

THE STATE OF THE SNOWPACK: A COMMUNITY-BASED APPROACH FOR TRANSFORMING HOW AVALANCHE FORECASTS ARE INTERPRETED AND APPLIED

INTERNATIONAL SNOW SCIENCE WORKSHOP 2026, WHISTLER, CANADA

Morgan Dinsdale^{1*}, Jason Wishlow², and Catherine Paone³

1 State Of The Snowpack Public Safety Society, Nelson, BC

2 State Of The Snowpack BOD, Whitewater Ski Resort Forecaster, Nelson, BC

3 State Of The Snowpack Public Safety Society, Nelson, BC

ABSTRACT: Avalanche forecasts are widely accessed, but access alone does not ensure understanding or safe decision-making. Despite ongoing advances in forecasting, a persistent gap remains between public avalanche forecasts and professional observations, and how backcountry users interpret and apply this information in real-world decision-making. Improving this connection requires new approaches to engaging with avalanche information.

State of the Snowpack Public Safety Society(SOTS) is a community-based approach designed to address this gap by influencing how avalanche forecasts are interpreted and applied. Through structured, recurring live events shared via livestream, qualified professionals (Canadian Avalanche Association Level 2-certified or greater) interpret current conditions and engage directly with their backcountry communities. These events translate snowpack conditions into local, experience-based narratives, facilitate dialogue among diverse user groups, and reinforce public avalanche forecasts. Within this setting, participants move beyond reading forecasts toward actively interpreting them—comparing perspectives, challenging assumptions, and developing a shared understanding of conditions across terrain and user groups. This process supports improved risk literacy and more informed decision-making.

Community-based avalanche education is not new, but it has traditionally been delivered through one-off events with limited reach and consistency. SOTS systematizes this approach into a repeatable, scalable model through a consistent event structure delivered regularly across regions and amplified through livestream and digital platforms. This creates continuity, expands access, and sustains engagement beyond the room. Since 2019, SOTS has grown into a nationally coordinated network spanning British Columbia to Quebec. During the 2025/26 season, SOTS chapters delivered 40 free events in 10 communities, engaging over 4,400 participants, with thousands more reached digitally. In March 2026 alone, SOTS content generated over 50,000 views.

SOTS demonstrates how structured, community-driven interpretation of avalanche conditions can strengthen the link between avalanche information and public behaviour, offering a scalable, transferable approach with relevance for avalanche safety practitioners and communities worldwide.

KEYWORDS: Risk communication; Decision making; Avalanche forecasting; Community-based education; Public safety; User behaviour

1. INTRODUCTION

Backcountry users today have access to substantial avalanche and snowpack information through public forecasts, public weather information, professional and recreational observations (MIN reports), educational resources, and social media.

* Corresponding author address:
Morgan Dinsdale,
State of the Snowpack Public Safety Society
Nelson, BC
email: morgan@stateofthesnowpack.com

Access, however, is only part of the process. Recreational users must ultimately manage their own exposure through decisions about when and where to travel (Fisher et al., 2022). Research has increasingly examined not only whether users understand

avalanche forecast information, but how they apply it during trip planning and terrain assessment. Haegeli et al. (2023a) found that a substantial proportion of forecast users may benefit from additional support in applying forecast information as intended.

The challenge is therefore not simply access to information. It is how people interpret, contextualize, and apply the information available to them.

At the same time, mountain communities contain substantial professional knowledge. Forecasters, guides, ski patrollers, avalanche technicians, educators, search and rescue members, and other professionals continually observe and interpret snowpack and avalanche conditions through their work on a daily basis, often in the same areas most frequented by public backcountry users in their communities.

State of the Snowpack (SOTS) was created out of a simple idea: what if qualified local avalanche professionals were given a platform to share their relevant local knowledge openly and directly with their local backcountry community?

SOTS provides a structured, repeatable framework that enables mountain communities to host free, recurring avalanche and snowpack awareness events led by qualified local professionals. SOTS provides the framework, professional standards, resources, and support, while local volunteers and avalanche professionals bring the program to life within their communities.

At each event, qualified professionals share the evolving “snowpack story” through current observations and experience-based perspectives, connecting local knowledge with established public avalanche information. The conversational format helps participants understand and interpret Avalanche Canada’s regional avalanche forecasts, including how conditions and snowpack characteristics may vary spatially within a forecast region. It also creates space for questions, uncertainty, differing professional perspectives, and shared observations, helping participants build understanding and confidence in engaging with avalanche information and making informed decisions for themselves.

SOTS events do not produce an avalanche forecast, replace established public forecasting services or formal avalanche education, or tell people what decisions to make. Instead, it complements these resources by creating a free, recurring connection between established avalanche information, qualified local professional knowledge, and the public using that information in the backcountry.

The community dimension is important. Avalanche safety research has historically focused heavily on individuals and their risk-management processes, while social and cultural aspects of avalanche safety and the effectiveness of safety products and services have received comparatively less attention (Haegeli et al., 2023b). Backcountry users travel in groups, exchange observations, influence one another’s decisions, and participate in local mountain cultures. SOTS events create a recurring space in which avalanche safety can become a community conversation.

2. PROGRAM DEVELOPMENT

SOTS began in Nelson, British Columbia, in 2019 with a simple idea: bring local avalanche professionals and recreational users together to talk openly about the current snowpack, share knowledge, and help people make more informed decisions so they can return home safely from the backcountry.

Recurrence quickly became central to the model. Snowpacks evolve continuously, and conditions discussed early in a season may remain relevant weeks or months later. Repeated events allow participants to follow that evolution rather than encounter snowpack information as isolated snapshots. Over the course of a winter, professionals can explain how past, current, and incoming weather influences snow crystal formation and metamorphism, how these processes contribute to changes within the snowpack and avalanche hazard, and why earlier layers or weather events may remain relevant later in the season. By connecting the history of the snowpack with current observations and anticipated weather, participants can

develop a more complete understanding of how their local snowpack evolves and how those changes may inform both immediate and longer-term backcountry trip planning.

As interest emerged from other mountain communities, SOTS faced a practical challenge: how could a program based on local relationships and knowledge expand without losing those qualities?

The resulting approach was decentralized:

Communities lead. SOTS supports.

Local organizers understand their communities, and local professionals know their terrain and snow climate. SOTS provides the framework, professional standards, resources, training, and organizational support required for consistent programming while allowing communities to incorporate locally relevant expertise, conditions, and examples. This approach has enabled SOTS to grow from one community into a coordinated network spanning British Columbia, Alberta, and Quebec while remaining grassroots and locally driven. Across chapters, consistent professional standards provide a common foundation for credible, high-quality programming regardless of location or local delivery structure.

3. THE SOTS MODEL

The SOTS model is grounded in five interconnected principles: Local Knowledge, Shared Openly; Clarity Over Complexity; Community-Led Safety; Access and Inclusion; and Connection Through Conversation.

3.1 Local Knowledge, Shared Openly

Mountain communities contain professionals who spend considerable time observing snow, weather, avalanche activity, and terrain. SOTS provides a framework for this local professional knowledge to be shared openly with recreational users.

Snowpack presenters are required to hold a minimum of a Canadian Avalanche Association (CAA) Avalanche Operations Level 2 certification or an accepted equivalent professional qualification. Presenters share observations, discuss snowpack evolution and uncertainty, and connect local experience with the broader regional avalanche picture presented by Avalanche Canada.

Preparation and delivery of SOTS snowpack presentations are recognized as Continuing Professional Development (CPD) by the Canadian Avalanche Association (CAA), Association of Canadian Mountain Guides (ACMG), Canadian Mechanized Backcountry Guides Association (CMBGA), and Canadian Ski Guides Association (CSGA), allowing qualified professionals to receive professional development recognition for contributing their expertise to public-facing avalanche education.

The objective is not to create a localized avalanche forecast, but to provide context around established public avalanche information through the perspectives of local qualified professionals actively working within the region.

3.2 Clarity Over Complexity

Avalanche and snowpack information is inherently complex. SOTS does not attempt to remove that complexity or suggest uncertainty can be eliminated. Instead, it creates an environment in which complex information can be explored in ways the public can understand and act upon.

Communication style matters. Fisher et al. (2022) found that reducing jargon improved understanding among users with no or introductory avalanche training, while additional explanation increased the perceived usefulness of travel and terrain advice. Statham and Gould (2016) similarly identify scaling technical concepts to the audience as an important component of avalanche risk education and communication.

A live community setting provides opportunities for explanation and clarification. Participants can ask questions, professionals can explain concepts in different ways, and technical information can be connected to current observations and local context.

Presenters are encouraged to tell the “snowpack story”: What happened earlier in the season? What has changed? What are professionals seeing now? What remains uncertain? What are they continuing to watch? Clarity does not mean simplifying conditions into an answer. It means helping people engage with the information, context, and uncertainty behind it, supporting the risk literacy needed to interpret avalanche information and apply it within their own decision-making.

3.3 Community-Led Safety

SOTS events are organized and delivered with local volunteers and avalanche professionals, often people participants encounter elsewhere in their mountain community as guides, patrollers, educators, forecasters, or search and rescue members. These existing relationships can support familiarity, trust, and open discussion.

3.4 Access and Inclusion

SOTS events are free. Formal avalanche education remains essential, but cost, geography, scheduling, and other barriers can affect access to professional expertise and continued learning. SOTS provides an additional accessible layer where people with different levels of training and experience can participate in the same conversation. Livestreaming extends this access beyond the venue. It allows people who cannot attend physically to hear the discussion and enables locally generated knowledge to reach a broader audience.

3.5 Connection Through Conversation

Conversation is central to the model. Participants can ask questions, compare observations, and hear professionals discuss not only what they know, but what remains uncertain. A presentation can transfer information; conversation allows people to interact with it.

The goal is not a community in which everyone makes the same decisions. It is one in which discussing conditions, uncertainty, observations, and decision-making becomes normal. By encouraging these conversations, SOTS aims to empower people to make more informed decisions and contribute to a stronger culture of backcountry safety, one where the shared goal is ultimately to reduce risk and help everyone return home safely.

3.6 Event Structure

Each event is coordinated and delivered by a local volunteer team within the SOTS framework, with support from the central organization. The core is a current snowpack presentation in which qualified professionals discuss snowpack evolution and conditions using observations, weather and snowpack information, public avalanche information, including Avalanche Canada’s public regional forecasts and Mountain Information Network (MIN) reports, and other relevant resources.

Multiple professional perspectives are encouraged. Presenters may work across different terrain, elevations, geographic areas, and operations, allowing participants to hear where observations align and where conditions differ. Presentations prioritize the most heavily used winter backcountry recreation areas within each chapter’s region, including terrain frequented by skiers, splitboarders, and snow-machine users. Drawing observations from several locally relevant areas helps participants understand how snowpack and avalanche conditions may vary spatially within a broader Avalanche Canada forecast region.

In Nelson, for example, presentations commonly include observations from the heavily travelled backcountry surrounding Whitewater Ski Resort and Kootenay Pass, while also incorporating observations

from areas such as the Slokan Valley and publicly accessed recreation areas near local mechanized ski operations. Bringing together professionals working across these different areas provides participants with a broader picture of local snowpack variability than observations from any single location could provide.

Events also include complementary public-safety topics, moderated discussion, and participant questions. Where infrastructure is available, events are livestreamed.

Most importantly, the process repeats throughout the winter. Each chapter typically hosts one SOTS event per month from December through March or April, depending on the length of the local winter season. This monthly cadence allows participants to follow snowpack evolution over time while presenters revisit earlier observations, discuss subsequent changes, and connect current and anticipated conditions with the season's snowpack history. Individual events therefore form part of a continuous, season-long community conversation rather than functioning as stand-alone presentations.

4. SCALING THE MODEL

Scaling a locally driven program creates tension between consistency and autonomy. SOTS addresses this by standardizing the framework rather than every conversation.

Central coordination establishes presenter standards, supports volunteers, provides standardized resources, coordinates partnerships and communications, and supports livestream infrastructure. Local teams retain responsibility for delivery, including identifying presenters, relevant topics, and the conditions and examples most meaningful to their communities.

Formal collaboration agreements with Avalanche Canada and the Canadian Avalanche Association connect SOTS with Canada's established public avalanche safety and professional communities. Avalanche Canada forecasters and field team members have also participated as SOTS presenters, reinforcing the program's complementary relationship with established public forecasting.

The model therefore standardizes what needs to be consistent; purpose, presenter qualifications, core educational structure, resources, and organizational support, while preserving the local knowledge and relationships that make each chapter unique.

Growth has demonstrated that scaling requires more than replicating an event. Volunteer support, presenter coordination, funding, insurance, communications, technology, partnerships, and organizational oversight become increasingly important as the network grows.

The practical challenge is to provide enough structure for consistency and sustainability without compromising local integrity.

5. PROGRAM REACH

During the 2025/26 winter season, SOTS communities delivered:

- 40 free community avalanche events;
- programming in 10 communities across British Columbia, Alberta, and Quebec;
- more than 4,400 in-person attendees;
- more than 6,500 livestream views;
- participation from more than 90 volunteers; and
- participation from approximately 40 avalanche professionals.

These results demonstrate substantial program reach and engagement from both recreational users and the professional avalanche community. In-person events facilitate direct questions, conversation, and local relationships, while livestreaming extends access beyond individual host communities.

Professional participation is particularly important because the model depends on practitioners being willing to share their expertise publicly. CPD recognition and formal collaborations further connect this participation with the broader avalanche and guiding professions.

Program reach alone does not capture the full impact or value of SOTS. Participants, presenters, community partners, and public-safety organizations have reported value in the program as a forum for understanding current conditions, engaging with professional perspectives, and supporting more informed conversations about backcountry risk. These experiences provide important qualitative indications of impact, while future evaluation offers an opportunity to better document and understand how participation influences confidence, interpretation of avalanche and snowpack information, forecast use, trip planning, and reported decision-making.

Some of the outcomes most important to prevention-focused avalanche safety, however, will always be difficult to quantify. A participant may interpret a forecast differently, change an objective, select different terrain, or decide not to travel because of something learned or discussed at a SOTS event. In some cases, that decision may mean an avalanche is never triggered, a search and rescue response is never required, or a life is not lost. These avoided outcomes are largely invisible and cannot be reliably attributed to any single intervention.

The impact of SOTS should therefore be considered through multiple forms of evidence: program adoption, growth, reach, and participation; professional and community engagement; participant and stakeholder experience; reported changes in understanding and decision-making; and the broader prevention objective of supporting a more informed, proactive, and safety-conscious backcountry community.

6. PRACTICAL LESSONS

Several lessons have emerged through the development and expansion of SOTS.

Local relationships matter. Expansion has been strongest where motivated local organizers and professionals already exist within a community.

Recurrence creates continuity. Repeated events allow participants to follow an evolving snowpack and build familiarity with the professionals sharing information.

Professional standards build credibility. Community conversation benefits from broad participation, but SOTS maintains a minimum professional qualification for those interpreting current snowpack conditions.

Consistency and flexibility must coexist. Communities differ in snow climate, recreation, venues, partnerships, presenter pools, and volunteer capacity. Standardizing the framework while allowing locally relevant delivery has been central to the model.

Free programming requires resources. Removing cost as a barrier to the public requires sustainable funding for coordination, insurance, communications, equipment, and administration.

Digital and in-person delivery are complementary. Livestreaming expands access, but the informal relationships and conversations of a physical event are difficult to reproduce online.

7. FUTURE WORK

The growth of SOTS demonstrates feasibility, reach, sustained community engagement, and strong participation from avalanche professionals. Feedback from participants, presenters, partners, and public-safety organizations also provides important qualitative indications of the program's value. The next opportunity is to better document and understand the ways in which participation influences how people engage with, interpret, and apply avalanche and snowpack information.

Future evaluation should distinguish between access, understanding, confidence, and application. Fisher et al. (2022) examined understanding, confidence, and perceived usefulness separately, while Haegeli et al. (2023a) identified challenges in how forecast users apply hazard information during trip planning and terrain assessment. Haegeli et al. (2023b) further call for greater attention to the effectiveness of avalanche safety products and services and the perspectives of their users.

For SOTS, evaluation could examine participants' confidence interpreting avalanche information; understanding of regional forecasts and spatial variability; engagement with forecasts and observations; comfort asking questions and discussing uncertainty; connection with local professionals; sense of connection and belonging within their backcountry community; openness to differing observations, experiences, and perspectives; and reported influence on trip planning and decision-making. Because SOTS is recurring, evaluation should also consider whether repeated participation throughout a winter influences these outcomes as participants follow the evolution of the snowpack and build relationships with local professionals and other backcountry users over time.

Evaluation of prevention-focused programming will always have limitations. Reported changes in understanding or decision-making can be studied, but the most consequential outcomes – a different terrain choice, an avalanche not triggered, a rescue not required, or a life not lost – are inherently difficult to observe or attribute. Evaluation should therefore use multiple forms of evidence to build a more complete picture of program impact rather than relying on any single outcome measure.

Future work should focus on both strengthening the SOTS network and better understanding how different elements of the model contribute to its value: recurring engagement, local professional knowledge, multiple perspectives, conversation, accessibility, or the combination of these elements. This can help refine the program while contributing practical insight into how community-based avalanche programming can support the interpretation and application of public avalanche information.

8. CONCLUSION

Recreational backcountry users have access to more avalanche and snowpack information than ever before. The opportunity is not simply to provide more information, but to support how people interpret, contextualize, discuss, and apply it.

SOTS offers one practical approach. Through a structured, repeatable framework, qualified local avalanche professionals share current observations and the evolving snowpack story through free, recurring community events. Professional standards provide consistency, while local professionals, volunteers, conditions, and conversations keep the program relevant to each community.

SOTS does not replace avalanche forecasts or formal education, nor does it tell people what decisions to make. It creates a space between information and application where established public avalanche information can meet qualified local knowledge, professional experience, and community conversation.

From one community in 2019 to 40 events across 10 communities in 2025/26, the growth of SOTS demonstrates the potential for this approach to be implemented at scale while remaining locally driven. SOTS has developed and scaled a practical framework for bridging information and application through recurring, community-based professional interpretation and conversation. Rather than creating another source of avalanche and snowpack information, the model helps communities engage more deeply with information already available through local context, multiple professional perspectives, and continued conversation throughout the winter.

The principle underlying the program remains simple: *Local knowledge, shared openly.*

When qualified professionals can share what they know, when that knowledge is freely accessible, and when communities have a place to ask questions and talk openly about the snowpack, avalanche information becomes something a community can understand, contextualize, and engage with together.

ACKNOWLEDGEMENTS

State of the Snowpack is made possible by the avalanche professionals, local organizers, volunteers, partners, and backcountry users who contribute their time, knowledge, observations, and perspectives across the SOTS network.

REFERENCES

Fisher, K. C., Haegeli, P., and Mair, P., 2022. Travel and terrain advice statements in public avalanche bulletins: a quantitative analysis of who uses this information, what makes it useful, and how it can be improved for users, *Nat. Hazards Earth Syst. Sci.*, 22, 1973–2000, <https://doi.org/10.5194/nhess-22-1973-2022>.

Haegeli, P., Mitterer, C., Stucki, T., Walcher, M., and Rupf, R., 2023a. Insights on how avalanche forecast users combine danger ratings with steepness to assess the avalanche risk of individual slopes during trip planning, *Proceedings of the International Snow Science Workshop*, Bend, Oregon, 366–372.

Haegeli, P., St. Clair, A., McNeil, K., Mannberg, A., and Hetland, A., 2023b. Reflections on how to improve the contribution of social science research to avalanche safety practices, *Proceedings of the International Snow Science Workshop*, Bend, Oregon, 72–79.

Statham, G. and Gould, B., 2016. Risk-based avalanche program design, *Proceedings of the International Snow Science Workshop*, Breckenridge, Colorado, 100–103.