YUKON AVALANCHE ASSOCIATION - THE FIRST YEAR AND THE FUTURE

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ABSTRACT: The Yukon Avalanche Association (YAA) was formed in 2010 with the goal of promoting avalanche safety and awareness to an expanding group of backcountry users in Yukon and Northern BC. In the spring of 2011 funding was secured for a 3-year pilot project involving community outreach, education, terrain mapping and the creation of a public avalanche forecast, including funds for hiring two full-time avalanche technicians. In this paper we summarize the successes and challenges of the first season of funding and explore ongoing challenges to the maintenance and expansion of YAA activities.

1. INTRODUCTION

Yukon Territory is a sparsely-populated region with just under 36,000 residents (Yukon Bureau of Statistics, 2012b) with the majority residing around Whitehorse. A nearly 12% growth rate from 2006-2011 (Yukon Bureau of Statistics, 2012a), has brought an influx of new residents from across Canada and the world, and has led to a growth in wintertime recreation including ski touring and snowmobiling. As with other mountainous regions of Canada, many new backcountry users are unaware of avalanche danger and safe travel practices. Although recreational avalanche courses have been available locally since the 1980s there have been challenges in engaging all user groups. In 2009 local avalanche practitioners partnered with the Canadian Avalanche Centre (CAC) to bring its Backcountry Avalanche Workshop (BAW) to Whitehorse for the first time. The enthusiastic response that year and in subsequent years confirmed not only a need but also a desire within the backcountry community for more knowledge.

The Yukon Avalanche Association (YAA) was formed in March 2010 as a non-profit organization with the goal of promoting avalanche awareness and safety within the Yukon backcountry community. In the fall of 2010 an application was submitted for funding through the Canadian Search and Rescue Secretariat's New Initiative Fund (NIF). The application outlined a number of concrete goals including; 1) Development of a Public Avalanche Forecast; 2) Terrain mapping of high-use backcountry areas; and, 3) Development and delivery of avalanche awareness and education campaigns for a variety of user groups. In the spring of 2011 the NIF funding was approved for a period of 3 years including 2 winter seasons. The total monetary amount committed was approximately $761,000. This doesn't tell the whole story, however, as the awarding of the funding was also contingent on significant in-kind support from Parks Canada, local practioners and volunteers. This was supplemented by a successful application for $70,000 from the Strategic Investments in Northern Economic Development (SINED) fund for use toward public education and outreach activities. In 2012 a further $47,579 was awarded from the Community Development Fund (CDF); $18,400 for Avalanche Terrain Exposure Scale (ATES) communications products and $29,179 for snowmobile outreach. Although these amount to significant awards, it should be emphasized that with the exception of a Project Manager, all YAA board members and volunteers are unpaid. The YAA also benefited from numerous local business providing services and products at discounted rates.



Figure 1: Proposed forecast region, covering the White Pass and Wheaton Valley areas of Yukon and northern BC (Map data ©Google).

The creation of a public avalanche product was the

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most daunting task facing the board: After consideration of a number of options, the CAC was approached to form a partnership due to its expertise in creating and delivering avalanche products in Western Canada as well as its history in partnering with the Centre d'avalanche de La Haute-Gaspésie in Québec.

The remainder of this paper summarizes the various YAA activities during the first season of NIF funding including successes, challenges and plans for moving forward.

2. GOVERNANCE

The YAA executive is comprised of the President, Vice-President, Treasurer and Secretary. One board position is reserved for a Parks Canada representative and their alternate and a second position is reserved for a representative from the snowmobile community and their alternate. The board is rounded out with four Director-at-large positions.

The scope and timing of the YAA projects were very ambitious from the outset. During the spring and summer after approval of NIF funding the board and several volunteers committed hundreds of hours toward planning of projects including outreach and the winter field program. In the fall of 2011 a local contractor was hired as the project manager. Their duties included liaising with the avalanche technicians and the CAC along with managing NIF funding. Although this role was assigned a number of responsibilities, it was found that in practice these were relatively fluid and a number of problems arose in communicating and delegating tasks.

With the receipt of addition funding from SINED, a local company, Tipping Point Strategies, was hired to help with business planning and media campaigns. By the end of the first field season the roles and responsibilities of the board and the project manager were better-defined and the outline of a business plan was in place for the new board after the spring 2012 general meeting.

Concurrent with the challenge of working with and delegating to a contractor and volunteers was the drain on board members themselves. Hindsight has shed light on the phenomenon of a new board being composed of 'doers' rather than delegators and policy makers: As with many new projects, the YAA board was comprised of passionate people with avalanche expertise but as a whole lacking skill in areas such as governance, policy and protocols. This was a cause of some initial disorganization as members worked hard to complete specific tasks, but the knowledge gaps were gradually filled as the season progressed.

Although the first reason was rife with challenges, some expected and others unexpected, the vast majority of first-year goals were accomplished on schedule. Board members and volunteers did not hesitate to commit most or all of their spare time (and in some cases holiday time) to ensure that goals were met and tasks were completed. Although some board members including the author started the year with very little experience in governance, roles within the board were fluid enough that by the end of the season the board was able to work efficiently with a resultant drop in stress levels and time commitments.

3. OUTREACH

I the decades leading up to the founding of the YAA a number of dedicated volunteers and Parks Canada staff delivered avalanche safety outreach to users in Whitehorse and surrounding communities. More recently this core group of volunteers partnered with the CAC to hold Backcountry Avalanche Workshops (BAW) for three consecutive years, all of which had the highest attendance of any BAW events. In addition, local practioners partnered with the CAC to obtain banners and outreach materials for events centered around National Avalanche Awareness Days.

The goal for the first year of NIF funding was to hold one public event every month from November through April, with some specifically targeting snowmobilers. The first such event was held as an information session on the YAA, funding and plans for the coming winter seasons. Subsequent events introduced the technicians and the new field program and others were timed to coincide with Avalanche Awareness Days, Parks Canada events, a film festival in Skagway and the Easter long weekend sledding events in Haines Summit. Some events were structured as lecture-style information sessions and others were held outdoors and gave recreationists a chance to learn about and use avalanche safety gear.

Local media were very supportive of public initiatives including, as mentioned in Section 4, a weekly radio spot from the technicians every Friday morning. Free exposure was augmented by the purchase of radio and print ads. Social media figured prominently in outreach efforts from the beginning and Facebook pages and Twitter feeds from the YAA both experienced significant traffic. One challenge involved the CAC online forums: Since its creation the Klondike forum has been well used by local recreationists to share snowpack conditions and observations. Technical challenges during the winter of 2011-12 limited the ability of many users to post information and several independent Facebook pages were created. This led to some difficulty in consolidating information and

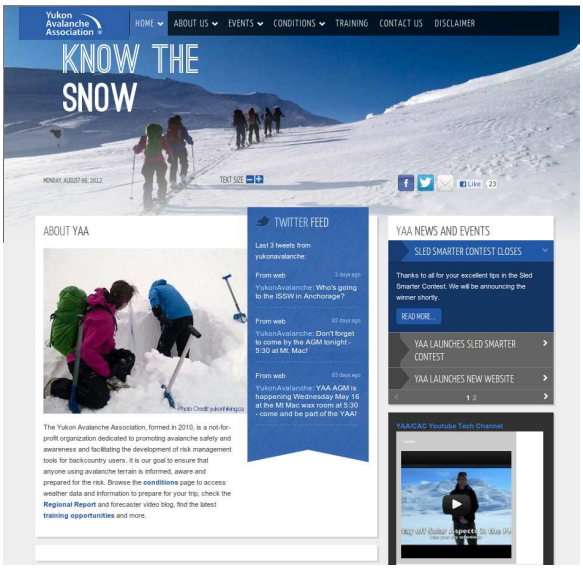


Figure 2: The new YAA web page. The Twitter feed and other social media are integrated into the main page.

will likely continue to be a challenge in the future.

A web page (www.YukonAvalanche.ca) was built in 2011 to help disseminate information about the YAA, weather data and links to AST course providers through the CAC website. In spring 2012 this was replaced with a new page that incorporates the YAA Twitter feed and Youtube updates from the technicians on the main page (Figure 2). The launch of the page coincided with a media blitz targeted at snowmobilers over the Easter Long weekend. This is typically a very popular weekend, especially in the Haines Summit area. Web page and Facebook traffic both experienced upswings during this event.

Finally, outreach in Skagway was assisted by a local outdoor retailer who assisted in promotion of YAA events and made time for a presentation at the annual Backcountry Bash and Ball film festival in Skagway.

Judging by attendance at events, web metrics and feedback from users the YAA outreach activities were very successful this past season. The plan for coming seasons is to maintain that momentum and continue to target snowmobile user groups as they remain underrepresented in attendance at some public events and in participation on YAA and CAC social media sites.

4. CONDITIONS REPORT

The YAA partnership with the CAC offered a number of logistical advantages: The employment of two full-time avalanche technicians could be administered by the CAC which is a large non-profit with the capacity to risk-manage staff in the field; The CAC already has a framework in place for collection of data, interpretation and dissemination of public avalanche products, freeing the YAA from the creation of a forecast system from scratch. The CAC's reputation also aided in attracting experienced applicants for the technician positions.

The hiring of avalanche technicians was accomplished in the fall of 2011. Although the initial goal was to hire at least one local technician, the disparity in qualifications and experience between locals and 'outside' applicants led to the hiring of two BC residents who between them had significant experience in ski hill, mechanized and industrial avalanche work. In place of local hires, a list of qualified local aspiring avalanche professionals was compiled with the hope that they could gain experience while working side by side with experienced technicians.

The technicians began their field season in December 2011 with a number of time-sensitive tasks to complete. Foremost among these was the familiarization with the forecast area (Figure 1). The southwestern portion of the area lies within 25 km of the Lynn Canal in Alaska and parts of it may be considered coastal, but the snowpack changes quickly to transitional and continental over a short distance (see Sharp (2012) for an in-depth summary of the variability and associated challenges). These climactic zones had to be better quantified and at the same time the technicians had to become familiar with the usage patterns of winter recreationists.

The initial goal was to transition from an avalanche conditions report in December to a full fledged Public Avalanche Forecast by mid-winter. As the scope of learning and forecasting for a brand new area became apparent, the focus was changed to the creation of a weekly Avalanche Conditions Report. Despite some initial disappointment in this decision, the technicians worked with CAC staff to create additional products that could fill this void. A weekly Friday morning radio report was aired on a local radio station, with one of the technicians phoning in from the field to summarize their observations for the week. A Youtube channel enjoyed immediate uptake as the technicians filmed snowpack stability tests and recent avalanche activity.

The most significant challenge with the field program was the time spent travelling to and from Whitehorse, approximately 2 hours each way in addition to time spent on loading and unloading snowmobiles, office work and documentation. This meant that actual time available for field work was restricted and that the technicians were generally only able to visit the field 3-4 days each week. This was partially addressed by increasing funding for accommodation at the Fraser/White Pass highway camp from 1-2 nights each week to 3-4 nights/week. A locally-hired third

technician will be in place for the coming season to alleviate this challenge and to further the goal of building local capacity.

By the end of the season the various public avalanche products enjoyed significant usage and awareness of the program grew thanks to these efforts as well as local media buy-in. This portion of the program will likely continue to evolve for the coming season with the availability of the third avalanche technician and the deployment of an additional weather station.

5. WEATHER STATIONS

The lack of consistent weather observations in the forecast region was addressed as part of the NIF funding application. Until early 2000s, Environment Canada (EC) offered training to Yukon Highways Maintenance workers and daily weather observations were collected from all highways camps. This training was eventually discontinued and weather reports became sporadic. Yukon Highways maintains two automated weather stations in the region: An FTS station on Mt Racine at the BC/Yukon border and a Davis Scientific weather station at Fraser highways camp, however both lack instrumentation for measuring winter precipitation.

The NIF funding allowed for the purchase and installation of two remote weather stations in the first year and an additional station in the second year of funding. Several factors were given consideration when designing the stations and choosing sites: Foremost was the need to collect representative data to support the avalanche forecast; Components and battery banks had to be able to withstand heavy riming, very cold temperatures and strong winds; The ongoing maintenance costs had to be minimized in the event that the YAA does not have sufficient funding to maintain them on its own; and stations had to be safely accessible by ski or snowmobile in order to perform routine maintenance.

With those considerations in mind, components were purchased from Campbell Scientific for one ridgetop station with wind, temperature and relative humidity and a valley bottom station with wind, temperature, relative humidity, snow depth and a custom-built standpipe for measuring snow water equivalent. A third ridgetop station was installed in the Wheaton Valley area in spring 2012. All stations use GOES satellite transmitters to transmit hourly data in SHEF format (National Weather Service, 2008). Significant advantages of this system include the lack of data transmission costs, the robustness of the system as a whole and the availability of the data to anybody with an internet connection. Weather data are decoded and displayed on the YAA site in dynamic real-time graphs, shown in Figure 3. All data are stored in an online database which facilitates dissemination to any interested third parties.

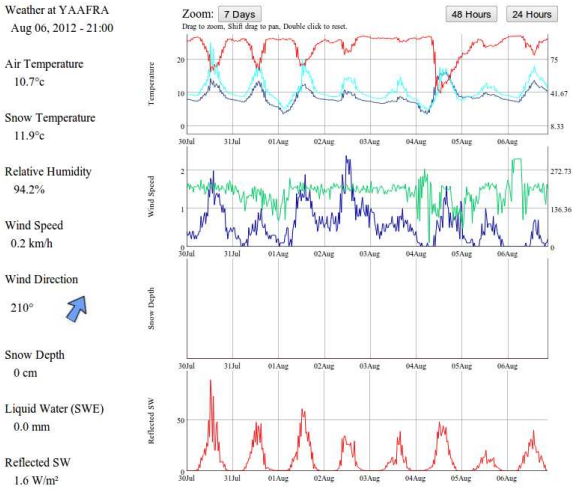


Figure 3: YAA weather page. Date are accessed from a MySQL database in real-time and graphs may be zoomed in and out.

A number of challenges were encountered with the weather stations. Shortly after installation of the first ridgetop station, a short-lived but intense fall storm moved through White Pass. Station transmissions ceased shortly after wind speeds in excess of 80 km/h were recorded. The station could not be visited until two weeks later, when we were greeted by the sight shown in Figure 4. The GOES antenna was destroyed and the shaft on the wind sensor was damaged beyond repair. Somewhat impressively, the tripod and solar panel mount were undamaged. The wrecked antenna was replaced with a helical antenna from Stevens Water Resources and stood up well in high winds for the remainder of the season.

A second challenge involved the lack of AC power: The stations all run on banks of 100 Amp-Hour batteries supplemented with 50W solar panels, but precise power reserves were difficult to estimate due the influence of cold temperatures and short days on the charge rate and battery performance. For this reason, a mixture of ethanol and antifreeze was used to prevent freezing in the standpipe rather than using a circulation pump. This led to problems with icing of the pressure transducer and degradation of the gasket around the transducer. Due to leakage and interference with other instruments the standpipe was disconnected in February and will be rebuilt before next season.



Figure 4: Ridgetop station after a storm in November 2011. The GOES antenna was destroyed and the wind sensor was damaged. This riming occured over 3 days.

6. TERRAIN MAPPING

Parks Canada first implemented ATES ratings and signage for the Log Cabin area of Chilkoot National Historic site in 2007, with signage designed to be useful without an avalanche forecast. Due to the inclusion of the Avaluator (Hageli et al., 2006) in CAC Avalanche Skills Training courses the local backcountry community already had some familiarity with ATES ratings. The release of Version 2.0 of the Avaluator, which relied less heavily on the existence of a local avalanche danger rating, increased the utility of ATES ratings to recreational users.

The areas to be targeted for new ATES ratings were identified primarily through consultation with local backcountry users at YAA outreach events. Attendees were encouraged to mark popular routes and destinations on a map and this was subsequently passed on to the mapping consultant. This approach had the added benefit of reducing some confusion regarding local names for specific regions and terrain features.

Four local avalanche practitioners were hired to assist the contractor and the targeted areas, divided equally between those used heavily by skiers and those used predominantly by snowmobilers, were mapped in March and April 2012. A third phase is planned for spring 2013. ATES products will displayed on highway signage, in brochures and online, hopefully in time for the coming season.

7. MOVING FORWARD

In May 2012 a new YAA board was elected. Approximately half of the board carried over from the previous year and new members brought valuable experience with regards to funding, governance and outreach activities. The previous year's board was frank in sharing their successes and failures along with recommendations for moving ahead.

The biggest current challenge facing the YAA is continuation of funding. The 2011-12 field season brought widespread publicity both within and without the backcountry recreation community and the season ended with significant momentum. The Avalanche Conditions Report and outreach by the technicians were embraced by backcountry users, but this facet of the program also represents by far the most significant ongoing expense to the YAA. Parks Canada contributed significant in-kind support to guide the field program during its initial establishment, but given recent federal budget cuts and reduced staffing during the winter season, this level of commitment may not be sustainable in future years. There was also in-kind support from the Yukon Territorial Government but further support will likely be necessary for the maintenance and growth of the public avalanche product.

Concurrent with funding challenges is the desire of many recreationists to have the same Public Avalanche Forecast as is available to recreationists in British Columbia. Although our forecast area is relatively rich in automated weather data and has a good history of data sharing by recreational users, it lacks a single portal for them to post and access these observations. More importantly, it lacks the commercial or professional operations that form the backbone of observation networks in other forecast areas. This challenge and some ongoing work and potential solutions are explored more thoroughly in the paper by Sharp (2012).

A final challenge that was unexpected comes from lines on a map. Recreational usage does not follow provincial, territorial or international boundaries and is dictated solely by the snow, terrain and access. The fact that the White Pass usage area includes portions of Yukon, British Columbia and Alaska has led to numerous difficulties including obtaining permission for weather station sites and limiting where avalanche technicians may travel and where ATES ratings may be done. It has also led to difficulties in government buy-in. There remains unexplored potential to develop interagency cooperation with land management agencies within Yukon Government, BC Parks and BC Forest Service, United States National Parks Service, Parks Canada and local First Nations. Despite numerous challenges, it has been encouraging to receive support, both in-kind and financial, from a number of business, government agencies and individuals in Skagway along with an enthusiastic reception by Alaskan users.

Overall, the YAA is very proud of what has been ac-

complished thus far. In two years since its formation and after one year of funding, the YAA enjoys significant goodwill in the public eye due in equal measure to the hard work of board members and volunteers, the Avalanche Conditions Report, public outreach events and media campaigns and the availability of real-time weather in the White Pass. We hope that our experiences may help with the development of outreach programs and avalanche products in areas that are presently under-served.

ACKNOWLEDGEMENTS

Notwithstanding the incredible number of volunteer hours that have been committed over the past 2 years by the YAA boards and volunteers, this project would never have come together without the work of several key Yukon residents in the 20 years. Kirstie Simpson, Hector MacKenzie and Christine Aikens were key in initiating the first funding applications. The Canadian Search and Rescue Secretriat NIF program has provided the bulk of the funding for YAA activities while grants from SINED and CDF provided additional much-needed funds. Thanks to the YAA boards past and present; Parks Canada; the CAC; Yukon Highways; BC Ministry of Transportation; the United States National Parks Service; Up North Adventures; Yukon Yamaha; The Mountain Shop; Skagway Brewing Company and numerous local recreationists who donated their time and expertise.

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