

Best Management Practices for Recreational Activities on Grasslands in the Thompson and Okanagan Basins



January 2004



Ministry of Water, Land and Air Protection
Ecosystem Standards and Planning
Biodiversity Branch



Grasslands Conservation Council
of British Columbia

Acknowledgements

The consultants on this project – Sandra Bicego of Dovetail Consulting Inc., Judith Cullington of Judith Cullington and Associates, and Tracey Hooper of AXYS Environmental Consulting Ltd. - would like to acknowledge the time, commitment, and effort of a number of people who helped develop this document. A special thank you to:

- the participants of the BMP workshop (held September 26, 2003 at Quilchena Hotel near Merritt);
- the Best Management Practices (BMP) Review Committee; and,
- the BMP Planning Team: Bruno Delesalle and Taylor Zeeg of the Grasslands Conservation Council of British Columbia, and Debbie Webb and Bob Cox of the Ministry of Water, Land and Air Protection.

The BMPs, guidelines, and other information contained in this report are the product of considerable communication and collaboration among these individuals and organizations, who committed their time and effort to help make this document real and meaningful.

Preface

From Osoyoos to Kamloops and Lytton to Vernon, the Thompson-Okanagan grasslands are rare and unique landscapes facing increased pressures from a variety of sources. The pressure from human development is particularly acute, and in regions such as the Central Okanagan, population growth rates are among the highest in Canada. With an appealing climate, spectacular views and world-class recreation opportunities, it is easy to see why the Thompson and Okanagan grasslands in B.C.'s Southern Interior valleys are so popular. In this spectacular setting, an increasing number of people are recreating on grasslands. However, with increased recreation comes increased pressure on the grasslands and associated habitats. In response to these pressures, this document was developed as a tool to promote collaboration and a stewardship ethic amongst recreationists in order to achieve the conservation of grasslands in the Thompson and Okanagan basins.

The success of the Best Management Practices (BMP) document is dependent on strong partnerships between recreationists and organizations dedicated to promoting conservation and stewardship values. The Grasslands Conservation Council of British Columbia, in partnership with the Ministry of Water, Land and Air Protection facilitated the development of this document with a wide range of commercial and non-commercial recreation interests. The BMP document was developed with input and careful review from over 40 organizations, which included a workshop, held in September near Merritt B.C., resulting in a comprehensive code of practice developed *by* the user, *for* the user.¹

In order to maintain and support the grassland landscapes we all enjoy, voluntary stewardship is critical. Increasing pressures and decreasing regulatory measures places more responsibility on recreation user-groups to ensure stewardship values are promoted and upheld. Stewardship implies understanding, caring for, and maintaining a wide range of values, including those associated with various recreational activities. Stewardship is consistent with sustainable use – it does not mean preservation or protection from human use.

Taking ownership of the Best Management Practices document is the starting point. This document is intended to be the backbone of a vision predicated on voluntary stewardship. In order for the BMP document to be effective *on the ground*, recreation groups and other organizations will voluntarily use this document as a tool to develop more focused information and educational brochures that are activity-specific. The success of this BMP document will require pro-active involvement from the clubs and organizations that participated in its development.

By understanding how your activity impacts grasslands, you can choose an appropriate set of best management practices to achieve conservation and stewardship of the Thompson - Okanagan grasslands. When enjoying the region's grassland areas, ensure that your proposed activities are planned and carried out in compliance with the best management practices that apply.

¹ The results of the workshop can be found in a report on the [GCC website](http://www.B.C.grasslands.org/conservationcampaigns/bmp.htm): <http://www.B.C.grasslands.org/conservationcampaigns/bmp.htm>.

Table of Contents

Acknowledgements.....	ii
Preface	iii
Table of Contents	iv
1. Introduction.....	1
1.1. Purpose and Scope of this BMP Document	1
1.2. How to Use this BMP Document	2
2. Background.....	4
2.1. Grassland Ecosystems of the Thompson and Okanagan Basins ..	4
2.2. Associated Ecosystems and Habitats of Concern.....	6
2.3. Species at Risk.....	7
2.4. Crown Range Resources	8
2.5. Recreation Activities in B.C.'s Thompson and Okanagan Basins Grasslands.....	9
2.5.1. Motorized Recreation	9
2.5.2. Horseback Riding.....	10
2.5.3. Mountain Biking and Cycle Touring.....	10
2.5.4. Rock Climbing	10
2.5.5. Hiking, Backpacking, Camping, Picnicking and Nature Study	10
2.5.6. Back-country Skiing, Cross-country Skiing, Snow Shoeing and Dog Sledding.....	11
2.6. What are the Issues of Concern?	11
2.6.1. Soil Disturbances	11
2.6.2. Introduction and Spread of Invasive Plants	12
2.6.3. Impacts to Native Plants.....	14
2.6.4. Impacts to Native Wildlife	14
2.6.5. Impacts to Sensitive Environments and Landscape Features	15
2.6.6. Disturbances to Livestock and Forage	17
2.6.7. Impacts to Cultural Heritage Sites and Features.....	17
3. Best Management Practices	19
3.1. BMPs Applicable to All Recreation Activities.....	19
3.2. Motorized Recreation.....	35
3.2.1. What are the Impacts?	35
3.2.2. How Do Motorized Vehicle Recreational Activities Contribute to These Impacts?.....	35
3.2.3. How You Can Help: Recommended Best Management Practices	38
3.3. Horseback Riding	41
3.3.1. What are the Impacts?	42

3.3.2.	How Does Horseback Riding Contribute to These Impacts?..	42
3.3.3.	How You Can Help: Recommended Best Management Practices	44
3.4.	Mountain Biking and Cycle Touring.....	47
3.4.1.	What are the Impacts?	47
3.4.2.	How Does Mountain Biking and Cycle Touring Contribute to These Impacts?.....	48
3.4.3.	How You Can Help: Recommended Best Management Practices	50
3.5.	Rock Climbing.....	52
3.5.1.	What are the Impacts?	52
3.5.2.	How Does Rock Climbing Contribute to These Impacts?.....	53
3.5.3.	How You Can Help: Recommended Best Management Practices	53
3.6.	Hiking and Other Activities	56
3.6.1.	What are the Impacts?	56
3.6.2.	How Do Hiking and Related Activities Contribute to Impacts?57	
3.6.3.	How You Can Help: Recommended Best Management Practices	59
4.	What you can do to promote BMPs.....	62
5.	References.....	64
5.1.	References Cited	64
5.2.	Additional References.....	69
5.2.1.	All Activities	69
5.2.2.	Motorized	70
5.2.3.	Horseback Riding	70
5.2.4.	Hiking, Backpacking, Camping, Picnicking, Nature Study, Back-country Skiing, Cross-country Skiing, Snow Shoeing, Dog Sledding and Hunting	70
5.2.5.	Mountain biking	71
6.	Acronyms.....	72
7.	Glossary.....	73
8.	Information Sources.....	76
8.1.	Invasive Plants.....	76
8.2.	Trail Ethics	77
8.3.	First Nations in the Thompson – Okanagan	79
8.4.	Public Agencies Responsible for Recreation and Crown Range Resources in the Thompson-Okanagan Regions	79
8.5.	Trail Design and Maintenance.....	82
9.	Appendix.....	84
9.1.	Organizations and People who Participated in the Development of this Document.....	84

Table of Contents

1. Introduction

What are grasslands?

Grasslands are open areas with few trees where grasses or grass-like plants are the dominant vegetation.

Grasslands are open areas with few trees where grasses or grass-like plants are the dominant vegetation. Grasslands in the province of British Columbia are rare, unique, life-sustaining ecosystems that support a great diversity of plants and animals, provide high quality grazing for livestock, and offer many excellent recreation opportunities for residents and visitors alike. B.C.'s grasslands are used extensively for motorized and non-motorized recreational activities for both commercial and non-commercial purposes. B.C.'s grasslands represent less than one percent of the provincial land base and are one of Canada's most endangered ecosystems (GCC 2003). More than 30% of British Columbia's threatened or endangered species depend on grasslands for their survival (B.C. MELP n.d.).

Stewardship and conservation of grassland ecosystems will depend heavily on our ability to manage human activities appropriately. Well-managed recreation activities can help minimize changes and negative impacts to grasslands and can also help foster an ethic of grassland **stewardship**. With ever-increasing pressures on a very small land base, managers, decision makers, and industry need to be able to effectively address the threats and deleterious changes to grasslands, including those from recreational activities.

Guidelines to assist the recreation and tourism sector in conserving B.C.'s grasslands are currently not available. The lack of information that can assist recreational groups to achieve sustainable use of grasslands puts into question the long-term **ecological integrity** of these ecosystems. For these reasons, the Grasslands Conservation Council of British Columbia (GCC), in collaboration with the B.C. Ministry of Water, Land and Air Protection (WLAP) have been working with the recreation sector, ranchers, First Nations, conservation and land trust organizations, and species and ecosystem specialists to develop stewardship guidelines for recreational activities for grasslands in the Thompson and Okanagan basins.

The guidelines provided in this document - called "Best Management Practices" or BMPs - identify ways in which recreationists can help sustain healthy grasslands while continuing to enjoy their outdoor activities. The intent of the BMPs is to provide a set of stewardship guidelines in the form of recommended actions - the do's and don'ts of recreation - to achieve conservation and stewardship of B.C.'s Thompson and Okanagan basin grasslands.

1.1. Purpose and Scope of this BMP Document

As a grasslands user, you can make a difference!

Many recreationists, ranchers, naturalists and others are already finding ways to keep grasslands healthy.

The purpose of the BMP document is to provide stewardship guidelines for motorized and non-motorized commercial recreational activities on grasslands in B.C.'s Thompson-Okanagan basins so that damage to sensitive grassland habitats and the species that inhabit them is minimized or prevented. While the focus of the BMPs is on commercial recreation, they are applicable to all individual recreationists.

The BMP document is intended for use by:

- the vast array of individuals who enjoy recreational activities on grasslands, such as those who like to hike, bike, view nature, bird watch, build trails, drive, climb, hunt, harvest, camp, picnic, hold events, and ride horseback in the grasslands of the Thompson and Okanagan basins; and
- recreation clubs, commercial operators (e.g., tourism operators, guide outfitters and shops who cater to recreationists), and land managers who are interested in managing activities to minimize impacts on grassland species and ecosystems.

Grasslands in British Columbia are threatened, support recreation and hold a great deal of biodiversity all at the same time; consequently, the proposed BMPs focus on the grasslands of the Thompson and Okanagan basins. The BMPs, however, may be generally applicable to grasslands in other areas in B.C., as well as to other ecosystems in B.C. This document focuses on information and education through the use of voluntary BMPs and we hope that it will serve as a catalyst for user groups to adapt this information for informing and educating their members and achieving stewardship on the ground.

1.2. How to Use this BMP Document

This document is organized into seven sections:

- **Section 1** provides the introduction and purpose of this BMP document.
- **Section 2** provides the general background information about grasslands in the Thompson and Okanagan basins, and their associated habitats and species of concern; Crown range resources; the main recreation activities that occur in these grasslands; and associated issues of concern.
- **Section 3** focuses on the Best Management Practices. This section first outlines the BMPs generally applicable to all recreation activities and then focuses on BMPs specific to each type of activity.

Each activity section contains the following questions and sections:

- *What are the impacts of the activity?*
- *How does the activity contribute to these impacts?*
- *How you can help* → These are the recommended BMPs. This section includes a list of Objectives. **Objectives** are statements about a desirable future condition (e.g., minimize soil disturbance). Each objective is followed by the recommended **BMPs** - things that individual recreationists can do to help meet the desired objectives.

Where relevant this section also includes:

- *Relevant laws and regulations.*²
- *Information needs*

- **Section 4** asks, “What can you do to promote BMPs?”.
- **Section 5** provides references and personal communications used in this document.
- **Section 6** provides a list of acronyms used in this document.

Definitions for terms in bold text can be found in the glossary in Section 7.

² The laws referred to in this document are not the official version of the legislation and should not be used for legal purposes. The printed version issued by the Queen’s Printer remains the official version. Copies may be obtained from Crown Publications Inc., 521 Fort Street, Victoria, B.C. V8W 1E7.

- **Section 7** contains a glossary of terms used in this document.
- **Section 8** provides some general information sources and websites.

2. Background

This section describes the grasslands of the Thompson and Okanagan basins, and provides general background information on grassland ecosystems, associated ecosystems, species of concern, and Crown range resources in the region. An overview is also provided of the main recreation activities in B.C.'s Thompson and Okanagan basins, and the issues and values of concern related to grasslands.

2.1. Grassland Ecosystems of the Thompson and Okanagan Basins

Grasslands are generally found in areas that are too hot and dry for forests to establish. The area to which this document applies includes the grasslands of the Thompson and Okanagan basins. (See figure 1 below).

Bunchgrass refers to a type of grass that grows in clumps or bunches.

The grasslands that occur in the Thompson and Okanagan basins are dominated by **bunchgrasses**. These grasslands typically occur from valley bottoms up to 1000 m in elevation (Nicholson et al. 1991), and are characterized by having widely spaced clumps of bunchgrasses, several types of flowers, moderate cover of shrubs, and lichens, mosses, and **cyanobacteria** that often form a crust (called a **microbiotic crust**) over the soil.

The grasslands of the Thompson and Okanagan basins have different types of plant communities depending on where they occur. For example, big sagebrush and antelope-brush grasslands occur at low elevations in the region. Big sagebrush grasslands, also called shrub-steppe, typically have abundant cover of big sagebrush, a greyish-green aromatic shrub that grows up to two metres tall. Scattered to nearly continuous clumps of bluebunch wheatgrass (a type of bunchgrass) grow amongst the sagebrush. These grasslands typically occur on silty clay loam or sandy loam soils in hot, dry sites from valley bottoms up to about 700 m elevation throughout the region (Nicholson et al. 1991).

Antelope-brush grasslands are characterized by the presence of scattered clumps of bunchgrasses, and antelope-brush, a dark green, stiffly-branched shrub that grows up to two metres tall. The distribution and extent of antelope-brush grasslands in B.C. is very limited; they generally occur on sandy soils in very hot, dry sites in the southern region of the Okanagan Valley and in the southernmost parts of the East Kootenay Trench south of Canal Flats (GCC 2003; MELP 1995).

Grasslands at middle and higher elevations of the Thompson and Okanagan basins are dominated by bunchgrasses such as bluebunch wheatgrass, or rough fescue and Idaho fescue. These grasslands generally occur on sites above 700 m elevation. Bluebunch wheatgrass grasslands occur on warm sites; fescue grasslands are most common on level sites and cool slopes that face north or east. These grasslands generally have more flowers, and the bunchgrass clumps tend to be more closely spaced than in sagebrush or antelope-brush grasslands (Nicholson et al. 1991).

For more information on grasslands, see the following websites:

Grasslands Conservation Council of B.C.
www.bcgrasslands.org

South Okanagan Similkameen Conservation Program
<http://www.soscp.org>

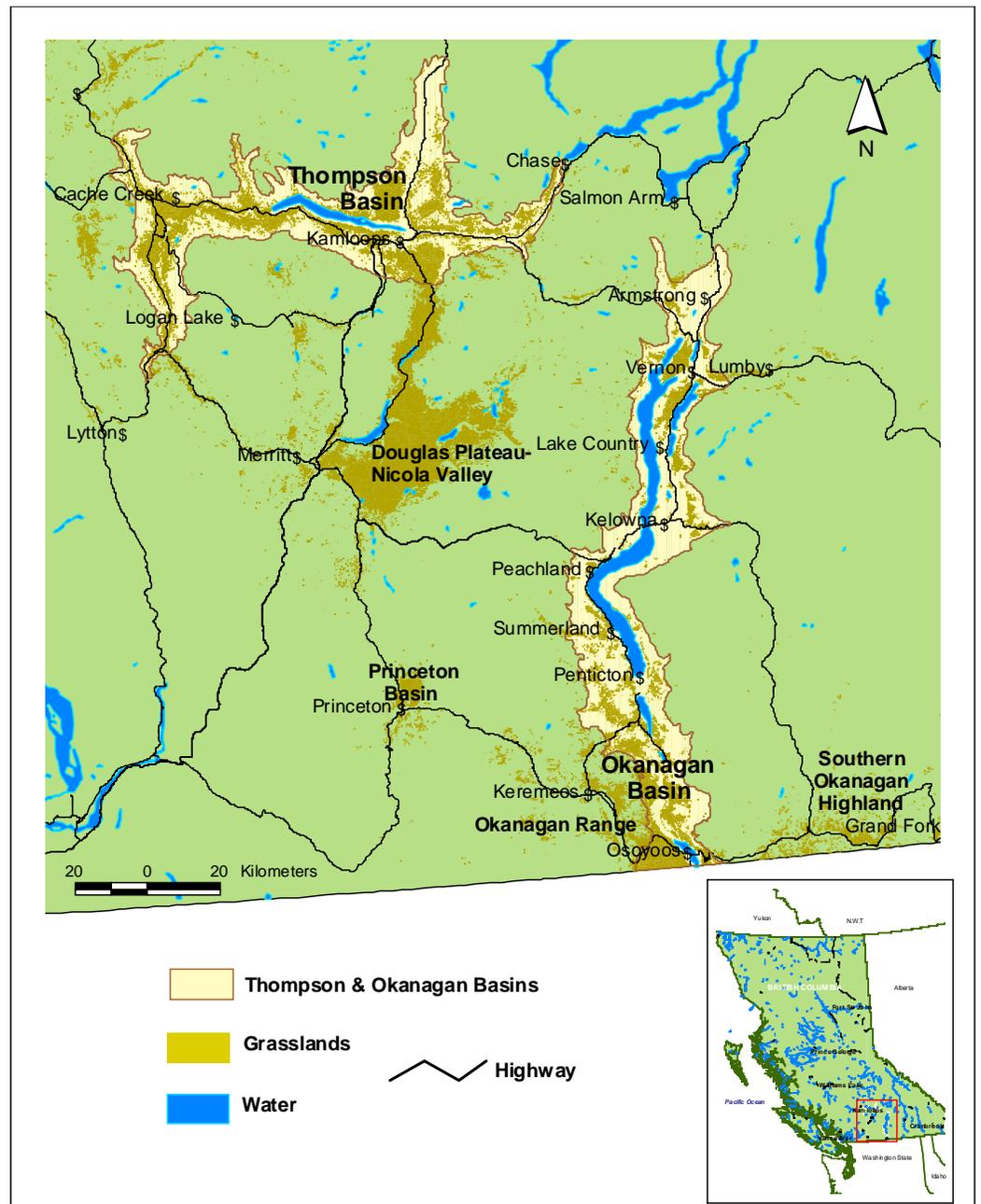


Figure 1: Grasslands of the Thompson and Okanagan Basins

Grasslands in the Thompson and Okanagan basins are important for a number of reasons:

- they comprise 13% (95,950 ha) and 10% (73,155 ha), respectively, of all of B.C.'s grasslands (GCC 2003);
- they provide a home for a wide array of plant, animal, and invertebrate species, including over 30% of B.C.'s species at risk;
- they are visually attractive landscapes;
- they provide valuable **forage** for the livestock industry, and for **wildlife**;

- they have provided First Nations peoples with resources such as food in the form of wildlife, berries, and herbs; plants for making medicines, mats, bags, and clothing; and, home sites, travel routes, and sites of spiritual significance (Thomson 1994, Parish et al. 1996, Cannings and Durance 1998).

Despite their importance, grasslands are one of B.C.'s most endangered natural regions. Open grasslands cover only 730,000 ha, or less than 1% of the province's land base (GCC 2003), yet they are being threatened by a number of factors. Throughout the Southern Interior, large areas of grasslands have been lost to vineyard, orchard, cropland, urban, and industrial developments. Remaining areas are under threat from the introduction and spread of invasive plants, forest encroachment, and from inappropriately managed livestock grazing and recreational activities.

Because many grasslands sites are expansive, open, and easily accessible, they are desirable sites for numerous types of recreational activities. Impacts from these activities can include such things as soil disturbances, invasive plant introductions and spread, damage to and loss of native vegetation, wildlife disturbances and destruction of critical habitat, and loss of the scenic quality of grassland areas.

2.2. Associated Ecosystems and Habitats of Concern

Wetlands and Riparian Habitats

Wetlands are areas of land where there is water at or near the ground surface throughout all or part of the year. They typically occur in depressions and shallow basins, but can also be found along the shallow edges of larger water bodies such as lakes and streams.

The **riparian** zone is the area of lush, moisture-loving vegetation that borders wetlands, lakes, streams, and rivers. Riparian zones are easy to identify in grassland areas because they form a rich, green transitional zone between aquatic and upland environments.

Healthy wetlands and riparian zones perform a number of vital functions including:

- stabilizing banks and shores of water bodies by reducing water and wind erosion;
- controlling water flow by capturing surface and groundwater from surrounding hillsides, and slowly releasing it back into the environment; and
- controlling water quality by trapping and preventing sediments, organic matter, nutrients, chemicals, and pathogens from reaching surface and ground waters; (Ducks Unlimited 1998).

Wetlands and riparian zones also provide critical fish and wildlife habitat in grassland areas (Thomas et al. 1979). Because they provide an important source of water and vegetation structural diversity in dry grassland areas, and because of their gentle topography, wetlands and riparian areas are used by a variety of wildlife species for cover, breeding and rearing habitat. Riparian areas are also used as travel corridors by many animals. Wildlife have been found to use riparian areas more than any other habitat associated with grasslands (Thomas et al. 1979; Bunnell et al. 1992).

In the South Okanagan, more than 85% of wetlands and their associated riparian areas have been drained, in-filled, or paved (Sarell 1990). Remaining areas throughout the Thompson and Okanagan basins are vulnerable to disturbances from the introduction and spread of invasive plants, and from inappropriately managed livestock grazing and recreational activities.

Because riparian zones are scenic, and provide shade and a source of water, recreationists often tend to concentrate their activities in these areas (Thomas et al. 1979, Bunnell et al. 1992). This can lead to impacts such as soil disturbances, invasive plant introductions, damage to and loss of native vegetation, wildlife disturbances and destruction of critical habitat, changes in water quality, and loss of the scenic quality of the area.

Silt Cliffs, Hoodoos, and Rock and Talus Habitats

Rocky outcroppings and escarpments, silt cliffs and **hoodoos**, and **talus** slopes (i.e., rubble accumulations at the base of rock outcroppings and escarpments) comprise about 1.6% (4675 ha) of the land base of the Thompson Basin, and 4% (13,233 ha) of the Okanagan Basin (GCC 2003). Although these sites appear to be harsh and barren due to their limited vegetation cover, they provide important habitat for many wildlife species. For example, California Bighorn Sheep use precipitous rock bluffs for both lambing and escape terrain, and Falcons and White-throated Swifts use cliff ledges and crevices for raising their young, and Canyon Wrens live amid the rocky cliffs. Bats also roost and raise their young in sun-warmed crevices, while rodents, lizards, and snakes use talus sites for cover, hibernating areas, and sunning spots.

Rocky habitats are attractive sites for rock climbing, but heavy use of these areas can remove fragile lichen cover, cause losses of plant species at risk, disturb bird and bat nesting and roosting sites, and disturb Bighorn Sheep escape terrain and lambing areas. Additionally, activities such as mountain biking or scrambling on silt cliffs and hoodoos can lead to erosion of these sensitive features.

For more information on species at risk, see the following websites:

Conservation Data Centre's Red- and Blue-listed species in B.C.

<http://srmwww.gov.bc.ca/cdc/index.htm>

Endangered Species in British Columbia

<http://srmwww.gov.bc.ca/atrisk/>

Committee on the Status of Endangered Wildlife in Canada
www.cosewic.gc.ca

Environment Canada
http://www.speciesatrisk.gc.ca/species/index_e.cfm

2.3. Species at Risk

The provincial listing of species was developed to highlight plant and animal species or plant communities that are considered to be at **risk** due to certain threats, declining population trends, or restricted distributions. The lists are used to determine which species or plant communities require conservation attention.

Red-listed species or plant communities are those which are considered to be endangered or threatened. Endangered means the species or plant community is expected to become extinct or extirpated in the near future, or is not expected to continue to survive in the wild if the factors that are threatening are not reversed. Extirpated means species or natural plant communities which no longer exist in the wild in British Columbia, but do occur elsewhere. Threatened means the species or plant community is likely to become endangered if the factors that are threatening its existence continue. **Blue-listed** species or plant communities are considered to be vulnerable or requiring special attention. Vulnerable species are considered to be at risk from human activities or natural events, but are not believed to be endangered or threatened.

Statistics on grassland species at risk are most readily available for the South Okanagan. Approximately, 30% of B.C.'s red-listed wildlife species and 46% of its

blue-listed species occur in this region (Iverson and Hooper 2002). This includes at least 18 species of mammals, 30 species of birds, six species of reptiles, and three species of amphibians (Iverson and Hooper 2002). Additionally, more than 300 rare invertebrate species, 134 red- and blue-listed plant species, and 35 rare plant communities are found in this region (Iverson and Hooper 2002, Canadian Parks and Wilderness Society, n.d.). One of B.C.'s most endangered grassland ecosystems is the antelope-brush grasslands. By 1995, 50% of the South Okanagan's historic antelope-brush grasslands had been lost, and most of the remaining area had been disturbed (Lea 2001). Additional losses have occurred since then (Lea 2001).

Knowledge of many plant communities and invertebrate species is currently lacking; consequently, the number of rare species and plant communities associated with B.C.'s grasslands will likely increase as more inventory work is conducted. Some of the red- and blue-listed animals and plants, and rare invertebrates that are known to occur in the grasslands of the Thompson and Okanagan basins, and associated habitats are:

- *Mammals*: Pallid Bat, Western Small-footed Myotis, Great Basin Pocket Mouse, Badger, California Bighorn Sheep;
- *Birds*: Prairie Falcon, Sharp-tailed Grouse, Long-billed Curlew, Burrowing Owl, Lewis's Woodpecker, Sage Thrasher, Grasshopper Sparrow;
- *Reptiles*: Western Rattlesnake, Racer, Gopher Snake, Night Snake;
- *Amphibians*: Tiger Salamander, Great Basin Spadefoot;
- *Invertebrates*: Behr's Hairstreak (butterfly), Vivid Dancer (damselfly), Northern Scorpion, Wind Scorpions, Lacebug, Flower Bug; and
- *Plants and Plant Communities*: scarlet gaura, Geyer's onion, low hawksbeard, antelope-brush/needle-and-thread grass (Nicholson et al. 1991, MELP 1995, Iverson and Hooper 2002, Scudder 2003).

Recreational activities can have detrimental effects on red- and blue-listed plant and animal species and plant communities by causing habitat loss or changes in habitat quality due to such things as soil disturbances, invasive plant introductions, damage to and loss of native vegetation, and changes in water quality. Additionally, animals can be injured or killed through collisions with vehicles, and their normal behavioural patterns and habitat use can be disrupted by vehicle noise or simply by repeated human presence especially in large numbers.

2.4. Crown Range Resources

For more information on Crown range resources in B.C., see the "Rangeland Handbook for B.C.," produced by the B.C. Cattleman's Association.

Although grasslands comprise only 0.8% of the provincial land base (GCC 2003), they provide a large proportion of the forage used by the province's livestock industry (Wikeem and Wikeem 1998). In the Thompson and Okanagan basins, livestock may graze native grassland areas from early spring through winter. Forage production varies among locations due to weather and moisture patterns. It takes one to five hectares of grassland in good health to feed a cow/calf pair for a month. Grasses such as bluebunch wheatgrass, Idaho and rough fescue, needle-and-thread grass, Sandberg's bluegrass, and junegrass are important forage plants in this region.

Tools such as herding, trail building, salting practices, fences and gates, and the development of water sources are important for managing cattle movements and forage use on native grasslands. Herding and the construction of gently graded trails

are used to move cattle between grazing pastures, and to distribute them uniformly over a range unit so that forage in a given area is not over-used. Salt blocks can also be used to draw cattle into areas that are under-utilized. Fences and gates are used to separate grazing pastures, force livestock to graze new or under-utilized areas, control movements of livestock among pastures, regulate grazing of certain types of forage, and protect prime grazing areas so they can be used selectively. The development of water sources can help keep livestock out of riparian areas, can be used to draw cattle into areas that are under-utilized, and can help reduce heavy utilization of forage in natural watering areas where water is scarce (France and Haywood-Farmer 1998).

Recreational activities can damage Crown range resources by causing habitat loss or changes in habitat quality due to soil disturbances, the introduction and spread of invasive plants, damage to and loss of native vegetation, and changes in water quality. Forcing cattle from roads up onto steep slopes, or dislodging cattle from upper slopes where they have been encouraged to stay, can severely impact otherwise off-limits areas. Not leaving gates and fences as found can result in cattle wandering into and grazing areas where they should be excluded (e.g., wetlands and riparian zones). Additionally, livestock can be injured or killed through collisions with vehicles, and their normal behavioural patterns and habitat use can be disrupted by vehicle noises.

All of these factors can affect the long-term health of grasslands and associated ecosystems, and in turn the livestock health and the livelihood of B.C.'s ranching community.

2.5. Recreation Activities in B.C.'s Thompson and Okanagan Basins Grasslands

This section provides a brief overview of some of the main recreational activities in B.C.'s Thompson and Okanagan basin grasslands. The following describes some of the most popular recreation activities that take place in the Thompson and Okanagan basins. There are other activities, such as dog trials, stargazing, racing and other large-gathering events that are growing in popularity. While these activities are not specifically addressed, they include some activities and BMPs described in this BMP document, for example, motorized vehicle use, walking or hiking through grasslands, camping, and picnicking.

2.5.1. Motorized Recreation

In this document, motorized recreation refers to the use of snowmobiles, three- and four-wheeled all-terrain vehicles (ATVs), 4x4s, motorcycles, dune buggies, and all other off-road motorized vehicles. The motorized vehicle recreation sector includes a variety of users including hunters, people who are physically unable to experience the outdoors using non-motorized transportation and enthusiasts who enjoy the thrill of the ride (MSRM 2002). Additionally, other users such as hikers, mountain bikers and other cyclists may use motorized vehicles to access their recreation areas.

Motorized recreation can take place on well-developed and maintained trails as well as unmanaged trails. In recent years, snowmobiling, motorcycling, and ATV riding

have increased in popularity. In the USA, participation in snowmobiling recreation is estimated to be increasing by 20% a year (MWLAP 2002).). In Montana, North Dakota, and portions of South Dakota, the number of registered ATV's and motorcycles increased by 92% between 1990 and 1998 (USDI and USDA 2001). Similar to the USA, participation in motorized recreational activities in B.C. has increased dramatically in recent years. It is expected that this trend will continue as populations in the Interior increase and as the tourism industry develops.

2.5.2. Horseback Riding

Horseback riding occurs in wilderness and semi-wilderness areas. Although trails are not always used, established systems of good trails or narrow gravel roads are generally preferred for riding since these provide good footing for horses (MSRM 2002). Horseback riding can involve single-day or multi-day excursions. Day trips are often made by individuals who live near urban centers, or by guests holidaying at lodges, resorts, or guest ranches. Multi-day excursions may be undertaken by individuals, or are led by guide-outfitters or packers as part of backcountry hunting or fishing holidays (MSRM 2002). Such trips are typically made in areas that provide access to feed, water, and semi-permanent facilities for the horses (MSRM 2002). Additionally, a number of guest ranches in B.C. offer tourists the opportunity to take part in single-day or multi-day cattle drives.

2.5.3. Mountain Biking and Cycle Touring

Mountain biking and cycle touring are examples of two popular forms of cycling-based recreation that take place in B.C.'s Interior, usually from May to October. Mountain biking is typically a single-day outing involving cross-country and downhill riding on various types of terrain from wide flat trails to challenging steep single-track trails with roots, rocks, trees and bushes as obstacles (MSRM 2002). Mountain biking can involve racing events and other forms of activities mentioned in this document, such as trail building and maintenance, camping and the use of vehicles for transportation. Cycle touring involves a 'scenic touring' experience that is less technical than mountain biking and is often enjoyed on flatter terrain, such as highways, secondary roads, side roads, and wide trails (MSRM 2002).

Nature study has become a popular pastime in Canada.

In 1996, 85% of Canada's population participated in nature-related activities, and spent 1.5 billion days enjoying nature (Environment Canada 2003).

A popular form of nature study in Canada is wildlife viewing. In 1996, nearly one in five people participated in this activity. Types of nature study that occur in the Thompson and Okanagan regions include wildlife viewing (such as bird watching), photography, rock hounding, and fossil collecting.

2.5.4. Rock Climbing

The B.C. Interior offers an array of rock climbing opportunities from beginner to expert levels. In the Thompson and Okanagan areas rock climbing takes place in such areas as Skaha Bluffs in Penticton, Kelowna, Kamloops, and the northern Okanagan Valley. Climbing typically takes place in spring, summer, and fall. Rock climbing terrain in the B.C. Interior is composed of limestone, quartzite, granite, and some areas of gneiss rock. Climbs in the Southern Interior often take place on rock faces associated with grasslands (Buckle 2003).

2.5.5. Hiking, Backpacking, Camping, Picnicking and Nature Study

Hiking, backpacking, camping, picnicking and nature study are activities that often take place in combination with other outdoor recreation activities, such as the activities mentioned in this document. For example, hikers may drive their vehicle to a trailhead to start their hiking trip. Most of these activities involve the use of

established trails to access features such as campsites, lakes, natural landscapes, wildlife, viewpoints, agricultural areas, and cultural features (MSRM 2002, MOF 2001). However, these activities also involve travelling in or using areas where there are no established trails, for example, taking part in bird watching, or gathering at large, temporary social events (mountain bike races, dog trials, stargazing). In the Thompson and Okanagan regions, these activities can take place from May to October and can be self-guided or offered through a club or tourism operation (MSRM 2002). Trails used for these activities are managed by several different agencies and organizations. (See Information Sources Section 8.4 for a list of agencies responsible for recreation in the Thompson /Okanagan).

2.5.6. Back-country Skiing, Cross-country Skiing, Snow Shoeing and Dog Sledding

Non-motorized winter activities in the Thompson and Okanagan basins include backcountry skiing, cross-country skiing, snowshoeing and dog sledding. These activities can be undertaken as a guided or unguided, single- or multi-day excursions. Outdoor winter recreationists access both front country and backcountry wilderness areas using secondary logging roads, trails, as well as commercially-run ski areas. Multi-day outings can involve the use of vehicles (e.g., cars, trucks, snowmobiles), dogs, and helicopters for access in and out of backcountry trails, as well as backcountry cabins, tents, or snow caves for overnight accommodation.

Skiing and snowshoeing takes place in the low elevations primarily from December to March. Skiers and snowshoers usually start at low- to mid-elevations en route to skiing in alpine and sub-alpine areas, and in bowls or areas between trees (MSRM 2002). Cross-country skiers prefer to remain on sites at lower elevations, which can include grasslands areas. Skiing generally occurs within designated Nordic ski areas where a local club maintains and charges a fee for the use of the trails.

Dog sledding as a sport is rapidly growing in popularity in the Thompson/Okanagan region, as is the number of commercial outfitters and ski resorts who offer this form of recreation to their clients (Thompson Okanagan Tourism Association n.d.).

2.6. What are the Issues of Concern?

Because grassland areas are open and expansive, they are easily accessible, and consequently, are especially vulnerable to recreational impacts. This section highlights the issues of concern related to grasslands, and provides an overview of associated recreational impacts.

2.6.1. Soil Disturbances

The Issue

Soils perform many vital functions. As well as providing a substrate and nutrient source for plants, and a home for micro-organisms and burrowing animals, soils capture, store, and slowly release water. By regulating water flow in this manner, soils help reduce the impacts of droughts and floods on plants, animals, and landscapes. Soils also filter wastes, recycle plant and animal material, and store nutrients and provide them to plants so that they will grow properly.

Soil compaction reduces breeding habitat for Painted Turtles which need loose soil for digging nest sites (Stevens 1992).

Types of Impacts

Grassland soils can be highly susceptible to disturbances such as **compaction**, or **exposure** and **erosion**. Compaction can occur when soils are repeatedly subjected to foot, hoof, or vehicle traffic. Exposure occurs when plant cover is damaged or removed, and erosion occurs when exposed soils are blown by winds, moved by water, or disturbed by pedestrian and vehicle travel.

Soil compaction can affect grassland ecosystems by:

- *reducing water permeability and infiltration rates*, which reduces the amount of moisture in the soil that is available to plants and micro-organisms and increases run-off;
- causing increased surface runoff of water, which can add to erosion problems;
- reducing the ability of plants to establish and extend their root systems;
- *making it difficult for animals to dig* into the soil to find food and shelter; and
- *reducing habitat quality and availability* for fish, amphibians and invertebrates, especially in riparian areas.

Soil exposure and erosion can result in further impacts to grassland ecosystems by:

- removing topsoil, organic matter, and nutrients that sustain grassland ecosystems;
- *causing plant roots to be exposed*, which leaves the plants vulnerable to stress and susceptible to windfall, preventing establishment of new plants; providing increased opportunity for the establishment of weeds;
- removal of microbiotic crusts which holds soil particles together, retains moisture and helps provide nutrients to other plants;
- preventing the establishment of new plants;
- providing increased opportunities for invasive plants to become established;
- *contaminating water supplies* (e.g., due to pathogens in soil); and
- *causing sedimentation of streams*, which in turn, damages fish spawning beds; increases turbidity; and, affects stream flow regimes and stream plants and wildlife.

The term "invasive plant" refers to any invasive alien plant species that has the potential to pose undesirable or detrimental impacts on humans, animals or ecosystems (FBC 2003). Alien species are those that are not native to the area in which they are currently found.

2.6.2. Introduction and Spread of Invasive Plants

The Issue

Thousands of hectares of native plant communities in British Columbia have been overtaken by invasive plants, which are commonly called weeds (B.C. MOF 2003). An invasive plant is any type of plant that humans consider to be undesirable, either because it has no obvious beneficial qualities, or because it interferes with our land management objectives (Wikeem et al. 1998). Typically, invasive plants are species of non-native (alien) plants that have been introduced to an area where their natural controlling agents, such as insect predators and plant pathogens, do not typically occur (Cranston et al. 1996).

Invasive plants commonly establish in areas where the soil has become exposed or eroded. Once they colonize an area, invasive plants can spread rapidly. For example, in the U.S. Pacific Northwest Region, rush skeleton weed is spreading at a rate of about 40,500 hectares per year (Russell 2001). The rapid spread of invasive plants is

of equal high concern in B.C. with its similar grassland ecosystem to the United States. In addition to lacking the natural controlling agents that keep their growth and spread in check, invasive plants possess a number of mechanisms that allow them to out-compete native plants. These include:

- prolific seed production;
- seeds that can remain viable for long periods of time;
- structures such as burrs, which are easily picked up and transported by humans, pets, livestock, or wild animals;
- extensive rooting systems; and
- chemical secretions that inhibit grazing by wild animals or livestock, or the growth of surrounding native plants.

How do Invasive Plants spread?

“People enjoying various land- and water-based recreational activities can unknowingly spread invasive plant seeds, roots and other reproductive parts. Cyclists and ATV users on grasslands, campers moving among parks, guide outfitters packing in hay for their horses, and boaters relaunching their boats into a new lake are examples of how recreational users can unknowingly introduce invasive plants (FBC 2003).”

Read the **Invasive Plant Strategy for British Columbia** produced by the Fraser Basin Council
<http://www.fraserbasin.bc.ca/publications/documents/InvasivePlantStrategyFNL.pdf>.

Types of Impacts

The ability of invasive plants to colonize areas and spread rapidly can cause a number of impacts to grassland ecosystems including:

- *loss of natural diversity of native plant communities.* A spotted knapweed invasion in Glacier National Park resulted in the loss of seven species of rare or uncommon plants within a three-year period (Duncan 1997). Even with the use of control programs, it can take many years for native plants to re-establish in areas previously infested with invasive plants (B.C. MOF 2002a). Changes in local plant communities can, in turn, affect the foraging patterns and distribution of livestock and wild animals.
- *degradation of soil and water.* Spotted knapweed invasions of native bunchgrass sites can increase surface runoff by up to 56%, and increase soil compaction by as much as 192% compared to non-infested sites (Lacey et al. 1989);
- *reduction in the quality and availability of fish and wildlife habitat* by affecting water quality, and availability of food, nesting habitat and security cover. Wetlands lose 50–100 percent of their native vegetation due to purple loosestrife invasion, which in turn leads to the displacement of many animals, such as muskrats. Many birds will not nest in loosestrife infestations (FBC 2003);
- *loss in livestock forage quantity, quality and availability.* Invasive plant invasions in B.C. cause an estimated 50% loss in available livestock forage annually (Cranston 2001);
- *increase in health threats to animals and humans.* Some invasive plant species produce chemical compounds that are toxic to livestock, wildlife, and in some cases, humans. Other species have structures such as barbs, thorns, and burrs which can cause physical injuries to animals;
- *change in natural fire behaviour.* Leafy spurge contains oil compounds that are highly flammable, and cheatgrass generally cures very early, providing a potential fuel source for fires early in the season (USDI and USDA 2001);
- *loss in the aesthetic quality* of the natural landscape;
- *reduction in the attractiveness* of recreational areas and reduction in recreational use of an area, e.g. dense infestation of knapweed could create a physical barrier to cyclists; and,
- *reduction in land values.*

2.6.3. Impacts to Native Plants

The Issue

The plants that make up a particular plant community are a reflection of the type of site on which they are growing. Site characteristics such as slope, soil type, moisture content, and the direction the site faces help determine what type of plants are able to grow in a particular area. Some grassland plant communities may be formed mainly of grasses, while others can include a mix of trees, shrubs, grasses, and forbs. Many grassland areas also have a well-defined crust on top of the soil that is comprised of a diverse community of mosses, lichens, and cyanobacteria. This crust is very thin and fragile, and often goes unnoticed by many grassland users, yet it performs a vital function in protecting the soil from moisture loss, stabilizing the soil and helping prevent erosion, and fixing atmospheric carbon and nitrogen and releasing it into the soil (McIntosh 2003).

Native plant communities provide forage for livestock, as well as feeding, breeding, and cover habitat for wildlife and invertebrates. Maintaining native plant communities (including the soil crust) is important to maintaining the natural diversity of grassland ecosystems.

Maintaining native grassland plant communities in B.C.'s Southern Interior can be difficult given the rate at which grassland ecosystems are being lost to urban and agricultural development. Many of the red- and blue-listed plant species, and rare plant communities found in this region are associated with grasslands. The difficulty of maintaining native grassland plant communities is compounded by the fact that many small grassland ecosystems have not yet been classified, but are rare and at risk.

Types of Impacts

The types of impacts that can occur to native plant communities include:

- *loss of plant cover and root systems*, which can lead to soil erosion and sedimentation;
- *loss of plant diversity* due to the loss of plant species, and/or to the loss of plant communities;
- *changes in plant communities* due to the spread of invasive plants. Changes in local plant communities can, in turn, affect the foraging patterns and distributions of livestock and wild animals; and,
- *structural or compositional changes in plant communities*, which in turn can affect habitat quality and availability for wildlife.

Impacts to native plants can differ, however, depending on how resistant they are to disturbances, how resilient they are, and how tolerant they are to repeated disturbances.

2.6.4. Impacts to Native Wildlife

The Issue

The Thompson and Okanagan grassland basins support a diversity of birds, mammals, reptiles, amphibians, fish, and invertebrates. Critical habitats for wildlife and invertebrates in the region include den sites, foraging habitats, breeding areas, habitats for rearing young, areas that provide security and thermal cover, winter ranges, mineral licks, travel corridors, and migration routes. Grasslands are also home to some species during critical times of the year. For example, snakes such as

Read more about snakes and other wildlife species that live in the Thompson and Okanagan grasslands:

Habitat Atlas for Wildlife at Risk website:
<http://wlapwww.gov.bc.ca/sir/fwh/wld/atlas/index.html>

the Gopher Snake, Racer, and Rubber Boa are active in the Thompson and Okanagan basins from April to October-November. During this time, foraging, mating, egg-laying and hatching occurs. Because populations of snakes are seasonally concentrated at their communal den sites, these communities may represent the entire snake population for the surrounding area, and are particularly vulnerable to disturbance (see side bar for more information).

Many of British Columbia's red- and blue-listed wildlife species are associated with grassland habitats. In the past century, all the wildlife species that have disappeared from the South Okanagan have been grassland species. These include the Pigmy Short-horned Lizard, White-tailed Jackrabbit, Sage Grouse, Sharp-tailed Grouse, and Burrowing Owl (MELP n.d.). This trend may continue as invasive plants and inappropriately managed livestock grazing, human development and recreational activities continue to threaten grasslands, and their associated wildlife and invertebrate populations in B.C.'s southern interior.

Types of Impacts

The types of impacts to native wildlife associated with the grasslands of the Thompson and Okanagan basins include:

- *habitat fragmentation* due to poorly planned recreational development. Habitat fragmentation can disrupt animal movements between important habitats, and can reduce habitats to sizes that are too small and too far apart to be used effectively.
- *loss of availability and suitability of habitats* for breeding, nesting, foraging, security and thermal cover;
- *loss of species* and species diversity;
- *disruption of game populations* at First Nations traditional hunting sites;
- *declines in a species' population* due to the death of individuals, or to impaired ability to reproduce and raise young. For example, increased road and trail developments in the grasslands of the Thompson and Okanagan basins may lead to greater mortality of the gopher snake. Declines in some populations of birds, amphibians and small mammals can result in reduced prey availability for predators (hawks, falcons, owls, foxes, and coyotes); and
- *behaviour disturbance* from human activities and uncontrolled pets, and from vehicle noise or exhaust, which can disrupt normal behavioural patterns such as foraging, resting, and breeding. These types of disturbances can also lead to the disruption of breeding territories, reduced ability to feed young or defend nest, and increased chances of predation. The response to disturbance can be pronounced at certain times of the year such as when animals are breeding, or are energetically stressed (e.g., during winter), and can lead to illness and even death, or the reduced ability to acquire food, reproduce, and raise young, (Miller 1999, WLAP 2002, 2).

The Prairie Falcon (which is RED-listed) is at risk in B.C. due to human disturbance at nesting sites on cliff edges (WLAP: <http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-14.htm>).

Noise is of special concern for species that normally live in quiet environments. Spadefoots may also mistake vehicle sounds for the sound of thunder, which triggers their emergence from underground burrows to breed in temporary ponds created by storm rains. The Spadefoots then may emerge at the wrong time of the year and may be unable to rebury themselves if they are stressed from dehydration or have depleted fat reserves (Bondello et al. 1979).

2.6.5. Impacts to Sensitive Environments and Landscape Features

The Issue

Sensitive environments and landscape features associated with grassland ecosystems in B.C.'s Southern Interior include wetland and riparian areas, hoodoos, silt cliffs, and rock and talus sites (see Section 2.2.2). All of these features provide critical

habitat for a variety of wildlife species. Additionally, wetlands and riparian zones have very different plant communities than grassland areas. Healthy wetlands and riparian areas also play a vital role in controlling water flows across the landscape, and in maintaining water quality and preventing soil erosion in wetland ecosystems.

In Southern B.C., many wetlands and their associated riparian areas have been lost to urban and agricultural development. Remaining areas are susceptible to infestations of invasive plants, and from inappropriately managed livestock grazing and recreational activities. The extent and distribution of hoodoos, silt cliffs, and rock and talus habitats is limited in B.C.'s Southern Interior, yet these sites are experiencing increasing pressure from recreational activities such as rock climbing, hiking and mountain biking.

Types of Impacts

The types of impacts that can occur to wetland and riparian ecosystems include:

- *loss of or damage to native vegetation;*
- *erosion of banks and shores* (due to vegetation loss) and soil disturbances, which in turn can lead to increased sedimentation of water bodies;
- *changes in water quality* due to erosion, sedimentation, and introduced pollutants. This affects habitat for fish, amphibians, aquatic invertebrates, and waterfowl, and drinking water for humans, and wildlife;
- *changes in water flow* due to soil compaction and erosion. This can lead to flooding or drying of wetlands and surrounding areas;
- *changes in water temperature* due to erosion, sedimentation, and loss of native vegetation. This, in turn, can affect the quality of fish habitat;
- *changes in native plant communities* due to the introduction of invasive plants;
- *changes in wildlife security cover, food resources, breeding and rearing habitat* due to loss of vegetation, changes in native plant communities, soil disturbances, and changes in water quality; and
- *disturbances to wildlife that live in wetland and riparian habitats:* Noise and exhaust from vehicles, increased road access to wetland and riparian areas, and road crossings of riparian areas can disrupt fish and wildlife migration movements, and disturb sensitive feeding and breeding areas.

The types of impacts that can occur to hoodoos, silt cliffs, and rock and talus sites include:

- *disturbances to roosting, hibernating, nesting, or rearing sites* that are used by birds, mammals, and reptiles;
- *disruption of wildlife travel corridors* and escape routes;
- *injury and death to snakes* in particular from the presence of humans;
- *damage to and loss of fragile lichens, mosses, and other small plants* that grow on these sites; and
- *soil erosion* of hoodoos and silt cliffs.

A study of bird use of riparian habitats in the Mohave Desert in California found that more birds and species of birds used riparian habitats that received low levels of off-road vehicle use compared to sites that were frequently used. Birds also flew at the sound of approaching vehicles, even if the vehicles were far away and out of sight. Some birds moved up to 3.2 km away from riparian areas that were used by off-road vehicles (Weinstein 1987).

2.6.6. Disturbances to Livestock and Forage

The Issue

In British Columbia, approximately 39% of the province's grasslands occur on private land, 9% occurs on Indian reserves, and 52% is found on Crown land (GCC 2003). Livestock grazing occurs in most of these grassland areas. Recreationists have the right to use Crown land, and may be permitted to use private lands. However, their activities must be properly managed so that healthy grasslands are maintained in the province. Recreational activities that disrupt livestock movements and foraging patterns can cause impacts to native grasslands.

Types of Impacts

The types of impacts from recreation activities that can affect livestock management, forage and thus, the health of native grasslands include:

- *the creation of new trails through grasslands* can lead to new cow trails, leading to changes in grazing patterns. They allow cattle to drift off the range into unauthorized areas (B.C. MAFF 2002).
- *damage to gates and fences, or gates not being left as found.* This can result in changes to livestock movements, allowing animal access to areas that are protected or are being rested from grazing, or it may confine livestock to sites that are susceptible to trampling and grazing pressure. This, in turn, can lead to soil disturbances, and loss of native plant cover;
- *the introduction and spread of invasive plants*, which results in changes to native plant communities, and reduced forage quality and availability for livestock; and
- *disturbances to free-ranging livestock* from vehicular traffic and uncontrolled dogs can cause stress to the livestock and disrupt livestock movements and foraging patterns. This can lead to increased trampling and grazing pressure if animals congregate in certain areas.

2.6.7. Impacts to Cultural Heritage Sites and Features

The Issue

Cultural and heritage sites and features provide an important link to the human past (MOF 2001). Humans have occupied the Okanagan Valley for at least 6000 years (Cannings and Durance 1998, Thomson 1994). The low-elevation bottomlands of this area provided accessible water, food, and medicine for the first human inhabitants (Cannings and Durance 1998, Thomson 1994). Historically, this region was occupied by the Interior Salish, with an isolated group of Athapaskan Tribe living in the Nicola Valley. Europeans began to explore the region and settle there in the early 1800s (Cannings 1980).

In this report, cultural heritage sites and features refer to those used by First Nations peoples. All cultural heritage sites are important to First Nations peoples in maintaining their traditional lifestyle and cultural identity. The type of First Nations cultural sites and features that occur in the Thompson and Okanagan basins include:

- pictographs (painted symbols, usually on rock faces), and petroglyphs (carvings on rock faces);
- kekulis (pit dwellings), rock shelters, and cache sites;
- burial sites;

- sites of spiritual significance; and
- sites used for the gathering of traditionally used foods and medicines.

Traditional use refers to the use of the land, water, plants, and animals by First Nations people for such things as food, trade, medicine, fuel, shelter, and spiritual or ceremonial purposes.

Historic sites and features refer to built structures and sites associated with European and Asian settlement of the Thompson Okanagan region. They provide a means of interpreting the settlement history of the area, and in some cases, provide a source of income for local communities that maintain and promote these features for educational and tourism purposes. The types of historical sites and features that are found in the region include:

- homestead sites;
- gold mining sites; and
- historical trade and travel routes such as the Fur Brigade Trail and Dewdney Trail.

Types of Impacts

A growing interest in the history of First Nations, European, and Asian occupation of B.C., and the promotion of associated sites for educational and tourism purposes makes cultural and heritage sites and features susceptible to impacts from increased human access. Irresponsible behaviour; increased vehicular and foot traffic; and noise, dust, and exhaust from vehicles can cause impacts such as:

- *vandalism* (e.g., the defacing of pictographs, and damaging of old homestead sites);
- *removal* of historical and cultural artefacts by souvenir hunters;
- *crushing and scattering* of artefacts;
- *compaction and erosion* of buried cultural sites;
- *disruption of game populations* at First Nations traditional hunting sites;
- *loss of or damage to medicinal plants* at First Nations traditional gathering sites; and
- *loss of the cultural value* of First Nations traditional spiritual sites.

3. Best Management Practices

This section describes the BMPs that are applicable to all recreational activities, then focuses on those BMPs that are applicable to specific types of recreation that take place on grasslands of the Thompson and Okanagan basins. For each recreation type, a discussion is presented on how that form of recreation can impact grassland ecosystems. This is followed by a list of **Objectives** that are designed to minimize or prevent those impacts. Under each objective is a list of **BMPs** that can be followed to meet that objective. Laws and regulations that are applicable to the objective are highlighted where relevant.

The overall goal of developing BMPs is to instill grassland stewardship values in recreationists in order to achieve a future state where grassland ecosystems are thriving. Eight objectives were identified that could achieve this goal:

Goals describe future visions or end states that are timeless and worded generally to establish broad aims.

Objectives are desired future states or conditions, which help to achieve a goal. Objectives are specific, measurable, timely, and attainable in the shorter term through BMPs.

BMPs are those things an individual should or should not do when undertaking recreational activities on grasslands to help achieve the objectives.

Respect Grassland Ecosystems

- **Objective 1:** Minimize soil disturbance
- **Objective 2:** Avoid the introduction or spread of invasive plants
- **Objective 3:** Respect native plants and wildlife
- **Objective 4:** Respect sensitive environments and landscape features

Respect All Users

- **Objective 5:** Avoid disturbing livestock and damaging forage
- **Objective 6:** Respect property and livelihoods

Respect Cultural and Heritage Features

- **Objective 7:** Respect First Nations lands, spiritual sites, cultural heritage features, and traditional land use
- **Objective 8:** Respect heritage features

3.1. BMPs Applicable to All Recreation Activities

The following are BMPs and relevant laws that are applicable to all recreational activities.

Objective 1: Minimize Soil Disturbance

Be aware:

- Learn about soil disturbance issues.
- Help educate other recreationists.

- Learn to recognize soil conditions, and avoid areas and landforms that are especially sensitive to soil disturbances.
- Learn to 'Leave No Trace' and 'Tread Lightly'.³

If you are on managed trails, roads, routes:

- Read and obey all trail/road signs and closures.
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas.
- Avoid travelling on existing trails if they are poorly placed, and are causing erosion problems (e.g., straight up or down a hillside or on an eroding side slope, or in riparian or wetland areas).
- Avoid widening trail corridors.
- Avoid breaking branches, which can lead to plant/tree destruction.
- Minimize or avoid trail use during periods of high precipitation and spring break up, when the soil is soft or sloppy.
- Consult local landowners before using non-designated trails to make sure you are not trespassing.

If you are not on managed trails, roads, routes:

- Avoid crossing grasslands except on established trails. Vehicles or large groups of people or horses can leave a noticeable track and result in others following this track.
- Avoid creating new trails (without appropriate planning and consultation). It is very easy for a new trail to develop by setting off on grasslands. The initial set of tracks you form will attract others to follow and soon a new trail is formed. With new trails come erosion and potential transfer of invasive plants.
- Travel on the most durable surfaces available: rock, gravel or snow.
- Avoid marking trees or building rock piles to point out your path, and remember to dismantle makeshift bridges that you built to cross streams.
- Report areas where soil disturbance is occurring to the land owner, your local government, Regional District, regional provincial offices, or First Nations in the Region (See Section 8.4 for contact information).

If you are building or maintaining trails, roads, routes:

- Leave trail building and maintenance to trained professionals. Individuals are encouraged to help, but only as part of work parties that are organized by experts in trail building and maintenance.
- Rehabilitate closed trails (put trails to bed) in order to allow them to return to their pre-trail natural condition.
- Work collaboratively with landowners and government, including First Nations, and other organizations. Consult with landowners and First Nations to utilize their expertise on such things as trail design, soil sensitivity, and location, and to achieve their support for trail building.

³ Visit the Leave No Trace website: <http://www.lnt.org/TeachingLNT/LNTEnglish.php> and the Tread Lightly! website: <http://www.treadlightly.org/> to learn more about these organizations which focus on responsible outdoor recreation.

- Minimize soil disturbance and erosion:
 - ❑ Reduce or minimize number of trails (especially where there are many in one area).
 - ❑ Maintain firm trail surface (also called ‘trail hardening’), by using wood chips, gravel, or wooden paths, but not asphalt.
 - ❑ Ensure trails are properly designed, placed, and maintained.
 - ❑ Ensure trails are built on appropriate soils that can withstand the impacts created by the particular activity.
 - ❑ Avoid steep downhill sections, especially where a trail is shared with other users such as hikers and horseback riders.
 - ❑ A lot of mountain bikers and ORV riders are looking for steeper areas because they are more fun. Where steep areas cannot be avoided or are desired, use appropriate erosion prevention measures such as water bars or switchbacks.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Use the best available practices to ensure that operations are environmentally and socially sustainable.
- Use signage on existing trails to identify trails, and sensitive areas.
- Provide a drop box with **reporting** form for recreationists to report soil disturbances or other problems.
- Consider the development of penalties or other forms of deterrence for off-trail use and irresponsible riders.
- Be aware of your operation’s footprint, and endeavour to keep it as small as possible.
- Ensure members and clients are aware of soil disturbance issues, and proper activity-based techniques to minimize damage to trails.
- Educate users on benefits of/reasons for staying on trails.
- Provide education on shutting down and rehabilitating damaged trails.

Relevant Laws

The *Forest Practices Code Act* outlines processes and legislative tools that are available for managing recreation conflicts on provincial forest lands. The *Act* allows a MOF recreation officer to:

- provide recreation management zones as a means of conserving values;
- establish recreation sites and trails, and set objectives under a higher level plan;
- close, repair, or construct a recreation site or trail;
- restrict and regulate use at a recreation site or trail;
- manage public recreation within provincial forest lands; and
- enter into management agreements with organizations involved with recreation on provincial forest lands.

More detailed information on regulations that apply to recreational activities can be found in the B.C. Ministry of Forests document *Outdoor Recreation and the Forest Practices Code* (MOF, 1995).

The [Forest and Range Practices Act](#) (currently Bill 74) will come into force in December 2005 and replace the *Forest Practices Code Act*. Please check the MOF website for future updates on this new legislation: <http://www.for.gov.bc.ca/code/>.

Information

- For further information on trail building, repair, and designs (e.g., for steep and difficult landscapes), see Section 8.5 – Trail Design and Maintenance.
- Additional information is needed on:
 - BMPs that have been developed for erosion and sediment control.
 - Identifying the need for new designated recreation areas in a particular area.

Objective 2: Avoid Introducing or Spreading Invasive Plants

Be aware:

- Learn to recognize invasive plants and know which plant parts to be concerned about. Become aware of the issues associated with invasive plants and how your activities can contribute to their spread.
- Read guides, brochures, and pamphlets produced by provincial government agencies or local weed management groups on invasive plants.
- Share your knowledge with other recreational users.

If you are on managed trails, roads, routes:

- Read and obey all trail/road signs and closures.
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas where possible.
- Leave gates as you found them, or as marked (unless they are lying on the ground, in which case you should pick them up and lean them up against a fence, and inform the landowner).

If you are not on managed trails, roads, routes:

- Avoid creating any new trails, routes, or paths across grasslands, especially with large groups of horses or motorized vehicles as each new track will attract others to follow and this can lead to soil erosion, invasive plants, loss of forage and changes in plant communities. The same applies to cycling and large hiking groups. It is very easy for a new trail to develop by setting off on grasslands. The initial set of tracks you form will attract others to follow and soon a new trail is formed.

If you find yourself in an area with invasive plants:

- Avoid or minimize all types of travel through weedy areas, or restrict activities to those periods when the spread of invasive plants is least likely.
- Before entering and upon leaving grassland areas, inspect clothing, footwear, and pets for invasive plant seeds or plant parts. Also inspect your equipment and vehicles. Remove seeds and plant parts, bag them, and dispose in the garbage or by incinerating them.

Learn what more you can do about invasive plants:

Weeds B.C.: www.weedsbc.ca

Ministry of Forests:
<http://www.for.gov.bc.ca/hfp/noxious/introduc.htm>

http://www.for.gov.bc.ca/dos/Programs/Range/weed_mgtn.htm

Trails B.C.:
www.trailsbc.ca/weedinfo.shtml

See Section 8.1 in this report for more information sources on invasive plants.

Local Weed Management Groups/Agencies:

Southern Interior Weed Management Committee – Kamloops (250) 851-1699

Okanagan Similkameen Regional District Weed Management Program (250) 404-0115

South Okanagan Weed Committee 250-404-0115

B.C. Ministry of Forests - Southern Interior Forest Region (250) 828-4131

- Don't pull invasive plants - you may be doing more damage by disturbing the soil, spreading seeds, or breaking plant roots. Weed pulls should only be undertaken under expert guidance.
- Flag sites of invasive plant infestations with biodegradable tape.
- Report infested areas:
 - ❑ *On Crown land:* Report infested areas to the nearest B.C. Forest Service office or the local invasive plant management group (See side bar and Section 8.4 for further information sources).
 - ❑ *On private land:* Inform landowners.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Organize volunteers at trailheads during busy times of the year, or when certain invasive plants are coming into seed, to build trail users' awareness, and ensure they understand invasive plant issues.
- Consider undertaking a weed pull with your local club or organization, but only under the guidance of invasive plant experts.
- Work with other recreationists to learn about the specific invasive plant issues in your recreation area.
- Work together to develop invasive plant control programs, and distribute local information on invasive plants to users through brochures, on the web, and in newsletters.
- Ensure clients and members are aware of invasive plant issues, and how their activities can contribute to the spread of invasive plants.
- Use signage to educate users about invasive plants.
- Encourage your group to participate in organized weed pulls that are supervised by trained professionals.
- Provide a drop box with reporting forms for recreationists to report sites of invasive plant invasions.

Relevant Laws

The B.C. [Weed Control Act](#) and the [Weed Control Regulations](#) were designed to protect the province's natural resources from the detrimental effects of noxious weeds. Under the Act, land occupiers, including private landowners and the provincial Ministries of Water, Land and Air Protection; Forests; and, Transportation are responsible for controlling designated noxious weed species on private and Crown land respectively. Section 2 of the *Weed Control Act* states: "In accordance with the regulations, an occupier must control noxious weeds growing or located on land and premises, and on any other property located on land and premises, occupied by that person." The *Act* also empowers local governments to establish weed control programs within their communities (Cranston 2001).

Information

Read [Invaders of Ecosystems](#) prepared by Edi Torrans of the Southern Interior Weed Management Committee.

Objective 3: Respect Native Plants and Wildlife

Be aware:

- Learn about the native plants and grasslands in your area.
- Learn about the types of wildlife that occur in your area and about their habitat requirements and migration patterns during different seasons.
- Inform yourself of important nesting or breeding and feeding areas by contacting your local conservation groups, wildlife stores, and resource managers.
- Share your knowledge with others.

If you are on managed trails, roads, routes:

- Read and obey all posted signs and trail/road closures that pertain to plants and wildlife (e.g., seasonal trail closures).
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas where possible.
- Leave gates as you found them, or as marked (unless they are lying on the ground, in which case you should pick them up and lean them up against a fence, and inform the landowner).

If you are not on managed trails, roads, routes:

- Avoid creating any new trails, routes, or paths across grasslands, especially with horses or motorized vehicles as each new track will attract others to follow and this can lead to increased erosion, invasive plants, loss of forage and changes in plant communities. The same applies to cycling or hiking. It is very easy for a new trail to develop by setting off on grasslands. The initial set of tracks you form will attract others to follow and soon a new trail is formed.

Minimize damage to plant life:

- Do not pick wildflowers, carve initials in trees, cut branches, peel bark off trees, or cut wildlife trees for firewood. (Refer to the firewood permit for your area for regulations regarding firewood cutting – Ministry of Forests) See Section 8.4 for contact information.
- Avoid trampling native vegetation.

Respect wildlife and wildlife features:

- Avoid salt licks, nesting and denning areas, winter ranges, and lek sites (i.e., sites used by birds such as Sharp-tailed Grouse for courtship and breeding).
- Avoid known sites used for breeding and rearing young. Watch for amphibians that are migrating between wintering and breeding areas, and avoid disturbing them.

If you encounter wildlife:

- Do not scare, pursue, or harass wildlife.
- Keep your distance from wild animals. Learn the signals they use to tell you that you are too close. Maintain a distance that is comfortable for them.

- Yield to them and wait until they move off the trail. If you must move before they do, move quietly, slowly, smoothly, and steadily; if possible, avoid moving directly towards them.
- Avoid using tape-recorded calls or other attraction devices. Wear natural-coloured clothing that doesn't rustle. Avoid wearing scented lotions. If practical, remove glasses that glint.
- Avoid making extended eye contact with wild animals, as they can sometimes interpret this as a threat.
- If you encounter nest or brood sites, give them a wide berth so you don't disturb adults or young, or damage eggs.
- Do not handle baby animals. If you find babies that appear to be lost or abandoned, remember that the adults are probably close by, or know how to find their young.
- Leave injured animals where you find them and notify local conservation officers. See Section 8.4 for agency contact details.
- Never feed wildlife as this interferes with their natural patterns and human food is often harmful.

If you are camping or picnicking:

- Store food and garbage securely at rest areas and campsites to avoid attracting wild animals.
- Clean up any food that spills and burn food waste. Do not bury waste as animals will dig it up.
- Pack out all garbage, including micro-garbage, such as cigarette butts, matches, and drink straws.
- Leave pets at home or control them at all times.
- Be aware of your potential impacts – Read about *Tread Lightly* BMPs under Objective 4 below.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Make recommendations to users to stay on existing trails especially with motorized forms of recreation and horses to avoid making new trails on the grasslands and impacting or changing plant communities.
- Use signage to increase awareness of wildlife breeding and rearing areas.
- Promote and encourage wildlife conservation practices by your clients and members:
 - Lead by example and follow standards, regulations and guidelines established by government for the protection of wildlife species and habitats.
 - Work together to develop and distribute information to clients or members on minimizing disturbances to local plants and wildlife (via brochures, maps website, newsletters, and local papers).
 - Display or hand out materials about native plants, grasslands, and wildlife areas to avoid and be aware of in a particular area, and in particular seasons.

Relevant Laws

- The [*B.C. Park Act*](#) states that commercial users must have a Park Act permit to operate in a Provincial Park. Government Commercial Backcountry policies have also been developed to address commercial 'back country operations' (WLAP 2002).
- Besides enabling the federal government to do wildlife research and interpretation, the *Canada Wildlife Act* allows for the designation of National Wildlife Areas (NWA) for conservation purposes. One of the five NWAs in British Columbia is the Vaseux Bighorn National Wildlife Area.
- The federal *Migratory Bird Act* regulates the hunting and use of migratory birds in Canada. It also prohibits the disturbance or destruction of nests, eggs and shelters of migratory birds, except where a permit has been issued.
- The provincial *Wildlife Act* deals with the protection and management of designated endangered species such as the Burrowing Owl; the management of recreational hunting; and, the management of Wildlife Management Areas (WMA), such as the South Okanagan WMA. The *Act* also states that beaver dams and muskrat dens must not be disturbed unless natural water drainage is threatened, and that bird nests must be protected. Eagle, Peregrine Falcon, Gyrfalcon, Osprey, heron, and Burrowing Owl nests are to be protected throughout the year; all other birds' nests are protected when occupied by a bird or egg.
- The federal *Species at Risk Act* (SARA) (Bill C-5) protects species at risk and their critical habitat on federal lands. The *Act* applies to migratory birds and aquatic species on all lands and to provincial or private lands when appropriate measures for the protection of species at risk are not being taken. The law includes such measures as:
 - ❑ prohibiting the disturbance, destruction, or removal of species listed as threatened, endangered or extirpated;
 - ❑ prohibiting the destruction of the residences of listed species; and
 - ❑ protecting critical habitat as identified by recovery plans and action strategies.
- For further information see: Environment Canada's Species at Risk web site: <http://www.speciesatrisk.gc.ca/sar/main.htm>.

Information

- Learn more about the grasslands of B.C.'s Thompson and Okanagan basins and associated ecosystems - Read Section 2.2.
- Learn more about red- and blue-listed species in your region - Read Section 2.2.
- Note that sensitive wildlife areas are often noted in the LRMP for an area; e.g. [Okanagan Shuswap LRMP](#).
- Read the relevant *Interim Wildlife Guidelines* developed by WLAP and stakeholders at <http://wlapwww.gov.bc.ca/wld/comrec/crecintro.html>. The general WLAP wildlife management website is found at: <http://wlapwww.gov.bc.ca/wld/wildman.htm>.
- Learn what to do about encountering bears and cougars. Read the *Bears and Cougars* brochure, available from many parks and information centres and

available on line at B.C. MWLAP:

<http://wlapwww.gov.bc.ca/bcparks/consERVE/bearsandcougars.pdf>.

- More information is needed on wildlife migration routes and seasons.

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes

Be aware:

- Learn more about the grassland ecosystems of B.C.'s Thompson and Okanagan basins: see Section 2.2.
- Learn about riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes—these are sensitive environments (See Section 2.2).

Tread lightly: Be aware of your potential impacts (See Side Bar):

Tread Lightly!

Travel and recreate with minimum impact

Respect the environment and the rights of others

Educate yourself--plan and prepare before you go

Allow for future use of the outdoors--leave it better than you found it

Discover the rewards of responsible recreation

<http://www.treadlightly.org/>

- Pack out what you pack in (and other's garbage!).
- Leave rocks, fossils, plants, and other natural or archaeological objects as you find them. Take home memories and photographs instead.
- Be efficient in the use of natural resources (e.g., water). Practice the 4Rs of consumption: reduce, re-use, recycle, and refuse. Encourage other organizations and companies to maintain good conservation and 4R practices.
- Only mark trails where absolutely necessary. Use GPS units instead of ground markers if possible. Use temporary markers for events (ribbon, pegs) and be sure to remove them afterwards.
- Control dogs at all times, or leave them at home. If travelling with dogs on high-use trails, clean up or properly dispose of their feces in garbage cans. If on remote trail, kick feces off the trail.
- Read and obey all trail/road signs and closures.
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas where possible.
- Leave gates as you found them, or as marked (unless they are lying on the ground, in which case you should pick them up and lean them up against a fence, and inform the landowner).
- Keep groups to manageable numbers, in most cases to fewer than a dozen – consider the sensitivity of areas.
- Respect seasonal and any other closures (e.g., those pertaining to high fire hazards).
- Observe all fire restrictions, and take due care with fires to prevent them from spreading. Do not discard burning materials such as matches and cigarettes.

If you are recreating near streams and riparian areas:

- Avoid or minimize stream crossings and travelling along riparian areas.
- If streams must be crossed, do so only at bridge crossings, or where roads or trails intersect the stream.
- Minimize crossings if a bridge or another appropriate crossing is not available. If crossing is necessary, cross where there is existing disturbance, or cross at

right angles to the banks, where the ground is low and firm, and where the stream bottom is firm. Stream bottoms with large cobbles are preferred over fine gravel substrates since there is less potential for damaging fish spawning beds or displacing fine silt which can smother fish eggs.

- Avoid trampling and breaking shrub branches near streams and in riparian areas.
- Don't remove or damage vegetation in riparian areas as this vegetation is required to hold banks during flood events.

If you are building or maintaining trails, roads, routes:

- Work with government agencies and landowners to consider establishing designated recreational corridors.
- Engage dealerships, clubs, and commercial recreation operators to sponsor local trail work sessions to help build trails that protect sensitive environments and landscape features, and maintain existing trails.
- Direct members and customers to appropriate legal trails, and provide updates on their conditions given recent weather patterns. Help spread the word about closure areas.

If you are a commercial recreation operator:

- Be aware of your operational footprint, and endeavour to keep it as small as possible.
- Government Commercial Backcountry policies have been developed to address commercial 'back country operations'. Be informed about Provincial Park and other government policies (See reference to laws below).

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Work together to provide signage:
 - ❑ Signage helps people know which areas are sensitive (one example is the use of colour-coded signs - red for stay out, green for go).
 - ❑ Government logos on signs help reduce vandalism.
 - ❑ Post signs at trailheads letting people know the consequences of littering.
 - ❑ List user groups on signs involved in trail development and maintenance.
 - ❑ Develop appropriate designated stream crossings (e.g., DFO-approved gravel crossings).
- Contact your local land manager to find out about the particular environmental concerns in your area, and help educate other recreationists.
- Encourage voluntary stewardship, group involvement and collaboration.
- If you are a land manager, use salt blocks as a tool for cattle management to draw cattle away from sensitive environments.
- Consult with First Nations/landowners about sensitive areas and landscape features.
- Take responsibility for certain areas (Adopt-a-Trail).
- Stage litter 'clean up' events; they get rid of unsightly messes, and build general public awareness.

- Provide educational materials about the sensitivity or natural history of the recreation areas.
- Provide local trail maps that outline local parks, trails, and sensitive areas.

Relevant Laws

- The [B.C. Park Act](#) states that commercial users must have a Park Act permit to operate in a Provincial Park.
- Government Commercial Backcountry policies have also been developed to address commercial 'back country operations' (WLAP 2002).
- The provincial *Fish Protection Act* includes legislation that deals with improving water allocation policy and procedures to ensure adequate flows are maintained for fish; improving riparian protection on private land and promoting enhanced watershed planning. The *Act* does not apply to agricultural activities. Under this *Act*, the *Streamside Protection Regulation* was established. The regulation requires certain regional districts and their municipalities to establish and protect "streamside protection and enhancement areas" (SPEA) adjacent to streams. The SPEA's would be "no disturbance" setbacks or "leave areas" along streams with widths determined according to a formula outlined in the regulation. The *Fish Protection Act* amends sections in several acts including the *Local Government Act* and the *Water Act*.
- The federal *Fisheries Act* allows for the protection or **restoration** of fish and fish habitat associated with streams, rivers, wetlands, and riparian areas, so that the productive capacity of that habitat is maintained. Under the *Act*, development proposals that have the potential to affect fish habitat, and compensatory mechanisms to offset the unavoidable destruction of fish habitat are reviewed and authorized.

Information

- See Section 8.5 for further information sources on trail design and maintenance.
- Visit Ministry of Forests' website to learn about the Forest Practices Code Fish Stream Crossings (<http://www.for.gov.bc.ca/tasb/legisregs/fpc/FPCGUIDE/FishStreamCrossing/FSCGdBk.pdf>).
- Contact the Conservation Data Centre (<http://srmwww.gov.bc.ca/cdc/>) for information about locations of species and ecosystems at risk (See Information Sources below, Section 8.4 for more information).

Objective 5: Avoid Disturbing Livestock and Damaging Forage

Be aware:

- Learn about the planned grazing use of the area before you set out. Inform the landowner if you observe cattle in unexpected areas.

Respect livestock and private and Crown land:

- Do not cross private land without permission. (See Relevant Laws below).

Inverted Vs

Members of the ATV community have developed the Inverted V to prevent cattle roaming beyond their assigned range areas as a solution to gates being knocked down or left open by irresponsible users.

Typically five feet wide, cattle guards look like an inverted 'V'. They can be built with metal, with pressure treated landscape ties using cross rails typically made from lodge pole pine, or with available resources.

The installation of an ATV Inverted V has typically occurred in cooperation with the local rancher and/or the MOF. They have been typically deployed in areas where the rancher has experienced a problem where a fence has been cut or knocked down by irresponsible users. The design of the ATV Inverted V accommodates different user groups (Dirt bikes, Mountain Bikes, Snowmobiles, and Hikers).

For more information contact
ATVB.C.: 250-456-2265 or
604-942-4603

- Be aware that on some sections of trails, motorized equipment may be used for farming or other purposes.
- Do not trample forage or create dust concerns.
- Pack out what you pack in, including micro garbage in order to avoid contaminating forage.
- Avoid calving areas. Give domestic livestock the right-of-way on trails. Don't spook cattle.
- Keep dogs under control, or leave them at home to avoid harassing livestock.

If you encounter gates:

- Leave gates as you found them, or as marked..
- If they are lying on the ground pick them up, lean them up against a fence, and inform the landowner.

If you are on managed trails, roads, routes:

- Read and obey all trail/road signs and closures (e.g., seasonal or short-term closures). Ask the landowner, local shop or club, or land manger if you are uncertain about closures.
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas where possible.
- Report any damage, or sick/injured livestock to the land owner, if possible, or the Ministry of Forests, Range Section.

If you are not on managed trails, roads, routes:

- Avoid creating any new trails, routes, or paths across grasslands, especially with horses or motorized vehicles as each new track will attract others to follow and this can lead to increased erosion, invasive plants, loss of forage and changes in plant communities. The same applies to cycling or hiking. It is very easy for a new trail to develop by setting off on grasslands. The initial set of tracks you form will attract others to follow and soon a new trail is formed.
- Avoid parking, camping or setting up staging areas off trail as this leads to soil compaction and impacts on plant communities.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Collaborate with landowners on proactive solutions such as the ATV "inverted V," which allow ATVs and other motorized vehicles to travel over cattle fences without opening gates.
- Ensure clients or members are aware of private lands that may be affected by recreation activities. Supply educational information on the issues associated with trespassing on agricultural land.
- Establish good working relationships between farmers/ranchers and trail managers to ensure quick responses to issues related to changes in agricultural operations/management.
- Land managers should provide consistent and easy to read signage along trails so recreationists do not accidentally wander off trails and trespass onto farm property.

- Interested parties should work with the ranching community to find out about, and warn clubs and tourism operators of intense farming activity (e.g., harvest time) when large volumes of dust are created. In turn, shops and clubs can warn their clientele/members, and land managers can provide temporary signage to warn trail users of trail conditions.
- Tell recreation users that land managers may deliberately leave gates open to allow livestock passage – usually these are tied back to the fence.
- Work together to develop invasive plant control programs and distribute local information on invasive plants to users through brochures, on the web and in newsletters. (See Objective 2 for further information.)

If you are building or maintaining trails, roads, routes:

- Work with commercial recreation operators, ranchers, land managers, shop owners, and club members to design and build trails that stop cattle moving off the range and into unauthorized areas. This will help protect grassland areas, and will enhance the trail riding experience. (See section 8.5 for information sources on trail design and management.)
- Encourage the involvement of interested parties in the trail planning process from the very beginning. (See also Relevant Laws and Information below.)
- Use fences, vegetation, or other types of physical buffers to keep trail users away from crops, and to minimize dust. Additionally, trails can be routed to take advantage of natural buffers.
- Require temporary trail closure if disease threats appear.
- Minimize water crossings. Where water crossings are necessary, provide bridges to discourage people from walking through the water since pathogens can be passed through the water supply. Consider riparian and water quality signage at streambanks to build awareness.

See A Guide to Developing Trails in Farm and Ranch Areas (MAFF 2002)

This guide outlines a code of conduct for developing trails in agricultural areas

(http://www.agf.gov.B.C.ca/trail_guide/agtrails1.pdf)

Relevant Laws

- Trespass refers to the unauthorized entry on to someone else's land. If land is fenced or posted with signs prohibiting trespassing at the access points to the property, a person coming on to the land is deemed to be a trespasser unless that person can show that he or she had the consent of the owner, lessee or occupier.
 - Thus, before you enter or use privately owned land or do anything in relation to that land you must obtain the consent of the landowner before entering onto the property (*Trespass Act*, R.S.B.C. 1979, c. 411) Nowlan and Jeffries (1996).
- The provincial *Farm Practices Protection (Right to Farm) Act (FPPA)* supports farmers' rights to farm in British Columbia, provided they use normal farming practices, and are in compliance with legislation such as the *Waste Management Act*, *Water Act*, *Pesticide Control Act*, and *Health Act*.
- The provincial *Agricultural Land Reserve (ALR) Act* protects farmland from conversion to non-agricultural use. The *Act* allows for compatible uses including wildlife habitat and nature reserves.
- The [Forest and Range Practices Act](#) (currently Bill 74) addresses unauthorized trail or recreation facility construction (section 57). Unless authorized in writing

by the minister or under another enactment, a person must not construct, rehabilitate, or maintain a trail or other recreation facility on Crown land. Contravention may result in removal or destruction of the trail or facility and restoration of the land underlying these developments.

Information

- *Trails: 'A Guide to Developing Trails in Farm and Ranch Areas'* (MAFF 2002) outlines a code of conduct for the development of trails in agricultural areas (http://www.agf.gov.bc.ca/trail_guide/agtrails1.pdf).

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

Respect private landowners, their land and buildings:

- If in doubt about private property, ask the landowner/manager's permission to go on the land, or contact the local range officer for information. (See Relevant Laws.)

If you are on managed trails, roads, routes:

- Read and obey all trail/road signs and closures.
- Stay on designated and existing trails, roads, and routes.
- Use existing parking or staging areas where possible.
- Leave gates as you found them, or as marked (unless they are lying on the ground, in which case you should pick them up and lean them up against a fence, and inform the landowner).
- Respect all buildings.
- Keep dogs under close control, or leave them at home.

If you are not on managed trails, roads, routes:

- Avoid creating any new trails, routes, or paths across grasslands, especially with horses or motorized vehicles as each new track will attract others to follow and this can lead to increased erosion, invasive weeds, loss of forage and changes in plant communities. The same applies to cycling or hiking. It is very easy for a new trail to develop by setting off on grasslands. The initial set of tracks you form will attract others to follow and soon a new trail is formed.

If you are building or maintaining trails, roads, routes:

- See this section above under Objective 4.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- *Clean up* after events and gatherings in open range areas.
- Work with landowners to build Inverted V crossings on designated routes to avoid issues with gates being left open or closed.
- Build a positive relationship with landowners whose property recreationists are using.

It's About Respect:
Treat other trail users with courtesy
Respect all signage and property
Avoid environmental damage
Inforn yourself about allowed trail uses and trail closures
Leave wildlife and plants alone
Stay on the trail: WADE
DON'T BRAID
(British Columbia Trails Society:
<http://www.trailsBC.ca/>)

If you are travelling during fire season:

- Check machines regularly for plant material near exhaust pipes or other structures that can become hot during use.
- Fuel up at staging areas wherever possible. Never fuel up in sensitive ecosystems, including riparian and wetland areas.
- Don't smoke while riding, make sure butts are fully extinguished, and pack them out.
- Be aware of dry grass, maturing grain crops and especially stay away from haystacks.
- During periods of extremely high fire hazard conditions, landowners and ranchers may ask for areas to be closed to public use. Respect landowners' wishes.

Relevant Laws

- Trespass refers to the unauthorized entry on to someone else's land. If land is fenced or posted with signs prohibiting trespassing at the access points to the property, a person coming on to the land is deemed to be a trespasser unless that person can show that he or she had the consent of the owner, lessee or occupier.
 - Thus, before you enter or use privately owned land or do anything in relation to that land you must obtain the consent of the landowner before entering onto the property (*Trespass Act*, R.S.B.C. 1979, c. 411. Read about trespass (Nowlan and Jeffries 1996).
- The provincial *Farm Practices Protection (Right to Farm) Act (FPPA)* supports farmers' rights to farm in British Columbia, provided they use normal farming practices, and are in compliance with legislation such as the *Waste Management Act*, *Water Act*, *Pesticide Control Act*, and *Health Act*.
- The provincial *Agricultural Land Reserve (ALR) Act* protects farmland from conversion to non-agricultural use. The *Act* allow for compatible uses including wildlife habitat and nature reserves.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use**Increase awareness and communicate:**

- Find out if recreational activities are permitted on First Nations' land.
- Learn about and communicate with the First Nations that live in your region to find out in whose territory you are planning to conduct your activities (See Section 8.3 for the First Nations that live in the Thompson/Okanagan).

Have respect:

- Do not disturb or remove cultural features such as pictographs or petroglyphs.
- Do not disturb known cultural sites such as First Nations traditional use areas, pit dwellings, or burial grounds.

- Avoid picking native species of plants. Some plant species, like arrow-leaved balsamroot, sagebrush mariposa lily, and yellow bell, may be used by First Nations peoples for cultural and traditional purposes.
- *Do not cut, damage, move, or otherwise impact **culturally modified trees** (CMTs), including coring them for dating purposes. (See Relevant Laws)*

If you are building or maintaining trails, roads, routes:

- Involve First Nations in trail planning, design, and implementation.

If you think you have found cultural heritage or traditional use sites:

- Contact the archaeology or anthropology department of your local University or College for advice on what you have found.
- Contact the Archaeology Branch: 250-952-4300.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Provide your clients and members with appropriate educational materials to enhance their appreciation of the First Nations cultural heritage history of the areas they visit.

Relevant Laws

- Disturbing culturally modified trees is an activity that could be considered a violation of the [Heritage Conservation Act](#). The purpose of the [Heritage Conservation Act](#) is to encourage and facilitate the protection and conservation of cultural heritage property in British Columbia. Cultural heritage and sites (sometimes referred to as archaeological remains) is considered to include personal property as well as land covered by water that has heritage value to British Columbia, a community, or an aboriginal people and which predates 1846. This includes culturally modified trees. Trees which were modified after 1846 are protected under the [Forest Practices Code of B.C](#) (University of Northern B.C. n.d.).
- The [Forest and Range Practices Act](#) (currently Bill 74) will likely come into force in December 2005 and replace the *Forest Practices Code of B.C. Act*. Please check the MOF website for future updates on this new legislation: <http://www.for.gov.bc.ca/code/>.

Information

- Persons encountering culturally modified trees are encouraged to record the finding and report it to the local Ministry of Forests (e.g., Southern Interior Forest Region 250-828-4131 – See Section 8.4 for other relevant public agencies).
- Persons encountering **cultural heritage** and **traditional use** features should contact the Archaeology Branch: 250-952-4300.

Objective 8: Respect Historic Features

- *Do not damage or alter* **historic** features such as old homesteads, cabins, and historic mining sites. B.C. law forbids the removal of archaeological material or historical artefacts. (See Relevant Laws below).
- If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:
 - Provide clients and members with appropriate educational materials to enhance appreciation of, and respect for, the cultural heritage history of the areas to be visited.

Relevant Laws

The purpose of the [Heritage Conservation Act](#) is to encourage and facilitate the protection and conservation of **heritage** property in British Columbia.

3.2. Motorized Recreation

This section describes the potential impacts that motorized recreation can have on grasslands in B.C.'s Thompson and Okanagan basins, along with the objectives to minimize or prevent those impacts, and the specific BMPs that can be followed to meet the objectives. Relevant laws and regulations are mentioned. Also, see the General BMP section above (3.1) for BMPs that apply to all recreation activities for grasslands in B.C.'s Thompson and Okanagan basins.

3.2.1. What are the Impacts?

In grassland ecosystems, motorized vehicle recreational activities can:

- cause soil disturbances;
- contribute to the introduction and spread of invasive plants;
- cause disturbances to native plants and wildlife;
- affect sensitive environments and landscape features;
- disrupt livestock management practices, which in turn, can affect grassland health; and
- disturb or damage cultural and heritage sites and features.

These impacts are described in detail in Section 2.3. The following section describes how motorized vehicle recreation can contribute to these impacts.

3.2.2. How Do Motorized Vehicle Recreational Activities Contribute to These Impacts?

Soil Disturbances: Soil impacts from motorized vehicle activities can last decades (MWLAP 2002). Motorized vehicle activity in grassland ecosystems can contribute to these impacts by:

- compacting soil through repeated vehicle traffic over the same area, such as along established road and trail systems.

Seed Hitch Hikers

In one experiment, a pickup truck that backed up 12 m through a patch of knapweed then drove forward out of the patch picked up an average of 1,644 knapweed plant seeds. After driving one kilometre, 1418 (86%) of the seeds had dropped off the truck. After driving 16 km, only 138 (8%) of the seeds still remained attached to the vehicle (Trunkle and Fay 1991).

- causing soil exposure when vehicles damage or uproot plants, thereby allowing the exposed soils to easily become wind blown or washed away by water.
- disturbing the soil crust, even from one pass over the area, impacting water infiltration and soil water relationships in the plant community.

Introduction and Spread of Invasive Plants: Motorized vehicle traffic can be a major factor in the introduction and spread of invasive plants in grassland areas by:

- transporting plants, roots, and seeds that become caught in the undercarriages and tires of motorized vehicles that become imbedded in the mud that clings to tires and vehicle bodies, or that are picked up in the treads of snowmobiles. When this occurs, invasive plants can be transported long distances and into new areas in a matter of hours. This occurs most frequently during seasons when weed plants are setting seeds.
- damaging existing vegetation and exposing soils during off-road vehicle activities, such as mud-bogging and travelling off established trails. These newly disturbed areas are ideal conditions for weeds to colonize.

Disturbances to Native Plants: Impacts to native plants from motorized vehicle activities can last decades (MWLAP 2002). Motorized vehicle activities can cause disturbances to native plants and changes to plant communities by:

- reducing the insulating quality of snowpack due to snow compaction or removal, which can affect vegetation and soils.
- crushing or uprooting native grassland plants, causing direct damage to plants which can change plant communities by eliminating certain species, or by helping to spread species that are adapted to living on disturbed sites. In addition, soils can be exposed due to the resulting loss of plant cover.
- creating dust, which settles on and damages nearby plants when vehicles travel through exposed soil sites during dry periods. The dust can affect the plants' ability to photosynthesize, grow, and reproduce.

Disturbances to Wildlife: In addition to directly harming wildlife, disturbances can also displace animals from critical habitats such as foraging areas and winter ranges. Changes in habitat quality and availability can result from soil disturbances, invasive plant introductions, and loss of native vegetation as discussed above. Motorized vehicle activities can contribute to these impacts by:

- damaging underground burrows and surface runways of small animals when vehicles travel off-road.
- disturbing semi-aquatic mammals when snowmobiles travel over ice.
- reducing the insulating quality of snow due to snow compaction, which can affect over-wintering habitat for small mammals.
- creating snow-packed trails which allow predators greater and easier access to areas where they may not have hunted traditionally (MWLAP 2002).
- causing direct animal deaths from collisions with vehicles. Large animals such as deer and moose are susceptible to being hit by fast-moving vehicles, especially during winter when snow packs reduce the animals' mobility.
- crushing small mammals, bird chicks, and slow moving reptiles and amphibians. Small mammals that live under the snow can also be crushed by snowmobiles (Miller 1999).

Effects of Garbage

Besides being offensive, garbage left by a trail user can cause serious injury to livestock, and can spoil entire crops. Farmers have seen cattle with cans stuck around their hoof. Pop cans that find their way into a hay field can be picked up by harvesting machinery, cut into small pieces, and un-knowingly fed to live-stock. The metal pieces can lodge in the animal's stomach and cause illness, and sometimes death. An entire crop can be lost if there is any risk of garbage being present. Health inspectors require farmers to guarantee that no foreign objects have been picked up in their crops during harvesting. In addition, cans, glass and metal objects left behind are a fire hazard.

(sources: B.C. MAFF 2002, Linda Allison, Allison Creek Ranch).

- causing stress to animals by approaching too closely, or by increased recreational activities in critical habitats, which can cause an animal's energy reserves to decline.
- disrupting normal animal behavioural patterns such as foraging, resting, and breeding and causing hearing loss due to noise produced by motorized vehicles.

Disturbances to Sensitive Environments and Landscape Features: Sensitive environments such as dry grassy slopes, wetlands and riparian environments are especially susceptible to soil compaction, exposure, and erosion, which results in changes in water flows and levels, and siltation of water bodies. Sensitive environments are also susceptible to the introduction and spread of invasive plants, and to disturbances to native plants (e.g., wetland and riparian plants and shrubs) and wildlife. The contribution of motorized vehicle recreation to these impacts has been discussed above. In addition, motorized vehicle recreation can contribute to impacts on sensitive environments by:

- causing snow compaction from snowmobile activity, which in turn, can result in increased runoff during the spring thaw.
- reducing the insulating value of the snowpack.
- introducing hydrocarbon pollutants from snowmobile exhaust emissions to streams and rivers when winter snows melt (Adams 1975, MWLAP 2002).
- causing damage to fragile lichens, mosses and other plants that grow on sensitive and rare environments.
- disturbing wildlife due to the mere presence of motorized vehicle activity in riparian areas, or to the noise produced by vehicles. Bird, turtle, and toad eggs can be crushed by vehicles, and breeding birds can be disturbed by vehicle noise.

Motorized vehicle recreation can also contribute to impacts on landscape features such as silt cliffs when they are used as jumping off points. This can lead to soil erosion, damage to vegetation, and disturbances to wildlife and their habitat.

Disturbances to Livestock, Forage, Livelihoods, and Private Property:

Motorized vehicle activities can contribute to these impacts by:

- creating new trails through grasslands, which livestock may follow into sensitive areas such as wetlands or riparian zones that are highly susceptible to grazing and trampling damage, or may cause livestock to drift into unauthorized grazing areas.
- accidentally damaging fences and failing to leave gates as found, which can give livestock access to areas that are designated for rest from grazing or should be protected, or can confine them to sites that could become heavily trampled and over-grazed.
- creating dust when heavy use of trails through agricultural areas occurs during dry seasons. This can result in damage to farm crops and native grassland plants.
- disturbing livestock due to noise from vehicular traffic, and to harassment from uncontrolled dogs that accompany riders. These types of disturbances can disrupt livestock movements and patterns, which in turn, could result in trampling or grazing damage to native grasslands.

Damage to livestock watering holes

Damage to livestock water holes from off road use can often cause the waterhole to dry out long before it should and/or make it impossible for cattle to get through the mud to the water (Linda Allison, Cattle Ranger, Allison Creek Ranch).

- introducing garbage, which can be eaten by livestock or can cause damage to crops when it is cut up and spread with harvesting machinery.

Disturbance to Cultural and Heritage Sites and Features: Impacts to cultural and heritage sites and features can arise from motorized vehicle traffic, and from noise, dust, and exhaust produced by vehicles. Motorized vehicles can contribute to these impacts by:

- removing, crushing or scattering artefacts.
- damaging (e.g., compaction and erosion) shallowly buried cultural sites.
- disrupting game populations and damaging medicinal plants at First Nations traditional hunting and gathering sites, and
- contributing to the possible loss of the cultural value of First Nations spiritual sites due to increased use by recreationists.

3.2.3. How You Can Help: Recommended Best Management Practices

Impacts from travelling by motorized vehicles can be avoided or minimized with a commitment to driver and rider responsibility, and appropriate trail siting, design, and management.

In addition to the BMPs noted under each objective below, see Section 3.1 for general BMPs and laws that apply to all recreation activities on grasslands in B.C.'s Thompson and Okanagan basins.

Objective 1: Minimize Soil Disturbance

Stay on managed trails, roads, and routes, plus:

- If driving a four-wheeled vehicle, avoid travelling on single-track trails, or on two-track trails that are narrower than your vehicle.
- Stay in the middle of trails to avoid widening them.
- Avoid creating switchbacks, shortcuts, or new paths for others to follow.
- Park or stage only in designated parking areas.
- Avoid travelling on poorly placed existing trails that are causing erosion problems. Trails straight up a hillside can severely erode in a heavy rain or runoff. Descending, contouring trails collect water and can also cause severe erosion.
- Avoid muddy trails, wet areas, or travelling through water holes.
- Do not exit off of managed trails onto travelling livestock or wildlife trails if it will disturb the stock. Be sensitive to wildlife trails.
- Accelerate slowly. Avoid spinning wheels/tracks to avoid creating rooster tails. 'Rip and Tear' acceleration causes many times the impact than that of conservative driving.
- Mud bog only in approved, designated areas.
- Hill climb only in designated areas.

- When snowmobiling, ride only where there is adequate snow cover – 12” or more. Ride where exposed soil and young trees and plants are not visible in order to avoid damaging soils and vegetation.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Consult with local stakeholders (e.g., government agencies – Ministry of Forests, naturalist groups, conservation interests, First Nations, landowners, etc) on establishing designated mud-bogging and hill climbing areas.
- Use and disseminate these and other best available practices to ensure that your operations are environmentally and socially sustainable.
- Be aware of your operation’s footprint, and endeavour to keep it as small as possible.

Objective 2: Avoid Introducing or Spreading Invasive Plants

- Check vehicle undercarriages, wheel wells, and engine compartments regularly for weeds, and before entering and after leaving grassland areas.
- Clean vehicles and equipment by removing mud, dirt, and plant parts after leaving grassland areas, or as soon as possible, in a weed-safe site such as a car wash. Do not wash your vehicle in streams or waterways to prevent spreading invasive plants downstream.

Use *weed-free* staging areas:

- Use staging areas that are free of invasive plants and be sure to keep them free of invasive plants
- If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:
 - ❑ Learn what the particular concerns with invasive plants are in your area.
 - ❑ Ask your local land manager or weed management group for information about avoiding introducing and spreading invasive plants, and provide this information to your clients or members (See Section 8.1 for more information on invasive plants).
 - ❑ Consider organizing volunteers at trailheads during busy times of the year, or when certain weeds are coming to seed, to build trail user awareness and ensure understanding of invasive plant issues.
 - ❑ If you are a land manager, control invasive plants in your staging areas to avoid their spread onto trails.

Objective 3: Respect Native Plants and Wildlife

Stay on managed trails, roads, and routes, plus:

- Avoid riding ATVs or trail bikes along beaches, through marshes or in areas where birds nest and breed.
- Obey all posted signs that pertain to wildlife.
- If you encounter wildlife, slow down, leave your engine running and stay on your machine.

If you encounter wildlife:

- Slow down, leave your engine running and stay on your machine.
- Think about maintaining your equipment: Keep machines tuned and properly muffled to reduce exhaust and noise.

When snowmobiling in deep snow:

- Stay clear of wild animals so that vehicle noise and proximity do not add stress to animals.

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes

Stay on managed trails, roads, and routes, plus:

- Avoid exiting off established trails onto travelling livestock or wildlife trails.
- Stay in the middle of trails to avoid widening them.
- Avoid creating switchbacks, shortcuts, or new paths for others to follow.
- If driving a four-wheeled vehicle, avoid travelling on single-track trails, or on two-track trails that are narrower than your vehicle.

If you are snowmobiling:

- Stay on managed trails or within designated snowmobile areas.
- Ride only where there is adequate snow cover (that is, where exposed soil and young trees and plants are not visible) to avoid damaging soils and vegetation.
- Avoid travelling over waterways, whether snow-covered or not: unburned fuel and oil causes damage to waterways at spring thaw.

If you are near streams and riparian areas:

- Do not drive through streams, except at approved crossings.
- Avoid travelling through riparian areas.
- Do not mud-bog except in approved areas.

If you are camping or picnicking:

- If camping is involved, see Section 3.6 below about the use of existing campsites.
- Where no camping sites are available, choose campsites that have durable vegetation.

If you are travelling during fire season:

- Check machines regularly for plant material near exhaust pipes or other structures that can become hot during use.
- Fuel up at staging areas wherever possible. Never fuel up in sensitive ecosystems, including riparian and wetland areas.
- Don't smoke while riding, make sure butts are fully extinguished, and pack them out.

- Be aware of dry grass, maturing grain crops and especially stay away from haystacks.
- During periods of extremely high fire hazard conditions, landowners and ranchers may ask for areas to be closed to public use. Respect landowners' wishes.

If you are a land manager:

- Consider the development of appropriate regulations for exhaust systems to help reduce noise and fire risks.

Information Needs

More information is needed on the impacts of cutting deadwood. For example, cutting deadwood is easier for snowmobilers, since wood on the ground is hidden under snow or is very wet, and packing in firewood is considered by snowmobilers to be unrealistic. Some people are concerned that most snags are wildlife trees and could even be culturally modified trees.

Objective 5: Avoid Disturbing Livestock and Damaging Forage

- See the BMPs and Laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 8: Respect Historic Features

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

3.3. Horseback Riding

This section describes the potential impacts that horseback riding can have on grasslands in B.C.'s Thompson and Okanagan basins. Objectives are provided to minimize or prevent these impacts along with the specific BMPs and Guidelines that can be followed to meet the objectives. Laws and regulations are mentioned where relevant. In addition to the BMPs noted under each objective below, see

Section 3.1 for the general BMPs and laws that apply to all recreation activities in B.C.'s Thompson and Okanagan grasslands.

3.3.1. What are the Impacts?

In grassland ecosystems, horseback riding activities can:

- cause soil disturbances;
- contribute to the introduction and spread of invasive plants;
- cause disturbances to native plants and wildlife;
- affect sensitive environments and landscape features;
- disrupt livestock management practices, which in turn can affect grassland health; and,
- disturb or damage cultural and heritage sites and features.

These impacts are described in detail in Section 2.3. The following section describes how horseback riding can contribute to these impacts.

3.3.2. How Does Horseback Riding Contribute to These Impacts?

Heavy Impacts

In one study, 600 passes by horses through a grassland area resulted in the loss of half of the area's plant cover (Weaver and Dale 1978).

Trails created by 1000 horse passes were up to three times as wide and seven times as deep as trails created by the same number of passes by hikers (Weaver and Dale 1978).

Soil Disturbances: Horses can create more damage to trails than humans on foot (MWLAP 2002). Horseback riding and packhorse travel through grassland areas can contribute to soil disturbance by:

- causing soil exposure. Grazing and trampling can remove vegetation cover and can uproot plants leaving exposed areas.
- causing soil compaction on horse trails.
- loosening soil due to horse's hoof actions. This can make soils susceptible to erosion (Whittaker 1978). For example, repeated horse riding on trails can turn the firm surface of a trail into a soft trail.

Impacts to soils can be pronounced at sites where horseback riders congregate. For example, in an area in Montana, campsites used by parties of horseback riders were six times larger, had four times as much devegetated area, had less soil organic horizon, were more compacted, and had more exotic plants than campsites used by backpackers (Cole 1983). These differences can be attributed to the trampling action of confined horses at the campsite, and to the fact that riding parties tend to be larger and stay longer at campsites than do backpacking groups (Lucas 1985).

Introduction and Spread of Invasive Plants: Horseback riding can contribute to the introduction of invasive plants into pristine areas, and to their spread in already affected areas. This occurs when invasive plant seeds become caught in horses' hooves, tack or hair, and are transported into other areas, or when seeds are spread through horse manure due to invasive plant-contaminated horse feed, or when invasive plant-contaminated feed is brought into campsites.

Disturbances to Native plants: Horseback riding, and camping with horses, can contribute to disturbances to native plants and changes to plant communities by:

- crushing or uprooting native grassland plants through trampling and grazing. The resulting loss of plant cover can expose soils. Direct damage to native

plants can result in changes to plant communities by eliminating certain species or by helping to spread species that are adapted to living on disturbed sites.

- creating dust when horseback riding through exposed soil sites during dry periods. The dust settles on nearby plants, affecting the plants' ability to photosynthesize, grow, and reproduce.

Disturbances to Native wildlife: In addition to directly harming wildlife, disturbances can also displace animals from critical habitats such as foraging areas and winter ranges. Changes in habitat quality and availability can result from soil disturbances, invasive plant introductions, and loss of native vegetation as discussed above. Horseback riding, particularly in concentrated areas, can contribute to these impacts by:

- damaging underground burrows and surface runways of small animals through trampling.
- causing direct animal deaths by trampling and crushing including crushing of bird, amphibian or reptile eggs.
- causing stress to animals by approaching too close, or from increased recreational activities in critical habitats, which can cause their energy reserves to decline.

Disturbances to Sensitive Environments and Landscape Features: Sensitive environments such as wetland and riparian environments are especially susceptible to soil compaction, exposure, and erosion due to trampling or grazing. This can result in changes in water flows and levels, and siltation of water bodies. Sensitive environments are also susceptible to the effects of invasive plants and disturbance to native plants and wildlife. The contribution of horseback riding to these impacts has been discussed above.

Disturbances to Livestock, Forage, Livelihoods, and Private Property:

Horseback riding can contribute to these impacts by:

- creating new trails through grasslands, which livestock may follow into sensitive areas such as wetlands or riparian zones that are highly susceptible to grazing and trampling damage.
- accidentally damaging fences and failing to leave gates as found, which can give livestock access to areas that should be protected, or can confine them to sites that could become heavily trampled and over-grazed.
- creating dust when heavy use of trails through agricultural areas occurs during dry seasons. This can result in damage to farm crops and native grassland plants.
- disturbing livestock due to harassment from uncontrolled dogs that accompany riders. This type of disturbance can disrupt livestock movements and patterns, which in turn could result in trampling or grazing damage to native grasslands.
- introducing garbage, which can be eaten by livestock or can cause damage to crops when it is cut up and spread with harvesting machinery.

Disturbance to Cultural and Heritage Sites and Features: Impacts to cultural and heritage sites and features can arise from horseback riding activities through:

- removing, crushing or scattering artefacts.
- damaging (e.g., compaction and erosion) shallowly buried cultural sites.

- disrupting game populations and damaging medicinal plants at First Nations traditional hunting and gathering sites, and
- contributing to the possible loss of the cultural value of First Nations spiritual sites due to increased use by recreationists.

3.3.3. How You Can Help: Recommended Best Management Practices

Impacts from horseback riding can be avoided or minimized with a commitment to horse rider responsibility, and appropriate trail siting, design, and management. In addition to the BMPs noted under each objective below, see Section 3.1 for general BMPs that apply to all recreation activities for grasslands in B.C.'s Thompson and Okanagan basins. If you use motorized vehicles to access areas used for your form of recreation, please also read the BMPs listed under the 'Motorized Recreation' section.

Objective 1: Minimize Soil Disturbance

If you are thinking of a horse trip:

- Use the minimum number of horses required for the trip.
- Select lightweight gear to help reduce the number of horses required. A rule of thumb is one pack animal to two riders if light gear is used.
- Select lightweight gear, compact stoves and tents to help reduce the number of horses required for the trip. A rule of thumb is one pack animal to two riders.
- Minimize travel when trails are wet.
- If you are going on a multiple day excursion: Read about *Leave No Trace Camping* (Section 3.6).

If you are going to dry feed your horse during the trip:

- Provide hay and grain that is free of invasive plants in order to reduce the amount of time that horses graze on native vegetation.
- Avoid grazing in wet or boggy areas that are sensitive to hoof action.
- Grazing of any livestock on Crown Land requires a grazing permit/license (under the *Range Act*). This requirement is often waived for non-commercial use. Check with the district Forest Service office near you. (See Section 8.4 for agency contact details.)

Stay on managed trails, roads, and routes, plus:

- Avoid creating switchbacks, shortcuts, or new paths for others to follow.
- Try to keep horses from skirting shallow puddles, small rocks, and bushes.
- Avoid travelling on the edges of potholes, along stream banks or other areas easily impacted by hoof action.
- Ride single file on all existing trails to avoid widening them.
- Avoid wet or boggy areas that are sensitive to hoof action.

If you are *not* on managed trails, roads, routes:

- Smaller riding parties should spread out and ride abreast to avoid creating new trails. Large riding parties should stick to managed trails and ride single file.
- If extremely difficult terrain must be negotiated, leave ample room between each rider. Horses that are free to place their feet around obstacles are less likely to cause damage to the ground, to themselves, and to their handlers.

When you come to a rest stop:

- Use discretion on where you tie your horse; horses often paw at the ground, and may do less damage to the surrounding soils and vegetation if tied on the trail. However, if on a well-used trail, consider tying your horse off the trail to avoid conflict.
- When tying up, choose live trees that are larger than 20 cm in diameter. Avoid heavily used trees, which may be killed by heavy soil compaction.
- Tend to your horses often:
 - ❑ For a rest stop or short break, where horses are not going to eat, use a short halter rope, typically 6-15 feet long. If a halter rope is long enough for a horse to nibble at the ground, it is long enough for him to step over it. A horse in trouble can do irreparable damage both to itself and the environment.
 - ❑ For a longer break where the horse is going to feed, then use a picket rope, typically up to 50 feet.
- Be aware that some horses are nervous if tied away from their friends and may trample or paw the ground. Relocate fretting horses, or hold them and help them settle down.
- Before you move on, fill in any ground that has been pawed.

If grazing is allowed at campsites:

- Keep horses in dry areas with abundant forage, and away from wet and boggy areas.
- Rotate horses throughout the area to reduce trampling and prevent overgrazing.
- Tend to horses often:
 - ❑ For a rest stop or short break, where horses are not going to eat, use a short halter rope, typically 6-15 feet long. If a halter rope is long enough for a horse to nibble at the ground, it is long enough for him to step over it. A horse in trouble can do irreparable damage both to itself and the environment.
 - ❑ For a longer break where the horse is going to feed, then use a picket rope, typically up to 50 feet.
- Ensure the horse is familiar with hobbles or pickets. Some horses are trained to respect electric fences, but be sure to set up fences away from game trails.
- At well-used campsites, break up horse manure and scatter it.
- Utilize established or previously used overnight shelters for the horses to minimize the number of disturbances to soils and vegetation.

Objective 2: Avoid Introducing or Spreading Invasive Plants

Be aware:

- Upon leaving and entering grassland areas, inspect clothing, footwear, horses (especially legs and hooves), and pets for invasive plant seeds or plant parts.
- Also inspect tack and equipment, especially for burrs. Remove seeds and plant parts, bag them, and dispose in the garbage or by incinerating them.

If you are thinking of a horse trip:

- Ensure that only feed that is free of invasive plants is given to horses for several days before travelling in grassland areas.
- If feed is hauled in, ensure that it is free of invasive plants, and processed.

Objective 3: Respect Native Plants and Wildlife

Stay on managed trails, roads, and routes, plus:

- Use calm, experienced animals that are in good condition.
- If possible, use horses and mules that know each other so there will be fewer disruptions.
- If accompanied by dogs, keep them close to the riding party and under control when wildlife or another party is encountered. If uncertain if a dog is controllable, leave the dog at home to avoid danger to the dog, other parties and wildlife.

If grazing is allowed at campsites:

- Avoid letting horses graze in wet, lowland areas where trampling damage is an issue. Camp in areas with adequate forage, or take the horses to another area for the majority of their grazing.
- Rotate grazing by horses throughout the area to reduce trampling and prevent overgrazing. Salting, or picketing of “social leaders” away from preferred grazing areas may be useful tools.
- Always stay aware of tied horses. Tie them short – about 2.5 feet. If a halter rope is long enough for a horse to nibble at the ground, it is long enough for him to step over it. A horse in trouble can do irreparable damage both to himself and the environment.
- Ensure stock is familiar with hobbles or pickets before arriving at a site. Picketing a horse is high-impact grazing. Change sites every day. Picket only your wrangle horse.
- At some areas it is appropriate to confine horses to a large area with an electric fence. However, this encourages high impact grazing, bare soils, invasive plants, and is generally discouraged. A gate as a natural barrier on the access trail towards the camp site may be a better solution.

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes

Stay on managed trails, roads, and routes, plus:

- When travelling in groups, try to stay in the same track, ride single file, and keep the group small.

If you are near streams and riparian areas:

- Keep campsites or areas where horses are contained at least 50 m from streams, lakes and other riparian areas.
- Lead horses to water or haul water to them.

Objective 5: Avoid Disturbing Livestock and Damaging Forage

- Check with local landowners if they have access restrictions for animals with health concerns.

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 8: Respect Historic Features

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

3.4. Mountain Biking and Cycle Touring

This section describes the potential impacts that mountain biking and cycle touring can have on grasslands in B.C.'s Thompson and Okanagan basins, along with the objectives to minimize or prevent those impacts, and the specific BMPs and Guidelines that can be followed to meet the objectives. Laws and regulations are mentioned where relevant.

3.4.1. What are the Impacts?

In grassland ecosystems, mountain biking and cycle touring can:

- cause soil disturbances;

- contribute to the introduction and spread of invasive plants;
- cause disturbances to native plants and wildlife;
- affect sensitive environments and landscape features;
- disrupt livestock management practices, which in turn, can affect grassland health; and
- disturb or damage cultural and heritage sites and features.

These impacts are described in detail in Section 2.3. The following section describes how mountain biking and cycle touring recreation can contribute to these impacts.

3.4.2. How Does Mountain Biking and Cycle Touring Contribute to These Impacts?

Soil Disturbances: Trail riding and poor trail building or maintenance can lead to soil erosion, compaction, and consequential increases in runoff leading to sedimentation of water bodies. Increased runoff can also damage trails and the areas surrounding them, which may result in trail closures and increased maintenance costs. Mountain biking and cycle touring can also contribute to soil disturbances by:

- compacting soil through repeated traffic over the same area, such as along established road and trail systems.
- causing soil exposure caused when bikes damage or uproot plants or the soil crust, thereby allowing the exposed soils to easily become wind blown or washed away by water.

Introduction and Spread of Invasive Plants: Mountain biking and cycle touring can be a major factor in the introduction and spread of invasive plants in grassland areas by:

- transporting invasive plants, roots, and seeds that become caught in the spokes and tires of bicycles and that become imbedded in the mud that clings to tires and bike frames. When this occurs, invasive plants can be transported long distances and into new areas in a matter of hours.
- damaging native vegetation and exposing soils when travelling off established trails. These newly disturbed areas are ideal conditions for invasive plants to colonize.

Disturbances to Native Plants and Wildlife: Mountain biking and off-road cycle touring can cause disturbances to native plants, cause changes to plant communities and disturb wildlife by:

- crushing or uprooting native plants when riding occurs off designated trails, or when cyclists try to avoid puddles. The direct damage to plants can change plant communities by eliminating certain species, or by helping to spread species that are adapted to living on disturbed sites.
- startling animals, which can lead them to modify their behaviour (e.g., increased flight responses or nest abandonments, and changes in feeding patterns and habitat use).
- damaging underground burrows and surface runways of small animals when travelling off-trail.

Proper Trail Building

Studies show that the extent and severity of physical impacts from trail building and uses depend on soil characteristics, slope and climate, as well as user behaviour (WLAP 2002). (See Section 8.5 Information Sources to find information on appropriate trail construction and maintenance techniques.

A study by Miller (1999) discusses the responses of wildlife to outdoor recreation, including mountain biking. Disturbances from these activities can cause changes in normal behavioural patterns which can lead to the reduced ability to reproduce and raise offspring, or to the reduced health or even death of the animal.

- causing stress to animals by approaching too close, or by increased recreational activities in critical habitats, which can cause an animal's energy reserves to decline.

Disturbances to Sensitive Environments and Landscape Features: Sensitive environments such as wetlands and riparian areas are especially susceptible to soil compaction, exposure, and erosion, which results in changes in water flows and levels, and siltation of water bodies. Sensitive environments are also susceptible to the introduction and spread of invasive plants and disturbance to native plants and wildlife. The contribution of mountain biking and cycle touring to these impacts has been discussed above. In addition, mountain biking and cycle touring can also contribute to disturbing sensitive environments by:

- disturbing wildlife due to the mere presence of cyclists in riparian areas. Bird, turtle, and toad eggs can be crushed if ridden over.
- causing erosion and damage to landscape features such as silt cliffs and hoodoos.
- causing damage to fragile lichens, mosses and other plants that grow on sensitive and rare environments.

Disturbances to Livestock, Forage, Livelihoods, and Private Property: The seemingly expansive and open nature of grasslands can result in trails being created without being properly planned. With increasing popularity of mountain biking, ranchers are noticing a greater number of trails being built around their properties. This can cause serious problems for ranchers, and the long-term health of grasslands. Mountain biking and cycle touring can contribute to these problems by:

- creating new trails through grasslands, which can affect livestock grazing patterns by allowing animals to move into unauthorized or sensitive areas such as wetlands and riparian zones, especially when gates are left open.
- creating dust when heavy use of trails through agricultural areas occurs during dry seasons. This can result in damage to farm crops and native grassland plants.
- failing to leave gates as found, which can give livestock access to areas that should be protected, or can confine them to sites that could become heavily trampled and over-grazed.
- disturbing livestock due to the mere presence of cyclists as they venture off trails onto farm fields to explore or find shortcuts, and disturbing livestock due to harassment from uncontrolled dogs that accompany cyclists. These types of disturbances can disrupt livestock movements and patterns, which in turn, could result in trampling or grazing damage to native grasslands.
- introducing garbage, which can be eaten by livestock or can cause damage to crops when it is cut up and spread with harvesting machinery.

Disturbances to Cultural and Heritage Sites and Features: Impacts to cultural and heritage sites and features can arise from mountain biking and cycle touring activities through:

- removing, crushing or scattering artefacts.
- damaging (e.g., compaction and erosion) shallowly buried cultural sites.
- disrupting game populations and damaging medicinal plants at First Nations traditional hunting and gathering sites.

- contributing to the possible loss of the cultural value of First Nations spiritual sites due to increased use by recreationists.

3.4.3. How You Can Help: Recommended Best Management Practices

Read more about riding skills at IMBAs Skill Site:

http://www.imba.com/nmbp/skills/skills_issues.html

Impacts from mountain biking and cycle touring can be avoided or minimized with a commitment to rider responsibility, and appropriate trail siting, design, and management. In addition to the BMPs noted under each objective below, see Section 3.1 for general BMPs that apply to all recreation activities in B.C.'s Thompson and Okanagan grassland basins. If you use motorized vehicles to access areas used for your form of recreation, please also read the BMPs listed under the 'Motorized Recreation' section.

Objective 1: Minimize Soil Disturbance

Stay on managed trails, roads, and routes, plus:

- Soil erosion and compaction can be avoided or minimized by riding responsibly and with appropriate trail design.
- Learn how to minimize damage to trails by riding responsibly and using proper riding techniques:
 - ❑ Control your bicycle at all times; your speed and the way you ride influences trail management decisions and policies;
 - ❑ Avoid skidding and sliding, which can occur by breaking harder than necessary;
 - ❑ Stay on existing trails and avoid cutting switchbacks;
 - ❑ Learn how to recognize different types of soils. Wet and muddy trails are more vulnerable to damage. Stay off trails during wet and muddy conditions as tire ruts will become pathways for water erosion;
 - ❑ If you find yourself on a wet trail section, stay on the existing trail and avoid creating a new one. Wade Don't Braid: get wet, ride through the puddle. Riding around puddles widens trails and leads to erosion.

If you are building or maintaining trails, roads, routes: Build and maintain trails with a focus on minimizing soil disturbance/erosion:

- Maintain a firm trail surface;
- Ensure proper trail placement, design, and management;
- Ensure that soils can withstand the impacts created by mountain biking and cycle touring;
- Avoid steep downhill sections, especially where a trail is shared with hikers; and,
- Where steep areas cannot be avoided, or are desired, use erosion prevention measures such as water bars, and curves.
- See Section 8.5 for further information sources on trail design and maintenance.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Work with local land managers to determine which areas are sensitive to soil disturbance.

- Provide clients with maps, rules of the trail, trail condition updates and educational brochures to ensure they are aware of soil disturbance issues and proper riding etiquette and techniques to minimize damage to trails.

Objective 2: Avoid Introducing or Spreading Invasive Plants

Be aware:

- Before entering and upon leaving grassland areas, inspect clothing, footwear, bikes, and pets for invasive plant seeds or plant parts.
- Remove seeds and plant parts, bag them, and dispose in the garbage or by incinerating them.
- Clean your bike of dirt and mud to remove any embedded seeds.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Organize volunteers at trailheads during busy times of the year, or when certain invasive plants are coming to seed, to build trail user awareness, and ensure understanding of invasive plant issues and minimize impacts.

Objective 3: Respect Native Plants and Wildlife

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes

Stay on managed trails, roads, and routes, plus:

- Practice low impact cycling – Read IMBA’s Rules of the Trail (See sidebar);
- Ride on open trails only;
- Respect trail and road closures including seasonal or short-term closures (ask a local shop or club or land manger if uncertain);
- Walk rather than ride across bridges and trestles;
- See above under Objective 1 to learn how to minimize damage to trails by using proper riding techniques.
- Avoid using hoodoos as bike drops (large jumps)

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Sponsor local trail work sessions to help build trails to protect sensitive environments/landscape features and maintain existing trails.
- Know what legal trails exist, and their conditions given recent weather patterns. Direct members and clients to appropriate trails.
- Be the source in your community for responsible riding advice:

IMBA Rules of the Trail

- Ride on Open Trails Only
- Control Your Bicycle
- Never Scare Animals
- Always Yield Trail
- Leave No Trace
- Plan Ahead

Visit IMBA's websites to read more about Soft Cycling (http://www.imba.com/resources/soft_cycling/index.html) and Trail Diplomacy (http://www.imba.com/resources/bike_management/5).

Read Williams Lake Cycling Club's Trail Ethics (<http://www.puddlebike.com/trails.html>)

- ❑ Display a local trail map, and use it to teach clients about local parks and sensitive areas;
- ❑ Ensure clients both understand and follow a set of trail ethics suited for your region. For example, display environmental trail ethics (e.g., a Rules of the Trail poster can be obtained from IMBA), point clients to appropriate websites, and hand out brochures with relevant information.

Objective 5: Avoid Disturbing Livestock and Damaging Forage

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 8: Respect Historic Features

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

3.5. Rock Climbing

This section describes the potential impacts that rock climbing can have on grassland ecosystems associated with B.C.'s Thompson and Okanagan basins, along with the objectives to minimize or prevent those impacts, and the specific BMPs and Guidelines that can be followed to meet the objectives. Laws and regulations are mentioned where relevant.

3.5.1. What are the Impacts?

In grassland ecosystems, rock climbing activities can:

- cause soil disturbances;
- contribute to the introduction and spread of invasive plants;
- cause disturbances to native plants and wildlife;
- affect sensitive environments and landscape features; and
- disturb or damage cultural and heritage sites and features.

These impacts are described in detail in Section 2.3. The following section describes how rock climbing can contribute to these impacts.

3.5.2. How Does Rock Climbing Contribute to These Impacts?

Soil Disturbances: Rock climbing access trails are used primarily by climbers and are not publicized in any detail. They tend to have little or no formal development, are not constructed to high- or multiple-use standards, and are often very steep. Inappropriate trail building can lead to water runoff concerns and soil disturbances such as erosion.

Introduction and Spread of Invasive Plants: Rock climbers may contribute to the spread of invasive plants if they pick up invasive plant seeds and plant parts on their shoes and clothing while travelling through infested sites on their way to climbing areas.

Disturbances to Native Plants and Wildlife: Rock climbing can cause disturbances to native plants and wildlife by:

- damaging fragile lichens and other small plants through cleaning. Due to the climate and vegetation growth in rock climbing areas, rock climbers often have to clean or remove vegetation and loose rock in order to develop new climbs, and maintain existing climbs (B.C. MELP and Volunteer Group of Climbers, n.d.).
- disturbing mammals (e.g., bats), birds (e.g., Falcons and White-throated Swifts), and reptiles (e.g., Western Rattlesnakes) that use rock habitats for roosting, hibernating, or rearing their young.
- disturbing wildlife in the vicinity of climbing sites through harassment from uncontrolled dogs that may accompany climbers.
- disrupting movements of wildlife such as California Bighorn Sheep which use rocky habitats to escape from predators and for lambing.

Disturbances to Sensitive Environments and Landscape Features: Sensitive environments such as wetlands and riparian environments are especially susceptible to the effects of invasive plants and disturbance to native plants and wildlife. The contribution of rock climbing to these impacts has been discussed above.

Disturbances to Cultural and Heritage Sites and Features: Impacts to cultural and heritage sites and features from rock climbing can include:

- damaging pictographs and petroglyphs (see Cultural Heritage in Glossary)
- removing, crushing or scattering artefacts.
- disrupting game populations and damaging medicinal plants at First Nations traditional hunting and gathering sites.
- contributing to the possible loss of the cultural value of First Nations spiritual sites due to increased use by recreationists.

3.5.3. How You Can Help: Recommended Best Management Practices

Impacts from rock climbing can be avoided or minimized with a commitment to climber responsibility, and appropriate trail siting, design, and management. In

addition to the BMPs noted under each objective below, see Section 3.1 for general BMPs that apply to all recreation activities in grasslands in B.C.'s Thompson and Okanagan basins.⁴ If you use motorized vehicles to access areas used for your form of recreation, please also read the BMPs listed under the 'Motorized Recreation' section.

Objective 1: Minimize Soil Disturbance

If you are building or maintaining trails, roads, routes:

- Any trail work to existing trails which would involve significant work such as use of chainsaws, or significant changes (e.g., routing), should be planned collaboratively with land managers and rock climbing clubs, associations and tourism operations.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Work with land managers to monitor trails and conduct minor maintenance works, such as water runoff control.

Objective 2: Avoid Introducing or Spreading Invasive Plants

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 3: Respect Native Plants and Wildlife

Be aware

- Learn about the types of plants and wildlife that use rock structures, and about their habitat requirements during different seasons
- Share your knowledge with other climbers.

Respect wildlife and wildlife features:

- Avoid disturbing any plants and animals that use rock faces or bluffs.
- Snakes are likely to be encountered in the grasslands and rock outcrops while approaching a climbing site and while rock climbing from April to September/November. If you see a snake, give the area a wide berth and alert other climbers to avoid these areas during these critical times.
- Birds such as the Prairie Falcon breed from April to August and tend to nest on cliff ledges below overhangs for shade. Climb with care during these periods to avoid disturbing nesting sites.
- Do not bring dogs to the rock climbing areas. They can be a major disturbance to the local wildlife.

If you are considering cleaning a rock face for a climbing route:

- Minimize impact of cleaning rock faces at all times.

⁴ Sources for the BMPs in this section: B.C. MELP and Volunteer Group of Climbers, n.d. (Available at: <http://wlapwww.gov.bc.ca/bcparks/recreation/stawamus/stawamus.htm>).

Identified Wildlife

Visit WLAP's website on Identified Wildlife Species to learn more about the ecology and vulnerabilities of species such as falcons, bats, and snakes which inhabit typical rock climbing areas:

http://wlapwww.gov.bc.ca/wlap/identified/species_table_of_contents.htm

- Remove only the minimum amount of material (e.g., lichens, moss, and debris) needed to ensure that a climb is safe and offers an appropriate climbing experience.
- Do not remove trees unless approved by a government agency (see Section 8.4 for the appropriate WLAP contact in your region).
- Carefully consider the importance and quality of the climbing route. Ask:
 - Will this route continue to be used and does it justify the amount of cleaning proposed?
 - How significant will it be to climbers for its length and grade of difficulty?
- During any cleaning activities, ensure the safety of any other user in the area. Consider safety especially when developing longer climbs.

If you are building or maintaining trails, roads, routes:

- As new climbing areas are developed, climbers should access them by choosing existing access trails or low impact access routes and must not cut or remove any material.
- If the need for trail planning and construction arises, climbers and local planners should evaluate, plan, and implement new trails where feasible.

If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:

- Provide climbers with educational material on animals that use rock faces, bluffs, and cliffs.
- Work collaboratively to develop strategies to ensure the protection of plants and wildlife especially during critical periods of the year (e.g., nesting).
 - For example, consider closing climbing faces or access routes (even temporarily) where there are unacceptable environmental impacts to plants and/or wildlife (e.g., closure of routes due to presence of nesting Falcons).

Information

- Read Section 8.5 for trail tips.
- Read about Impacts to Wildlife in Section 2.6.4

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian areas, rock faces, hoodoos, silt cliffs, and talus slopes**If you are a commercial recreation operator, land manager, shop or a club involved in managing recreational activities:**

- Work together with the climbing community to develop strategies to ensure the protection of sensitive environments and landscape features, and recreation opportunities.

Objective 5: Avoid Disturbing Livestock and Damaging Forage

- See the BMPs, Guidelines, and Laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 8: Respect Historic Features

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

3.6. Hiking and Other Activities

This section describes the potential impacts that hiking and other activities can have on grasslands in B.C.'s Thompson and Okanagan basins. Activities with similar impacts include, backpacking, nature study (wildlife viewing, rock hounding), camping, picnicking, backcountry and cross-country skiing, snowshoeing, and dog sledding. Also presented are objectives to minimize or prevent those impacts, and the specific BMPs and Guidelines that can be followed to meet the objectives. Laws and regulations are mentioned where relevant.

3.6.1. What are the Impacts?

In grasslands ecosystems, hiking, backpacking, nature study (wildlife viewing, rock hounding), camping, picnicking, backcountry and cross-country skiing, snow shoeing, and dog sledding can:

- cause soil disturbances;
- contribute to the introduction and spread of invasive plants;
- cause disturbances to native plants and wildlife;
- affect sensitive environments and landscape features;
- disrupt livestock management practices, which in turn, can affect grassland health; and
- disturb or damage cultural and heritage sites and features.

These impacts are described in detail in Section 2.3. The following section describes how hiking and related activities can contribute to these impacts.

3.6.2. How Do Hiking and Related Activities Contribute to Impacts?

Soil Disturbances: Hiking off-trail, and poor trail building or maintenance can lead to soil erosion, compaction, and consequential increases in runoff and sedimentation of water bodies. Increased runoff can also damage trails and the areas surrounding them, which may result in trail closures and increased maintenance costs. Trail construction and maintenance is an inexact science, and is affected by many variables, such as site location, soil type, local climatic conditions, and the type of intended use. Some of the problems with trails that result in erosion problems or cause hikers and other recreationists to travel off-trail are:

- *Deep Trenching* – This occurs when the trail becomes sunken. Hikers may feel like they're walking in the bottom half of a pipe, and so, may seek flatter terrain.
- *Widening* – This occurs when the trail has widened from a single or double track to an unsightly set of multiple, often trenched parallel tracks.
- *Tripping Hazards* – This occurs when regular use and erosion expose tree roots and rocks.
- *Steepness* - If a trail is too steep over a long distance hikers may not use it, and instead, may search for easier routes.
- *Long, winding trails* - Knowing that the shortest distance between two points is a straight line, users may find short cuts, which results in the creation of a web of trails.

There are certain general guidelines, which if adhered to, will prevent most trail deterioration, and will minimize maintenance costs. See the following website for these guidelines: <http://www.foothill.net/fta/work/maintnotes.html>

Introduction and Spread of Invasive Plants: Hikers and other recreationists can contribute to the spread of invasive plants by:

- transporting plant seeds and plant parts picked up on their shoes and clothing while travelling through infested sites. Dogs that accompany their humans in their recreational pursuits can also pick up and transport invasive plant seeds that become caught in their fur.
- damaging native vegetation and exposing soils when travelling off established trails. These newly disturbed areas are ideal conditions for invasive plants to colonize.

Disturbances to Native Plants and Wildlife: Hiking and related activities can cause disturbances to native plants, cause changes to plant communities and disturb wildlife by:

- crushing or uprooting native plants when walking off designated trails, or when trying to avoid puddles.
- damaging or removing rare plants or plants that are used by First Nations peoples (e.g., through picking of wildflowers).
- startling animals, which can lead them to modify their behaviour (e.g., increased flight responses or nest abandonments, and changes in feeding patterns and habitat use).
- disturbing wildlife – the effects of which can be more pronounced with increasing degree of trail use, time of year (e.g., during breeding season or when

Wildlife Impacts

Disturbances from activity on hiking trails can affect wildlife up to 100 m from the trail (WLAP 2002).

During the breeding season, nesting success has been found to be lower for grassland birds that nested close to heavily-used rather than lightly-used recreation trails (Miller 1999).

Grassland birds and mule deer have been found to show a greater flush response to hikers traveling off-trail as opposed to on established recreational trails (Miller 1999).

animals are energetically stressed in winter) and with travelling off-trail as these disturbances are spatially random and unpredictable (Miller 1999).

Disturbances to Sensitive Environments and Landscape Features: Sensitive environments such as wetlands and riparian environments are especially susceptible to soil compaction, exposure, and erosion, which can result in changes in water flows and levels, and siltation of water bodies. Sensitive environments are also susceptible to the introduction and spread of invasive plants and to disturbances to native plants and wildlife. The contribution of hiking and related activities to these impacts has been discussed above. In addition, hiking and related activities also contribute to disturbing sensitive environments by:

- disturbing wildlife due to the mere presence of recreationists in riparian areas. Bird, turtle, and toad eggs can be crushed if stepped on.
- causing erosion and damage to landscape features such as silt cliffs and hoodoos.
- causing damage to fragile lichens, mosses and other plants that grow on sensitive and rare environments when travelling off designated trails.

Disturbances to Livestock, Forage, Livelihoods, and Private Property: Hiking and related activities can contribute to these impacts by:

- creating new trails through grasslands, which livestock may follow into sensitive areas such as wetlands or riparian zones that are highly susceptible to grazing and trampling damage.
- failing to leave gates as found, which can give livestock access to areas that should be protected, or can confine them to sites that could become heavily trampled and grazed.
- creating dust when heavy use of trails through agricultural areas occurs during dry seasons. This can result in damage to farm crops and native grassland plants.
- disturbing livestock from harassment by uncontrolled dogs that accompany recreationists. This type of disturbance can disrupt livestock movements and patterns, which in turn, could result in trampling or grazing damage to native grasslands.
- introducing garbage, which can be eaten by livestock or can cause damage to crops when it is cut up and spread with harvesting machinery.

Disturbances to Cultural and Heritage Sites and Features: Impacts to cultural and heritage sites and features from recreational activities such as hiking and nature study could include the following:

- removing, crushing or scattering artefacts.
- damaging (e.g., compaction and erosion) shallowly buried cultural sites.
- disrupting game populations and damaging medicinal plants at First Nations traditional hunting and gathering sites.
- contributing to the possible loss of the cultural value of First Nations spiritual sites due to increased use by recreationists.

3.6.3. How You Can Help: Recommended Best Management Practices

Impacts from hiking, backpacking, camping, picnicking, nature study, back-country skiing, cross-country skiing, snow shoeing, and dog sledding can be avoided or minimized with a commitment to user responsibility, and appropriate trail siting, design, and management. In addition to the BMPs noted under each objective below, see Section 3.1 for general BMPs that apply to all recreation activities in grasslands of the Thompson and Okanagan basins. If you use motorized vehicles to access areas used for your form of recreation, please also read the BMPs listed under the 'Motorized Recreation' section.

Objective 1: Minimize Soil Disturbance

When planning a recreation trip in the grasslands

- If you are going to travel in a group, keep the group small (Trail Society of B.C.).

If you are building or maintaining trails, roads, routes:

- Organize volunteer trail maintenance sessions, using standard volunteer records and trail maintenance reports similar to those developed and distributed by [Trails B.C. \(http://www.trailsbc.ca/admin.html\)](http://www.trailsbc.ca/admin.html).
- See Section 8.5 for more information on trail building and maintenance.

Objective 2: Avoid Introducing and Spreading Invasive Plants

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 3: Respect Native Plants and Wildlife

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 4: Respect Sensitive Environments and Landscape Features, such as wetlands, riparian Areas, rock faces, hoodoos, silt cliffs, and talus slopes

Practice 'Leave No Trace' Camping:

- Use designated camping areas if possible.
- If designated areas do not exist, seek areas that have already been disturbed.
- If there are no designated or already disturbed areas, disperse camping spots to minimize disturbance in one area. Choose campsites that have durable surfaces such as bedrock or dry grassy areas. Such sites are quite resilient and capable of recovering rapidly from the effects of one night of low-impact use. In areas where there are no designated campsites, keep campsites small, and move camp as often as is necessary to avoid damaging the site.
- Enjoy your stay up to a maximum of 14 days.

- Keep campsites at least 50 m from streams, lakes, and other riparian areas. If you are camping for long periods of time on, or near, a bank or shore, preserve as much as the natural vegetation to avoid damage to plants. Land owners and land managers may consider planting new shrubs and appropriate plants if need be.
- Do not cut tree boughs to use as sleeping pads. This creates minimal benefit and maximum impact.
- Return the site to its natural condition before you leave your campsite. Do not build permanent structures. Do not hammer nails into trees for hanging gear, or cut trees or tree boughs.

When using campfires:

- Use lightweight stoves and lanterns rather than building campfires.
- If campfires must be built, keep fires small, and use established fire rings or fire pans wherever possible.
- If fire rings or pans are not available, dig up a small piece of sod and store it in a garbage bag. Build the fire in the area that has been removed. Burn all wood and coals to ash, and bury by replacing the sod to its original place.
- Attend your campfire at all times and extinguish before leaving.
- Consider the weather: Do not light campfires in strong winds.
- Use of wood: Walk 5 to 10 minutes away from camp to gather wood from a large area so that no single place becomes denuded. Collect loose sticks and branches from the ground. Do not cut down trees or remove their limbs. Firewood should be no larger in diameter than an adult's wrist so that it can be broken into proper lengths by hand and will burn down to white ash or small coals.
- Burn all wood and coals to ash, and put out campfires completely.

Think about your garbage:

- Reduce waste: Plan meals to reduce the amount of food carried. For example, avoid over-packaged and disposable items to help reduce the volume of garbage generated while camping. Use plastic bags or reusable containers to help reduce the potential garbage to be packed out.
- Pack it in and pack it out – even biodegradable garbage should be brought back to urban areas where it can be disposed of properly. Garbage includes: candy wrappers, twist ties, cans, bottle caps, broken glass, plastic bags, foil, biodegradable scraps such as apple cores and orange peels, energy bar wrappers, cigarette butts, punctured bike tire tubes, water bottles.
- Empty your holding tanks at a sanitation facility (B.C. MOF 2000).

When cleaning at your campsite:

- Avoid washing directly in a lake or stream or other bodies of water because this can cause contamination. Use a basin and small amount of biodegradable, phosphate-free soap for washing yourself and dirty dishes. Pack water in a pail or pot, wet down, then lather up and rinse off. The soap will filter through the soil and break down before reaching any body of water. Clothes can be cleaned by washing in plain, hot or cold water.

- Any washing activities should take place at least 60 m from natural water sources.
- After washing dishes, remove all food particles from waste water (a light weight strainer is handy) and scatter over a wide area away from camp. In bear country the best method is to pour the waste water into a **cat hole** and cover.

Practice responsible human waste management practices:

- If outhouses are not available, dig waste pits at least 15-20 cm deep and 10-15 cm in diameter, and at least 60 m (about 70 adult paces) from water, campsite, cattle, crops and trail sources. Cover and disguise pits when finished.
- Pack out all toilet paper and hygiene products to dispose of in town later.

If you are a rock and fossil collector:

- Respect private property and collect only with the owner's permission.
- Avoid causing damage to the environment while collecting material. Avoid contaminating wells, creeks, or other water supplies.
- Take home only what you can reasonably use.
- Leave all collecting areas free of litter, regardless of how you found them. Do not discard burning materials such as matches and cigarettes.
- Do not use firearms or blasting material in collecting areas.
- Report any deposits on public lands that should be protected for scientific and public education purposes, and for future generations to enjoy.

Objective 5: Avoid Disturbing Livestock and Damaging Forage

If you are a rock and fossil collector:

- Fill all excavation holes which may be dangerous to livestock.

Objective 6: Respect Property (buildings, fences/gates) and Livelihoods

If you encounter a horse or pack trains:

- Stay back from horses and pack trains at least 10 feet to avoid getting bucked.
- If you encounter a frightened horse, remove your backpack and talk in a friendly tone to the horse.

Objective 7: Respect First Nations Cultural Heritage and Traditional Land Use

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

Objective 8: Respect Historic Features

- See BMPs and laws relevant to achieving this objective in the General BMPs Section 3.1.

4. What you can do to promote BMPs

This Best Management Practices document has been written as the ‘master document’ on this subject: a compilation of why we need to conserve grasslands, and the many different things that recreational users can do to achieve grassland conservation and stewardship. As such, it is a large document and not likely to be used in this form by individual recreationists or those trying to educate users. We encourage you to use it as a source document for your own work in encouraging grasslands stewardship.

How can you, or your recreation group, use this BMP document to promote grassland stewardship?

You can prepare written materials:

- Use the BMP document as a source of information to develop guidelines/brochures/handouts for your members;
- Put the activity-related BMPs on your club website and in club newsletters; and,
- Create a wallet-sized card with a “code of practice” for your activity.

Develop educational/outreach programs using the BMP document as your guide:

- Include information items in newsletters, websites, in local papers, on radio and TV;
- Inform and educate members about sensitivities of grasslands;
- Encourage schools to incorporate information in their curricula, letting youth know why these are important; conduct field trips to demonstrate problems and solutions; and,
- Provide background material for guest speakers to clubs, community groups, and school groups.

Encourage landowners and land managers to educate and work with user groups:

- Invite invasive plant committee representatives to provide your club with field presentations on invasive plants.

Adopt on-the-ground programs and activities:

- Use the BMPs as guidelines in developing trail systems;
- Develop a signage strategy, e.g. marking the location of trails, marking the location of sensitive ecosystems; and,
- Place signs at a trailhead with “Do’s and Don’ts.”

Collaborate with other recreation and non-recreation users to achieve results:

- This document points out that the basic 'rules of the road' are similar for the many different types of recreational activities you do. Different user groups can use this BMP document as they work together to seek solutions.

We hope you will use this document creatively in a variety of different ways to promote recreational activities that minimize impacts to grassland ecosystems. We encourage you to share this document, and your ideas for using it, with others.

5. References

5.1. References Cited

This section includes the documents and personal communications cited as general references in this report. All website references were accessed between July and October 2003.

- Adams, E.S. 1975. Effects of Lead and Hydrocarbons from Snowmobile Exhaust on Brook Trout (*Salvelinus fontinalis*). *Transactions of the American Fisheries Society* 104(2): 363-373.
- B.C. Helicopter and Snowcat, Skiing Operators Association (B.C.HSSOA). 2003. *Stewardship of Mountain Ecosystems Best Practices for Sustainability*. B.C. Helicopter and Snowcat, Skiing Operators Association. Available at: <http://www.bchssoa.com/>
- B.C. Ministry of Agriculture Food and Fisheries. 2002. *A Guide to Developing Trails in Farm and Ranch Areas*. British Columbia Ministry of Agriculture, Food and Fisheries. Available at: http://www.agf.gov.bc.ca/trail_guide/agtrails_toc.pdf
- B.C. Ministry of Environment Land and Parks (B.C. MELP) and Volunteer Group of Climbers. N.d.. *Stawamus Chief, Shannon Falls & Murrin Provincial Parks Rock Climbing Strategy*. Prepared by B.C. Ministry of Environment Land and Parks, B.C. Parks, Garibaldi/Sunshine Coast District and Volunteer Group of Climbers. Available at: <http://wlapwww.gov.bc.ca/bcparks/recreation/stawamus/stawamus.htm>. General website: <http://wlapwww.gov.bc.ca/bcparks/recreation/stawamus/stawamus.htm> (Accessed August 2003).
- B.C. Ministry of Environment, Lands and Parks (B.C. MELP). 1995. *Antelopebrush Ecosystems*. B.C. Ministry of Environment, Lands and Parks, Victoria, BC.
- B.C. Ministry of Environment, Lands and Parks (B.C. MELP). N.d.. *Habitat Atlas for Wildlife at Risk: South Okanagan and Lower Similkameen*. B.C. Ministry of Environment, Lands and Parks, Penticton, BC.
- B.C. Ministry of Forests (B.C. MOF). 2003. *Noxious Weeds: Weed Control Program*. Available at: <http://www.for.gov.bc.ca/hfp/noxious/introduc.htm>. Accessed July 2003.
- B.C. Ministry of Forests (MOF). 2001. *Okanagan-Shuswap Land and Resource Management Plan*. Available at: <http://srmwww.gov.bc.ca/sir/lrmp/okan>
- B.C. Ministry of Forests: Forest Practices Branch (B.C. MOF). 2002a. *Weed Control is... Caring for Their Future. Brochure 74*. Available at: <http://www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro74.htm>. Accessed July 2003.
- B.C. Ministry of Forests (B.C. MOF). 1995. *Outdoor Recreation and the Forest Practices Code of B.C.* Recreation Section, March 1995.

- BC Ministry of Small Business, Tourism and Culture, Archaeology Branch. 2001. *Culturally Modified Trees of British Columbia - Version 2.0*. Available at: <http://www.for.gov.bc.ca/hfd/pubs/docs/mr/mr091.htm>
- B.C. Ministry of Sustainable Resource Management. 2003. Glossary of Resource Planning Terms. (website) <http://srmwww.gov.bc.ca/rmd/offices/landscape-watershed/glossary/S.HTM>
- B.C. Ministry of Sustainable Resource Management (B.C. MSRM). 2002. *Crown Land Recreational Conflict Documentation for the Ft St. James, Vanderhoof, Prince George, and Robson Valley LRMP Areas – About Conflict Between Motorized and Non-motorized Recreation Users*. http://srmwww.gov.bc.ca/rmd/rpts/recreationconflict/Main_Report_Rec.pdf
- B.C. Ministry of Water, Land and Air Protection (WLAP). 2002. *Interim Wildlife Guidelines for Commercial Backcountry Recreation*. (Six Chapters) MWLAP. Available at: <http://wlapwww.gov.bc.ca/wld/comrec/crecintro.html> (Accessed October 2003).
[Chapter 1: Using Interim Wildlife Guidelines for Obtaining Commercial Backcountry Recreation Tenures in British Columbia \(PDF 186KB\)](#)
[Chapter 2: Interim Wildlife Guidelines for Commercial Backcountry Recreation: Amphibians & Reptiles \(PDF 670KB\)](#)
[Chapter 3: Interim Wildlife Guidelines for Commercial Backcountry Recreation: Birds \(PDF 550KB\)](#)
[Chapter 4: Interim Wildlife Guidelines for Commercial Backcountry Recreation: Mammals \(PDF 1MB\)](#)
[Chapter 5: Interim Wildlife Guidelines for Commercial Backcountry Recreation: Plant Communities and Habitats \(PDF 631KB\)](#)
[Chapter 6: Interim Wildlife Guidelines for Commercial Backcountry Recreation: Sources of Human-Caused Disturbance \(PDF 428KB\)](#)
- Berry, K.H. 1980. *A Review of the Effects of Off-road Vehicles on Birds and Other Vertebrates*. Pages 451-467 In: R.M. DeGraff and N.G. Tilghman, eds. *Management of Western Forests and Grasslands for Non-game Birds*. U.S. Department of Agriculture, Forest Service, General Technical Report. INT-86.
- Bondello, M.C., A.C. Huntley, H.B. Cohen and B.H. Brattstrom. 1979. *The Effects of Dune Buggy Sounds on the Telecephalic Auditory Evoked Response in the Mohave Fringe-toed Lizard, Uma scoparia*. Unpublished Report, U.S. Bureau of Land Management, California Desert Program, Riverside, California. cited in Berry, K.H. 1980. *A Review of the Effects of Off-road Vehicles on Birds and Other Vertebrates*. Pages 451-467 In: R.M. DeGraff and N.G. Tilghman, eds. *Management of Western Forests and Grasslands for Non-game Birds*. U.S. Department of Agriculture, Forest Service, General Technical Report. INT-86.
- Buckle, Mathew. 2003. B.C. Alpine Climbing. (Website) <http://www.matthewbuckle.net/climb/bcclimbing/bcalpine.html> and Personal Communications (Email), September 2003.
- Bunnell, P., S. Rautio, C. Fletcher and A. Van Woudenberg. 1992. *Problem Analysis for Integrated Resource Management of Riparian Ecosystems. B.C.*. Ministry of Forests, B.C. Ministry of Environment, Victoria, BC.

References

- Canadian Parks and Wilderness Society. N.d. *Grasslands of British Columbia: Our Most Endangered Spaces*. Canadian Parks and Wilderness Society, B.C. Chapter, Vancouver, BC.
- Cannings, R.J. 1980. *Regional Analysis of Natural Region 3 – the Dry Interior Plateau*. Parks Canada, Parks System Planning Division, Ottawa.
- Cannings, R.J., and E. Durance. 1998. Human Use of Natural Resources in the South Okanagan and Lower Similkameen Valleys. In: I.M. Smith and G.G.E. Scudder, eds. *Assessment of Species Diversity in the Montane Cordillera Ecozone*. Burlington: Ecological Monitoring and Assessment Network, 1998.
- Cole, D.N. 1989. Viewpoint: Needed Research on Domestic and Recreational Livestock in Wilderness. *Journal of Range Management* 42: 84-86. cited in D.N. Cole. 1989. *Viewpoint: Needed Research on Domestic and Recreational Livestock in Wilderness. Journal of Range Management* 42: 84-86.
- Cranston, R. 2001. Noxious Weeds and the B.C. Weed Control Act. Page 4 In: *B.C. Grasslands*. Grasslands Conservation Council of British Columbia Magazine, April 2001. Kamloops, BC.
- Cranston, R., D. Ralph and B. Wikeem. 1996. *Field Guide to Noxious and Other Selected Weeds of British Columbia*. Ministry of Agriculture, Fisheries and Food, Ministry of Forests, Victoria, BC.
- Dalgarno, K. Personal communications. Land and Water B.C. July 2003.
- Ducks Unlimited. 1998. *Understanding Wetlands: A Wetland Handbook for British Columbia's Interior*. Ducks Unlimited, Kamloops, BC.
- Duncan, C. 1997. Environmental Benefits of Weed Management. Techline. Ag West Communications, Fort Collins, CO. cited in B.M. Wikeem, R.S. Cranston, A.H. Bawtree and C.W. Campbell. 1998. Selected Management Systems. Pages 140-162 In: C.W. Campbell and A.H. Bawtree, eds. *Rangeland Handbook for B.C.*. British Columbia Cattleman's Association, Kamloops, BC.
- East Kootenay Environmental Society. N.d. (brochure). *British Columbia Wild Backcountry There's Nowhere Else Like It on Earth*. East Kootenay Environmental Society.
- Environment Canada. 2003. *The Importance of Nature to Canadians: Survey Highlights – Executive Summary*. Available at: <http://www.ec.gc.ca/nature/highlights/summary.html>. Accessed August 2003.
- France, R.T. and R.B. Haywood-Farmer. 1998. Livestock Behaviour and Management. Pages 92-107. In: *Rangeland Handbook for B.C.*. C.W. Campbell and A.H. Bawtree, eds. B.C. Cattleman's Association, Kamloops, BC.
- Fraser Basin Council (FBC). 2003. Invasive Plant Strategy for British Columbia. Final Draft. October 12, 2003. Available at: <http://www.fraserbasin.bc.ca/publications/documents/InvasivePlantStrategyFNL.pdf>
- Grasslands Conservation Council of British Columbia (GCC). 2003. B.C. Grasslands Mapping Project: A Conservation Risk Assessment – 3 Year Annual Report. Grasslands Conservation Council of British Columbia.

Available at:

<http://www.bcgrasslands.org/SiteCM/U/D/85D6534A3E10CFD5.pdf>

- Harmata, A.R., J.E. Durr, and H. Geduldig. 1978. Home Range, Activity Patterns and Habitat Use of Prairie Falcons Nesting in the Mohave Desert. Unpublished Report, U.S. Bureau of Land Management, California Mohave Desert Program, Riverside, California. cited in K. H. Berry. 1980. *A Review of the Effects of Off-road Vehicles on Birds and Other Vertebrates*. Pages 451-467 In: R.M. DeGraff and N.G. Tilghman, eds. Management of Western Forests and Grasslands for Non-game Birds. U.S. Department of Agriculture, Forest Service, General Technical Report. INT-86.
- Jared Hobbs. 2003. Personal Communications. Junior Ecosystem Specialist, Ecosystem Planning and Standards Section, MWLAP.
- Iverson, K. and T.D. Hooper. 2002. *Options for a National Park in Natural Region 3: The Dry Interior Plateau*. Canadian Parks and Wilderness Society, Vancouver, BC.
- Lea, E.C. 2001. Antelope-brush ecosystems – past, present and future. Ministry of Sustainable Resource Management. Working report. Victoria, BC. cited in O. Dyer and E.C. Lea. 2003. Status and importance of the antelope-brush – needle-and-thread grass plant community in the South Okanagan Valley, British Columbia.
- Lacey, J.R., C.B. Marlow and J.R. Lane. 1989. Influence of Spotted Knapweed (*Centaurea maculosa*) on Surface Runoff and Sediment Yield. *Weed Tech.* 3: 627-631. cited in B.M. Wikeem, R.S. Cranston, A.H. Bawtree and C.W. Campbell. 1998. *Selected Management Systems*. Pages 140-162 in C.W. Campbell and A.H. Bawtree, eds. *Rangeland Handbook for B.C.*. British Columbia Cattleman's Association, Kamloops, BC.
- Lucas, R.C. 1985. Visitor Characteristics, Attitudes and Use Patterns in the Bob Marshall Wilderness Complex, 1970-82. USDA Forest Service Research Paper INT-345, Ogden, Utah. cited in D.N. Cole. 1989. Viewpoint: Needed Research on Domestic and Recreational Livestock in Wilderness. *Journal of Range Management* 42: 84-86.
- McIntosh, T. 2003. Biological Soil Crusts of the B.C. Grasslands and Shrub-steppe. *B.C. Grasslands*. Grasslands Conservation Council of British Columbia Magazine, February 2003. Kamloops, BC.
- Miller, Scott G. 1999. Environmental Impacts: The Dark Side of Outdoor Recreation. *The Quivira Coalition Newsletter*. 2(4).
http://www.quiviracoalition.org/documents/06_99-dark_side.html
- Moore, Roger. N.d.. *Executive Summary - Conflicts on Multiple-Use Trails - Synthesis of the Literature and State of the Practice*. Available at IMBA website:
http://www.imba.com/resources/bike_management/conflictstudy.html
- Nicholson, A., E. Hamilton, W.L. Harper and B.M. Wikeem. 1991. Bunchgrass Zone. Pages 125-137 In: D. Meidinger and J. Pojar, compilers and editors. *Ecosystems of British Columbia*. B.C.. Ministry of Forests, Research Branch, Special Report Series 6. Victoria, BC.
- Nowlan, Linda and Bill Jeffries. 1996. *Protecting British Columbia's Wetlands — A Citizen's Guide*. West Coast Environmental Law Research Foundation and the B.C. Wetlands Network.

References

- <http://www.wcel.org/wcelpub/1996/11580/welcome.html#contents> -
Trespass: http://www.wcel.org/wcelpub/1996/11580/11580_2_1.html
- Parish, R., R. Coupe and D. Lloyd. 1996. *Plants of Southern Interior British Columbia*. Lone Pine Press. Vancouver, BC.
- Russell, E. 2001. Weed Watch in the Thompson-Nicola. Page 5 In: *B.C. Grasslands*. Grasslands Conservation Council of British Columbia Magazine, April 2001. Kamloops, BC.
- Sarell, M.J. 1990. *Survey of relatively natural wetlands in the South Okanagan*. B.C. Ministry of Environment, Lands and Parks, Penticton, B.C. 6pp.
- Scudder, G.G.E. 2003. B.C. Grasslands: Rarity Hotspots for Insects. Pages 6-7 In: *B.C. Grasslands*. Grasslands Conservation Council of British Columbia. Magazine, February 2003.
- Stevens, V. 1992. *Wildlife Diversity in British Columbia: Distribution and Habitat Use in Biogeoclimatic Zones*. Wildlife Interpretations Subgroup, B.C. Ministry of Environment, B.C. Ministry of Forests, Victoria, BC.
- Thomas, J.W., C. Maser and J.E. Rodiek. 1979. *Wildlife Habitats in Managed Rangelands – the Great Basin of Southeastern Oregon: Riparian Zones*. U.S. Department of Agriculture, Forest Service General Technical Report PNW-80.
- Thompson Okanagan Tourism Association. N.d.. *Dog Sledding*. Super Natural British Columbia - Thompson Okanagan Tourism Association. <http://www.thompsonokanagan.com/adventure/dogsledding/index.htm>
- Thomson, D. 1994. *The Response of Okanagan Indians to European Settlement*. B.C. Studies 101:96-117.
- Tourism Action Society of the Kootenays (TASK). 2002. *Environmentally Responsible Recreation on Our Shorelines and Waterways - A Guide to Science Based Information*. Tourism Action Society of the Kootenays.
- Trunkle, T. and P. Fay. 1991. Transportation of Spotted Knapweed plant seeds by Vehicles. Proceedings: Montana Weed Control Association, Butte, MT. Jan. 14-16. 33pp. cited in United States Department of the Interior and United States Department of Agriculture. 2001. *Off-highway Vehicle Environmental Impact Statement and Proposed Plan Amendment for Montana, North Dakota and Portions of South Dakota*. United States Department of the Interior, Bureau of Land Management, Montana State Office, United States Department of Agriculture, Forest Service, Northern Region. Available at: www.mt.blm.gov/ea/ohv/index.html. Accessed July 2003.
- University of Northern B.C.. N.d.. *Culturally Modified Trees – Protection of Culturally Modified Trees*. Available at: http://otaku.unbc.ca/nfrep/features_march.html (Accessed September 2003).
- Weaver, T. and D. Dale. 1978. Trampling Effects of Hikers, Motorcycles, and Horses in Meadows and Forests. *Journal of Applied Ecology* 15:451-457. cited in D.N. Cole. 1989. Viewpoint: Needed Research on Domestic and Recreational Livestock in Wilderness. *Journal of Range Management* 42: 84-86.

- Weinstein, M. 1978. Impacts of Off-road Vehicles on the Avifauna of Afton Canyon. California Bureau of Land Management, Department of Land Management, Department of the Interior cited in K.H. Berry. 1980. A Review of the Effects of Off-road Vehicles on Birds and Other Vertebrates. Pages 451-467 In: R.M. DeGraff and N.G. Tilghman, eds. *Management of Western Forests and Grasslands for Non-game Birds*. U.S. Department of Agriculture, Forest Service, General Technical Report. INT-86.
- Whittaker, P.L. 1978. Comparison of Surface Impact by Hiking and Horseback Riding in the *Great Smoky Mountains National Park*. USDI National Park Service, Southeast Region, Management Report 24, Atlanta, Georgia. cited in D.N. Cole. 1989. Viewpoint: Needed Research on Domestic and Recreational Livestock in Wilderness. *Journal of Range Management* 42: 84-86.
- Wikeem, B.M., R.S. Cranston, A.H. Bawtree and C.W. Campbell. 1998. Selected Management Systems. Pages 140-162 In: C.W. Campbell and A.H. Bawtree, eds. *Rangeland Handbook for B.C.*. British Columbia Cattleman's Association, Kamloops, BC.
- Wikeem, S.J. and B.M. Wikeem. 1998. Classification of Range Plant Communities. Pages 38-60 In: *Rangeland Handbook for B.C.*. C.W. Campbell and A.H. Bawtree, eds. B.C. Cattleman's Association, Kamloops, BC.

5.2. Additional References

In addition to the reference cited above in section 6.1, the following lists some main sources of BMPs from other jurisdictions that were used to initially develop the BMPs in this document.

5.2.1. All Activities

- B.C. MOF- Forest Practices Code Fish-Stream Crossing Guidebook, March 2002. <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/FishStreamCrossing/FSCGdBk.pdf>
- B.C. MWLAP - General Wildlife, Marine & Outdoor Ethics Information http://wlapwww.gov.bc.ca/bcparks/explore/gen_info/wild_gen.htm
- B.C. Wilderness Tourism Association- Code of Conduct for B.C.'s Wilderness Tour Operators. WTA Code of Conduct 2002. <http://www.wilderness-tourism.bc.ca/code.html#>
- B.C. Wildlife Watch: <http://www3.telus.net/driftwood/bcwwhome.htm>
- BLM Ultimate Wildlife Watching: <http://www.ca.blm.gov/caso/wf-ultimate.html>
- East Kootenay Environmental Society (EKES) Wilderness Tourism and Recreation Campaign - <http://www.ekes.org/backcountry.html>.
Brochure available: http://www.ekes.org/pdf/EKES_backcountry.pdf

5.2.2. Motorized

ATV Naturewatch: <http://www.mmic.ca/atvnwtester/default.asp>

BLM Colorado Hunting guidelines: <http://www.co.blm.gov/lra/hunting.htm>

BLM Colorado. Equestrian Use in Gunnison - Leave No Trace Stock Handling Guidelines – Camping, trail use, feeding - <http://www.co.blm.gov/gra/gra-lnt-horse.htm>

5.2.3. Horseback Riding

Back Country Horsemen of British Columbia - <http://www.bchorsemen.bc.ca/bhbcnt.htm>

5.2.4. Hiking, Backpacking, Camping, Picnicking, Nature Study, Back-country Skiing, Cross-country Skiing, Snow Shoeing, Dog Sledding and Hunting

B.C. Forest Service - Recreation Campgrounds and Trails – a Guide to the Rules (2 pages) <http://www.for.gov.bc.ca/hfp/rec/brochure/poster.pdf>

B.C. MWLAP Cathedral Provincial Park – Camping: <http://wlapwww.gov.bc.ca/bcparks/explore/parkpgs/cathedral/back.htm#camping>

B.C. Wildlife Watch - British Columbia Wildlife Watch. Wildlife Viewing Tips. Available at: <http://www3.telus.net/driftwood/tips.htm>. Accessed July 2003.

BLM California. Leave no Trace - <http://www.ca.blm.gov/caso/leavenotrace.html> -Found at their Wilderness website: <http://www.ca.blm.gov/caso/wilderness.htm>

BLM Colorado Access to Public Lands – Gates <http://www.co.blm.gov/gjra/access.htm>

BLM Colorado Using Undeveloped Camp Sites - <http://www.co.blm.gov/gjra/undevelopedcampsites.htm>

Dog Sledding: <http://www.jus4funCanada.com/bc/dogsledding.html>; <http://www.thompsonokanagan.com/adventure/dogsledding/>

Environment Canada Environmental Tips for Cottagers and Campers. <http://www.pnr-rpn.ec.gc.ca/info/articles/ca00s07.en.html>

Kamloops Rock Works - Kamloops Rock Works. The Rock Hound's Code of Ethics. Available at: <http://www.kamloopsrockwo> - Grasslands Regulations <http://www.fs.fed.us/r1/dakotaprairie/regs.htm>

Leave No Trace Center for Outdoor Ethics: <http://www.lnt.org/>

South Carolina State Forests-Guidelines for Recreation on South Carolina State Forests - <http://www.state.sc.us/forest/sfrac.pdf>

Trails Society of B.C.: <http://www.trailsbc.ca/>. See also: http://www.trailsbc.ca/southwest_region/sw_home.asp http://www.trailsbc.ca/southwest_region/trail_ethics.doc <http://www.trailsbc.ca/safety.html>

Tread Lightly -<http://www.treadlightly.org/>

U.S. Fish and Wildlife Service - Tips for Wildlife Viewing (from the - For Birds and Mammals. Recreation.gov website:
<http://www.recreation.gov/wildlifeview.cfm?myActivity=wildlifeviewing>.

U.S. Department of Agriculture Forest Service– Dakota Prairie Grasslands -Trail Regulations - <http://www.fs.fed.us/r1/dakotaprairie/trails.htm>

5.2.5. Mountain biking

Bicycle South Australia website -

http://www.bikesa.asn.au/MTB_Projects/MTBProjects.htm

BLM Colorado Be an Ethical Rider - Rules of the Trail – BLM Colorado:
<http://www.co.blm.gov/gjra/ethicalrider.htm>

Calgary Mountain Bike Alliance Rules of the Trail -

<http://www.cmbalink.com/education.html#Rules>

Do Your Bit For Mountain Biking:

<http://www.mtba.asn.au/trails/index.shtml#1057561310.66860>

Idaho State Parks and Recreation, Recreation Resources Bureau Trail Etiquette - <http://www.idahoparks.org/rec/biking.html>

International Mountain Bicycling Association-IMBA:

Skills http://www.imba.com/nmbp/skills/skills_issues.html

Soft Cycling:

http://www.imba.com/resources/soft_cycling/index.html

Management :

http://www.imba.com/resources/bike_management/index.html

Science: <http://www.imba.com/resources/science/index.html>

Mountain Bike Australia and IMBA - Rules of the Trail:

http://www.imba.com/about/trail_rules.html

[basis for trail rules in the associations listed at the top of this table]

National Off-Road Bicycle Association <http://www.steamboat.com/summer-int.aspx?CategoryId=653#norba>

North Shore Mountain Biking Association: The Seven Commandments:

<http://www.nsmba.bc.ca/cms/index.php?option=displaypage&Itemid=51&op=page&SubMenu=>

Southwest Idaho Mountain Biking Association:

<http://www.swimba.org/join.shtml>

USDA Forest Service, Deborah J Chavez Mountain biking: issues and actions for USDA Forest Service managers, 1996. Res. Paper PSW-RP-226-Web. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 33 p.

<http://www.fs.fed.us/psw/publications/documents/rp-226/>

Williams Lake's Cycling Club: www.puddlebike.com

6. Acronyms

ATVs	All-terrain Vehicles
BLM	U.S. Department of Interior Bureau of Land Management
BMPs	Best Management Practices
dB	Decibel
GCC	Grasslands Conservation Council of British Columbia
FBC	Fraser Basin Council
IMBA	International Mountain Bicycling Association
Km	Kilometre
m	metre
MAFF	British Columbia Ministry of Agriculture, Food and Fisheries.
MELP	Ministry of Environment, Land and Parks (now WLAP)
MSRM	Ministry of Sustainable Resource Management
NGO	Non-governmental organization
OHV	Off Highway Vehicle
USDAFS	U.S. Department of Agriculture, Forest Service
WLAP	B.C. Ministry of Water, Land and Air Protection
WMA	Wildlife Management Area

7. Glossary

For the purposes of this document, the following terms are defined as follows:

Best management practices (BMPs): Methods, measures, or approaches based on known science that if followed, allow the standards to be met or the desired objective to be achieved.

Blue-listed: Species or plant communities that are considered to be Vulnerable in British Columbia. These are of special concern because they are particularly sensitive to human activities or natural events. Blue-listed elements are at risk, but are not Extirpated, Endangered or Threatened.

Bunchgrass: A type of grass that characteristically grows in the form of a bunch.

Cat hole: A shallow scrape made in the soil with one's boots or other digging device, which is used for burying human waste. The hole is lightly covered with soil as a cat would do.

Cultural heritage: In this report, cultural heritage values refer to those sites and features used by First Nations peoples. Cultural heritage values in the Thompson and Okanagan basins include: pictographs (painted symbols, usually on rock faces), and petroglyphs (carvings on rock faces); kekulis (pit dwellings), rock shelters, and cache sites; burial sites; story sites; sites of spiritual significance; and, sites used for the gathering of traditionally used foods and medicines.

Culturally Modified Trees: A tree that has been altered by native people as part of their traditional use of the forest (BC Ministry of Small Business, Tourism and Culture, Archaeology Branch 2001).

Cyanobacteria: A form of bacteria (single celled organism) formerly called 'blue-green algae'.

Ecological integrity: The soundness or wholeness of the processes and organisms composing the ecosystem. To maintain ecosystem integrity one must maintain functioning, self-sustaining ecosystems with characteristics similar to the original ones (B.C. MSRM 2003).

Forage: Vegetation that provides food for grazing or browsing domestic and wild animals.

Goal: Goals provide general purpose and direction. They are the end result of ultimate accomplishment toward which an effort is directed. They generally should reflect perceived present and future need. They must be capable of being effectively pursued. (MOF Web Glossary). An ideal; a desired endpoint; frequently defined in abstract terms. Goals are qualitative and are achieved by means of objectives. (Dunster and Dunster 1996).

Guidelines: A set of recommended or suggested methods or actions that should be followed in most circumstances to assist administrative and planning decisions, and their implementation in the field. Guidelines may consist of policy statements, procedures, or checklists. They are provided as a broad framework of recommended actions to be taken and therefore, provide some flexibility for decision making. Note that guidelines cannot, by definition, be mandatory; such actions are prescribed by regulations or rules. (Dunster and Dunster 1996).

Habitat: The natural area used or occupied by a plant or animal, and which provides critical elements to sustain life (e.g., food, water, shelter).

Heritage: Includes personal property that has heritage value to British Columbia, or a community. Heritage also refers to the First Nations traditional and cultural resources. Heritage sites are land, including land covered by water that has heritage value to British Columbia, a community or the First Nations.

Historic sites: Built structures and sites, such as old homesteads, associated with European and Asian settlement of the Thompson Okanagan region.

Hoodoos: Sandstone pillars that are formed by wind and water erosion.

Invasive Plants: Invasive plants, which are commonly called weeds, are any type of plant that humans consider to be undesirable, either because it has no obvious beneficial qualities, or because it interferes with our land management objectives. In this report, the term 'invasive plant' refers to non-native or alien plant species.

Inverted Vs:: Structures built out of wood that allow recreationists (e.g., dirt bikers, mountain bikers, snowmobilers, hikers) to continue with their activities while ensuring cattle remain in their assigned areas.

Land Manager: A land manager includes ranchers and farmers responsible for the management of range and agricultural land.

Microbiotic crust: A thin crust of lichens, mosses, liverworts, fungi and algae that covers the soils between grasslands plants helping to keep soil cool, retain moisture, and keep out invasive plants. Also called the cryptogamic crust.

Monitoring: repeated, systematic measurements done with a specific purpose in mind. Monitoring is focused on measurements over time in order to detect the change toward, or away from, a stated standard or objective. Monitoring is part of the cycle of assessment and evaluation that is linked to management activities. (Quayle 2003).

Objective: a quantifiable, measurable and defined target, capable of attainment within a defined period of time. Objectives are the means by which goals are achieved and should include four main components: 1) They must state the desired outcome (i.e., what is to be accomplished.); 2) They must indicate the time period within which the expected outcome is to be achieved; 3) They must include measurement factors, such as quantity, quality, or cost, so that the fulfillment of the objective can be verified; 4) They must indicate who is responsible for achieving the indicated result. Desirable (but not absolutely essential) elements of objectives are a description of how they will be achieved and an indication of who will determine whether the results have been achieved. Objectives are typically narrower and shorter in range than goals, and serve as milestones toward goal achievement. (Dunster and Dunster 1996).

Red-listed: Species or natural plant communities that are Extirpated, Endangered, or Threatened in British Columbia. Extirpated species or natural plant communities no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered species or natural plant communities are facing imminent extirpation or extinction. Threatened elements are likely to become endangered if limiting factors are not reversed.

Rehabilitation: the restoration of ecosystem functions and processes in a degraded system or habitat. (Dunster and Dunster 1996).

Reporting: the process of effectively communicating the results of monitoring and their potential implications to a target audience. (Quayle 2003).

Restoration: a process of returning ecosystems or habitats to their original structure and species composition. Restoration requires a detailed knowledge of the (original) species, ecosystem functions, and interacting processes involved. (Dunster and Dunster 1996).

Riparian Area: Riparian areas are zones of lush, moisture-loving vegetation that borders rivers, streams, lakes, and wetlands. Riparian zones are easy to identify in grassland areas because they form a rich, green transitional zone between aquatic and upland environments.

Risk: the probability that an undesirable event will or will not occur. It is the product of the probability of the event taking place, the probability of being exposed to the event, and the probability of certain outcomes occurring if exposure did take place. Risk can be statistically quantified in a risk assessment. (Dunster and Dunster 1996).

Soil Compaction: The compressing of soil layers by applied weight such as occurs when repeated motor vehicle or foot traffic takes place over a given area.

Soil Erosion: The loosening and movement of soil by wind, water, ice, or gravity.

Soil Exposure: The exposure of bare soil due to the removal of plant cover.

Staging areas: Areas where recreationists arrive to start or organize their activities, whether as individuals or in groups.

Standard: quantifiable and measurable thresholds that are typically defined in law or regulation, and are mandatory. A statement that outlines how well something should be done, rather than how it should be done. A standard does not necessarily imply fairness or equity, or an absolute knowledge of cause-and-effect linkages. Standards are typically established using a combination of best available scientific knowledge, tempered by cautious use of an established safety (caution) factor. (Dunster and Dunster 1996).

Stewardship: caring for the land and associated resources so that healthy ecosystems can be passed on to future generations (Dunster and Dunster 1996).

Sustainability: A state or process that can be maintained indefinitely. The principles of sustainability integrate three closely interlinked elements - the environment, the economy and the social system - into a system that can be maintained in a healthy state indefinitely (B.C. MSRM, 2003).

Talus: Rubble that is produced by rock falls, and which accumulates at the base of a steep rock slope.

Traditional Use: The traditional use of the land, water, plants, and animals by First Nations people for such things as food, trade, medicine, fuel, shelter, and spiritual or ceremonial purposes

Wetlands: are areas of land where there is water at or near the ground surface throughout all or part of the year.

Wildlife: refers to mammals, birds, reptiles, and amphibians.

8. Information Sources

8.1. Invasive Plants

Local Invasive Plant Management Groups

- Southern Interior Weed Management Committee (250 851-1699)
- Okanagan Similkameen Regional District Weed Management Program (250 404-0115)
- South Okanagan Weed Committee (250-404-0115)

Provincial Noxious Weed Program

- *Office Location:* 515 Columbia Street, Kamloops, BC Fax: 828-4154, Phone: 828-4127

Noxious Weed Identification Guides and References

The Canadian Parks and Wilderness Society's B.C. Chapter report "Invasion of British Columbia's Grasslands" provides an overview of the threat of invasive plants to our provincial grasslands, examines different methods of controlling weeds, and describes community initiatives for restoring grassland areas that have been invaded by weeds. Available at: http://cpawsbc.org/pdfs/invasion_bc_grasslands.pdf

The Ministry of Agriculture, Food, and Fisheries' publication "Field Guide to Noxious and Other Selected Weeds of British Columbia" provides descriptions and colour photos of B.C.'s noxious weed species. Available at: <http://www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm>; <http://www.agf.gov.bc.ca/cropprot/noxious.htm>

The Ministry of Agriculture, Food, and Fisheries and the Open Learning Institute have produced a "Guide to Weeds in B.C.." This reference was designed for farmers, ranchers, resource managers, students, and the public, and profiles 80 weed species. Included is information on the identification, impact, legal status, habitat, local distribution, biology, ecology, and management of each weed. Available at: <http://www.weedsbc.ca/pdf/GuidetoWeeds.pdf>

The Ministry of Agriculture, Food, and Fisheries and the Open Learning Institute have produced "Seven Steps to Managing Your Weeds". The guide is intended to provide a template for preparing individualized integrated weed management plans. Available at: <http://www.weedsbc.ca/pdf/7StepsToManagingYourWeeds.pdf>

The Weeds B.C. website highlights “10 Destructive Weeds of B.C.. The site also provides information on weed impacts, and weed management and resources. See <http://www.weedsbc.ca>

Trails B.C.. Noxious Weeds - What Can You Do. Provides a useful overview of weed issues and information on the identification of types of weeds. <http://www.trailsbc.ca/weedinfo.shtml>

Weed Brochures

“Weeds – How They Spread and What You Can Do to Stop Them”. Brochure 73. Available from the B.C. Ministry of Forests: Forest Practices Branch on the following website: <http://www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro73.htm>

“Weed Control is...caring for their future”. Brochure 74. Available from the B.C. Ministry of Forests: Forest Practices Branch on the following website: <http://www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro74.htm>

8.2. Trail Ethics

Many mountain bike clubs around B.C. have developed their own trail ethics based on the International Mountain Bicycling Association’s (IMBA) rules of the trail:

“The way we ride today shapes mountain bike trail access tomorrow. Do your part to preserve and enhance our sport's access and image by observing the following rules of the trail, formulated by IMBA, the International Mountain Bicycling Association. These rules are recognized around the world as the standard code of conduct for mountain bikers. IMBA's mission is to promote mountain bicycling that is environmentally sound and socially responsible.”

1. Ride On Open Trails Only. Respect trail and road closures (ask if uncertain); avoid trespassing on private land; obtain permits or other authorization as may be required. Federal and state (not appropriate to Canada) Wilderness areas are closed to cycling. The way you ride will influence trail management decisions and policies.

2. Leave No Trace. Be sensitive to the dirt beneath you. Recognize different types of soils and trail construction; practice low-impact cycling. Wet and muddy trails are more vulnerable to damage. When the trailbed is soft, consider other riding options. This also means staying on existing trails and not creating new ones. Don't cut switchbacks. Be sure to pack out at least as much as you pack in.

3. Control Your Bicycle! Inattention for even a second can cause problems. Obey all bicycle speed regulations and recommendations.

4. Always Yield Trail. Let your fellow trail users know you're coming. A friendly greeting or bell is considerate and works well; don't startle others. Show your respect when passing by slowing to a walking pace or even stopping. Anticipate other trail users around corners or in blind spots. Yielding means slow down, establish communication, be prepared to stop if necessary and pass safely.

5. Never Scare Animals. All animals are startled by an unannounced approach, a sudden movement, or a loud noise. This can be dangerous for you, others, and the animals. Give animals extra room and time to adjust to you. When passing horses

use special care and follow directions from the horseback riders (ask if uncertain). Running cattle and disturbing wildlife is a serious offense. Leave gates as you found them, or as marked.

6. Plan Ahead. Know your equipment, your ability, and the area in which you are riding -- and prepare accordingly. Be self-sufficient at all times, keep your equipment in good repair, and carry necessary supplies for changes in weather or other conditions. A well-executed trip is a satisfaction to you and not a burden to others. Always wear a helmet and appropriate safety gear.

Keep trails open by setting a good example of environmentally sound and socially responsible off-road cycling. (http://www.imba.com/about/trail_rules.html)

Trails Society of B.C. (Trails B.C.) – A Trail User’s Code of Ethics:

Be aware that different users share the same trails. Know the Three C’s:

Common Sense – begins with planning your trip and continues with various encounters on the trail.

- When encountering others on the trail, the most mobile usually yields the right of way but use common sense to determine who can move out the way most easily. Ideally, cyclists yield to everyone and hikers yield to horses. However, a cyclist climbing a steep pitch will appreciate consideration.
- Generally, it is a good habit to travel on the right side to allow ease of travel when encountering others and passing on the left.

Communication

- A friendly word of greeting reassures horses and lets others know of your presence.
- Communicate with other trail users to warn them of dangers, trail conditions and features along the trail.
- Let people know if there are others in your group.

Courtesy

- Be aware of and understanding of others needs.

Other sources of information for trail ethics which informs both motorized and non-motorized recreationists include the following (See References section 5.2 for more BMP-related references):

- [Communicate When Passing](http://www.imba.com/resources/soft_cycling/passing.html) -- Trail courtesy is critical (http://www.imba.com/resources/soft_cycling/passing.html)
- [Share The Trails](http://www.imba.com/resources/soft_cycling/sharetrails.html) --- From the New England Mountain Bicycling Association (http://www.imba.com/resources/soft_cycling/sharetrails.html)
- [The Art of Riding Softly](http://www.imba.com/resources/soft_cycling/art.html) -- Hank Barlow, Mountain Bike magazine (http://www.imba.com/resources/soft_cycling/art.html)
- [Bikes and Horses: A Case for Sharing](http://www.imba.com/resources/bike_management/clemson_horses.html) -- National Symposium on Horse Trails in Forest Ecosystems (http://www.imba.com/resources/bike_management/clemson_horses.html)

8.3. First Nations in the Thompson – Okanagan

- See the following website for a list of the First Nations in the Thompson-Okanagan: <http://www.canadafirstnations.com/britishcolumbia/okanagan/>

8.4. Public Agencies Responsible for Recreation and Crown Range Resources in the Thompson-Okanagan Regions

The following lists federal, provincial, and regional agencies responsible for public and commercial recreation on Crown land. The roles identified are those currently assigned (adapted from MSRM 2002).

Enquiry BC: B.C. provincial government toll-free telephone information service which can connect a call to government offices throughout the province, free of charge, and can be used to determine which branch, department or ministry can best answer an enquiry and provides contact names and telephone numbers:

In Victoria call: 387-6121

In Vancouver call: 604-660-2421

Elsewhere in B.C. call: 1 800 663-7867

Outside B.C.: 604 660 2421

http://www.msrm.gov.bc.ca/prgs/enquiry_bc.htm

Ministry of Water, Land and Air Protection – Environmental Stewardship Division, B.C. Parks Section. This section is mandated to manage recreational activities in provincial parks, protected areas, and wildlife management areas (recreation is not permitted in ecological reserves). This includes the administration of Park Use Permits.

Thompson and Okanagan Regions: 1259 Dalhousie Drive, Kamloops BC, V2C 5Z5

<http://wlapwww.gov.bc.ca/sir/fwh/index.html>

Headquarters: PO Box 9339 Stn Prov Govt, Victoria BC, V8W 9M1

Telephone: 250 387-1161 Fax: 250 387-5669

E-mail: www.wlapmail@gems5.gov.bc.ca

Environmental Stewardship Division:

http://wlapwww.gov.bc.ca/esd/esd_main.htm,

B.C. Parks Section: <http://wlapwww.gov.bc.ca/bcparks/>

Ministry of Sustainable Resource Management, Resource Management Division: This Division (formerly Ministry of Small Business, Tourism and Culture; Tourism Policy and Land Use Branch) supports the development and approval of strategic land and water use plans, including coastal planning and landscape and watershed planning. Under this Division, the Tourism and Recreation Branch and regional tourism planners develop tourism land-use policy, and manage a province-wide inventory of existing tourism activities and capabilities on Crown land.

Southern Interior Region <http://srmwww.gov.bc.ca/sir/>
Partners in Grasslands: <http://srmwww.gov.bc.ca/sir/gcc/index.html>

Ministry of Sustainable Resource Management, Decision Support Services: Decision Support Services (formerly Land Use Coordination Office) provides government with professional decision support services supports land use planning, Treaty negotiations, sectoral economic development and land tenure allocations. Focus areas include: sustainable resource development, economic development, scientifically based and principled environment management, and open and accountable decision making. Tourism Opportunities Studies are among the initiatives they are responsible for.

B.C. Conservation Data Centre - Ministry of Sustainable Resource Management: The British Columbia Conservation Data Centre (CDC) systematically collects and disseminates information on the rare and endangered plants, animals and plant communities of British Columbia. This information is compiled and maintained in a computerized database which provides a centralized and scientific source of information on the status, locations and level of protection of these rare organisms and ecosystems.

Phone: (250) 356-0928
Fax: (250) 387-2733
e-mail: cdcdata@victorial.gov.bc.ca
web access: <http://srmwww.gov.bc.ca/cdc/index.htm>

Ministry of Forests: Responsible for managing recreation on provincial Crown Land outside Protected Areas (Parks) and municipal areas, with the exception of Commercial Recreation tenures. While no longer accepting responsibility for the management of recreation sites or trails, the MOF will continue to set policy and standards for the management of forest recreation resources (recreation and visual resource management).

Southern Interior Forest Region
515 Columbia St. Kamloops V2C 2T7
Phone: 250-828-4131
<http://www.for.gov.bc.ca/rsi/>

B.C. Forest Service Recreation -
515 Columbia St. Kamloops V2C 2T7
Phone: 250-828-4131
<http://www.for.gov.bc.ca/hfp/rec/rec.htm>

Kamloops Forest District
1265 Dalhousie Drive,
Kamloops, BC, V2C-5Z5
District office direct line phone: 250-371-6500. Fax: 828-4627
<http://www.for.gov.bc.ca/dka/>

Okanagan Shuswap Forest District
2501 - 14th Avenue
Vernon, BC, V1T 8Z1
Phone: (250) 558-1700. Fax: (250) 549-5485
<http://www.for.gov.bc.ca/dos/>

Ministry of Agriculture, Food and Fisheries (MAFF): One of the strategic objectives of MAFF is to undertake resource management and planning to maintain

the quality and availability of land and water for the province's agriculture and food industries. MAFF has recently worked with the recreation industry to ensure farm and ranch areas are used sustainably for recreational trail building and maintenance (MAFF 2002). <http://www.agf.gov.bc.ca/resmgmt/index.htm>

Kamloops Office
162 Oriole Rd
Kamloops BC V2C 4N7
Toll Free: 1-888-823-3355
Tel: 250 371-6050 Fax: 250 828-4631

Kelowna Office
Room 200, 1690 Powick Rd
Kelowna BC V1X 7G5
Toll Free: 1-888-332-3352
Tel: 250 861-7211 Fax: 250 861-7490

Land and Water B.C. Incorporated as a Crown corporation (formerly B.C. Assets and Lands Corporation) that provides lands and assets marketing and land management services for the province of B.C. As of 1998, the corporation has the responsibility of managing commercial recreation tenures on provincial Crown land. http://lwbc.bc.ca/applying_for_land/online_application.htm

Tourism B.C. This Crown Corporation works with B.C.'s tourism industry to promote the tourist trade and develop programs related to marketing, industry training, and visitor services. <http://www.tourism.bc.ca/>

B.C. Hydro: Manages significant water-based outdoor recreation opportunities. B.C. Hydro promotes and manages appropriate commercial and recreational use of the reservoirs, rights-of way, and other of its properties. <http://www.bchydro.com/recreation/>

Municipalities and Regional Districts: Governance of Crown lands in and surrounding municipal districts. In some cases the regional districts can apply zoning over Crown Land. The role of the Municipalities may be augmented upon release and approval of the new community charter.

- Central Okanagan Regional District: <http://www.regionaldistrict.com>
- North Okanagan Regional District: <http://www.nord.ca/>
- Thompson Nicola Regional District: <http://www.tnrd.bc.ca/>
- Regional District of Okanagan – Similkameen: <http://www.rdos.bc.ca/>

Parks Canada: An agency of the Federal Department of Canadian Heritage. Manages National Parks and National Historic Sites.

Department of Fisheries and Oceans: Manages all water bodies within B.C. As part of the management, DFO also provides sport and recreational fishing and boating opportunities. DFO is responsible for small craft rules and regulations, including operator licensing, safety and waste management. http://www.pac.dfo-mpo.gc.ca/pages/default_e.htm (Pacific Region).

8.5. Trail Design and Maintenance

Birkby, Robert. 1996. "[Lightly on the Land: The SCA Trail-Building and Maintenance Manual](#)". Mountaineers Press Available at the [Student Conservation Association, Inc.](#)

- Book covers all aspects of trail building and maintenance, revegetation and restoration. Useful for trail users, land managers and volunteer trail builders interested in trail design and maintenance.

California State Parks and Recreation

<http://www.foothill.net/fta/work/maintnotes.html>

- Discusses trail design. One example is the use of water bars to divert water off a trail at controlled points along the trail. They can be incorporated into the original construction of a trail, or they can be installed later as a maintenance measure. If done well, a series of water bars can effectively eliminate erosion and stabilize a trail for years. If done poorly, water bars can accentuate trail erosion and become dangerous tripping hazards

International Mountain Biking Association (IMBA). N.d.. The Science of Dirt:

http://www.imba.com/resources/science/science_dirt.html

http://www.imba.com/resources/trail_building/index.html

- A summary of knowledge regarding erosion on trails. Useful BMPs relating to the potential for reducing or preventing soil disturbances from off-road cycling.

International Mountain Biking Association (IMBA). N.d.. [Closing and Reclaiming Damaged Trails](#)

- Eight tips on the web for reclaiming old trails and returning them to a natural condition along with pictures of examples. Useful guidelines for trails that were poorly designed or are in need of being 'returned back to nature.'

MAFF. 2002. *A Guide to Developing Trails in Farm and Ranch Areas*. British Columbia Ministry of Agriculture, Food and Fisheries. Available at:

http://www.agf.gov.bc.ca/trail_guide/agtrails_toc.pdf

<http://www.agf.gov.bc.ca/trail%5Fguide/agtrails%5Fcomplete.pdf>

- The Guide was developed by the Ministry of Agriculture, Food and Fisheries with the assistance of the Agricultural Land Commission. The Guide will be of interest to people directly involved in the planning, design, development and maintenance as well as use of trails that go through or near agricultural lands.
- The Guide includes a 'Code of Conduct' related to agricultural areas, a discussion of issues and opportunities, and a Trail Development Toolbox applicable to crown land grasslands.

Ministry of Forests. 1995. Trails and Recreation Facilities Guidebook. Authority: Forest Practices Code of British Columbia Act, Section 102. Ministry of Forests. Available at:

<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/trail/trailtoc.htm>

- This is a guidebook designed to assist outdoor recreation groups and Forest Service staff in meeting the requirements set out in Section 102, Unauthorized trail or recreation facility construction, of the *Forest Practices Code of B.C. Act* and Part 3 of the *Forest Recreation Regulation*. Recommended directions for individuals

or groups interested in constructing, rehabilitating or maintaining trails or recreation facilities are also provided. The guidebook applies to all provincial Crown land outside of parks. That is, it applies to grasslands and other provincial Crown lands such as non-municipal and rural settlements.

Mitchell, Martha S. 2000. [Erosion Control Strategies for New Trails](http://www.forester.net/ec_0009_stone.html). Available at: http://www.forester.net/ec_0009_stone.html.

- Step-by-step decision guidelines for trail siting, alignment, and drainage to minimise erosion. Useful for best practices in trail design for all non-motorized trail use activities (riding, horseback riding, hiking, etc.)

North Shore Mountain Bike Association Trail Tips:

<http://www.nsmba.bc.ca/cms/index.php?option=displaypage&Itemid=52&op=page&SubMenu=>

- The Links on the NSMBA web page are provided “to give aspiring trail builders some ideas on how to build their trails better.”

The Trails Society of British Columbia. N.d. *Trails B.C.: Safety on the Trans Canada Trail*. On line at: <http://www.trailsbc.ca/safety.html>

- Site includes general tips for all users travelling along the trail, planning ahead, cycling and encountering wildlife. The tips are generally applicable. However, as the Trans Canada Trail passes through the Okanagan region, the tips are also specifically applicable to grasslands and rangelands regions.
- See also the Trail Maintenance Policy and Procedures: <http://www.trailsbc.ca/admin.html>

9. Appendix

9.1. Organizations and People who Participated in the Development of this Document

This BMP document has been developed through four phases:

- **Literature review** to provide background information on the grassland ecosystems and the species of concern in the grasslands of the Thompson and Okanagan basins, the types of recreational activities that occur in these grasslands, and the issues and impacts of concern related to these activities. Examples of BMPs from other jurisdictions were also identified.
- **A questionnaire** was sent to a variety of interest groups, individuals, and government agencies to identify possible impacts of concern and examples of existing BMPs. The responses to the questionnaire were analyzed and summarized.
- **A workshop held at the Quilchena Hotel, near Merritt, B.C. in September 2003.** Invitees included recreationists, responsible agencies, ranchers, First Nations, conservation and land trust organizations, species and ecosystem specialists, and academia. Participants further developed and refined the initial draft recreational BMPs for the Thompson-Okanagan region that was prepared before the workshop. The results of the workshop can be found in a report on the [GCC website](http://www.bcgrasslands.org/conservationcampaigns/bmp.htm): <http://www.bcgrasslands.org/conservationcampaigns/bmp.htm>)
- **Producing the BMP Report:** A Review Committee representing a wide variety of recreational and land use interests assisted with reviewing drafts of this BMP document.

The following is a list of the organizations and people who helped to develop this document.

First name	Last name	Organisation
Linda	Allison	Allison Creek ranch
Sue	Austen	South Okanagan Similkameen Stewardship Program
Dave	Bacon	Land and Water B.C.
Ian	Barnett	Ducks Unlimited
Sandra	Bicego	Dovetail Consulting Inc.
John	Blinston	Quad Riders Association of B.C.
Errol	Borsky	West Coast Dirt Riders
Norm	Boulanger	Quad Riders Association of B.C.
Jim	Brown	Lytton First Nation
Anthea	Bryan	South Okanagan Similkameen Stewardship Program
Dave	Butler	Canadian Mountain Holidays
Ken	Campbell	Myra Canyon Trestle Society
Todd	Cashin	Central Okanagan Regional District
Graeme	Casorso	Kelowna Mountain Bike Club
Debbie	Clarke	Allan Brooks Nature Centre
Bob	Cox	Ministry of Water, Land and Air Protection
Roy	Cranston	Ministry of Agriculture, Food and Fisheries

Judith	Cullington	Judith Cullington & Associates
Katherine	Cumming	Parks Canada
Kevin	Dalgarno	B.C. Hydro
Bruno	Delesalle	Grasslands Conservation Council of B.C.
Lucille	Dempsey	South Kamloops Stockman's Association
Chris	Donald	Lionsgaters 4WD Society
Dale	Drown	Guide Outfitters Association of B.C.
Eva	Durance	South Okanagan Naturalists
Ian	Dyson	Prairie Conservation Forum
Jennifer	Eastwood	Ministry of Forests
Elizabeth	Eldridge	Land and Water B.C.
Bev	Felske	Quad Riders Association of B.C.
John	Firnesz	Saskatchewan Parks and Recreation Association
Eileen	Fletcher	Tourism Development Coordinator
Judy	Guichon	Gerard Guichon Ranch Ltd.
Eric	Gunderson	North West Environmental Group
Rose	Gunoff	Ministry of Water, Land and Air Protection
Brenda	Hartley	Ministry of Sustainable Resource Management
Kat	Hartwig Haywood- Farmer	East Kootenay Environmental Society
Bob	Henricksen	Indian Gardens Ranch
Lorne	Henricksen	Logan Lake ATV Club
Jon	Heshka	University College of the Cariboo
Ellen	Hockley	Horse Council of B.C.
Tracey	Hooper	AXYS Environmental Consulting
Cathy	Hummelt	Manitoba Conservation, Parks and Natural Areas Branch
Jarrett	Humphrey	4 Wheel Drive Association of B.C./MRCBC
Kelvin	Kelly	Saskatchewan Environment
Pam	Krannitz	Canadian Wildlife Service
Ron	Laroy	Revelstoke ATV Club
Susan	Latimer	Ministry of Water, Land and Air Protection
David	Lock	Pacific Northwest Motorbike Association
Wray	Macdonnell	Ministry of Agriculture, Food and Fisheries
Bill	Marshall	Ministry of Forests
Dave	McBeth	Ministry of Sustainable Resource Management
Patricia	Mehlhop	U.S. Fish and Wildlife Service
Judy	Millar	Ministry of Water, Land and Air Protection
Jennifer	Morrison	Nicola Tribal Association
Pat	Moulton	Ministry of Water Land and Air Protection
Allan	Munnik	Lower Mainland ATV Club/Quad Riders Association of B.C.
Enzo	Nadalin	Integrated Municipal Provincial Auto Crime Team
Geoff	Neily	Backcountry Horsemen of B.C.
Margaret	Ning	Friends of Grasslands, Australia
Conrad	Olsen	Saskatchewan Ministry of Environment, Fish and Wildlife Branch
Tod	Osborne	Coldstream Ranch

Joanne	Page	South Star Recreation Trail Committee
Bruce	Petch	Ministry of Water, Land and Air Protection
Roy	Pixley	Lower Mainland ATV Club
Martin	Ponsioen	Ministry of Forests
Isabel	Pritchard	Friends of South Slopes
John	Reedy	Quad Riders Association of B.C.
Howie	Richardson	Okanagan University College and author of <i>Skaha Rockclimbs</i>
Dave	Richmond	Ministry of Water, Land and Air Protection
Mike	Rose	Quilchena Ranch
Mary	Sandy	Nicola Tribal Association
Colin	Schmidt	Grasslands National Park of Canada
Ken	Schykulski	Parks and Natural Areas Branch, Manitoba Conservation
George	Scott	Summit Seekers Snowmobile Club
Lisa	Scott	South Okanagan Weed Committee
G.G.E	Scudder	The University of British Columbia
Candace	Shadley	Cycling B.C.
Murphy	Shewchuk	The Trails Society of B.C.
Katharine	Shewchuk	Nicola Nordic Ski Club
Martin	Sills	Ministry of Agriculture, Food and Fisheries
Brian	Springinotic	Ministry of Sustainable Resource Management
Linda	Strong-Watson	Alberta Trail Net
Fred	Thiesen	Ministry of Forests
Edi	Torrans	Southern Interior Weed Management Committee
Bill	Waldie	Wine Country Walkways
Debbie	Webb	Ministry of Water, Land and Air Protection
Janet	Webster	Lytton First Nation
Peter	Weilandt	Ministry of Water, Land and Air Protection
Mark	Weston	Ministry of Water, Land and Air Protection
Pat	Whiteway	B.C. Snowmobile Federation
Brian	Wikeem	Solterra Environmental Consulting
Ed	Wiken	Wildlife Habitat Canada
Carl	Withler	Ministry of Agriculture, Food and Fisheries
Vic	Wright	Ministry of Forests
Taylor	Zeeg	Grasslands Conservation Council of B.C.