# Recreation use patterns and grizzly bear den site encounters in Alberta National and Provincial Parks

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## Den encounters – are they increasing?

The probability of encounters at grizzly bear denning sites is very low, but over the past decade six incidents of bears being disturbed by winter recreationists have occurred in Banff National Park (BNP) and Peter Lougheed Provincial Park (PLPP), AB, one resulting in human injuries. Although these incidents are isolated and rare, it may be evident of an emerging trend. These incidents resulted in six reactive area closures to provide den site security; four other proactive closures were enacted where GPS-collared bears were denning in areas heavily used by winter recreationists. Other surprise contact encounters at grizzly bear den entrances in Canada have also occurred, resulting in one human fatality.

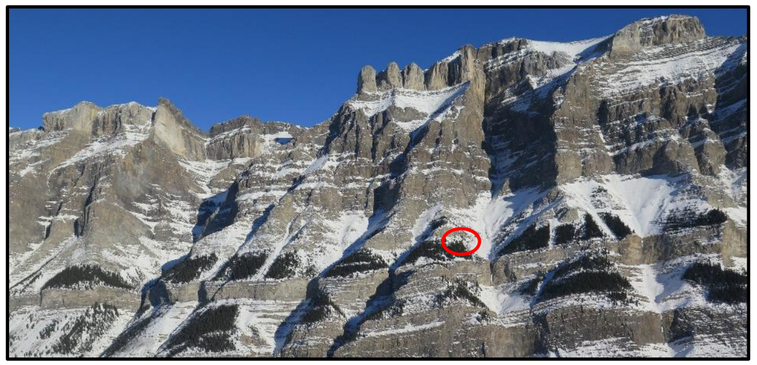

*Photo 1. Mt Wilson (BNP) den site location*

Two BNP incidents during the winter of 2015/16 involved ice climbers; the first incident resulted in two professional European alpinists being attacked by a grizzly bear defending its den entrance. The climbers were descending in the dark and unaware of the den site (Photo 1); one individual sustained serious injuries that required hospital care. The encounter ended quickly, and the visitors were able to flee the immediate area. BNP wildlife-conflict specialists conducted an aerial site investigation which revealed a visible den entrance less than 10 metres from the alpinists' descent route and blood stains in the snow. Slope and elevation of this den site are typical for grizzly bear dens in BNP but the den's location above a series of large cliffs was unusual. The short duration of the incident illustrated the defensive behaviour of the bear, typical of a surprise encounter. This is the first-time ice climbers have been attacked by a grizzly bear in Canada that we are aware of.

## Den Characteristics

Fifteen grizzly bear dens were visited in the summer of 2015 near Lake Louise in BNP (Photo 2). None were on south facing aspects but there was no preference for other aspects. 80% of the dens were located on sites with slopes between 25-34 degrees, similar to previous studies (Russell et al. 1979, Vroom et al. 1980, Hamer and Herrero 1983, Stevens and Gibeau 2005). 93% of the dens were between 2200-2400m elevation with only one site above 2500m. Slope characteristics were also measured to examine snow loading in the den area. 87% of dens were located on either depressions or side-slopes. These micro-terrain features likely promote cross-loading of the snowpack, providing more thermal insulation than ridges or flat terrain.

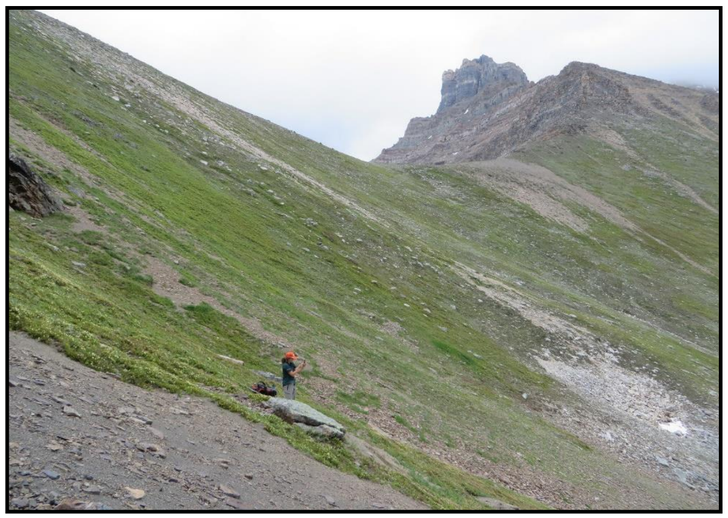

*Photo 2. Measuring den site characteristics*

This slope and elevation band also coincides with highly sought-after ski touring terrain and, potentially, ice climbing access and egress routes. As advances are made in recreationist skill level and equipment, along with rapidly shifting winter backcountry use trends, access into grizzly bear denning habitat will increase. Previous studies have shown human activity within 1 km of a den can cause den abandonment and have negative effects on cub recruitment (Linnell et al. 2000, Swenson et al. 1997). The encroachment of recreationists into quality denning terrain could impact human safety, increase physiological stress to bears, and reduce habitat security for bears at a critical time of year.

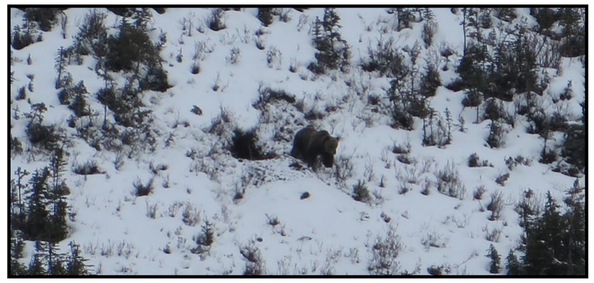

*Photo 3. Male grizzly bear (M126) at den site*

## Next Steps

Several other variables were measured including den dimensions, soil characteristics, and surrounding vegetation. Emerging trends demonstrate a preference for loamy sand; soil particle size showed two clusters around medium and coarse. 93% of sites were sparsely forested by larch or subalpine fir with only one site dominated by Engelmann spruce. An additional >100 den site locations from GPS and radio-collared grizzly bears in BNP and PLPP could be analyzed to determine den site habitat selection using resource selection function (RSF) models.

Data on patterns of human use during the winter are lacking. Locations of popular ski touring and ice climbing areas need to be GIS-mapped and similar measurements of their characteristics collected. These data would allow for confirmation of the overlap of human use and denning sites, to help inform proactive management actions to ensure grizzly bear habitat security.

## References

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