

The background of the cover is a photograph of a majestic, snow-covered mountain peak. The mountain's surface is rugged, with patches of dark rock visible through the white snow. In the foreground, a wide, smooth expanse of snow slopes down towards the viewer. Two small, dark figures of people are standing on this slope, providing a sense of scale to the massive mountain. The sky is a clear, deep blue.

PARKS CANADA'S BACKCOUNTRY AVALANCHE RISK REVIEW

REPORT OF THE INDEPENDENT PANEL

Prepared for Parks Canada

June 30, 2003

FOREWARD

This report presents the conclusions and recommendations of the panel of external consultants established by Parks Canada to review diverse aspects of winter backcountry safety in Canada's mountain National Parks. It follows a brief but intensive review of the topics referred to the panel for consideration.

In the course of the review, it became evident that safe winter backcountry use is not an exclusive concern of Parks Canada but, in fact, is part of a larger safety support system involving park users and other parties.

Thus, while some of the recommendations point to direct action by Parks Canada, many will require cooperative effort. For the latter category, the challenge will be for Parks Canada and its diverse partners to arrive at mutually agreeable arrangements that will contribute to the goal of enhancing the safety of winter backcountry visitors. We believe that there is much goodwill, shared understanding and interest to make this possible.

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ACKNOWLEDGEMENTS

The panel would like to thank the many organizations and individuals who assisted us with the benefit of their time, ideas, information, and information leads.

We begin with thanking Ian Syme, Chief Warden of Banff National Park, who was our primary contact on this review and his able assistant Susan Hairsine who helped organize meetings, facilities, phone services, hotels, information, and contacts. Because Banff was our occasional office, the Public Safety Wardens – particularly Tim Auger and Marc Ledwidge – were frequently asked by the panel members for supplementary information which they cheerfully and competently supplied. Jillian Roulet, Senior Policy Advisor for the Mountain National Parks was helpful throughout the project.

Wayne Tucker, Backcountry Recreation Specialist, assumed extra duties of compiling overviews of visitation, use, and incident information for the five mountain parks and prepared the figures which appear in the panel's report.

The panel held workshops or meetings with staff of the field units for each of the five mountain national park field units. These staff gave freely of their time and ideas and provided a valuable contribution from the perspective of field wardens, visitor reception centre staff, and communications officers. The public safety wardens coordinated participation from each field unit, provided overviews, and organized meeting notes. We thank all the participants for their special efforts to inform us.

Many organizations and individuals generously agreed to share their perspectives and provide insights that would otherwise have been unobtainable:

- Brian Callaghan, Superintendent of Canadian Rockies School Division, who assembled a special meeting with his outdoor educators;
- Scott McLarty, who together with Tom Inkster of the Calgary Board of Education provided invaluable insights on many policy areas regarding student safety;
- Dr. Bruce Jamieson of the Engineering Department, University of Calgary, who briefed us on many topics – including incident research, current research initiatives, and European experiences;
- Clare Israelson of the Canadian Avalanche Centre who provided much useful information and insight;
- Bruce Keith and Nancy Hansen of the Alpine Club of Canada who provided both user data and informed insights;
- Scott Russell of the National Search and Rescue Secretariat who, with his associates, fielded a range of information requests;

- Michel Villeneuve for explaining aspects of Parks Canada’s safety policies;
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- Scott Hutchinson of Banff Mountain Academy for his views;
- George Field of Alberta Parks for sharing his knowledge;
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- Manrico Scremin of the Federation of the British Columbia Mountain Clubs for his assistance and Brian Wood (B.C. Mountaineering Club) and Dave King (Caledonia Ramblers) for responding to questionnaires; and
- Dave Stark, Chief Guide, Yamnuska Inc. for his response.

Holly Johansen, who served as project assistant, was unfailingly helpful throughout the project. “Desk topping” of this report was done by her.

INTRODUCTION

Winter backcountry recreational use is increasing and for many reasons. The mountains present the opportunity for a wilderness experience...the chance to savour superb scenic vistas and enjoy the pure aesthetic of untracked snow, combined with the wondrous physical sensation of “surfing” powder snow...typically in the company of friends. They present a “peak experience” with physical, aesthetic, social and spiritually uplifting dimensions. Canada’s mountain parks are a particularly attractive destination for winter backcountry activity because they offer an unsurpassed landscape setting; these mountain parks were designated for protection and public recreation in recognition of their many outstanding natural features...including spectacular mountain landscapes, dramatic geological formations, wildlife, and diverse forest, montane and alpine habitats. These present a superb setting for a wilderness experience.

A winter backcountry experience is not without risk, however. Mountainous terrain presents many obstacles and hazards because of the ever-present forces of erosion, weather and gravity. Snowpack builds on the mountainous terrain - and depending on weather, sunshine, wind, elevation, slope, aspect and many other factors - presents risks because of potential instability. Depending on the weather events of any given year, the snowpack can be relatively more safe or relatively more hazardous. The winter of 2002-03 was particularly hazardous because of what technical experts termed “persistent deep instabilities” in the snowpack. And those conditions contributed to tragic fatalities...both inside and beyond the national parks...reinforcing the ever-present inherent hazards of avalanche terrain.

This Review

In the case of the National Parks, those fatalities were sufficient to raise questions about the effectiveness of measures aimed at “managing” the risk of winter backcountry activities in avalanche terrain. This review was commissioned to evaluate the effectiveness of these measures and make recommendations for improvements where necessary.

Parks Canada established an independent panel, which was directed to review:

- current practices and actions by Parks Canada to reduce risks from backcountry winter activities;
- how Parks Canada can improve the perception of the inherent risk from those backcountry winter activities;
- the communication of that risk to assist the diverse park users in managing their own risk;

- how users access emergency notification systems to initiate required emergency response;
- the certification requirements in both the profit and not-for-profit sectors, for leading winter activities in avalanche terrain;
- the concept of implementing travel restrictions as a result of predicted avalanche conditions; and also to
- link with other reviews, as applicable, that are also underway as a result of this past winter's avalanche accidents.

Appendix 2 presents the full terms of reference.

Approach

The panel took a multi-stranded approach to this project involving:

- compilation and review of key Parks Canada documents;
- conducting workshops with staff from each of Parks Canada's five field units in the mountain parks;
- discussions with representatives of key organizations with specialized knowledge of, or whose members participate in winter backcountry activities;
- distributing questionnaires to representatives of user organizations to obtain their perspectives on the topics before the panel;
- liaising with principals of the concurrent avalanche safety review being conducted by British Columbia;
- phone interviews; and
- internet/library research.

Throughout this project the panel aimed at identifying measures which will help to reduce the risk inherent in winter recreation in backcountry areas of Canada's mountain parks. This includes recommended actions appropriate for both park users and Parks Canada.

The panel is aware of a simultaneous separate review of the February 2, 2003, Glacier Park avalanche incident being done by an experienced consultant engaged by the Strathcona-Tweedsmuir private school, seven of whose students were fatalities. A meeting between school representatives and the panel, while offered, could not be scheduled because of the concurrent preparation of the above report and the report of this panel. While this panel's assignment is complete, a subsequent process of review and implementation will follow. Parks Canada has indicated its willingness to meet with school representatives in the process of reviewing and responding to the findings of these reports.

This panel recognizes that British Columbia also has a study of public safety education and awareness underway with a strong emphasis on the public warning system. The panel established liaison with this study and anticipates the respective efforts of the two projects to be complementary.

The results of all of the above reviews will be hopefully be helpful to Parks Canada and other parties with interest in enhancing the safety of winter backcountry recreational use – both inside and beyond the mountain National Parks.

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1.0 BACKCOUNTRY USE AND RISK

1.1 THE NATIONAL PARK CONTEXT

The National Parks have long been a magnet for mountaineering activity. Glacier National Park, for example, has been identified as the origin of mountaineering in North America. The hub of that activity was Glacier House, operated by the Canadian Pacific Railway, and it was staffed with Swiss mountaineers hired to contribute to developing a mountain tourism economy.

Well over a century has passed and the allure of the mountain parks continues. Glacier House is but a memory, but the legacy of mountaineering in the Columbia and Rocky Mountains endures. Canada's national parks thus have a tradition of supporting mountain recreation. The *National Park Act*, originally approved in 1930, dedicated these parks to the people of Canada for their benefit, education and enjoyment...with the provision of keeping them "unimpaired" for the enjoyment of future generations. It is notable that the national park system began in 1885 with dedication of mineral hot springs near Banff for public use.

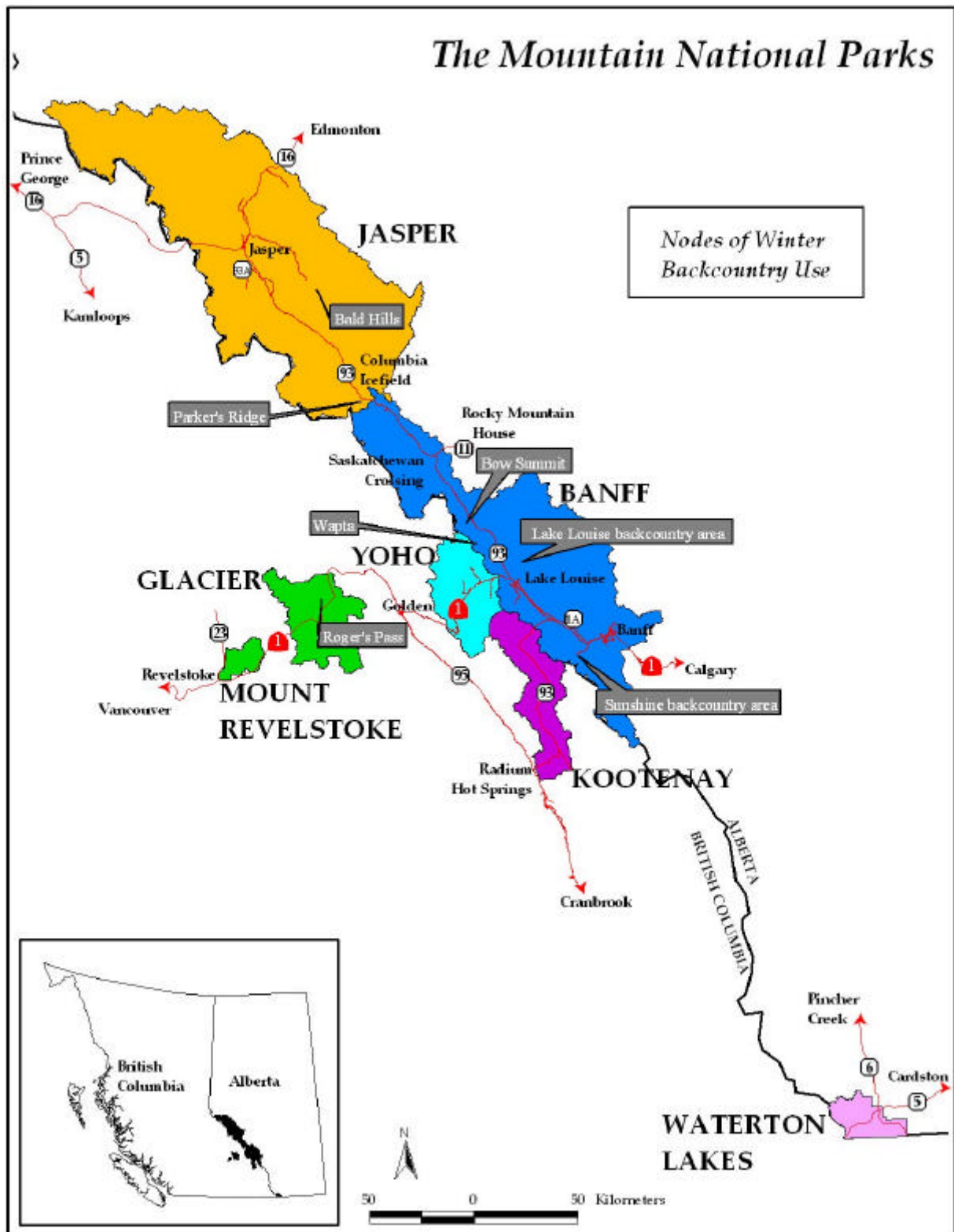
Public use, appreciation and enjoyment – in a manner which reflects the spirit of leaving natural systems unimpaired – is a strong and continuing tradition in national parks for both the Canadian public and Parks Canada. It is also a significant challenge as pressures of human use increase. Population growth, improved access, affluence, cultural interest in adventure and fitness, plus a desire to experience nature are factors behind the enduring appeal and growing participation in mountain-based recreation - winter and summer.

National parks, because of their conservation mandate, provide opportunities for only a segment of the winter recreation spectrum. There are established and designated downhill ski areas as well as track-set cross-country ski trails. Outside the designated ski areas, winter recreation is "self-propelled" – that is non-motorized. Thus backcountry skiing and snowboarding, ski mountaineering, ice climbing, and snowshoeing are all acceptable winter recreation activities. Heli-skiing and snowmobiling are not accommodated in national parks but are in the adjacent Crown lands of Alberta and British Columbia and may be conditionally allowed in designated areas of provincial parks where allowed for under approved park management plans.

The economic significance of these winter backcountry activities in both the mountain national parks and in adjacent provincial lands is substantial – and has particular significance to mountain communities who host these diverse aspects of winter tourism, which help diversify and strengthen their seasonal economies.

The mountain national parks considered in this review are Banff, Glacier, Jasper, Kootenay, Mount Revelstoke, Yoho, and Waterton and these are shown on Figure 1: Map of the Mountain National Parks.

Figure 1:

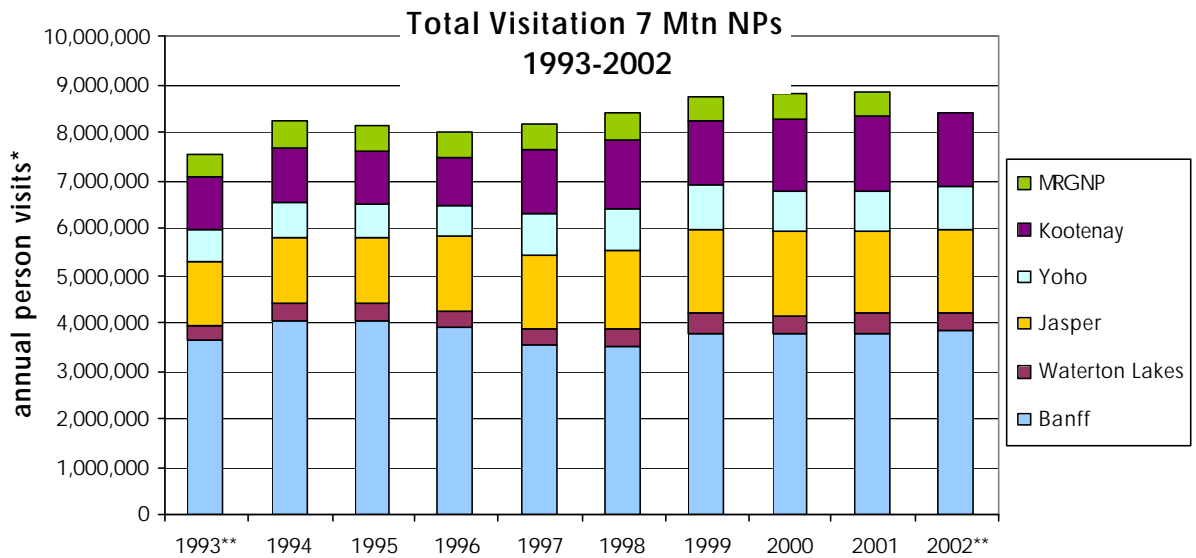


1.2 WINTER BACKCOUNTRY USE

Comprehensive counts or estimates of winter backcountry use are not available for various reasons including reduced winter staff levels in the parks, the dispersed nature of the activity, and the relatively recent growth in its more widespread popularity.

Parks Canada’s information (see Figure 2: Total Visitation in 7 Mountain National Parks – 1993 - 2002) provides a useful overall picture of modest overall growth in visitation.

Figure 2:

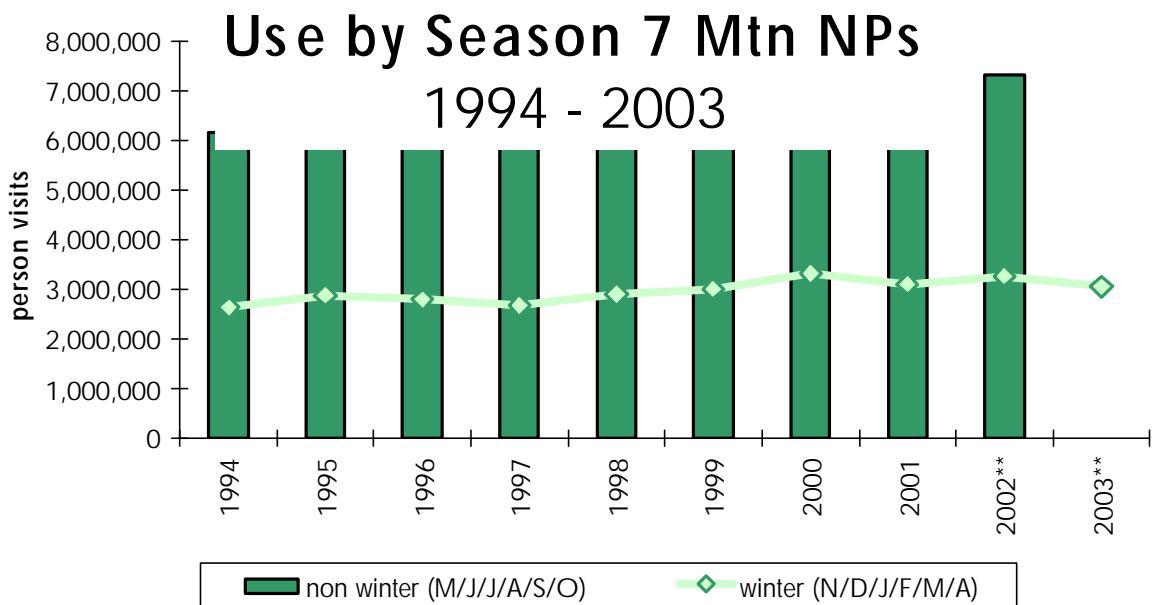


**Indicates incomplete data.

*Person Visit: One visit is recorded each time a person enters the land or marine part of a reporting unit for recreational, educational, or cultural purposes during business hours. (Local, commercial, and “through” traffic are excluded.)

Interestingly, winter visitation represents a modestly growing portion of overall visitation (see Figure 3: Use by Season 7 Mountain National Parks).

Figure 3:



**Indicates Incomplete Data

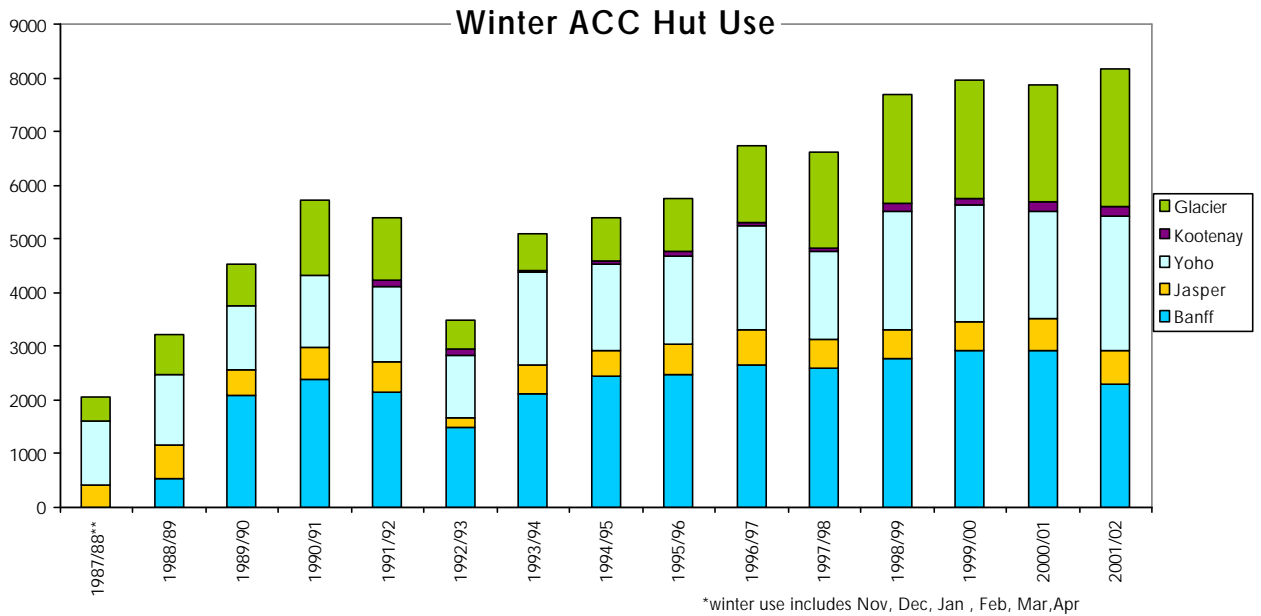
Kootenay National Park records substantial growth in the proportion of winter to overall visits.

Particular and comprehensive data on winter backcountry use is more elusive but there are a number of surrogate indicators which point to a pattern of increasing use. At an overview level there are a number of general indicators of expanding winter backcountry use including:

- doubling of membership in the Alpine Club of Canada (ACC) in the last decade;

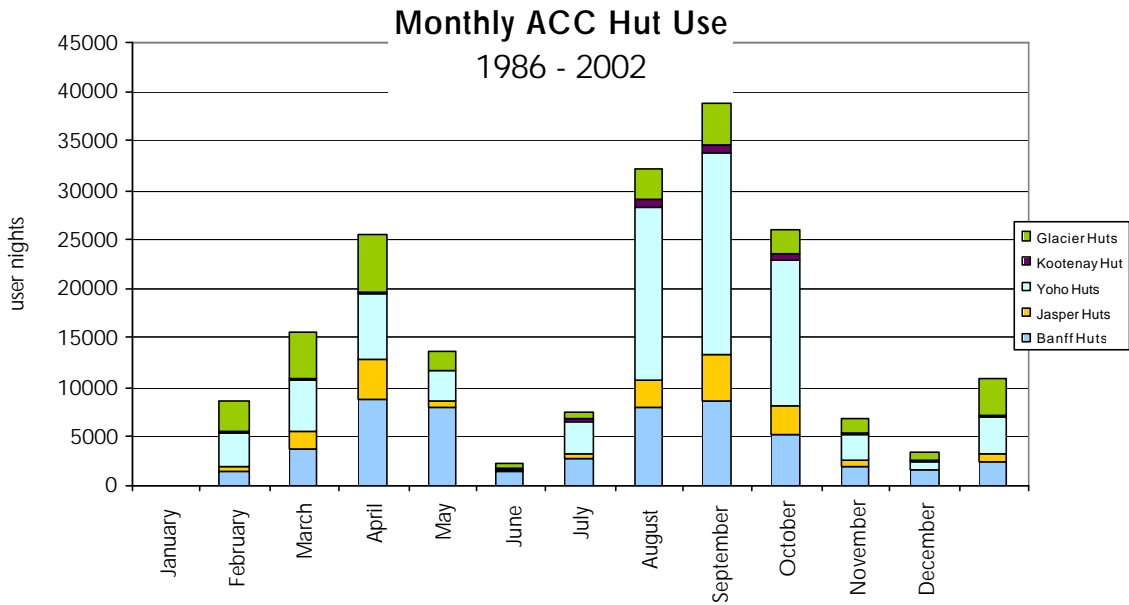
- a steady and significant overall increase in winter use of the ACC huts in the national parks as dramatically depicted by Figure 4: Winter ACC Hut Use – 1988-2002; and

Figure 4:



- Monthly ACC Hut Use 1988-2002 is instructive, showing that March use is comparable to use in one of the prime-hiking months - October - as illustrated in Figure 5, following.

Figure 5:



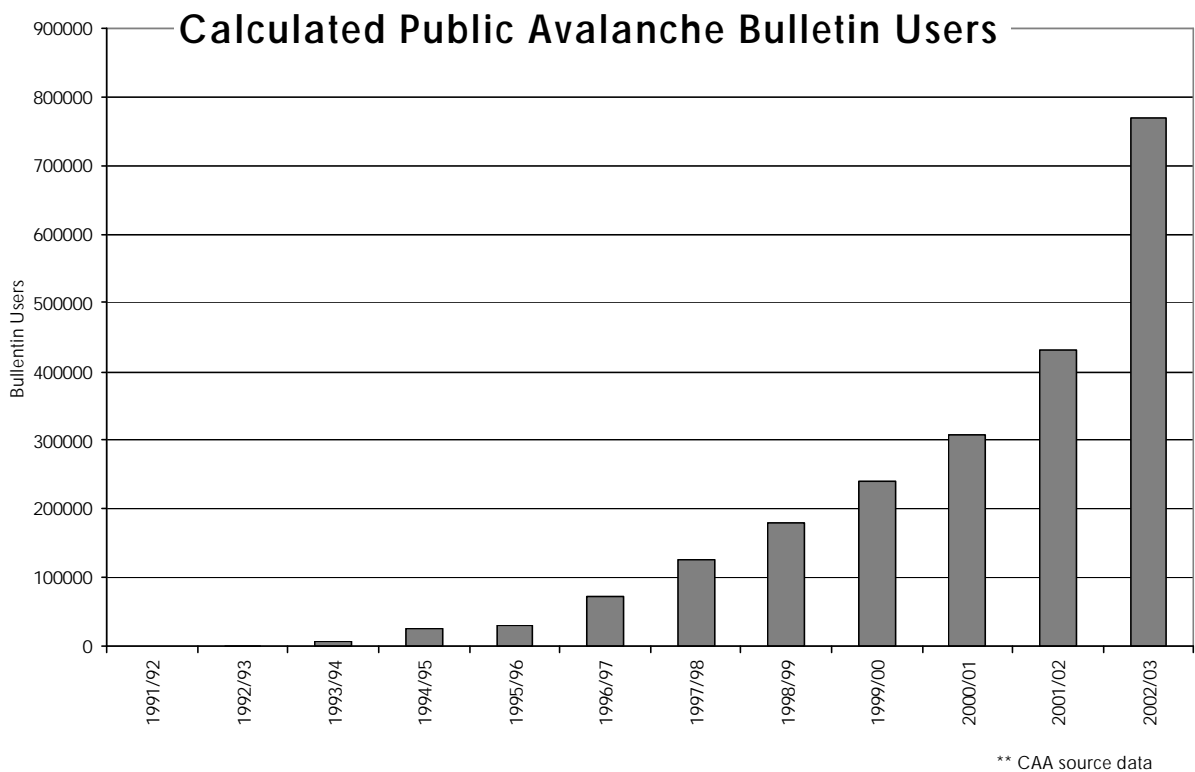
Mountain Equipment Coop kindly agreed to provide some insights from retail sales – as a general indicator of trends and offered these insights*:

- winter products represent approximately 50% of overall sales of Mountain Equipment Coop.
- a substantial increase in alpine (ski) touring equipment sales; as a specialized but growing niche, along with ski mountaineering. (This growth is facilitated by the significant improvements in the equipment available.);
- growth in snowshoe sales, considered primarily to be used for day use activities;
- sales of winter backcountry equipment have grown year after year (with the exception of 2002-03 when it is believed that widespread reporting of adverse snowpack conditions led consumers to defer purchase decisions.).

*Personal communication with Peter Robinson, C.E.O., Mountain Equipment Coop.

Use of the Avalanche Bulletin, produced by Parks Canada for the national parks and presented to the public through the Canadian Avalanche Association (CAA)*, is instructive. Figure 6, following, shows the dramatic growth in public use of these bulletins which first appeared in 1992/1993. This growth reflects the increasing availability of the information through the website but presumably also reflects growing interest of the public in winter backcountry use of the mountains.

Figure 6:



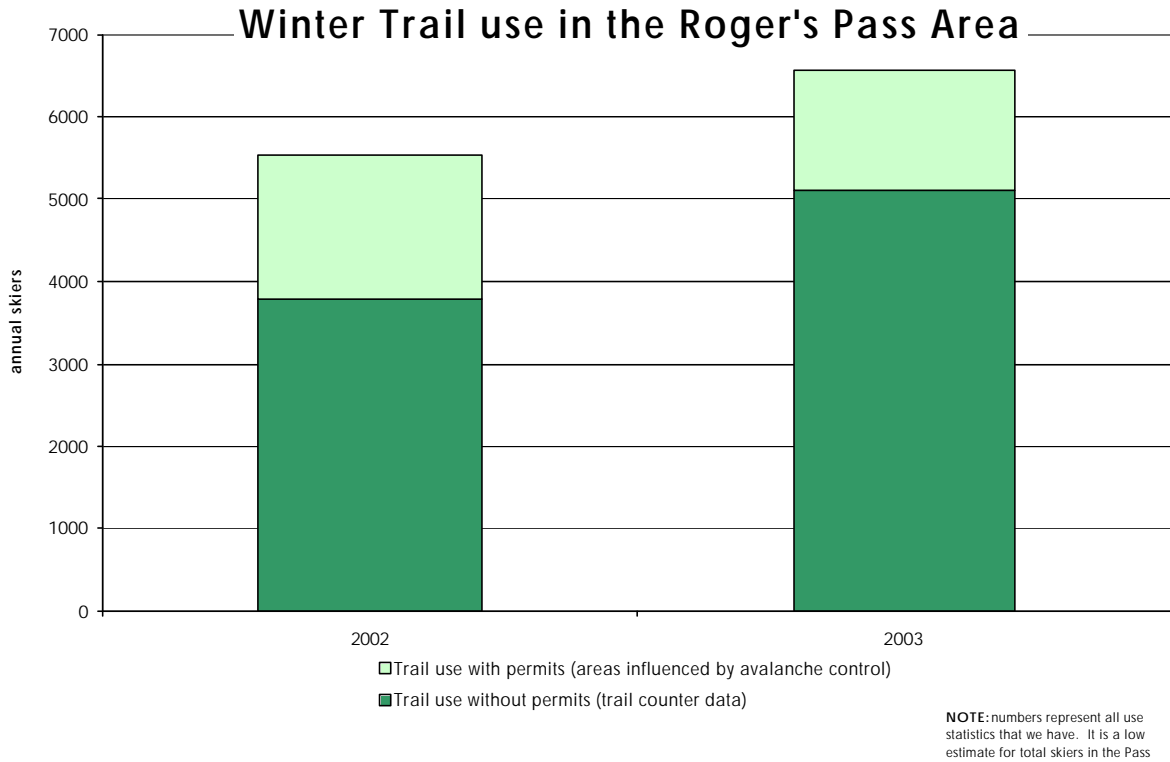
Other sources point to trends in winter backcountry use. Writing for *Couloir*,** Peter Kray estimates the backcountry market to be 300,000 or about 3% of the lift assisted ski market in the USA. This proportion probably applies to the Canadian market as does his outlook for winter backcountry use – “optimistically estimated at 5% annually”.

Such an aggregate overall estimate will not reflect local circumstances and attractivity. For example data from Glacier National Park shows considerable growth between 2002 and 2003 (see Figure 7: Glacier Park Winter Ski Permits and Trail Counter Statistics; 2002-2003 Comparison).

*The CAA is a non-profit society which operates from the Canadian Avalanche Centre (CAC) in Revelstoke BC. The terms CAA and CAS are used interchangeably in this report.

***Couloir*, Vol. XV-3, Dec. 2002

Figure 7:



It is sufficient to illustrate the special attraction of destinations in Canada's backcountry – both within and beyond the parks – which is increasingly featured in ski and snowboarding publications.

1.3 BACKCOUNTRY AVALANCHE RISK

Winter mountain backcountry travel, by its nature, presents inherent avalanche risks.

There are several interacting and changing factors that contribute to the degree of backcountry avalanche risk including terrain, snowpack conditions and the weather factors influencing it, and human factors – particularly decision making.

Terrain has an obvious impact with key variables being steepness (slope angle), elevation, aspect – including orientation to both the sun and prevailing winds, size and shape of the slope, gullies, and bowls, vegetative cover and terrain roughness. These can present hazards in and of themselves as well as being major influences on snowpack stability. The snowpack and the many variations in its stability – some terrain influenced and others determined by climate and weather – is a key factor

in backcountry risk. There are significant regional differences in snowpack deposition and accumulation. So in the Canadian cordillera, the snowpack west of the Rocky Mountains is generally thicker reflecting maritime climate influences. Further east in the Rockies, the continental climate results in a thinner snowpack, often subject to development of weak layers because of cold air.

A broad gradient from coastal (maritime) snow conditions, through a “transitional snow environment” in the Selkirk Mountains (which include Glacier and Mt. Revelstoke National Parks) to the continental snow conditions of the Rockies (which include Jasper, Banff and Waterton Parks) is recognized.*

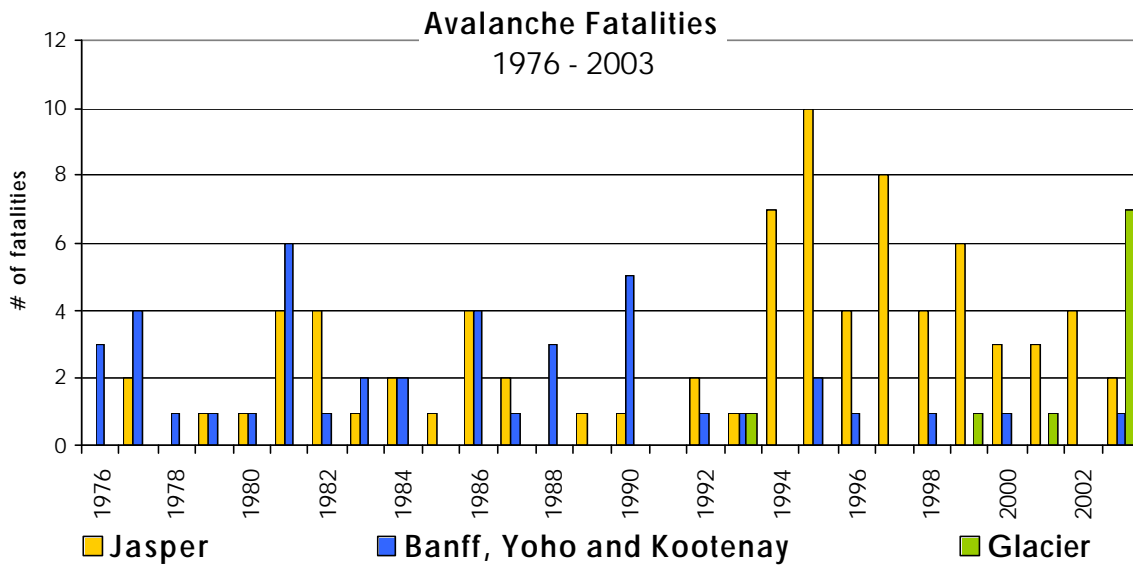
On top of the regional differences are local differences – often influenced by local terrain as well as wind exposure. The conditions during deposition of the snow as well as subsequent weather changes including temperature changes, melting and freezing, and other factors influence snow stability. Accordingly, understanding the history and structure of the snowpack is a key factor in avalanche risk reduction. Therefore, this information is interpreted for users and presented in the avalanche bulletins.

Human factors – particularly the interpretation of terrain safety and snow stability are key determinants of the degree of backcountry risk. Training to assist decision-making on whether or not to travel, where to travel and when to travel becomes a critical instrument of risk reduction. Route selection for example is a key decision. The key human factor is to learn to recognize locations where the risk levels are unacceptable and then to act accordingly.

The historical record on avalanche fatalities is instructive. The Warden Service compiled a record of “Avalanche Fatalities – 1976-2003” shown as Figure 8 below.

*See: British Columbia Ministry of Forests, *Snow Avalanche Management in Forested Terrain*, 2002, p.9.

Figure 8:



The average number of fatalities over the recording period appears to be approximately four and one half per year for all of the mountain national parks, with a peak of twelve in 1995.*

Importantly, there is no upward trend even in the face of growing use – including the emergence of snowboarding and ice-climbing and therefore presumed increases in risk exposure – the actual rate of avalanche incidents has declined. This likely reflects a combination of factors including avalanche risk education and awareness, awareness and use of forecast information, and personal preparedness.

Even considering the unusual snowpack conditions in Winter 2002-2003, and taking into account the greatly increased visitor population over the 30-year period shown, the rate of avalanche incidence compared to user population is declining in the mountain national parks. Given this important fact, the panel concludes that proposing fundamental changes to the policies and practices regarding visitor management in the backcountry of the national parks are not warranted.

*There were no recorded avalanche fatalities in Waterton National Park.

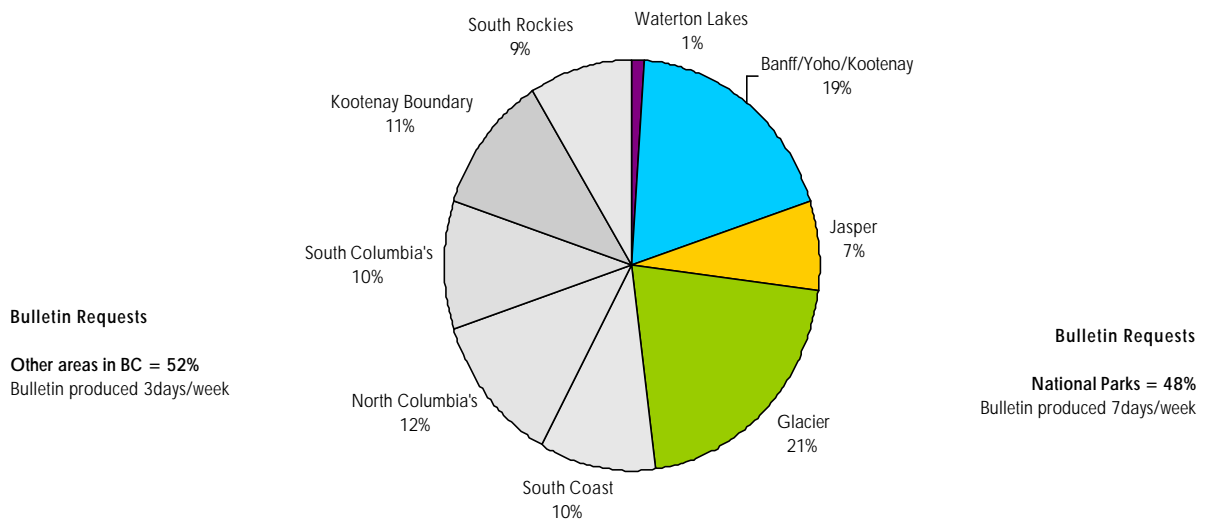
However, in view of the sharp increases in user population, the apparent tendency for a subset of users to seek “extreme” experiences, and the increasing tendency for some users to go “out of bounds” into the backcountry immediately adjacent to designated ski areas, renewed efforts in risk communication and training directed at the “unaware” type of backcountry user, appears to be essential. These are discussed later in this report.

As indicated in Figure 6, the total annual use of the public avalanche bulletin went to over 760,000 inquiries in 2002-2003. The Canadian Avalanche Association (CAA) believes the large increase between 2001-2002 and 2002-2003 reflected both general growth as well as particular interest because of the unstable snowpack conditions in 2002-2003.

As Figure 9 indicates, almost half of all public inquiries on the avalanche bulletin website in 2002-2003 are for the national parks. This high proportion certainly reflects the fact that the bulletins in these parks are updated daily (in contrast with three days per week elsewhere)...but it also indicates the popularity of the parks as a destination because of both proximity and inherent appeal.

Figure 9:

Avalanche Bulletin Web Requests by Location Winter 2002-03



** CAA Source Data

1.4 VARIED PERCEPTIONS OF RISK

The complexity of the factors bearing upon perception of risk are discussed at various points in this report. That perception is subject to many influences including the media, training, and education, attitude and experience.

The general public's perception is shaped from the many media reports covering catastrophic avalanches, especially those involving injuries, fatalities, or transportation disruption. The orientation of the media itself is varied – ranging from emphasis in human and compassionate concerns, to economic impact - to search for causes and to technical analysis. Popular media tend to emphasize human impacts which shapes general and political perceptions – particularly where “calls for quick action” are advanced.

Among the recreational users of the backcountry, perceptions vary widely. Popular media – print and film - and its associated advertising are significant shapers of factor perception – including the perception of the backcountry as a place for “extreme” experiences. Specialized publications and film tailored to recreationalists develop interest in backcountry as both a get-away and a place for high adventure. A few include materials to help inform participants to potential risk and offer educational guidance on safety practices.

Considering the wide range of demographics, experience and training – it is apparent that perception varies widely and approaches to risk communication must be similarly diverse. It is apparent however that there is an appetite for solid information such as avalanche bulletins.

With the growing use of the avalanche bulletins – especially those posted on the website, the CAA believes this information has had a major influence on users through influencing their trip decision-making.

1.5 PERSONAL AND PUBLIC SAFETY RESPONSIBILITIES

Regarding the concept of “backcountry” in relation to public safety, it has no absolute definition. In some applications, “front-country” is defined on the basis of adjacency to a main highway corridor as well as visual access to the height of land. Backcountry under this definition would lack primary highway access and would be more remote.

In the case of Parks Canada, it is employed differently. The practice is to consider as backcountry, all terrain which is not served by lift facilities and which is not road accessible and in which avalanche control measures are not undertaken. It is essentially lands beyond a trailhead – without roads or lifts – in which natural processes prevail. As a roadless area, backcountry is accessed through self-propulsion. It is a wilderness environment with minimal management.

Personal Responsibility

Backcountry – accessed as it is through wilderness travel – requires personal preparedness and responsibility for safety. Parks Canada’s policies on this are explicit:

“Parks Canada expects that park users will exhibit a degree of self-reliance and responsibility for their own safety commensurate with the degree of difficulty of activities they undertake...” and users are expected to:

- “be properly provisioned and have levels of knowledge, skill and physical fitness required...
- consider the information and advice provided...
- cope with adverse conditions...and
- assume a high degree of responsibility for their own safety and survival....”*

The idea of inherent risk is stressed in this policy statement and documents developed further to it.

Parks Canada’s Responsibilities

The responsibilities assumed by Parks Canada are similarly set out in a policy statement which, among other points, notes:

- “Parks Canada will place a high priority on...comprehensive incident prevention”
- “Parks Canada will place a high priority on providing information and advice to assist park users in reflecting and planning recreational activities which match their levels of physical fitness, technical ability, provisioning and equipment”...and
- “Consistent with the principle that park users are expected to be responsible for their own safety, levels of service and search and rescue in each park will:
 - a) focus on providing basic services...and
 - b) vary in direct proportion to levels of use and frequency of public safety incidents...”*

In terms of avalanche risk, Parks Canada has assumed a number of responsibilities over a considerable period of time – including avalanche control, forecasting, public communication and rescue response. With direct responsibilities for highways in the national parks – and particularly the Trans-Canada Highway – Parks Canada has an extensive frontcountry avalanche control program. At Rogers Pass in Glacier National Park, the Trans-Canada Highway

*Parks Canada Interim Bulletin 4.4.3 *Public Safety Management*, August 1998, p. 5/19

*Ibid

passes through a succession of active avalanche paths, where active avalanche control and associated snow-clearing exists. (This same corridor has the mainline of the Canadian Pacific Railway, which, like the highway, has protective sheds and also requires active avalanche control).

Parks Canada's avalanche control program at Rogers Pass is described as the single biggest avalanche control operation in North America. Integral to that control operation is a system for avalanche forecasting which is supported by a sophisticated network of telemetric snowpack and weather monitoring stations. Data from that network, coupled with routine field observations and monitoring plus weather forecasts, form the basis of a daily avalanche forecast.

Previously, Parks Canada also provided frontcountry avalanche control in the designated ski areas at Lake Louise, Sunshine Village (near Banff), and Marmot Basin (near Jasper). This control activity is now assumed by those resorts. Parks Canada does however continue to provide a daily avalanche forecast bulletin as a public service. That service was apparently initiated during the winter of 1981-1982 – reportedly in response to a number of fatal accidents earlier in 1981.**

Provision of the winter daily avalanche forecast bulletin remains a fundamental park safety and public service activity of Parks Canada's wardens. The wardens producing the forecasts are specialists in public safety issues as well as being qualified mountain guides. As with the frontcountry forecasts – the bulletins they prepare for the backcountry are developed by synthesizing snowpack data from recording stations and field operations with weather forecast data. Avalanche control is not carried out in the backcountry, thus making the avalanche bulletin a primary public safety tool.

Parks Canada has, as a matter of policy, committed to search and rescue services to minimize impacts of incidents – and these include avalanche search and rescue. Within the mountain parks, search and rescue is the responsibility of the Warden Service which has trained specialists to assist park visitors in distress. These public safety wardens are also members of the Association of Canadian Mountain Guides – an organization formed in 1964, with a motivating force being Walter Perrin, the then Assistant Chief Park Warden responsible for public safety.

Search and Rescue (SAR) services provided by Parks Canada are delivered in conjunction with other federal departments, other agencies, associations, and volunteer groups as appropriate.

The responsibilities described above take their guidance from the 1998 *Public Safety Management* Interim Bulletin 4.4.3 which outlines broad procedures for planning, safety information and control, and search and rescue. That bulletin, while comprehensive, should be reviewed to ensure it reflects more recent organizational changes in Parks Canada.

**Lyle Arthur Sutherland, *Managing the Avalanche Hazard Faced by Backcountry Skiers*, unpublished M.Sc Thesis, Department of Geography, University of Alberta, 1986.

2.0 RISK: CONCEPTS AND TERMINOLOGY

2.1 GENERAL CONCEPT OF RISK

“Risk” is best described as “the chance of loss (or gain)”. The aspect of “gain” is parenthesized because when most people think of risks, they think of what worries them most. For example, they think about the bad things that might happen to them and especially to their children, as a result of health threats or environmental pollution. However, above all risk is about “chance”. Asked whether an uncertain outcome is going to happen or not, a risk expert will reply: “Maybe”.

Most people will readily acknowledge that they willingly participate in risk-taking activities, not to prevent losses, but to achieve gains. For most this involves buying lottery tickets or spending limited amounts of their money playing various games of chance at casinos, the racetrack, or in “friendly” games of poker. Playing games of chance is where most people actually encounter the concept of probability (or chance) in their daily lives. Most will also be aware that they purchase insurance as a “hedge” against the chance that many bad events which occur randomly in the population could also happen to them. Even the most cautious (and therefore risk-averse) homeowners or vehicle drivers can wind up inadvertently causing a fire in their home or an accident on the road, respectively.

The “language of risk” is, however, gradually entering our everyday life because it is useful. Think about weather forecasts, for example, which are now given in probability terms. (“There is a 20% chance of showers today”.) Another example is the UV exposure index, which encourages individuals to assess their risk of sunburn – in terms of the likelihood of sunburn within a specified timeframe – on a scale which is derived from a spectrum of skin types in the population. This is a relatively recent development. It is likely that, if asked, many people would still struggle to articulate what a “chance of rain” really means. But using this language competently expands as a result of repeated usage, and we can expect much more use in the future, because it is the best way to express the fact that reality is made up of a range of possibilities at any moment in time.

2.2 AVALANCHE RISK TERMINOLOGY

As part of the language of risk, a vocabulary exists and it has its specialized interpretations of how it applies to avalanche risk.

Key Definitions Around Risk

- *Risk*: the chance of loss or harm to life (injury, death) and property, expressed as probability of occurrence (P) times consequence (C) or quantitatively as $R = P \times C$;
- *Hazard*: the source of harm (e.g. avalanche: sudden down-slope movement in a snowpack);

- *Probability (frequency) [P]*: the likelihood of being exposed to the risk event under specified circumstances (avalanche: “return period, the average expected time between events reaching or exceeding a given position” [CAA]);
- *Consequences [C]*: the magnitude of the loss or harm, (e.g. number of injuries and deaths plus monetary losses);
- *Exposure*: which persons or structures are likely to encounter the risk event, under specified conditions;
- *Risk Assessment*: determination of the level of risk, either qualitatively (low, medium, high) or quantitatively (e.g., the annual probability of a size 3 snow avalanche at a particular location);
- *Acceptable Risk*: the level of risk for an activity, as understood qualitatively by either a risk manager or a member of the public, at which a person would willingly expose himself or herself to that risk. It is important to note that determination of what is an acceptable level of risk will differ widely among individuals for the same risk situation, depending on a wide variety of factors, including the subjective judgments made by those individuals.
- *Trade-offs*: comparing various aspects of a risk situation, for example, the personal benefits of an activity to an individual compared with the chance of a specified type of harm.

Interpreting Risk

Risk terminology can be either obscure or confusing to many individuals who may not appreciate the significance of the precise distinctions which are essential to understanding and “managing” it. The most common misunderstanding is between *hazard* and *risk*. Since a hazard description focuses on the nature of the harmful events that may occur, it is not surprising that many people become fearful simply from hearing such a description.

However, what links and differentiates “hazard” and “risk” is the key third term, *exposure*. To illustrate, a hazard is of no consequence to a person who is not at all exposed to it. Backcountry avalanches, therefore, should not concern anyone who avoids traveling in the backcountry. In Canada avalanche hazards in mountainous terrain are common, but they represent a risk only to people using such locations when a certain depth of snowpack exists, thus presenting exposure to risk.

Almost everyone can have some trouble in trying to do a personal assessment of danger when probabilistic information is presented. This is true whether or not the information is presented qualitatively or quantitatively. For example, what exactly is the difference – in practical terms – between “low” and “moderate” avalanche risk? Or between a 10% probability and a 20% probability?

There is a good reason for the difficulty we have with either of these forms of expression when it comes to something like risks associated with recreational activities like backcountry skiing. The reason is, we are not evaluating the risk in isolation. Rather, we are trying to work out an intuitive calculation of the trade-off between risk and benefit. Our risk evaluation is often done when we are already engaged in preparing for an activity, at which point the expected benefits are uppermost in our minds. This “bias” can have an impact on the way in which we interpret the probabilistic information we are subsequently given, by risk managers, about the risks. In other words, there is always the possibility that we might downplay the risks, even subconsciously, so that our personal trade-off calculation shows an excess of benefit over risk – in other words, a “go” decision.

These and other complexities inherent in the personal use of risk terminology mean that risk managers need to be extremely careful in the expressions they choose in communicating risk to the public. Given the reality of these complexities, there are no ideal or perfect solutions to any risk communication challenge. Rather, there is a need for the risk manager to always:

- be alert to the possible misunderstandings that might arise;
- solicit feedback from the intended recipients about the effectiveness of risk communication formats; and
- continuously experiment with new formats to increase the effectiveness of risk messages.

2.3 CANADIAN AVALANCHE DANGER DESCRIPTIONS AND TERMINOLOGY

As indicated above, use of the risk-based approach is a key tool for both assessing the hazards the public may encounter in activities undertaken in national parks and elsewhere, and communicating the results of those assessments to the public.

With specific reference to avalanche risk, the key terminology is used and presented in the widely-used, five-level danger scale of the CAA, having descriptors for each of the levels as follows:

- **Low:** Natural avalanches *very unlikely*. Human triggered avalanches *unlikely*.
- **Moderate:** Natural avalanches *unlikely*. Human triggered avalanches *possible*.
- **Considerable:** Natural avalanches *possible*. Human triggered avalanches *probable*.
- **High:** Natural and human triggered avalanches *likely*.
- **Extreme:** Widespread natural and human triggered avalanches *certain*.

This application of avalanche risk rating, based on a European system, is a good example of how qualitative terminology has been chosen in order to convey a probability continuum to users. Within this five-point danger level scale there are six probability indicators, as qualitatively expressed, in ascending order: *very unlikely – unlikely – possible – probable – likely – certain*. Four of the six terms are commonly used in everyday life and are intuitively easy to understand: very unlikely, unlikely, likely, certain. However, this is not the case with the other two terms – possible and probable. Unfortunately, these also happen to be the descriptors for the most critical level of danger encountered by winter backcountry travellers - namely, “considerable.”

Much attention among avalanche professionals has been focused on the “mid-point” in this avalanche danger scale, namely, the designation “considerable.” This is appropriate because the panel, in its discussions, heard that risk managers think that this is the category on the danger level scale where the most serious forms of misinterpretation by the public arise and also where experience has shown the highest frequency of avalanche incidents occur.

Generally speaking, when communicating to the public, experts should use words in accordance with ordinary, everyday usage. The best reference-point for such usages is provided by common dictionary definitions. Here are a list of key words used in the avalanche danger scale from *Merriam-Webster’s Collegiate Dictionary, Tenth Edition*:

- Unlikely: “not likely: Improbable”;
- Possible: “being something that may or may not occur”;
- Probable: “likely to be or become true or real”;
- Likely: “having a high probability of occurring or being true; very probable”;
- Certain: “inevitable”.

The most important for our purposes here is the definition of “probable”: Webster’s uses “likely” as a synonym, and “likely” is defined as “high probability.”

On the intuitive level “possible” seems to correlate with “unlikely,” and as a practical matter, this would seem to be an adequate representation of the level of danger that is being conveyed. However, “probable” is a far more problematic term in this context. Clearly, the authors of the danger level scale intend to discriminate between “probable” and “likely,” assigning some (unspecified) higher degree of likelihood to the latter than the former. And yet, using an introspective test, one is challenged to come up with a good way of specifying *to what degree* “probable” is less likely than “likely.”

For example, is the term “probable” meant to indicate a level of about 50% (“50-50”) probability? Or 40%? Or less – and if so, how much less?

These questions are designed to raise the issue of whether or not the six-part qualitative terminology used in the avalanche danger scale might be accompanied by numerical probabilities, in order to better convey the *essential differences* between each of the various levels. The panel does not minimize the complexities involved but proposes that issue should be researched.

This is not an inconsequential matter. Peoples’ backcountry travel decisions are based on the information available and is only truly “available” if it is comprehensible to them. This means ensuring understandability in both the language used and the underlying concepts.

Given that, since the five-level scale has been widely used for a long time, and has become the international standard on which the CAA system is based, there would be little support for substituting another one, such as a three-point scale (low – moderate – high).^{*} However, the whole point about any such scale, and its qualitative descriptors, is to communicate risk to the non-expert public. Therefore, it is wise to periodically review, analyze and compare the communicative utility of existing and alternative danger rating schemes to continuously improve their effectiveness.

In this context, the seven categories and their associated probabilities used by the Intergovernmental Panel on Climate Change are instructive:

<u>Category</u>	<u>Probability (%)</u>
• Exceptionally unlikely	< 1
• Very unlikely	1-10
• Unlikely	10-33
• Medium Likelihood	33-66
• Likely	66-90
• Very Likely	90-99
• Virtually Certain	> 99

They could form the basis for dialogue on the present CAA five-level scale and how it might be accompanied by numerical probabilities.

^{*}CAA, *Guidelines for Snow Avalanche Risk Determination and Mapping in Canada* (2002) p. 10 which reference “three orders of magnitude for avalanche frequency and consequences rated qualitatively (proportionality to the risk) with risk rated as low (L), moderate (M) and high (H) for damage to forest cover.”

2.4 RECOMMENDATION

- (1) Parks Canada should propose to the CAA, the initiation of an “expert-based” review of the language in the current avalanche danger scale with a view to assessing potential refinements and introducing improvements to enhance both its understandability and utility to backcountry recreational users. Further clarification of the terms and the associated probabilities (and the determining factors) should also assist those who prepare forecasts.

Additionally – avalanche risk is a combination of both probability and the consequences in terms of destructive potential. Any re-examination should also consider how best to factor in the concept of “consequences” in the rating scale.

3.0 PARKS CANADA'S BACKCOUNTRY AVALANCHE RISK MANAGEMENT SYSTEM

3.1 THE POLICY CONTENT

Parks Canada, as a federal agency, works within the context of national legislation and a body of supporting regulations and policies. The policies themselves have evolved from field practices within Parks Canada and its constituent parks in response to demand and necessity. The *Canada National Parks Act, 2000* is the latest legislative statement, which has evolved from the initial 1930 statute. That Act provides the legal basis for regulations and the policies which outline how they are applied. It provides for the preparation of a "management plan", for each park "continuing a long-term ecological vision for the park...and provision for resource protection and restoration, zoning, visitor use, public awareness and performance evaluation..."*.

The supporting policy states that:

"Park management plans provide the framework for further detailed sub-plans concerning:

- (i) ecosystem management (park conservation plan); and
- (ii) interpretation, visitor services and visitor risk management (park service plan)**.

Again, as a federal agency, Parks Canada also works under the umbrella of overall national policies. One such policy is a statement on approaches to risk management issued by Canada's Treasury Board.

3.2 FEDERAL TREASURY BOARD FRAMEWORK

The Treasury Board's 2001 document, *Integrated Risk Management Framework*, provides broad functional guidance for risk management planning for all federal agencies, including Parks Canada.

Its generic definition of the area is as follows: "Risk management is a systematic approach to setting the best course of action under uncertainty by identifying, assessing, understanding, acting on and communicating risk issues." The following extract from this document sets out both a clear general process and a set of expectations for application to every area of responsibility of the Federal Government.

**Canada National Parks Act, 2000, s.11.*

**See Section 2.1.4, *Guiding Principles and Operational Policies*, Parks Canada, 1994.

“Risk Identification –

1. Identifying Issues, Setting Context:

- Defining the problems or opportunities, scope, context (social, cultural, scientific evidence, etc.) and associated risk issues.
- Deciding on necessary people, expertise, tools and techniques (e.g., scenarios, brainstorming, checklists).
- Performing a stakeholder analysis (determining risk tolerances, stakeholder positions, attitudes).

Risk Assessment –

2. Assessing Key Risk Areas:

- Analyzing context/results or environmental scan and determining types /categories of risk to be addressed, significant organization-wide issues, and vital local issues.

3. Measuring Likelihood and Impact:

- Determining degree of exposure, expressed as likelihood and impact, of assessed risks, choosing tools.

4. Ranking Risks:

- Ranking risks, considering risk tolerance, using existing or developing new criteria and tools.

Responding to Risk –

5. Setting Desired Results:

- Defining objectives and expected outcomes for ranked risks, short/long term.

6. Developing Options:

- Identifying and analyzing options – ways to minimize threats and maximize opportunities – approaches, tools.

7. Selecting a Strategy:

- Choosing a strategy, applying decision criteria – results-oriented, problem/opportunity driven.
- Applying, where appropriate, the precautionary approach/ principle as a means of managing risks of serious or irreversible harm in situations of scientific uncertainty.

8. Implementing the Strategy:

- Developing and implementing a plan.

Monitoring and Evaluation –

9. Monitoring, Evaluating, and Adjusting:

- Learning, improving the decision-making/risk management process locally and organization-wide, using effectiveness criteria, reporting on performance and results.”

This framework provides broad guidelines on contents and approach to risk management based on “best practices”.

Prior to these guidelines, there has been considerable visitor risk management practice in Parks Canada. For example, serious mountaineering accidents in Banff in the 1950's led to the establishment of a search and rescue program in the national parks – a key function of the Warden Service today. It was accompanied by parallel development of incident prevention services, the practice of which is perhaps best summarized in Parks Canada's *Visitor Risk Management Handbook*, 1996. That document reflected the Treasury Board guidelines in place at that time.

The general principles and practices of the 2001 framework provide a useful checklist and appear to be reflected in both the above Handbook and park specific public safety plans discussed below.

3.3 PARKS CANADA'S RISK MANAGEMENT FRAMEWORK

The general framework of legislation, "activity" policy directives, and especially Directive 4.4.3, Public Safety Management, are very clear respecting:

- the priority on accident prevention;
- the expectation of and responsibilities for reasonable prevention actions by park officials;
- the responsibilities of park users for their own safety commensurate with the activities they undertake.

As part of Parks Canada's Guiding Principles, the principle on "Appropriate Visitor Activities" states:

"There are inherent dangers associated with some natural and cultural features and public activities. Therefore management programs involving others are developed by Parks Canada for the safety of visitors. Public safety considerations are built into planning and design processes. Priority is placed on accident prevention, education and information programs...and visitors are encouraged...to learn about any risks...and to exercise self-reliance and responsibility for their own safety in recreational and other activities..."*

These broad policies and principles give guidance to Park Management Plans which in turn provide for detailed sub plans on "interpretation, visitor services and visitor risk management (park service plan)"** which are discussed below.

3.4 RISK MANAGEMENT PLANNING AND FIELD PRACTICES

The *Visitor Risk Management (VRM) Handbook* provides a generally sound basis for preparing plans to manage public safety in Canadian national parks. The

*Parks Canada, *Guiding Principles and Operational Policies*, 1994.

**Ibid, Section 2.1.4, Management Plans

panel recognizes it is an evolving framework which sets out the program logic for developing a “public safety plan”. It cites many examples of best practices in the national park system at the time of its publication.

The public safety plans for the mountain national parks also reflect an evolution of thinking and practice. All reflect an action orientation towards Search & Rescue (SAR) and the associated operating plans – emphasizing direction and coordination of emergency operations and the detailed operating procedures and checklists.

The public safety documents examined by the panel are:

- 1989 Emergency Contingency Plan: Mt. Revelstoke and Glacier National Parks. Includes:
 - Search & Rescue Response;
 - Search & Rescue Operating Procedures;
 - Cave Rescue Procedures; and
 - Avalanche Rescue Procedures.
- 1989 Natural Hazards Assessment and Evaluation: Waterton Lakes National Park
- 1994 Public Safety Plan: Banff National Park
- Public Safety Plan: Yoho National Park
- 2001 Public Safety Plan, Jasper National Park of Canada
- 2002 Emergency Plan: Lake Louise, Yoho and Kootenay Field Unit
- 2002 Search & Rescue Operating Procedures: Lake Louise, Yoho and Kootenay Field Unit. Also:
 - Avalanche Rescue Plan (2003)

Each of these planning documents have been developed at different times, by different people and with differing emphases and reflects the substantial discretion given to each park superintendent to assess local requirements. The plan document and the related planning process have several benefits, including: clarifying understanding of the issues; facilitating thinking on approaches to risk management; communicating the rationale for the selected approaches; providing a template for project assessment and prioritization; and documenting current thinking to orient new staff, which is particularly helpful where staff succession is to occur. Plans also provide context for the more specific operating procedures.

The Mt. Revelstoke/Glacier documents are oriented towards incident response and while sufficient for that purpose, would benefit from an overview public safety plan presenting overall objection issues, risk control strategies, and service/response priorities.

The Waterton Assessment takes a strong “biophysical” approach and places emphasis on reviewing incidents in the context of various natural hazard categories - including avalanche. It employs a simple, judgement-based system to rank hazards which inherently places a greater emphasis on frontcountry activities and areas with high visitor exposure. In that respect, it may not be the ideal or sole prioritization tool, although it is helpful in identifying high-risk sites.

The Yoho plan is similar to that for Banff. The Lake Louise, Yoho, and Kootenay field units reference both of these plans and has detailed search and rescue procedures.

The Banff Public Safety Plan (developed with consultant assistance) reflects more recent thinking and includes:

- Guiding Principles including communication, due diligence, and cost effectiveness;
- Issue identification;
- An activity-based, hazard-based, and “hot-spot” based overview;
- A breakdown and description of incident data on each major activity to highlight hot spots and issues;
- An issues list.

Its procedural provisions for plan preparation warrant review in consideration of changed staffing arrangements.

The Jasper Public Safety Plan, the most recent comprehensive document (prepared with consultant assistance), features:

- guiding principles (as per Banff);
- a concept for decision-making including provision for public safety advisory groups;
- a clear statement of objectives as a framework for laying out ongoing operations and planned projects for each objective;
- short performance measures;
- broad costing for each service objective; and
- appendices include a hazard, hot spot, and activity based analysis (per Waterton and Banff).

The Jasper document, built on earlier experiences, with its clear tabular presentation of objectives and related actions provides a template for updating of the public safety plans for the other mountain national parks. It also provides a structured context for detailed operating (a.k.a. contingency) plans.

3.5 RECOMMENDATIONS

Based on workshops with Parks Canada's staff and associated review, the following recommendations are advanced with regard to risk management planning:

- (2) Parks Canada should clarify the relationship between the Public Safety Plan and various other plans. The stated principle is that public safety considerations are built into planning processes.

The various plans identified include:

- Park Management;
- Park Service;
- Public Safety;
- Park Conservation;
- Backcountry Management; and
- Wildlife Management.

Questions to consider with regard to these plans are:

- what guidance is provided by a park management plan to a public safety plan?
- conversely, what public safety factors should a park management plan consider?
- what is the relationship between the Park Service Plan and the Public Safety Plan? Are both needed?
- are the public safety linkages with the other sub-plans clear?

Clarifying these relationships and plan requirements should help reduce the "planning fatigue" expressed by some operational staff and also reinforce the value of the Public Safety Plan as a strategy document and as a tool for budgeting and prioritizing projects.

- (3) Parks Canada should consider developing a simplified version of the current *Visitor Risk Management Handbook* to enhance its utility to field staff in the mountain national parks and specifically could:

- benefit from incorporating "best practice" features from the most recent public safety plans in the mountain national parks in order to encourage their adoption;
- contain a new and separate category on avalanches, which are currently grouped under "Falling National Objects". Their magnitude and consequence of avalanches in the mountain parks warrants this;

- clarify the relationship between the Public Safety Plan and associated operating procedures (both of which are required); and
 - clarify the specific required contributions for public safety delivery, including that from communications staff to ensure that their issue management and media relations' priorities do not preclude effort on accident prevention through risk communication.
- (4) A cross-park review and update of public safety plans in the mountain parks should be considered, not to foster consistency for its own sake – but to encourage incorporating best practices throughout these parks. This could be facilitated through the “public safety network” – comprising the public safety specialists in the mountain parks.
- (5) As an adjunct to its planning, Parks Canada should seriously consider a regionally based (i.e. for all the mountain parks) public safety advisory committee (or alternatively a periodic forum) drawn from key stakeholder groups which could serve as a sounding board on public safety issues and initiatives.

There are also some important considerations with respect to the gathering of information required for safety-related planning for winter backcountry use in the mountain national parks.

- (6) Parks Canada should review its approach towards the collection and consistent recording of data on winter backcountry use across the mountain parks in order to enable assessing trends and patterns of public use.

Data on winter backcountry use is limited and much of it is anecdotal and would benefit from more systematic efforts to collect it. A regular system of sample surveys at more heavily used winter backcountry sites (e.g. Bow Summit) could provide a base of data (e.g. demographic profile of visitors; origin of visit, activity, frequency of use, avalanche awareness, etc.) to help in deriving trends and identifying communications needs. The panel recognizes that data collection and management will require staff resources – a difficult challenge in an era of reduction.

- (7) Regarding avalanche incidents, these are currently reported under an overall “occurrence” reporting system, covering a range of enforcement issues. A dedicated separate reporting “section” or report on Avalanche Incidents is recommended to facilitate deriving of information from the database.

To help ascertain trends and patterns in avalanche incidents, consistent data categories should be employed, covering headings such as backcountry activity, location of incident, number in party, type of avalanche, natural or human triggered, victim status (i.e. impacts), forecast and actual conditions at the time, and number of staff responding. This could form the basis for annual reporting on the avalanche bulletin website as well as serve as a tool for future avalanche safety planning.

4.0 UNDERSTANDING PERCEPTION OF RISK

4.1 GENERAL FRAMEWORK

Citizens look at risk differently than professional risk managers do. Many feel much more comfortable with familiar hazards, such as car accidents, as opposed to unfamiliar hazards, such as radiation. They appear willing to tolerate much higher risks for the former than for the latter. Additionally, many do not react in the same way to all consequences, such as fatalities. Deaths of children, for example, are regarded as particularly tragic, as are deaths of large numbers of people simultaneously, as in airplane crashes. Not all ways of dying or falling ill are regarded as equal, with cancer or slow neurodegenerative disease being more dreaded than sudden accidental death.

Many are offended if, in response to an expression of concern about a particular hazard, such as radiation from nuclear power plants, they are told that, by comparison with many activities they cheerfully indulge in daily, that there is nothing to worry about. Many do not understand why, with all the resources of modern science at their disposal, risk managers cannot give clear and unequivocal responses to their concerns, but instead present their answers in terms of probabilities, that is, the chances that something bad may or may not happen.

The public appears to believe that it matters greatly whether one is exposed “voluntarily” or “involuntarily” to risks, even if the consequences of the former (such as smoking) exceeds the latter by a wide margin. This behaviour or belief appears to be rooted in the importance of the value placed on personal choice and individual autonomy. Most recreational activities fall into the category of voluntary risk, including winter backcountry activity with its risk of avalanches. It is safe to assume that these risks are voluntarily assumed, with the proviso that a sufficient level of awareness is present in the risk-taker, so that he or she understands, as fully as possible, what risks are present in a given situation.

Closely related to the voluntary assumption of risk is the matter of familiarity. A general rule in the risk perception field is that people overestimate the frequency and magnitude of unfamiliar risks and underestimate them for familiar risks. An unfamiliar risk is, for example, an industrial chemical and a familiar risk is automobile driving. People overestimate, by a wide margin, their own competence behind the wheel in comparison with others and thus underestimate their personal risk (these are the types of risks for which it is common to think that “they happen to other people”). The erroneous reasoning is that one’s relative competence protects against accidents. The assumption of personal competence is translated into a subconscious downplaying of the risks, both as to frequency and personal consequences.

All recreational activities fall into the category of familiar risks, even when aspects integral to the activity (such as being in mountain avalanche terrain) may be quite unfamiliar. Meanwhile the activity itself, such as skiing, snowboarding or hiking, is very familiar. These deeply entrenched attitudes represent a challenge to the capacity of risk managers to deliver effective and persuasive warnings.

Finally, one key consideration with respect to backcountry avalanche risk, is for the risk manager to have a clear idea of who it is that is accepting the risk. Adults making decisions for themselves can be considered to be the “risk-takers”. A special situation exists, however, in all cases where there is an intermediate institution, acting *in loco parentis*, which is organizing activity for young people under the legal age of majority (where parental consent forms are required). In this case it is the parents who are actually the risk-takers, not the young people, and it is therefore the parents who need to be well informed of and understand the relevant risk factors.

4.2 “RISK HOMEOSTASIS” AND CHANGING SOCIAL VALUES

“Risk homeostasis” – or, more simply, the notion that everyone has a personal “set-point” for risk tolerance – is a concept made familiar by Queen’s University psychologist Gerald Wilde. Our “set-point” acts like a thermostat, keeping the level of risk in our environment relatively constant as the external environment changes around us. In practical terms, this means that as our environment becomes relatively safer (better diet, health care, safety devices), some portion of the population, who have on average a higher tolerance for risk than others, will actively seek out risky new activities. The growing popularity of “extreme” sports exemplifies this.

In fact, public perceptions of risks are not static over time. Rather, they mutate in response to many factors, such as information acquisition, aging, acquisition of new skills, and changing cues (peer pressure) in the social environment. Current advertising shows many examples of relatively more extreme risk-taking by young people in popular sports, without portraying potential consequences. Even the many automobile ads directed at well-to-do adults feature examples of driving and handling at speeds that only professionals could safely do, with the disclaimer (“don’t try this yourself!”) flashed quickly on the screen – all of which seems paradoxical.

Nevertheless, this is a part of our popular culture today and one which risk managers must be familiar with, especially if they are – like Parks Canada – in the business of providing outdoor recreational opportunities with their inherent risks.

4.3 APPLICATION TO PARKS CANADA'S RISK MANAGEMENT

Understanding of the underlying dynamics in the public's perception of risks is very useful for risk managers, including those with Parks Canada. This understanding assists risk managers in knowing:

- what types of information they should seek to convey;
- what types of risk-takers make up the key audiences for risk messages; and
- what types of information presentation formats are likely to be most effective for their messages.

These dimensions can be considered relative to a four-category user profile identified by Parks Canada in a presentation to the CAA*. Those categories of winter backcountry users are described as the:

- professional;
- trained recreationalist;
- untrained recreationalist; and
- unaware.

Applying this communication direction means considering type of information, audience and format:

1. Types of information:
All users except the "professional" category may, for varying reasons, be expected to under-estimate risk. Therefore the language used to convey different levels of danger must be chosen accordingly – in other words, it should seek to prevent users from "discounting" the risk. An example is the argument that tobacco companies should be forbidden to use the words "light" and "mild" to describe some of their products, since there is evidence to show that users allow themselves to believe that these products represent lower risk.
2. Key audiences:
The least-aware users (the "unaware" and the "untrained recreationalist") constitute the "front line" for risk communications. Hazard warning information must be designed in the first instance for these users, which means that the meaning of words and expression must be easily comprehensible to them.

*Presentation by Steve Blake to the CAA Annual Meeting, Penticton BC, May 2003.

3. Effective information presentation formats:
Some combination of familiar “icons” coupled with short “high impact” verbal descriptors (backed up by more detailed information, of course), delivered at times and places designed to maximize attention getting, should be the basic thrust of risk communication efforts. (See Section 5.0 for further discussion of this topic.)

4.4 RESPONSIBILITIES OF MANAGERS AND USERS

Management of risks for backcountry activities in national parks is, as previously noted, a shared responsibility between users and parks managers. One way of dividing this responsibility is as follows:

1. *Responsibilities of Parks Managers:*
 - Assessing risks on an ongoing basis, through information-gathering and the application of danger classification methods (as is the current practice);
 - Understanding the basis for the risk perceptions and risk awareness levels of typical users;
 - Communicating risks to users effectively and through easy-to-access formats.
2. *Responsibilities of Users:*
 - Accessing up-to-date risk assessments provided by parks managers;
 - Making informed judgments about personal risk-taking, based on appraisals of all relevant information including their levels of personal fitness preparedness, expertise and training;
 - If acting *in loco parentis* or on behalf of another person who is not taking part in the activity directly, ensuring that such other party is fully aware of the risk factors and how to evaluate them.

In an electronic age, the availability and influence of media is all pervasive and capable of influencing the risk tolerance for “extreme” activity - without portraying potential downside consequences. Beer commercials and “extreme” outdoor films are cited as contributing to increased risk taking with inadequate conveyance of such consequences.

4.5 RECOMMENDATIONS

- (8) Given the importance of communicating with the “least aware” winter backcountry users, and the concern that the current avalanche safety information may be too technical, Parks Canada should consider devoting a modest expenditure to focus group testing of the most important set of messages and the most effective presentation formats to convey them.
- (9) Parks Canada, in conjunction with other agencies supporting safe winter outdoor recreation, should actively promote partnerships with the media, the advertising industry, and the outdoor film industry to foster public service print and video products intended to foster more informed perceptions of risk – and particularly risk avoidance behaviours.

Additional recommendations respecting the application of this communication direction are presented in the following section.

5.0 COMMUNICATION OF RISK

5.1 GENERAL PRINCIPLES

Risk communication is the process of communicating responsibly and effectively about the risk factors associated with industrial technologies, natural hazards, and human activities. Communication responsibilities arise for developers and managers of industrial technologies, as well as for those who oversee public health, environmental management for natural hazards and for public activities. In general, risk managers have an obligation to effectively communicate their assessment of the risks associated with their specific risk management responsibilities.

As indicated in Section 4.0, professional risk managers must assume that members of the public will understand risk in ways that differ from the formal risk assessment methodologies of trained professionals. Good risk communication practice seeks to overcome those differences in order to facilitate informed understanding of the risks and trade-offs associated with the activities which members of the public wish to engage in. This is accomplished by:

- seeking to understand the basis of public risk perceptions for the activities in question;
- interpreting the results of expert risk assessments in terms that are appropriate for non-expert audiences; and
- over time, trying to develop a shared understanding, between the public and the risk managers, of the risk factors.

Informed public understanding of risk factors is the key to achieving broad support for, and trust in, risk management strategies. This requires devoting sufficient resources and effort to ensure effective risk communication practices.

5.2 APPLICATION TO PARKS CANADA'S RISK MANAGEMENT

With respect to backcountry avalanche risk in the mountain national parks, Parks Canada faces risk communication challenges, posed as questions:

With respect to the *assessment* of risk:

- Is there uniformity in the collection and reporting of relevant data, so that the public may get a clear sense of comparative risk across different areas and environmental conditions?
- Is there consistency and robustness in the methods used to “roll up” the data into danger or hazard categories that are easily understood by the public?

- Is the overall assessment of risk then reported to the public in easily accessible terminology?

With respect to the *management* of risk:

- Is there a consistent understanding and reporting of the risk assessment results across different parks and for similar situations?
- Is the “division of responsibility” for managing risks – as between Parks Canada staff and the public – presented clearly to, and understood by, members of the public who use the parks?

With respect to the *communication* of risk:

- Are the different types and magnitudes of relevant hazards presented to members of the public in ways that enable them to make informed judgments about risk-taking?
- Is the full range of information presentation formats used to convey danger being utilized effectively?
- Are the “most vulnerable” categories of users (however defined) being reached by clearly understandable warnings?

While this section concentrates on the communication of risk, the questions on both risk assessment and risk management are clearly applicable to the overall challenge of effectively informing park users.

As a general statement, it is fair to observe that the avalanche bulletin system pioneered by Parks Canada beginning in 1981, and now presented to the public through the CAA’s website, meets the test of uniformity in collection and reporting of relevant data. It is considered consistent and robust in the methods used to both collect and assemble data on snowpack and weather conditions to develop avalanche risk forecasts. The fact that it is prepared for five separate “field units” in the mountain parks is an effort to ensure it reflects the more local environmental conditions in each of those park units.

There are, of course, remaining technical challenges for the bulletin system – not the least of which is the large geographic scale of the forecast units, but also the variations in terrain types both within and between the units. Forecasters endeavour to make significant generalizations based on their knowledge of the terrain, plus snowpack data from regular and supplementary point sources, and weather forecasts then apply the standard avalanche risk ratings to produce a public advisory bulletin.

The matter of communication of risk and how to increase its effectiveness, which this panel was specifically directed to explore, is discussed below.

5.3 “DUTY TO WARN”

The concept of “duty to warn” is well-entrenched in common law and civil law codes and provides the most suitable basis for Parks Canada’s risk communication responsibilities. It means that the risk manager has the duty to: (1) assess levels of danger; and (2) advise users of these dangers in understandable and accessible formats. Skilful assessment of conditions is clearly critical.

If the assessment is carried out at a reasonable level of effort and skill, the discharge of duty to warn responsibility shifts to the effective provision of hazard information. For avalanche risks and related natural hazards, the core challenge is to discharge this responsibility without inappropriately discouraging the activities and to provide information that assists users make informed decisions. Warnings that are vague, overly general or non-specific, not sufficiently discriminating (as between different conditions), or not based on current information, are useless if they lull users into a false sense of security, with potentially disastrous consequences. This is, of course, why avalanche bulletins are frequently updated.

The duty to warn may have quite different intended applications, depending on the context. In many cases, warnings are intended to discourage certain actions absolutely, for example, to keep people away from dangerous facilities, such as high-voltage transmission lines or away from active avalanche control areas.

With respect to backcountry avalanche risk, the objective of the duty to warn, under most conditions, is to create in the mind of the user an *awareness* and *informed understanding* of the risks. That again is a primary objective of the public avalanche risk bulletins. This is complicated by the fact that there is a spectrum of backcountry users ranging from the uninformed, untrained, and inexperienced to the informed, trained and well-experienced professional. Recognizing this avalanche risk, communications have to target the entire spectrum of backcountry users with uniform basic information as well as allow for detailed supplementary information.

Although there is always room for continuous improvement, it is perhaps fair to say that the more detailed information now presented in the avalanche bulletins, primarily assists the sophisticated user and adequately discharges the duty to warn. The important challenge is to improve the effectiveness of “first-line” communications of avalanche risk to enhance understandability and usefulness to less-experienced and less-knowledgeable backcountry users.

5.4 TESTS OF EFFECTIVENESS

According to the specialist literature, the most important starting-point for those who are designing warnings is to recognize the distinction between *knowledge* and *awareness*. The basic text on risk communications puts the point this way:

- “In the context of dealing with hazards, it is not enough to say that people know something. Rather, it is critical that people be aware of (thinking about) the relevant information *at the right time*” (emphasis added).*

With respect to the target audiences (receivers) for warnings, the authors go on as follows**:

- “There are four general principles that apply when taking receiver characteristics into account in the design of warnings:

Principle 1. Know thy receiver....

Principle 2. When variability exists in the target audience, design warnings for the low-end extreme. Do not design for the average....

Principle 3. [omitted here]

Principle 4. Market test the warning system.”

The basic test for effectiveness, therefore, has three components: (1) whether or not *the least-sophisticated user* comes away with (2) an adequate *awareness* of the risks (3) *at the time when the activity is about to be undertaken*. In this context “awareness” can be thought of as bringing about “top-of-mind” status for the key message. Therefore an awareness warning must be sufficiently precise and easily-communicated so that it displaces any other knowledge or attitude about the risk at hand, especially for the least-experienced user (a.k.a. “the unaware”).

The only reliable way to evaluate success in achieving effective communication is with the use of appropriate focus-group tests. Such tests are relatively inexpensive and are indispensable for completing the design of an effective hazard warning system – especially where the objective is not to discourage use.

5.5 EFFECTIVE HAZARD WARNINGS

There are two components in today’s recognized set of effective warnings: text (wording) and symbols (or icons). Many warnings use only one or the other, but they may also be combined where the wording is kept relatively short. Where the purpose of the messages is to inform the audience about a sequential series of escalating risks, rather than a single type of “absolute” danger (“Keep Out!”), almost certainly both text and symbols would be needed in order to convey the right level of detail and discrimination among various hazard categories. Backcountry avalanche risk is clearly a warning design challenge of the latter category because of the differentiated levels of hazard from place to place and from day to day and potentially from hour to hour.

*Wogalter et al., *Warnings and Risk Communication*, page 7

**Ibid, p.11

The design of both text and symbols must meet the basic challenge of all warnings, namely, “*active*” *comprehension*: Does the receiver understand both the meaning *and* the urgency of the message as something relevant to his or her well being?

So far as the text is concerned, Wogalter *et al.* comment: “Very subtle differences in the wording of safety messages or warnings can affect the information conveyed to people.... Without pre-testing comprehension cannot be guaranteed, and it should not be assumed.”* This point is relevant to the comments made in section 2.3 about the language used in the current avalanche warning five-level scale and to Recommendation 8.

So far as the use of symbols is concerned, there are excellent guidelines for their use in hazard warning design in the literature, which may be adapted to the construction of effective symbols to be used for backcountry avalanche risk.** Parks Canada is familiar with this topic as a result of a project on Natural Hazard Signage aimed at increasing visitor awareness.*** That report developed and evaluated sign designs through use of focus groups. Participants were asked the meaning of the signs, whether the word message was clear and whether colour and a supporting pictograph on how to cope helped. That particular project indicated:

- the importance of using written text as well as symbols for many warning messages;
- use of colour helped in understanding the message; and
- a fairly high percentage (79) correctly identified a basic avalanche hazard symbol portraying a buried skier. This suggests however there is value in some accompanying words.

The authors noted that “Hazard warnings are intended for use in the frontcountry, as visitors to backcountry settings are expected to exhibit a greater degree of self reliance.... However to assist backcountry users it is important to provide them with the proper safety information early enough in their trip to allow them either to prepare for the dangers or to choose not to participate in an activity”.+

They also reference Public Safety Management Directive 4.4.3# which states “where the hazard is not site specific, signs should be placed at strategic access points and information facilities”.

*Ibid, p. 36

**See chapter eight in *Wogalter et al.*, including the figures in the colour-plate section of this chapter.

****Natural Hazard Safety Signs* prepared for Parks Canada, Western Region by Western Ergonomics Inc. and Paul Arthur, VisuCom Ltd., 1996.

+Ibid, p. 31

#Bulletin 4.4.3, p.13

The conclusions from the above signage project suggest value in avalanche warning symbols with colour, provision for explanatory words, and capable of being used in various ways including in print material, visitor centres, kiosks, and at selected trailheads.

5.6 RECOMMENDATIONS

- (10) Parks Canada should continue to support and provide forecast contributions to the Canadian Avalanche Centre as the widely recognized and accepted vehicle for providing the public with avalanche risk information to support their informed backcountry trip planning and decision making.
- (11) Additionally, the official mandate of the specialized Avalanche Control Section of Parks Canada's Highway Service in Glacier Park should formally recognize that their forecast duties increasingly have application to recreational use as well as transportation, thereby reflecting current practice.
- (12) The CAA website, in addition to providing forecast services to its private company members, also serves as the vehicle for conveying avalanche risk information to the general public. It is a prime vehicle for distributing the daily avalanche bulletins prepared by Parks Canada's field units to the public. Support for that publically available bulletin is essential...and is linked not only to the protection of citizens of Alberta and BC who are primary users...but also is an important service which support a vibrant and growing winter backcountry recreational economy – both outside and inside the national parks.

Parks Canada and other appropriate federal agencies such as Environment Canada should work with the Province of British Columbia and Alberta to identify stable and adequate funding support to ensure publicly available avalanche bulletins. In arriving at a cost-sharing formula, Parks Canada should be given recognition for its current daily contributions of forecasts to the CAA bulletin system.

- (13) Further to the proposed reassessment of the language used in the current avalanche danger scale, (see Recommendation 1) the key parties - including Parks Canada - should consider other additional refinements to increase the effective "reach" of their respective current avalanche bulletin. Those proposed refinements include:
 - a) developing and adding a new "icon" layer as the first level which would symbolically portray each risk level (comparable, for example, to the standard "green, blue, black" symbols used in designated ski areas).
 - b) adding a short "basic" one to two sentence summary of prevailing avalanche risk conditions as a second layer to precede the "Description" section in the current bulletins.

- c) providing more and better graphic materials as “links” on the avalanche centre website. This could be built over time and include:
- route maps (particularly for prime use areas);
 - avalanche history maps (some exist) with popular routes overlain; and
 - oblique and vertical photos of critical sections of popular routes.
- d) an additional “technical layer” (or layers) presenting, for example snow profile and telemetric reports on snow conditions. (This layer, in particular, would be conditional upon financial and resourcing feasibility).

Use of focus groups should be part of any refinement efforts for the reasons presented above.

- (14) Parks Canada, preferably with Alberta and British Columbia, plus other federal agencies such as Environment Canada, should support an initiative to secure support and funding from the National Search and Rescue Secretariat (NSS) under its “New Initiatives Funding” to support the refinement and further development of the public avalanche risk bulletin, as outlined in (13) above.
- (15) Parks Canada, working in conjunction with the parties identified in (14) above, also support and pursue funding and development of basic:
- backcountry avalanche awareness and training materials; and
 - trip planning modules

which would also be “links” in the public avalanche bulletin website.

There should be separate modules for the Rocky and Columbia Mountains in order to recognize their fundamentally different conditions. The NSS would appear to be a key player in advancing such an initiative.

- (16) Symbols used by Parks Canada and other parties, particularly the CAA, should be consistent and reflect the various dimensions of effective risk communication, and include:
- a) a “first level” hazard icon and signage system – aimed particularly for impact on and assistance to least experienced backcountry users;
- b) the warning signage system should include both text and uniform, recognizable symbols which identify and differentiate graduated levels of danger; and

- c) placement of “first level” signage, near or on approaches to known hazard sites, should have the design objective of maximizing *awareness* in the minds of the least experienced users. (Potential sites for “field testing” of new signage could be at the interface of patrolled ski area boundaries and wilderness areas of the parks because of the known level of incidents adjacent to designated ski areas).

Proposed symbols and text should be pre-tested through appropriate focus groups before being implemented.

- (17) Parks Canada, in partnership with NSS and other agencies, should develop additional educational materials on avalanche risk - both portable and permanent. A key part of this material should form part of the permanent resources of visitor reception centres and include:
- backcountry recreation map atlases and photos;
 - snow condition displays; and
 - short “5 minute film festival” videos featuring backcountry use and safety.
- (18) Parks Canada and other similar agencies should seek partnerships with the private sector and established safety organizations to produce a range of video products including:
- “risk and consequence” videos; and
 - avalanche training and safety preparedness videos.
- (19) Parks Canada should consider enhancing assisting kiosks or adding new ones at the most heavily used winter backcountry trailheads (e.g. Bow Summit) with more area-specific avalanche information such as:
- maps showing access routes and avalanche history; and
 - aerial or oblique photos to assist with terrain interpretation.
- (20) Given the axiom that “Effective education and trip planning begins at home”, Parks Canada should work with other organizations like Sports Canada and the NSS to assess and then support selected safety training and awareness initiatives intended to enhance outdoor recreation safety.* Those selected should be suitable for schools and non-government organizations.

*For example, the NSS has financially supported the development of: (1) “Smartrisk” (be smart about the risks being taken) initiative which has a more specialized “Snowsmart” component; and (2) “Youthsafe” which was developed for application in schools – presently those in Alberta – and which presents activity guidelines.

There are also, for example, “Safety Guidelines for Physical Activity in Alberta Schools” (Alberta Centre for Injury Control and Research, U of A, 2000) designed to help school authorities formulate their specific safety guidelines. At present, it does not specifically cover winter backcountry activities. (Snowboarding and skiing are limited to commercially operated ski facilities). References to avalanche risk management are limited.

6.0 EMERGENCY NOTIFICATION

6.1 INTRODUCTION

The panel was asked to review how winter backcountry users access the available emergency notification systems in order to initiate emergency response in national parks. Emergency notification requires having a fully functioning communication system:

- first – to effectively initiate a call for assistance from the site of the incident;
- second – to effectively receive the emergency call, to effectively understand it, and to convey the message to a field response group;
- third – for the field response group to be capable of quickly and effectively receiving the call (either directly or through an intermediary) to initiate the response; and
- fourth – for the field rescue unit to have effective links with a base, air support services, and other response agencies (e.g. ambulance services).

Because the panel was instructed to only examine initiating emergency notification – namely call initiation and receipt - the complexities of field communication of search and rescue operations (fourth above) are not discussed.

6.2 BACKCOUNTRY COMMUNICATIONS

Most National Park visitors travelling into the backcountry realize they will not have ready access to standard telephone and other communications systems, unless they carry specialized equipment. Many do not dwell on what communication system they might require in an emergency situation.

Beyond the park frontcountry, access to regular telephones becomes limited. There are occasional service facilities and staff residences along the highways with telephones but many are closed during the winter. There are also private businesses - lodges and hotels - along the highways in a few locations in some parks, but many are again not open in winter. In backcountry areas a few landline telephone services exist such as at Lake O'Hara Lodge in Yoho Park, an 11-kilometre ski up a winter trail.

There is cellular phone coverage in and around the settlements of Banff, Canmore, Lake Louise, Jasper, Radium, Golden and Revelstoke and in some of the adjacent highway corridors where terrain allows (e.g. Icefields Highway, south of Jasper townsite). Where cell phone coverage exists, it is an affordable and effective emergency notification system.

Conventional telephone service, including cellular, is generally not available in backcountry regions, except at a few highway locations and usually vehicle access is required to reach them.

If emergency assistance is required by backcountry travelers due to serious injury(s) or a serious incident such as an avalanche requiring rescue, time is critical. Many emergency response organizations go by "The Golden Hour" rule. If a victim(s) in a serious or life-threatening condition can be evacuated to an advanced care facility within one hour, he/she has a greater chance of recovery. Past an hour, chances decline rapidly. Therefore, two-way voice communications via standard telephone or satellite phone, or radio communications to enable rapid reporting of a serious incident and the location and other particulars will assist survival.

6.3 EMERGENCY SIGNAL INITIATION

Backcountry travellers must understand both the limitations of and the technical operating requirements of specialized equipment if they wish to have emergency communications when in the backcountry. The primary options are:

- satellite telephone (sat-phones) to emergency telephone contacts; and
- high-frequency radio to emergency dispatch centres.

Sat-phones and radios have technical limitations in some confined mountain terrain, for example, the effective range of two-way radios depends on "access" to higher elevation radio repeaters that rebroadcast signals.

Satellite Telephone

Sat-phone technology has been used for several decades by military and specialized services but only in the last decade has it become available for general use. The initial worldwide provider of this service was Iridium, but that consortium went out of business due to start-up challenges including the high cost.

The main service providers are now "Globalstar" and a new "Iridium". Costs have been reduced and this has made sat-phones increasingly common for outdoor and remote activities. The future points towards increasing efficiency and use of this technology.

Sat-phones have greater range and coverage than two-way radio systems in mountain regions and can call any number because they transmit to and receive signals from a series of satellites.

Users can turn on a unit and quickly link by relocating to a better terrain location which can improve reception. A call can be lost temporarily when satellites move out of range, however, follow-up calls can be placed at intervals as satellite contact is re-established.

Sat-phones allow for direct contact without tying up a dedicated line such as a Park's radio frequency channel. A concern expressed with sat-phone connections is that the operator receiving an emergency call may have little or no awareness of local geography and therefore may not know which local 911 emergency centre to call. This concern requires follow up to ensure that protocol development and training occur so this technology reaches its full potential effectiveness.

Two-Way Radio

Parks Canada staff use standard high frequency (FM) radio communication for day-to-day field operations. This proven technology continues to serve operations that require connection where regular telephone landlines are not available.

One of the major limitations in the use of two-way radio use is that only one user can speak and transmit at a given time. If there is a high volume of radio traffic on a frequency, communication becomes difficult. Most radio systems provide communications along main highway corridors and unless users are within reasonable range of the occasional "repeaters" (to re-broadcast), they may not have contact with the dispatch centre.

Most professional guides who operate in the mountain parks carry two-way radios. Emergency contact frequencies are programmed in on the express understanding that the Parks frequency is for emergency use ONLY, reflecting Parks Canada's recognition of the safety benefits.

Limitations to the number of users, greater complexity, and variable connectivity means that two-way radios are generally less suitable than sat-phones for use by most backcountry users.

Emergency Locating Beacons

Similar to 'emergency location transmitters' (ELT) used on aircraft, there are Personal Location Beacons (PLB) for an individual or a group to carry. While more affordable than sat-phones or quality two-way radios, an activated PLB only sends out an electronic pulse signal and there is no voice contact. Satellites identify the signals and sends them to a search and rescue centre, in Canada's case, located at Canadian Forces Base (CFB), Trenton, Ontario.

Emergency signals received at Trenton are followed up on by the nearest CFB search and rescue base which, for the mountain parks, is on Vancouver Island. A search aircraft is sent. Variable weather conditions, challenging light from the white snow landscape, and mountain terrain restrict both flight and search activities. For these reasons, helicopters are far the more practical in the rugged mountain regions, however armed forces helicopters are not sent out to the mountain park areas for these purposes and helicopters are not linked into the search and rescue PLB search system. For these reasons, the PLB is clearly not a preferred system.

6.4 EMERGENCY CALL RECEIPT AND DISPATCH ARRANGEMENTS

While the previous section discussed call initiation, this section discusses arrangements for their receipt - a key link in the emergency response chain. These arrangements differ from place to place reflecting geographic and service network differences.

The geography of the mountain parks is complex and the parks are located in two provinces, on different sides or straddling the continental divide. The mountain parks are divided into five “field units” which reflects this geography and the practicalities of access from the main communities and highways as well as visitor use patterns. Because of these geographical differences, the communications arrangements for receiving emergency calls differs in each of the mountain field units as described below.

Banff Field Unit

This unit has an internal dispatch office in the town of Banff which operates a 24/7 radio communications service to support field operations. Emergency calls are received through a 911 system, which has been adopted as a central coordinating system for all emergency calls in the Banff to Calgary region. The Banff field unit financially contributes to the provincially operated 911 system through its grants-in-lieu of property taxes; Banff Park is designated as an “Improvement District” for property tax assessment purposes.

The 911 emergency call centre for this region is in Calgary and is operated by the Calgary fire department and it provides connections to police, fire, and ambulance services, as well as to Parks Canada’s Warden Service (and to Alberta Parks in Kananaskis Country).

An operating issue is that the Warden Service is not always ‘top of mind’ with the 911 operators. It is reported that the regional 911 call centre does not always appropriately contact the Warden Service, suggesting a need to review the operating protocols and to improve system effectiveness, possibly through additional staff training.

An example cited was the dispatch of a volunteer fire crew to an emergency call near Lake Louise when, in fact, a backcountry rescue service provided by the Warden Service of Parks Canada was needed. Enhanced protocols and associated training to properly query the location of a backcountry incident and the response requirements appears to be necessary.

Lake Louise, Yoho, Kootenay Field Unit (LLYK)

Arrangements are somewhat similar to Banff, in that all emergency calls on the Alberta side of the “Great Divide” are to the 911 emergency call centre in Calgary. That 911 call centre then links to the Banff field units dispatch centre who provide communications support to the LLYK field unit.

The major difference from Banff is that emergency calls originating from the British Columbia side of the “Great Divide” go to the 911 call centre in Cranbrook, British Columbia. That centre then contacts Parks Canada’s dispatch centre in Banff, who provide the field unit staff with necessary communications support.

Jasper Field Unit

The Jasper Field Unit has a unique arrangement. It provides regional 911 emergency call centre services on a 24/7-basis which includes the town of Jasper, under contract arrangements and covers police, fire and ambulance operations. Internal Parks Canada radio and telephone dispatch services are provided from the same centre, making it a fully integrated service which is fully knowledgeable of Warden Service requirements. It requires full staffing and associated financial support from Parks Canada. The panel did not have the time or resources to evaluate cost-effectiveness of this integrated operating model, compared with other arrangements.

This Jasper integrated dispatch centre provides communication services to the Mt. Revelstoke/Glacier Field Unit with some current limitations as described below.

Waterton Field Unit

The Waterton Park dispatch system is handled contract through the Lethbridge Fire Control Dispatch service, and operates as follows:

“When a visitor calls the Emergency reporting number 859-2636 to report an (avalanche) accident, the call is received by Lethbridge Fire Control Dispatch. Dispatch follows written protocol for notification of the Park Warden Service. The warden is contacted either by park radio or telephone.

Initial reporting information is taken by dispatch as per protocol. The reporting person is asked to remain on the line. Communication can be linked directly from the reporting person to the Park Warden through Dispatch.”*

Waterton Park uses only one emergency number (911 is not available in the region). Should a person dial 911 in Waterton, they get a Telus operator who then attempts to direct that call to the emergency directory listing. The key for this unit is ensuring that the one direct emergency phone number is clearly posted or otherwise brought to the attention of the parks backcountry users.

Mt. Revelstoke/Glacier (MRGNP) Field Unit

These two Parks are managed as a single field unit by the administrative office in Revelstoke. Neither Park has full-time dispatch personnel. Instead they rely on a system of protocols to provide this function.

The current protocol system for internal emergency dispatch and emergency contact is summarized below.**

There is a Duty Warden (DW) 24/7 - there are two separate protocols for contact - one for regular work hours and the other for after hours.

During regular work hours (07:00 - 16:00), the DW can be contacted via radio or phone. The DW number is now posted as are the numbers for the warden service and park administration office which are open during regular working hours and whose “after-hours” phones provide the DW emergency number. During the day the DW cell is call-forwarded to Jasper Dispatch. Jasper Dispatch can call the DW either via radio or telephone at the Rogers Pass warden office. In the case of radio, the link can be initiated by Jasper Dispatch or through any park radio with a keypad. Once “open”, Jasper Dispatch is linked into the MRGNP radio repeater system through a so-called Voice-Over Internet Protocol (VoIP).

The difficulty is that this link with Jasper Dispatch works intermittently during the day when there is heavy message traffic because of a narrow bandwidth on the Wide Area Network (WAN). During weekdays from 0700 to 1700 hours, heavy WAN traffic from the Revelstoke headquarters disrupts the VoIP and creates “drop-outs”.

The field unit indicates that it is currently “investigating wide band options such as ADSL as a temporary fix until we can upgrade our WAN to high speed”. Such an upgrade is a priority if Jasper is to function as an effective dispatch.

There are specific operating procedures and “hot sheet” emergency response protocols in place at Jasper Dispatch that have been developed with MRGNP.

*Description from Waterton Park public safety staff.

**Summary based on notes from MRGNP staff.

The panel understands that there are no regular dispatch/switchboard positions at MRGNP so that there may be times when a call to the Rogers Pass warden office may not be directly answered. This means that a reliable link to Jasper (or an alternative dispatch) is essential to ensure calls reach the DW.

The dispatch system for emergency calls in MRGNP has 3 Tiers:

- Tier 1 – response by the DW (or other park staff) who initiate response, including calls to the RCMP, ambulance, fire service, or towing service as required (and to the DW should the DW not first receive the incoming call);
- Tier 2 – local dispatch from either the office in Rogers Pass or Revelstoke. Several staff are trained to handle such dispatch when a complex emergency entailing a need for “continuous” dispatch exists (however this dispatch system is not staffed 24/7); and
- Tier 3 – use of Jasper Dispatch. Again, this is done by forwarding either the DW cell phone number to Jasper Dispatch (this is called “external dispatch”) or by radio over VOIP protocol which functions 24 hours per day.

In the case of an incident, the “incident commander”, as defined in emergency procedures, decides which tier is appropriate (i.e. whether to employ Tier 2 or Tier 3).

In terms of direct public access, the Rogers Pass warden office, the Rogers Pass Visitor Reception Centre, and the Revelstoke office are open during regular office hours.

For phone contact, signs posted at kiosks identify 911 as the contact number for ambulance, police, and fire and the warden service emergency number 837-1194 has recently been posted.

There is considerable complexity in this system at present and some current reliability issues as described.

A critical need is to ensure that emergency connections to wardens at Rogers Pass are direct – either through a trained available local dispatch – or a clear functioning link to another dispatch centre such as Jasper.

It is also necessary to ensure that enough people know how to effectively operate the MRGNP dispatch for Tier 2 responses. And when dispatch is not done at the warden office or the administrative offices in Revelstoke, then Jasper Dispatch must be in a position to fully function as a local dispatch/incident communications centre.

To ensure that Jasper dispatch can effectively serve as a primary emergency call centre for MRGNP, requires ensuring adequate bandwidth. Thus, the public would call a posted park emergency number and the call would be handled locally or patched through to Jasper – depending on the time of day.

An option could be to secure 911 service based out of more local communities, as is done for Banff and Jasper. The panel understands there is 911 service locally around the community of Revelstoke for police, fire, and ambulance services but there are no plans to connect to Rogers Pass. Apparently 911 calls from Revelstoke are actually directed to and handled by the Operating Control Centre (OCC) in Kelowna. We understand that apparently, 911 calls in the Golden area are handled through the Cranbrook OCC.

A concern expressed is that the 911 emergency call to an OCC may reach an operator not familiar with the need to call Parks Canada Warden Service in the event of a backcountry emergency in a park. Apparently the routing and response protocols are improving over time as the OCC are becoming more familiar with responding to backcountry issues. The 911 protocols in Kelowna and Cranbrook should be reviewed to ensure they are adequate.

Another option is to obtain a dedicated line operated under the auspices of British Columbia's Provincial Emergency Program (PEP). Initial discussion with the BC PEP indicates that they can provide a unique dedicated toll-free emergency number to serve the park. The advantage is that this service connects to a province-wide Emergency Coordinating Centre (ECC) in Victoria with 24/7 coverage. Their staff are fully aware of handling emergency procedures and stay on the line to bridge the incoming emergency call with the local emergency responder such as the Warden Service. They would still require assured access to the Duty Warden who in turn requires a fully functional service to serve as an "Incident Command Centre" and coordinate local search and rescue efforts.

What needs to be investigated further is whether Jasper best fulfils that primary emergency contact role or whether a 911 link or a link to the BC emergency centre would be preferable. Jasper dispatch has the advantages of fully knowing the park roles, uses the Parks Canada's tracking systems, and has the advantage of access to "CPIC" (police information) for law enforcement purposes which park wardens may require.

Apparently the band width/capacity problem of the park radio system needs to be addressed to make either Jasper Dispatch or the option of the ECC work properly. This needs further assessment by technical experts. Regarding the dedicated 1-888 line, the ECC indicated it is prepared to put it in place at no cost to Parks Canada. The question of access to "CPIC" under this option would need to be assessed.

In terms of recent field experience, there are a few communications lessons from the response to the February 1, 2003, avalanche incident in Glacier Park near Rogers Pass. It was certainly a catastrophic event with a large avalanche and a number of victims. Rescue response and emergency care came quickly because a call for assistance went out rapidly. The first of 17 individuals involved had a hand exposed and he was rapidly dug out by another independent party on the scene. The rescued individual was a trip leader with a satellite phone which was very good fortune. He had the direct warden office number and established contact because the warden was at the desk and was able to rapidly initiate emergency “call-out”. This incident illustrates the utility of a sat-phone plus a known contact number. Successful response hinged on knowing the emergency access number and having personnel connected to it.

6.5 RECOMMENDATIONS

The above review points to a number of recommendations respecting emergency call initiation, receipt, and response.

- (21) Regarding effectiveness of incoming calls, Parks Canada, through its Visitor Reception Centres, Warden Offices, and other means should ensure:
 - a) that information on the communications technologies which access emergency numbers in each of the mountain parks is readily available including information outlining the advantages, limitations, and effective coverage by cellular phones, satellite phones, and high-frequency radio systems;
 - b) ready access to information on the local availability (rental or purchase) and use of satellite phones; and
 - c) identification on a field-unit-by-field-unit basis, the single best emergency number to contact for backcountry emergencies in the mountain parks – be it 911, a dedicated 1-888 number, or a consistent park number. Those numbers could be on a printed card made available to park users.

- (22) Parks Canada should continue to provide licenced business operators and guides access to its emergency radio contact frequencies, continuing with the understanding that it is strictly for emergencies.

The panel generally understands the complexities of the geography and appreciates the need for flexibility in implementing arrangements that respond to the unique geography history and situation of each mountain park field unit. That forms context for the recommendations which follow.

- (23) Regarding the Banff and LLYK Field Units, the service issue appears to be “human factors” in the system – particularly the working awareness of the 911 operators, based in Calgary, of park backcountry emergency access needs. The first step would be to address this issue with the service provider through protocols and training of operators.

One measure to better communicate park needs, relative to the 911 system, would be to ensure direct Parks Canada representation on the Improvement District, (appointed by the Province of Alberta) regarding local services, such as 911. Banff Park is a significant contributor to and client of the Improvement District; representation of the parks' safety interests might be as a standing member of its emergency services committee to ensure adequate understanding of and attention to public safety needs in the park.

Should those steps not prove effective for park needs, Parks Canada should explore the feasibility of a separate Bow Valley call centre in conjunction with Alberta Parks and neighbouring municipalities. The panel understands that there is a 911-call centre currently providing services out of Black Diamond, Alberta which might be suitable.

A further option to consider would be a combined 911/dispatch centre operated out of the Banff Field Unit based on the Jasper model with the understanding it would have to be fully cost-recoverable and that a cost-effectiveness analysis confirms its feasibility. This would be done if the existing arrangements don't prove adequate.

- (24) For the Waterton Field Unit, the key is to continue to ensure that the one direct emergency number currently in place is clearly and consistently posted on all emergency phones, signs, publications, kiosks, etc., and made available at the visitor reception centre, on the website, and in the community.
- (25) Regarding the Mt. Revelstoke/Glacier Field Unit, there is substantial complexity, suggesting:
 - a) Parks Canada proceeds to immediately address the issue of intermittent daytime links of its radio system to the Jasper Dispatch phones through necessary system upgrades;
 - b) there is a need to ensure functional emergency support for wardens at Rogers Pass at all times – either through adequate trained staff – or through a reliable link and arrangements with Jasper Dispatch (or an alternative dispatch centres);
 - c) the system upgrade identified in a) above is necessary to ensure the MRG Field Unit has required dispatch support from Jasper, but particularly when local dispatch at Rogers Pass is not staffed; and
 - d) Parks Canada should explore the feasibility and comparative advantages of a dedicated 1-888 emergency number operated through the BC “Emergency Coordinating Centre” (or alternatively an extension of the Revelstoke 911 system).

- (26) Regarding Yoho and Kootenay National Parks, continuing primary emergency links through the 911 system which handles emergency calls through the Cranbrook Operational Control Centre may be best. These calls are routed to Banff Dispatch (which also handles Lake Louise – except its primary call goes to the Calgary 911 call centre) for warden response.

Again, the feasibility and comparative advantages of obtaining initial emergency contact through a dedicated 1-888 number under BC's Emergency Coordination Centre should be reviewed – concurrent with the review proposed for Mt. Revelstoke and Glacier parks in 25(d) above.

- (27) The panel appreciates the unique history and evolution of the emergency notification systems for each park and that these represent the currently most feasible or cost-effective solution.

Given the inherent attraction of a single consistent primary emergency contact number for the mountain parks, an overview feasibility assessment of such a 1-800 number for all of the mountain national parks is suggested. This could be done concurrently with the assessment of the comparative advantages and feasibility of a dedicated 1-888 emergency number as outlined in recommendations 24 and 26 above.

7.0 LEADERSHIP CERTIFICATION

7.1 DIRECTION

The terms of reference directed the panel to:

- “clarify responsibilities of individuals, organizations, and Parks Canada with respect to preparing for winter backcountry travel and decisions related to risk management; and
- review the certifications required for undertaking hazardous activities in National Parks in a leadership capacity for both ‘for-profit’ and ‘not-for-profit’ groups and organizations (winter only).”

As earlier identified, the National Parks have a broad spectrum of users. They have a long history of guided activities dating to the late 1800’s and a similarly long history of solo and group adventure. The mountain parks in particular have long served as hosts for tourism – winter and summer with a wide range of licenced business activities to serve visitors. They have served as a magnet for both visitors and generations of seasonal staff who serve them.

That magnetism has been profound for residents of communities – particularly those within day-use range. Population growth – particularly in southern Alberta has been a significant factor in sustained and steady growth in park visitation. Individuals and recreation groups have viewed the parks as prime destinations for skiing, ski touring, mountaineering, and more recently, snowboarding and ice climbing.

Schools and various post-secondary institutions have viewed the mountain parks as a locale for experiential education, training, and research.

Post-secondary institutions have also used the parks as a basis for less formal “extension” courses. Organizations like the Alpine Club – as well as various private institutions, often use the mountain parks as a base for outings and training.

Public Safety Management

As noted in previous sections, Parks Canada has assumed responsibilities for visitor public safety as outlined in Operating Policies and Guidelines; Directives and the VRM Handbook. These define the responsibilities for both users and Parks Canada as well as define the parameters for actions to respond to the variety of park user groups, such as outlined above.

A key principle is visitor “self reliance and responsibility, commensurate with the degree of difficulty of activities they undertake”.

Parks Canada's responsibilities include providing basic services for recreational activities through provision of safe facilities, visitor programs and a wide range of information to facilitate safe park use. As part of that responsibility Parks Canada has undertaken certification and licencing of guides.

With that background, review of responsibilities and leadership certification needs using the fundamental distinction between 'for-profit' and 'not-for-profit' follows. We examine that in the context of the Parks Canada's role as a land manager including responsibilities for public safety management.

7.2 THE CONCEPT OF CERTIFICATION

Clarifying the meaning of certification is required, given the potential variety of interpretations it may have in the public, the media, and the professional community. Certification can refer to both the *process* of becoming certified as well as the *end product* – namely certification held by a successful candidate with an accompanying *certificate* as visible proof. In either case, it is intended to provide some proof and assurance of training and other qualifications.

Qualifications refer to the qualities or skills required to receive a certificate. *Accreditation* is defined as “to recognize (an educational institution) as maintaining standards that qualify the graduates for admission to higher or more specialized institutions, or for professional practice”.

Accreditation, in turn is achieved through a process, typically that of peer review, to established standards of quality and performance to be met through the training offered by an institution. If that standard is met, the institution is formally recognized and accredited.

These terms will be referred to in the following pages.

7.3 LEADERSHIP AND CERTIFICATION: THE PROFIT SECTOR

Parks Canada requires all commercial operations who operate in the National Parks – summer or winter – to have a Business Licence. The authority for this is the *National Parks Business Regulations, 1998, SOR/98-455*. Business, as defined:

- “means any trade, industry, employment, occupation, activity or special event carried on for profit, fundraising or commercial promotion in a park, and includes a business operated by a charitable organization (commerce)”.

Business licences are issued by the Park Superintendent, and may specify terms and conditions, as well, there are provisions for inspection and suspension.

Guiding activities, both winter and summer, require a business licence. To meet Parks Canada's requirements as a mountain guide or assistant guide (for backcountry or other guiding), candidates must have:

- certification through the Association of Canadian Mountain Guides (ACMG) for specific winter backcountry guiding activities; and
- a recognized current first aid (80 hours+) certification.

Other particulars are outlined in Management Directive 4.6.40, *Certification and Licencing of Guides in National Parks*, 1988. The purpose of that directive is:

“To help ensure a safe and high-quality experience for visitors who hire the services of a guide licenced to operate in a national park. To minimize the possible liability of the Crown in the event of accidents resulting from the business operations of guides. To standardize basic procedures for the certification of the qualification of guides and the issue of licences to guide”.

That directive defines “certification” as:

“The process of determining that an applicant for a guide licence has the required skills, knowledge and experience to carry out the responsibilities relating to the specific category of licence applied for”.

The regulations lay out requirements to establish appropriate tests for each category of guide licence including trip planning, hazard assessment, crisis management, and rescue skills. Management Directive 4.4.3, *Public Safety Management* provides the further direction that:

“Parks Canada will require the licencees...to take precautions to prevent public safety incidents created by the condition of facilities they operate and service they provide”.

Directive 4.6.40 (Directive 2) states that “Anyone acting as a guide in a national park requires the relevant business licence for a guide. It does not matter whether the person has a place of business in the park or where the guided trip originates or ends”. What seems of particular importance here is the intent to regulate standards of guides who operate for hire as a business.

The assessment of the panel is that between these provisions of Parks Canada and the related qualification process operated by the Association of Canadian Mountain Guides, the certification credentials for guiding in the ‘for-profit’ sector are clear.

7.4 LEADERSHIP AND CERTIFICATION: THE NOT-FOR-PROFIT SECTOR

The Not-for-Profit Sector

This sector essentially comprises recreational and educational pursuits of groups and institutions on a non-profit basis. They would not meet the fundamental test of a “business” as defined by Parks Canada and outlined in Section 7.3 above – namely being carried on for profit.

The groups and institutions pertinent to winter backcountry activities in national parks are many and varied. They include:

- a variety of clubs organized for outdoor mountain activity, such as the Alpine Club of Canada, with a national perspective, as well as a variety of more locally-based clubs;
- umbrella groups such as the B.C. Federation of Mountain Clubs, the Outdoor Recreation Council of B.C., and the Calgary Area Outdoor Council, which represent the ‘policy’ interests of their member clubs;
- youth groups such as the Boy Scouts and Girl Guides of Canada;
- school classes, schools and school districts (both private and public) whose students and teachers, from primary to secondary levels, use the national parks as a basis for education and outdoor oriented learning projects and programs;
- post-secondary institutions who use the national parks as a basis for educational, research and more specific outdoor skills training; and
- clubs associated with schools and post-secondary institutions.

Given that wide variety, it is useful to make a primary distinction between:

- non-commercial groups, such as clubs; and
- custodial groups, such as educational institutions.

The “non-commercial” groups (clubs) generally have a primary goal of organizing activities and outings for their members. They typically comprise adults and assume responsibility for managing their own activities. They largely comprise peers and have a lower “duty of care” because they are not conducting activities in the capacity of a “custodian” (see discussion of “loco parentis” in section 4.4). Activity organizers serve in a volunteer capacity.

The custodial groups such as schools, boy scouts, and so on have distinguishing features. They have adult supervisors who organize, manage and lead groups of individuals below the “age of majority” and to that extent, they have to exercise a higher standard of care.

Parks Canada's Requirements

Unlike the 'for profit' or business activities which require a business licence, the panel did not identify any specific directives respecting licencing or permitting of winter backcountry activities. Through recent practice, however, Parks Canada has applied the licencing requirements of Management Directive 4.6.40, Certification and Licencing of Guides, to certain groups and organizations such as specific post-secondary educational institutions and non-profit Societies for their training programs in backcountry areas in the National Parks. The rationale has been that these organizations have regularly recurring programs which appear similar to those offered by licenced guiding operations. Some of the programs are led by certified and licenced guides who receive remuneration even though the programs are operated on a non-profit basis. The underlying rationale also includes the thought that it provides an opportunity to check insurance coverage and qualifications, for both public safety as well as to reduce exposure to possible liability claims by exercising diligence.

The licenced guides who lead such trips in the national parks and who operate on a "for hire" basis would however require a business licence.

The panel understands that this practice of licencing may not be uniformly applied in all the mountain parks – perhaps reflecting the discretion afforded to each Superintendent – but also reflecting a fundamental ambiguity. Are these institutions operating on a "for-profit" basis or not? The profit motive appears to be the basic test in the "business" definition used by Parks Canada. Educational and training institutions and societies are not a "business operation" and their objective is not "profit". They may however engage licenced guides who themselves would have to have a business licence.

Thus, it appears that there is fundamental confusion between the licencing of a guide and the licencing of an institution that the guide may lead. The institution, if not operating on a for-profit basis, should be viewed as a user group, and not as a business – and therefore would not need a business licence. A for-profit guide who is hired for the purpose of leading a trip for an institution and who operates as a business, would however require a business licence. A guide not operating as a business and for profit – but as a "custodial" leader would not appear to need a licence.

The panel believes these distinctions should be reviewed and confirmed with the objective of ensuring consistent practice regarding licencing of institutions across the mountain parks. The business test should be fundamental – is the activity a business operation and is it for-profit (as outlined in the regulations)?

Non-commercial and custodial groups do not appear to meet that licencing test and they would be considered park users. Then the guiding principle that “users will exhibit a degree of self reliance and responsibility for their own safety commensurate with the degree of difficulties they undertake” would be applicable. The responsibility of Parks Canada would appear to be the duty to warn through information initiatives.

If a business licence is not applicable and some form of permitting is contemplated, for non-commercial and custodial groups, then some other considerations come to the fore:

- purpose - are the objectives of permitting clear?
- benefits - are the benefits of permitting clear?
- feasibility - can the permitting system be effectively administered and monitored?
- priority - is permitting activity a good priority given limited staff?
- effectiveness – is permitting the best way to achieve the objectives?
- necessity – must this be done by Parks Canada or is it better done elsewhere?

Generally, it would appear there are limited applications for such permitting. Environmental protection may be one such reason – to limit the place and/or time of use.

The panel also understands that licencing is not applied to clubs - or groups (e.g. churches, societies, etc.) for their outdoor activities nor to primary middle or secondary schools who have custody of students engaged in outdoor activities. Again, where licenced guides are engaged to lead trips, these guides must themselves have a valid business licence. However, informal groups and custodial group activities themselves are not classified as businesses (under the “business” definition) and would not require a licence.

From an administrative point of view, Parks Canada staff does not regard “permitting” of non-commercial or custodial groups as a need or a priority.

Staff of Glacier Park does administer time limited “Permits” to allow users to enter highway avalanche control zones during periods when no active control measures (e.g. explosives) are being employed.

Staff in that same park, with their readily accessible visitor centre and its close proximity to winter backcountry trails, expressed some preference for mandatory check-in in order to assist monitoring of trends and to facilitate searches if required. Experience with such a mandatory system, which has been eliminated

as a formal requirement elsewhere, revealed practical difficulties because users may not “sign out” and thus trigger false search and rescue alarms. The working conclusion is that for convenient locations such as the Glacier Park Visitor Reception Centre, registration should be a voluntary option because it presents an opportunity for park staff to:

- discuss the interests and capabilities of the visitors groups capabilities and to offer suitable information to assist their decision making; and
- ensure group leaders and members access available information on prevailing avalanche risk and other conditions.

This option would be made available on a park-by-park basis at the discretion of the park superintendent who must assess the practicability of the voluntary check-in.

7.5 A POSSIBLE CERTIFICATION DECISION MODEL

The above discussion suggests that the various park user groups array themselves in a spectrum:

- formally organized for outdoor activities through a licenced guide;
- custodial groups where activities are organized for participants by supervisors; and
- non-commercial recreational groups, largely comprising peers.

Those under a licenced guide operate as a business and must have a Business Licence. To get such a licence, the guide must be certified regarding their skills, qualifications, and capability to arrange and conduct trips. The guide assumes significant responsibility for group safety.

“Custodial” groups are those where there is a strong duty of care because of required adult supervision and leadership of the group. Examples include schoolteachers – usually acting in a volunteer capacity – who lead winter ventures by students; and Scout and Guide leaders who also volunteer to take youth into backcountry settings. It is this category of groups that has distinctive requirements in respect of leadership qualification (discussed below). Because of the custodial relationship (see section 4.4) of the leaders to the participants, it is important that the degree of difficulty of the activity be matched by the qualifications of the leader(s). Terrain type is a major factor in determining degree of difficulty.

The “non-commercial” groups such as clubs typically self organize periodic backcountry ski, snowboarding, and climbing ventures for their members. These groups assume responsibility for organizing and conducting their own backcountry activities in trips with varying degrees of difficulty. In their responses to questionnaires, they express a general preference for self-organization and minimum interference, but also very strong interest in maintaining and enhancing information services – particularly the avalanche bulletins on the website.

Figure 10: Concept for Leader Certification Requirements portrays a conceptual relationship between these types of groups and the degrees of difficulty of the potential terrain they use and its associated risk.

Figure 10:

CONCEPT FOR LEADER CERTIFICATION REQUIREMENTS

TERRAIN*	RISK+	LEADER QUALIFICATIONS	A NON-COMMERCIAL GROUPS	B CUSTODIAL GROUPS	C BUSINESS GROUPS
3 Difficult (Technical, e.g. Climbing Classes 3-6)	High <ul style="list-style-type: none"> Alpine Hot Spots Specialized Skills & Equipment 	Certified Mountain Guide (or equivalent)	<ul style="list-style-type: none"> “Self Certified” Leaders 	<ul style="list-style-type: none"> Certified Guide Required. Parks Canada explains this via an advisory notice. 	Guide Licence Required
2 Moderate	Medium <ul style="list-style-type: none"> Sub Alpine Moderate Terrain Recreational Skills 	<ul style="list-style-type: none"> Mountain Skills Basic Leadership First Aid Insurance 	<ul style="list-style-type: none"> Self Organized 	<ul style="list-style-type: none"> Leader Certified by Umbrella Group; No Permit Required, Advisory Only 	Guide Licence Required (policy)
1 Easy	Lower <ul style="list-style-type: none"> Easy Access Easy Terrain Basic Skills 	<ul style="list-style-type: none"> Basic Leadership First Aid Insurance 	<ul style="list-style-type: none"> Self Organized 	<ul style="list-style-type: none"> Leader Certified by Umbrella Group; No Permit Required, Advisory Only 	Guide Licence Required (policy)

*Uniform Classification System Needed +Specific Criteria Need Definition

NOT-FOR-PROFIT SECTOR

PROFIT SECTOR

The concept has several features:

- the businesses are licenced and the guides decide on the appropriate degree of risk;
- the custodial groups have a tiered qualification system that is associated with terrain type and/or degree of risk they encounter; and
- the non-commercial groups are self-organized and determine leader certification requirements themselves as well as the type of trip/degree of risk.

The purpose of this concept is to present a guiding framework. Only “businesses” would obtain a licence; custodial and non-commercial groups would not. Non-commercial groups would maintain responsibility for their activities and for self-certifying their leaders taking trips into difficult/risky terrain.

For custodial groups, an accredited guide would be required by policy, when the group proposes to use difficult/risky terrain (see Grid 3B). The custodial groups would be alerted to this through a “strong advisory notice” to known and potential groups.

Enforcement of non-compliance could be done through warning letters and/or public notices. As Figure 10 shows, leader qualifications would be lower for moderate terrain/medium risk (Grid 2B) and still lower for easy terrain/lower risk (Grid 1B).

This “model” presents a basic framework. As the footnotes point out, further work on the terrain classification and the risk classification is required. That could include Parks Canada’s Wardens classifying the commonly used backcountry destinations into lower, medium and high risk categories to assist teachers and other leaders to make appropriate destination choices. The groups would still have to make the decisions, management themselves, and assume appropriate user responsibility for self-reliance.

Leader qualifications would be done by an accreditation body external to Parks Canada. External accreditation is proposed because it would leave this responsibility with groups who organize the trips. Leaving leader qualification under permit processes to last minute checks by parks staff is largely impractical for many reasons including the wide variability in groups, and probably too late to effectively influence group behaviour. Also it would not appear to be a core duty of parks staff in keeping with the enunciated principle of personal responsibility.

7.6 OBSERVATIONS ON ACCREDITATION

Again, the concept of “accreditation” presumes a peer group exists for purposes of accreditation. The panel did not identify any active accrediting body for purposes of overseeing the standards (and “certification”) of non-commercial leaders of winter backcountry activity in Canada. Literature references were found to an Association of Experiential Education who we understand is active in the USA. The Alpine Club advised the panel of the International Union of Mountaineering Associations (UIAA) who have produced “Model Training Standards for Voluntary Leaders and Instructors” which were ratified in 1993. This appears to have established a commission for mountain training and uniform standards for “completion of structured training validated by examination”*, with member federations applying them according to local circumstances. The panel found no evidence of these being in effect in respect of training for volunteers for winter backcountry activity in Canada.

Leads with teacher associations, school districts and ministries responsible for education were explored and the panel identified no applicable accrediting bodies. Some of those interviewed indicated that there is no interest at the provincial education ministry levels. The ministries in Alberta and British Columbia assign full custodial responsibility to school districts and their staff, and present no guiding policy on outdoor leadership certification nor do they maintain any expertise in this area.

*UIAA, *Model Training Standards for Voluntary Leaders and Instructors*, Bern, Switzerland, p. 6.

The panel was advised that there is no apparent interest in promulgating policy guidance to teachers and schools on this topic. It also appears there is little tangible encouragement offered teachers to lead outdoor education activities. Yet as one distinguished educator put it...”standardized guidelines are the key”**...to feasible and effective outdoor education programs.

The panel next turned to examining the Coaching Association of Canada (CAOC) that provides standardized training for most sports across Canada. It advises it has weekend certification courses suitable for volunteers. The standards of certification vary and where coaches are hired, responsibilities increase. In deciding on qualifications, they are moving from a ‘course-based’ to ‘competency-based’ approach with external judging.

While it does not presently appear to have training modules geared to winter backcountry activities, it does appear to have:

- the right orientation;
- established methods and approaches; and
- an established structure and systems.

Perhaps there is some scope for a productive collaboration between the Coaching Association and the Alpine Club of Canada (ACC) who signed the 1993 protocol with the UIAA (described above) to put in place a suitable training and certification module for backcountry activities. The Coaching Association appears to have an established system for accrediting organizations (such as the ACC and others) for delivery.

Courses such as those offered by the University of Calgary’s Outdoor Programs Division on “Basic Wilderness Leadership” could be incorporated as training and certification units.

Why is this being explored? The answer is to find some credible body who can train and qualify individuals to lead backcountry trips of custodial and non-commercial groups into the mountain national parks and other destinations. This is because “effective outdoor education starts outside the parks...at home”. Also review of leader qualifications of non-commercial and custodial does not appear to be a core responsibility of a parks agency (or indeed, a feasible one).

7.7 THE INSURANCE FACTOR

During the interviews the panel conducted, the issue of insurance and insurability was raised. Apparently in response to the financial impacts of the infamous 9/11 attack, and other economic factors, insurance companies are raising rates and reducing insurance availability. As one prominent educator advised, “the insurers have the capability to shut our outdoor education programs down”. The approval or rejection criteria used by the insurers lacks transparency to the user groups so qualifying for it is uncertain.

**Personal communication with John Bales, Coaching Association of Canada, Ottawa.

Perhaps it is in this arena that accreditation and certification provisions – for example, to accredit a school district and to train and certify its outdoor leaders – would help by visibly demonstrating safety standards, reduced risk, and thus greater insurability.

Apparently some school divisions in Alberta have united to establish “insurance exchanges”. These exchanges pool their resources and self-insure. They recognize that insurance is fundamental to good risk management.

Apparently various non-government organizations that engage in outdoor activities which are deemed to be risky are facing difficulties in obtaining insurance. That suggests that there may be scope for enlarging the application of the insurance exchange concept and setting up an insurance body capable of administering it. Potentially the lessons of the Insurance Corporation of British Columbia and the provisions for external review of rates (as in the BC case by the BC Utilities Commission) might provide useful direction should existing insurance mechanisms not prove adequate.

7.8 RECOMMENDATIONS

- (28) The panel believes there is a need to clarify the application of business licence requirements, particularly for institutions using the mountain parks, with the primary test being “Is their activity a business operation and is it for-profit?” If not, a licence would not be required. If the institution hires a guide to lead a trip, the guide would require a business licence.

Parks Canada should develop a brief policy directive to promote uniform practice across the mountain parks on this matter. The fundamental policy distinction would exist for businesses in the for-profit sector and the not-for-profit sector.

- (29) The panel believes that apart from licencing of businesses, any certification for those leading trips into mountain national parks is not a core responsibility for Parks Canada.

The panel recommends that Parks Canada lend its active support to establishing “infrastructure” for accreditation of trainers and certification of leaders for winter backcountry activities. This would parallel the system in place for many sports in Canada.

- (30) Of the models the panel identified to lead an accreditation and certification process, the CAOC model appears to have appropriate expertise, structure, systems, and knowledge.

The panel recommends Parks Canada, in conjunction with Sports Canada (in Canadian Heritage), plus applicable provincial agencies and interested societies, explore the potential of developing the CAOC model for backcountry leader certification in the not-for-profit sector. The Alpine Club of Canada has expressed qualified interest in the training area and training modules in other institutions (e.g. University of Calgary) have potential to assist.

- (31) The panel recommends that Parks Canada apply no permitting to non-commercial groups (with no custodial responsibilities). At the same time, the panel would suggest that Parks Canada help foster their interest in developing and implementing a graduated training and certification program for backcountry trip organizers.
- (32) The panel recommends that Parks Canada requires certified guides where not-for-profit custodial groups propose to use difficult terrain or use areas presenting high-risk conditions.

To this end, the panel recommends that Parks Canada develop and distribute a suitable advisory document for all known and prospective “custodial” user groups to alert them to this requirement. That advisory document would also outline appropriate conditions of use such as group size. Also Parks Canada should classify the commonly used backcountry destinations into lower, medium, and high-risk categories to assist not-for-profit leaders make appropriate decisions.

- (33) Should the issues of uncertain insurability facing educational institutions, recreation groups and other winter backcountry participants continue, Parks Canada and other interested parties should support – with the cooperation of the Provinces of Alberta and British Columbia – a symposium to explore the feasibility and desirability of regulated insurance exchange based on a self (or mutual) insurance concept.
- (34) In discussions with the Province of Alberta and British Columbia, Parks Canada should advance:
 - a) the advantages of trained outdoor leaders as a means of enhancing public safety and promote the desirability of incentives to teachers and other volunteers to encourage them to continue to lead backcountry activities; and
 - b) the apparent advantages and effectiveness of having provincially promulgated guidelines for safe outdoor activities for students. The policy of having each school district/or division independently develop these appears inefficient and likely to lead to high variability of both standards and participation rates.

8.0 APPROACHES TO TRAVEL RESTRICTION IN AVALANCHE TERRAIN

8.1 THE ISSUES

Parks Canada has several roles in respect of avalanches – namely avalanche control in highway corridors maintained in the parks by Parks Canada; ensuring avalanche control occurs in designated ski areas; and providing information support, education and awareness initiatives; and finally search and rescue back-up support for recreational backcountry use.

The concept of restricting recreational travel into known avalanche hazard areas is occasionally presented as a potential risk reduction measure. It presumes that the hazard areas can be reliably documented and mapped – which in the case of the national parks presents issues of available geographically specific data and knowledge as well as adequate personnel to conduct the analysis and implement the control measures.

Terrain mapping at a macro level is conceptually easy to do, and with geographic information systems is also increasingly feasible although the costs are not insignificant. Key parameters of elevation, slope and aspect can be readily mapped. As has been seen in earlier discussion on risk, what however would be: (1) the key parameters on which to base restriction; and (2) the degrees of acceptable risk that would be used in defining suitable terrain? Additionally, there are the complexities introduced by numerous local terrain variations.

Moreover, there is the issue of scale...extensive landscapes managed by relatively few people...presents the issue of where to start and when to stop. And could cessation of mapping be argued as implying all other areas that are not mapped are therefore safe? And from earlier discussion, we know that terrain alone is not a sufficient indicator. Snowpack is a key factor...and a factor which is subject to wide temporal (including hourly) and spatial variation...and one that also interacts – sometimes obviously and sometimes subtlety – with terrain to determine the aggregate degree of hazard.

There are the administrative complexities as well. If the snow-terrain interaction is frequently shifting the avalanche risk rating, how can a credible travel restriction be implemented? Moreover, if it is a restriction, can it be implemented in a continuous, consistent, and effective way? In the event of violations, can an area restriction be readily and practically enforced? As a seasonal veteran put it, “No teeth equals no compliance.” A number of observers have noted that unless any restriction – usually presented by signage – is kept up to date, the warning is ignored or regarded as irrelevant.

There is also the matter of public acceptance. The National Parks have a long tradition of wilderness travel. And as one seasoned veteran observed relative to experienced users...”mountaineers by their nature are anti-authoritarian”. At the other end of the spectrum, park officials report anecdotally of a growing trend of resistance, especially at the entry level of backcountry users...who are inclined to “give officials the bird”. These tendencies would be aggravated by any perception of arbitrariness.

A question could be posed along the lines of “if restricted here, why not there?” and “if restricted now, why not formerly? And what about tomorrow?” The capacity to respond to those potentially numerous queries would be restricted.

8.2 INSIGHTS FROM CURRENT PRACTICE

Glacier National Park perhaps has the greatest experience of all the mountain national parks in Canada, based on its highway avalanche control zones. In the Trans-Canada highway corridor, closure areas have been posted in recognition of the active and ongoing explosive detonation to trigger “controlled” avalanches. In Glacier Park, Wardens report a growing pattern of entry into the restricted areas because they present accessible and tantalizing terrain-snow conditions. Recognizing growing publicity and popularity and use, officials have implemented a “permit” system which provides for temporary backcountry recreational use during periods when active avalanche control operations are not underway. This permit opening system is viewed as a new way of dealing with recreational clients and one that is unique to the special circumstances of Glacier Park. It is not the equivalent of a system of openings and closings based on avalanche hazard.

Temporary restrictions authorized by Regulations* have been introduced at various points in the national parks in response to particular hazard issues – often problem wildlife. Experience has shown that it is easier to decide when to implement a closure than when to lift it. The act of “lifting” a closure implies a level of risk security that cannot be assured, especially in a dynamic avalanche prone environment.

8.3 INSIGHTS FROM USA EXPERIENCE

Jackson Hole is a legendary ski area in Wyoming where skiers and snowboarders use the commercial ski lifts to access backcountry avalanche terrain in the public domain in both the adjacent Grand Teton National Park and Bridger National Forest. Previously closed, this public land was opened to allow access to touring areas. The specified requirement for access is a “low” avalanche rating, along with other factors such as good visibility. In an article by Robert Comey,** several relevant experiences from this area were reported:

**National Park General Regulations*, 2002, Section 36

**Robert H. Comey – “Alpine Touring Access Management on Public Lands in Avalanche Terrain”; Bridger-Teton National Forest Avalanche Forecast Laboratory, Teton Village, Wyoming

- A policy “that none of the touring terrain can be opened until all areas within the extensive forecast region are considered to have a low avalanche hazard.”
- “Recent increases in the numbers of tourers and changes in user habits have been observed...some of today’s snowboarders and skiers are content to remain in the backcountry well after the (daily warming) warm-up has occurred resulting in an exposure to the hazard of avalanches and causing adverse impacts on the quality of skiing...The popularity of extreme skiing and snowboarding has resulted in the flocking of inexperienced and experienced masses to the extreme aspects of the touring area...some of these (experienced) users have organized and are seeking legal aid in an effort to obtain an open-gate policy and to address violation issues”.

The author presents a cloudy outlook stating, “that future management options are open for discussion but options are likely to be limited by incident response limitations, liability issues, and the potential for a significant number of fatalities”. He concludes with a couple of pertinent observations:

- “The premise that low hazard does not mean that no hazard exists and the reality that the low hazard is in fact just a forecast...and;
- “To address these issues public education with respect to avalanche awareness and self rescue capabilities are necessary.”*

Also commenting on the Jackson Hole experience, Peter Kray’s article quoted a ski patroller saying, “...the equipment is so good, and the movies are pushing so much, that we’re rescuing a lot of people with no backcountry experience at all. I mean, we’ve found lost people hiking uphill.”**

The Jackson Hole experience with travel restriction points to its innate complexities and difficulties. Does this mean there is no workable solution? Hardly. Perhaps the key lies in the notion “that there is no regulation more effective than self regulation”.

8.4 A POTENTIAL WAY FORWARD: THE “RULES BASED” APPROACH

The very term “rules based” conjures up a spectre of “more darn government intervention”. In fact, this evolving methodology developed in Europe is about “decision-rules”. Such decision-rules are ready reckoning devices intended to assist users assess complex situations and make informed decisions. Such decision-rules are common business practice in both the private and public sectors. Perhaps a better term than rules-based would be “factor-based” (or risk factor based) wherein the backcountry user (a.k.a. decision maker) takes a number of complex variables into account in determining a course of action.

*Telephone checks with State Park officials in Alaska and Colorado confirmed the reliance on self-regulation rather than terrain restriction.

**Peter Kray, “Open Boundaries: Are they creating Backcountry Skiers?”, *Couloir*, December 2002.

In the case of backcountry travel, that course of action can include:

- whether or not to go;
- when to go;
- where to go; and
- what route is appropriate.

In practice, the “rules-based” system is voluntary and in Europe is aimed at assisting the recreating public competently assess and adjust for the risk factors that are present.

So what comprises this factor-based decision tool? First, it is important to know that this emerging system is presently only fully available in German. It is known as the Munter risk reduction system after its author* and is presently being translated into English with the expectation of availability late in 2003.** The title is *3x3 Avalanches: Decision Making in Critical Situations*.

The concept of “3x3” comes from the simultaneous consideration of three broad sets of criteria, namely:

- environmental conditions, specifically snow conditions and weather;
- various terrain factors; and
- human factors including experience, training, equipment, skills, and condition.

It presents a method for simultaneously considering these factors separately and in combination and “zooming” between broader and more localized scales to assess risk. It goes on to advance a number of risk reduction strategies, such as slope steepness. These risk reduction factors were determined through analysis of actual avalanche incidents. Munter stresses the method is only a tool and that proper application is critical to its effectiveness.

This thoughtful system was developed with the goal of reducing avalanche deaths by fifty percent. It clearly acknowledges that inherent risks remain. It is built on empirical observations that snowpacks are highly variable, with some areas having super weak zones, which are hard to identify. What Munter seeks to do is present a method for combining factors that contribute to increased risk. He then presents a way to use snowpack, terrain, and human factors so as to reduce that risk. Hence the term “risk reduction method”. It is based on the model of:

$$\text{Acceptable Risk} = \frac{\text{Danger Potential}}{\text{Reduction Factor} \times \text{Reduction Factor}} = \text{Less than or equal to 1}$$

*Munter, W. 1999: *3x3 Lawinen: Entscheiden in Kritische Situationen*, Garmush, Germany. (With extract translated by Pascal Haegeli, Avalanche Research, UBC, Vancouver and presented to the Canadian Avalanche Association, May 2003.)

**Comment of Pascal Hageli to the CAA, May 9, 2003.

Reduction factors include slope steepness, slope aspect, and group size as key variables. Both risk and reduction factors are presented as exponential (i.e. 2, 4, and 8) and factors are intended to be looked at in combinations.

This is not the only new system. Another has been developed by the Austrian Alpine Club, for example, called the “stop and go” system.

All of these systems depend on avalanche forecast data – typically produced at a much more detailed scale in Europe than is currently available (and probably feasible in Canada). There are other differences as well, including availability in Europe of free commercially sponsored weekend courses available to the public to learn these new methods, as well as the essentials of pre-trip training.

As Dr. Bruce Jamieson* concluded after considering these new systems, “Build tools...and they will use them”. He notes that these factor-based systems require good forecasts because they involve two-stage decision making:

- Stage 1: Decisions at a Distance – including the decision to go and the selection of a location based on maps and forecast information;
- Stage 2: Decisions at the site based on field observations.

He and others emphasize that this factor-based method is primarily a tool intended for use of amateur backcountry recreationalists. Professional guides are concerned that it will be applied to them...when in fact they usually have access to more in-depth and geographical specific information and field data as well as extensive training and experience.

That said, an adapted variation of a risk factor based method seems to hold promise as a useful and informative tool and as an instrument for voluntary terrain restriction. That approach would fulfill an educational need and avoid the many practical enforcement issues that an outright terrain restriction concept would imply. Properly introduced, a factor-based system would likely result in voluntary acceptance.

8.5 STEPS TOWARDS DEVELOPMENT AND IMPLEMENTATION

The imminent release of an English language version of W. Munter’s method is sure to spark interest in Canada. Already Dr. B. Jamieson is thinking of approaches towards developing a version suitable for Canada. In discussion with him, the following broad approach emerged:

*Personal communication. Dr. Jamieson is an avalanche specialist in the Engineering Faculty of the University of Calgary.

- 1) Initially develop a prototype of a factor-based system for use in Canada. This would be done via an expert panel or “Delphi method” of idea exchange to identify key factors that are most relevant in the Canadian context. It would also review best practices elsewhere. This pilot application would look at using the present avalanche bulletin information and current mapping.
- 2) Training and Field Testing - Based on the above prototype, adapt current “Recreation Avalanche Course” training materials currently used by the CAA and apply the factor method. Evaluation of the results of this pilot training would occur.
- 3) Factor Assessment – Re-analysis of actual avalanche incident data* as well as data sets of commercial operators on terrain and other risk factors would help identify more locally (western Canada mountains) relevant factors including the significance of varying types of vegetative cover.
- 4) Apply the Factor Analysis to Maps and Photos – This would be the start of building terrain atlases and/or maps for known “hot spots” and popular use areas. This would be done after the key factors of slope, aspect, slope steepness, terrain type, elevation, avalanche history, vegetative cover, etc. were identified empirically and through research. Such mapping would be progressively refined based on the results of field analysis and on-going research. This would be of material assistance, as most recreational users have not been trained in terrain analysis.
- 5) Weather Effects - Given the significance of weather as a factor in snowpack conditions, research should examine the minimum requirements for weather data and how best to meet any gaps – particularly in prime winter backcountry recreation areas – to ensure maximum effectiveness of the factor-based decision tool.
- 6) Pilot a Website Application - Completed maps could be converted into active displays as well as presented as links on the avalanche bulletin website (CAA), referred elsewhere in this report.

This approach must be comprehensive because avalanche risk is a combination of natural and human factors. For example, terrain mapping of key terrain risk factors is clearly only one factor. Another is snowpack condition – regionally and locally – as is weather. Training in the effective “reading” of terrain, snowpack and weather is clearly a companion requirement as any tool is only as good as its user. Backcountry users must be trained to assess and relate the various risk factors to each other, and to apply this understanding to reducing their risk.

*For example, Dr. David McClung of UBC reported at the May 2003 CAA meeting on an analysis of skier-triggered avalanches being done through his graduate student, Harpa Grimmsdottir.

8.6 RECOMMENDATIONS

- (35) Parks Canada, through its membership on the federal Interdepartmental Committee on Search and Rescue, should support the development of factor-based decision-tools to better equip recreational backcountry users to evaluate and reduce avalanche risk.
- (36) Parks Canada's interest is in the safety of park visitors, including winter backcountry users. Parks Canada should, in conjunction with the CAA and other interested parties, actively encourage and provide support to applied research and development of a "made-in-Canada" version of the factor-based system.

Such an avalanche safety initiative should be comprehensive in scope and include developing a prototype of a factor-based risk reduction system, plus pilot projects to field test, evaluate and improve it. European experience suggests the factors must be soundly based on applied research on avalanche incidents.

The results of that research could be readily applied not only in form of a "decision tool" but also in the form of mapping – available on the web, in atlases and at backcountry trailhead kiosks. All of these visitor reception centres would assist users in making safe decisions regarding winter backcountry trips.

Support for funding and developing such a system should be sought from the NSS because of its potential for broad application in Canada and elsewhere. Appropriate private sector participation in this initiative should be welcomed.

9.0 THE NEXT PHASE

The report of the panel reflects the results of a review based on workshops, interviews, questionnaires, phone interviews, and literature research. It advances recommendations to Parks Canada and many of these either require or would benefit from multi-party engagement and support.

Parks Canada may wish to first distribute this report to the key organizations and other parties interested in winter backcountry avalanche safety, with the request that they review this document and provide their comments back to Parks Canada. This could lead to possible meetings or workshops aimed at fostering dialogue and subsequent agreement on implementation measures, many of which likely cannot be accomplished by Parks Canada acting on its own.

The panel hopes that this review will contribute to productive interchange between Parks Canada, various other federal and provincial agencies, associations with interest in safety, and various park user groups and result in actions that enhance the safety and enjoyment of winter backcountry recreation.

APPENDICES

APPENDIX 1

PARKS CANADA INFORMATION BULLETIN; PROJECT ANNOUNCEMENT

*Parks Canada
Information Bulletin*
CP2003-00XXX

Parcs Canada

PARKS CANADA ANNOUNCES INDEPENDENT BACKCOUNTRY RISK REVIEW PANEL

Calgary, April 22, 2003 – Parks Canada today announced the members of a panel established to review aspects of winter backcountry safety. The review, covering the mountain national parks of Canada in British Columbia and Alberta, will examine how Parks Canada communicates avalanche information to park users.

Parks Canada's goal is to make backcountry users aware of avalanche dangers and provide them with complete information so they can make informed decisions.

Mr. Denis O'Gorman, former Assistant Deputy Minister for BC Parks, has been selected to lead the panel. Mr. O'Gorman will be assisted by Mr. Phil Hein, technical advisor, and Dr. William Leiss, risk management communications advisor. The panel will submit a report to Parks Canada this summer.

Following the tragic death of seven students in Glacier National Park in February 2003, Parks Canada made a decision to conduct an independent review of how its avalanche information is communicated to the public. In the interim, Parks Canada instituted electronic information signs in the mountain parks to inform park travellers of backcountry avalanche danger, and where to obtain current information. In addition, Parks Canada has worked closely with local hotels and businesses to provide information to their guests and customers.

Parks Canada takes seriously its responsibilities for avalanche awareness. Parks Canada provides daily updates and advice to the public on avalanche conditions in the mountain national parks.

Information:

Bill Hunt
Communications,
Office of the Executive Director, Mountain Parks
Parks Canada
(403) 762-1568

BACKGROUNDER

Parks Canada Backcountry Avalanche Risk Review Panel

Denis O’Gorman, Project Leader:

Formerly with British Columbia government (ADM, BC Parks for 6 years), Mr. O’Gorman has held senior positions in ministries managing provincial parks, environment and forests. His areas of expertise include protected areas planning and management, land use policy, integrated resource use planning, impact assessment, policy analysis and development, project coordination, regulatory procedure and strategic planning. He has managed the process for legislative designation of new parks and protected areas under BC’s Protected Areas Strategy and he co-chaired the Pacific Marine Heritage Legacy program with Parks Canada. Mr. O’Gorman has led various initiatives associated with the review and development of provincial government policy related to parks, biodiversity, planning, land use, forestry, and energy. He is a member of the Canadian Institute of Planners and an Honorary Member of the Association of BC Professional Foresters. He currently lives in Penticton, British Columbia.

Phil Hein, Technical Advisor:

A Mountain Guide (ACMG 1980) and International Mountain Guide (IFMGA 1980), Mr. Hein has been a professional member of the CAA since 1986. Mr. Hein is a member of the CAA Education Committee (1995 to present) and was a steering committee member to redevelop the Level 2 training program for avalanche professionals. Mr. Hein has been the technical investigator on approximately 10 avalanche fatality incidents in the Rockies and Columbia Mountains, including the Mike Wynn fatality (Parks Canada employee) and is a backcountry travel safety consultant for University of Calgary avalanche research program. Mr. Hein is a ski guide (senior lead guide status) for the heli-skiing and ski touring industry. He is also a consultant for backcountry recreation studies and mountain operations programming for the private sector and BC Government (since 1990). Mr. Hein assists with College of the Rockies for providing training and outdoor trips for the Adventure Tourism Business Operations program. Located in Golden, BC, Mr. Hein continues to guide clients in winter and summer in outdoor adventure activities.

Dr. William Leiss, Risk Management Communications Advisor:

Dr. William Leiss is one of the most senior risk communication experts in Canada, and has worked extensively in a consulting capacity with industry and with Federal and Provincial governments in the area of risk communication, risk management, public consultation and multi stakeholder consensus building processes. Dr. Leiss is a Fellow of the Royal Society of Canada. Under the auspices of the Royal Society he has established a national framework for the use of expert panels in risk controversies in Canada. Dr. Leiss has considerable academic credentials including: NSERC/SSHRC Industrial Research Chair in Risk Communication and Policy, University of Calgary; Professor, School of Policy Studies, Queen’s University; and Vice-President Research, Simon Fraser University. He has been involved in various inquiries including: the Walkerton Inquiry, and the Canadian Blood Services Inquiry. Dr. Leiss lives in Ottawa and works for the consulting company, Magnus and Associates.

APPENDIX 2

BACKGROUNDER; PROJECT TERMS OF REFERENCE

Parks Canada Backcountry Avalanche Risk Review Panel Terms of Reference

Purpose

- To undertake a review of current Parks Canada practices with respect to advising park backcountry users of potential risks from avalanches while travelling in the backcountry of the mountain national parks in British Columbia and Alberta,
- To identify components of the current practices and procedures that are particularly strong,
- To identify components of the current practices and procedures that require changes and improvements,
- Identify recommendations for addressing problem areas or areas needing improvement.

Background

The Parks Canada Agency manages a large area of wilderness within the provinces of Alberta and British Columbia. The agency's policy is to recognize that travel in backcountry areas is hazardous. The agency's responsibility is to ensure that sufficient and adequate information is provided so that potential individual or group users can make their own decision relative to the risk. Parks Canada recognizes that the risk in backcountry travel cannot be eliminated; for many people that is part of the attraction of this type of experience. However, we do want to do the best possible job in making potential users fully aware of the potential risk so they can make their own decision. We also want to be proactive in getting the message out to park users that because an area is in a national park does not mean that all risk has been eliminated.

Parks Canada has conducted a number of plans and reviews, in the last ten years, to help mitigate visitor risk in National Parks. From National Policy Guidelines to local operational plans, visitor risk management and how Parks Canada responds to managing that risk, requires review in light of recent avalanche accidents in national parks.

Risk management aims to reduce the frequency and severity of unintentional injury and loss of life through cost effective means. Risk management means supporting fact-based decisions within an organization, identifying priority safety issues for thorough consideration and ensuring implementation of effective action. Parks Canada views risk management from a holistic and comprehensive perspective.

Parks Canada has implemented many risk management mitigations based on the previous plans and reviews that have been carried out. This review will focus on the mitigations currently in place and evaluate their effectiveness and make recommendations for improvement if necessary. In this study, the full range of concerns and elements surrounding risk management of backcountry (avalanche) focused activities in the mountain parks will be reviewed.

The review will focus on winter activities in avalanche terrain in backcountry areas, and encompass the National Parks of British Columbia and Alberta namely Jasper, Banff, Yoho, Kootenay, Mt. Revelstoke, Glacier and Waterton. It is recognized that applications from this review may influence how Parks Canada manages year round use in these parks.

Scope of Work

- To review Parks Canada's current risk management practices and actions in the mountain parks of Alberta and British Columbia. This will focus on activities that occur in the wintertime, associated with avalanche terrain, in natural areas.
- To review how Parks Canada manages the perceptions of risk in natural areas held by users and stakeholders, and how Parks Canada can improve the communications around inherent risk in natural areas as it pertains to avalanches.
- To review the effectiveness of Parks Canada's communication approach and capability for advising the public of the risks associated with winter activities and to ensure that this communication allows visitors to manage their own risk. To make recommendations, as needed, as to how public information systems could be improved or enhanced to aid in individual and group decision making.
- To review how users access the emergency notification systems and initiate emergency response in national parks. Evolving communication technology readily accessible by users may require Parks Canada to adjust its notification methods. (Note: how Parks Canada responds to an emergency, once being notified, is not part of this review).
- To clarify responsibilities of individuals, organizations and Parks Canada with respect to preparing for winter backcountry travel and decisions related to risk management. To review the certifications required for undertaking hazardous activities in National Parks in a leadership capacity for both 'for profit' and 'not for profit' groups and organizations (winter only).
- To review the concept of implementing travel restrictions in natural areas as a result of predicted avalanche conditions in National Parks.
- To link to other reviews, where applicable, that are ongoing as a result of avalanche accidents during the winter of 2002/03.

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