. Therefore it is important that hazard scores be used only as a course filter to help identify potential problem areas and/or to aide in the prioritization of watersheds for application of a more complete watershed assessment. When scores are tending to the high end of the scale, the FDP should state how the possible hazard will be addressed.

The following is an illustration of how the hazard rating might be used:

- If indicator “a)” is high - discuss further assessment (i.e. channel assessment) needs with agency specialists and or consider alternate harvest schedules or areas;
- If indicators “b)” to “e)” are high - confirm indicator with field review, discuss assessments with agency specialists, and consider reducing new road development and/or a road reclamation strategy.

3.0 Assessment and Detailed Mapping for Mineral Exploration Activities

Mineral exploration and related activities create more localized impacts than do forest activities, therefore, the same general assessment and mapping procedure can be used in all three classes of domestic watershed.

When activities which require a Mines Act Permit (mechanized soil disturbance) are proposed within a domestic watershed, the MEM statutory decision maker may require

all or some of the following based on proposed amount of disturbance, sensitivity of the area and proximity of water intakes:

1. Obtain a 1:20,000 TRIM map (or better quality map if available) of the area, the largest scale air photo pairs available and the water intake map)
2. Transfer the locations of the water intakes on the water intake map to a large-scale topographic map (i.e. the 1:20,000 TRIM map). Provide a description of the intakes with accompanying photographs.
3. Map the courses of the streams above the water intakes on the topographic map by walking upstream from the intake to the area of proposed activity. It may be possible to quickly affirm that the TRIM map is correct and further ground verification is not necessary. If it is not correct, use compass and chain methods or a GPS to enable transfer of true stream locations onto the topographic map. Generally, inaccuracies in TRIM stream locations occur more on small streams that are poorly defined by contours.
4. A reconnaissance level terrain stability assessment and detailed surface soil erosion assessment and mapping may be required by the MEM statutory decision maker in particularly sensitive areas.
5. Use the map with an overlay of the terrain map (if a terrain stability assessment has been required) to plan the trail building and other mining or exploration activities. All proposed works are to be noted on the map.

4.0 Terrain Hazards

- A person should not propose harvesting of an area in a domestic watershed if the area is subject to a high likelihood of landslides following timber harvesting.
- Reconnaissance level terrain mapping is normally required in domestic watersheds.

5.0 Roads

- A road in a domestic watershed should not be located within a 50 m radius upslope of a water intake.
- Roads should be constructed so as to minimize disruption of surface and subsurface flow pathways particularly in spring recharge areas.
- A person who constructs, modifies or deactivates a road in a domestic watershed should:
 - (a) notify water licensees or their representatives of the start date of road construction, modification or deactivation at least 48 hours before the start of road construction, modification or deactivation if it is anticipated that sediment could reach a water intake;
 - (b) ensure that rock containing significant amounts of sulphide minerals, and which may have potential for generation of acid, is not used for road construction or modification.

6.0 Harvest Levels

Harvest levels are determined by calculation of the equivalent clearcut area (ECA) as is necessary for the watershed report card. This is done for the domestic watershed as a whole and for major sub-drainages within the domestic watershed. The concentration of harvesting on smaller areas should also be considered.

ECA's in sub-basins

- The maximum ECA in any basin larger than 250 ha, that has not been individually considered in the report card, should not exceed 30 % of the area. If it has been considered individually, the report card will apply.

ECA's above sensitive sites

- When cutblocks are proposed on areas which drain onto class IV or V terrain (or slopes over 60% if terrain mapping not available), the ECA should be limited to 20 % of the area draining onto the sensitive site.

7.0 Range

Range plans, which include range use and range stewardship plans, should indicate known domestic intakes and actions taken to accommodate this resource use. The Range plans should indicate levels of use, strategies for wetlands and riparian areas, and other provisions.

Domestic water users can review range plans and provide comment. The Ministry of Forests (MOF) district manager approves range plans and can require amendments if special circumstances warrant. In addition, the district manager can require security for the performance of obligations under a range plan.

If problems or special circumstances arise with respect to range use in a domestic watershed, the initial preferred approach is for the water user to deal with the MOF district manager. In cases where it is suspected that a water supply has been contaminated, the district manager should promptly notify and consult with staff in all appropriate agencies in order to locate the appropriate expertise to confirm and respond to the problem. Occasionally, an inter-agency team may be required to resolve contentious situations.

8.0 Timber Harvesting

A person carrying out a timber harvesting operation on applicable land within a domestic watershed should not, except to provide access to, or to maintain, a water supply intake, cut or damage a tree that is closer than 50m upslope of a water supply intake and must protect known water supply intakes and infrastructures.

9.0 Silviculture

- The use of livestock to carry out site preparation or brush control within a riparian management area, should be guided by a suitable management or animal control plan which addresses maintenance of water quality.
- The use of pesticides should be managed by an Integrated Pest Management plan, where non-toxic alternative treatments and long term prevention of pest problems should be considered. Opportunities for public input should be provided in contentious areas.
- A 10m fertilizer-free zone should be maintained around any flowing stream that is observable from the air. Fertilizer application close to streams is sometimes beneficial to water quality (e.g. hydro-seeding of road banks at stream crossings).
- Fertilizer should not be applied within 50m upslope of a water intake.
- Fertilizer should be applied during cool and moist conditions (not during the summer).

10.0 Recreation

- The construction of recreation facilities within riparian management areas should be avoided whenever possible.
- In general, activities such as motorized recreation and camping should not be encouraged in smaller domestic watersheds (< 10 km²).

11.0 Mineral Exploration Practices in Domestic Watersheds

- Avoid locating roads, drill sites, trenches or other works within 50 metres radius upslope of a water intake or on unstable ground, unless authorized by the MEM statutory decision maker.
- Exploration drilling and the establishment of pump intakes in domestic water sheds should not be located within 50 metres radius upslope of a water intake.
- Roads, drill sites, trenches or other works should not interfere with any known subsurface flow paths of a drainage area that contributes to a spring.
- When a road location is surveyed in the field, the location of the crossings of each water source stream should be clearly ribboned with the name of the source and “domestic water supply” written on the flagging. The locations of the crossings are to be pointed out to those doing the construction.
- When the roads are constructed, signs are to be placed at each water supply stream crossing which name the stream and indicate “domestic water supply”.
- Trail, drill pad, trenching and other works should be carried out in such a manner that adverse impacts on water quality are minimized. For instance, sumps shall be utilized to contain drill cuttings and mud. Drilling muds and fluid additives shall be of a non-toxic and non-hazardous nature.
- Works should be designed and constructed in such a manner that surface drainage is prevented from directly entering a water supply stream. Where possible, works should be designed and constructed such that water drains away from the stream. Specialized construction practices, operating practices and materials (such as filter fabrics, high quality surfacing materials etc.) may be required to be utilized. For

instance impervious drill sumps with drilling fluid recirculation may be required in select instances.

- All personnel working on the project must be informed that they are operating in a water supply area and that all activities including personal hygiene must respect the maintenance of the downstream water supply.
- In general works shall be reclaimed as soon as practicable, when they are no longer required.
- A person who constructs, modifies or reclaims a road or exploration trail in a domestic watershed should; (a) notify water licensees or their representatives of the start date of road construction, modification or reclamation at least 48 hours before the start of road construction, modification or reclamation if it is anticipated that sediment could reach a water intake; (b) ensure that rock containing significant amounts of sulphide minerals, and which may have potential for generation of acid, is not used for road construction or modification.
- The MEM statutory decision maker may require drill holes that make water to be sealed with cement.
- Trenches should be located or oriented to minimize inflows of surface water.
- If trenches intercept the water table or groundwater flows, work should not continue until it can be determined that domestic water supplies will not likely be adversely affected and the MEM statutory decision maker has approved a mitigative strategy.

12.0 Planning Framework and Public Input

For forest activities, the following chart summarizes the first stage of planning in domestic watersheds.

Watershed type	Class 1	Class 2	Class 3
	Springs and very small streams	Small streams with defined drainage area <500 ha.	Larger streams with defined drainage area >500 ha.
Objective	Maintain water quality, quantity and timing of flow.	Maintain water quality, quantity and timing of flow.	Maintain water quality, quantity and timing of flow.
Watershed characteristics	Very small streams and spring recharge areas often with indistinct catchment boundaries and channels. Drainage patterns and sensitive areas cannot usually be determined from existing mapping.	Erosion prevention is the principle concern. Sediment is likely to reach intakes. Streams may be of sufficient size to cause debris flows or bedload movement. Peak flow becomes a concern in larger streams in this class.	Slope failure, sediment delivery and channel stability are the key factors in maintaining water quality. Peak flow is a concern.
Strategy	Detailed mapping required. Forest development plan should address hazards for specific local conditions.	The domestic watershed report card may prove useful but must be accompanied by ground-truthing local conditions. Forest development plan should address hazards.	Reconnaissance level assessment required using domestic watershed report card. In larger watersheds assessment by sub-drainage becomes important. Forest

			development plan should address hazards.
Target conditions	Avoid problem areas. Minimal disturbance of sub-surface drainage patterns and surface channels. Recommend ECA < 30%.	Avoid problem areas which could result in sediment movement. Minimize roads and stream crossings. Recommend ECA < 30%.	Distribute cut by elevation and sub-drainage to reduce peak flows. Mitigative action plans are required for problem areas. Recommend ECA < 35%
Data requirements	Recommend level B or C terrain and soils mapping. Detailed mapping of drainage patterns, drainage areas and water intake and stream locations.	Recommend level B or C terrain and soils mapping. Detailed mapping of drainage patterns and drainage areas may in required in portions of the watershed.	Recommend level D terrain and soils mapping to ensure the effective application of the domestic watershed report card.

In the second stage of planning, the forest licensee or SBFEP should incorporate the assessment information and recommendations into the forest development plan. Riparian management and other forest management practices particular to domestic watersheds should be incorporated into the various operational plans.

When the forest development plan is advertised for public review, the forest company should make a reasonable attempt to notify the affected water licensees that:

- a) the forest development plan is being offered for review (date, time, place);
- b) the forest development plan proposes harvesting or roads in the domestic watershed.

This process will ensure that water licensees are notified about the proposed activity and are aware of their opportunity to comment on the forest development plan. Public input would be facilitated by the inclusion of the watershed assessment that will give water users an indication of existing and proposed impacts to the watershed.

The responsibility for approving forest development plans which cover areas in domestic watersheds, rests solely with the MOF district manager

This guideline should be considered baseline management that can be applied to all domestic watersheds regardless of the number of users or other management issues. Obviously, there are some domestic watersheds where the consequences of a damaged water supply are very high and others where the consequences are relatively low. In some high consequence areas, it is expected that more planning, assessment, monitoring and public involvement will be necessary to address all issues.

For mineral exploration activities, the need for public consultation will be considered on a project-by-project, site-specific basis when activity is proposed in domestic watersheds.

Appendix 5.3 -

Risk Assessment Procedure for Proposed Resource Development Activities Above Alluvial and Debris Torrent Fans

By: Dwain Boyer¹

Abstract:

Alluvial and debris torrent fans are common landforms in Kootenay Region of the Province of BC. Many of the fans are relic features, products of the last deglaciation period. However, many remain active or potentially active. Rapidly melting snow, heavy rains, channel blockages and/or landslides can result in avulsions and/or debris torrent or debris floods on these fans. Private and public lands, infrastructure and people occupying the fans are at risk of being damaged during these extreme events. For the most part, these events are naturally occurring. However, resource extraction activities, such as timber harvesting and mining, can increase the risk by increasing peak flows and/or the number of landslides. There are also emerging concerns with climate change due to global warming. Predictions include the possibility of warmer temperatures and more extreme storm events. Over the last few years, the Ministry of Water, Land and Air Protection (formerly, Ministry of Environment, Land and Parks) has mapped many of these fan areas so that forest licensees, wood lot owners and mining companies can be aware of these risks when planning development in watersheds. The object of this paper is to present a procedure for assessing this risk.

¹ Dwain Boyer, P.Eng., Engineering Section Head, Ministry of Water, Land and Air Protection, Nelson, BC

1.0 Purpose

There are many alluvial and colluvial fans along populated valley bottoms in the steep mountainous terrain of south east corner of British Columbia, Canada. During periods of high runoff, channels can shift (Figure 1 and 2) and debris flows can reach valley bottoms (Figure 3) with devastating effects on people and property. Timber harvesting and road construction in watershed areas above these fans can increase the frequency and magnitude of floods and debris flows on the fans. Terrain Stability Field Assessments, required by the Forest Practice Code (FPC), can reduce risks associated with individual road segments and cutblocks in areas where they are required. However, except in Community Watersheds and some high value fishery streams, watershed scale risk assessment procedures are not required. In addition, there is no recognized standard procedure for the preparation of a watershed scale risk assessment report.

In this paper, “alluvial” refers to fans built up from sediment carried by floodwaters, while “colluvial” fans are formed mainly by debris flows, a type of mass movement also commonly called debris torrents.

The purpose of this document is to propose a procedure to assess the additional risks associated with resource development activities to people and property situated on these fans.



Figure 1: Duhamel Creek Fan: 1956



Figure 2: Duhamel Creek Fan: 1956

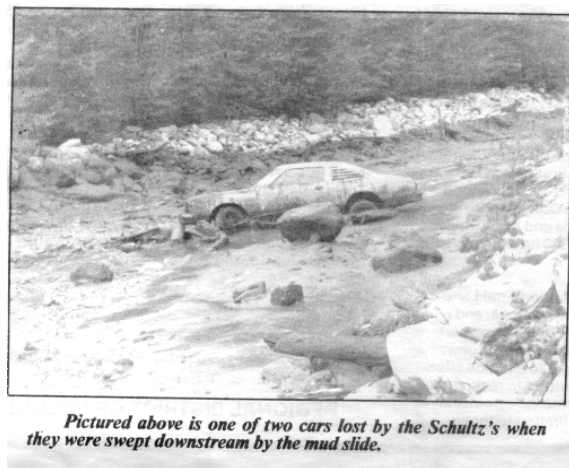


Figure 3: Birtchland Creek Fan Debris Flood 1982.

2.0 Existing Risk Assessment Reports Related to Public Safety

This section identifies existing reports and procedures that deal with resource development risk assessments.

2.1 Interior Watershed Assessment Procedure

The Forest Practice Code (FPC) Watershed Assessment Procedure Guidebook (WAPG) (1999) is the only legislated requirement for a watershed scale risk assessment dealing with public safety on fans. Section 14 (1) of the Operational Planning Regulation (OPR) states that a person proposing a forest development plan in a community watershed area must first carry out a watershed assessment. Section 14 (2) of the OPR states that watershed assessment for Community Watersheds in the interior of BC must be carried out in accordance with the WAPG or equivalent. The guidebook states that the reporting hydrologists and the Watershed Assessment Committee must identify and assess downstream flooding and debris flow risk. The guidebook, however, was written primarily to assess risks to community drinking water supplies. The guidebook does not provide direction on how to assess risks to people and property on a fan at the outlet of the watershed.

2.2 Terrain Stability Field Assessments

Section 2.5 of the FPC Forest Road Regulation requires a person proposing to construct roads in areas with moderate or high likelihood of landslide activity to carry out Terrain Stability Field Assessments (TSFA). Section 16 of the Operational Planning Regulation (OPR) states that TSFA reports are required for any cutblock proposed in areas with moderate to high likelihood of landslides in community watersheds. Section 17 of the OPR requires TSFA reports for all cutblocks in areas with a high likelihood of landslides. The TSFA reports provide risk assessments for cutblocks and/or road segments in some areas of a watershed where new development or road deactivation work is proposed. Cumulative and off-site effects of roads and harvesting in watersheds are often not considered.

2.3 Perry Ridge Risk Assessment Report

An overview risk assessment report was prepared for the Perry Ridge area in the Slocan Valley (Boyer, et al 1999). This is an example of a strategic level risk assessment that is not required by regulation. After identifying geologic and hydrologic hazards in the study area the report provided an assessment of the existing risks posed to life and limb, property and water supply. Anticipated risks associated with proposed road building and logging on Crown land were then determined. Several streams discharge onto populated alluvial and colluvial fans at the base of the ridge. Several map products, not usually

available for forest development planning, were used in the study. These included geological hazard maps for the private land on the valley bottom, stream channel surveys and a total chance logging plan. The report provided strategic level advice on where higher risk areas exist, where more detailed professional review is required and suggests measures to reduce risks.

2.4 Ministry of Water, Land and Air Protection

Under Section 82 of the *Land Title Act* a person proposing to subdivide property in areas subject to flooding must first obtain consent from the Ministry of Water, Land and Air Protection (WLAP). WLAP also provides local governments with floodplain maps for bylaws and assists with the construction of flood and debris torrent protection works on floodplains and active fans. These regulatory requirements sometimes result in the developer hiring an engineer/geoscientist to prepare risk assessment reports for fan areas. Some of these reports provide useful information such as the predominant hazard type, the frequency of events and consequences.

2.5 Local Governments

Local governments have the mandate to control and direct land use. Floodplain bylaws, development areas and building permits are used to direct appropriate uses of hazardous lands. Risk assessments reports and maps may provide information on predominant hazard type, frequency of events and consequences.

3.0 Where Should Risk Assessment Reports be Required?

In some areas of the province, there are relic paraglacial fans that pose a very low risk to people and property on the fan. These fans have an incised, unobstructed, single channel from the apex to the toe of the fan with channel capacity to convey major floods (one in two hundred year flood discharge) without avulsing or overtopping. Debris flows do not reach the fan under the present day condition. The chance of man made changes 'reactivating' one of these relic fans is very low. On this type of fans watershed risk assessments are not warranted.

However, most active or potentially active fans in the Kootenays are not of this paraglacial type. Most fans do not have a 'bullet-proof' channel, able to convey major floods with attendant timber debris, ice and bedload. Many fans in the region have been constructed, at least partially, by debris flow. In the steep watersheds, road construction and timber removal can renew landslide vigour and transform an inactive relic fan into an active fan. Consequently, risk assessments should be required above most high consequence fans in the region.

Alluvial and/or debris torrent fan risk assessment reports should be required where watershed development activities, such as forest harvesting and mineral exploration, have the potential to significantly increase the risk of damage to people and property on valley bottom fans.

In 1998, WLAP's Kootenay Regional office in Nelson, British Columbia, began compiling an inventory of areas at risk on the valley bottoms. Under contract with WLAP, Klohn-Crippen Consultants Ltd., identified potentially active alluvial and debris torrent fans along the main settlement and travel corridors for the Kootenay Region. Six hundred and fifty fans were identified using air photographs and existing reports. Fifty fans were inspected on the ground by Klohn-Crippen staff to delineate active fan boundaries. The 600 fans that were not field verified were labelled "potentially active alluvial and/or debris flow fans" and were identified as dots on a map. This information was combined with WLAP's pre-existing active fan inventory.

Since this initial inventory, ongoing field work by WLAP staff and others have resulted in the mapping of approximately seventy additional fan polygons. The Regional District of Central Kootenay (RDCK) has a project in-progress to delineate all geological boundaries for all known potential fans in their region. The fan polygons are being created using air photographs. Consequently, the dominant hazard type and degree of geologic activity is not confirmed on these fans. A project is in progress to make all WLAP and RDCK identified polygons available on a website.

Using these polygons, forest licensees and others can determine where their activities have the potential to increase risk to people and property.

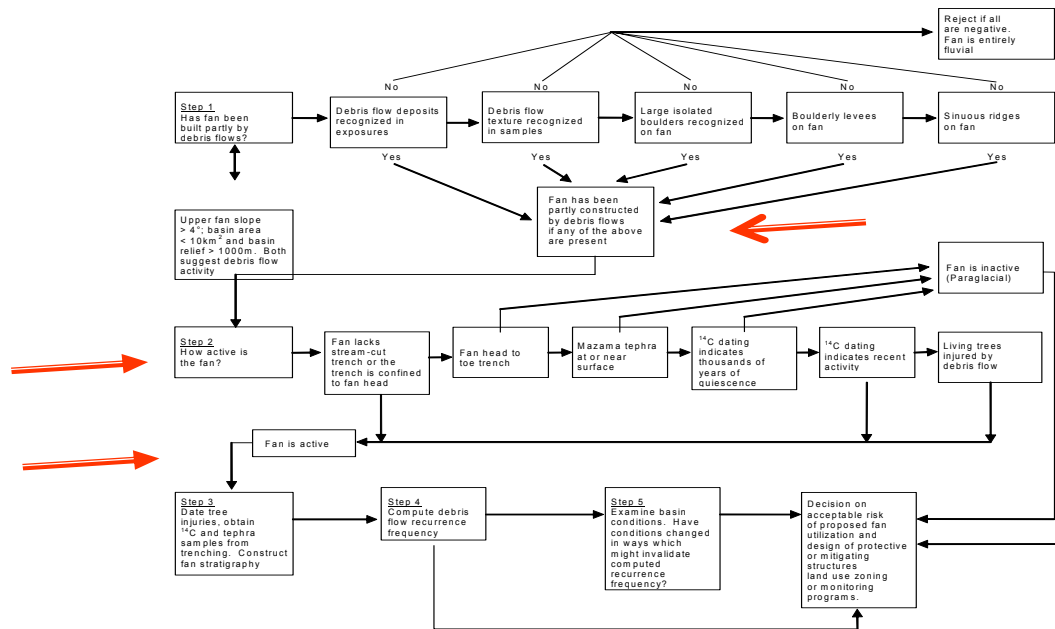
4.0 Determination of Dominant Hazard on The Fans

The assessment procedure will vary depending on the predominant hazard affecting the fan area. The primary concern in watersheds above alluvial fans is a possible increase in the magnitude and frequency of peak flows at the fan apex and below. Consequently, for alluvial fans, the proposed risk assessment procedure focuses on the primary activity that tends to increase the risk of flooding, e.g. the rate of tree removal and road building. Conversely, for areas above a colluvial fan, the primary concern is with landslide initiation and the assessment procedure focuses on the assessment of roads and tree removal on or below steep unstable terrain.

A field review by a qualified professional is usually required to determine the dominant hazard type on a fan. Existing studies and/or mapping mentioned in Section 3.0 may provide this information or be useful to help make the determination. Melton's ruggedness number (Melton 1965), (Jackson et al 1987), (Boyer 1999) can be used as an initial assessment before going to the field (Boyer 2000). Generally, for larger watersheds with larger flatter fans (third order streams and higher) the main concern on the fan is flooding. Smaller steeper watersheds with smaller steeper fans usually have fans that have been partially or mostly constructed from debris flow events. On these fans the main concern is the volume and run-out distances for debris flow events.

Jackson et. al., describe a methodology for the determination of the dominant hazard on a fan (Figure 4). A fan is classified as an alluvial fan if all the answers to questions in Step 1 in Figure 4 are negative. The hazards on an active alluvial fan include overbank

flooding and avulsion. Positive answers to any of the questions in Step 1 of the flowchart indicate the fan was at least partly constructed by debris flows.



Source: Jackson Jr. (1987)

Figure 4: A flow diagram summarizing debris flow hazard evaluation methodology

5.0 Risk Assessment Procedure for Areas above Alluvial Fans

5.1 Map Sub-basins and H60 Lines

The first step is to delineate watershed boundaries above the apex of the fan on a suitably scaled map (usually between 1:10,000 and 1:20,000). Sub-basin drainage boundaries and H60 line(s) are then mapped (Watershed Assessment Guidebook 1999). Watershed and sub-basin Equivalent Clearcut Areas (ECA) are calculated using procedure described in Watershed Assessment Guidebook for existing condition and proposed development scenario.

5.2 Hazard Rating

A hazard rating is then assigned for the watershed and sub-basins using Table 1. The hazard ratings are based on ECA calculations. Several other factors, such as road density and the spatial distribution of disturbances, obviously have effects on the runoff hydrograph. However, it is assumed that these effects are sufficiently accounted for in the ECA calculation. (With the continued advances in computing power, digital terrain

mapping and remote sensing one will soon be able to model development proposals on virtual representations of watersheds Whittaker 2000) and routinely make decisions on risk. Until then, using ECA values is judged to be an adequate representation of the level of disturbance in the watershed).

Hazard ratings can be assigned using more detailed and sophisticated methods.

Threshold ECA values presented in Table 1 were determined through a review of paired watershed studies and guideline documents used in southern BC.

ECA Level	Avulsion Hazard Rating
< 15 %	Low
15 to 25 %	Medium
> 25%	High

Table 1: Avulsion Hazard Rating

5.3 Consequence Rating

Consequence ratings are assigned using Table 2. The table assigns a consequence rating based on housing density. This approach was taken for several reasons:

- A.** Some local governments have established rural landuse bylaws that set lot sizes and building densities. These are an expression of local desire for housing density and should remain static for the mid to long term.
- B.** As mentioned in Section 3.0, WLAP has mapped many of the populated fans in the region. This, along with the administration of floodplain management programs (subdivision approvals by the province and floodplain bylaws by the local governments), will tend to keep lot sizes at existing levels in high hazard areas.
- C.** Fan areas have been identified for local governments, so that in areas that have building bylaws, building inspectors do not approve new building construction without due consideration for the flood and/or debris flow hazards.
- D.** The majority of the local governments have bylaws that restrict the number of principal dwellings to one per lot.
- E.** Highways, secondary roads, railways and utilities are common features on the fans in the valley bottoms.

If a hospital, school or other such important infrastructure exists on a fan, then the consequence rating should automatically be raised to high.

Density of Buildings	Consequence Rating
Rural agriculture: 8 hectare min. lot size	Low
Rural residential: 2 hectare min. lot size	Moderate
Community: lot sizes less than 2 hectares	High

Table 2: Consequence Rating

5.4 Risk Rating

Hazards and consequences are combined to establish a risk rating using Table 3. If the risk rating for the entire watershed and all sub-basins are low then the development proposal should be allowed to proceed subject to normal Forest Practice Code requirements.

If the risk rating for the entire watershed is low but one or more of the sub-basins have a high hazard rating then an assessment should be completed for the mainstream channel below the confluence of the sub-basin(s). The assessment is undertaken, by a stream channel specialist, to determine if increased peak flows emerging from the sub-basin(s) will increase movement of bedload and woody debris and/or increase bank erosion in the main channel. If main channel disturbance is anticipated, the professional should then assess the risk of the destabilizing effect reaching the fan and increasing the hazard on the fan. If the increases in peak flows from the sub-basin(s) will increase the hazard on the fan then the ECA in the sub-basin(s) should be reduced to 20% or less depending on the advice of the hydrologist and stream channel specialist.

If the risk rating for the watershed at the apex of the fan is moderate or high, development should be deferred or modified or an avulsion risk assessment should be undertaken.

HAZARD	CONSEQUENCE		
	High	Medium	Low
High	VH	H	M
Medium	H	M	L
Low	M	L	L

Table 3: Risk Rating

5.4.1 Fan Avulsion Risk Assessment

The fan avulsion risk assessment procedure is built upon work by (Chatwin 1999). A hazard rating is derived using a stream power index and a sensitivity rating for the fan. The stream power index is obtained from Table 4. The stream power index varies according to the channel gradient and the cross section. For example, the stream power index for a 2m deep and 2m wide channel on a 40 % grade is Very High. A 1m deep and 4m wide channel on a slope less than 8 % has a Moderate index.

The sensitivity of the fan to avulsion hazard is determined by fluvial specialists using the following criteria (Chatwin 1999):

- Degree of incision of channel(s)
- Number of active channels
- Amount of woody debris
- Amount of stored sediment

CHANNEL CROSS-SECTIONAL AREA (M2)

CHANNEL GRADIENT (%)	< 0.5	0.5 – 1.0	1.0 – 2.0	2.0 – 4.0	4.0 – 8.0
> 40	L	M	M	H	VH
20 – 40	VL	L	M	H	H
8 – 20	VL	L	L	M	H
< 8	VL	VL	L	L	M

Table 4: Rating of Stream Channel Power

Table 5 is used to establish an avulsion hazard rating. The avulsion hazard rating is combined with the consequence rating to establish a risk rating for avulsion hazard on the fan (Table 3). Using this approach, a fan with more than two channels, with channel incision less than one meter, large amounts of large woody debris and large amounts of stored sediment in the channel, will have a High sensitivity to destabilization (Chatwin 1999).

Sensitivity of the Fan

Stream Power Index	Low	Moderate	High
Very Low	VL	L	L
Low	VL	L	M
Moderate	L	M	H
High	L	H	VH

Table 5: Determining Avulsion Hazard

If the risk of avulsion is low, no further analysis is required. If the risk is determined to be moderate, high or very high, the development proposal is scaled back further or alternately, a more detailed risk assessment can be undertaken focusing on the channel capacity calculations.

5.4.2 Channel Capacity Risk Assessment

A numeric model (HEC-RAS) is used to estimate water levels in the channel(s) associated with the increased discharges anticipated due to the development proposal. Inputs to the model include channel cross-sections, channel slope, channel roughness and stream discharge (US Army Corps of Engineers, 1998). The HEC-RAS model, like all models, must be used with caution. The model operates on the assumption of a fixed bed geometry. During major floods, steep mountain streams usually experience large scale bedload movement, channel shifting and log jams. The fixed bed model does not take these conditions into account. However, because the objective is to assess future relative changes, the fixed bed model is considered appropriate for use in this application.

A flood discharge with a recurrence interval of one in two hundred years (Q_{200}) is used as a basis for floodplain development control in the province and is considered an appropriate flood magnitude for this assessment procedure. Once an estimate is obtained for the Q_{200} (usually the annual maximum daily discharge) it is increased by the percentage increase in ECA associated with the development proposal. For example, if the estimated Q_{200} for the predevelopment period is $20\text{m}^3/\text{s}$ and the proposed development plan is expected to increase the ECA to 25 % then the discharge used in the model would be $25\text{m}^3/\text{s}$. It is recognized that there is a risk of other processes, such as, a rapid breach of a dam or channel blockage or ice jamming causing flood discharges and water levels higher than a predicted Q_{200} (Jakob and Jordan 2001). However, these occurrences are infrequent and the objective is to examine relative risk.

Tables 7 and 2 are used to determine the hazard and risk ratings. If the risk is low no further analysis is required. If the risk is raised to the moderate or higher category, then the development proposal should be deferred or downsized.

Channel Clearance	Hazard Rating
2m or more to top of bank	Low
1 to 2m to top of bank	Moderate
Less than 1m to top of bank	High

Table 7: Channel Capacity Hazard Rating

6.0 Risk Assessment Procedure for Areas above Debris Flow Fans

This section describes a procedure for completing a watershed scale risk assessment when field indicators (Figure 4), existing reports and/or professional opinion indicate that the dominant hazard on the fan is debris flow. The procedure generally follows the approach used by Boyer et al (2000) in the Perry Ridge Risk Assessment Report (Section 2.3).

In areas with obvious high risks, consideration should be given to having the assessment completed by an expert panel. Debris flow hazards are difficult to quantify. Consequently, most assessment reports depend heavily on professional judgment. A panel of experts can provide a consensual risk assessment, which is more reliable than one prepared by a single report. Ideally, the team would consist of a geomorphologist, a forest hydrologist, and a forester. In less sensitive/less contentious watersheds with lower consequences, a qualified professional can undertake the assessment. A peer review of the report by an independent expert will increase the confidence in the risk assessment.

The assessors should become familiar with the terrain where development is proposed and where previous activity has occurred in the watershed by a helicopter overview flight and/or a few days in the field. The assessor should also discuss and/or go in the field with authors of supporting documents, such as, Terrain Stability Field Assessment reports (TSFA) and channel assessments.

6.1 Event Types

The first step is to identify the types of geological hazards present in the watershed that could have an affect on the fan. These usually include debris flows (including debris torrents and debris floods) and snow avalanches. On rare occasions, fans are flooded by the mass movement of snow and slush during a rapid warming event in winter.

6.2 Assessing Existing Hazards

All available information, a helicopter overview flight(s) and a few days in the field (depending on the size and sensitivity of the watershed) are used to identify landslide and snow avalanche sensitive terrain in the watershed. A stream channel survey procedure developed for the Perry Ridge study, by Steve Chatwin, is used to assist in the assessment of gully and head water stream channels (Chatwin 1999). Existing roads, trails, cutblocks

and/or mining disturbances (tailing ponds, waste piles, old structures such as dams, etc.) on or above steep unstable terrain must be included in the assessment.

6.3 Fan Hazard Ratings For Existing Condition

Once unstable and/or potentially unstable areas are identified, linkages or connectiveness between these sites and the fan are assessed. This assessment is undertaken using professional judgment and all existing information including stream channel inventory and rating information (Chatwin, 1999). Additional field reviews may be warranted for high-risk sites. Each event type is assigned a hazard rating using the following three class rating system: Low, Moderate and High.

6.4 Rating Hazards with Consideration of Development Effects

Once the existing hazards are rated, the influence of the proposed development on these ratings is assessed.

Roads, trails, cutblocks or other disturbances proposed on or above identified and suspected unstable terrain must be assessed. These include hazards associated with flat over steep scenarios (Jordan, 2001). Each site should be viewed in the field with special attention paid to potential micro drainage problems (Greene, 2001). When timber harvesting is proposed on or above steep unstable terrain, micro drainages should be mapped and verified in the field to assess the risk of landslide initiation by drainage concentration or diversion. ECA's should be calculated to assess the risk of localized peak flow increases causing landslide initiation.

If there are proposed clearcut areas in potential snow avalanche start zones and the assessment team or qualified professional does not have the experience with the detection and prediction of snow avalanches, specialists should be retained to assess snow avalanche hazards.

Stream channel surveys (Chatwin, 1999) are used to assess the linkages associated with proposed development.

Hazard assessment should consider all possible spacial and temporal effects of the proposed development. Disturbance effects can be long lasting and require a continued site commitment until hydrological recovery and/or road deactivation works take hold. On or near unstable terrain, there is a certain degree of risk of a landslide or erosion event whenever a road segment is left through a winter with open ditches and culverts. Road cutbanks failures and culvert blockage can go undetected and can occur during spring break-up when men and equipment cannot access the site(s).

7.0 Risk Analysis

Hazard ratings are combined with consequence ratings (Table 2) for the fan using Table 3.

Areas where proposed developments pose a high risk should be rejected from the plan. Areas generating a moderate risk should also be deferred unless a combination of project modifications and/or special best management practices can mitigate the hazard effects from the development proposal, i.e. move the risk rating for the project into the low category. Proposed best management practices recommended and the company proposing them should have a proven track record.

8.0 Conclusion

A procedure for assessing increased risk on alluvial and colluvial fans associated with resource development proposals is presented.

References

- Boyer, D. 1999. Debris Flow Hazards on Alluvial Fans: Kootenay Region, Southeast BC. Confronting Uncertainty: Managing Change in Water Resources and the Environment, Richmond, BC p.325
- Chatwin, S. 1999. Perry Ridge Stream Channel Survey. Prepared for Ministry of Forests, Arrow Forest District, Castlegar, BC
- Forest Practices Code of BC, 1999. Interior Watershed Assessment Procedure Guidebook.
- Green, K. and Halleram, W. 2001. Drainage Plans, A Comprehensive Planning Tool in High Risk Terrain. Terrain Stability and Forest Management for Interior of BC Conference. Nelson, BC.
- Jakob, M. and Jordan, P. 2001. Design Flood Estimates in Mountain Streams – The Need for a Geomorphic Approach. Com. J. Civ. Eng. Vol 28. pgs 425 – 439.

- Jackson, L.E.Jr., R. A., Kostaschuk, G.M. McDonald. 1987. Identification of Debris Flow Hazard on Alluvial Fans in the Canadian Rocky Mountains. Geological Society of America, Vol. VII pg. 115-124.
- Jordan, P. 2001. Landslide Frequencies & Terrain Attributes in Arrow & Kootenay Lake Forest Districts.
- Klohn-Crippen, 1998. Terrain Stability Inventory Alluvial And Debris Torrent Fans, Kootenay Region. Report prepared for
- Melton, M.A. 1965. The Geomorphic and Paleoclimatic Significance of Alluvial Deposits in Southern Arizona. Journal of Geology. V.73, p.1-38
- US Army Corp. of Engineers 1998. HEC-RAS River Analysis System User's Manual Version 2.2
- Whitaker, A. 2000. Modeling of Peak Flow Change Using the DHSVM Model. Watershed Assessment in the Southern Interior of BC Symposium, Penticton, BC 2000.

Appendix 6.0 - Draft Statement of Commitment to Sustainable Resource Management and Governance Principles

A Statement of Commitment to Sustainable Resource Management

WHEREAS, the Province of British Columbia is committed to pass on to future generations a vibrant economy, a healthy and diverse environment, safe and resilient communities and a responsive government;

WHEREAS, the Province of British Columbia is committed to adopt a scientifically-based, principled approach to environmental management that ensures sustainability, accountability and responsibility;

WHEREAS, providing certainty of access to Crown land and resources will result in increased investment, jobs and community stability;

WHEREAS, economic prosperity depends on maintaining the natural quality of the environment and enhancing the health of our communities;

THEREFORE, be it resolved that the following governance principles form the basis of the ministry's approach to sustainable resource management.

Governance Principles

Themes	Governance Principles
<p>Accountable and Responsive Government is about setting clear standards and ensuring those standards are being met through monitoring, enforcement, auditing and reporting.</p>	<p>Accountability - Enhancing performance management through effective compliance, enforcement, auditing and public reporting activities.</p> <p>Continual improvement & innovation - Learning from the past, adapting to changing circumstances, encouraging innovation and being entrepreneurial.</p> <p>Science-based decision-making – Making justifiable decisions informed by science-based information and risk management.</p> <p>Transparency - Establishing open and transparent decision-making processes that consider First Nations, the public and other key interests.</p>
<p>Certainty is about improving access to Crown land and resources; streamlining decision-making; seeking to accommodate First Nations interests; improving Crown land tenure management; improving the investment climate; and ensuring access to markets.</p>	<p>Certainty - Making timely and clear decisions within a predictable and understandable framework.</p> <p>Competitiveness - Ensuring that British Columbia remains internationally competitive by removing barriers to investment and promoting open trade.</p> <p>Efficiency - Focussed and efficient delivery of government services and maximizing the net benefits arising from the allocation, development and use of natural resources.</p>
<p>Shared Stewardship is about working cooperatively to achieve a sustainable future by shifting towards results based approaches,</p>	<p>Inclusion - Including the interests of First Nations, and their desire to participate more fully in the economy of the Province.</p> <p>Integration - Ensuring that decisions integrate economic, environmental and social elements, while considering the limits of each, for the benefit of present and future</p>

providing incentive and taking into account economic, environmental and social objectives.	generations. Shared responsibility - Encouraging co-operation among First Nations; federal, provincial and local governments; academics; industry and non-governmental organizations in developing and implementing policies.
--	---