ABSTRACT: Historically overlooked in Quebec, snow avalanches nonetheless resulted in 73 fatalities across the province between 1825 and the present day. Beginning 15 years ago, the development of winter tourism in the Chic-Chocs Mountains revealed the need for avalanche safety programs. Therefore, the Centre d'avalanche de la Haute-Gaspésie was created in 1999 to promote backcountry safety among Quebec's skiers, who are known to travel far and wide in pursuit of their sport. The first service to emerge was a forecasting program that issued a snow bulletin once a week to inform backcountry users of conditions in the mountains. Today, a bilingual avalanche bulletin, issued every two days from December 1st to April 30th, highlights the danger rating and avalanche problems. In the early 2000s, the Canadian Avalanche Association (CAA) came to Quebec to help develop expertise by offering avalanche, weather and search and rescue professional training. To date, more than 150 students have taken CAA courses in the province. Public awareness activities have also successfully informed and educated youth and winter enthusiasts through public conferences, Avalanche Skills Training courses, workshops and Avalanche Awareness Days held for the last 10 years in the Chic-Chocs. All these programs have the common goal to improve avalanche safety, reduce risk of accidents and thus save lives. Unique in Eastern Canada, this not-for-profit organization is now working toward a provincial recognition and is in the process of changing its name to Quebec Avalanche Centre or Avalanche Quebec.

KEYWORDS: Chic-Chocs, avalanche awareness, education, forecasting

1. INTRODUCTION

Contrary to conventional wisdom, snow avalanches are not restricted to high mountain ranges such as the Rockies, the Alps or the Himalayas. In Quebec, despite generally not being considered a mountainous region, this natural hazard has claimed many victims since 1825. A survey of historical records reveals that snow avalanches are the second deadliest natural hazard behind landslides and mudslides (Hétu et al., 2008). Following the tragic accident in Kangiqsualujjuaq, which led to nine fatalities and 25 injured persons, the idea of a center of expertise in avalanches was born. In order to increase avalanche safety in Quebec, the project to create an avalanche center was initiated in autumn 1999 by the regional municipality: Municipalité régionale de comté (MRC) de La Haute-Gaspésie. The Avalanche Centre was registered as a not-for-profit organization in July 2006 and remains the only one of its kind in Eastern Canada. Its mission is to ensure a wide range of high-level avalanche safety activities and services including: public awareness, education and information on avalanche dangers; backcountry recreationist and professional training, avalanche forecasting in the Chic-Chocs; assistance for avalanche search and rescue throughout the province as well as encouragement and support for research in the field. This paper presents an overview of 15 years of avalanche safety in Quebec, exposing the problem of snow avalanches, discussing the different phases associated with the establishment of the Avalanche Centre, summarizing existing programs and major projects especially in winter tourism development. All these efforts aim to improve avalanche safety, reduce accidents and thus save lives.

2. SNOW AVALANCHES IN QUEBEC?

In Quebec, snow avalanches affect roads, buildings, mining and forestry sites and obviously winter recreational activities in almost all regions. Since 1825, the estimated toll is 73 deaths, including more than 30 in the last 40 years (Hétu et al., 2011). Although many serious incidents (buried and injured persons, damaged houses, etc.) were identified, only fatalities were analyzed. Inquests from coroners, newspaper articles and compilations previously published were used to trace 43 deadly accidents all across the province (Fig. 1). Regions such as Eastern Townships, Charlevoix,
Gaspe Peninsula, Groulx Mountains, Saguenay and Northern Quebec combine two conditions required to produce avalanche: heavy winter precipitation and slopes sufficiently steep to start an avalanche (Jamieson and Brooks, 1998).

Several examples drawn from the accident records demonstrate the range and scope of the avalanche problem in Quebec. While avalanches are generally associated with mountains, only five fatalities have occurred so far in what might be considered classic mountain terrain, one in the highlands of Saguenay (1985), one in Groulx Mountains (1996) and three in the Chic-Chocs (2000, 2000, 2009). These accidents occurred while the victims were practicing backcountry activities (ski, telemark, and snowshoe). By contrast, one of the worst tragedies in Canada occurred in Quebec on January 1st 1999 in Kangiqsualujjuak (Northern Quebec) with 9 fatalities and 25 injured persons. In this incident, a school was destroyed by a large slab that released from a short slope while residents of the village had gathered to celebrate the New Year. Transportation is also threatened; three fatalities occurred on roads of the northern Gaspe Peninsula, all near the village of Mont-Saint-Pierre (Hétu, 2007, 2009).

The majority of snow avalanches in Quebec took place on relatively short slopes (100 meters or less vertical relief) often outside of mountainous areas (Hétu and Boucher, 2009). Avalanches occurred on all kinds of slopes: gravel pit slopes, marine embankment terraces, cliffs, mining deposits, sidewalls of gullies. Even if Quebec is not considered mountainous, the terrain is quite rugged in almost all regions and heavy winter precipitation and steep slopes are often found. The Chic-Chocs Mountains of Gaspe Peninsula, with more than 25 peaks above 1000 meters, numerous alpine are-
As, annual snow precipitation of 8 to 10 meters and increasing backcountry use in winter, are still the place most at risk. In order to educate Quebeois of ‘overlooked’ risks of avalanches and to inform backcountry users in the Chic-Chocs, the Centre d’avalanche de la Haute-Gaspésie was established in autumn 1999.

3. GETTING INSPIRED BY THE CANADIAN COMMUNITY

Following the successful ECAP (Eastern Canada Avalanche Project) in Newfoundland between 1996 and 1998, the Canadian Avalanche Association (CAA) launched QCAP (Quebec Collaborative Avalanche Project) in 2001. With Search and Rescue New Initiative Funds (SARNIF) from National Search and Rescue Secretariat (NSS) and sponsored by Parks Canada, QCAP took place over a period of three years (2001 to 2004). The objectives of this project were 1) to facilitate the development of skills and knowledge among the staff of the Avalanche Centre, 2) to train instructors in order to teach avalanche courses for winter recreationists, 3) to create a public awareness campaign and 4) to develop an avalanche search and rescue capacity in the province. Several exchanges, visits, courses and trainings were conducted between bilingual professionals from Western Canada and the team in place in Quebec. In the end, QCAP allowed the Centre d’avalanche de la Haute-Gaspésie to acquire professionalism at the outset by being exposed to the best practices in the industry as well as to gain autonomy in terms of public awareness development, training and forecasting. The project also created a network of contacts among the top avalanche professionals of the country. Overall, QCAP consolidated the establishment of the Centre d’avalanche de la Haute-Gaspésie and increased its capacity and credibility.

Since then, the Avalanche Centre has remained in constant contact with the Canadian community. Every spring, an annual report is presented to the Canadian Avalanche Association (CAA) at the Spring Conference. The Centre d’avalanche de la Haute-Gaspésie continues efforts to meet Canadian standards by incorporating various products developed and used by the CAA such as the Avalanche Terrain Exposure Scale (ATES) ratings, the Industry Information Exchange (Info-Ex) and the use of iconography and specific terminology in public bulletins.

4. DEVELOP AND MAINTAIN AN EXPERTISE

The expertise developed in early stage of the Avalanche Centre has continued and expanded over the years. Indeed, in collaboration with the CAA, several Industry Training Program (ITP) courses are offered each winter in Quebec: Introduction to mountain weather, Avalanche Operations Level 1 and Avalanche Search and Rescue Response. Since the first ITP course in 2003, more than 150 professionals attended these specialized courses in Quebec, which contribute not only to maintain the expertise of the instructors, but also to strengthen the winter tourism and backcountry ski industry. Professionals from Quebec are also encouraged to continue their career development by attending various specialized and ongoing training sessions organized by the Centre d’avalanche de la Haute-Gaspésie. In addition, the Avalanche Centre welcomes several trainees every winter in order to share the expertise and knowledge. Finally, a consulting service is offered for specific risk management problems experienced by winter tourism businesses anywhere in Quebec.

To remain up-to-date to the industry standards, staff of the Centre d’avalanche de la Haute-Gaspésie frequently interact with peers during courses, conferences, or on exchange visits, with the Canadian and International community. Participation to International Snow Science Workshop (ISSW) since 2002 helps to maintain and expand this network of contacts. In terms of research, several labs are addressing the issue of snow avalanches in Quebec : Centre d’études nordiques (CEN) of Université du Québec à Rimouski, Geo-cryolab of Université de Montréal, Department of Geography of Université du Québec à Montréal and Department of Geomatics of Université de Sherbrooke. A contact person from the Avalanche Centre ensures that relationships with universities are nurtured and knowledge is shared within the industry.

5. RAISE AWARENESS, EDUCATE AND INFORM QUEBECOIS

The slogan So the mountains remain a safe winter playground (Pour que la montagne en hiver demeure un terrain de jeu sécuritaire) guides the mission of awareness, education and information for the Centre d’avalanche de la Haute-Gaspésie. Thus, a program of public awareness was established early on in 2001. Numerous activities target a wide range of users, especially youth and winter recreationists such as snowshoers, skiers, snowboarders and snowmobilers. Public events in the
Chic-Chocs region include school activities, films festivals and educational talks. Avalanche Awareness Days, held over a week-end period in early March, allows backcountry users and visitors to meet the forecasters, to try new avalanche safety gear, as well as to learn about various courses and training offered thorough the province. On average, 200 winter enthusiasts gather annually in parc national de la Gaspésie for a weekend full of activities. Elsewhere in the province, workshops, conferences and outdoor events help the Avalanche Centre deliver its safety message to Quebecois who are likely to venture out on snowy slopes, in Quebec or overseas, and are sometimes uninformed, reckless or poorly equipped. Many accidents involving Quebecois in the mountains around the world are on record. Therefore, the Avalanche Centre seeks to raise awareness among skiers from Quebec who practice their sport at home or elsewhere. To do so, a partnership has been developed with Voyages Gendron, one of the largest tour operators of the country, to reach a large number of skiers through conferences, articles and avalanche courses among their customers.

As for education, avalanche safety courses developed by the Canadian Avalanche Center (CAC), have been taught in Quebec since 2003. First delivered by the Centre d’avalanche de la Haute-Gaspésie, these courses are now taught by private accredited instructors. In average, 350 to 400 backcountry recreationists attend annually. Translated and adapted to French Canadian language, the courses are the same as those taught in Western Canada. The Avalanche Centre continues to get involved with the education program of winter enthusiasts by promoting avalanche courses, translating educational material (online course, books, etc.) and providing support to the CAC instructors in Quebec.

To inform backcountry users in the Chic-Chocs, the Centre d’avalanche de la Haute-Gaspésie produced avalanche bulletins as early as 2002. The first bulletins outlined snow conditions and weather forecasts for a period of five days and were posted at trailheads. Soon thereafter, bilingual snow bulletins were issued and distributed every three days to a list of email subscribers. Today, this list has 1300 French subscribers and 350 English subscribers who receive a new bulletin every two days. Inspired by the Canadian model, the Chic-Chocs avalanche bulletin provides information about the avalanche danger for different elevation bands, as well as specifying avalanche problems, snowpack conditions, and providing weather forecasts. In 2003, four weather stations were installed (two automated and two manual) enabling remotely sensed information to diminish uncertainty and increase forecast accuracy. Since 2012, a special collaboration with Alpine Weather Consultants allows to get detailed weather outlook for the Chic-Chocs area, which is useful for professionals and recreationists.

6. TOWARDS SUSTAINABLE WINTER TOURISM

Because sustainable tourism development requires security above all, the Centre d’avalanche de la Haute-Gaspésie has always been intimately involved in the winter tourism development in the Chic-Chocs. First efforts were oriented towards the construction and marking of evacuation trails and backcountry ski routes in the parc national de la Gaspésie, réserve faunique des Chic-Chocs and adjacent public lands. Then, the Powder Road map (Route de la Poudreuse) was created to promote guided backcountry ski operations in Haute-Gaspésie. Distributed throughout the province, this marketing tool promotes a safe and enjoyable ski experience in addition it aims to retain visitors longer in the region. Recently, the Chic-Chocs guidebook was published in 2010, after many years of hard work. With more than 2000 copies in circulation, this book helps readers to plan a safe trip and gives backcountry users important information about ski routes and destinations. Its increasing popularity has encouraged the production of a second edition in 2012 and an English version is planned for 2015. These special projects will improve the safety of visitors and thus support the sustainable development of emerging sector of backcountry skiing in the Chic-Chocs.

7. FUTURE CHALLENGES

While the Avalanche Centre celebrates its 15th anniversary this year, many challenges still lie ahead. Funding is a constant concern because of the lack of programs for avalanche safety both at the provincial and federal levels. The Centre d’avalanche de la Haute-Gaspésie is a public service organization and its funding comes from Government of Quebec (45%), Government of Canada (5%), local and regional organizations (45%) as well as self-generated revenues (5%). The annual budget, around 250 000$, must be constantly renewed. Ideally a specific agreement between Government of Quebec, provincial departments, agencies, and community partners would ensure the existence of the Avalanche Centre and maintain its activities and services. In the context of an
increasing backcountry use, the Centre d’avalanche de la Haute-Gaspésie needs more than ever to secure stable funding in order to ensure its sustainability and meet the growing needs of winter enthusiasts and commercial operations alike.

Another significant challenge, once overlooked but now recognized, is the risk management on the main road corridor in Haute-Gaspésie. Snow avalanches pose a real risk and threaten drivers every year on specific sections of highway 132 and 198. More than fifty (50) avalanches blocking the road partially or completely are reported every winter. A pilot-project initiated in 2012 helped to develop a partnership between Ministère des Transports du Québec and the Avalanche Centre to implement a comprehensive safety management program for roads and highways.

Looking forward, the next milestone for the Avalanche Centre is to develop a brand that extends to the entire territory and landscape of Quebec, which will formalize and recognize its mission and presence well beyond its home region of Haute-Gaspésie: Quebec Avalanche Centre or Avalanche Quebec.

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