Interim Wildlife Guidelines for Commercial Backcountry Recreation in British Columbia

Chapter 4

MAMMALS

Dall Sheep
Photo: BC Parks

BRITISH COLUMBIA

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Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Badger (Red)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect the population of this species	1.1	Document and report any known occurrences of this species	1.1.1	Existing range well known
2.0	Home range well documented	2.2[M]	Identify and map badger populations and habitats	2.1.1	Occupied home ranges known
3.0	Protect species from human disturbance	3.1	Train staff and clients on responsible behaviour near badger habitats	3.1.1	Knowledgeable staff ensure no intrusions and no poaching
		3.2	Develop an access management plan that protects badgers from human disturbance in known use areas	3.2.1	Species continues to use the area
		3.3	Maintain badger burrows (badgers use hundreds of burrows)	3.3.1	Badger burrows maintained
4.0	Maintain a dense and diverse prey source	4.1	Maintain populations and habitats of prey species (primarily pocket gophers and ground squirrels)	4.1.1	Abundant prey species and populations

[M] = Strategy required for major development only

Note: Information on this species is classified as sensitive and only available on a need to know basis from the Regional Endangered Species Specialist.

RED: Indigenous species or subspecies that have been legally designated or are being considered for legal designation as Extirpated, Endangered, or Threatened status in BC
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Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Badger

Key issues of concern: den sites, prey densities.

Principal sources of information:

Cannings, S. G., Ramsay, L. R., Fraser, D. F., & Fraker, M. A. (1999). *Rare amphibians, reptiles, and mammals of British Columbia*. Victoria, BC: Wildlife Branch and Resources Inventory Branch, British Columbia Ministry of Environment, Lands and Parks. Available through Crown Publications (http://www.crownpub.bc.ca) Inventory Number 605.

Claar, J. J., Anderson, N., Boyd, D., Cherry, M., Conrad, B., Hompesch, R., Miller, S., Olson, G., Pac, H. I., Waller, J., Wittinger, T., & Youmans, H. (1999). Carnivores. In G. Joslin & H. Youmans (Eds.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana* (pp. 7.1 - 7.63): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/7carn.pdf.

Carnivores exhibit a wide variety of responses to recreational activities, which range from being highly sensitive to human disturbance (e.g. grizzly bears) to being well adapted to the presence of humans and human activities (e.g. skunks and coyotes). Claar provide a recent, comprehensive survey of recreational impacts on carnivores. Although they focus on Montana, much of their information and recommendations apply to British Columbia.

Badgers are red-listed predators found in open areas and brushlands where they hunt fossorial (burrowing)prey such as ground squirrels and pocket gophers They are at risk because the area of suitable habitat in the province is small, and much of that habitat has already been greatly modified by human activity. The dry regions of the southern Interior and the east Kootenay provide the habitat that badgers prefer: grasslands, and open pine or fir forests.

The objective of commercial recreation guidelines for Badger* is to maintain the current distribution and abundance of provincial populations.

* Location information on this species is classified as sensitive and is only available on a need to know basis from the Regional Endangered Species Specialist.

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Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Bats: Red- and Blue-listed species*

Fringed Myotis (BLUE), Keen's Long-eared Myotis (RED), Northern Long-eared Myotis (BLUE), Pallid Bat (RED), Spotted Bat (BLUE), Townsend's Big-Eared Bat (BLUE), Western Red Bat (RED), Western Small-footed Myotis (BLUE)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Identify habitats where occurrence is likely	1.1[M]	Identify and map sensitive habitats, including hibernacula, roost sites, and critical foraging habitats.	1.1.1	Habitat mapped
2.0	Maintain critical habitats	2.1	Avoid facility development near sensitive habitats (e.g. caves, old forests, etc).	2.1.1	Large trees and old growth forest characteristics maintained.
		2.2	Avoid the use of pesticides near sensitive bat sites	2.1.2	No pesticide use in sensitive areas
3.0	Avoid disturbance	3.1	Prevent abandonment of hibernacula, maternity colonies and roost sites by preventing access to these sites.	3.1.1	Occupied caves and cliffs continue to be used by this species
		3.2	Train staff and clients on responsible behaviour near sensitive bat habitats.	3.2.1	Knowledgeable staff ensure no intrusions

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Bats: Red- and Blue-listed species

Key issues of concern: maternal and daytime roosts, and winter hibernacula (e.g., caves).

Principal sources of information:

Barclay, R. M. R., & Brigham, R. M. (1996). *Bats and Forests Symposium, October 19-21, 1995* (Working Paper 23/1996). Victoria, BC: Research Branch, BC Ministry of Forests.

Nagorsen, D. W., & Brigham, R. W. (1993). *The Bats of British Columbia* (Vol. 1). Vancouver, BC: UBC Press and Royal British Columbia Museum.

For distribution and map of Keen's Long-eared Myotis, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-28.htm

British Columbia is home to 16 species of bats. Most are migratory, arriving in the Province in spring and leaving in the fall: exact timing of these seasonal movements varies with species and location within the province. It is during their period of residency that concern exists regarding impacts of backcountry recreation.

While migratory bats are in B.C., their principal activity is birthing and raising offspring. The important consideration is for the sites used by bats to give birth and raise young (maternity colonies), and the sites used by bats for daytime roosts.

A few species of bats are year-round residents, and so the concern about roosting and den sites exists throughout the year. Hibernation is a critical period in the life cycle of bats, a time they typically lose 20 to 40% of their body weight and severely deplete their reserves of body fat. During this time, they are extremely vulnerable to human disturbance in the caves, mines, buildings, tree cavities, tree bark, and rock crevices they use as winter hibernacula. Caving, particularly in winter, can have a very high impact on bat hibernacula. Disturbance from hibernation uses up valuable fat reserves prematurely, with the result that bats disturbed from hibernation may die later of starvation. The sensitivity of bats to human disturbance at roost sites is well established.

The objective of commercial recreation guidelines for Red- and Blue-listed bats is to maintain their current distribution and abundance in the province.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Bison - athabascae ssp. (Red) - bison ssp. (Blue)

Last revision: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect the population	1.1[M]	Identify and map sensitive habitats including calving and rutting habitats and winter ranges by compiling existing information and/or conducting inventories. Assign ratings of high and moderate sensitivity. Operator to be familiar with these sites in the tenured area	1.1.1	Critical habitats such as calving areas, escape terrain, mineral licks and winter ranges known
2.0	Protect bison from harassment	2.1	Seasonally close highly sensitive habitats.	2.1.1	No human caused disturbance during calving period
		2.2	Regulate recreation activities within moderate sensitivity areas as needed. Minimize potential disturbance of bison by modifying use areas and activities to address seasonal habitat needs	2.2.1	No human caused bison disturbance
		2.3	Limit aircraft flight altitude to a minimum of 500 m over designated bison habitats		
		2.4	In cooperation with WLAP staff, select particular routes, heli-ports, heli-pads, and heli-spots for all helicopter activities in the vicinity of bison ranges		
		2.6	Prevent facility development on or near critical seasonal bison habitats.		
		2.7	All access trails and viewing areas should be at least 300 m away from sensitive sites		
		2.8	Train staff and clients on responsible behaviour near bison and their habitats		

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Bison

Key issues of concern: human activity on winter ranges

Principal sources of information:

Aune, K. E. (1981). Impact of winter recreationists on wildlife in a portion of Yellowstone National Park, Wyoming. Unpublished M.Sc., Montana State University, Bozeman, MT.

Olliff, T., Legg, K., & Kaeding, B. (1999). Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment. Yellowstone National Park, WY: Report to the Greater Yellowstone Coordinating Committee.

Bison react to humans on foot more quickly than to humans on mechanized vehicles, such as snowmobiles. In winter, bison use groomed snowmobile trails as travel routes, and the level of use increases with increasing snow depth. Snowmobilers may cause bison to flee when encountered. Aune reported that heavy human activity within 63 yards of trails might temporarily displace wildlife. However, bison do not appear to use groomed ski trails to the same extent.

The objective of commercial recreation guidelines for Bison is to maintain the current distribution and abundance of provincial populations of Plains and Wood Bison, and allow their expansion consistent with provincial management plans and national recovery efforts.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Caribou* (Mountain ecotype-Red)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Maintain the natural distribution of Caribou	1.1[M]	Identify and map seasonal habitats which may be designated as sensitive, including early and late winter ranges. Calving and rutting grounds should also be included in areas of the province where caribou are concentrated for these activities. Assign ratings of high and moderate sensitivity. These ratings may vary for different activities for different areas	1.1.1	Habitats identified and maintained
2.0	Minimize stress caused by human disturbance	2.1	While in the backcountry, stay at a distance which does not disturb or alarm caribou or cause them to leave the immediate area. This distance will be greatest for activities where people may startle caribou with sudden appearances or loud noises.	2.1.1	Caribou activity continues unabated
		2.2	Seasonally close habitats designated as highly sensitive to off-highway vehicles (OHVS)s, snowmobiles, and other forms of transport as deemed appropriate by WLAP staff..	2.2.1	Snowmobile and OHV activity only in planned areas
		2.3	Regulate snowmobile and OHV activity within designated habitats of moderate sensitivity as needed.	2.3.1	
		2.4	Seasonally close habitats designated as highly sensitive to pick-up and drop-off sites for helicopters. Where there is direct overlap of intensive helicopter use with caribou habitats then consideration should be given to horizontal no-fly zones over critical areas.	2.4.1	Caribou not negatively impacted by helicopter activity
		2.5	Limit the frequency of helicopter and fixed-wing flights in habitats designated as highly or moderately sensitive. Ensure that overflying aircraft maintain an altitude above the ground which is higher than either 300 m or a distance determined by the WLAP Regional Manager.	2.5.1	

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		2.6	In cooperation with WLAP staff, select particular routes, heli-ports, heli-pads, and heli-spots for all helicopter activities in the vicinity of designated Caribou habitat.	2.6.1	
		2.7	Ensure that non-motorized access trails and Caribou viewing areas are well screened from highly sensitive sites. Non-motorized trail users should stay on single trails and avoid wandering in highly sensitive areas.	2.7.1	
		2.8	Train staff and clients in responsible behaviour near caribou habitats which are designated as sensitive	2.8.1	
3.0	Maintain the functional integrity of caribou habitat	3.1	Prevent facility development on or near Caribou habitats designated as highly sensitive.	3.1.1	Absence of facilities in key sensitive caribou habitats

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* Note: These commercial recreation guidelines apply to all caribou herds which are listed by the Conservation Data Centre (CDC) and/or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), as well as other herds designated by regional WLAP staff:

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Caribou

Key issues of concern: human activity on late winter ranges, and at calving

Principal sources of information:

Simpson, K., & Terry, E. (2000). *Impacts of backcountry recreation activities on Mountain Caribou - management concerns, interim management guidelines and research needs* (Wildlife Working Report 99). Victoria, BC: Ministry of Environment, Lands and Parks.

Stevenson, S. K., Armleder, H. M., Jull, M. J., King, D. G., McLellan, B. N., & Coxson, D. S. (1994). *Mountain Caribou in managed forests: Preliminary recommendations for managers*. Victoria, BC: Research Branch, Ministry of Forests. Available at: http://wlapwww.gov.bc.ca/wld/documents/r26_mtcaribou.pdf

All caribou in British Columbia belong to the woodland subspecies (*Rangifer tarandus caribou*), but can be further divided into three ecotypes based on differences in habitat use, behaviour and migration patterns

- *Mountain ecotype* caribou live in southeastern BC. They are characterized by their use of high elevation habitat in late winter where they forage almost exclusively on arboreal lichens.
- *Northern ecotype* caribou lives in west-central and northen BC. During winter, these caribou use low elevation forests or windswept alpine ridges where they crater for terrestrial lichens. They also feed on arboreal lichens during winter but to a lesser extent.
- *Boreal ecotype* of caribou resides in the lowlands of northeastern BC where animals are dispersed in scattered , relatively sedentary groups.

While the concerns over potential adverse impacts of recreation are greatest for the red-listed Mountain Caribou, there are several herds of the northern ecotype that are also facing pressure from winter recreationists (e.g. Telkwa herd). As more road access opens up in the boreal forest in northeast BC, similar impacts are expected for boreal caribou.

Generally, caribou cover wide elevational and geographical ranges over the course of a year, and this extensive movement puts them into contact with many types of recreational and other human activities. The two habitats of greatest concern for caribou are the calving and late winter ranges. During calving, caribou disperse to more isolated areas, with the result that they are susceptible to impacts of wide-ranging OHVs and snowmobiles that are capable of accessing these areas. Late winter habitat use in subalpine and alpine areas can be greatly impacted by backcountry recreation, particularly for the mountain-ecotype of caribou. Since caribou in the subalpine are particularly cryptic and difficult to see, and their tracks are often not visible in wind swept areas, recreationists may be deluded into believing there are no caribou present when this is not the case.

Mountain caribou have evolved a strategy of wintering at alpine and sub-alpine elevations to obtain arboreal lichens and, presumably, to reduce their exposure to predators. With the evolution of the modern snowmobile, many ranges that were previously difficult to access have become readily accessible. The expansion of industrial roads into higher elevation forests has also facilitated access to these subalpine areas by snowmobilers, cross-country skiers and other recreationists. As well, the growth of heli-skiing has introduced still more people into these habitats.

Changes in access and increases in winter recreation on caribou winter range are responsible for several wildlife management concerns. Improved access can have negative implications, including increased chances of illegal harvest of caribou, facilitated by their characteristically unwary, and even inquisitive, behaviour. The

creation of trails, and other linear corridors in an area may also render caribou vulnerable to non-human predators, such as wolves. Winter range areas located near roads and /or highways may experience greater use by recreationists and consequently, suffer potentially greater negative impacts.

Increased recreational activity in caribou habitat may disturb wintering animals. Although a definitive study of the effects of recreation disturbance on woodland caribou has not yet been completed, common sense dictates caution, particularly where the vitality of red-listed species is concerned. There are documented negative responses of caribou to other disturbing stimuli, such as blasting. These included increased movements and energy expenditures and possible habitat displacement. In addition, studies showing the effects of different forms of disturbance (e.g. aircraft, snowmobiles) on other ungulate species have resulted in growing speculation over potential disturbance to caribou in the backcountry. Like other ungulates, caribou may habituate to predictable, non-threatening human behaviours if negative associations are avoided. However, sudden loud noises and unpredictable human behaviour typically result in extreme alarm responses and flight. Biologists suggest that caribou can tolerate low levels of recreational activities but will avoid areas of heavy use, and rank the potential threat of four winter backcountry recreation activities to Mountain Caribou, where snowmobiling was “very high”, heli-skiing “high”, snowcat skiing “moderate” and backcountry skiing “low”.

The objective of commercial recreation guidelines for Caribou is to maintain the current distribution and abundance of provincial herds.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Fisher (Blue)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect the population of this species	1.1	Document and report any known occurrences of this species	1.1.1	Existing range well known
2.0	Home range well documented	2.2[M]	Inventory home range and abundance	2.1.1	Occupied home ranges known
3.0	Protect species from human disturbance	3.1	Train staff and clients on responsible behaviour near Fisher and their habitats	3.1.1	Knowledgeable staff ensure no intrusions and no poaching
		3.2	Develop an access management plan that aims to minimize human access in known use areas	3.2.1	Species continues to use the area
4.0	Maintain a dense and diverse prey source	4.1	Maintain critical elements for prey species, food, cover, denning sites	4.1.1	Abundant prey species and populations
5.0	Maintain sufficient amounts of mature forested habitat and coarse woody debris in known habitats	5.1	Maintain sufficient amounts of mature forested habitat and coast wood debris in known habitats by limiting basal area reduction in known habitats to 20%.	5.1.1	Forest habitat and connectivity maintained and displacement of fisher avoided
		5.2	Prevent removal of coarse woody debris from known habitats	5.2.1	Natural distribution and amounts of Coarse Woody Debris maintained
6.0	Maintain riparian areas with natural distribution of older deciduous trees	6.1	Minimize activities in riparian zones and maintain mature deciduous trees	6.1.1	Riparian habitat maintained

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Fisher

Key issues of concern: natal den sites

Principal sources of information:

Claar, J. J., Anderson, N., Boyd, D., Cherry, M., Conrad, B., Hompesch, R., Miller, S., Olson, G., Pac, H. I., Waller, J., Wittinger, T., & Youmans, H. (1999). Carnivores. In G. Joslin & H. Youmans (Eds.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana* (pp. 7.1 - 7.63): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/7carn.pdf

Olliff, T., Legg, K., & Kaeding, B. (1999). *Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment*. Yellowstone National Park, WY: Report to the Greater Yellowstone Coordinating Committee.

For distribution and map, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-31.htm

Carnivores exhibit a wide variety of responses to recreational activities, which range from being highly sensitive to human disturbance (e.g. grizzly bears) to being well adapted to the presence of humans and human activities (e.g. skunks and coyotes). Claar provide a recent, comprehensive survey of recreational impacts on carnivores. Although they focus on Montana, much of their information and recommendations apply to British Columbia.

In their review of Fisher, Claar et al. (1999) noted that the direct effects of recreational activities on this species have not been systematically examined. However, the literature on Fisher suggests that they are adaptable to human activity, with the possible exception of females with kits. Possible indirect effects include loss, degradation or fragmentation of prime habitats and displacement as a result of increased human access.

The objective of commercial recreation guidelines for Fisher is to maintain the current distribution and abundance of provincial populations.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Gray Wolf

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Maintain natural habitat conditions and behaviour patterns	1.1	Avoid facilities development on or near ungulate winter ranges that also support wolves in winter.	1.1.1	Natural conditions and behaviour maintained
		1.2	Train staff and clients on responsible behaviour near sensitive wolf habitats		
		1.3	Prevent the grooming and use of snowmobile trails after April 1 in identified critical areas		
		1.4	Keep domestic dogs leashed or tethered in areas with significant wolf populations		
2.0	Avoid displacement of wolves during critical denning period	2.1	Close destination areas near wolf dens between April 15 and July 15 to prevent displacement of wolves during critical denning period.		

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Gray Wolf

Key issues of concern: natal den site; rendezvous sites, winter ranges of ungulate prey

Principal sources of information:

Claar, J. J., Anderson, N., Boyd, D., Cherry, M., Conrad, B., Hompesch, R., Miller, S., Olson, G., Pac, H. I., Waller, J., Wittinger, T., & Youmans, H. (1999). Carnivores. In G. Joslin & H. Youmans (Eds.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana* (pp. 7.1 - 7.63): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/7carn.pdf

Olliff, T., Legg, K., & Kaeding, B. (1999). *Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment*. Yellowstone National Park, WY: Report to the Greater Yellowstone Coordinating Committee.

Weaver, J. L., Paquet, P. C., & Ruggiero, L. F. (1996). Resilience and conservation of large carnivores in the Rocky Mountains. *Conservation Biology, 10*(4), 964-976.

In a review paper, Weaver noted that most field researchers have found that wolves tend to avoid human settlements, and to exhibit slight aversion within about 1 km of open roads, and to use gated and unplowed roads readily. Among their cited papers were data indicating that radio-collared wolves in Alaska avoided accessible roads but were attracted to gated and gravel roads that received little use. Others papers cited noted observations that wolves avoided exploiting their prey near clusters of human habitation and development, especially in narrow river valleys. Weaver also remarked that wolves are sensitive to human disturbance near active den sites from mid-April to July, but provided no evidence in support of this statement. Beyond the problem of disturbance and displacement, domestic dogs also present a significant risk of transmitting infectious diseases and parasites to wolves.

The objective of commercial recreation guidelines for Gray Wolf is to maintain the current distribution and abundance of provincial populations.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Grizzly Bear (Blue)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Maintain functional integrity of habitat	1.1 [M]	Map bear habitat (localized and home range) and connectivity corridors within the tenure area using existing information or by conducting an inventory	1.1.1	Healthy natural bear populations
		1.2	No facility development on or near high use bear habitat eg. critical denning and feeding habitat	1.2.1	New facilities located away from high use bear areas
		1.3	Minimize road and trail (less than 0.5 km/ sq km) development in occupied habitat.	1.3.1	measures of road and trail density
		1.4	Protect existing roadless areas pending completion of Grizzly Recovery for Threatened Population Units		No new roads
		1.5	Apply seasonal road restrictions in areas of important habitat		Establishment of seasonal restrictions
			Limit helicopter and fixed-wing flight to a minimum of 300 m. over critical grizzly bear habitat.		
2.0	Prevent bear access to human supplied foods	2.1	Food and garbage stored in bear proof containers. No long term storage	2.1.1	Number of incidents of bears obtaining human supplied food.
3.0	Minimize bear/human encounters	3.1	Avoid disturbance of bears and habitat degradation. Locate and design facilities, roads and trails to minimize risk of bear/human contacts. Where possible coordinate facilities and infrastructure with other industrial development. Seasonally modify activities and use areas.	3.1.1	Number of bear/human contacts
		3.2	Train staff and clients on responsible behaviour near grizzly bears and sensitive grizzly bear habitats, applying bear viewing guidelines where appropriate.	3.2.1	Number and severity of incidents
4.0	Minimize need to relocation or destroy bears	4.1	Prepare a Bear Emergency Plan, and Bear reporting and monitoring program	4.1.1	Number of relocations and number of bears destroyed

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Grizzly Bear

Key issues of concern: denning habitat, early spring and late fall feeding grounds, especially area-concentrated sites

Principal sources of information:

Claar, J. J., et all. (1999). Carnivores. In G. Joslin & H. Youmans (Eds.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana* (pp. 7.1 - 7.63): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/7carn.pdf

Olliff, T., Legg, K., & Kaeding, B. (1999). *Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment*. Yellowstone National Park, WY: Report to the Greater Yellowstone Coordinating Committee.

For distribution and map, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-32.htm

Bear viewing has special considerations that the viewing of other wildlife does not. The presence of humans in bear habitat can create stress for grizzly bears and cause them to abandon a habitat, either temporarily or permanently. Grizzly Bears are sensitive to human activity, but some individuals can habituate to predictable behaviours. In a few situations, habituation could be seen as positive, such as the very closely regulated viewing of brown bears at McNeal River Falls in Alaska.

Unfortunately, the more typical situation is that human activity is not well regulated, and in these cases habituated bears can become unpredictable and potentially dangerous. If the habituated bears are also food-conditioned, then the risk to human safety increases significantly.

Grizzly Bears are also negatively affected by motorized vehicle use, although this topic is less well studied on trails with varying levels of human use. As the level of use increases, so does the negative effect. Vehicular traffic along open roads can displace grizzly bears from 100-900m.

Even where female grizzlies use areas near roads and settlements, presumably to avoid males that are less tolerant of human activities, these sows often become habituated, food-conditioned, and are eventually relocated or destroyed. Habituation can also occur when bears feed on improperly handled garbage.

The objective of commercial recreation guidelines for Grizzly Bear is to maintain the current distribution and abundance of provincial populations and prevent the habituation of Grizzly Bears to humans and human activities.

Bear viewing guidelines (abridged)

Bear Viewing Guidelines directly quoted from *Commercial Recreation on Crown Land - Guidelines for Staff and Applicants.* Full guidelines are available at:
http://www.bc-land-assets.com/CLB/pdf__files/crguide.pdf

Wildlife viewing provides excellent opportunities to promote the appreciation of wildlife and habitat conservation. Bears, in particular, have broad public appeal and are popular for viewing purposes. Despite this, the conservation of bears must remain the primary objective of all bear management and cannot be compromised to increase viewing opportunities. Bears, particularly grizzlies, are already facing stresses from a variety of sources including habitat loss, fragmentation and alienation. To compound these current impacts with the additional stress of a human presence, often at prime feeding locations, may be unacceptable in some locations.

Viewing programs in some areas have led to the displacement of individuals, particularly adult males who are generally resistant to habituation. However, whether this impacts bears at the population level is difficult to measure and has not been well studied. The potential for impact on bear populations is thought to vary depending on whether the bears congregate at a point concentration, are found along linear habitats (usually a river with a salmon run) or are dispersed across several habitats. The nature and degree of human use is also a variable which must be considered in determining the appropriateness of each bear viewing program.

Hunting around bear viewing areas poses an ethical dilemma and can be quite controversial. Some degree of habituation is likely to occur for most bears using these sites, particularly at point and linear concentrations. Here, management objectives must be clearly set prior to the commencement of viewing. If hunting is desired, viewing programs should avoid habituation and separate seasons set for both activities.

As with any backcountry enterprise, commercial operators must ensure a reasonable level of safety for their clients. Therefore, visitors should be given an overview of bear behaviour, food and waste management and how to react in the event of a bear encounter prior to any viewing event.

Considerations in Reviewing an Application Involving Bear Viewing

The main objective should be the conservation of bears. This must take precedence over all other objectives.

The impacts on bears of backcountry tourism both within and outside protected areas, and increased access, can be considerable, especially when they are cumulative. A major concern in the establishment of bear viewing opportunities is the stress placed on bears. This stress may alter behaviour resulting in displacement from prime habitat. This is particularly relevant because the best bear viewing opportunities occur at sites to which bears reliably return, usually due to a consistent food source, such as salmon. Not coincidentally, these areas represent prime habitat, usually with important food resources. Displacement from such resources may impact survivorship of some individuals, although such concerns are difficult to test and have not been well documented.

Viewing must not compound impacts currently faced by individual bears and bear populations in British Columbia.

Site-specific restrictions should be employed to mitigate potential impacts on bears. These include, but are not limited to:

- Visitor number restrictions. Optimal group size is determined by various on-site factors including topography, ability to build blinds and proximity to the bears.
- Distance restrictions. Viewers should be required to maintain a maximum distance from bears for their own safety and to reduce stress on the bears, e.g., in Khutzeymateen Provincial Park, viewers are required to maintain at least 150 m from the bears.
- Seasonal restrictions. Bear viewing should be restricted to set seasons, which should be determined on a site-specific basis. Seasonal viewing restrictions will help reduce conflict with hunting activities and allow bears time at critical food sources (e.g., salmon runs, berry patches) without human disturbance.
- Access restrictions. Bears should be left an option to feed without human observation. There is also concern regarding potential impacts from helicopter and fixed-wing overpasses for viewing purposes as well as jet-boat tours. The potential disturbance of such activities on bears is unknown and requires further investigation. Should such access methods be shown to be disruptive, they should be abandoned in favour of more benign viewing programs.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Areas with high potential for impacting bear behaviour should not be considered as suitable commercial viewing operations.

All commercial bear viewing should be led by a licensed guide with requisite training in bear behaviour, local ecology, ethics and conservation, pertinent regulations, first aid and a primer on tourism service to ensure a quality product is offered.

Commercial viewing operations provide excellent interpretive opportunities to educate the public about bear behaviour, ecology and conservation. Such knowledge may help reduce the number of backcountry confrontations and subsequent need to remove "problem" bears. All bear viewing operations should be required to develop an interpretive program to supplement the viewing experience.

Bear viewing seasons should not coincide with bear hunting seasons.

Whenever habituation of bears is observed, hunting should be discontinued within the radius of an average home range for an adult female (grizzly or black bear depending on the species present) from the viewing site.

Human safety should be paramount in day-to-day operations. Although managing bear populations should be the primary objective at bear viewing sites, visitor safety should be paramount in terms of day-to-day operations. These priorities require that visitation be cancelled in the event of an unstable situation with a potential "problem bear".

Prior to any viewing event, all visitors should be given a thorough overview on bear behaviour, acceptable human behaviour, food and waste management and proper reactions to close encounters with bears.

A hazard/risk assessment should be completed for all trails advertised for public bear viewing.

Landfills are not acceptable locations for bear viewing. Food or garbage conditioned bears represent a risk to human safety. In addition, the interpretive value of observing bears at landfills is very low; it may in fact be negative. More than 800 black bears and over 50 grizzlies are destroyed annually due to bear-human conflicts, often as a result of bears having access to non-natural foods such as garbage.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Lynx

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect from harassment by humans	1.1	Ensure lynx do not have access to human supplied foods by storing food and garbage in lynx proof containers.	1.1.1	No unnatural behaviour
		1.2	Maintain good sanitation of all transportation routes and snowmobile trails.		
		1.3	Regulate human activities so that they occur in a predictable fashion within defined areas to decrease flight responses. Where human-activity occurs on winter ranges, keep it concentrated in established areas to encourage habituation.		

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BLUE: Indigenous species or subspecies considered to be Vulnerable in BC. They are at risk, but not Extirpated, Endangered, or Threatened.

Lynx

Key issues of concern: winter range, natal den sites

Principal sources of information:

Claar, J. J., Anderson, N., Boyd, D., Cherry, M., Conrad, B., Hompesch, R., Miller, S., Olson, G., Pac, H. I., Waller, J., Wittinger, T., & Youmans, H. (1999). Carnivores. In G. Joslin & H. Youmans (Eds.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana* (pp. 7.1 - 7.63): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/7carn.pdf.

Olliff, T., Legg, K., & Kaeding, B. (1999). *Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment*. Yellowstone National Park, WY: Report to the Greater Yellowstone Coordinating Committee.

Studies are lacking on the impacts of backcountry recreational activities on lynx. Notwithstanding this lack, it is less likely that these activities will kill lynx, but more likely that they will have indirect affects that influence natality and survival. Recreational activities and their associated infrastructure will likely reduce the amount of suitable habitat available to lynx in two major ways. First, buildings and travel routes may destroy and fragment habitat. Second, lynx may avoid otherwise suitable habitat because of unfamiliar sights, sounds and smells associated with human activity. This avoidance reduces habitat effectiveness, which in turn, could reduce hunting success and so reduce food intake. Taken to extreme situations, this could lead to reproductive failure or reduced litter sizes, or increased levels of mortality among kittens.

Snowmobiling appears to be the source of major concern in literature reviews. Reasons for this concern include: "this activity occurs when animals are frequently in poor condition… this activity can be dispersed on the landscape…it may occur at night when lynx are usually active…it is frequently accompanied by human disturbance and habitat loss…it may alter the density and distribution of snowshoe hares, a favored prey item." (Halfpenny et al. 1999).

Non-motorized recreational activities may also adversely impact lynx because these activities are typically dispersed and unpredictable (from the lynx's perspective). The absence of repetitive, predictable activities reduces the likelihood that lynx become habituated to it (Lynx appear to habituate more readily to motorized vehicles on roadways). Conversely, lynx do become habituated to human activity around sources of food such as garbage dumps.

Biologists recommend that a cumulative effects approach be taken when assessing impacts of recreation on lynx, but note that such studies have yet to be undertaken.

The objective of commercial recreation guidelines for Lynx is to maintain the current distribution and abundance of provincial populations.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Mountain Goat

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Maintain the natural population	1.1 M	Identify, map and designate seasonal mountain goat habitats by compiling existing information and/or conducting an inventory. Operator to be familiar with seasonal mountain goat habitat.	1.1.1	Natural distribution and habitat sensitivity documented
			Apply Ungulate Winter Range guidelines.		
2.0	Avoid harassment	2.1	Maintain seasonal no-fly zones for helicopters and fixed-wing aircraft that are a minimum 2000 m horizontal and vertical distance from designated goat habitats unless goats are separated by a physical barrier that would minimize disturbance levels (e.g. mountain ridge or terrain block).	2.1.1	No disruption to natural behaviour patterns
		2.2	Select heli-ports, heli-pads and heli-spots for all helicopter activities to avoid locations within 2000 m of designated Mountain Goat habitat.	2.2.1	No disruption to natural behaviour patterns
		2.3	Avoid all human disturbance of identified kidding areas between May and June. Helicopters should not operate within 2000 m of goats during this period.	2.3.1	Successful kidding and natural behaviour patterns maintained
		2.4	Avoid all human disturbance of designated winter ranges between November and April by directing activity away from these areas	2.4.1	
		2.5	All non-motorized access trails and Mountain Goat viewing areas should be at least 300 m away from sensitive sites such as mineral licks and kidding cliffs.	2.5.1	
		2.6	Train staff and clients on responsible behaviour near critical seasonal Mountain Goat habitats.	2.6.1	
		2.7	Implement aircraft operating procedures/ flightlines (within and en-route to tenure area) to avoid disturbance of mountain goats when they are known to be using designated habitats		
3.0	Maintain habitat quality	3.1	Prevent development of facilities in or near high use habitats.	3.1.1	Critical habitats maintained

[M] = Strategy required for major development only

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Mountain Goat

Key issues of concern: human presence, especially in helicopters and snowmobiles.

Principal sources of information:

Cote, S. D. (1996). Mountain goat responses to helicopter disturbance. *Wildlife Society Bulletin, 24*, 681-685.

Foster, B. R., & Rahs, E. Y. (1983). A study of canyon-dwelling mountain goats in relation to a proposed hydroelectric development in northwest British Columbia, Canada. *Biological Conservation, 33*, 209-228.

Frid, A. (1997). *Human disturbance of mountain goats and related ungulates: a literature-based analysis with applications to Goatherd Mountain* (Unpublished report). Haines Junction, YK: Kluane National Park Reserve.

Penner, D. F. (1988). Behavioural response and habituation of Mountain Goats in relation to petroleum exploration at Pinto Creek, Alberta. *Biennial Symposium of the Northern Wild Sheep and Goat Council, 6*, 141-158.

Wilson, S. F., & Shackleton, D. M. (2001). *Backcountry Recreation and Mountain Goats* (Wildlife Bulletin B-103). Victoria: BC: Ministry of Environment, Lands and Parks. http://wlapwww.gov.bc.ca/wld/documents/b103.pdf

For distribution and map, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-36.htm

Of all the ungulate species, mountain goats appear the most sensitive to disturbance, especially by helicopters. In Montana, increased disturbance by helicopters reduced productivity of mountain goats. In the Rocky Mountains of Alberta, mountain goats moved in response to helicopters from a distance of at least up to 1.5 km. In northern British Columbia, a study indicated that goats required a buffer area of 2 km to completely avoid harassment. A variety of reports recommend that helicopters should maintain a minimum of 2 km horizontal distance to avoid disturbance to mountain goats.

While the guidelines call for a minimum 2 km horizontal and vertical separation from goats and goat habitat, these distance interval restrictions may be relaxed by ameliorating circumstances (e.g. safety concerns due to weather)

The response of mountain goats to people, traffic and noise has also been examined in summer and in winter. In summer, goats can tolerate foot and vehicular traffic, "if they are gradually acclimatized and negative associations are avoided" (Penner 1988), especially if the activity is localized and highly predictable, but do not appear to habituate to sudden, unpredictable stimuli such as aircraft over flights or predators. Penner reported that Mountain Goats accepted indirect, persistent noise (i.e. generator noise) but showed alarm responses to aircraft.

An extensive problem analysis, literature review, and research program on human disturbance of Mountain Goats has been completed by Wilson and Shackleton.

The objective of commercial recreation guidelines for Mountain Goat is to maintain the current distribution and abundance of provincial populations.

Rodents: Red- and Blue-listed species

Cascade Mantled Ground Squirrel (BLUE), Great Basin Pocket Mouse (BLUE), Least Chipmunk – *orocetes* ssp. (BLUE), Least Chipmunk – *selkirki* ssp. (RED), Meadow Jumping Mouse – *alascensis* ssp. (BLUE), Mountain Beaver - *rainieri* ssp. (BLUE), Mountain Beaver – *rufa* ssp. (RED), Northern Bog Lemming – *artemisiae* ssp. (BLUE), Northern Pocket Gopher – *segregatus* ssp. (RED), Red-tailed Chipmunk – *ruficaudus* ssp. (RED), Red-tailed Chipmunk – *simulans* ssp. (BLUE), Southern Red-backed Vole – *galei* ssp. (BLUE), Southern Red-backed Vole – *occidentalis* ssp. (RED), Townsend's Vole – *cowani* ssp. (RED), Western Harvest Mouse (BLUE)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Identify the home range of these species	1.1	Identify all occurrences of this subspecies	1.1.1	Occurrences known
2.0	Protect from human harassment	2.1	Protect known population through training of staff and clients since these species are often treated as pests	2.1.1	Natural behaviour maintained
3.0	Natural high quality habitats maintained	3.1	Maintain sensitive habitats and the natural distribution of important habitat features (e.g. Coarse Woody Debris).	3.1.1	Natural distribution maintained

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Rodents: Red- and Blue-listed species

Key issues of concern: breeding and foraging habitats

Principal sources of information:

Cannings, S. G., Ramsay, L. R., Fraser, D. F., & Fraker, M. A. (1999). *Rare amphibians, reptiles, and mammals of British Columbia*. Victoria, BC: Wildlife Branch and Resources Inventory Branch, British Columbia Ministry of Environment, Lands and Parks. Available through Crown Publications (http://www.crownpub.bc.ca), Inventory Number 605.

Hickman, G. R., Dixon, B. G., & Corn, J. (1999). Small mammals. In G. J. a. H. Youmans (Ed.), *Effects of recreation on Rocky Mountain Wildlife: A review for Montana.* (pp. 4.1-4.16): Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society http://www.montanatws.org/pages/page4.html.

For distribution and map of Mountain Beaver, see: http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-29.htm

Red- and Blue-listed rodents include 16 species and subspecies of mammals. Most are small, such as chipmunks, voles, lemmings and mice, and they occupy a wide range of habitats from sea level to alpine and from shrub-steppe to evergreen forests. It is difficult generalize about the impacts of backcountry recreation for such a diverse group of animals, so the appropriate course of action is to first identify which species likely occur in the area of activity. The next logical step is to then determine the critical needs of those species present, and then develop specific guidelines to minimize or prevent impacts.

Notwithstanding the need for a site- and species-specific approach, Hickman offers some useful general considerations:

- In alpine habitats, small rodents can be affected by even minor levels of human use due to the ecological sensitivity of these high elevation ecosystems. Local extinctions can be serious because alpine species are often isolated from each other, given the discontinuous distribution of alpine areas especially in the southern half of the province.
- In bog habitats, snowmobiles and other off-highway vehicles (OHVS)s can damage bog vegetation that could degrade habitats for some species. Trails and roads that divert or modify drainage also can seriously degrade bog habitats.
- Snow cover is important to the winter survival of many rodents and snow compaction by snowmobiles can markedly increase the mortality of some small mammals.

The objective of commercial recreation guidelines for Red- and Blue-listed rodents is to maintain their current distribution and abundance in the province

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Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Sea Otter *(Blue)*

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Identify the home range of this species	1.1	Identify and map colonies, aggregations and feeding areas	1.1.1	Existing range known
		1.2	Document and report any known occurrences of Sea Otters	1.1.2	Occurrences known
2.0	Avoid disturbance and displacement	2.1	Maintain a no motorized watercraft buffer zone of 200 m around colonies, aggregations and feeding areas	2.1.1	Species continues to use area
		2.2	Maintain no-fly zones for helicopters and fixed-wing aircraft that are a minimum of 200 m horizontal and vertical distance from colonies, aggregations and feeding areas		
		2.3	No human recreational activity within 100 m of colonies, aggregations and feeding areas.		
		2.4	Prevent facility development within 2000 m of colonies, aggregations and feeding areas		
		2.5	Train staff and clients in appropriate behaviour in the vicinity of Sea Otters and their habitats	2.1.2	Knowledgeable staff ensure species protected from human disturbance

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Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Sea Otter

Key issues of concern: colonies, aggregations and feeding areas

Principal sources of information:

Blood, D. A. (1993). *Sea otter* (Wildlife in British Columbia At Risk). Victoria, BC: Ministry of Environment, Lands and Parks. Available at http://wlapwww.gov.bc.ca/wld/index.html

Cannings, S. G., Ramsay, L. R., Fraser, D. F., & Fraker, M. A. (1999). *Rare amphibians, reptiles, and mammals of British Columbia*. Victoria, BC: Wildlife Branch and Resources Inventory Branch, British Columbia Ministry of Environment, Lands and Parks. Available through Crown Publications (http://www.crownpub.bc.ca/), Inventory Number 605

Sea Otters are considered Endangered under the BC Wildlife Act, and the Committee on the Status of Endangered Wildlife in Canada has listed the Sea Otter as Threatened. Heavily exploited for their fur, they were extirpated from Canada by 1911. Reintroductions from 1969-72 have resulted in small (<1000 animals) , but growing, populations off the west coast of Vancouver Island and at the Hakai Provincial Recreation Area off the central coast of British Columbia. Their preferred habitat is kelp beds in shallow coastal waters with abundant prey such as sea urchins, abalone, crabs and other molluscs.

Otters are sensitive to oil pollution in marine waters: the Exon Valdez disaster in southeast Alaska killed nearly half of the sea otters in the affected parts of Prince William Sound.

The objective of interim commercial recreation guidelines for Sea Otter is to maintain the current distribution and abundance of provincial populations.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Sheep

Rocky Mountain Bighorn, California Bighorn, Stone's and Dall's **(BLUE)**

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect the population	1.1[M]	Identify and map sensitive sites, including escape terrain, lambing habitats, mineral licks and winter ranges. Assign ratings of high and moderate sensitivity.	1.1.1	Critical habitats known
2.0	Protect sheep from harassment	2.1	Seasonally close highly sensitive habitats to snowmobiles and off-highway vehicles (OHVs).	2.1.1	No human caused disturbance during lambing period
		2.2	Regulate snowmobile and OHV activities within moderate sensitivity areas as needed.	2.2.1	No human caused sheep disturbance
		2.3	Limit helicopter and fixed-wing flight altitudes to a minimum of 500 m over designated sheep habitats and a minimum 1000 m horizontal distance from designated sheep habitats.		
		2.4	For sensitive sites, maintain a 2000 m horizontal separation from flight lines. Distance intervals may be relaxed by ameliorating circumstances (e.g. safety concerns because of weather)		
		2.5	Select heli-pads, heli-ports and heli-spots to avoid locations within 2000 m of designated sheep habitats.		
		2.6	Prevent facility development on or near critical seasonal wild sheep habitats.		
		2.7	All access trails and viewing areas should be at least 300 m away from sensitive sites		
		2.8	Train staff and clients on responsible behaviour near sheep and sheep habitats		

[M] = Strategy required for major development only

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Bighorn Sheep (California & Rocky Mountain) and Thinhorn Sheep (Dall's & Stone's)

Key issues of concern: low and high elevation winter ranges, lambing grounds, and mineral licks.

Principal sources of information:

Bleich, V. C., Bowyer, R. T., Pauli, A. M., Nicholson, M. C., & Anthes, R. W. (1994). Mountain sheep (Ovis canadensis) helicopter surveys: ramifications for the conservation of large mammals. *Biological Conservation . 70*(1-7).

Geist, V. (1978). Behaviour. In J. L. Schmidt & D. L. Gilbert (Eds.), *Big game of North America - Ecology and management* (pp. 283-296). Harrisburg, PA: Stackpole Books.

Krausman, P. R., & Hervert, J. J. (1983). Mountain sheep responses to aerial surveys. *Wildlife Society Bulletin, 11*, 372-375.

Legg, K. L. (1998). A review of the potential effects of winter recreation on bighorn sheep. *Biennial Symposium of the Northern Wild Sheep and Goat Council, 11*(14-19).

Paquet, M. M., & Demarchi, R. A. (1999). *Stone's Sheep of the northern Rockies: the effects of access*: The Foundation of North American Wild Sheep and Guide-Outfitters Association of British Columbia..

For distribution and map, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-33.htm

Wild sheep seem more sensitive to human activities than forest dwelling ungulates, as might be expected from a species living in open habitats. In addition to habitat needs generally described for hoofed mammals, wild sheep have additional needs for steep cliffs which serve as escape terrain and as safe places for lambing. Recreational activities that prevent wild sheep from accessing escape terrain or increase time spent in these areas probably increases stress, and may lower foraging efficiency. Operators need to be familiar with such sites in the tenured area

Human activities that stress Mountain Sheep include viewing, helicopter and fixed-wing aircraft, vehicles, and domestic dogs. While occasional exposure to these activities likely has minimal effect on wild sheep, chronic exposure potentially reduces forage efficiency that, in turn, affects growth and survival. Chronic stress can also compromise the immune system in wild sheep, increasing their vulnerability to diseases.

One published report suggests a preliminary setback distance of 3.5 km to reduce helicopter disturbance of Dall's sheep in the Yukon. In the Todagin Mountain area, thinhorn sheep and mountain goats have abandoned the area within 4 to 5 km of the helicopter flight corridor used for mine development. A five-year research program in the Churn Creek area suggests Bighorn Sheep may be as sensitive to helicopter disturbance as Mountain Goats. Bighorns have been observed to flee from helicopters that are 1 to 2 km away. Helicopter activities associated with wildlife viewing could have even a greater impact, since there would be more of a tendency for operators to fly in for a "closer" look.

The objective of commercial recreation guidelines for Mountain Sheep is to maintain the current distribution and abundance of provincial populations.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Vancouver Island Marmot (Red)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Identify the home range of this subspecies	1.1	Identify and map all occurrences and report all sightings and known use areas	1.1.1	Occurrences known
2.0	Protect from human harassment	2.1	Prevent facilities development and high levels of human activity in identified critical habitats at all times of the year.	2.1.1	Natural behaviour maintained
		2.2	Prevent dogs from approaching within 500 m of occupied habitats	2.2.1	No dogs in occupied habitats
		2.3	Limit helicopter and fixed-wing flight altitudes to a minimum of 500 m over occupied marmot habitats. Prevent helicopter landings near known use areas	2.3.1	No human caused disturbance
		2.4	Avoid human recreational activities near occupied habitats during spring and summer when marmots are active	2.4.1	No human caused disturbance
3.0	Natural high quality habitats maintained	3.1	Maintain sensitive habitats and the natural distribution of important habitat features	3.1.1	Natural distribution maintained
		3.2	Train staff and clients on responsible behaviour near Vancouver Island Marmot habitats	3.2.1	Knowledgeable staff ensure no intrusions

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Vancouver Island Marmot

Key issues of concern: all currently and historically occupied habitats

Principal sources of information:

Bryant, A. A. (1997). *Updated status report on the Vancouver Island marmot (Marmota vancouverensis)*. Ottawa, ON: Committee on the status of endangered wildlife in Canada (COSEWIC), Canadian Wildlife Service.

Bryant, A., & Blood, D. A. (1999). *Vancouver Island Marmot* (Wildlife in British Columbia At Risk). Victoria, BC: Ministry of Environment, Lands and Parks. Available at http://wlapwww.gov.bc.ca/wld/index.htm

Janz, D. W., Bryant, A. A., Dawe, N. K., Schwantje, H., Harper, B., Nagorsen, D., Doyle, D., deLaronde, M., Fraser, D., Lindsay, D., Leight-Spencer, S., McLaughlin, R., & Simmons, R. (1998). *Revised National Recovery Plan for the Vancouver Island Marmot*. Ottawa, ON: Recovery of Nationally Endangered Wildlife (RENEW) Committee. Report available from the Canadian Nature Federation, Ottawa, ON.

For distribution and map of Vancouver Island Marmot, see:
http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/other/species/species-30.htm

The Vancouver Island marmot is among the world's most rare mammals: fewer than 100 individuals exist in the wild. These marmots live in small colonies in steep, unforested patches at or just below treeline on Vancouver Island.

Marmots are hibernators. They emerge from their winter dens in May, give birth to litters in June and enter hibernation in September. Winter recreational activities appear to have no impact on marmot and there is no evidence that summer recreational activities affect marmots. Habitat changes resulting from ski developments also appear to have minimal impact on marmots. In fact, one colony of marmots lives on a ski run at a popular Vancouver Island ski resort. Notwithstanding the lack of evidence that backcountry recreational activities adversely affect marmots, the extremely precarious state of the species means that any activities must be avoided. As noted by Bryan, "The potential exists that some marmot colonies could be "loved to death" by ecotourists, but I consider this risk to be small." Among the reasons cited for this statement is the fact that most marmot colonies are unpublicized, difficult to access and located on private forestry lands.

The objective of commercial recreation guidelines for the Vancouver Island Marmot is to maintain the current distribution and abundance of the world population in the province.

Interim Wildlife Guidelines for Commercial Recreation: **MAMMALS**

Wolverine (Blue)

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Protect critical habitats including denning sites	1.1	Report all sightings and known denning and high use sites. Maintain 2000 m buffer of non-use from known or suspected denning areas from mid February to May 30. Operator to be familiar with critical habitats and denning sites within the tenured area.	1.1.1	Observed critical habitats identified and protected; no abandonment of dens
		1.2[M]	Survey potential denning and high use sites	1.2.1	Potential critical habitats known
2.0	Protect species from human disturbance	2.1	Train staff and clients on responsible behaviour near sensitive wolverine habitats.	2.1.1	Knowledgeable staff ensure no intrusions and no poaching
		2.2	Avoid helicopter overflights and helicopter landings, heliskiing and snowmobile use near known den sites from mid February to May 30.	2.2.1	Natural behaviour and range maintained. No abandonment of den sites.
		2.3	Prevent facilities development and high levels of human activity in identified high use habitats at all other times of the year.	2.3.1	Natural behaviour and habitat maintained.

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Wolverine

Key issues of concern: natal den sites

Principal sources of information:

Cannings, S. G., Ramsay, L. R., Fraser, D. F., & Fraker, M. A. (1999). *Rare amphibians, reptiles, and mammals of British Columbia*. Victoria, BC: Wildlife Branch and Resources Inventory Branch, British Columbia Ministry of Environment, Lands and Parks. Available through Crown Publications (http://www.crownpub.bc.ca/) Inventory Number 605

Krebs, J. A., & Lewis, D. (2000). Wolverine ecology and habitat use in the North Columbia Mountains: progress report. In L. M. Darling (Ed.), *Proceedings of a Conference on the Biology and Management of Species and Habitats at Risk* (Vol. 2, pp. 695-703). Victoria, BC: Ministry of Environment, Lands and Park.

Weaver, J. L., Paquet, P. C., & Ruggiero, L. F. (1996). Resilience and conservation of large carnivores in the Rocky Mountains. *Conservation Biology, 10*(4), 964-976.

Wolverines occupy large home ranges, and so they are likely to intersect winter recreational activities of many sorts, depending on the area. Winter is the critical period for wolverine and other carnivores, and so winter recreational activities can potentially affect wolverine in several ways, including disrupted foraging behaviour along groomed trails and other travel corridors, and displacement due to noise of snowmobiles or human presence. Wolverines seem to avoid human settlements. In the northern Columbia Mountains of British Columbia, national parks and unroaded wilderness areas receive high wolverine use, but pressures from commercial backcountry use, snowmobiling, and logging may jeopardize the ability of these high use areas to act as refugia for wolverine populations.

In late winter (Feb 15 – Apr 30), reproductive females establish natal dens in areas with little or no human disturbance, in non-forested habitats (avalanche debris or large blocky talus) of upper-elevation forested zones (e.g. Englemann Spruce- Subalpine Fir biogeoclimatic zone). Often these natal dens are in the same type of subalpine cirques that snowmobilers seek. Females with kits are extremely vulnerable to human disturbance and will abandon den sites if disturbed.

The objective of commercial recreation guidelines for Wolverine is to maintain the current distribution and abundance of provincial populations.

Exotic Pack Animals

including llamas, alpacas and domestic goats

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Prevent transmission of epidemic diseases	1.1	Prohibit the use of exotic pack animals in specifically designated areas with very high ungulate values and/or particularly sensitive populations (e.g. mountain sheep)	1.1.1	No disease epidemics in native ungulates
		1.2	On less sensitive ungulate ranges, confine travel of exotic pack animals to designated routes that prevent the potential for contact with native ungulates	1.2.1	
		1.3	Separate exotic pack animals from native ungulates temporally, for example, by allowing the use of winter ranges during summer	1.3.1	
		1.4	Keep exotic pack animals leashed and/or tethered at all times	1.4.1	
		1.5	Ensure all exotic pack animals are in good health prior to and during pack trips, and that if any illness occurs, that a veterinarian experienced with the species examines them. The examination should place particular emphasis on diagnosis for those parasites and infectious diseases potentially transmitted to wild ungulates, and any findings should be reported to the regional WLAP office	1.5.1	
		1.6	Train staff and clients on responsible behaviour with exotic pack animals on and near ungulate ranges	1.6.1	Knowledgeable staff prevent disease transmission

Exotic Pack Animals

Key issues of concern: spread of introduced diseases

There are a variety of diseases and parasites that can infect and be carried by apparently healthy "exotic" pack animals (e.g. domestic goats, llamas and alpacas) that are capable of being transmitted to native ungulate populations with disastrous consequences. Most wild ungulate populations are immunologically naïve and are believed to have little natural resistance to organisms that are found in these domesticated species. Transfer between animals can result in illness of individual animals and has the potential to spread to a greater proportion of the wild population and become endemic. Many examples exist where disease organisms have transferred from domestic stocks to wild ungulates (e.g. brucellosis in elk, tuberculosis in white tailed deer, pasteurellosis in mountain sheep).

The objective of commercial recreation guidelines for "exotic" pack animals is to minimize their physical contact with native ungulates.

Ungulate[1] Winter Range

Last modified: March 2002

MANAGEMENT OBJECTIVE		IMPACT MITIGATION GUIDELINES		SUCCESS INDICATOR	
1.0	Maintain natural distribution of ungulates on their wintering range	1.1	For major projects, identify and map ungulate winter ranges and identify critical periods.	1.1.1	Winter ranges identified and mapped
2.0	Minimize stress caused by human disturbance	2.1	Avoid construction of facilities on designated ungulate winter ranges.	2.1.1	Minimal human caused disturbance
		2.2	Plan developments so there are buffer areas between humans and wintering ungulates, and create or maintain sight barriers, noise barriers and hiding cover between areas of human-use and winter ranges.	2.2.1	
		2.3	Locate transportation routes and snowmobile trails outside of critical winter ranges.	2.3.1	
		2.4	Where existing snowmobile trails intersect critical winter ranges, restrict snowmobiles to designated roads and trails, and prevent their use during critical periods.	2.4.1	
		2.5	Where proposed winter-use trails and roads are in close proximity (within 300 m) of important winter ranges, screen the routes behind ridgelines and vegetative cover	2.5.1	
		2.6	Establish, and enforce low speed limits (e.g. 40 kph) on roads and trails that are within 300 m of important winter ranges.	2.6.1	Few ungulate-vehicle collisions
		2.7	Restrict off road travel during critical winter periods.	2.7.1	
		2.8	If ungulates are traveling on plowed roads, ensure frequent escape breaks are created in the bermed snow to allow animals to exit the road to avoid vehicular traffic.	2.8.1	

[1] **Ungulate** A group of terrestrial mammals that are characterized by the presence of hooves. There are 9 species of native ungulates in British Columbia; Elk, Moose, Mule Deer, White-tailed Deer, Caribou, Bison, Mountain Goat, Bighorn Sheep, and Thinhorn Sheep

RED: Indigenous species or subspecies that have been legally designated or are being considered for legal designation as Extirpated, Endangered, or Threatened status in BC

BLUE: Indigenous species or subspecies considered to be Vulnerable in BC. They are at risk, but not Extirpated, Endangered, or Threatened.

		2.9	Regulate human activities so that they occur in a predictable fashion within defined areas to decrease flight responses. Where human-activity occurs on winter ranges, keep it concentrated in established areas to limit disturbance impacts.	2.9.1	Minimal human caused disturbance
		2.10	Plan human use of ungulate winter ranges, including viewing distances to minimize flight responses as appropriate for different species present in the area.	2.10.1	
		2.11	Restrict human use of certain critical winter ranges during critical periods when there are indications that ungulates are being displaced either spatially or temporally by human presence.	2.11.1	
		2.12	Minimize and focus areas used for heli-skiing. Helicopter over-flights should meet the species specific avoidance criteria, unless these activities are separated from winter range habitat by a physical barrier that would minimize disturbance levels (e.g. a mountain ridge or terrain block). Distance interval restrictions may be relaxed by ameliorating circumstance (e.g. safety concerns because of weather).	2.12.1	
		2.13	Train staff and clients on responsible behaviour on and near ungulate winter ranges, including the leashing of pets to prevent chasing of wintering ungulates.	2.13.1	Knowledgeable staff ensure no intrusions
3.0	Maintain high quality winter and early spring habitats	3.1	Where the potential exists for competition for forage resources, manage livestock use of critical ungulate winter ranges to minimize impacts and improve range condition.	3.1.1	Winter and early spring forage resources are maintained

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Ungulate Winter Ranges

Key issues of concern: habitat degradation, additional stress on animals

Most of the concern about the effects of recreational activities on hoofed mammals is for the winter season, because animals are most vulnerable to adverse impacts at that time. During this season, ungulates are:

- Concentrated into smaller areas compared to other times of the year, so that any adverse activity or event is more likely to affect a greater number of individuals than at other seasons when they are more dispersed.
- In poorer physical condition because of nutritionally inadequate forage, and so are less able to cope with extra stresses and disturbances, both natural and human-caused.
- Exposed to increased energetic costs as a result of greater energy needs from inclement weather and the increased energy spent through locomotion in snow.
- Less able to disperse within their winter range because deep snow restricts or prevents their movements.
- Very limited in their choices of alternative habitats because deep snow and other physical factors precludes access to them.

The above conditions and factors apply to the entire winter season. However, toward late winter, the condition of wintering ungulates, suffering from increased energetic demands and decreased energy intake, will progressively deteriorate until they can be quite debilitated. The loss of condition and the resulting levels of over wintering mortality vary according to the severity and duration of tough conditions. In a severe winter on poor range, displacement of animals from even a small segment of their range may hurt the larger population.

Another critical season is the post-winter or early spring period. At this time, ungulates are at the lowest point in their annual cycle, and access to nutritious new forage is essential if individuals are to regain physical condition. Most adult females are in the last stages of pregnancy and preparing for birth and lactation. Energy demands are especially heavy, and nutritious forage is essential for their recovery, and for the successful birthing and rearing of newborns. Lactation is the most energy demanding time of the annual cycle for females.

If ungulates are exposed to excessive stresses over the winter, the effects are rarely observed immediately, for example, by the death of individuals. More typically, animals move away from a stress, such as winter recreationists and nothing more seems to happen. Of course, responses vary according to many factors such as type of activity, its proximity, its duration, and its frequency, but it is the cumulative incremental effects of these seemingly innocuous events that are of greatest concerns. Consequences of these impacts are often subtle, sub-clinical and delayed. They can occur in late winter/early spring or during lactation – chronic stress can impair immune responses, animals lose weight and die of malnutrition, others are less able to escape predators or withstand disease, females abort fetuses, or newborns fail to thrive because of inadequate milk supplies or interrupted maternal care.

By their very nature, these types of cumulative impacts are difficult to document. Studies of ungulate response to recreational activities commonly measure behavioural changes, such as movements by animals when exposed to different activities at varying distances. The energy costs of these responses can be determined by extrapolating from studies of ungulate locomotion. Other studies have used heart rate to monitor ungulate responses because there is a strong correlation between heart rate and metabolic costs.

Another consideration is that there are only limited areas that meet the habitat requirements of ungulates for winter range. Although each species has its own requirements for winter habitat, in most

cases winter range is limiting. Consequently, recreational activities that reduce the physical extent of winter habitat place an additional demand on animals.

The objective of commercial recreation guidelines for ungulates on their winter ranges is to minimize stress and other adverse effects due to human activities. The aim is to design and plan Commercial Recreation facilities and operations to minimize impacts on ungulates on their winter range

Refer to species specific guidelines for Mountain Sheep, Bison, Caribou, and Mountain Goat.