

ISSW- SKI RESORT TERRAIN EXPANSION: A TALE OF COMPACTION AND THE MONKEY IN THE MIDDLE

David P. CAA Professional Member Forecaster, Richard M. CAA Professional Member Forecaster.

Lake Louise Ski Resort, Alberta Canada

ABSTRACT: Lake Louise Ski Resort's terrain expansion follows our 2019 Long Range Plan approved by Parks Canada. The West Bowl expansion adds 480 acres of avalanche prone terrain. The scale and variability in aspect and elevation create operational complexity.

Timely effective compaction is the critical factor. Early season compaction shapes basal layer development and winter stability; missed opportunities allow weak layers to persist and can delay or prevent terrain openings.

West Bowl avalanche path is the "monkey in the middle." Timely effective compaction provides the optimum opportunity to open the rest of the terrain. Missed opportunities delays all of it. However, effort here must be balanced with core ski area priorities.

KEYWORDS: Resort Operations, Compaction, Terrain, Avalanche, Continental Snowpack, Lake Louise

1. SITE CONTEXT

The Lake Louise Ski Resort in Banff National Park draws over 500,000 skier visits annually. There are 120 known avalanche paths, making the control program one of Canada's largest. A base elevation of 1650m to the top elevation of 2460m provides 990m of vertical meters encompassing alpine, tree line and below tree line avalanche zones. Winter operations are from late October to mid-May. Lake Louise is in a continental snowpack climate.

2. OPERATIONAL CONTEXT

The Lake Louise Ski Resort Long-Range Plan (LRP) was approved by Parks Canada in 2019 and included changes associated with an area known as West Bowl. Parks Canada oversees development through a staged, limits-based approval system. A component of this LRP pertained to access and related development of the greater West Bowl area. As part of the LRP, West Bowl moved previously side-country style terrain into managed in-bounds resort terrain. Terrain expansion in complex avalanche terrain is not only a planning and infrastructure problem it is also a snow management problem.

3. COMPACTION PRINCIPLE

Early-season compaction is a strategic priority because it modifies how the basal snowpack forms before weak layers become established. When compaction opportunities are missed, persistent weaknesses can make openings slower, narrower, or operationally unrealistic. In a large expansion zone, one sub-area can become the key constraint on the entire West Bowl terrain program. Effective early compaction in thin snowpack conditions, helps establish a stable and reliable basal snowpack that will support the full winter snowpack.

* Corresponding author address:

Dave Petch CAA Professional, Lake Louise Ski Area,
Lake Louise, 1 Whitehorn Rd; AB T0L 1E0
Tel: +1 403-522-1315
email: dave.petch@skilouise.com
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4. THE MONKEY IN THE MIDDLE

The West Bowl avalanche path itself is one component of the much larger 480-acre West Bowl expansion, yet it has quickly become the hinge point in the broader opening plan. This focal feature is roughly 700m wide, 500m long with 30°–40° slopes and defined terrain traps, giving it high operational consequence. If compaction succeeds, the broader expansion becomes more achievable; if it fails, the broader terrain program is delayed with it.

5. SKI COMPACTION METHOD

The main challenge with running a timely ski compaction program in the West Bowl expansion is access. The terrain we most want to affect sits in the alpine, while the tree line and below tree line portions are often unsuitable for ski travel. That leaves a relatively narrow alpine elevation band where early-season compaction actually works. To address this, we adopted an 'uphill' ski compaction model using employer provided "rock skis" set up for ski touring with climbing skins. Team members could stay concentrated in the target zone and travel up and down the focal slopes, often just off the ground. It was a subtle shift, but it made our extensive early-season snowpack compaction program noticeably more effective.

6. COORDINATION AND CULTURE

Compaction success depends on coordinated effort from avalanche teams, ski patrol, lift and terrain operations, and guests willing to ski in marginal early-season coverage. This makes expansion not only a technical challenge but a cultural and organizational challenge.

7. TAKEAWAY

The Lake Louise Ski Resort West Bowl case suggests that avalanche terrain expansion is not complete when terrain is approved or accessed. It is complete when early season operational choices create a snowpack that can support reliable openings.



Figure 1: Snowpack modification in West Bowl at Lake Louise Ski Resort.



Figure 2: Uphill Ski Compaction

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