

Review of Access Management Strategies and Tools

**Prepared for:
Foothills Landscape Management Forum**

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March 2009

Acknowledgements

This review was completed with the support of the Foothills Landscape Management Forum (FLMF) and in particular, the Energy Partners of the Foothills Research Institute. The Energy Partners include Canadian Natural Resources Limited, Conoco-Phillips Canada, Encana Corporation, Petro-Canada and Talisman Energy Inc. Further support was provided by Shell Canada Limited and TransCanada Corporation. Without the financial support and direction of all of these partners the project would not have been possible.

The consultants would like to specifically thank Wayne Thorp, Director of the Foothills Landscape Management Forum and John Kerkhoven (Petro-Canada), the Energy Partners *representative to the Board of the Foothills Research Institute*, both of whom provided guidance and assistance throughout the project.

We would also like to thank the following individuals who generously provided far more time and insights than could reasonably be asked of them; Roger Creasy (Shell Canada), Nigel Douglas (Alberta Wilderness Association), Cal Rakach (Alberta Off-Highway Vehicle Association) and Randy Rasmussen (American Hiking Society). We are particularly appreciative of Roger Creasey's effort in providing a tour of Shell's Waterton Gas Field and the access management program in place there.

Finally, this report would not have been possible without the time and effort of all of those individuals and their respective organizations who graciously consented to interviews or to participate in the survey. Their engagement is greatly appreciated.

Liard Consulting provided invaluable assistance researching and collecting information about access management initiatives in B.C.

About the Foothills Research Institute

A partnership of government, industry, local communities, public interest groups and academia, the Foothills Research Institute (FRI) conducts research on the cultural, ecological, economic and social values of Alberta's forests. Focusing on its core study area, comprised of 27,500 square kilometres in west-central Alberta, the Institute generates knowledge and tools that contribute to the sustainable management of Alberta's foothills forests.

About the Foothills Landscape Management Forum

Established in 2005 as the Caribou Landscape Management Association, the Foothills Landscape Management Forum operates as a program under the auspices of the Foothills Research Institute. A partnership with thirteen members, including an Aboriginal community and forest and energy companies operating in the area of the Little Smoky and A la Pêche caribou ranges, the Forum is involved in initiatives that facilitate integrated land management in Alberta's Foothills forests.

About the Consultant

Eos Research & Consulting Ltd. is an independent consultant working on strategic environmental, regulatory and sustainability issues, providing analysis, advice and management of key risks and opportunities. Richard Williams is the Principal of Eos.

Acronyms and Abbreviations

AMP	Access Management Plan
ALCES	Alberta Landscape Cumulative Effects Simulator
ASRD	Alberta Sustainable Resource Development
ATV	All Terrain Vehicle
BLM	(U.S.) Bureau of Land Management
CAMP	(B.C.) Coordinated Access Management Planning
CAPP	Canadian Association of Petroleum Producers
CFR	(U.S.) Code of Federal Regulations
CIRL	Canadian Institute of Resources Law
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPAWS	Canadian Parks and Wilderness Society
ENGO	Environmental Non-Governmental Organization
FDP	(B.C.) Forest Development Plan
FLMF	Foothills Landscape Management Forum
FLUZ	(Alberta) Forest Land Use Zone
FMA	(Alberta) Forest Management Area
FRPA	(B.C.) Forest and Range Practices Act
GSMG	Ghost Stewardship Monitoring Group
ILM	Integrated Land Management
IRP	Integrated Resource Plan
KSF	Key Success Factor(s)
LRMP	(B.C.) Land and Resource Management Plan(ing)
NGO	Non-Governmental Organization
NOHVCC	(U.S.) National Off Highway Vehicle Conservation Council
NPS	(U.S.) National Park Service
OHV	Off Highway Vehicle
ORV	Off Road Vehicle (see also OHV)
ROW	Right-Of Way
SAGD	Steam Assisted Gravity Drainage (production of heavy oil/bitumen)
SRD	(Alberta) Sustainable Resource Development
SRMP	(B.C.) Sustainable Resource Management Plan
SUV	Sports Utility Vehicle
TDA	Timber Damage Assessment
USFS	United States Forest Service

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EXECUTIVE SUMMARY

This report is provided to the Foothills Landscape Management Forum (FLMF) as part of the requirements of a contract between Foothills Research Institute and Eos Research & Consulting Ltd. for the review of Project Tools for Access Management. The review was completed on behalf of the Energy Partners to the Foothills Research Institute and was explicitly focused on understanding how access was and could be managed on public lands.

At the start of this review, the Foothills Landscape Management Forum posed four questions for the consultant to answer:

- How is access management done?
- How is it adopted?
- What regulatory and non-regulatory tools are employed?
- How effective are they?

To answer the questions, over the past five months, Eos has completed a literature review, interviewed experts in government, industry, academia and among public user groups, and undertaken a survey of public land managers, users and other interested parties. While the work has focused on three principle jurisdictions, including Alberta, British Columbia and U.S. federal lands, documents and information from other parts of Canada, the U.S., Australia, New Zealand and the United Kingdom have also been reviewed.

At the end of the work, perhaps the overriding lesson is that access management is one of the most difficult land use planning problems. This is particularly true when the objective involves denying public users access to existing routes. That being said, the following answers are offered in response to the original questions:

How is access management done?

Done well, access management involves a mutually supporting system that includes clear goals and objectives, planning, communication, physical measures, enforcement and monitoring and review.

How is it adopted?

Access management is usually adopted as the result of a planning process that strives to balance a range of competing interests.

What regulatory and non-regulatory tools are employed?

The tools employed by jurisdictions wanting to manage access on public land range from legislative tools such as Alberta's Public Lands Act to physical measures such as gates and road decommissioning.

To better understand how at least some of these tools relate to each other, the consultant has proposed the following hierarchy as a mechanism for making decisions about what types of tools to employ.

A Hierarchy of Access Management Options.

How effective are they?

All of the tools provide some level of effectiveness in the right situation. However, the effectiveness of individual tools appears to be closely correlated to the setting in which they are applied and, going back to the answer to the first question, to the supporting measures that they are adopted in combination with. For example, a gate is more effective if employed in a physical setting that does not permit traffic to easily detour around it, where the reason for its presence is explained in terms that relate to users' interests and there is some level of enforcement to reinforce its purpose.

The balance of the report provides more fulsome answers to each of the questions as well as a summary of the lessons learned and the consultant's recommendations, and is organized into sections addressing the following elements:

- § Regulatory frameworks for access management;
- § Planning;
- § Communications/Education;
- § Physical measures;
- § Enforcement.

Each of these elements is discussed in detail in the report.

Lessons Learned

Key lessons resulting from this review include:

- Overarching:
 - Access management is an issue for jurisdictions throughout North America.
 - US federal agencies are managing a tidal wave of recreation users on an extensive pre-existing road and trail network, which exceeds resources available to maintain it
 - Western Canada is experiencing some of the same dynamic as the U.S. in areas adjacent to Calgary and Vancouver.
 - There appears to have been very little objective monitoring/evaluation of how well existing initiatives are actually working.
- Regulatory Concerns
 - Canadian regulatory frameworks appear relatively uncoordinated.
 - In Alberta, the best tool appears to be FLUZ's.
- Planning
 - The key to successful access planning is good public engagement.
 - Public planning processes require significant resources to be successful.
 - Start with good information that allows decision consequences to be understood.
- Tools for Access Control
 - Most physical access controls can be circumvented by determined individuals.
 - Successful controls that incorporate site-specific design and are supported by other measures.
 - Recreational users of public lands are a fact of life, if denied access to one area they will simply show up in another.
 - Once roads and trails become accepted as "traditional routes", closure is more difficult.
- Communication
 - Communication is key and often lacking.
 - Users have to know what is expected of them.
 - Use multiple communications channels in ways that support each other to reach users.
- Enforcement
 - Everyone wants greater enforcement effort and more significant penalties.
 - There is a spectrum of potential "enforcement" tools, ranging from the soft and fuzzy (public visibility) to the hard (law enforcement officers).
 - The "hard" law enforcement options were uniformly reported to be in short supply.

Recommendations

The FLMF, and the Foothills Energy Partners in particular, should develop a comprehensive communications plan to ensure that the results of the review and subsequently the results of any pilot project undertaken with the provincial government are constructively disseminated.

More specific recommendations are provided below.

For an Alberta Access Management Pilot

- Develop a comprehensive strategy that fully utilizes all of the available tools.
- Identify clear objectives together with performance measures and monitoring that determine if those objectives are met.
- Put in place a regulatory framework that allows for enforcement, e.g. a FLUZ.
- Practice good public engagement throughout.
- Look for opportunities to limit the development footprint from the outset.
- For recreational users, segment your audience, recognizing the differences in approach required for each.
- Support physical measures with good communication, appropriate setting and enforcement.
- Close temporary corridors such as abandoned wellsite roads as soon as possible.
- Develop trail alternatives for OHV users that divert them into acceptable areas.
- Employ a comprehensive communications strategy that ensures users understand what is expected of them..
- Develop an enforcement strategy that recognizes your constraints.

For Individual Companies

Some of the recommendations apply equally to individual companies that are contemplating access management initiatives. Briefly, these include:

- Look for opportunities to limit the development footprint from the start, e.g.:
 - Adopt objective targets that limit new, net access creation;
 - Deactivate roads, etc. to create space for future new access (and reduce costs).
 - Close temporary corridors ASAP to prevent them from becoming “traditional” access.
- Support physical measures with good communication, appropriate setting and enforcement. Pay attention to quality and design of specific measures.
- Develop those elements of an enforcement approach that lies within your control (e.g. public visibility of measures, working with local public groups).

1. Introduction

This report is provided to the Foothills Landscape Management Forum (FLMF) as part of the requirements of a contract between Foothills Research Institute and Eos Research & Consulting Ltd. for the review of Project Tools for Access Management. The review was completed on behalf of the Energy Partners to the Foothills Research Institute and was explicitly focused on understanding how access was and could be managed on public lands.

The project and this report seek to answer four key questions posed by the Foothills Landscape Management Forum, including:

- How is access management done?
- How is it adopted?
- What regulatory and non-regulatory tools are employed?
- How effective are they?

In its May 2008 workshop, FLMF adopted a broad definition of access management, as “the placement, management and reclamation of linear infrastructure and the associated impacts arising from the use of that infrastructure by industry and all other public users.” The workshop participants further suggested that access management includes the following:

- Primary corridor identification
- Secondary road plans
- Pipeline plans
- Restoration, deactivation and reclamation plans
- Control of use measures
- Effective mitigation measures
- Other users.

1.1. Background

1.1.1. Why is Access an Issue?

The creation and subsequent use of access is generally viewed as the most significant source of negative effects on the environment arising from the industrial development of the landscape. And the development of roads has been among the most widespread modifications of the North American natural landscape in the past century. For example, a U.S. Department of Transportation (1996) estimate suggests that there are more than 13 million kilometres of roads of all kinds in the U.S., accounting for the destruction of more than 4.8 million hectares of land and water bodies. This footprint is greatly magnified with the effects of other linear disturbances, including railroads, pipelines, electrical transmission lines and, in oil and gas producing regions, seismic lines.

Potential effects of linear disturbances on terrestrial and aquatic habitats have been reviewed by a wide range of authors with perhaps the most comprehensive review by Trombulak & Frissell (2000), who identified seven primary concerns, including:

- Increased mortality from road construction;
Road construction kills or injures any immobile or slow-moving organisms in the path of the road.
- Increased mortality from collisions with vehicles;
In general, mortality increases with traffic volume as animals either cross or are attracted to altered habitat at roadsides.
- Modifications of animal behaviour;
Roads can shift home ranges and alter movement patterns and escape responses, causing fragmentation of populations.
- Alteration of the physical environment;
Roads can affect soil density, temperature, soil water content, surface-water flow, patterns of runoff and sedimentation in adjacent streams.
- Alteration of the chemical environment;
Maintenance and use of roads can contribute at least different classes of chemicals to the environment, including heavy metals, salts, organic pollutants such as hydrocarbons, ozone and nutrients.
- Spread of exotic species;
Altered habitats, modified soils, loss of forest canopies and transport of seeds, etc. by vehicles can all increase dispersal of exotic plants, insects and diseases.
- Increased alteration and use of habitats by humans.
Roads facilitate increased human use of an area, for example, by providing access to natural resources and recreation opportunities.

Examining effects of linear disturbance on wildlife in the Yellowstone to Yukon corridor, Craighead (unk.) summarized the effects of linear disturbances as follows:

“Human developments and other alterations of natural habitat act to fragment animal populations and habitat, and to restrict movements. In the short term, restricted movements can have negative effects on populations and ecosystem functions. In the long term, restricted movements can reduce gene flow and have negative effects on meta-populations and species roads, railroads, trails, and other linear developments often reduce or eliminate animal movements and habitat connectivity ... “

Within Alberta, access is of particular concern with respect to two species: grizzly bears (*Ursus arctos*), recommended to be of Special Concern by COSEWIC and provincially considered as May be at Risk of extinction or extirpation at the general status level (Alberta Grizzly Bear Recovery Plan, 2008); and woodland caribou (*Rangifer tarandus*), which have been designated as a threatened species both provincially and nationally (Golder Associates,

2007). Both species inhabit the less developed portions of the province, including the Rockies, the Foothills regions and, in the case of woodland caribou, the Boreal forest. All of these areas are experiencing rapidly increasing development from the oil and gas and forestry sectors. In addition, the Rockies and Foothills areas are increasingly impacted by growing pressure from recreational interests.

1.1.2. Project Context

Since 1991, Alberta's population has grown by almost 1 million people to total 3.5 million in early 2008. At the same time, the province's economy, and in particular the oil and gas sector, has grown even more rapidly. With industry, agriculture, housing, infrastructure, residential development and recreation all competing for the land base, the provincial government introduced a draft Land-Use Framework in May of 2008 to manage cumulative effects on crown land resulting from growth and ensure that a balance is struck between Albertan's social and environmental goals. The Framework was subsequently finalized in December of 2008 (Alberta SRD, 2008).

Key elements of the new Land-Use Framework include:

- Development of seven regional land-use plans;
- Creation of a Cabinet Committee, to be supported by a Land-use Secretariat;
- Establishment of Regional Advisory Councils for each planning region;
- Implementation of "cumulative effects" based management to guide regional level efforts to manage the impacts of development on land, air and water.

The Land-Use Framework follows on the precedents established by two earlier land use management initiatives. In 1948, the province was divided into the Green areas and the White areas. The Green area, the province's publicly owned or Crown lands, was to be managed primarily for forest production, watershed protection, fish and wildlife and recreation. The White area was designated for settlement, including agriculture.

In 1977, the provincial government introduced a policy for Resource Management of the Eastern Slopes. This policy identified watershed integrity as the highest priority for the eastern slopes region, followed by recreation and tourism. The policy was implemented through sub-regional and local integrated resource management plans (IRP's) for each of the sub-regions.

As a result of these sub-regional IRP's such as that developed for the Castle River area, and subsequent initiatives, a number of access management plans (AMP's) have also been developed in the province, including those for Castle River, Big Horn, Berland-Smoky, Peace Area, and Richardson Backcountry.

Ongoing initiatives in the province which can be expected to affect the future need for access management strategies include:

- Grizzly Bear Recovery Plan

- Caribou Recovery Plans
- Foothills Research Institute and Foothills Land Management Forum
- Water for Life strategy (2003)
- Provincial Energy Strategy (2008)
- Alberta climate change strategy (2008),
- Strategy for the management of Species at Risk (2009)
- Integrated Land Management strategy for Alberta

1.2. Approach

Over a five month period, between October 2008 and February 2009, Eos undertook a literature review, interviews and a survey of public land managers, users and interested parties in order to answer the four questions posed above, i.e.:

- How is access management done?
- How is it adopted?
- What regulatory and non-regulatory tools are employed?
- How effective are they?

The principle geographic focus of the review was western Canada and the western United States. In Canada, access management is primarily an issue in Alberta and British Columbia and most of the review effort was focused on these provinces. In the U.S., the focus was primarily on the management of U.S. federal lands by the U.S. Forest Service (USFS, Forest Service), the Bureau of Land Management (BLM) and the National Park Service (NPS). In addition, primarily as part of the literature review, information was obtained for Saskatchewan, Ontario, selected U.S. states, Australia, New Zealand and the United Kingdom. Information regarding these latter jurisdictions was limited and not pursued in the interview and survey portions of the review.

Literature Review

A review was undertaken to identify relevant literature and “grey literature” sources developed by governments, regulators, industry associations, environmental NGO’s and others. The literature review was intended to develop an understanding of the access management initiatives that have been implemented in North America and elsewhere, as well as to identify access management practices that may be relevant to Alberta.

Interviews

Throughout the review period, face-to-face and telephone interviews were conducted with individuals in government, industry and public groups in order to identify past and current access management initiatives, better understand the issues involved and identify key individuals that could be contacted either for further interviews or as part of the survey.

Survey

During the second half of the review, the structured survey (see Appendix 1) was distributed to more than 100 individuals in government, industry and among ORV and environmental groups. As noted below, 33 responses were received back. Surveys were

either completed and returned electronically or in some cases were completed by the consultants in telephone or face-to-face interviews. In particular, the consultants sought interviews as a means of completing the survey with U.S. respondents because it allowed opportunities to ask clarifying questions regarding the less familiar regulatory framework.

Table 1. Breakdown of Survey Respondents.

Geography	Sector				
	Government	Industry	ORV	ENGO	Total
Alberta	5	6	3	3	17
B.C.	7	0	1	1	9
U.S.	5	1	0	1	7
Total	17	7	4	5	33

In total, 58 individuals contributed to the review through the survey, interviews and providing advice and suggestions¹.

Table 2. Breakdown of all Contributors to the Review.

Geography	Sector				
	Government	Industry	ORV	ENGO	Total
Alberta	7	11	3	5	26
B.C.	7	1	1	1	10
U.S.	9	2	0	2	13
Other	2	0	0	0	2
Total	25	14	4	8	58

Individual contributors to the review are identified in Appendix 2.

¹ Throughout the report, those individuals who took the time to take part in interviews or to complete the survey form are referred to collectively as respondents.

2. Regulatory Frameworks

While the review examined a wide range of jurisdictions, as noted above, an extensive body of information and experience with access management was noted only in Alberta, B.C. and with respect to U.S. federal lands. This section focuses on those three jurisdictions.

2.1. Alberta

There are no apparent estimates of the total extent of roads, trails and other access corridors in Alberta. However, some figures provide an indication of the extent of access development in the province:

- A 1999 estimate found 100,000 seismic lines criss-crossing northern Alberta, equal to 1.5 million kilometres of linear disturbance, much of which can be travelled by OHV's (Cundiff, 2006);
- Primary and secondary highways alone, provide more than 20,000 kilometres of access to all corners of the province (Wikipedia, 2008);
- In one 60,000 square kilometre Forest Management Agreement area managed by Al-Pac, CPAWS estimated 17,764 kilometres of roads. Using ALCES², the organization predicted that the total could increase to 162,000 kilometres in the following 50 years (CPAWS, 2006).

While the current economic downturn may temporarily slow development, significant resources of oil sands, timber and both conventional and non-conventional (e.g. coal bed methane, shale gas) oil and gas suggest that the province will be in the business of developing roads and other access corridors for some time to come.

Alberta Sustainable Resource Development is the principle land use manager in the province. However, the ministries of Energy, Environment as well as the Energy Resource Conservation Board and the Natural Resource Conservation Board are also involved in the authorization and management of resource development.

Table 3 outlines elements of Alberta's regulatory framework for roads and access corridors.

² The [Alberta Landscape Cumulative Effects Simulator \(ALCES\)](#), a landscape simulator that examines landscapes and land use practices was developed by Dr. Brad Stelfox of [Forem Technologies](#).

Table 3. Legislative and Regulatory Tools for Managing Access in Alberta.³

Document	Description
Public Lands Act	<p>Enabling legislation that governs use of Alberta public lands, the Act should theoretically provide a basis for access management, including:</p> <p>Sec. 11.1: The Minister may establish and support programs and initiatives for the purpose of conservation and resource management</p> <p>Sec. 15: (2) The Minister may prescribe terms and conditions</p> <p>Sec. 54.01: Prohibited uses of roads, etc. (1) In this section, "closed road" means a road that was constructed pursuant to a licence of occupation issued under this Act and has been closed a. by an order of the Minister, or b. in accordance with a term or condition of the licence of occupation.</p> <p>(2) No person shall a. travel on or enter on a closed road, b. damage, destroy, remove or alter any posted notice or sign denoting a closed road, c. damage, destroy, remove or alter any barrier set up to prevent access to a closed road, or</p> <p>Unless the person is authorized to do so</p>
Disposition and Fees Regulation (Public Lands Act)	<p>Supporting implementation of the Public Lands Act, the regulation also suggests a potential ability to manage access on public lands, including:</p> <p>Sec. 71: Holder's duty re: roads If any or all of a licensed area is a road, the holder shall b. provide gates that are equipped with locks, and</p> <p>Sec. 72: Closing roads (1) The Minister may, with the consent of the holder of a licence, close a road referred to in section 71 for any period of time that the Minister considers appropriate to all vehicles except a. vehicles operated on behalf of the licensee, and b. vehicles operated on behalf of a commercial user entitled to use the road under section 73.</p> <p>(2) If a road is closed pursuant to subsection (1), the holder of the licence shall erect prominent signs at each access point to the licensed area and at any other point prescribed by the Minister advising of the closure and the reason for it.</p>
Forest Reserves Act	<p>Facilitates the creation of Forest Land Use Zones (FLUZ).</p> <p>Sec. 7: The Minister may make regulations prohibiting or restricting vehicular, pedestrian or other traffic.</p> <p>Sec. 46: The Lieutenant Governor in Council may make regulations a. declaring any area of forest land to be a forest land use zone; b. permitting, prohibiting, regulating or controlling uses of land in forest land use zones;</p>

³ Note that this compilation is drawn from a variety of secondary resources and is not the product of a comprehensive legal review. As such it may be incomplete in some respects.

Document	Description
Forest Recreation Regulation	Provides motorized access restrictions for specific Forest land Use Zones, e.g. <p>“no person shall, within the Whitecourt Sandhills Cross-country Ski Forest Land Use Zone, operate</p> <p>(a) an on-highway vehicle, except on a highway, or</p> <p>(b) an off-highway vehicle or snow vehicle.”</p>
Draft Land-Use Framework	Creates a land use planning framework and guides development of regional land use plans.

While the Public Lands Act and associated regulations appear to provide a basis for the proactive management of access, those interviewed and/or surveyed in the course of this project routinely pointed to Forest Land Use Zones (FLUZ), created under the Forest Recreation Regulation, as the most important regulatory tool for managing access.

Forest Land Use Zones

A FLUZ is an area to which legislative controls are applied to solve specific land use problems, generally limitations on recreational use in environmentally sensitive portions of the province. Each FLUZ is created for a specific land base and the conditions applied are intended to address the specific concerns of that land base. There are currently 19 FLUZ in Alberta, the majority in the Eastern Slopes region.

Once a FLUZ has been established, only designated routes are open to public motorized access. Typically, the determination of which roads and trails are to remain open involves the development of an Access Management Plan.

Effectiveness

In a 2004 review of the legal and policy framework for managing access in western Canada, the Canadian Institute of Resources Law (CIRL, 2004) reached a number of conclusions relating to effectiveness, including the following that are applicable to Alberta:

- “all three provinces lack a discrete, coherent, and comprehensive law or even body of laws relating to public access to oil and gas corridors on public lands”;
- “all three provinces have difficulty integrating management decisions arising from the land-based and resource/activity-based legislative sets”⁴;
- “The frameworks do not clearly define the legal division of labour between oil and gas regulators ... and land managers with respect to managing public access”;
- “Most of the few express legal provisions that exist do not seem to be applied consistently ... these provisions may also be out of touch with current regional land management philosophies even for the corridors/locations to which the legal provisions are applied.”

⁴ And go on to note that they are “... promoting land- use planning and possibly other approaches to remedy this problem”.

Similarly, in 2004, the Alberta Chapter of the Wildlife Society, noting that then recent changes to the Public Lands Act provided government with the authority to close access and manage public use of access, provided two observations:

- "Access management in the Ghost and Big Horn regions has been successful";
- "[the Society was] concerned about the rate of proliferation of new access, and a lack of control over the use of new access routes".

Participants responding to this review's survey⁵ rated the effectiveness of the Alberta Public Act Lands Act between 1 and 4 on the five point scale used for rating regulatory tools, with most respondents suggesting the lower end of the scale. FLUZ were generally considered more effective and rated between 2 and 4, although, two ENGO representatives rated the FLUZ employed in the Castle, Ghost and/or Big Horn areas between 0 and 1.

When asked about key success factors and areas for improvement, respondents focused primarily on better enforcement of existing regulations, etc. and the need for greater public information and education, both of which are addressed in more detail in sections 4.1 and 5.0 respectively. Most other suggestions also related more closely to planning and/or access mitigation measures.

One agency employee commented that there was a need for the existing framework to move away from the current permissive policy and legislative framework, in order to better meet current and evolving public attitudes and expectations. More specifically, gaps that were noted in the current regulatory framework included:

- Lack of consistency between FLUZ;
An agency employee noted that because FLUZ are infrequently established, there was no consistency in approaches to managing access. For example, in the Castle FLUZ, vehicles can travel on any designated trails, in the McLean FLUZ travel is limited to vehicles of 1,000 lbs. or less, in the Ghost FLUZ there is a width restriction on vehicles and in the Big Horn FLUZ vehicles are limited by tire pressure, wheelbase width and weight (1,300 lbs.). Further, it was suggested that each FLUZ uses a different planning process, sometimes involving little public participation.
- Ineffective regulation of access outside of FLUZ areas;
Several individuals noted that while FLUZ are generally effective, because there is no regulatory framework in place for the balance of the province, success often has the effect of displacing ORV use onto other less regulated lands. Some respondents pursued that line of thought and suggested that a basic province-wide regulatory framework was required.
- Focusing on motorized recreation to the exclusion of non-motorized recreation.
Echoing concerns arising from USFS Travel Management Planning (see sec. 2.3.1, below), some respondents suggested that initiatives often focus on OHV's and lose sight of the often extensive non-motorized use of the land.

⁵ Seventeen out of a total of 33 survey respondents focused on the Alberta regulatory framework (as opposed to the BC or US-federal regulatory frameworks).

Finally, many Alberta respondents identified the new Land Use Framework and its emphasis on land use planning as a potential solution to gaps in the current framework.

2.2. British Columbia

Estimates of the extent of resource roads in B.C. range from 400,000 to 550,000 kilometres, of which 50% to 60% are non-status or de-activated (Forest Practices Board, 2005a). Resource roads are used for industrial activities including forestry, oil and gas and mining as well as commercial and public recreation. The Forest Practices Board estimates that B.C. is continuing to develop 20,000 to 30,000 kilometres of road per year to support timber salvage operations resulting from the mountain pine beetle infestation and for growing oil and gas development. In addition, the government continues to develop recreation opportunities that would help to meet its target of doubling tourism in the province by 2015.

At least five Ministries and Agencies are involved in the authorization and management of this growing road infrastructure, including:

- Ministry of Forests and Range;
- Oil and Gas Commission
- Ministry of Energy, Mines and Petroleum Resources
- Ministry of Agriculture and Lands
- Ministry of Tourism, Sports and the Arts

Table 4 provides key legislation and regulation related to managing access in B.C.

Table 4. Legislative and Regulatory Tools for Managing Access in B.C.⁶

Document	Description
Land Act	<ul style="list-style-type: none"> • Sec. 66: The Lieutenant Governor in Council may, by regulation prohibit a specific use of Crown land in a designated area. The Ministry of Agriculture and Lands oversees the Act. • Sec. 93.4: Allows the Minister to establish Forest & Range Practices Act related objectives for the management of Crown Land
Land Use Objectives Regulation (Land Act)	Sets criteria for establishing Forest & Range Practices Act related objectives for the management of Crown Land.
Forest & Range Practices Act	<ul style="list-style-type: none"> • Sec. 58: Ministry of Forests and Range can restrict or prohibit recreation activities to protect recreation or range resources, or address user conflicts in specific areas. This authority is being transferred to the Minister of Tourism, Sports and the Arts. • Sec. 57: Prohibits unauthorized trail or recreational facility construction.
Forest Planning and Practices Regulation (FRPA)	<ul style="list-style-type: none"> • Sec. 36: Limits on the extent of a cut block that can be occupied by permanent access structures. • Sec. 70.1: Authority to construct maintain or deactivate a road.

⁶ Modified from Vold and Chatwin, 2005. Note that this compilation is drawn from a variety of secondary resources and is not the product of a comprehensive legal review. As such it may be incomplete in some respects.

Document	Description
	<ul style="list-style-type: none"> • Sec. 82: Expectations for how a road will be deactivated. • Sec. 86: Requires forest licensees to provide the locations of roads constructed in their operating areas.
Forest Recreation Regulation	Part 3: approval procedure for trail and recreation facility development.
Wildlife Act	Sec. 109: The Minister of Environment may, by regulation, prohibit or restrict public access for the purpose of wildlife management.
Public Access Prohibition Regulation (Wildlife Act)	Establishes constraints on motor vehicle access in the Muskwa-Kechika Management Area and six other regions of the province.
Motor Vehicle (All Terrain) Act, section 7	Sec. 7: The Lieutenant Governor in Council may make regulations with respect to the operation or prohibition of ATV's. (Only snowmobiles are recognized as an ATV under this Act) The Ministry of Tourism, Sports and the Arts now oversees this Act.
Muskwa-Kechika Management Area Act	While it does not directly address access management, the Act does enshrine adoption of the MKMA plan as a guide for lower-level planning and as guidance for regulatory decisions under other resource and land management statutes, providing a distinct land management regime for the area.

With the shift away from the Forest Practices Code, access management in B.C. is no longer directly addressed by forest licensee plans. However, it can be addressed through three different levels of planning, including:

- Strategic land use plans;
Strategic land use plans such as the LRMP's can provide high level strategic direction for access management within areas available for resource development.
- Sustainable resource management plans (SRMP);
SRMP's can refine and augment LRMP level direction on access management issues by providing landscape level objectives that are more site-specific.
- Coordinated access management plans (CAMP).
The primary intent of CAMP is to assist government agencies in making decisions about the existing inventory of resource roads by providing direction based on stakeholder input. CAMP is discussed in greater detail in sec. 3.2.2, below.⁷

Legal implementation of access objectives developed in the CAMP and other planning processes can take place under section 93.4 of the Land Act and the Land Use Objectives Regulation. This creates objectives that are implemented through the Forest and Range Practices Act (FRPA). These objectives must subsequently be addressed by forest licensees in their Forest Stewardship Plans.

⁷ Matthews (1999) indicates that with the development of the Forest Practices Code in the 1990's, CAMP has been superseded but that the process continues (to that time) to provide direction to ongoing access management initiatives in the province. However, LRMP's such as the Sea to Sky LRMP continue to complete CAMP's. Sea to Sky (S2S) LRMP completed its CAMP in 2008 and makes no mention of the demise of the process.

Alternatively access objectives can simply be endorsed by government agencies and while they would then have no legal standing they can be used as policy guidance by government. This route would not create legal objectives to be implemented through the FRPA however.

Effectiveness

The Canadian Institute for Resources Law describes B.C.'s regime for managing public lands and natural resources as the most chaotic of the three western-most provinces (CIRL, 2004). Similarly, the Institute appears to consider the province's framework for access management "complex and uncertain, in large part because of its transitional nature and because its components are poorly integrated".

CIRL concluded that B.C. had no discrete legal framework for managing access, rather a myriad of provisions in numerous statutes and regulations. However, despite this conclusion, the institute did find that B.C. legislation and regulations appeared to provide substantial opportunity to manage public access on oil and gas corridors. CIRL noted, with what appeared to be some surprise, that agencies and non-government stakeholders accorded significant respect to the LRMP processes in particular.

While the CIRL review was completed almost five years ago, there is little reason to think that the regulatory framework has become significantly more effective. While the Forest and Range Practices Act has largely supplanted the old Forest Act and Forest Practices Code, the balance of the framework appears to remain as it was. More recently, in a review of access management planning in the province, the Forest Practices Board, commented that:

" ... there is no single, consistent process [in the province] to deal with access management concerns."

Notably, the provincial government introduced the Resource Road Act in the spring of 2008, intending to consolidate the road related parts of five separate acts and implement consistent standards for the construction, maintenance, use and deactivation of resource roads (BC Government News Release, April 2008). The act was pulled before being passed into law, reportedly due to significant recreational user pressure.

Respondents gave most aspects of the B.C. regulatory framework a higher rating than might be expected from reading CIRL's 2004 analysis, giving most aspects of the framework ratings between 3 and 5, i.e. Moderate to Very Effective. At first glance, this might appear to reflect the high proportion of agency staff among the respondents (seven of nine). However, the two public respondents also gave relatively high ratings.

As for Alberta respondents, key success factors and suggestions for improvement focused on enforcement and public information/education, which are addressed elsewhere in this report. Other KSF's and suggestions for improvement cited primarily related to planning.

2.3. U.S. Federal Lands

US federal lands include more than 500 million acres⁸ managed by the Forest Service (USFS), the Bureau of Land Management (BLM) and the National Parks Service (NPS). In the past, these lands, particularly those managed by the Forest Service, supported extensive timber harvesting. However, for the last decade, access related concerns on U.S. federal lands (U.S. Forest Service, Bureau of Land Management and National Park Service lands) have focused on the impacts of recreational users operating off-highway vehicles (OHV's)⁹ on federal public lands. Efforts to address the resultant issues are usually referred to as travel management. Growing oil and gas activity in the Rocky Mountain states suggests that industrial access is becoming an equally significant issue in some areas.

The US Forest Service estimates that more than 97% of Americans participate in some form of outdoor recreation (USFS, 2006). However, a smaller number operating OHV's on public lands generate the greatest concerns. Between 1972 and 2004, the Forest Service estimated that U.S. OHV users increased from 5 million to 51 million. Growth in OHV use has generated significant issues and led the Forest Service to identify "unmanaged recreation" as one of the four principal threats facing the National Forest system. In this regard, the Forest Service's former Chief, Dale Bosworth, commented in 2004:

"The days we can take off-highway vehicles cross-country across the national forests are over."¹⁰

And in June of this year, during U.S Senate hearings on ORV use on federal lands (US Senate, 2008), the Committee Chair suggested that "it appears questionable to me whether BLM and Forest Service are able to properly manage this use".

As a result of growing ORV pressure, the Forest Service has identified erosion, damage to cultural sites, user conflicts, spread of invasive species, destruction of wildlife habitat and risks to public safety resulting from unmanaged recreation, including cross-country ORV use (USFS, 2006). The Forest Service has also reportedly identified at least 60,000 miles of "unclassified" roads on its lands. Some of these may have been legally constructed in the past. However, most are likely unauthorized, created by ORV riders (Archie, 2007).

⁸ Based on information provided by each of the agencies own websites, the [BLM](#) manages 264 million acres, the [Forest Service](#) manages 193 million acres and the [National Park Service](#) manages 84 million acres, the majority of which is in the western half of the continental U.S.

⁹ Off-highway vehicles are also commonly referred to as off-road vehicles (ORV's). While different publications may distinguish between ORV's and OHV's, in practice the terms appear to be used interchangeably. In this report, OHV is used throughout and refers to the full range of potential motor vehicles affecting public lands, including 2WD passenger vehicles, 4WD passenger vehicles, ATV's, motorcycles and snowmobiles.

¹⁰ In remarks in Idaho in 2004, the Forest Service Chief identified motorized recreation as the issue and explicitly stated that timber cutting and road building was no longer the agency's primary mission. Chris Butler of the Idaho Statesman, 01/17/2004. http://www.wildfirelessons.net/documents/Bosworth_ID_Statesman_011704.pdf

One BLM official suggested that BLM lands are extensively affected with unmanaged ORV use, with some units seeing 5 to 7.5 miles of unauthorized roads and trails per square mile. Even National Park lands are not immune, with the Sierra Club documenting significant impacts to national parks in Alaska from ORV's including all terrain vehicles (ATV's) and four-wheel drive passenger vehicles (4X4's, pick-up trucks) (Sierra Club Alaska, unk.).

Regulatory efforts to address concerns for the impacts of ORV's on federal public lands are based on a combination of Executive Orders, regulations and agency policy.

Two Executive Orders guide ORV management on federal lands:

- Executive Order 11644 – Use of Off-Road Vehicles on the Public Lands, issued by President Nixon on February 8th, 1972, directs federal agencies to develop regulations for administrative designation of specific trails and areas in which ORV's would be permitted to operate.
- Executive Order 11989 – Off-Road Vehicles on Public Lands, issued by President Carter on May 24th, 1977. This amended the earlier Executive Order in two ways:
 - Requiring agency officials to close areas or trails where ORV use is causing "considerable adverse effects"; and
 - Authorizing agency officials to consider lands as closed for ORV use unless specifically designated as open.

2.3.1. U.S. Forest Service

The Forest Service appears to have provided the most active response to the Executive Orders, publishing final Travel Management regulations (36 CFR Parts 212, 251, 261 and 295) in July 2005 (US Federal Register, 2005). The regulations provide codified direction on managing ORV use on Forest Service lands.

Table 5. Forest Service Regulations and Directives for ORV Management.¹¹

Document	Date Introduced	Description
36 CFR 212	July 1, 2005	Administration of the Forest Transportation System (The "Travel Management Rule") Authorizes management of USFS roads, including road construction and maintenance (212.4) and regulating use by classes of vehicles and types of traffic (212.5(2)(ii)). 212.1 defines a road as "a motor vehicle travel-way over 50 inches wide unless designated and managed as a trail."
36 CFR 251	July 1, 2005	
36 CFR 261	July 1, 2005	Prohibitions Including [261.13(d)] violating acceptable noise emission standard established by a Federal or State and [261.13(h)] damage or disturbance to forest resources. Subpart B261.55(b) allows for special closure orders to close trails and areas to

¹¹ Modified from Yankoviak, 2005. Note that this compilation is drawn from a variety of secondary resources and is not the product of a comprehensive legal review. As such it may be incomplete in some respects.

Document	Date Introduced	Description
		motor vehicle use.
36 CFR 295	July 1, 2005	Use of Motor Vehicles on Forest Service Roads Provides rules for planning and designation of motorized use off of forest roads: <ul style="list-style-type: none"> • 295.2(a) calls for restricting or prohibiting vehicle use that is likely to cause adverse effects to the resource or other users until the adverse effects can be eliminated; • 295.2(b) says ORV management plans shall provide for resource protection, public safety and minimize conflict between users; • 295.5 directs managers to close areas and trails with considerable adverse effects from ORV use until the cause of those effects is eliminated and measures put in place to prevent reoccurrence. • 295.6 calls for annual review of ORV management plans and designation decisions.
Forest Service Manual 2355		ORV Management Further interprets regulations, providing specific Forest Service policy, e.g.: FSM 2355.04 outlines the responsibilities of the Regional Forester, Forest Supervisor and District Ranger with respect to managing ORV use.
Forest Service Handbook 7709.59, Ch. 50		Transportation System Operations Handbook Contains detailed standards and practices for US-FS staff. In particular: <ul style="list-style-type: none"> • FSH 7709.59, 50: 51.4 provide factors to consider in a hazard analysis before designating appropriate uses on forest roads; • FSH 7709.59. 50: 52.2 (a Region 1 supplement) advises managers on how to minimize "potential conflicts of mixed use".
Forest Service Handbook 2309.18		Trails Management Provides specific instructions on trail construction and maintenance standards, methods for monitoring trail use and appropriate ways to manage trail use.

Under the regulations, all national forests are required to develop a Motor Vehicle Use Map, designating which routes are open, limited or closed to use by motorized vehicles and ORV's. Approximately 45% of the 176 national forests will have completed the route and area designation process by the end of 2008, with the balance to be completed by 2010.

2001 Roadless Rule

On January 12th, 2001, after nearly three years of analysis, the Forest Service adopted the Roadless Area Conservation Rule to conserve 58.5 million acres (237,000 km.²) of relatively pristine national forest lands from most logging and road construction. Starting with changes proposed by President George W. Bush upon entering office, the Roadless Rule has had an on again/off again history as the Bush administration, states and conservationists have wrestled largely through the U.S. court system. As of August 12th, 2008, the Rule had been enjoined (for the third time) by a Wyoming judge and after eight years remains to be implemented. The Rule's supporters are currently appealing the August, 2008 decision.

If implemented, in addition to developing Motor Vehicle User maps, each national forest would be required to develop forest management plans which limit road development in

inventoried roadless areas (IRA's) to what is required for fire fighting and limited administrative needs.

2.3.2. Bureau of Land Management

To respond to the 1972/1978 Executive Orders, the BLM issued the National Management Strategy for Motorized OHV Use on Public Lands (U.S. Department of the Interior, 2001). The strategy was intended to set direction for planning and managing motorized recreational use in compliance with the Executive Orders and other elements of the regulatory framework. In 2005, the BLM issued a revised Land Use Planning Handbook (U.S. Department of the Interior, 2005), which includes specific guidance for Comprehensive Travel and Transportation Management.

Table 6. BLM Regulations and Directives for ORV Management.¹²

Document	Description
43 CFR, Part 1600	Planning, Programming, Budgeting Establishes BLM land use planning requirements under a "multiple use" mandate.
43 CFR, Part 8340	Off-road vehicles To establish criteria for designating public lands as either "open", "limited" or "closed", including: <ul style="list-style-type: none"> • 8342.1 which provides designation criteria; and • 8342.2 which outlines the designation process requirements; and • 8343.1 which provides standards (e.g. "no ORV may be operated on public lands unless equipped with brakes in good working condition.")
National Management Strategy for ORV Use on Public Lands	Sets direction for planning and managing motorized recreational use in compliance with the Executive Orders and other elements of the regulatory framework.
BLM Land Use Planning Handbook	Includes specific guidance for Comprehensive Travel and Transportation Management (Appendix C, pgs. 17 – 20).

To meet the requirements of the Executive Orders and the framework identified above, BLM Field Offices are required to designate areas and/or roads and trails as open, limited or closed to motorized travel activities. Designations are based on the criteria outlined in 43 CFR, Part 8340 and made in Resource Management Plans or in revisions to existing plans.

2.3.3. National Park Service

"Since its inception in 1916, the Park Service has been charged with maintaining parks "unimpaired" for future generations to enjoy. According to current policies, when park officials determine an activity may lead to impairment, officials are authorized to ban the activity."¹³

¹² Note that this compilation is drawn from a variety of secondary resources and is not the product of a comprehensive legal review. As such it may be incomplete in some respects.

¹³ Taken from a 2005 Los Angeles Times article sounding alarm over policy changes proposed by a Cheney appointee to the Department of the Interior (Cart, 2005).

While it is also subject to the 1972/1977 Executive Orders, the National Park Service has a long history of land management that includes significant restrictions on access to motorized vehicles. The long term mission and management of the park system is based on two underlying statutes, the National Park Service Organic Act of 1916 and the National Park Service General Authorities Act (1970). With a pre-existing framework in place, the NPS has not matched USFS and BLM efforts during the past decade.

Key elements of the National Parks Service regulatory framework are noted in table 7, below.

Table 7. National Park Service Framework for OHV Management.¹⁴

Document	Description
Wilderness Act	Authorizes, under specific circumstances, the continuation of motorboat and aircraft use in designated wilderness where those activities were established prior to the wilderness designation.
Alaska National Interest Lands Conservation Act	Includes elements governing rights-of-way, access procedures and recreational activities for wilderness areas in Alaska.
36 CFR, Part 1.5	Provides discretionary authority to impose local restrictions, public use limits, and closures and designate areas for specific uses or activities.
36 CFR, Part 4.10	Limits where routes and areas may be designated for motorized ORV use, i.e. only in national recreation areas, national seashores, etc. (not parks) and only by special regulation.
36 CFR, Part 4.30	Prohibits public use of motorized equipment or any form of mechanical transport in designated wilderness areas outside of Alaska.
36 CFR, Part 13	Together with 43 CFR 36, governs rights-of-way, access procedures and recreational activities for wilderness areas in Alaska
43 CFR, Part 36	Together with 36 CFR 13, governs rights-of-way, access procedures and recreational activities for wilderness areas in Alaska
Management Policies 2006	<ul style="list-style-type: none"> - Highest of three levels of guidance documents provided to National Park System managers - Provides policy interpreting the body of statutes and regulations affecting management of the National Park System - Includes reference to motorized access, rights-of-way, motorized ORV use and management of recreational use of the park system

¹⁴ Note that this compilation is drawn from a variety of secondary resources and is not the product of a comprehensive legal review. As such it may be incomplete in some respects.

2.3.4. US Regulatory Framework – Effectiveness

On paper the U.S. appears to have a comprehensive regulatory framework for managing OHV and other access to federal lands. However, even if the litigious history of the 2001 Roadless Rule is put aside, published accounts suggest that the effectiveness of this framework is not what it could be. Three types of issues have been raised:

- Fiscal sustainability of travel management plans

In testimony to the June 2008 Senate hearing, the Wilderness Society pointed to numerous national forest travel management plans that allow for significantly more roads and trails than there is budget available to maintain (U.S. Senate, 2008). Among the examples provided, budgets were 25% to 33% less than would be needed for the designated road/trail systems.

In a 2004 review, Taxpayers for Common Sense estimated the road maintenance backlog in national forests exceeds \$10 billion (Zimmerman and Collier, 2004). This backlog is attributed to political interference and a failure on the part of the Forest Service to shift its road building policies and budgets to match the shift in mission from timber harvesting to managing land for multiple purposes.

- On the Ground Effects

Reporting on a 2004 National Park internal survey, Archie (2007) indicates that the survey revealed pervasive problems with illegal OHV use, including damage to natural and cultural resources and conflicts among users in more than 70 parks (out a total of 400). Wildlands CPR (Archie, 2007) also reported that the Forest Service has documented at least 60,000 miles of “unclassified¹⁵” roads on its lands.

- Agency implementation

Despite Executive Orders dating back to the 1970’s, federal agencies did not take focused action to address OHV use for more than 20 years, appearing to act only once the problems associated with motorized recreation had become overwhelming. In a report prepared for the New Mexico State Senate, state agency authors suggest that ORV use on most USFS and BLM lands was largely unrestricted until the USFS brought out its 2005 Travel Management Rule (SJM40, 2008).

The Wilderness Society has suggested that BLM and USFS travel management planning has failed to meet the requirements of the Executive Orders and/or the governing regulations. They cite the failure of the agencies to designate large portions of the managed land base, continuing designation of motorized access in wilderness areas protected under the National Landscape Conservation System and simply maintaining large areas as status quo (US Senate, 2008). Focusing on OHV management on federal lands in Alaska, Sierra Club (2007?) identified the failure of agencies to coordinate management strategies both within and between themselves

¹⁵ Unclassified roads include roads that may have been constructed legally at some point in the past but for which no record was kept. However, most are likely unauthorized, created by ORV riders.

and poor levels of public outreach to engage and educate ORV users. The review also found that requirements for designating roads/trails were frequently ignored.

And as noted above, the Chair of the Senate Hearing held in June 2008 provided his opinion to the effect that "it appears questionable to me whether BLM and Forest Service are able to properly manage this use".

However, information provided by this reviews respondents suggests a more nuanced view for several reasons:

- While recognizing the problems, most of those spoken to were able to point to areas where the framework has been applied with some success, suggesting that it may be the quality of the implementation rather than the effectiveness of the regulatory framework which is the issue¹⁶.
- The BLM in particular, is faced with managing access onto fragmented, open lands with little forest cover or favourable topography for channelling access into more easily managed corridors.
- Federal lands in the western U.S. have been the focus of a significant ideological battle between an administration, managers within its own agencies and a wide range of public organizations. The Bush administration sought to expand industrial access to the federal land base in the face of agency and public opposition and in doing so, appeared to be in opposition to some of the guiding philosophies held by the land management agencies. As a result, policy has been fought out in the courts to the satisfaction of none.

With relatively few U.S. respondents to the survey, it is difficult to draw any real conclusions from the ratings provided. That being said, most individuals rated the key regulatory tools relatively high, i.e. 3 to 5. One respondent distinguished between the tools, rated between 3 and 4, and implementation, rated between 1 and 2.

The most relevant KSF's and suggestions for improvement distinguished between the USFS and BLM approaches to implementation of the 1972/1977 Executive Orders. Generally, the USFS approach was seen as the more successful because its codified, centralized approach made it more transparent to outsiders and thus more accountable. It was also recognized that the BLM has a more difficult task with the fragmented, open lands it manages.

ENGO concerns with the USFS approach related to the narrow focus on ORV's, with other non-motorized users of the National Forests often excluded from discussions.

¹⁶ In this regard, discussing the USFS, one US respondent talked about the need for some "old guard", who saw themselves as road builders, to retire before progress could be made on Travel Management and road closures. Even now, he suggests, some ex-USFS personnel are the Travel Planning programs most vocal opponents.

3. Access Management Planning

Land use plans, including access management plans, ensure that public lands are managed in accordance with applicable laws, regulations and policies. This review divides plans into two major types and several sub-types for the purposes of discussion. In practice, different planning approaches have more similarities than differences.

- Pre-development planning
 - Pre-tenure planning
 - Coordinated operational planning
- Post-development planning
 - Integrated Resource Planning (Alberta)
 - Coordinated Access Management Planning (CAMP) and the processes that have followed (B.C.)
 - Travel Planning (US federal lands)

This section also includes a brief review of access management planning goals, objectives and performance measures.

3.1. Pre-Development Planning

Pre-development planning is all about limiting the creation of access at the start of the development cycle. As such, pre-development planning is also considered briefly in the discussion of Footprint Reduction (sec. 4.2) below.

Published materials uniformly point to quantifiable benefits of pre-development planning, citing the real reductions in kilometres of road development required and the smaller footprint that can be achieved with successful initiatives. For example:

- Kakwa-Copton Industrial Access Corridor Plan: Participants estimate 50% less road will be required over the life of the plan compared to conventional, uncoordinated development.
- Al-Pac Surmount Area Plan: The participants estimated 34% fewer roads would be required over 30 years and potential cost savings of \$1 million for avoided road construction. ConocoPhillips reportedly saved \$100,000 in 2006 in avoided tree clearing and Timber Damage Assessment costs.

These and other examples are discussed below.

3.1.1. Pre-Tenure Planning

The example of pre-tenure planning that was looked at in greatest detail was B.C.'s Muskwa-Kechika Management Area. In addition, a paper based review was undertaken for the Roan Plateau Resource Management Area, an area recently opened to oil and gas development in Utah under management of the BLM.

Muskwa-Kechika Management Area

The 6.3 million hectare Muskwa-Kechika Management Area is a product of the Land and Resource Management Planning (LRMP) process undertaken in Northeast B.C. during the 1990's. Consisting of 1.6 million hectares of park lands and 4.7 million hectares of special management zones, the area is governed under the Muskwa-Kechika Management Area Act and related regulations.

A significant feature of Act is the requirement that pre-tenure plans must be completed and approved by the Minister before new oil and gas tenures can be completed. Up until May 2004, five pre-tenure plans had been completed for five watershed based areas¹⁷, including:

- Halfway-Graham;
- Muskwa West;
- Besa-Prophet;
- Dunleavy Creek; and
- Upper Sikanni.

Access management is an integral part of each of the plans. Each plan designates key corridors and conditions on access along these¹⁸, based on environmental sensitivity, public recommendations and past use. All motor vehicle travel is limited to these designated routes. The plans remain in effect with an additional plan expected to be developed for the Sulphur-Eight mile area (pers. comm., W. Sawchuk).

Commenting on the Muskwa-Kechika pre-tenure approach, a recent Pembina Institute (Schneider & Dyer, 2006) had this to say:

"the Muskwa-Kechika Management Area is a good example of how pre-tenure planning for petroleum development can be successfully applied pre-tenure plans, which provide binding directions on oil and gas developments plans include quantitative numeric thresholds for land-based disturbances"

However, with little oil and gas development in the area to-date, success of the plans remains to be determined. The Halfway-Graham plan was successfully applied to timber development by Canadian Forest Products Ltd., with harvesting accomplished in a single pass over two years rather than in smaller increments over 10 to 15 years as is the more usual practice (pers. comm., J. Stevenson). At the end of the single pass, the Graham River bridge was removed and roads deactivated, not to be reopened for 10 to 15 years.

¹⁷ The B.C Ministry of Agriculture and Lands, Integrated Land Management Bureau website (http://ilmbwww.gov.bc.ca/slrp/lrmp/fortstjohn/muskwa/plan/strategic_plans/oil_gas_pretenure.html) makes no reference to any activity after this time.

¹⁸ Four types of routes have been designated under the Wildlife Act and the M-K Management Area Regulation:

- Motor vehicles restricted to within 400 m on either side of the route;
- Motor vehicles restricted to within 10 m on either side of the route;
- Only vehicles under 500 kg allowed and these restricted to within 400 m on either side of the route.
- Only vehicles under 500 kg allowed and these restricted to within 10 m on either side of the route.

Looking at the Muskwa-Kechika experiment more broadly, Mr. Sawchuk rated success of the Muskwa-Kechika Management Area and associated Access Management Area highly, assigning a rating of 5 and 4 respectively. The success of these initiatives was attributed to the high public acceptance associated with the underlying LRM Plans and to the specific, objective nature of the Access Management Area¹⁹ making it easy to monitor.

Roan Plateau Resource Management Plan

In August 2008, at the end of a very contentious seven-year process, the BLM put up for lease approximately 74,000 acres on Utah's Roan Plateau. Formerly undeveloped, in the centre of an intensive oil and gas development area, the Roan Plateau Planning Area is considered to have very high wildlife, aquatic and landscape values. While development has not yet begun on the Plateau, BLM has committed in its notification to bidders that only "phased and clustered ridgetop development" will be allowed on the Plateau.

Specifically, BLM indicates that leases will be developed in a phased, ridge-by-ridge approach with one operator required to conduct operations on behalf of all lessees on each ridgetop parcel, consolidating all roads, powerlines and pipelines. Development will be confined to corridors along existing roads and be limited to no more than one percent (approximately 350 acres) at any one time with wells clustered on multi-well pads at least ½ mile apart. The new management plan also limits motorized and mechanized travel to designated routes and has created an ORV recreation area below the Plateau.

It is too early to assess the effectiveness of this approach.

3.1.2. Coordinating Operational Planning

Four examples of coordinated operational planning were examined as part of this review, all in Alberta. These include the Kakwa-Copton Industrial Access Corridor Plan, the Berland-Smokey Access Plan, the Alberta-Pacific Forest Industries Surmont Area Plan and a similar initiative undertaken by Canadian Forest Products in the Grande Prairie area. A fifth Alberta example, the Chungo Creek Industrial Access Management Area, was also briefly examined. However, this initiative is reportedly inactive (A. Parnell, pers. comm.).

Kakwa-Copton Industrial Access Corridor Plan

In a two year process beginning in mid-2004, 11 oil and gas companies and two forest tenure holders worked with Alberta Sustainable Resource Development to develop and agree on an industrial access corridor plan which combined the access needs of both industry sectors (Kakwa-Copton Industrial Access Planning Committee, 2006). Goals included minimizing the industrial footprint in the Kakwa-Copton area and identifying opportunities to reclaim roads that are no longer required.

¹⁹ The Muskwa-Kechika [Access Management Area](#) (AMA), legislated under the BC Wildlife Act, Public Access Prohibition Regulation, was established to limit vehicular access to designated routes in order to protect a range of values (e.g. visual quality, spiritual values, and wildlife values).

A key feature of the planning process was agreement between participating companies to share confidential plans and data through a third-party, Silvacom Ltd., which assembled the information and maintained confidentiality (Gibb & Winship, 2007). A completed plan was approved by SRD in March 2007 and an SRD Information Letter outlining the expectations and requirements for the planning area issued January 29, 2008 (Alberta SRD, 2008).

Industrial respondents rated the success of the plan uniformly high (5), estimating that it will result in 50% less road development than would occur with uncoordinated development. While viewing the plan as generally beneficial, government and public respondents provided ratings ranging from 1 to 2.5, with some suggesting that the baseline against which industrial participants measured benefits was an unlikely scenario. Most respondents commented on the value of the information sharing approach managed by Silvacom²⁰.

Berland Smoky Access Plan

Beginning as the Caribou Landscape Management Association, four years ago, the Foothills Landscape Management Forum (FLMF) developed an integrated industrial access planning process that was completed in the spring of 2008. The impetus for integrated planning was concerns for the A la Peche and Little Smoky caribou herds that depend on this active resource development area.

With 13 members, including one First Nation, four forest products firms and eight oil and gas companies, and with direction from SRD and Alberta Energy, the FLMF developed the Integrated Industry Access Plan (IIAP) which it believes will reduce the future road footprint in the area by 30% from what it might otherwise have been. The Plan identifies primary access routing within the Berland-Smoky area and sets requirements for applicants wanting to develop within the area, including expectations of shared use of roads.

SRD approved the plan in July of 2008 (Alta. SRD, 2008) and issued an Information Letter (IL 2008-05) confirming its acceptance of the plan and setting out the above noted and other conditions. Applicants who follow the corridors outlined in the Plan will receive streamlined review and approval. Those seeking exceptions to the Plan will be referred to the FLMF, which must support any modifications to the primary corridors.

Unique features of the IIAP include the review process and the requirement for annual monitoring of road development, road deactivation and access density.

Alberta –Pacific Forest Industries Surmount Area Plan

Under the banner of integrated landscape management, Al-Pac has initiated two programs to limit disturbance and access creation in its FMA. With the "Narrow Seismic Incentive Program", the company agreed to waive Timber Damage Assessment (TDA) payments on all lines less than 2.5 m in width. Between 2001 and 2003, Al-Pac estimates that this approach reduced the width of more than 2500 km of seismic lines (Pope & Dyer, 2003).

²⁰ That being said, one public respondent was scathing in comments regarding the lack of industry openness regarding baseline and resource information for a number of Alberta land-use planning efforts, suggesting the processes lacked adequate transparency as a result.

The company also published an Access Development or “century-map” describing planned permanent haul roads in all of its 5.8 million hectare FMA area. As a result, Al-Pac has found oil and gas partners for most major haul roads developed between 1993 and 2003.

Commenting on the integration of planning between ConocoPhillips Canada and Al-Pac in the Surmount area, Schneider & Dyer (2006) reported that the two companies have the potential to reduce road development by 34% over 30 years. By integrating operational planning, Al-Pac was able to adjust harvest plans to fit within the SAGD footprint and to transport timber using ConocoPhillips’ well-site roads. Additional benefits include possible savings of \$1 million in road construction costs and savings of \$100,000 to 2006 in tree clearing and Timber Damage Assessment costs for ConocoPhillips. However, the authors note that even with coordinated development, the levels of disturbance remain very high.

Canadian Forest Products, Grande Prairie

In a somewhat less formal approach, Canfor has signed non-binding agreements with both Suncor and Conoco-Phillips to cooperate on planning and development in its Grande Prairie FMA (Kryzanowski, 2006). The agreements have led to cooperative planning efforts, exchange of resource inventory information and sharing of roads. For its part, Canfor has been able to assist Suncor with timber inventory information and forestry expertise while Suncor has assisted Canfor in meeting its forest certification requirements and in supporting reforestation efforts with information/estimates of well site and other facility life (J. Stephenson, pers. comm.).

3.2. Post-Development Planning

Post-development planning allows for the management of existing access networks. In practice, the following examples of post-development planning also involve management of proposed new access creation but the focus is on an existing road/access network. Examples that were examined include Access Management Plans developed in Alberta under the Integrated Resource Planning framework, B.C.’s Coordinated Access Management Planning (CAMP) and successors, and the USFS Travel Planning process.

3.2.1. Integrated Resource Planning in Alberta

Castle River

The Castle River Access Management Plan was the earliest AMP developed in Alberta. Initiated in 1982, the plan was completed and implemented beginning in 1998. Intended to strike a balance between motorized recreational vehicle use in the area and resource protection, the plan appears to have brought about more controversy than it resolved.

The Castle River area lies adjacent to Waterton National Park at the southern extension of Alberta’s Foothills region. It was identified in connection with the provincial government’s Policy for Resource Management in the Eastern Slopes (Alta. SRD, 1977) and beginning in 1983, a Sub-Regional Integrated Resource Plan was developed for a 970 square kilometre area. The AMP was developed to address the significant access issues that were identified in the sub-region. However, it took until 1998 before a Forest Land Use Zone was imposed

on the area and until 2000 for Shell Canada to initiate its current access management program in the south-eastern portion of the sub-region.

Integrated Resource Planning was the key tool identified for implementing the provincial government's Eastern Slopes Policy. Aside from the long period of time taken to undertake any kind of meaningful implementation, the policy does not seem to have addressed the problems it set out to solve. Reviewing past Integrated Resource Planning efforts in Alberta, one expert provided these observations in 2006²¹:

- Implementation of IRP was eviscerated by budget cuts in the 1990s;
- The plans are out of date; no systematic process for developing and updating plans;
- [Plans] have no legal force (do not bind subsequent decision makers such as the EUB);
- Use multiple-use zoning approach that seems to assume that most activities and values can be accommodated on a given land base;
- Broad zoning with lists of permitted activities – but little or no guidance on the acceptable pace and intensity of development, total amount of disturbance, priorities among land uses and values, or appropriate trade-offs in case of conflicts; and
- Little or no attention to coordinating activities so as to minimize cumulative footprint and impacts.

In a 2003 review of land use decisions in the Castle region, Kennett (2003) commented that:

“it appears that the Castle AMP continues to operate under the assumption that OHV users who encounter an un-signed road or trail will treat it as closed to public access”.

Mr. Kennett goes on to say that:

“five years after it received legal status, there remains widespread concern in some government agencies and among a broad range of stakeholders, that the Government of Alberta is still not effectively managing motorized access in the Castle”.

Looking specifically at the AMP, industry and government respondents rated the Plan relatively highly (2.5-4), one of whom commented that the plan had pushed 85 to 90% of OHV users onto designated trails in acceptable areas. However, two public respondents rated the Plans success much lower, 1 to 2, citing the failures of the planning process one to two decades earlier. The industry and government (and other public respondents) could not comment on the original process, not having been involved at the time.²²

One outcome of the planning process that all agreed was successful is Shell Canada's ongoing implementation of an access management program in the south-eastern canyons of the Castle. Shell has a successful program of gating roads, closing un-needed access and developing subject to a commitment for no net new access in the area. Shell

²¹ “Landscape Change in Alberta: What Would Ethical Leadership Look Like?” Speaking Notes Steve Kennett Canadian Institute of Resources Law. Prepared for the Panel Discussion on “Ethical Leadership & the Alberta Landscape: Preserving the Foundation of our Cowboy Heritage”. Convened by the Sheldon Chumir Foundation for Ethics in Leadership, June 26, 2006. <http://www.chumirethicsfoundation.ca/files/pdf/060626LandscapeChangeInAlberta.pdf>

²² In fact, most of the comments concerning the “failures” of the Castle AMP appear to relate primarily to failures of implementation and in particular, the lack of enforcement, rather than the plan itself or the process by which it was reached.

representatives stated that the IRP and AMP provided the basis for their program (R. Creasey, pers. comm.).

Ghost-Waiparous

This area, northwest of Cochrane, lies only an hour's driving time from Calgary and its population of more than one million people. While OHV trail riding has been a popular activity in the area since the 1960's, following the creation of access into it for oil and gas exploration. However, by 2002 concerns for impacts of unrestricted motorized recreational use led the Government of Alberta to initiate development of an AMP. The final plan was approved in April 2005.

The Ghost-Waiparous area is part of the Ghost River sub-region, which was first examined as part of the IRP plan developed under the provincial government's Eastern Slopes Policy. The Ghost IRP was completed and released in 1984 and updated in 1988. However, due to the limitations of the IRP approach (outlined above), recreational OHV use of the area continued apparently without interruption until the development of an AMP, creation of a FLUZ for the area and appointment of the public Ghost Stewardship Monitoring Group (GSMG).

While the plan has allowed designated trails to increase from 189 kilometres to 600 kilometres, local environmental organizations appeared to cautiously support the plan when it was announced in 2006²³. More recently, the Ghost Stewardship Monitoring Group identified several problems that continue to be associated with the Ghost-Waiparous (GSMG, 2008)²⁴, including:

- Increased use and growing disorder, including large-scale random camping and environmental damage caused by uncontrolled recreational activities;
- Insufficient provincial resources, as SRD budgets have failed to keep pace with the growth in population and the growth in use of the area.

Government and industry respondents to this review rated the Ghost-Waiparous planning process highly (3 to 5). However, two public respondents familiar with the AMP rated it lower (0-3), although one noted that the Stewardship Monitoring Group deserved a higher rating (4-5) than the planning process. Concerns regarding the process included what was perceived as an effort at manipulation by SRD at the start of the process and perceptions of a strong OHV user focus to the exclusion of non-motorized recreational users. In particular, one respondent took great exception to SRD's approach which involved separating participants into "interest tables" in an effort to find areas of agreement early on.

Positive aspects cited by respondents include recognition of watershed values (due to the presence of the City of Calgary at the planning table) and a subsequent commitment to creating a "sustainable" trail system that will increasingly direct users into acceptable trails

²³ CPAWS, 2006. Castle, Ghost and Crowsnest Activity. Green Notes Newsletter, December 2006. <http://www.cpawscalgary.org/newsletters/green-notes-dec2006.pdf>

²⁴ GSMG, 2008. 2008 Annual Report. Ghost Stewardship Monitoring Group,

and areas²⁵. Respondents identified the FLUZ designation as a key step towards improved enforcement in support of the AMP.

3.2.2. B.C. - Coordinated Access Management Planning and Beyond

The CAMP process was developed by the B.C. Ministry of Forests during the early 1980's, as an approach for managing access conflicts in areas with historic patterns of multi-use, using a multi-party forum. The general process that merged for developing a CAMP was ultimately documented by the Ministry of Forests document in its "A Guide to Coordinated Access Management Planning" (Integrated Resources Branch, January 1989).

Prior to the 1995 introduction of the Forest Practices Code (the Code), some Forest Districts engaged in voluntary coordinated access management planning. The Code required forest licensees to include an access management plan with their Forest Development Plans (FDP), providing a planning tool and an opportunity for public consultation on access issues. The Forest and Range Practices Act (FRPA) which has now replaced the Code requires none of this (See sec. 2.2, above).

According to Rowe (2008), CAMP as most recently applied (Sea To Sky LRMP in south-western B.C.) is intended to:

- Address access issues primarily at the strategic level, while providing links to operational level planning;
- Act as a tool for public information on access issues;
- Assist government agencies in decision making related to access;
- Provide direction to forest licensees.

Table 8 provides a summary of the "Lessons Learned" in a review of CAMP undertaken for the B.C. Access Management Initiative in 1995 (Carmanah Research, 1995).

Table 8. B.C. CAMP: Lessons Learned.
Align CAMP with higher level planning initiatives (e.g. LRMP)
Take responsibility for all roads, non-status, proposed, etc. and write accountability into decisions
Take advantage of available information, documentation, mapping and resources within government prior to starting
Allow 6 mos. to one year for the process – timing and frequency of meetings affects participation
Engage other government agencies, ensure their commitment with funding requirements, encourage collaboration
Resource the process with outside facilitators and consultants to reduce workload for Forest Service staff
Select a plan area large enough to allow for tradeoffs between users (suggested 100,000 to 200,000 hectares), use natural (watershed) boundaries, set road density targets
Ensure all stakeholder groups represented, involve all users, consensus decision making, look for diversity

²⁵ In this regard, the GSMG, in its 2008 Annual Report, noted that SRD had invited trail design experts from the (U.S.) National Off-Highway Vehicle Conservation Council to lead a three-day workshop for over 30 SRD staff and members of the GSMG during 2008.

– limit group size to manageable number (15-20), allow one spokesperson per group
Ensure all participants clearly understand objectives and possible outcomes from the start, understand all participants expectations
Draft a tight terms of reference, write it down, establish ground rules at the start and articulate relationship to other planning processes
Hold meetings in communities with strong facilitator and chair
Establish what final product is at the start
Communicate and distribute widely
Review annually, update every 1-3 years

As noted above, Matthews (1999) suggests that since the 1980's, CAMP has been superseded by other planning approaches, albeit significantly influencing those latter approaches. However, B.C. continues to develop CAMP plans where these have been directed by the Land and Resource Management Plans (e.g. the Sea to Sky CAMP in southwestern B.C.).

CAMP evolved out of the land use conflicts that plagued the province over the past few decades. These began in the early 1980's in the Clayoquot Sound region of Vancouver Island and in south-eastern portion of the province, the Kootenay-Boundary region. Subsequently, Commission on Resources and the Environment plans were developed for both of these regions, with the Kootenay-Boundary plan approved in the mid-1990's.

As the provincial planning processes evolved and governments changed, shifts in emphasis led to the development of revised higher level plans, including one for the Kootenay-Boundary Region, and a series of local-level plans known as Strategic Resource Management Plans (SRMP's) that are typically applied at a watershed scale.

Access Planning in Southeastern B.C.

A specialized group of SRMP's have emerged, in part, driven by the province's Commercial Recreation on Crown Land Policy. For the Kootenay-Boundary Region, three plans have been developed:

- Cranbrook West Recreation Management Strategy (approved April 15, 2005);
- Golden Backcountry Recreation Access Plan (approved July 31, 2003);
- Southern Rocky Mountain Management Plan (approved August 28, 2003).

The plans were developed through volunteer-driven community consensus-based initiatives that involved key public and commercial recreational sector representatives. Plan implementation has been largely through voluntary means, using partnerships with user groups, acceptance within the community and continued coordination by government. In some limited circumstances, the plans call for legislated closures for wildlife and protection reasons. Implementation of each of the plans is supported by stakeholder advisory committees that were formed to assist in regular revisions.

Commenting in 2005, the Forest Practices Board had this to say about B.C.'s processes for access management planning:

"Access management planning, and opportunities for public involvement in the location of new resource roads, have been significantly reduced in the last 10 years. The deactivation of existing roads does not require a permit, or any public or other resource user consultation. Even where access management plans are prepared, they are not legally binding. Many of the user conflicts, and environmental impacts, of road access are related to public use of roads to access backcountry area recreational opportunities. Many people want input on decisions to develop new roads, restrict public access, and whether to maintain or deactivate existing roads. The lack of effective access management planning means the public does not have an opportunity to address specific access issues and concerns." (Forest Practices Board, 2005)

The conclusions of the Forest Practices Board for the province as a whole are in contrast to the views offered by B.C. respondents to this review. All of the individuals responding to the survey, ranked the processes followed for the Kootenay-Boundary Region recreation access management plans Moderate to High (2.5-4)²⁶. Key success factors cited by respondents included the following:

- Breadth of stakeholder engagement;
- Role of consensus decision making;
- Positive role played by the stakeholder steering committee.

Otherwise, KSF's varied widely. Gaps that were noted in the processes included:

- Lack of balance between motorized and non-motorized users;
- Lack of legislative back-up for the plans;
- Poor inventories of existing trails (or at least lack of consensus on what existed);
- Perception that agency staff made decisions behind closed doors despite years of public input;
- Lack of monitoring following implementation.

Comments should be interpreted as indicative only. There were too few respondents to be able to draw any real conclusions.

3.2.3. US Forest Service Travel Planning

Access planning on federal lands is directed towards compliance with the 1972/1977 Executive Orders. Each of the principle agencies has adopted different approaches to implementation. Generally, the Forest Service and BLM refer to the planning and implementation steps as travel management, while the National Park Service addresses the requirements within its general management plans and backcountry management plans.

²⁶ Notably, eight of nine B.C. respondents, provided Moderate to High (2.5 – 4) ratings for their respective access planning processes. The ninth individual declined to provide a rating for the respective planning process. Eight of the nine respondents were employed directly or indirectly by the responsible Ministries.

The approach taken by the USFS is more structured and was the focus of most U.S. survey respondents. Early in this decade the US Forest Service identified four major threats to national forests and grasslands, including:

- The risk of catastrophic fire,
- The loss of open space,
- Invasive species, and
- Unmanaged recreation, including the effects of unmanaged OHV's.

In response to the threats posed by ORV traffic, and guided by the 1972/1977 Executive Orders, the Forest Service published a new Travel Management Rule ((36 CFR 212) in July, 2005. The rule requires that Forests designate a system of roads, trails and other areas open to motor vehicle use by class of vehicle and, if appropriate, by time of year. Once designated and published on a Motor Vehicle Use Map (MVUM), motor vehicle use off the designated system will be prohibited.

As required by the U.S. National Environmental Policy Act, Motor Vehicle Use Map's are to be published after the environmental analysis process have confirmed the designation of roads, trails and other areas. The maps are intended to be distributed at Forest Service Offices and on the internet.

The Travel Management planning processes applies to every parcel of land in the U.S. National Forest system. It is guided by the Forest Service Manual and Handbooks as well as by a body of lower level guidance materials. Within that framework, individual forests appear to have significant latitude in the process they apply to meet the planning requirements. However, all Forests must meet the requirement by 2010 (45% are estimated to have completed it by end of 2008).²⁷

While Forests have two remaining years to complete planning, enough have done so that a body of knowledge is emerging regarding key success factors for successful travel management planning. Table 9 summarizes the lessons learned according to two published reviews.

Table 9. USFS Travel Planning: Reviews of Lessons Learned.

US-FS OHV Projects ²⁸	US-FS Road Decommissioning ²⁹
Collaboration is key!	Public outreach – the importance of winning over communities

²⁷ Among particular forests in the northern Rocky Mountain states, an additional layer of planning has been undertaken in connection with the development of a Conservation Strategy for remaining Grizzly Bear populations. Involving the Forest Service, National Park Service, the US Fish & Wildlife Service and state fish and wildlife agencies, the Conservation Strategies have been subject to an EIA and then incorporated into amendments to the affected Forest Plans.

²⁸ US Institute for Environmental Conflict Resolution, 2005.

²⁹ Peluso, 2004.

Collaboration means different things to different stakeholders - important to clarify what kind of collaboration is sought	Choose uncontroversial roads to remove at the start
Be inclusive – invite all affected stakeholders	Choose projects that take local needs into account
Communication widely – provide information	Be creative in developing funding
Need leadership to emerge.	
Need funding and resources to support process	
“Plan to be involved forever” – relationships and engagement are the most important element	
Adopt a sound, appropriate organizational structure	
OHV growth means if built, trails and facilities will be used (if closed OHV users will go elsewhere)	
Recognize differences between OHV’s – motorcycles vs. ATV’s vs. 4WD	
Recognize the level of conflict between users – conflict is generally best resolved closer to the resource	

The process has also attracted criticism. Focusing specifically on Alaska, the Sierra Club (2007) identified widespread failures in access management and implementation of federal requirements in a review that can likely also be interpreted as a comment on planning processes as well.

Commenting on the travel management processes of both the Forest Service and BLM, agency staff and stakeholders responding to this review offered the following:

- “[US-FS travel management planning] is unfortunately rushed not taking a comprehensive look ... mostly looking solely at ORV’s”
- “[BLM travel management planning] doing a more comprehensive job .. but [in Utah] the BLM has thrown its hands up and is allowing continued use of 10,000 miles of illegal trails plans are focusing primarily on recreation and don’t address economic and commercial use.”
- “too focused on ORV management and have forgotten the bigger picture of transportation and access management.”

Respondents also outlined KSF’s and gaps that were consistent with published reviews. In particular, several respondents suggested that early public involvement was a key consideration and identified processes where stakeholders were successfully involved at the earliest stages and those where they should have been.

3.3. Goals, Objectives and Performance Measures

Among the jurisdictions and planning processes that were examined for this review, access management was undertaken with a wide range of goals and objectives in mind, including:

- Wildlife protection and/or restoration;
For Berland-Smoky, Kakwa-Copton and other areas in west central Alberta are managing access to limit impacts to caribou while National Forests in the Greater Yellowstone Area manage access as part of their implementation of the area’s Grizzly Bear recovery strategy.

- Hydrology and terrain stability;
The Clearwater National Forest in Idaho and other national forests in the U.S. Pacific Northwest have undertaken significant road decommissioning programs primarily to reduce erosion, landslides, stream sedimentation and other impacts to watersheds hydrological condition and aquatic habitat.
- Aesthetics;
A significant proportion of conflicts in southern Alberta FLUZ's such as the Castle River and Ghost-Waiparous appear to relate to non-motorized users concerns for wilderness values, noise levels and other aesthetic effects of motorized traffic in Foothills and Rocky Mountain landscapes.
- Manage user conflicts;
Following from concerns for aesthetics, some proportion conflicts in the southern Alberta FLUZ's (and U.S. Rocky Mountain areas) relate to incompatibility of many motorized and non-motorized recreation uses of public lands.
- Budget.
U.S. National Forests nationwide are facing significant gaps between the maintenance needs of their legacy road systems and available budgets.

Understanding goals and objectives that must be achieved is essential to ensuring a successful planning process. While many of the initiatives that were reviewed included some discussion of goals and objectives, relatively few then took the step of identifying performance measures, particularly objective, quantitative measures, or monitoring programs that would inform future action.

Three initiatives were identified that could be said to demonstrate best practice with respect to performance measures and monitoring, including:

- Berland-Smoky Access Plan;
- Greater Yellowstone Area (GYA) Grizzly Bear Strategy; and
- Castle Access Management Plan;

Established in the spring of 2008, the Berland-Smoky Access Plan includes a requirement for annual monitoring reports to measure the level of disturbance, incorporating measures of roads constructed, roads deactivated or restored and access density. The reports will work from a 2007 baseline, with the first monitoring report incorporated into the approved Access Plan.

The GYA Grizzly Bear Strategy was developed to manage the transition of grizzly bears in the GYA from a listed "endangered species" to a recovered species. With delisting in 2007, the USFS and National Park Service began implementing the Conservation Strategy (ICST, 2007), including requirements to manage and monitor access and for annual monitoring of habitat standards in the recovery area. Performance measures include:

- Grazing leases and livestock levels on leases;
- Number of development sites;
- Motorized access route density and secure habitat (i.e. habitat with <1 mile/mile² of open, motorized access)

The second Monitoring Report, published in June 2008 (YGCC, 2008), provides a detailed review of these measures applied at both a Forest/Park level and for sub-regions within each Forest/Park.

“Best practice” may not be the appropriate label to apply to the Castle AMP with respect to performance measurement and monitoring. However, as the oldest access management initiative in Alberta, the Castle Special Management Area (FLUZ) has received significant ongoing attention from environmental NGO’s and the stakeholders in the Access Management Plan (AMP), including Shell Canada. The AMP incorporated targets for kilometres of roads in different classifications as well as a review of the plan two years following implementation. That review never did happen. Instead, the Castle-Crown Wilderness Coalition, Canadian Parks & Wilderness, World Wildlife Federation, Shell Canada and other organizations have sponsored various unofficial reviews, including (but not limited to³⁰):

- Bringing it Back: A Restoration Framework for the Castle Wilderness (Sheppard, et. al., 2002);
- O’Hagen Trail System Assessment, Castle Special Management Area (Gramineae Services Ltd., 2002);
- Selected Ecological Resources of Alberta’s Castle Carbondale: A synopsis of current knowledge (Arc Wildlife Resources Ltd., 2005).

In particular, the O’Hagen Trail System Assessment examines a specific trail system in detail and makes recommendations for closures, repairs and upgrades to achieve the intent of the AMP. Shell Canada reports that this is one of several such operational reviews intended to facilitate ongoing management efforts.

Despite lapses in government attention, the Castle Special Management Zone is, arguably, one of the most studied access management initiatives in the province. Significantly, none of the reviews of the area and/or AMP appear to examine the initial road targets.

Overall, what was most notable with respect to performance measurement and monitoring in the course of this review was its rarity. This finding is consistent with comments from a U.S. author (Switalski et. al., 2004), commenting on the lack of objective analysis related to road removal programs and their effects:

“even after thousands of kilometres of roads have been removed, there is an alarming lack of published analysis of the effectiveness of these efforts”

3.4. Lessons Learned

The BLM Land Use Planning Handbook (BLM, 2005) describes land use planning as “inherently a public process”. Survey respondents and others interviewed in the course of this review apparently agreed. Aspects related to public involvement were the most frequently raised KSF’s or suggestions for improvement when discussing specific access

³⁰ See also the Castle Crown Wilderness Coalition for ongoing information concerning the Special Management Area: <http://www.cwc.ab.ca/index.php>.

management planning processes. Some of the specific public involvement issues included the following:

- Need for broad, multi-stakeholder representation;
- Understanding individual groups interests and needs;
- Build trust and relationships among participants;
- Need for facilitation;
- Transparent decision making;
- Clear boundaries, clear understanding of objectives from the start.

These “lessons learned” and others relating to other aspects of planning are discussed in Sec. 6, (Conclusion) below.

4. Mitigating Access

Once the decision to construct a road or ROW has been made, the focus of effort shifts to mitigating its effects. Four aspects of mitigation are examined, including:

- Education and/or communication;
- Footprint reduction;
- Physical controls that block use of access of corridors;
- Other means of mitigating the development of access (i.e. road design, timing of closures, etc.); and

Each is addressed in turn, below.

4.1. Communication

Why

After “enforcement”, education/communication was the KSF/gap most frequently cited by respondents. While some provided detailed comments to define what they meant, most simply provided the headings and a clear indication that the focus was on recreational users of public lands. Typical comments related to user or public “buy-in” and to providing a rationale for why access may be restricted. For example³¹:

- Need clear communication why land is off limits;
- Instill knowledge of the rules in the minds of the public;
- Need to carefully market travel management to the public, linking it to benefits to them, e.g. more and bigger elk available to hunters;
- Need outreach, including education and communication, to ORV users;
- Don't generally do a good job of communicating why people can't use an area.

The need to explain to users why they are being asked not to access an area is a recurring theme in the literature. For example:

“.... like other users groups, the majority of OHV users would likely undertake efforts to minimize the detrimental impacts of their activities if they were aware of the impacts they are causing.” (Brewin et al., 2003)

Going beyond simple explanations of how to comply and why comply, some agency respondents responsible for U.S. federal lands and for lands in south-western Alberta, were explicit about the need to overcome an entrenched public culture that had developed in recent decades, that it is OK to travel anywhere, anytime. One individual went even further, linking at least some of the current issues with recreational ORV access to the advertising campaigns of auto and ATV manufacturers that encourage off-road and cross-country use of their SUV's and ORV's.

³¹ Comments are taken from notes of conversations and interviews, as such they are not direct quotes, rather they paraphrase typical statements and opinions.

What can be extrapolated from respondents' comments and suggestions is that successful access management needs the support of a comprehensive communications approach.

How

There is a wide range of potential communications tools that can be used to "speak to" motorized and other users of public lands about access constraints and issues. The survey specifically identified four such tools:

- Signs
- Newspaper ads and notices
- Providing maps and brochures
- ORV licensing

Respondents provided other suggestions, including:

- Engaging user and/or ORV groups;
- Information kiosks;
- Posting potential fines for non-compliance on signs; and
- Public monitoring, Stewardship or Public Steering groups
- Third-party education programs such as Tread Lightly, Leave No Trace or Shifting Gears
- Education (of both users and public land managers) provided by the (U.S.) NOHVCC.

All of the tools can generally be sorted into those applicable for Point of Use information, information provided in advance of use and longer term Education.

In particular, with respect to channels for providing longer term Education, respondents identified the following groups:

- Stewardship Committees/Public Monitoring groups/etc.
Stewardship groups were repeatedly cited as key to successfully implementing access management plans. The groups provide an interface between the public and users and the land managers. Examples include the Ghost Stewardship Monitoring Committee and Stakeholder Advisory Committees for the Cranbrook West Recreation Management Strategy and the Southern Rocky Mountains Management Plan in B.C.

While most input regarding stewardship groups was favourable, one respondent was concerned for the heavy weighting towards ORV user representation and issues for some Alberta initiatives, to the exclusion of other user groups.

- Collaborating with user groups;
BLM and USFS have identified collaboration with user groups such as local ORV groups as a key strategy for implementing travel management requirements. In its National Management Strategy for Motorized OHV Use (BLM, 2001) the BLM signaled intent to work with user and community groups to distribute training and materials such as maps

and brochures. The USFS identified lessons learned from recent collaboration efforts in a 2005 review (US Institute for Environmental Conflict Resolution, 2005).

The USFS review, suggests that collaboration with user groups has promise as a future strategy rather than one that the Forest Service has yet mastered. Echoing concerns noted with respect to Alberta steering/monitoring committees, a US ENGO discussed the frustrations of dealing with National Forests that have focused single mindedly on OHV users, without necessarily considering other (non-motorized) groups in their travel management planning, suggesting public collaboration practice has a ways to go.

- Tread Lightly! Inc., Leave No Trace and Shifting Gears;
Both the Forest Service and BLM (BLM, 2001) have also identified collaboration with national ethics development organizations such as Tread Lightly!³² and Leave No Trace³³ as a source of education materials and as a channel for getting messages about ethical recreational land use practices out to motorized and non-motorized audiences. Several mentions of a similar program, Shifting Gears, developed by Alberta SRD were noted. However, no detailed information could be located suggesting it may be defunct.

One respondent described setting up a USFS Tread Lightly! trailer in the local Wal-Mart parking lot on the weekend before hunting season started, to be able to hand out designated trail maps and other information in support of Travel Management plans.

- National Off-Highway Vehicle Conservation Council (NOHVCC)
NOHVCC was regularly cited by U.S. federal land managers and some Canadian respondents for its extensive training programs provided to both ORV users and to land management agencies. The group provides guidance materials and training regarding effective design for ORV trails and recreation areas as well as effective capacity building for multi-stakeholder groups setting out to work together on travel management issues. For users, the group provides guidance and training on “responsible” ORV recreation.

Effectiveness

Respondents cited four purposes for communications related to access management, including:

- Users need to understand what they must do to comply;
- Compliance appears to be best when users understand why they should comply;
- Education is needed to overcome entrenched attitudes and patterns of use; and
- Public lands managers need feedback about users views and issues and about what works/what doesn't.

³² Tread Lightly is a US non-profit organization that was originally developed within the Forest Service and subsequently spun out to allow it to grow beyond what would be possible within the agency and to allow it to work with a wider range of organizations.

³³ Leave No Trace is a US non-profit organization with a similar purpose to Tread Lightly!, but focusing on non-motorized recreation.

It is safe to say that few or none of those interviewed were contemplating comprehensive communications strategies that would address all of those needs. Survey respondents rated the usefulness of four types of communication and, as noted above, provided suggestions for other tools and approaches.

Table 10. Effectiveness Ratings for Various Communications Tools.

Measure	No. People Ranking	Mean Rank	Relative Rank
Signs	29	2.90	1
Newspaper ads or notices	24	1.83	4
Providing maps & brochures	27	2.78	2
ORV licensing	15	2.2	3
Other	17		

Almost all respondents identified a need for more communication, citing user attitudes, shortfalls in funding, the need to obtain user “buy-in”, etc. Some good examples that were noted include:

- The USFS focus on developing maps of designated roads/trails to communicate where users can operate OHV's;
- US Fish & Wildlife Service understanding that access closures for the Grizzly Bear Recovery had to be communicated in terms of the benefits to local public land users (e.g. more, bigger elk);
- Alberta and B.C. use of public stewardship/monitoring groups as an interface between the implementing agencies and the user public.
- Utah BLM use of the Tread Lightly program in community information/education programs prior to hunting season.

Overall, a comprehensive, strategic approach to communicating access management matters appears lacking in all of the jurisdictions examined.

4.2. Footprint Reduction

Several ENGO and industry respondents emphasized the need for footprint reduction as the first level of consideration for managing access, taking the approach that the easiest access to manage is that which is not created.

Minimizing footprint of oil and gas exploration and development is a theme that has been repeatedly examined in both Canada and the U.S. As noted above (sec. 3.1, Pre-Development Planning), there are at least four examples in Alberta of coordinating development and/or operational planning of the oil and gas and forest industries, a significant footprint reduction tool, including the AI-Pac Forest Management Area (Pope & Dyer, 2003), Canadian Forest Products Limited's Grande Prairie Forest Management Area (J.

Stephenson, pers. comm.), the Kakwa-Copton Industrial Access Corridor Plan (Alta. SRD, 2006), Berland-Smokey Access Plan (Alta. SRD, 2008) and Chungo Creek Industrial Access Management Area (Alta. SRD, 2005).

In B.C., pre-tenure plans developed for the Muskwa-Kechika Special Management Zones focus on reducing footprint of both oil and gas and forestry development (B.C. ILM Bureau).

The most comprehensive review of footprint reduction opportunities was completed by R. McManus Consulting, et. al., (2004) on behalf of the CAPP. In the U.S., BLM has developed an extensive body of guidance materials directed at managing the effects of oil and gas exploration and development on public lands³⁴.

Table 11 summarizes approaches that appear best suited to minimizing creation of access.

Table 11. Summary of Footprint Reduction Approaches for Oil and Gas³⁵

Development Activity	Management Practice
Roads	<ul style="list-style-type: none"> - Use of snow making equipment for constructing temporary water crossings - Use of drilling mats to create summer access to drill sites in muskeg and similar areas - Use of existing roads where they are outside of environmentally sensitive areas - Use common roads wherever possible
Seismic	<ul style="list-style-type: none"> - Low impact (i.e. narrow, <2.5 m wide) seismic cut lines - Mulching machines to reduce cost of cutting low-impact seismic lines and promote subsequent re-vegetation - Heli-portable access to seismic activities
Wells and Facilities	<ul style="list-style-type: none"> - Cluster drill pads, roads and facilities in specific, "low-impact" areas - Drill multiple wells from a single pad using directional/horizontal drilling technologies. - Reuse of abandoned well sites - Remote operation of wells/facilities with Supervisory Control and data Acquisition (SCADA).

As noted above (sec. 2.1, Pre-Development Planning), the BLM has recently imposed a very restrictive management regime to reduce the oil and gas development footprint in the Roan Plateau region of Utah. Briefly, leases will be developed in a phased, ridge-by-ridge approach with one operator conducting operations on behalf of all lessees on each ridgetop (BLM Colorado, 2008a). Development will be confined to corridors along existing roads and be limited to no more than one percent (approximately 350 acres) at any one time with wells clustered on multi-well pads. It is too early in the projects life to assess effectiveness.

³⁴ The BLM is responsible for managing and administering all mineral extraction activities on federal lands, including those of the U.S. Forest Service.

³⁵ Drawn from R. McManus Consulting, et. al., 2004; Wyoming Game & Fish Department, 2004; BLM/USFS, 2007; and BLM Best Management Practices Website.

4.3. Physical Controls

Where roads must be developed, physical closure measures provide an important means of mitigating their effects.

Forestry activities by themselves (managed forests, restricted roads) had no discernable effect on grizzly bear habitat use, at least in the heavily forested Selkirk Mountains Grizzly Bear Ecosystem the only observed negative effects on habitat use and population dynamics were from open roads. We recommend that open forestry roads be restricted to forestry use only. (Weilgus and Vernier, 2003)³⁶

Prior to this review, commentary on physical access measures and their effectiveness was limited to four sources, including Axys (1995), Golder (2007), Platt (1993) and Rowe (2008). Platt (1993) provided the most objective assessment (although, limited in scope), based on on-the-ground inspections of road closure measures in the Cabinet-Yaak Grizzly Bear Ecosystem (part of Montana's Kootenai National Forest). Assessments by Axys (1995) and Golder (2007) were based on surveys of "experts" in government and industry, primarily in Alberta. (The current survey attempts to broaden the geographic scope of assessment and engage public land users, but remains essentially an opinion survey.)

The following table compares the rankings of specific control measures developed in each of the four assessments.

Table 12. Relative Effectiveness of Access Management Measures.

Access Management Measure	Review Source			
	This Review (2009)	Golder ³⁷ (2007)	Axys (1995)	Platt (1993)
Manned gates ³⁸	1	4	2	
ROW re-contouring	2		2	
Rollback	3	1	1	
Road Deactivation	4	3	4	
Directional Drilling & Boring	5	5		
Unmanned gates	6	11	6	2 ³⁹
Removal of Stream Crossings	7	2		
Excavations/Tank Traps	8			
Berms	9	10	7	1

³⁶ That being said, Horejsi, looking at U.S. grizzly bear research states that no distinction can be made between "administrative or preferentially treated commercial use traffic and any other form of traffic. The frequency of traffic can be surprisingly low and still maintain negative effects on bears."

³⁷ Golder ratings modified to provide a single ranking.

³⁸ Note shortcomings to this ranking noted in text below.

³⁹ Platt distinguished between steel and wooden gates in the Cabinet-Yaak GBE, with steel gates being both more numerous and significantly more effective.

Access Management Measure	Review Source			
	This Review (2009)	Golder ³⁷ (2007)	Axys (1995)	Platt (1993)
Visual Screening	10	9	8	
Remote Operations (including SCADA)		6/7		
Barriers at junctions with active access routes		8		
Line Blocking ⁴⁰		13		
Special construction ⁴¹			3	
Boulders				3
Posts and Rails				4
Other			9	

Focusing specifically on the closure and decommissioning of roads, Switalski, et. al. compared effectiveness relative to forest hydrological and wildlife values with cost. The following table examines six control measures that can be applied to roads (ripping would fall within the range of practices that comprise road deactivation in Table 12, above.).

Table 13. Relative costs and benefits of road closure measures⁴².

Criteria	Fix stability problems?	Control Erosion?	Improve Wildlife Security?	Cost
Manned gates	No	No	No (Yes, if deters access)	\$280,000/gate ⁴³
Unmanned gates	No	No	No (Yes, if deters access)	\$2,500-10,000/gate ⁴⁴
Barriers	No	No	No (Yes, if deters access)	\$800-1,000/barrier
Ripping	No	Yes	Yes	\$400-1,200/km
Stream Crossing restoration	Yes (with recontouring)	Yes	Yes	\$500-150,000/crossing
Recontouring	Yes	Yes	Yes	\$3,000-200,000/km ⁴⁵

⁴⁰ i.e. falling of mature trees across a ROW.

⁴¹ Includes bored pipeline stream crossings, directional drilled stream crossings and clearing and grading restrictions (e.g. shearing trees only with no grading, to facilitate re-vegetation).

⁴² Modified from Switalski, et. al., 2004.

⁴³ Personal communication, W. Thorp, Foothills Landscape Management Forum, March 26, 2009, includes \$2,500-10,000 per gate for installation and the balance of cost for manning.

⁴⁴ Switalski, et. al. suggests costs of U.S.\$1,000-2,800 per gate for unmanned gates, while W.Thorp (Pers. Comm.) suggests Cdn. \$2,500-10,000 per gate.

⁴⁵ Schaffer (2003), in a national review of USFS road decommissioning, estimates that the USFS spends on average approximately U.S.\$2,800 per mile (\$1,739 per kilometre) with costs as high as \$22,000 per mile in Alaska and as low as \$982 per mile in Arizona/New Mexico.

While costs vary widely depending on the sites measures are applied to, they do provide a more objective criterion for assessing measures⁴⁶.

The brief discussion of specific measures that follows is based on these same sources. For more detailed descriptions specific measures and some drawings, the reader is referred to Axys (1995).

4.3.1. Manned Gates

On average, respondents to this survey considered manned gates to be the most effective control measure for reducing unauthorized users, but also the most costly and thus most suitable for temporary or seasonal closures. However, it should be noted that in most instances where respondents provided a high rating for the effectiveness of manned gates it was assumed that the gate and its guardian would be able to completely stop unauthorized access. Despite the high rating, there were a number of indications that actual effectiveness may be much lower.

Axys (1995) suggested⁴⁷ that in some cases, attendants do not have legal authority to prevent public access through the control point but can use persuasion and if unsuccessful, record licence plate numbers to discourage illegal activity. This significant shortcoming was again noted by many Alberta respondents to this review. In particular, Alberta industry respondents identified manned gates being ordered by regulatory authorities to reduce unauthorized (public) traffic in sensitive areas such as woodland caribou ranges where industrial traffic was too high for unmanned gates to be practical. However, with manned gates installed on roads experiencing up to 800 vehicles per day of which less than 5% were public or unauthorized traffic, their effectiveness in these situations may be negligible. In a survey conducted by FLMF (W.Thorp, pers. comm. - further detail regarding the FLMF survey is provide in Appendix 9) industrial respondents provided comments that illustrate the situation, including:

- "Stop traffic long enough to ask who the people work for and where they are going, then allow anyone to pass. So in the context of restricting access, no they don't work"
- They keep "unauthorized" users off the roads but virtually all of the users are "authorized" so in total the effectiveness is questionable.

Factors that were identified as increasing effectiveness of manned gates include provision of signs or other information outlining the purpose of the closure, positioning the gate in a location where natural off-ROW obstructions (e.g. steep terrain, streams, dense timber) or

⁴⁶ Golder (2007) also examines costs associated with access control measures, ranking cost differences (i.e. high, moderate, low, negligible) between caribou ranges and outside of caribou ranges. The focus is not so much on understanding the merits of specific measures as on the costs imposed for caribou management in Alberta.

⁴⁷ Respondents confirmed that on many manned gates required in Alberta, the attendant can provide no more than advice, having no power to deny access. However, other respondents suggested that it is possible to significantly discourage access, if not completely prevent it dependent on the tone and approach of the attendant. Most respondents outside of Alberta appear to have assumed that attendants could stop all unauthorized access.

lack of alternative access corridors limit opportunities to detour around the gate and continuous manning (versus, for example, only during working hours).

4.3.2. Rollback

Rollback was ranked as the most effective access control measure in the surveys conducted by both Axys and Golder. Applicable to pipelines where access along the ROW will not be required following construction or decommissioned roads, it was generally considered to be effective at limiting travel by 4x4's, ATV's and predators. Suggestions for improving effectiveness include ensuring that rollback is dense, consisting of large slash, stumps and large lumps of debris and that is applied for up to 400 metres. While considered to be inexpensive, in areas incapable of providing large enough diameter slash, it may be expensive to truck adequate materials to the site.

4.3.3. Unmanned Gates

While unmanned gates are the most frequently used access control measure, opinions on their effectiveness range widely, from Negligible to Highly effective. Unmanned gates are less expensive than manned⁴⁸ but without an attendant they must be constructed more durably, generally of steel with cement posts to reduce potential for vandalism, and locked with keyed or combination locks. Even so, anecdotal reports of high levels of vandalism suggest that in many situations unmanned gates cannot be sufficiently protected to remain effective without active enforcement of access management restrictions. One reason for high vandalism was suggested by some respondents; gates can be controversial, when seen as unfair to excluded public, particularly where understanding of the reasons for closure is limited. Within security core areas (i.e. grizzly bear recovery ranges), the U.S. Fish & Wildlife Service has indicated they are not an acceptable device to restrict roads (1995)⁴⁹.

In one of the most mature access control programs in Alberta, Shell Canada has successfully employed gates as the primary tool for managing access in the Waterton gas field⁵⁰. With approximately 33 gates in place, Shell experiences vandalism to approximately two to three gates per year. Vandalised gates are generally located in remote locations well outside of the purview of the area's industrial and landowner traffic. Shell's experience suggests that the factors increasing effectiveness of unmanned gates include:

- Signs or other information outlining the purpose of the closure;
- Prevent detouring by placing gates on bridges and/or in combination with off-ROW obstructions (natural or constructed) and in the absence of alternative access corridors;
- Placing gates in visible, trafficked sites.

⁴⁸ An estimate of \$5,000 per gate was provided for the replacement costs for vandalized gates. Pers. comm., Richard Etenhoffer, Shell Canada, November 28th, 2008; the above table suggests a range of \$2,500 to 10,000.

⁴⁹ Reportedly due to concerns for vandalism and detours around gates with ATV's, etc., although, one respondent suggested that the reason was that they did not deter hunters or poachers on foot.

⁵⁰ Pers. comm., Roger Creasey and Richard Etenhoffer, November 28th, 2005.

4.3.4. Berms

Despite being among the most frequently used access control measures, berms were considered less than Moderately effective. They are inexpensive when constructed of locally available materials including slash, soil, rock or a combination of materials. However, berms can be prone to long term degradation from weathering and vandalism. While adequate for controlling 4x4 traffic, ATV's are generally considered able to circumvent them.

Axys (1995) suggest that several berms are commonly constructed in a sequence to increase their effectiveness and recommends that for increased durability, berms be constructed with a base of spoil and rock and capped with large diameter slash laid in a criss-cross fashion. Other factors suggested for increasing effectiveness, include:

- Construct with wings to form an "H" structure to make detouring around more difficult;
- Construct in combination with excavations;
- Limit potential for vandalism by constructing in a visible location such as the junction with unrestricted access rather than down a ROW and out of sight;
- Provide educational information/signage.

Placing boulders, lock blocks, felled timber or other materials across the ROW as suggested in Rowe (2008) or using post and beam structures (Platt, 1993) likely have similar effects to berms. When used to block access at junctions with unregulated ROW's, use of barriers was rated as Moderately effective by respondents to the Golder survey and considered to be of moderate cost.

Similarly, line blocking, which involves falling mature timber across ROW's and other routes was also found to be of Moderate or better effectiveness by Golder.

4.3.5. Excavations

Excavations are considered to be of Moderate effectiveness, perhaps more effective than berms. Excavations can range from shallow ditches constructed in association with waterbars to "tank traps", relatively deep excavations with steep edges. Similar to berms, excavations are inexpensive to construct but are subject to degradation from weathering and vandalism. Both berms and excavations can pose a safety hazard for ATV and snowmobile users because they may not be readily visible.

Factors suggested for increasing the effectiveness of excavations include:

- Construct in combination with berms;
- Construct in substrates more likely to hold a vertical bank structure such as clay-rich till and/or in areas with high water table so that they fill with water.
- Combine with other control measures which make detours more difficult.

4.3.6. Stream Crossings

Several control measures were identified in relation to stream crossings, including:

- Permanent removal of stream crossings;

- Temporary removal of bridge decking;
- Stream bank restoration to restore the vertical bank structures often removed as a result of pipeline or ROW construction;
- Directional drilling or boring pipeline stream crossings to avoid creating a crossing.

Removing stream crossing structures was considered to be Moderately to Highly effective, although, effectiveness would depend in large part on the size, flow and bank characteristics of the stream in question.

Note: a significant proportion of survey respondents interpreted the question regarding stream crossings in a different way. These individuals suggested that providing bridges and constructed stream crossings could be effective at reducing OHV fording of streams which results in impacts to water quality and aquatic habitat.

4.3.7. Visual Screening

Visual screening, which in Western Canada is largely limited to “dog-legs” in ROW alignments or tree/shrub barriers, is primarily used in flat terrain. Considered less than Moderately effective, visual screens can also limit hunters/predators lines of sight along ROW’s. Visual screening is generally inexpensive.

A reportedly successful BLM program implemented in the California desert used visual screening and alteration of decommissioned routes to make them “literally disappear” (Abbe, 2007).

4.4. Decommissioning

In the hierarchy of access management approaches, decommissioning (also, road removal, restoration, or deactivation) of roads, trails and other access can be employed either ex ante, as part of a mitigation strategy to reduce road density prior to new development or ex post, once a particular road has reached the end of its usefulness. The most widely accepted definition of decommissioning is “the physical treatment of a roadbed to restore the form and integrity of associated hill slopes, channels, and floodplains and their related hydrologic, geomorphic and ecological processes and properties” (Switalski, et al., 2004). Notwithstanding this definition, among the road decommissioning programs examined, the term can describe a wide range of treatments from simply removing the road from maps and databases to full road re-contouring. Common treatments⁵¹ include:

- Installation of berms and/or excavations, including waterbars;

⁵¹ Merrill and Casaday provide perhaps the best description of applicable treatments in a series of documents that include “Field Techniques for Forest and Range Road Removal” (2001) as well as four best management practices relating to culvert removal, full and partial road recontouring and road to trail conversion (2001a, 2003, 2003a and 2003b) respectively. The BC Ministry of Forests and range also provides detailed guidance on road deactivation (which does not necessarily equate with decommissioning or road removal) in its Engineering Manual (BC-MFOR, 2006).

- “Ripping” the road bed;
- Removing stream crossing structures and restoring stream channels;
- Full road recontouring; and
- Following recontouring, application of rollback or other barriers to limit travel and revegetation to restore forest productivity/ecological integrity.

Among USFS travel management programs, road decommissioning is distinguished from road closure, a term that generally implies the temporary limiting of access, in effect, “storing” the road for later use or eventual decommissioning. While the USFS distinguishes between the two approaches, Schaffer (2003) found that in practice, different National Forests were applying a range of “decommissioning” treatments that in many cases were more likely to be temporary in their effects.

In British Columbia, the Ministry of Forests has established three levels of road deactivation, including permanent, semi-permanent and temporary (MoF, 1993). Similarly, Alberta generally recognizes two levels, including temporary and permanent (Fisher, 1989). In all cases, temporary closure generally involves measures such as gating or blocking entrance to the road and installation of erosion control features such as water bars. Decommissioning usually involves more permanent treatments.

4.4.1. Decommissioning - Effectiveness

Axys (1995) ranked right-of-way deactivation (decommissioning) just below “Highly” effective, ranking it second only to rollback and indicated that decommissioning was effective for access control and for returning the land base to near-original topographic conditions and capability. They noted that decommissioning could limit future activities such as fire fighting.

The most extensive decommissioning programs appear to be those on USFS lands in association with Travel Management planning. Most review of these programs was focused on the associated planning process (sec. 3.0, above). However, in an on-the-ground evaluation of road decommissioning in Clearwater National Forest (Idaho), Watershed Consulting (2002) found no evidence of motor vehicle use on any of the closed, abandoned or obliterated roads they examined, even though gates at the entrance of some roads “did not appear to be adequate to prevent use of the roads by ORV’s”. They concluded that the decommissioning efforts had been “extremely effective for preventing motorized access”.

Focusing on watershed concerns, they found that the decommissioning program had successfully restored watershed integrity and appeared to be effective at preventing failures in high-rainfall events, a primary concern in this National Forest. By comparison, previously abandoned roads, thought to be stable because of abundant re-vegetation, routinely failed in slides causing significant erosion and impacts to the watersheds during a significant storm event. Similarly, Schaffer (2003) observed that re-contouring appears to be effective at mitigating and eliminating most ecological impacts of roads, including restoring hydrological integrity. In a 2005 survey of forestry roads, the BC Forest practices Board identified that deactivation reduced the incident of landslides on roads that were

constructed to Forest Practices Code standards and those that pre-dated the Code (FRB, 2005), although, most effective for roads constructed to the former standard.

With respect to the shortcomings of decommissioning, Watershed Consulting concluded that the Clearwater program was less successful than it could have been at restoring aquatic and terrestrial habitat capability because no account was taken of road density in prioritizing roads for decommissioning. Commenting on seismic lines, Lee and Boutin (2006 – cited in Schneider and Dyer, 2006) found that 65% of lines cut in the western Canadian boreal region during the past three decades were still in a cleared state, despite use of the “conventional” approach to restoration, which involved seeding with grass at closure.

Respondents to this review rated road deactivation and full road recontouring as among the most effective control measures available. Ratings for deactivation ranged from Low to Very High while those for re-contouring ranged from Moderate to Very High. Numerous respondents suggested that effectiveness was closely related to setting and the supporting measures employed. For example, deactivated roads in terrain that did not permit easy detouring worked best and to be most effective, deactivation and re-contouring should also employ barriers to prevent travel while vegetation re-establishes.

4.5. Mitigation by Other Means

4.5.1. Design for Wildlife

A review of wildlife research, particularly that relating to grizzly bears, concerning the effects of roads and access highlights a number of themes that relate to the management of access once created.

Examining grizzly bear use of roaded areas in west-central Alberta, Roever et. al. (2008a and 2008b) determined that bears were not so much attracted to roads as the roads had been constructed through high potential bear habitat. Similarly, Weaver (2001), identifying riparian sites, avalanche chutes and older burned areas that provided key grasses, forbes and berries for grizzly bears recommended that adequate hiding cover should be maintained around these prime feeding sites and/or human access curtailed to provide secure habitat. Acting on this type of information, some oil and gas companies have been able to plan development activities to better accommodate grizzly bear habitat requirements. For example, ConocoPhillips used bear research maps to find a route for a pipeline in the FLMF area, while Petro-Canada used habitat maps to plan their development south of Robb, Alberta. In both cases the objective was to minimize disturbance to grizzly bears. (Zimmerman et al., 2003).

Once roads have been constructed, the above noted research suggests construction practices that reduce their attractiveness to bears, including the development and implementation of management practices that reduce grizzly bear attractants (e.g. clover – *Trifolium* spp.) in the road margins and ditches. Roever et. al., 2008a suggests seeding

with native species only, in order to reduce foraging opportunities and decrease the potential for vehicular collisions and reduce human/grizzly encounters.

Examining the management regimes for roads (i.e. timing of closures for wildlife protection), Roever et. al. goes on to suggest that closures be implemented in spring, when bears appear to be use habitat close to roads. Similarly, Mace et. al. (1996) suggests that a properly implemented program would minimize road density and traffic volume in watersheds with high-value habitats such as avalanche chutes during spring (Mace et al., 1996). Mace et. al. further suggest that innovative road access programs that allowed short-term (e.g. 2 weeks during summer) access by humans during periods when displacement impacts to grizzly bears are minimal would be optimal. Weillgus et. al. (2002) lends further support for road closures as a tool, stating that open roads result in habitat avoidance and loss and increased mortality and that partial or piece-meal road closures such as those used by the U.S. Forest Service may not be as effective as previously thought .. female bears may avoid closed roads and adjacent habitats if they are exposed to open roads within their home ranges.

4.5.2. Designated ORV "Parks"

Four respondents in the U.S. and Canada discussed strategies based on identifying and developing areas in which intense ORV use could be acceptable. Developing such ORV "parks", provides an outlet for users that channels them away from sensitive and otherwise unacceptable areas. Comments in this regard included:

- Need to provide the right area – if this is done, chances are people will follow the management scheme – if not, most people likely to make a mess;
- Need to provide a sustainable trail system that allows people to have fun;
- Provide good loop riding opportunities that are fun for families of different abilities.

The concept of providing such areas is also addressed in the emerging body of literature that examines implementation of travel management initiatives. For example, in a review of 11 travel management projects from across the U.S., the US Institute for Environmental Conflict Resolution and the Morris K. Udall Foundation (2005) identified (as one of their key lessons):

"If you build it they will come – and the corollary, if you close it they will show up elsewhere."⁵²

One of the principle groups focusing on the development of such areas in the U.S. is the [National Off-Highway Vehicle Conservation Council](#) (NOHVCC). The guidance materials, training and workshops of this group were recommended by both U.S. agency staff and ORV

⁵² In particular, this learning was articulated in connection with the experiences of the Hopkinton-Everett Reservoir, a state managed area with a designated ORV trail system in New Hampshire. The area had previously suffered from uncontrolled ORV use and lies within one hour's drive of the major population center in the state. The initiative involved designating and improving specific trails and closure of inappropriate uses.

users in Canada. In particular, the group has developed [Management Guidelines for OHV Recreation](#) (Crimmins, 2006), a widely cited resource guide to assist in the “planning, development, operation and maintenance of environmentally sustainable and quality OHV trails, trail systems and areas”.

5. Enforcement

Enforcement was the most frequently identified issue relating to access management during interviews and in survey responses that were a part of this review. The topic was not explicitly identified in the survey questions and yet it was almost uniformly raised by contributors/respondents. There was near universal agreement that enforcement and monitoring were essential to successful access management. To quote from a study conducted in the U.S. in 2001, "information and education will not result in substantial behavioural change".

Among Alberta and B.C. contributors, enforcement was seen to be lacking, with little effort and few penalties or consequences. In many cases, the contributors did not feel that an enforceable statute existed or that it was only narrowly available. For example, in Alberta, Forest Land Use Zones were seen to provide a basis for enforcement, however, only a small portion of the province had a FLUZ in place.

In the U.S., several respondents discussed enforcement actions and penalties being used in the National Forests and National Parks. In each case, clear statutes and penalties are in place. In one example, in a Utah National Forest, an officer reportedly issued three citations to one family of three, with each citation believed to be US\$250. In another example, in Yellowstone Park, rangers reportedly fined an individual "several hundred dollars per day" when he got his truck stuck on a trail in the Park – and would not allow him to use another motor vehicle to remove it.

In all jurisdictions, respondents cited too few enforcement officers, patrols, "boots on the ground", etc. being available to address the issues being created, largely by recreational ORV users on public land. Several respondents discussed the segmentation of ORV users, generally characterizing users as falling into three groups, e.g.:

- Law abiding or honest: willing to ride on designated routes (80%?);
- Influenceable: unlikely to break down gates or other barriers but willing to use undesignated routes without a physical barrier and undesignated routes where others have broken down the barrier or set the example (15%?);
- Incurable: seeking out opportunities to travel on closed routes, willing to go to great lengths to remove or surmount barriers, travel cross-country and create new, unofficial trails (5%?).

(Literature examining U.S. federal lands management suggest that the numbers falling into the incurable and influenceable groups might be much higher, i.e. in a Colorado study, as many as 2/3's of users report going off trail "occasionally"⁵³; in Montana, 23% of users "always or sometimes" ride across country even though off-route riding has been against

⁵³ Monaghan and Associates, 2001.

state law since 2001⁵⁴; in Utah, 49.4% of users reported preferring to ride off established trails, with 39% doing so in their most recent excursion⁵⁵).

Figure 1. Segmentation of Recreational Users of Public Land

Responses to this review were consistent with, or even more optimistic than, enforcement concerns identified during the literature review, all of which focused on US federal lands. In a report completed for a New Mexico State Senate Committee (New Mexico, 2008), four state land management agencies identified a wide range of studies corroborating a view that “years of unmanaged ORV recreation have resulted in people becoming accustomed to taking their machines nearly anywhere they pleased”. Or, in the words of a former USFS Deputy-Chief, “vast landscapes, a deeply entrenched pattern of abuse, far too little enforcement, and soft penalties” (Public Employees for Environmental Responsibility, 2007).

Table 14. Comparison of US Federal Agencies Enforcement Effort⁵⁶.

	Acres per uniformed law enforcement officer	Visitors per uniformed law enforcement officer	Enforcement as a percentage of total agency budget
National Park Service	32,000	161,000	5.9%
Bureau of Land Management	1,044,000	211,500	2.7%
US Forest Service	358,000	652,000	1.8%

⁵⁴ Lewis and Paige, 2006.

⁵⁵ Fisher, Blahna and Blair, 2002.

⁵⁶ Source: USFS 2007 internal memo released by Public Employees for Environmental Responsibility.

Having painted a somewhat bleak picture of enforcement concerns on US federal lands, both the New Mexico State report (2008) and Archie (2007) provided recommendations based on examples of successful enforcement efforts. These recommendations are best summarized by Archie as "Six Strategies For Success".

- Make a commitment.
Engage in serious enforcement efforts by expanding enforcement capacity, intensifying and targeting patrol efforts.
- Lay the groundwork.
Create enforceable ORV route systems and regulations. Make the route system clear on maps and on the ground. Create a system that makes ORV's easy to identify or limits their numbers.
- See and be seen.
Engage in visible action and meaningful collaboration. Form broad coalitions for public support and formalize collaboration among law enforcement entities. Create meaningful opportunities for citizen reporting.
- Make riders responsible.
Promote a culture shift among peers, working with leaders in the ORV community and information campaigns to educate and cultivate support.
- Use the force.
Incorporate technologies that work such as remote electronic monitoring and tracking problems and repeat offenders.
- Fit the punishment to the crime.
Make penalties meaningful by considering natural resource damage in the fines, adding appropriate community service as a penalty and linking violations to other recreational privileges.

One significant finding drawn from respondents' comments relates to what is meant by "enforcement". There is a spectrum of enforcement options, ranging from public visibility to law enforcement officers issuing citations. Each of these can support public compliance with access constraints, recognizing that only the "hardest" enforcement may address the most incorrigible offenders.

Figure 2. Spectrum of "Enforcement" Approaches.



Different respondents reported success with actions all along this spectrum. For example, Shell relies on public visibility to protect most of its gates and associated facilities in the Waterton area. Those structures lying close to the Forestry Trunk Road and in full view of traffic along that road are usually undisturbed. Gates subject to vandalism are usually in much less travelled areas, outside of public scrutiny.

Archie (2007) provides an example of volunteer patrols used in a 100,000 acre area known as Fourmile in Colorado that is divided into USFS and BLM managed sections. Friends of Fourmile, a group of local motorized and non-motorized users registered as volunteers with both USFS and BLM and received training in safe, effective volunteer contacts. Wearing gear that identifies them as official volunteers, they act as educators and provide information to agency and county sheriff staff for serious violations they observe. (Archie does note that volunteer patrols in the Bridger-Teton National Forest during 2003 met with mixed success, although no details were provided.)

Montana has reportedly enjoyed some success with "Rovers", state enforcement staff who patrol and provide information but do not get involved in issuing citations or other "hard" enforcement activities.

National Forests in the Greater Yellowstone area (and all other National Forests) employ two different levels of enforcement staff, including Forest Protection Officers – unarmed officers able to make public contacts and write citations for a limited range of violations, and Law Enforcement Officers – armed officers with full enforcement powers. Forests generally have one to two Law Enforcement Officers and a larger number of Forest Protection Officers, who are usually seasonal.

However, in spite of the range of possible enforcement options, respondents repeatedly stressed that there is always some portion of users that fall into the Incurable category. For these individuals "hard" enforcement is necessary and to fail to respond risks diminishing respect for the laws, regulations and measures that are in place to control access in the eyes of other, more reasonable, groups of users.

6. Conclusion

At the start of this review, the Foothills Landscape Management Forum posed four questions for the consultant to answer:

- How is access management done?
- How is it adopted?
- What regulatory and non-regulatory tools are employed?
- How effective are they?

To answer the questions, over the past five months, Eos has completed a literature review, interviewed experts in government, industry, academia and among public user groups, and undertaken a survey of public land managers, users and other interested parties. While the work has focused on three principle jurisdictions, including Alberta, British Columbia and U.S. federal lands, documents and information from other parts of Canada, the U.S., Australia, New Zealand and the United Kingdom have also been reviewed.

At the end of the work, perhaps the overriding lesson is that access management is one of the most difficult land use planning problems. As a result, there are no absolutes and no “silver bullets” for those seeking to manage access to public lands. This is particularly true when the objective involves denying public users access to existing routes. That being said, the following answers are offered in response to the original questions:

How is access management done?

Done well, access management is a strategy rather than a gate or a berm or an education program. Successful access management involves a system of mutually supporting measures that include clear goals and objectives, planning, communication, physical measures, enforcement and monitoring and review.

How is it adopted?

Access management is usually adopted as the result of a planning process that strives to balance a range of competing interests. The most successful planning processes appear to be those that have practiced good public engagement, involving potentially affected parties to ensure their needs and concerns are addressed and recognizing that there must be trade-offs between parties to reach an optimal (consensus) solution.

What regulatory and non-regulatory tools are employed?

The tools employed by jurisdictions wanting to manage access on public land range from legislation such as Alberta’s Public Lands Act, the U.S. 1972/1977 Executive Orders and regulations such as the Forest Recreation Regulation, to physical measures such as gates and road decommissioning. This report examines the following tools in detail:

- Regulatory frameworks, including legislation, regulation and policy;
- Planning processes;
- Communications tools;
- Physical controls; and

- Enforcement.

To better understand how at least some of these tools relate to each other, the consultant has proposed the following hierarchy as a mechanism for making decisions about what types of tools to employ.

Figure 3. A Hierarchy of Access Management Options.

How effective are they?

All of the tools provide some level of effectiveness in the right situation. However, the effectiveness of individual tools appears to be closely correlated to the setting in which they are applied and, going back to the answer to the first question, to the supporting measures that they are adopted in combination with. For example, a gate is more effective if employed in a physical setting that does not permit traffic to easily detour around it, where the reason for its presence is explained in terms that relate to users' interests and there is some level of enforcement to protect it.

The report sections that precede this, attempt to provide a more fulsome answer to each of the questions. What follows is a summary of the lessons from this review and the

consultant's recommendations, both for an Alberta access management pilot project and for the individual companies that sponsored this work, as they contemplate their response to agency and public requests to better manage access to the lands in which they work. The lessons and recommendations that are provided may not apply equally to every situation or allow for uniform success. What they do, in point in a direction that this review's respondents and the literature suggest is likely to increase the odds of success.

6.1. Lessons Learned

This review of access management and the FLMF proposal that an access management pilot project be undertaken comes at a time when the province has published a Provincial Land Use Framework and committed itself to developing regional plans for six regions of Alberta. Both the lessons drawn from the review and those that would emerge as a result of undertaking a pilot project would be expected to provide a valuable input to the Land Use Framework process over the coming months.

Overarching

- Access management is a continental issue shared by jurisdictions throughout North America. To a lesser degree, it is also an issue in jurisdictions around the world, including the United Kingdom, Australia and New Zealand;
- In the US, federal land managers are attempting to manage a tidal wave of recreation users looking for opportunities to use an extensive pre-existing road and trail network left over from earlier timber harvesting and mining activities and informal/illegal recreational trail development. This road and trail system significantly exceeds the resources available to maintain it and is leading to environmental degradation of the federal public land base.
- While Western Canada is experiencing some of the same dynamic as the U.S. in the southern regions, it is still actively developing its access network in response to development of oil and gas, timber and mining resources. Areas in close proximity to Calgary, such as Ghost-Waiparous and Castle River in Alberta and the Kootenay-Boundary region in B.C., or to the Howe Sound-Whistler corridor in B.C. are experiencing rapidly growing recreational user pressures, particularly from OHV's.
- Where access management initiatives have been implemented, there appears to have been very little objective monitoring/evaluation of how well plans and specific measures are actually working. For example, only four significant sources identified in this review examined effectiveness of physical access control measures. Only one, an early study (Platt, 1993) looked objectively at the performance of a small number of specific measures.
- Despite the differences in context, this review suggests that there are a variety of lessons for Alberta when looking at B.C. and the U.S., as well as when looking at Alberta's own initiatives undertaken in the province to-date.

Regulatory Concerns

- Canadian regulatory frameworks for managing access appear relatively uncoordinated, largely because there is little in the way of enforceable prohibitions.
- In Alberta, the best tool is currently Forest Land Use Zones created under the Forest Recreation Regulation. While there are provisions in the Public Lands Act that should allow access closures to be enforced, these do not appear to have been put to use.

Planning

- The key to successful access planning is good public engagement, including:
 - Broad, multi-stakeholder representation
One B.C. respondent described the need to involve anyone that could be a user or have an interest in the outcome. Others cited “inclusive” processes that allowed different kinds of opportunities to meet or provide input. A review of USFS Travel Planning concluded “be inclusive, invite all affected stakeholders”.
 - Understanding individual groups’ interests and needs
Respondents stressed the need to develop an understanding of participants’ interests early in the process. A caution: several respondents expressed frustration with one Alberta planning process in which SRD separated stakeholders into “focus groups” in an attempt to better understand areas of agreement before the dynamics of the stakeholder table took effect. For at least one participant, it was interpreted as heavy handed manipulation.
 - Build trust and relationships among participants
Recognize that some significant conflicts exist between groups that use public lands, including those between ORV users and non-motorized recreation and between recreational users and industry. A lack of trust between users groups is the starting point for many processes. Decisions that all groups can live with and will support require time, patience and good facilitation. One respondent discussed the need to achieve a shared vision at the outset and to “get the fights” over with early on.
 - Need for facilitation
Respondents frequently cited the essential contribution of the facilitator in overcoming the lack of trust, entrenched positions and other process roadblocks. An early key role appears to be developing an understanding of the stakeholder’s interests and needs.
- Clearly communicate boundaries and an understanding of objectives right from the start. Ensure everyone understands the givens, i.e. what must be achieved to be successful, what constraints are beyond the control of the sponsoring agency. Frequently cited as a means of managing expectations and limiting stakeholders’ frustration with process.
- Transparent decision making
Land managers need to show the correlation between stakeholder advice and what has been brought back to the table; stakeholders have to be able to see that their advice has been taken seriously. A U.S. respondent talked about unrealistic expectations created among stakeholders for their role in BLM led planning processes and the backlash that ensued when decisions came back that did not appear to incorporate public input. An Alberta respondent

expressed anger that much resource information was the property of industry participants rather than government and thus not available to the public when decisions were made. Feed advice back to the stakeholders for their verification.

- Public planning processes require significant resources, including funds, management time and staff, to be successful.
- Start with comprehensive, high-quality resource information that allows participants to understand decision consequences;
Lack of good information was frequently cited as an impediment to progress. Suggested measures included engaging GIS technicians and experienced staff with knowledge of the local landscape and resource issues involved. A frequently cited KSF for the Kakwa-Copton initiative was use of Silvacom, a 3rd-party consultant able to aggregate confidential industry data.

Tools for Access Control

- There is general consensus among those interviewed and/or surveyed, that most physical access controls can be circumvented by determined individuals.
- There is no “silver bullet”, i.e. no one-size-fits-all measure that works in all situations. Successful management requires controls that incorporate site-specific design and are supported by other measures.
- Recreational users of public lands are a fact of life. If they are denied access to one area they will simply show up in another. On the other hand, there are numerous examples in the U.S. to suggest that if challenging, entertaining trail systems are provided in acceptable areas, ORV enthusiasts will use them.
- Once roads and trails become accepted as “traditional routes”, then closure is more difficult in all jurisdictions. The newer the road, the easier it is to get public acceptance of closure.

Communication

- Communication at every step of the access management process is key and often lacking.
- Most respondents felt that providing potential users with a clear, reasonable rationale for area closures and closed roads and trails would increase the degree of acceptance for those closures. Users have to know what is expected of them.
- Respondents identified a wide range of communication channels (e.g. signs, maps, brochures, kiosks, engagement with user groups, informational patrols, etc.) for reaching potential public land users and emphasized the importance of using multiple channels in ways that support each other for each management initiative.

Enforcement

- Respondents were absolutely consistent regarding the need for greater enforcement effort and more significant penalties regardless of the jurisdiction that was being discussed.

- There was a spectrum of potential “enforcement” tools that were identified, ranging from the soft and fuzzy (public visibility) to the hard (law enforcement officers).
- The “hard” law enforcement options were uniformly reported to be in short supply for reasons as varied as too few funds, insufficient regulatory and/or political resolve and lack of enforceable statutes.

6.2. Recommendations

The FLMF, and the Foothills Energy Partners in particular, should develop a comprehensive communications plan to ensure that the results of the review and subsequently the results of any pilot project undertaken with the provincial government are constructively disseminated. Past projects, including the Northeast B.C. Access Management Project undertaken in the mid-1990's failed in this respect. And as has been noted in this report, access management initiatives have rarely developed good information on what works and what doesn't and while there is much information on effects of access on different environmental and social values, there is much more limited information on how to respond.

For these reasons, the work of the FLMF in this regard could provide a valuable source of information, particularly in light of the province of Alberta's recent launch of the Land Use Framework and associated regional planning process.

More specific recommendations relating to establishment of an access management pilot are provided below.

6.2.1. Recommendations for an Alberta Access Management Pilot

- Develop a comprehensive strategy that fully utilizes all of the available tools. Recognize that the tools must be employed in such a way that they mutually support each other.
- If a pilot project is to inform future efforts and decision making it is key that the strategy develop clear goals, objectives and (quantitative) performance measures. Monitoring of the performance measures is needed objectively determine whether objectives are met and assess the effectiveness of the measures employed.
- Put in place a clear regulatory framework that allows for enforcement. In Alberta, the best tool is currently Forest Land Use Zones created under the Forest Recreation Regulation.
- Practice good public engagement throughout.
 - Be inclusive when identifying the stakeholders that should be at the table;
 - Engage a credible, knowledgeable facilitator;
 - Spend the time at the outset to understand the participants' interests, needs and wants.

- Look for opportunities to limit the development footprint from the outset, including measures which reduce access created by individual project's as well as coordinated operational planning that finds synergies between companies and industries:
 - Adopt objective targets that limit new, net access creation;
 - Put in place road, etc. deactivation programs that create space for new access that will be required in future.
- Where recreational access is a significant feature, segment your audience, recognizing the differences between the Incurable, Influencable and Honest populations and the differences in approach that might be needed to manage them.
- Where access controls are contemplated, design an interlocking approach of signs and other informational measures together with mutually supporting physical controls and enforcement.
 - Pay attention to the design of specific measures. The quality and the design of controls such as gates appears to make a significant difference in their effectiveness, as does the setting in which they are placed (e.g. public visibility, difficult to detour around, etc.).
- Close temporary corridors such as abandoned wellsite roads as soon as possible to avoid allowing them to evolve into "traditional" access.
- Where recreational access is a significant feature, develop road and trail alternatives for ORV users that divert them into acceptable areas, in order to reduce access pressure and impacts on more sensitive locations.
- Employ a comprehensive communications strategy that uses the multiple channels that are available to you.
- Develop an enforcement strategy that recognizes your constraints. If hard enforcement is limited or not available, you can limit the creation of new access at the outset (i.e. limit footprint), close roads and trails by making them completely impassable and fully develop the soft enforcement options that are available.

6.2.2. Recommendations for Companies Managing Access

Some of the above noted recommendations apply equally to individual companies that are contemplating access management initiatives in response to regulatory requests or to meet their own objectives. Briefly, these include:

- Understand your goals and objectives, develop appropriate performance measures and regularly monitor to validate the effectiveness of measures and approaches employed.
- Look for opportunities to limit the industry development footprint from the outset, including measures which reduce access created by individual project's as well as

coordinated operational planning that finds access reduction synergies between companies and industries. For example:

- Adopt objective targets that limit new, net access creation;
 - Put in place road, etc. deactivation programs that create space for new access that will be required in future (and can reduce costs).
 - Close temporary corridors such as abandoned wellsite roads as soon as possible to avoid allowing them to evolve into “traditional” access.
- Where access controls are contemplated, design an interlocking approach of signs and other information together with mutually supporting physical measures and enforcement.
 - Pay attention to the design of specific measures. The quality and the design of controls such as gates appears to make a significant difference in their effectiveness, as does the setting in which they are placed (e.g. public visibility, difficult to detour around, etc.).
 - Develop an enforcement strategy that recognizes your constraints, taking full advantage of the soft enforcement options that might be available for a specific site.

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8. Appendices

1. Access Management Survey form.
2. Contributors to the Survey and Interviews.
3. Recommended Guidance Materials.
4. Effectiveness of Access Control Measures (This Review).
5. Frequency of Use and Effectiveness of Access Control Measures (Axys, 1995).
6. Expert Opinion Effectiveness and Cost Ratings for Access Management Measures (Golder, 2007).
7. Effectiveness Ratings for Control Structures in Cabinet-Yaak Grizzly Bear Ecosystem.
8. Outline of U.S. Regulatory Framework.

Appendix 1. Access Management Survey Form

Foothills Landscape Management Forum
Survey of Access/Travel Management Strategies and Tools

This survey, conducted by Eos Research & Consulting for the [Foothills Research Institute](#) and the Foothills Landscape Management Forum, examines effectiveness of strategies and tools currently used to manage access to public lands.

The survey is part of a larger review of access management strategies and tools that has been initiated by a group of energy firms, including Petro-Canada, Encana, Husky, Talisman, Trans-Canada, Shell and ConocoPhillips, that are supporters of the Institute. The project also includes an already completed literature review which examined access management approaches in a variety of North American jurisdictions. Together, the literature review and the survey are intended to facilitate the future development of an access management pilot project in partnership with the Alberta provincial government.

The following questions explore several aspects of access management. While we would like to have the opportunity to discuss the questions with you by telephone during January 2009, if you prefer, we would be pleased to accept an electronically completed version of the survey.

To submit the completed survey or if you have questions, please e-mail to richard-williams@shaw.ca . Alternatively, please contact Richard Williams at 604-929-6157.

Name: _____ **Organization:** _____

Position: _____

Tel. _____ **E-mail:** _____

QUESTIONNAIRE

1. Have you employed access management or are you familiar with access management measures that have been implemented for resource protection?
Yes _____ **No** _____
2. Can you identify where/when the access measures you are most familiar with were used?
3. Who was responsible for putting the access management measures in place?

Legislation and Policy for Access Management

4. Can you identify the principle legislative and policy tools governing access management in the jurisdiction you are most familiar with?
5. Please rate the effectiveness of the legislation/regulation/policy tools in this jurisdiction on a scale of 1 (unsuccessful) to 5 (very successful).

Act/Regulation/Policy: _____ **Rating:** _____

_____	_____
_____	_____
_____	_____

6. What are the most important factors contributing to the success of the legislation/regulation/ policy in place in this jurisdiction?

7. What do you believe could be improved?

Access Plan Development and Implementation

8. Please describe the access/travel planning process used for the initiative you are most familiar with?

9. Please rate the success of this planning process on a scale of 1 (unsuccessful) to 5 (very successful).

Initiative: _____ Rating: _____

10. What key success factors contributed to the success of the access/travel planning process?

i. _____

ii. _____

iii. _____

11. What were the major short-comings of the process? What could have been improved?

i. _____

ii. _____

iii. _____

Access Management Tools

12. What specific measures have been employed in the initiatives you are familiar with:

- | | | |
|---------------------------------------|----------------------------------|------------------------------------|
| <i>Signs</i> | <i>Manned gates</i> | <i>Visual screening</i> |
| <i>Newspaper ads or notices</i> | <i>Unmanned gates</i> | <i>Bemps</i> |
| <i>Providing maps & brochures</i> | <i>Rollback</i> | <i>Directional drilling/boring</i> |
| <i>ORV licensing</i> | <i>Removing stream crossings</i> | <i>Road deactivation</i> |
| | <i>Excavations (Tank traps)</i> | <i>Complete road recontouring</i> |

13. Please provide a rating of the effectiveness of the following access control measures based on the following categories:

- a. **Very High:** Prevents ATV travel and possibly discourages predator travel;
- b. **High:** discourages some ATV travel and prevents 4x4 travel;
- c. **Moderate:** unlikely to stop ATV travel but prevents 4x4 travel;
- d. **Low:** Navigable by 4x4's but not 2-wheel drive vehicles;
- e. **Negligible:** Navigable to most vehicles.

Measure	Effectiveness				
	Very High	High	Moderate	Low	Negligible
Information/Education					
Signs					
Newspaper ads or notices					
Providing maps & brochures					
ORV licensing					
Other?					
Physical Measures					
Rollback					
Manned Gates					
Unmanned Gates					
Removing Stream Crossings					
Berms					
Excavations (Tank Traps)					
Directional drilling/boring					
Visual Screening					
Road Deactivation					
Complete Road Recontouring					
Other?					

14. What key success factors contributed to the success of the control measures employed?

- i. _____
- ii. _____
- iii. _____

15. What were the major short-comings of the measures employed? What could be improved?

- i. _____
- ii. _____
- iii. _____

Wrap-Up

16. What in your opinion are the most important factors for successful access management?

i. _____

ii. _____

iii. _____

17. Do you have any closing thoughts that you would like to provide with respect to access/travel management?

Appendix 2. Contributors to the Survey and Interviews

Individual	Affiliation	Date ⁵⁷	Surveyed
1. Barber, Kim	U.S. Forest Service	Jan 26, 2009	v
2. Bartell, Kim	U.S. Forest Service	Feb 5, 2009	v
3. Beattie, Dave	Ghost Stewardship Monitoring Committee		v
4. Bildson, Brian	Sheep Creek Lodge		v
5. Boyce, Mark	University of Alberta	Oct 31, 2008	
6. Bruha, Jamie	Alta. Sustainable Resource Development		v
7. Brygidir, Lisa	Shell Canada	Dec 9, 2009	
8. Cooper, Natalie	Shell Canada	Dec 9, 2009	
9. Creasey, Roger	Shell Canada	Various	v
10. Cunningham, Peter	Elkford ATV Club	Feb 9, 2009	v
11. Curry, Greg	U.S. Bureau of Land Management	Nov 18, 2008	
12. Davis, Garth	ConocoPhillips		v
13. DeGagne, Frank	B.C. Integrated Land Mgmt. Bureau	Various	v
14. DeGagne, John	B.C. Ministry of Forests	Jan 21, 2009	v
15. Douglas, Nigel	Alberta Wilderness Association	Various	v
16. Dzus, Glenn	Shell Canada	Jan 30, 2009	v
17. Ettenhofer, Richard	Shell Canada	Jan 23, 2009	v
18. Flett, Steve	B.C. Integrated Land Mgmt. Bureau	Jan 19, 2009	v
19. Francis, Wendy	Yellowstone to Yukon	Various	
20. Fry, Mary	U.S. Forest Service	Jan 22, 2009	
21. Germain, Andre	B.C. Ministry of Forests	Jan 22, 2009	
22. Gibb, Rob	Talisman		v
23. Hurtas, F.J.	Kootenay Wildlife Heritage Fund	Jan 21, 2009	
24. Kasworm, Wayne	U.S. Fish & Wildlife Service	Jan 23, 2009	v
25. Kerkhoven, John	Petro-Canada		v
26. Livingston, Don	Alta. Sustainable Resource Development		v
27. Matthews, Lesley	Williams Energy	Various	
28. Meyer, Roger	Alta. Sustainable Resource Development	Various	v
29. Monchak, Darcy	B.C. Integrated Land Mgmt. Bureau		v
30. Newman, Craig	U.S. Forest Service		v
31. Otway, Steven	Parks Canada (Jasper)	Oct 31, 2008	
32. Parnell, Aniko	Alta. Sustainable Resource Development	Nov 19, 2008	

⁵⁷ Dates only provided for individuals that were spoken to face-to-face or by telephone.

33. Quinn, Michael	University of Calgary	Oct 6, 2008	
34. Rakash, Cal	Alberta ORV Association	Various	v
35. Rasmussen, Randy	American Hiking Society	Various	v
36. Rice, Colin	Spectra Energy Inc.	Feb 9, 2009	
37. Rowe, Greg	Consultant, Rowe Forest Mgmt. Ltd.	Jan 19, 2009	v
38. Sargent, Gary	Canadian Assoc. of Petroleum Producers	Oct 17, 2009	
39. Sawchuk, Wayne	Member, M-K Mgmt. Area Advisory Board	Various	v
40. Selland, Glenn	Alta. Sustainable Resource Development	Jan 21, 2009	
41. Servheen, Chris	U.S. Fish & Wildlife Service	Jan 15, 2009	v
42. Sewell, Vince	B.C. Ministry of Forests	Jan 25, 2009	v
43. Sheppard, David	Castle Crown Wilderness Coalition		v
44. Skarie, Richard	Natural Resource Group Inc.	Oct 16, 2008	
45. Smith, Vera	Wilderness Society	Oct 23, 2008	
46. Stanlan, Rob	Consultant	Oct 21, 2008	
47. Stenhouse, Gordon	Foothills Research Institute	Nov 19, 2008	
48. Stephenson, Jim	Canadian Forest Products Ltd.	Feb 16, 2009	
49. St. Louis, Diedre	U.S. Forest Service	Nov 17, 2008	
50. Sudan, Sangita	B.C. Integrated Land Mgmt. Bureau	Various	v
51. Thorp, Myles	Yukon Forest Service	Oct 22, 2008	
52. Thresher, Bill	Alta. Sustainable Resource Development		v
53. Throop, Gail	U.S. Forest Service	Dec 12, 2008	
54. Tweedy, James	Castle Crown Wilderness Coalition	Jan 9, 2009	v
55. Walsh, Helene	Canadian Parks & Wilderness Society	Feb 4, 2009	
56. Willsey, Dale	Alta. Sustainable Resource Development	Feb 4, 2009	v
57. Winship, Bob	Weyerhaeuser Canada		v
58. Zimmerman, Peter	ConocoPhillips	Dec 9, 2008	
59. Zubrod, Sharon	ConocoPhillips (U.S.)	Jan 23, 2009	v

Appendix 3. Recommended Guidance Materials

In the course of the review, a wide range of guidance documents were identified and are listed below. While many of these guidance documents were developed by and for U.S. public land managers, they may have useful elements for Alberta public land managers and companies undertaking access management initiatives.

Regulatory Frameworks

Canadian Institute of Resource Law (CIRL), 2004. The Legal and Policy Framework for Managing Public Access to Oil and Gas Corridors on Public Lands in Alberta, Saskatchewan and British Columbia. A research report prepared for the Canadian Association of Petroleum Producers, June 2004.

Planning

Bureau of Land Management, 2005. Land Use Planning Handbook, BLM Handbook H-1601-1. United States Department of the Interior, Bureau of Land Management, November 3, 2005.

Forest Service, 1999. Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, Forest Service Miscellaneous Report FS-642, August 1999 (48 pgs.)

Graves, Paul, Anne Atkinson and Mark Goldbach, 2006. Travel and Transportation Management: Planning and Conducting Route Inventories, Technical Reference 9113-1, Bureau of Land Management, Denver, Colorado (60 pgs.)

Communication

Tread Lightly! Website: <http://www.treadlightly.org/page.php/home/Home.html>

A nonprofit organization offering a variety of tools to help arm recreationists and the industries that serve them with essential outdoor ethics.

Mitigation

Axys Environmental Consulting Ltd., 1995. A Compendium of Physical Access Control Measures for Roads and Other Rights-of-Way. A Component of the Access Management Initiative in Northeastern B.C., March 1995.

Bureau of Land management and U.S. Forest Service, 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book. Fourth Edition – Revised 2007. Prepared by the U.S. Department of the Interior, Bureau of Land Management and U.S. Department of Agriculture, Forest Service.

Crimmins, Tom M., 2006. Management Guidelines for Off-highway Vehicle Recreation: A resource guide to assist in the planning, development operation and maintenance of

environmentally sustainable and quality OHV trails, trail systems and areas. National Off-Highway Vehicle Conservation Council. (Printed)

Forestry Road Management, January 2005 (33 pgs.)

General document on managing forestry roads, jointly developed by the Manitoba Forestry Branch in cooperation with the three forest licence holders in the province as well as Forest Industry Assoc. of Manitoba and Manitoba Water Stewardship.

Guide to Sustainable Mountain Trails: Trail Assessment, Planning and Design Sketchbook, 2007 Edition (167 pgs.).

Merrill, B.R., and E. Casaday. 2001a. 44 pp. Field Techniques for Forest & Range Road Removal. Published by: California State Parks, North Coast Redwoods District, Roads, Trails and Resources

Part I:

<http://www.parks.ca.gov/pages/23071/files/field%20techniques%20for%20road%20removal%20part%201.pdf>

Part II:

<http://www.parks.ca.gov/pages/23071/files/field%20techniques%20for%20road%20removal%20part%202.pdf>

Appendices:

<http://www.parks.ca.gov/pages/939/files/Field%20Techniques%20For%20Road%20Removal%20App.pdf>

Merrill, Brian R. and Ethan Casaday, 2001. Best Management Practices: Culvert Replacement. Roads, Trails and Resources Management Section, North Coast redwoods District, California State Parks. (18 pgs.)

Merrill, Brian R. and Ethan Casaday, 2003. Best Management Practices for Road Rehabilitation: Full Road Recontouring. Roads, Trails and Resources Management Section, North Coast redwoods District, California State Parks, May 2003. (20 pgs.)

Merrill, Brian R. and Ethan Casaday, 2003. Best Management Practices for Road Rehabilitation: Partial Road Recontouring. Roads, Trails and Resources Management Section, North Coast redwoods District, California State Parks, May 2003. (19 pgs.)

Merrill, Brian R. and Ethan Casaday, 2003. Best Management Practices for Road Rehabilitation: Road to Trail Conversion. Roads, Trails and Resources Management Section, North Coast redwoods District, California State Parks, May 2003. (20 pgs.)

Merrill, Brian R. and Ethan Casaday, 2003. Best Management Practices for Road Rehabilitation: Road-Stream Crossing Removal. Roads, Trails and Resources Management Section, North Coast redwoods District, California State Parks, May 2003. (25 pgs.)

Pennsylvania Design Manual for Off-Highway Recreational Vehicles. March 2004, 145 pgs.
<http://www.dcnr.state.pa.us/brc/PaTrailDesignManual.pdf>

So You Want to Build an OHV Facility? A Practical guide to Planning and Development. (16 pgs., ppt.) <http://www.dcnr.state.pa.us/brc/OHVfinal.PDF>

Switalski, T. Adam and Allison Jones, 2008. Best Management Practices for Off-Road Vehicle Use on Forestlands: A Guide for Designating and Managing Off-Road Vehicle Routes (58 pgs.), January 2008. (Full doc. printed)

Designed as a resource for public land management agency staff, law enforcement officials, and citizens groups, this document outlines Best Management Practices (BMPs) to aid land managers in travel planning or in any decision-making process related to off-road vehicle management on forested lands.

Trail Construction and Maintenance Handbook, 2007 Edition.
<http://www.fhwa.dot.gov/environment/fspubs/07232806/toc.htm>

Trails and Wildlife Task Force, Colorado State Parks, & Hellmund Associates. (1998). Planning trails with wildlife in mind: A handbook for trail planners. Denver, CO, September 1998, Colorado State Parks.

Wernex, Joe, 1984. A Guide to Off-Road Motorcycle Trail Design and Construction. American Motorcyclist Association, Westerville, Ohio.

Western Governors Association (2006). Coal Bed Methane Best Management Practices: A Handbook. April 2006 (28 pgs.)

Includes a range of BMP's applicable to access management.

Enforcement

Archie, Michele L., 2007. Six Strategies for Success: Effective Enforcement of Off-Road Vehicle Access on Public Lands (40 pgs.), 2007. Wildlands CPR, Missoula, Montana.
<http://www.wildlandscpr.org/files/uploads/PDFs/SixStrategiesEnforcementReport.pdf>

Appendix 4. Effectiveness of Access Control Measures (This Review)

Measure	No. Who Ranked	Range of Rankings	Mean Rank	Relative Rank
Information/Education				
Signs	29	84	2.90	1
Newspaper ads or notices	24	44	1.83	4
Providing maps & brochures	27	75	2.78	2
ORV licensing	15	33	2.2	3
Other	17			
Physical Measures				
Rollback	20	77	3.85	3
Manned Gates	19	77	4.05	1
Unmanned Gates	30	100	3.33	6
Removing Stream Crossings	23	74	3.22	7
Berms	25	69	2.76	9
Excavations (Tank Traps)	20	61	3.05	8
Directional drilling/boring	13	44	3.38	5
Visual Screening	24	29	1.21	10
Road Deactivation	25	86	3.44	4
Complete Road Recontouring	25	98	3.92	2
Other	5			

Appendix 5. Frequency of Use & Effectiveness (Axys, 1995).

Access Control Measure	Frequency of Use (n = 45)	No. Who Ranked ⁵⁸	Range of Rank	Mean Rank ⁵⁹
Slash Rollback	27 (60%)	20	2.5-5	4.1
Manned gates	27 (60%)	23	1.5-4	3.7
RoW Recontouring	33 (73%)	22	2-5	3.7
Special Construction	10 (22%)	3	3-4	3.6
Excavation	27 (60%)	20	2.5-4	3.3
Legislation/Policy	30 (67%)	14	1-4	3.2
Unmanned gates	41 (92%)	37	1-4	3.2
Berms	40 (89%)	37	1.5-4	2.9
Visual Screening	18 (40%)	12	1-5	2.7
Other	3 (29%)	–	–	–

⁵⁸ Ranks were only recorded for those who felt confident enough to rank the particular access control measure.

⁵⁹ Mean rank was calculated using only the total number of ranked responses. Rankings range from 1 (negligible efficiency) to 5 (high efficiency), with a ranking of 3 (moderate efficiency) defined as capable of prevent 4X4 travel but unlikely to stop ATV travel.

Appendix 6. Expert Opinion Effectiveness and Cost Ratings (Golder, 2007).

Access Control Measure	Employed by Oil & Gas (% Respondents)	Employed by Forestry (% Respondents)	Effectiveness ⁶⁰			Relative Costs ⁶¹			
			High	Moderate	Low	High (\$\$\$)	Moderate (\$\$)	Low (\$)	Negligible
Legislation/Policy	43	33	3	6	11	1	3	6	6
Manned gates	79	7	12	5	5	10	2		2
Unmanned gates	57	53		12	13	4	6	3	4
Berms	79	53		16	9	1	3	6	8
Excavation/Road Deactivation	43	73	8	14	4	5	6	1	6
Rollback	100	40	11.5 ⁶²	13	4.4	3	6	7	2
Removal of Creek Crossings	71	73	6.5	18.5	3	7	5	3	5
Visual Screening	79	20	4	11	12	2	6	2	8
Directional Drilling & Boring	71	n/a	11	8		8	1	2	1
Line Blocking	36	7	5	5	3	2	1	1	5
Predator Flagging	n/a	n/a		1	6	1		2	1
Remote Operations	79	20	8	9.5	3.5	5	2	3	3
Truck Scheduling/Convoys	43	0	1		12	1		7.5	2.5
Remote telemetry (SCADA)	79	n/a	9	8	2	8	2	1	3
Barriers at junctions with active access routes	50	13	6	12	4	3	11	4	3
Other (aerial spraying to reduce forage, access management and common use plans)	n/a	40	-	-	-	-	-	-	-

⁶⁰ Subjective rating of effectiveness: High (prevents ATV travel and may discourage predator travel), Moderate (discourages ATV travel, prevents 4X4 travel), Low (4X4 navigable). Values in bold represent rating with highest selection from respondents.

⁶¹ Relative costs rated based on costs for implementation in caribou ranges versus outside of caribou ranges; High (incremental costs are >2X as much), Moderate (incremental costs 2X), Low (incremental costs <2X), Negligible (incremental costs equal to those on lands outside caribou ranges).

⁶² A 0.5 value was used where respondents indicated effectiveness or costs varied across a range (e.g. moderate to low dependant on site-specific details).

Appendix 7. Effectiveness Ratings for Control Structures in Cabinet-Yaak Grizzly Bear Ecosystem (Platt, 1993)⁶³.

Type of Control Structure	Effectiveness Ranking									
	No. 1		No. 2		No. 3		No. 4		Total	
	#	%	#	%	#	%	#	%	Effective	Ineffective
Steel Gates	37	13.2	37	13.2	22	7.8	50	17.8	50 (17.8%)	96 (34.2%)
Wooden Gates	0	0	1	0.4	0	0	2	0.7	2 (0.7%)	1 (0.4%)
Earthen Berm	12	4.3	31	11.0	0	0	71	25.3	71 (25.3%)	43 (15.3%)
Boulders	0	0	0	0	0	0	3	1.1	3 (1.1%)	0
Posts and Rail	4	1.4	2	0.7	0	0	1	0.4	1 (0.4%)	7 (2.5%)
Other	5	1.8	0	0	0	0	0	0	0	5 (1.8%)

Effectiveness Ranking	Description
1	Does not effectively stop any vehicle. The structure is listed as closed on the closure notice but is found: <ul style="list-style-type: none"> • Readily passable to normal width vehicles with recourse to use of tools or damaging the structure – either because it is unlocked, vandalised or not in place, or there is a detour available. • Open and actively in use by contractors.
2	Restricts vehicles over 40" in width but not narrower vehicles. The structure is listed as closed on the closure notice and effectively restricts passenger vehicles, but is found: <ul style="list-style-type: none"> • Readily accessible by ORV's and shows evidence of detours. • Readily passable by ORV's with no evidence of detours but a substantial likelihood of available detours based on closure violations in area.
3	Effectively restricts only vehicle operators without a key. Structure is listed as closed on closure notice, is locked, and shows no evidence of detour, but is found to: <ul style="list-style-type: none"> • Have fresh tracks on road behind the gate, indicating recent use by normal passenger vehicles. • Be in active use by authorized personnel at the time of the inventory.
4	Effectively restricts all vehicles. The structure is listed as closed on the closure notice and appears totally effective, showing no evidence of motor vehicle use.

⁶³ Table is slightly modified from that provided by Platt to make it clearer to understand.

Appendix 8. Outline of U.S. Regulatory Framework

CONSTITUTION		
Article I Legislative Branch	Article II Executive Branch	Article III Judicial Branch
Authorizes Congress to make laws	Authorizes President to execute laws	Authorizes courts to interpret laws
LAWS (U.S. Statutes and U.S. Code)	EXECUTIVE ORDERS (Issued by President; codified in Title 3, Code of Federal Regulations (3 CFR))	LEGAL DECISIONS (Case Law)
	REGULATIONS (Issued by Federal agencies; published in Federal Register and codified in CFR)	
	ADDITIONAL GOVERNMENT-WIDE GUIDANCE	
	INTERNAL AGENCY POLICY AND PROCEDURES Department of Agriculture <ul style="list-style-type: none"> • Departmental Manual (DM) • Departmental Regulations (DR) • National Finance Center External Procedures Forest Service: <ul style="list-style-type: none"> - Issues regulations at 36 CFR - Issues policies and procedures in FSM and FSH - Negotiates master agreement with union 	

Appendix 9. Interim Survey Results - FLMF Caribou Mitigation Costs.

The Foothills Landscape Management Forum (FLMF) (formerly the Caribou Landscape Management Association) was formed in 2005 is comprised of 14 members involved in projects that facilitate integrated land management between the forest product and energy companies that are developing resources along the foothills of Alberta's forests.

The members of the Foothills Landscape Management Forum are:

- ANC Timber Limited,
- Aseniwuche Winewak Nation of Canada (Grande Cache)
- Canadian Natural Resources Limited
- Canfor (Canadian Forest Products Ltd.)
- ConocoPhillips Canada
- Devon Canada Corporation
- EnCana Corporation
- Foothills Forest Products Inc.
- Hinton Wood Products, a division of West Fraser Mills Limited
- Husky Energy Limited
- Suncor Energy Inc.
- Shell Canada Limited
- Talisman Energy Inc.
- TransCanada Pipelines Limited

The following provides a summary of responses to a survey of FLMF members conducted during 2008. Eight out of 13 members responded to the survey, providing costs and opinions regarding effectiveness of the access measures employed and in particular gating of roads. Selected questions and responses are provided below.

How many manned gates and cost?

- Eight companies indicated a total of 14 manned gates, including 13 installed as a condition of received LOC's and one installed for recording traffic volumes.
- Total annual cost is estimated at \$3,960,000

Effective or not?

- "For the purpose of Caribou management, not effective"
- "Effective for keeping track of road use not for control"
- "Stop traffic long enough to ask who the people work for and where they are going, then allow anyone to pass. So in the context of restricting access, no they don't work"
- "There are NO limitations on volume of traffic or type; so ineffective."

- “Effective for what? - No defined objectives from SRD”
- “Not effective can’t stop anyone from going in”
- “It counts traffic that’s it, on all weather road with high recreation use. It doesn’t stop traffic or check for firearms. Our questions on how to manage the gate go unanswered”
- Don't know. Never told objectives just that we need to install.

How many unmanned gates and cost?

- The eight companies indicated a total of 40 gates;
- Estimated costs associated with gates included \$2500- \$10,000 per gate for installation and \$2,000 per gate each year for maintenance;
- Total costs estimated at \$280,000/yr
- Annual maintenance generally involves gate replacement and repair and lock replacement for up to 10 gates per year.

Effective or not?

- Effectiveness: Limited as most of the public use is during hunting season and quads just drive around the gates.
- They keep “unauthorized” users off the roads but virtually all of the users are “authorized” so in total the effectiveness is questionable.
- The only people that the gates keep out are those members of the general public who don’t know the combination for the gate lock
- The gates are either broken through, or the areas behind accessed by ATV. The types of access behind most un-manned gates are usually more conducive to ATV use than on-highway vehicles.
- Most access concerns are during hunting season and the majority of hunters are on ATVs. We do not observe many “public” vehicles on the industrial, radio controlled roads
- No regulatory authority
- No enforcement by SRD
- No consequence for being behind the gate
- Corporate risk to manage the public
- Public does not accept industry managing access

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