Crested Butte Avalanche Center
2017-2018 Annual Report

Baxter Basin, Poverty Gulch, February 2018

Produced by Ian Havlick – Forecaster for CBAC
9/2/2018

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Forecaster's Summary

The winter of 2017-18 would likely be written off by powder hounds as a season to be forgotten, nearly on par with "the year without a winter" of 1977. However from the avalanche observer, the slides seen across our Elk Mountains with massive propagation measured in the thousands of feet, and fracture line depths over six feet deep on many occasions easily eclipsed avalanche sizes observed during the near-record winter we saw in 2016-2017.

A prolonged drought through the fall, and into December allowed what minimal snow accumulations we had to transform into large grained, striated depth hoar which would plague the base of our snowpack the entire season and "re-activate" with significant snowfall, wind events, and rain and warming events through April, allowing impressive persistent slab and wet slab avalanche cycles well into spring. December and January were far below average, and though the avalanche center did continue to issue daily advisories through this drought, the danger fell to a consistent low danger rating, with the community holding our collective breath, waiting for that big "Elk Mountain Special," the multi-foot mega storm that tends to wash away the basal facets a few times a "normal" winter (if we are lucky) and start a new. February finally showed some promise, but rather than one big Pacific slugger of a storm, the Crested Butte backcountry was treated to a string of small to medium sized storms that incrementally loaded our snowpack, building that slab without causing a widespread avalanche cycle until the last week

in February when the sky seemed to come crashing down with a slow motion, long duration deep slab avalanche cycle. Observations and near misses came pouring in once the storm clouds from one storm cleared out, allowing observations into the deeper portions of our forecast area. The time between February 16th and March 1st showcased one after another staggeringly wide crown lines zig-zagging terrain between 29-45º in steepness. Several close calls and one incident requiring assistance from Crested Butte Search and Rescue for two injured skiers on Schuylkill Ridge (Birthday Bowl) after triggering a size 2 slab avalanche on 2/19. One could say that all the excitement of a "normal" winter was just all packed into February this year.

After the nice parade of storms in February, March came in like a lamb, and left like the month of May… Strong high pressure took hold, that intense early spring sun returned, and the few storms we did see roll through the Elk Mountains saw unusually warm characteristics with pronounced rain/snow levels well above valley floor, and the first wet loose avalanche cycle of the spring oozing down east through south facing slopes as early as March 2nd. Another very pronounced wet avalanche cycle, both wet loose and wet slabs, ran late March spurred by rain, and producing an especially impressive wet slab cycle as the early winter's large grained facets saw free water for the first time on north, east, south and south west facing terrain.

In addition to the inputs of unusually warm temperatures, and bouts of liquid precipitation, the now seemingly regular addition of that dreaded red desert dust from the desert southwest blew in on several pre-frontal wind events in mid to late March, decreasing reflectivity of the white snow, and speeding spring snow melt and emergence of trailheads and flower beds by mid April.

Our CBAC team continued to meet and exceed our community's growing thirst for timelier, more accurate, more engaging and more multi-media soaked avalanche resources. Despite the slow start to the season, our annual Awareness Night in early December was bursting at the seams, was standing room only seating for about 450 people who came out to listen to the variety of presenters and educators and socialize amongst the local tribe. The following day our Beacon Brush-Up event offered for free community avalanche rescue education and equipment demos was once again a hit with over 100 people in attendance. Despite minimal snowfall, and with a big help from the Town of Crested Butte heavy operators, we dumped enough plow debris to enable realistic shoveling practice for the 200lb fire department cadaver. After the Awareness weekend, our forecasters were dinging their skis and risking their knees to bring any news of avalanche hazard and ride-able snow to the public, though many in the community likely used the preliminary reports to just confirm yet another weekend of desert mountain biking through early December. Even though high pressure had an iron grip on the Elk Mountains for many days this last winter, when the snow or rain fell, or significant winds blew, our CBAC forecaster team was anticipating the changes and ramped up observations, videos, and social media posts to advise all users, both human and motorized, of the potential current avalanche hazard.

Our goal is to meet the growing needs for accurate and tangible avalanche information, and we couldn't do it without the overwhelming support from our community. Thanks for another great season!

CBAC Operations

The Crested Butte Avalanche Center (CBAC) has been operating as a non-profit 501c3 avalanche center since 2002. This season, the CBAC issued 131 daily weather and avalanche advisories beginning on December 1st, 2017 that were disseminated to the public through our website, email, and radio broadcasts. Surprisingly, even despite the slow start to the season and meager snowfall for much of the winter, we only produced 7 fewer forecasts than our blockbuster, record setting winter of 2017. The 2018 season featured 14 "weekly summaries" spearheaded by Eric Murrow in coordination with oversight from the trio of CBAC forecasters, and 8 snowpack updates during the shoulder seasons.

The CBAC was staffed with one full time director/lead forecaster, two part-time forecasters, one forecaster intern, and a development director. Ben Pritchett served as Executive Director and Lead Forecaster. Though Ben is a longtime local and avalanche professional, this was Ben's first full season with the CBAC, a role which evolved from part-time avalanche forecaster in 2017 after Zach took on a new position as Director of the Flathead Avalanche Center in Montana. Ian Havlick and Evan Ross both worked as part-time avalanche forecasters. This was Ian's 5th season and Evan's 4th season with the CBAC. The CBAC continued the development director position this season led masterfully by Karen Williams. Eric Murrow volunteered as the CBAC's intern, which evolved to actively forecasting this spring. The CBAC's board of directors is comprised of 10 members: Than Acuff (President), Steve Banks (Vice President), Chad Berardo**,** Seth Tucker**,** Christie Hicks**,** Kirk Haskell**,** Jim Duffy, John Dugenske**,** Chris Read**,** and Keitha Kostyk.

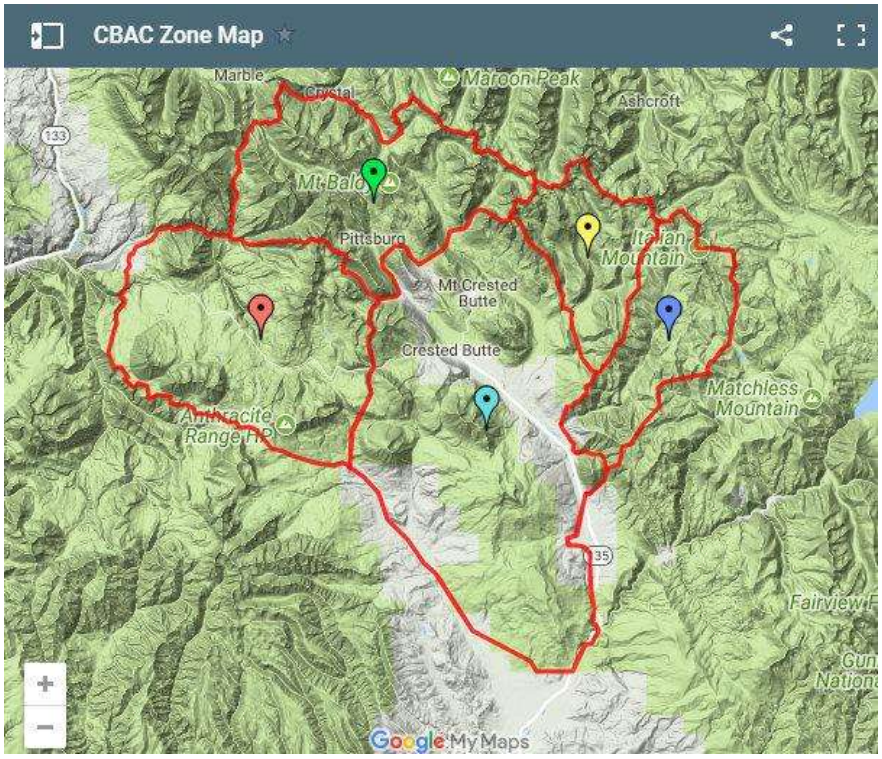


Figure 1: Overview of the CBAC advisory area; approximately 326,000 acres.

Weather, Snowpack, and Avalanche Summary

Right off the heels of our "Snowpocalypse" year of 2017, the winter of 2017-2018 was characterized by nearly the opposite the previous winter will be remember for, a dismally low winter snowpack. The first lasting snows fell in October, lingered on northerly aspects and melted out nearly everywhere else until almost Christmas time in mid to late December. January continued to see dribs and drabs of Pacific moisture skirting to the north of Colorado. February accounted for about 50% of the season's snowfall, with a steady flow of small to medium sized storms which briefly held promise for a turnaround of sorts for the winter. However, March rolled in, and high pressure returned, pushing any bit of moisture again to the northern Rockies of Wyoming and Montana. March storms also grew warmer, bringing traditionally unusual rain events to terrain as high as 12,000 feet. In addition to rainfall limiting snowpack growth, the red desert dust decreased albedo (reflectivity of the snow surface), and increased snowmelt through April. The near record low snowfall kept the Gunnison River basin snow water equivalent estimated at around 25-50% of average, the lowest snowpack in nearly 38 years. Somewhat equally alarming are the warming temperature trends billy barr, of the Rocky Mountain Biological Laboratory, keeper of meticulious weather data for over 40 year in the nearby town of Gothic, continues to uncover. Below (Figure 3) is the NRCS time scale snowpack chart for the 2017-2018 water year for the Gunnison River Basin based on the Schofield Pass SNOTEL measurement site north of Crested Butte, a located in the orographically favored "snow belt" of the Elk Mountains. The snowpack in the Gunnison Basin peaked the 3rd week of March, nearly a month earlier than normal (Figure 3).

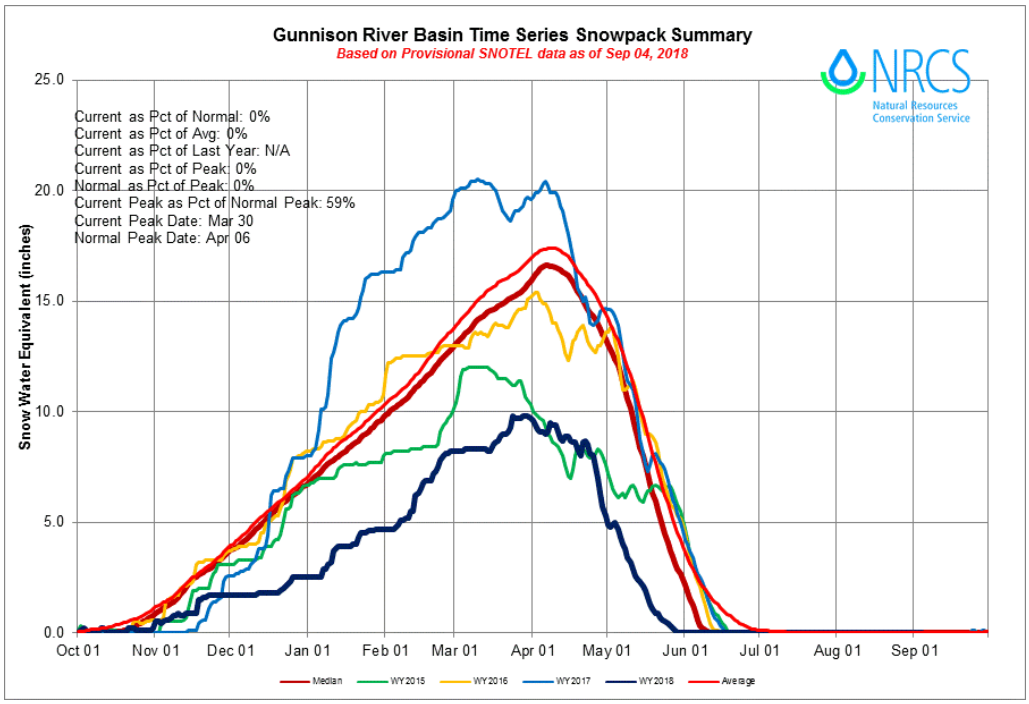
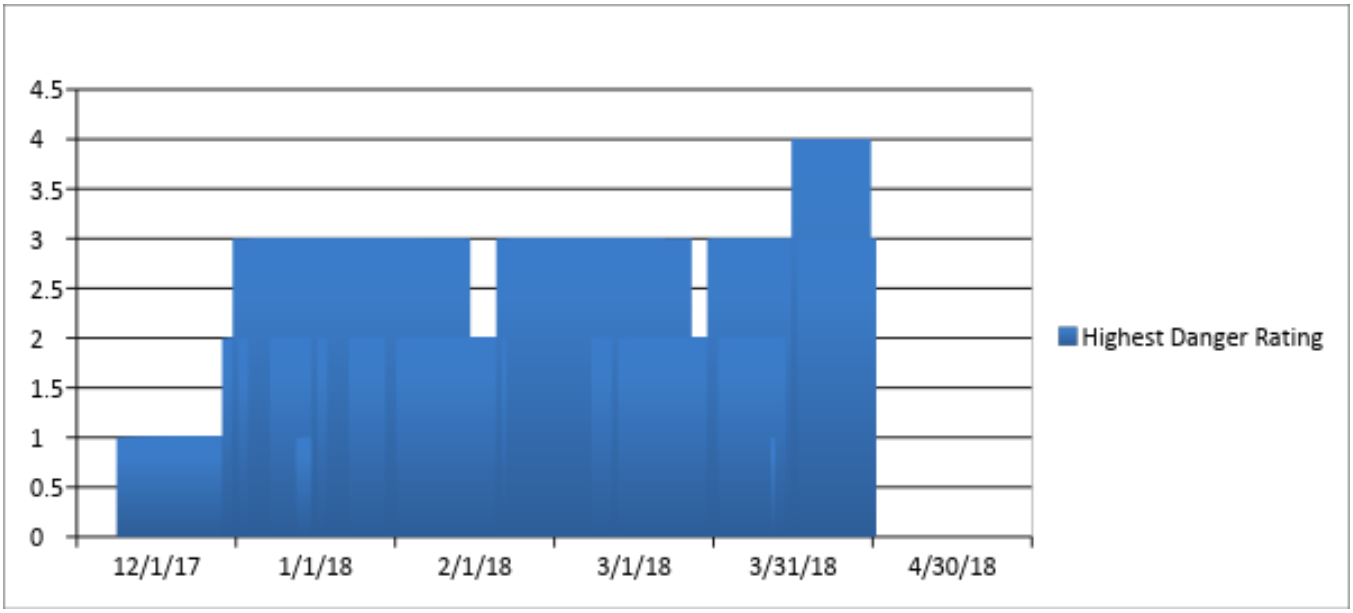


Figure 2: Comparison of this season's water year (navy blue line), relative to previous seasons and the 30 year average for the Gunnison River Basin. The snowpack was far below average for the entire season, with a melt off several weeks earlier than historical average at Schofield Pass.

The CBAC uses the 5-level North American Danger Scale to offer travel advice to backcountry users. Each day, three elevation bands (above, near, and below treeline) are given an avalanche danger rating. This season, the highest avalanche danger between the three elevation bands was never rated Extreme (Level 5), High (Level 4) once times, Considerable (Level 3) 34 times, Moderate (Level 2) 70 times, and Low (Level 1) 25 times.



November

Our winter started off slowly this season, with unusually mild temperatures and little snow through mid-November. Any snow left on the ground from October's light snowfall events was confined to northerly aspects at high elevations. This snow formed a pronounced layer of facets, coupled with crusts in some cases, creating a future persistent weak layer. From mid to late November, we saw a few small storms. This new snow began to facet on various aspects. The storms were often windy with lots of snow transport forming stout, stubbornly reactive slabs on top of the October facets. A few natural triggered avalanches were observed during this time, mostly D1 to D2 in size (Figure 3), with some eager ski tourers submitting observations of remotely "cracking" and collapsing portions of the snowpack near Paradise Divide.

Figure 3: 11/17/17. Prolonged drought through mid-November left bare ground on all but the highest, northerly facing slopes in the Paradise Divide area. This is a photo and analysis of the first significant recorded avalanche of the season, November 17th, 2017, off Schofield Pass near Emerald Lake.

However, these somewhat normal avalanche occurrences dwindled as the snowpack and shallow slabs eventually faceted out, and avalanche activity ceased (Figure 4) until an extremely rare wet slab avalanche was observed during a warm week failing on the east face of Gothic Mountain. In some ways, this unusual avalanche could eventually be said to sum up the entire winter; warm, shallow, unpredictable (Figure 4).

By mid December, we were starting to all collectively fret about the season that might not be. We had delayed the start of daily avalanche advisories to December 1st due to lack of snow and hazard, but eventually, kicked off the season. During the first week of forecasting there were a handful of natural avalanches observed, including an impressive avalanche off Mount Axtell, near the Pencil.

Figure 4: 11/26/17. Wet slab avalanche, east face of Gothic Mountain, observed 8am

December

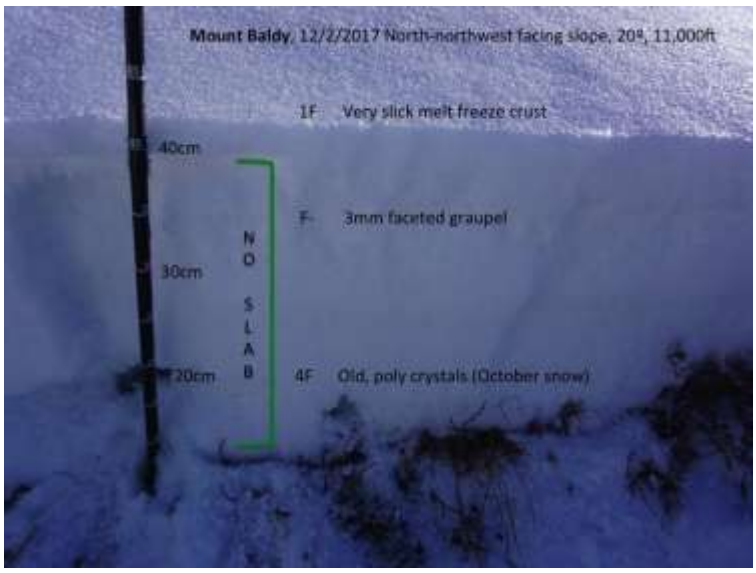


Figure 5 12/2/17. Snow profile, Mount Baldy, north facing terrain, 11,000ft.

Figure 5: 12/03/17. Size 2 persistent slab avalanche. Photo taken below "the Pencil" on Mount Axtell.

As forecasters we toured where snow depths allowed, and drove the usual backcountry roads, noting snow coverage as it was certain that when we finally got snow, the lingering snow we could see, would inevitably be where we would see avalanches.

Figure 6: 12/11/17. Snow distribution photo of west and northwest facing Snodgrass

Figure 7: 12/11/17. Snow distribution photo of Purple Palace, northeast facing terrain.

Drought continued through mid-December until the Pacific trough we had all been burning skis as sacrifice finally arrived with a paltry 6" of light density cold snow, accompanied by strong northerly winds. Another small wave of moisture followed the 12/22 storm as cold, somewhat dry northwest flow remained in place. Christmas brought the heavier snowfall and first significant avalanche cycle when an unpredicted heavy snow squall moved across the forecast area right when avalanche forecasters dread it the most, 7-8 am, forecast publication hour. A moderate avalanche rating was quickly bumped to considerable, and we utilized social media channels to spread the news of rapidly rising avalanche danger.

Figure 8: 12/23/17. Skier triggered size 1.5 avalanches in storm snow, failing on large grained facets.

Though observers did report cracking, collapsing, and small, pockety avalanches, the spike of precipitation intensity and rise in avalanche danger during this time resulted in fewer avalanches than expected, likely due to the powdery nature of the new snow, lacking "slab" enough slab characteristics to produce a wide spread avalanche cycle and flushing the rotten, mature depth hoar and facets near the ground. As the 2017 calendar expired, reports of small dry loose and wind slab avalanches trickled in, but largely the backcountry went quiet once again. The big scary persistent facets and depth hoar near the ground would live on!

Figure 9:12/26/17. Remotely triggered persistent slab avalanche. Standard 7th Bowl skin track, Anthracites.

January

The first week of January was just that monotonous blue sky, high pressure weather that all the powderhounds dread. Over the course of the first week, avalanches subsided and the once Christmas slab largely faceted away, except for the real windblasted, dense windslabs above treeline. The night of January 7th, a storm arrived, dropping 11" of snow, but only .60" snow water equivalent (SWE). The snowpack grew noisey from the rapid load, did produce monster collapses and cracking, but surprisingly few proper avalanches. Stability tests would reveal the structure and failure planes, but lacked propagation propensity (Figure 10).

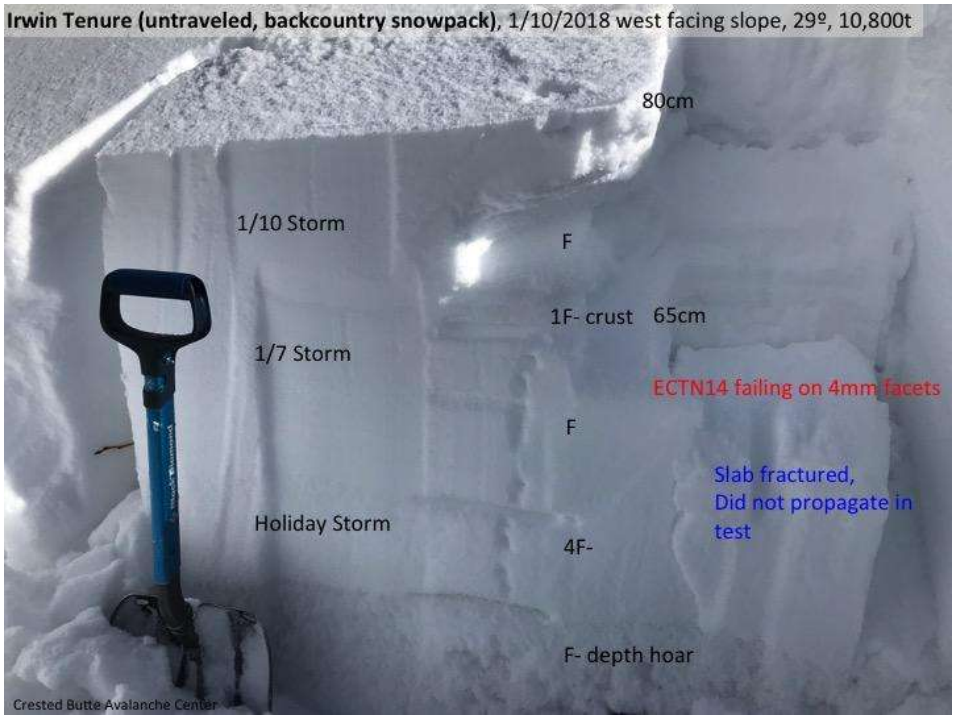


Figure 10: 1/10/18. Snow profile following 1/7 storm. No propagation, but poor structure.

Following the decent storm on 1/7, the moisture once again slid to our north, and the Elk Mountains fell into high pressure, once again. The snowpack transitioned into that "spooky" moderate, where we had poor structure, and a slab that in places was stiff and dense enough to produce signs of instability or avalanche, but largely fell dorment, until another observation would roll in, reported a spooky event. One of those observations was when the danger was rated moderate on the day, and a party ski touring on Coney's (skiers left skin track), remotely triggered a sizable slab avalanche on a steeper convex roll near the top of the ridge (Figure 11). This pocket had longtime locals not surprised, but scratching their heads when the last time they saw that feature slide.

Figure 11: 1/13/18. Remotely triggered avalanche in a rarely sliding pocket on Coney's.

Other notable avalanches was Mount Owen, when the big northeast cirque slid as it usually does at least a few times a year. The avalanche appeared to be triggered by cornice fall at ridgetop, and then propagated widely on apron to depth hoar near the ground.

Figure 12: 1/16/18. Large natural avalanche, Mount Owen, initiated by cornice fall, failing near the ground.

The remainder of January saw mild temperatures and only 1-2" of liquid water (1.8" at Irwin) falling in the "snow-belt," the swath of mountains stretching from the West Elks, past Irwin, northeastward to Schofield Pass. Temperatures were amazingly mild, never falling below 26ºF (once), and generally hovering in the low 30ºs.

There were some close calls in late January, involving "repeat offenders." Slopes which had slid already earilier in the winter, filled back in, reloaded lingering persistent grains (facets and depth hoar), and were much more easily triggered. A few notable observations came from the upper Slate River drainage, a large remotely triggered slide failing on those notorious weak grains near the ground near Pittsburg, and one skier triggered avalanche was caught on camera by two, very experienced, longtime locals in the Purple Palace vicinity north of Pittsburg, when they ventured into terrain that had run earlier in the winter (potentially during the holidays).

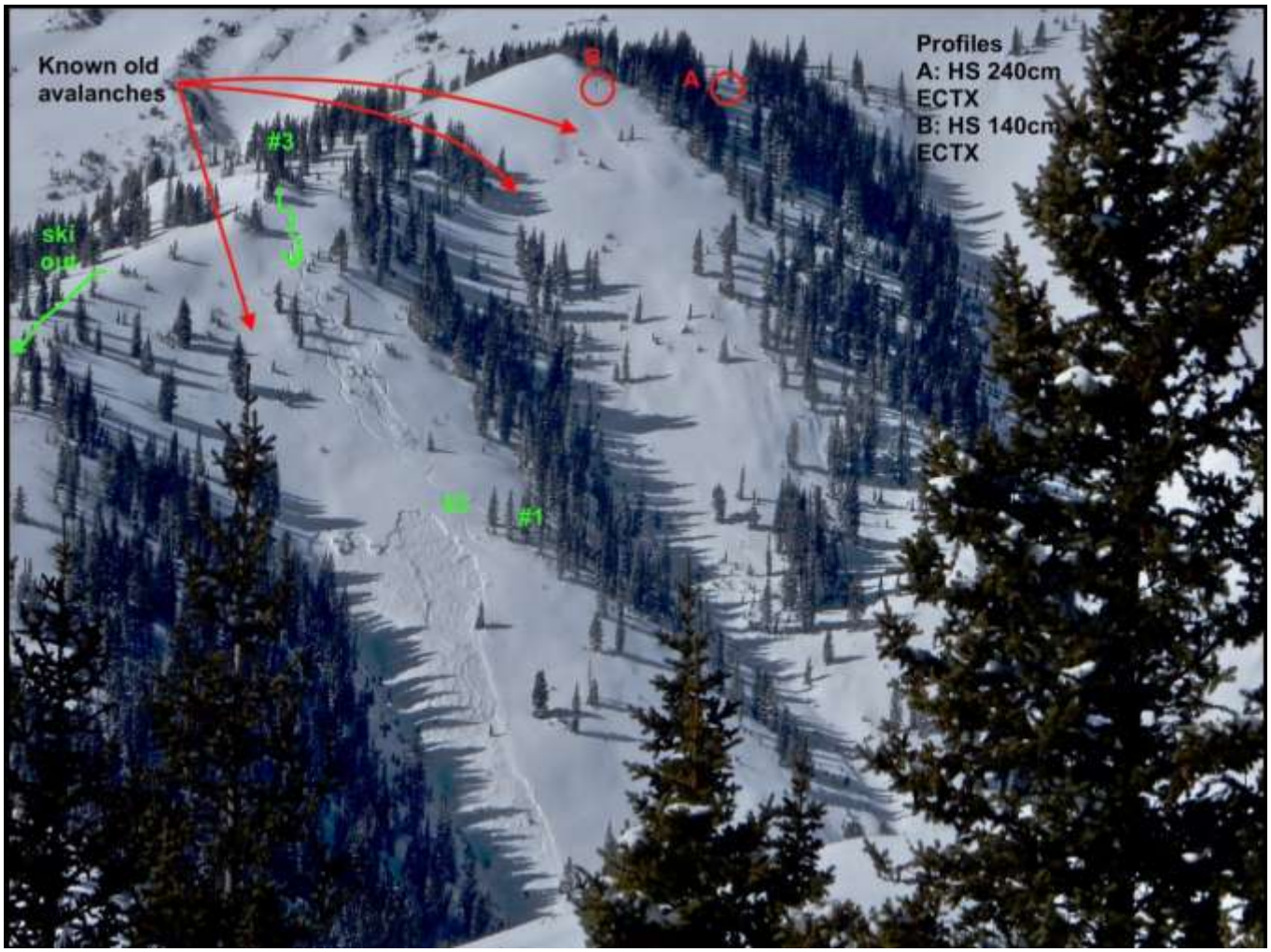
Figure 13 and 14: 1/28/18. Size 2 avalanche caught in action. Skier was able to escape and was not caught.

February

February was the winters snowiest month, with snow measured on all but four days. Avalanches started to be observed as soon as the snow started falling. A big lesson was learned by our forecast team when a team of both CAIC and CBAC forecasters went to investigate the recent Purple Palace activity (Figure 13 and 14), thinking it was potentially a buried surface hoar layer, when in fact it was the sneaky "repeat offender," resulting in what they admitted was a close call to skier involvement. Snow was finally falling, deep, cold, and it was a good reminder we do not always have the whole puzzle solved until someone stumbles onto the metaphorical "missing piece" someone secretly stuffing in a pocket or dropped on the floor (or, in an avalanche forecaster's world, nearly gets caught in an avalanche!)(Figures 15, 16, 17). The biggest 24 hour accumulation was only 12", but modest accumulations did add up, culminating in a pretty impressive, long duration avalanche cycle late in the month, when the lurking persistent weak layers finally reached critical mass, and with the continuity and maturity of the persistent weak layers near the ground, allowed very wide propagation, and failing 3-10+ feet deep. Deep slabs worked into the daily jargon on the forecasts and although danger never officially bumped to high danger, we flirted with it for many days, 17 days at rated considerable to be exact. Over the course of the month of February we effectively doubled the season's snowpack with 80" measured at Irwin, 6"+ of snow water equivalent. The large avalanches were long awaited and not a shock. We anticipated there would be a large avalanche cycle, what

was tricky was trying to nail the timing of when the avalanche cycle would occur. The snow favored forecast area north and west of Crested Butte had largely been the major players in the avalanche game leading up to February, but we also began to see avalanches increasing in size and occurrence spread to the Brush and upper Cement Creek drainages during the latter half of February. As the snow piled up, so did stories and observations of more near misses, with experienced skiers underestimating the unpredictability of such a pronounced weak layer near the ground, growing deeper and deeper with every small disturbance, and therefore, more and more stubborn and hard to evaluate. One such incident was on Schuylkill, another in the Anthracites, another one on Anthracite Mesa, and potentially others went unreported.

Eventually, once a weak layer is deep enough, standard stability tests such as compression tests and extended column tests begin to see higher and higher "false stable" results, the most dangerous result. "False Stable" test results do not show failure or propagation, however (sometimes with hindsight!), there are avalanches occurring on representative slopes, it is just that our rudimentary tests are merely rough estimations of the interaction of slab, weak layer, slope angle, friction, phase of the moon, and all the other nuanced delicate dance that is the avalanche phenomenon.



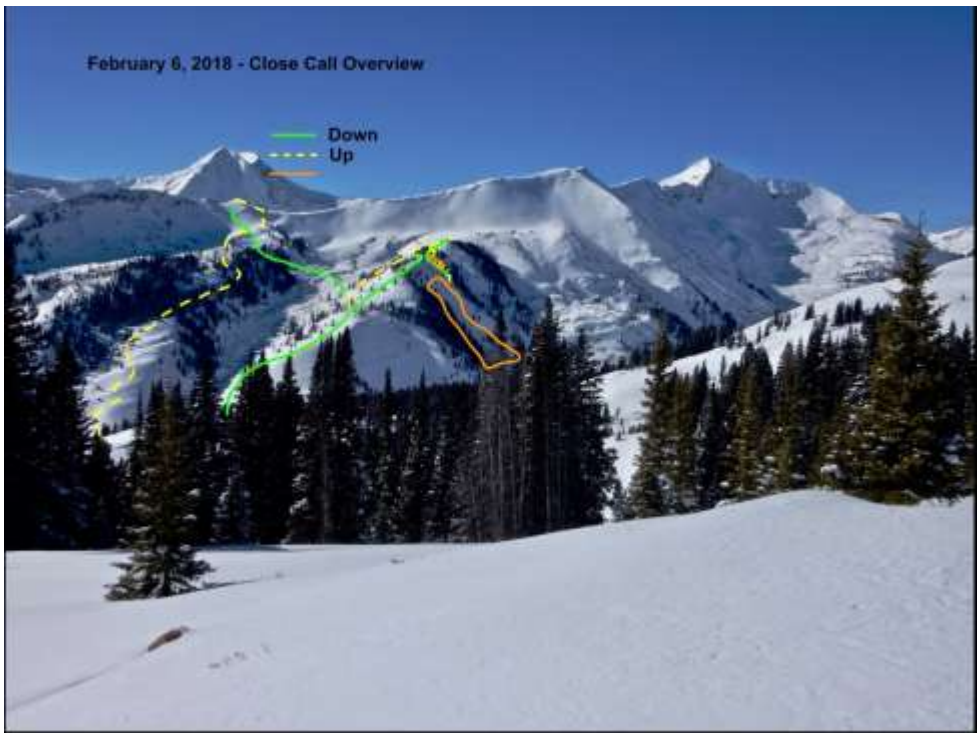


Figure 14, 15, 16: 2/6/18. Near Miss analysis involving repeater avalanches in Purple Palace.

Finally, mid- month, February 16th, the high elevation mountains saw a reprieve from the steady snow, and observers were able to venture into the alpine and look around. What could be seen during a brief window of good

light, was amazing. Huge crown lines zig-zagging terrain features, shearing to the dirt and dead wildflowers were amazing sights (Figure 17).

Figure 17, 18: 2/16/18. Impressive propagation and crown depths during Feb 16-17thth deep slab cycle in both Purple Mountain, Baxter Basin, Gothic Mountain, and Redwell Basin (Feb 23rd).

Fresh large to very large avalanches continued to be reported into early March, most of which failed where early season snow cover lingered, however, toward the end of the month, we began to see enough snow load on crust/facet combinations become deep enough for more southeasterly and southerly slopes get in on the action, helped along by strong southerly and southwesterly winds that raged above treeline for days. The most memorable southerly avalanche has to be the monsterous Afley slide, failing mid morning February 27th, gouging to dirt and rock and wrapping around a nearly 90^{o} ridgeline to the east facing aspect.

Figure 19, 20: 2/27/18. Impressive Afley avalanche failing mid morning after light but steady SW wind loading.

March, April

March and April were the months that winter really shriveled on the vine. Total precipitation for March and April combined to about 24-30" of snow, and ~2" of liquid water. Temperatures rose for prolonged periods above freezing and the snowpack began to consolidate and as a forecast center, we collectively held our breaths for the first free water to trickle and percolate down to the cold, large grained depth hoar near the ground that remained on all the slopes that had not slid already..and even those that had! The CBAC once again forecasted for the Grand Traverse, and just so happened that race night fell on one of the major storms of the winter. Despite best efforts, forecasters on course decided that a Reverse was the safest and most prudent option. Once the storm passed, observers noted many size 2 avalanches on or adjacent to the race course and the decision was re-affirmed. Toward the end of March, the weather systems and meager moisture the Elk Mountains did harvest, started as rain up to nearly treeline, hastening the percolation and kicking off several wet slab cycles into early April.

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Figure 21: Mid March snow surface runnels from warm temperatures and rain.

Figure 22, 23: 4/8/18. Widespread wet slab avalanche activity on Climax Chutes and Purple Ridge, enhanced by rainfall and rapid rise in temperatures.

Incidents:

Fortunately, there were no avalanche fatalities in the Crested Butte forecast area this season. However, we received reports of one avalanche involvement resulting in injuries. There were several other "near misses" reported or observed as well.

Avalanche accident on Schuylkill Ridge in Birthday Bowl area 2-19-2018.

2 skiers descended into the skier right side of Birthday Bowl. After a short first pitch, skier 1 was skiing to the right of the Birthday Bowl gully, while skier 2 was posted uphill of skier 1 watching from some distance below the ridge. Skier 1 heard skier 2 yell, saw snow moving around him, was caught in the slide briefly and pulled under the snow. After popping back to the surface he was able to exit and arrest by grabbing a tree, moving maybe 100′ downhill. Skier 1 sustained lower leg injuries and lost some gear. After calling 911 to initiate a rescue response

learned that skier 2 had already called 911. Relieved that his partner had called 911 too, skier 1 walked down the skier's right side of the path to the toe of the debris and found skier 2's partial burial site and tracks heading downhill.

When the avalanche released, skier 2 yelled to warn skier 1 but was pulled off his feet from his stationary position and carried downhill approximately 1000′ vertical feet in a very rough ride. He sustained substantial injuries along the way from impacts with trees. After coming to rest partially buried on the debris pile, skier 2 initially switched their transceiver to search and did not find a signal. He too contacted 911. Severely injured and without any information about the position of his partner yet, he then began to crawl downhill.

CB SAR rescuers contacted both parties a short distance downhill of the debris, and evacuated both parties for further medical care.

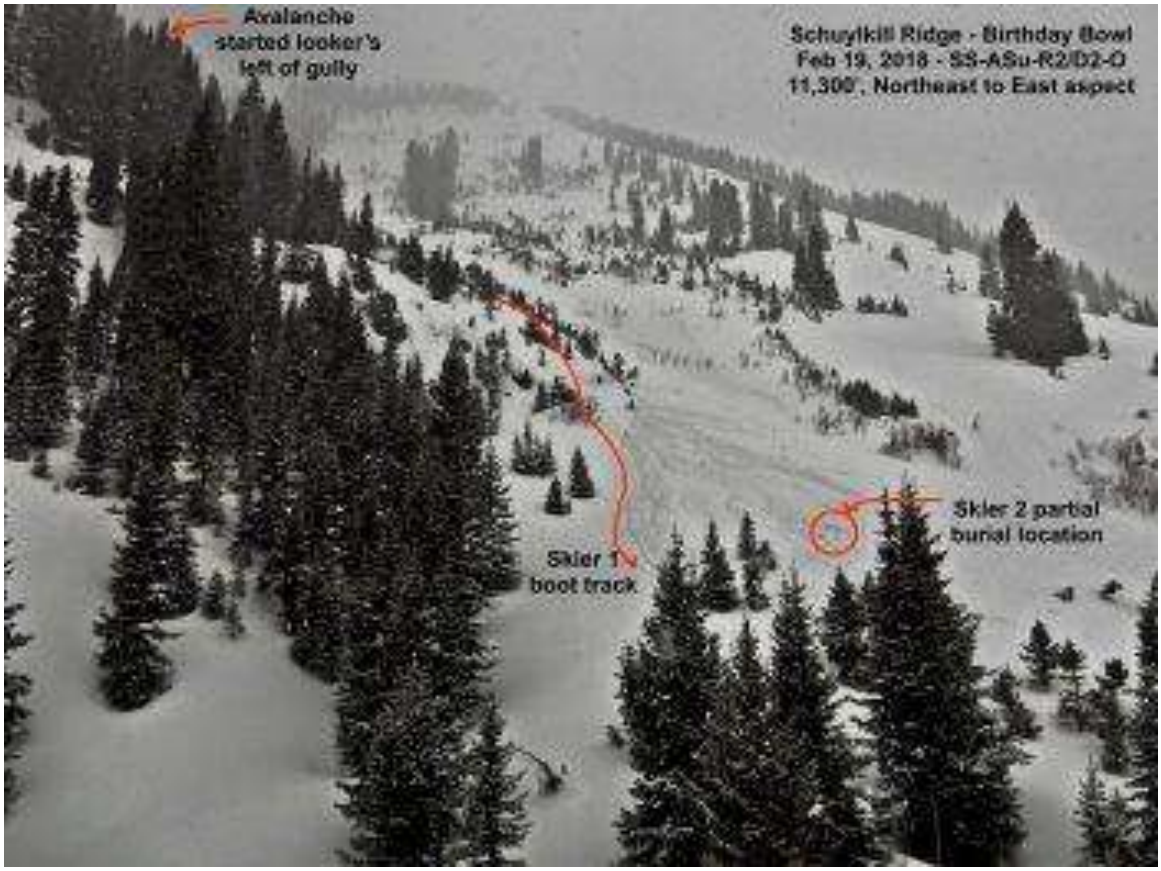

Figure 24, 25: 2/19/18. Photos from Schuylkill accident site. Apologies for poor photo quality, but all that was submitted to CBAC.

Mount Emmons, Red Lady skin track:

Examined the cornice triggered avalanche from yesterday's near miss. Party was very very lucky the outcome was not worse. Cornice broke large, and propagated a good chunk of extreme terrain, cliffs and trees and on apron, released 60cm slab failing below 4cm 1F+ windboard on small grained facets.
Also looked at large avalanche in Wolverine basin, propagating into treed terrain. (HS-N-R2D2.5-O). Impressive.

Weather: Mostly clear, light west winds above treeline. Temperatures remained cold above treeline, but low elevations did feel mild today.
Snowpack: Snow coveraged has increased from recent snow, but strong winds have kept above treeline slopes wind scoured. Residual windslabs from last 48-72hrs appeared to be healing, and generally unreactive in terrain travelled today. One profile in very weak spot in Red Lady Bowl revealed poor structure, and test columns failing on isolation twice (ECTV x2), and one ECTP16 SC. Two propagation saw tests on basal facets failed repeatedly at PST20/100end on November/early December depth hoar. zDug in very weak spot near cliffs with both crust facet combinations in midpack and 3-4mm DH near rocky ground HS 80cm. Did not dig in bowl proper, but would expect slightly better structure and depth.

Figure 25, 26: 2/17/18. Photos from Red Lady skin track involvement and near miss.

Media

The CBAC's website (www.cbavalanchecenter.org) is our primary tool for communicating information to the public. The website was completely redesigned 4 years ago. This season, our numbers did dip, largely due to the poor winter and general lack of snowfall. Our web traffic across our platforms is tied extremely closely to the winter weather the Gunnison Valley experiences. Our website had 43,949 views, averaging 2.20 seconds. The CBAC also sends a daily advisory email to a list of 430 subscribers. Furthermore, avalanche advisories are broadcast daily on two local radio stations, KAYV and KBUT and an abbreviated advisory is published on the local TV station, CBTV.

The CBAC continues to expand and improve upon its social media presence. The center uses Instagram and Facebook on a daily basis to reach a broader audience while providing visual media and dialogue to highlight current conditions. The CBAC also regularly produces YouTube videos to demonstrate avalanche concerns in the field. Our social media audiences continue to grow and mature: our Instagram followers, Facebook reach, and Youtube view-time all dipped in traffic due to last season but our engagement, and interaction per post does grow.

We plan to continue our avalanche-related social media products and look for new opportunities to expand and improve in this arena.

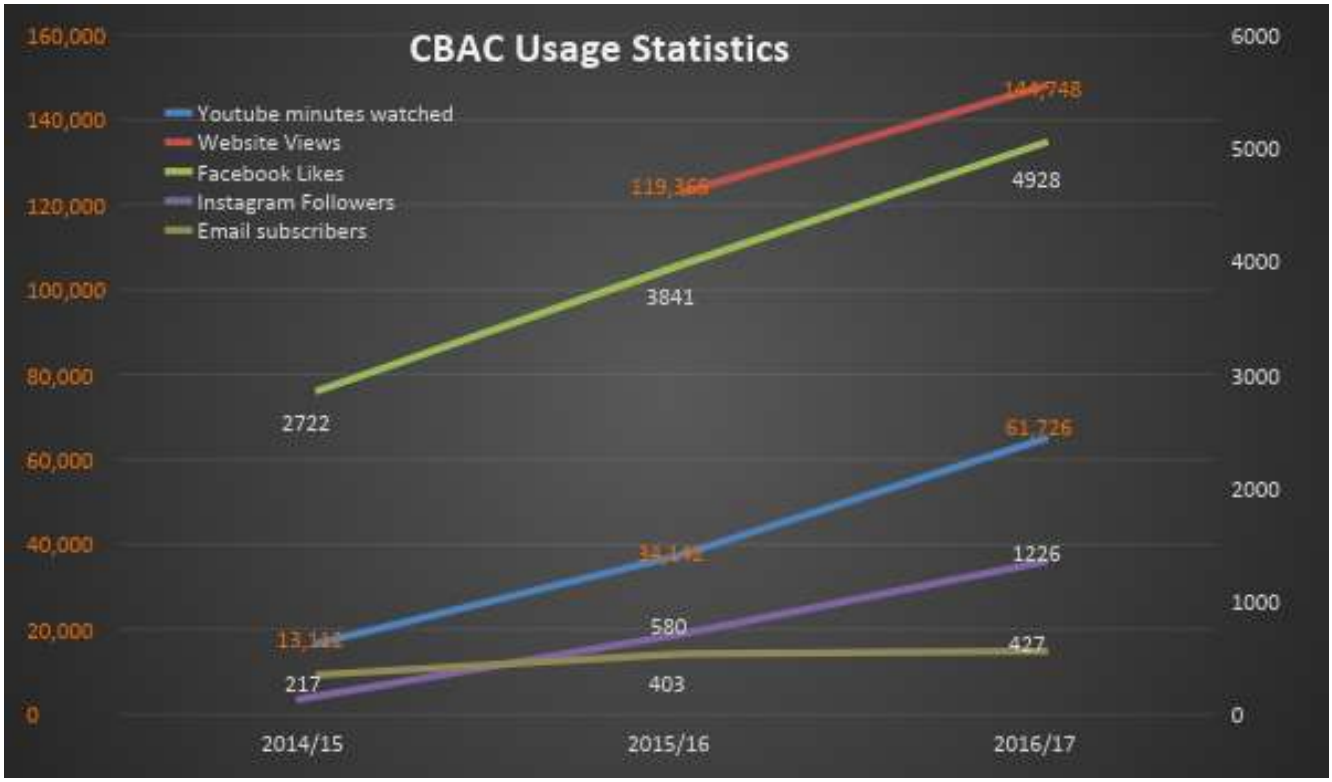

Figure 40: User statistics from the CBAC's various media outlets show strong growth in audience.

CBAC staff conducted over a dozen interviews throughout the season with local and regional media sources, including KBUT (example), the Crested Butte News (example, example), the Gunnison Country Times, and the Colorado Springs Gazette (example). Our content was also featured in state and national media sources, such as the Denver Post, Channel 9 News, Channel 7 News, Fox 31 News, Unofficial Networks (example), and more. Additionally, CBAC regularly publishes short backcountry-related articles to the Crested Butte News and to our avalanche center's blog, and we published several articles about this season's storm cycles and near misses to The Avalanche Review.

Observations

The CBAC relies heavily on field observations to improve the accuracy and content of our advisory products. Accordingly, our center has made a goal of expanding the frequency and geographic extent of professional fieldwork. This winter, the CBAC purchased a top of the line SkiDoo 850 164" powder snowmobile and enclosed trailer which we plan to "wrap" with a memorial to Brad, and advertise our sponsors. These assets were enabled by a generous donation from the Brad Sethness family.

CBAC staff published 130 observations from field visits this season. These written observations included 654 pieces of media, most commonly photos or videos of avalanche activity or snow. This is continues the growth of multi-media as that is the what is desired from our community. Anecdotal feedback from the backcountry user community showed that videos and photos are a welcomed and helpful means of communicating avalanche hazard. The CBAC also maintains and re-tooled our weather station near Elkton (The Dan K Weather Station) with over $3000 in improvements and conducts full snow profiles on a bi-monthly basis at our study plot near Snodgrass.

Figure 29: An example of media produced post field visit.

The CBAC relies heavily on public observations for additional field data. Given our expansive geographic forecast area and limited resources, crowd-sourced information helps us improve advisory accuracy and provides an additional resource for backcountry users. The Gunnison Valley community continues to impress us with a steady flow of observations relating to snow, weather, and avalanches. We published 147 observations that came from sources outside of the CBAC, and these were of tremendous value to our products. Simply put, we couldn't produce our quality of forecasts without your contributions. Thank you for your observations!

We'd also like to acknowledge several professional operations for their continual data sharing. Irwin Guides sends us daily observations from their cat ski operation, and Irwin's backcountry guides share their field observations with the CBAC on a regular basis. billy barr in Gothic maintains meticulous weather records and makes a special and timely effort to email us weather and avalanche data during storm cycles. The Crested Butte Ski Patrol also made a large impact this season with increased information sharing to our avalanche center from very pertinent northerly facing avalanche mitigation routes in previously unopened terrain.

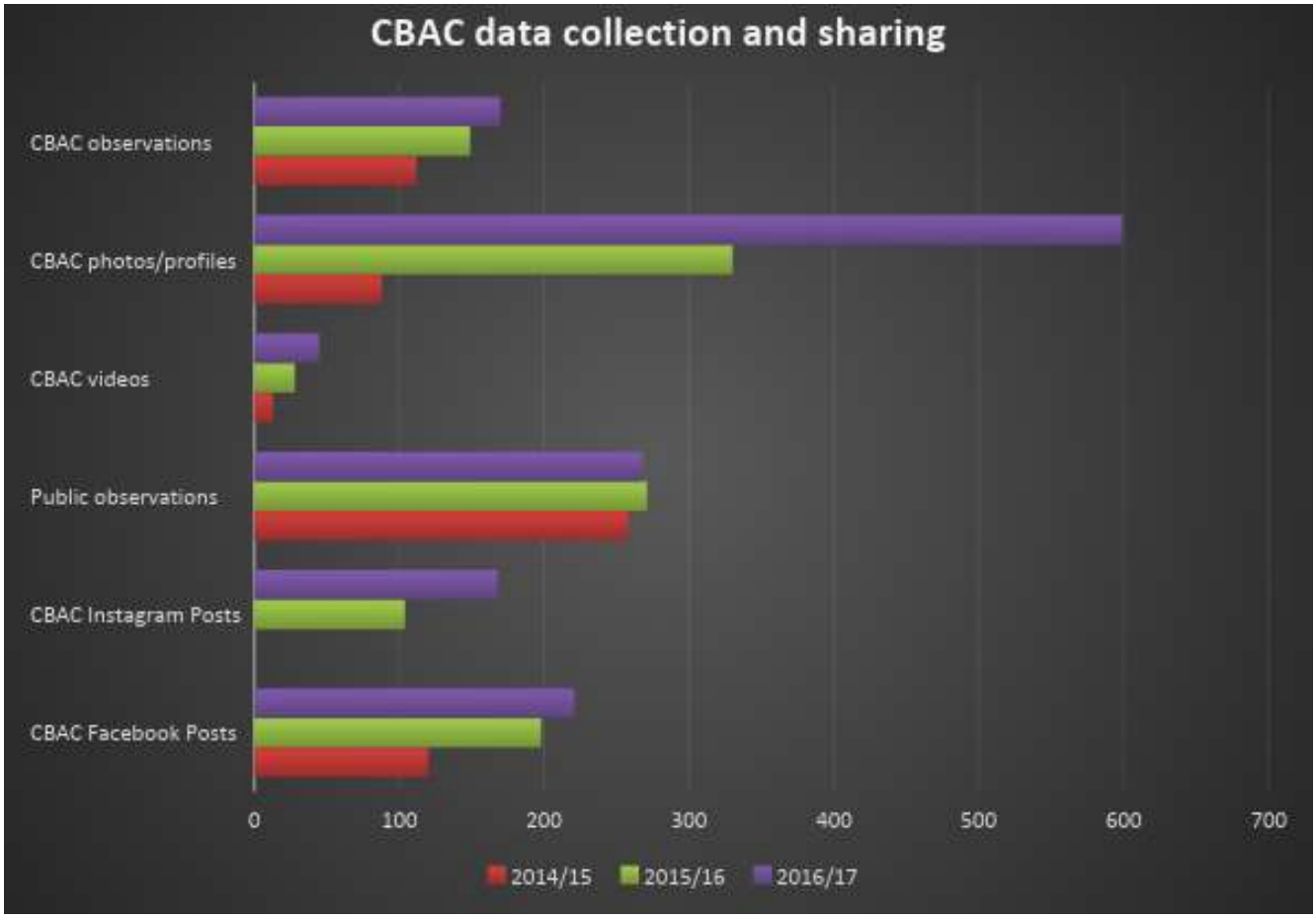

Figure 42: CBAC data collection and sharing has increased substantially over the past few years, thanks to more paid field time, a better website, and a concerted effort to improve our media presence.

Outreach and Events

The CBAC hosted two major educational events this year: Avalanche Awareness Night and Beacon Brush-up. Both events saw their largest turnouts yet and were brimming at capacity. Awareness Night featured avalanche-related presentations from Billy Rankin, Ben Pritchett, Randy Felix, Sean Crossen, Andy Sovick, and Ian Havlick. These can be viewed on our YouTube channel. We estimate 450 people attended this year's event. Beacon Brush-up provided a day-long venue for rescue training and practice scenarios for enthusiasts of all ages and abilities (Figure 44). We had an overwhelming public response with an estimated 150 attendees this year. These outreach events would not be possible without the many volunteer hours as well as financial and in-kind support, including sponsorship from Black Ties Ski Rentals and Irwin Guides.

Figure 43: A full house at this year's Avalanche Awareness Night.

CBAC staff gave 14 presentations at various educational programs this year, including the International Snow Science Workshop, WSCU's Avalanche Awareness Night, Know Before You Go, the Gallatin Pro Development Seminar, and the Backcountry Film Fest.

Figure 44: Students participating in a rescue scenario at the Beacon Brushup.

The CBAC also hosted two other fundraising events: The Al Johnson Race and the GoDeeper Beer Tasting. These were both successful and fun ways to increase community support and awareness for the CBAC.

Finances

As a 501c3 non-profit organization, the CBAC operates on a fiscally streamlined budget to provide a valuable community resource while working under limited financial resources. The majority of our income comes from individual and business donations and our fundraising events. We exceeded our fundraising goals this season and are grateful for the community's continued support. Thank you! The CBAC continues to operate on a small and sustainable budget, largely centered on staff and operating expenses.

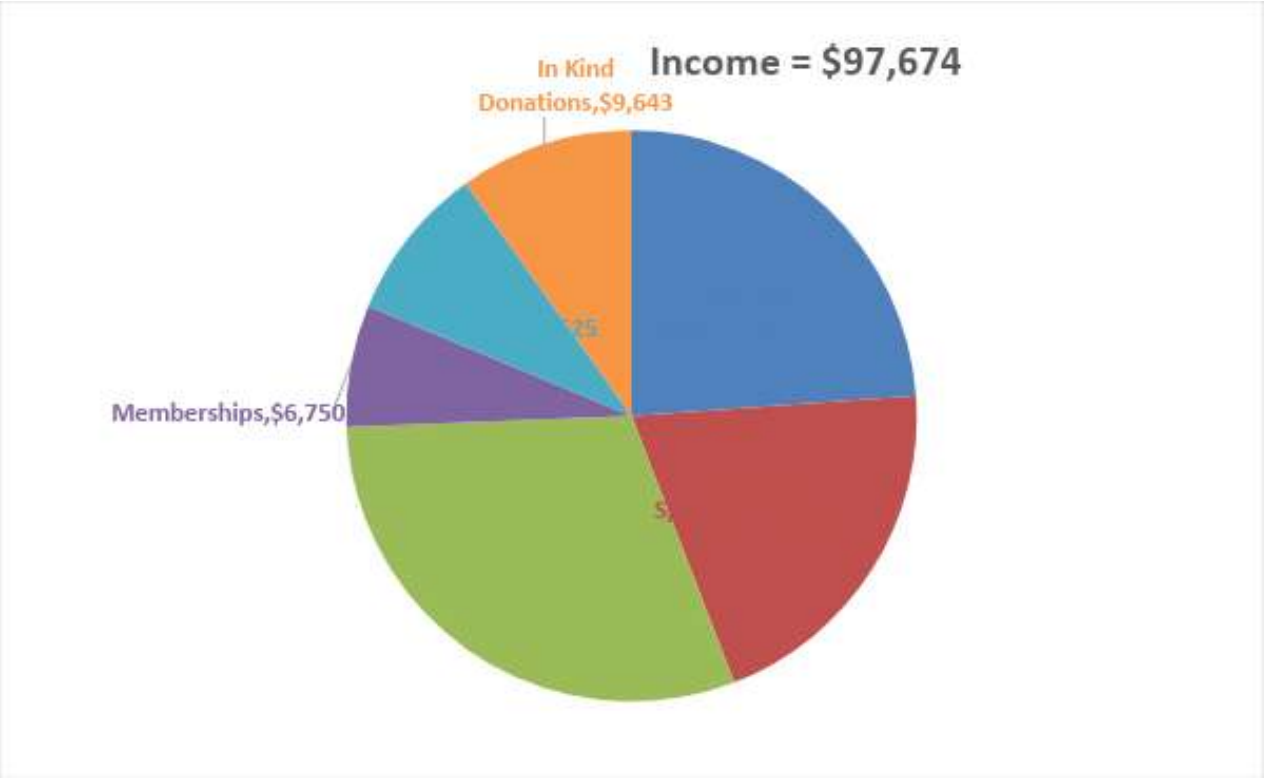

Figure 45: CBAC income for the 2016-2017 fiscal year.

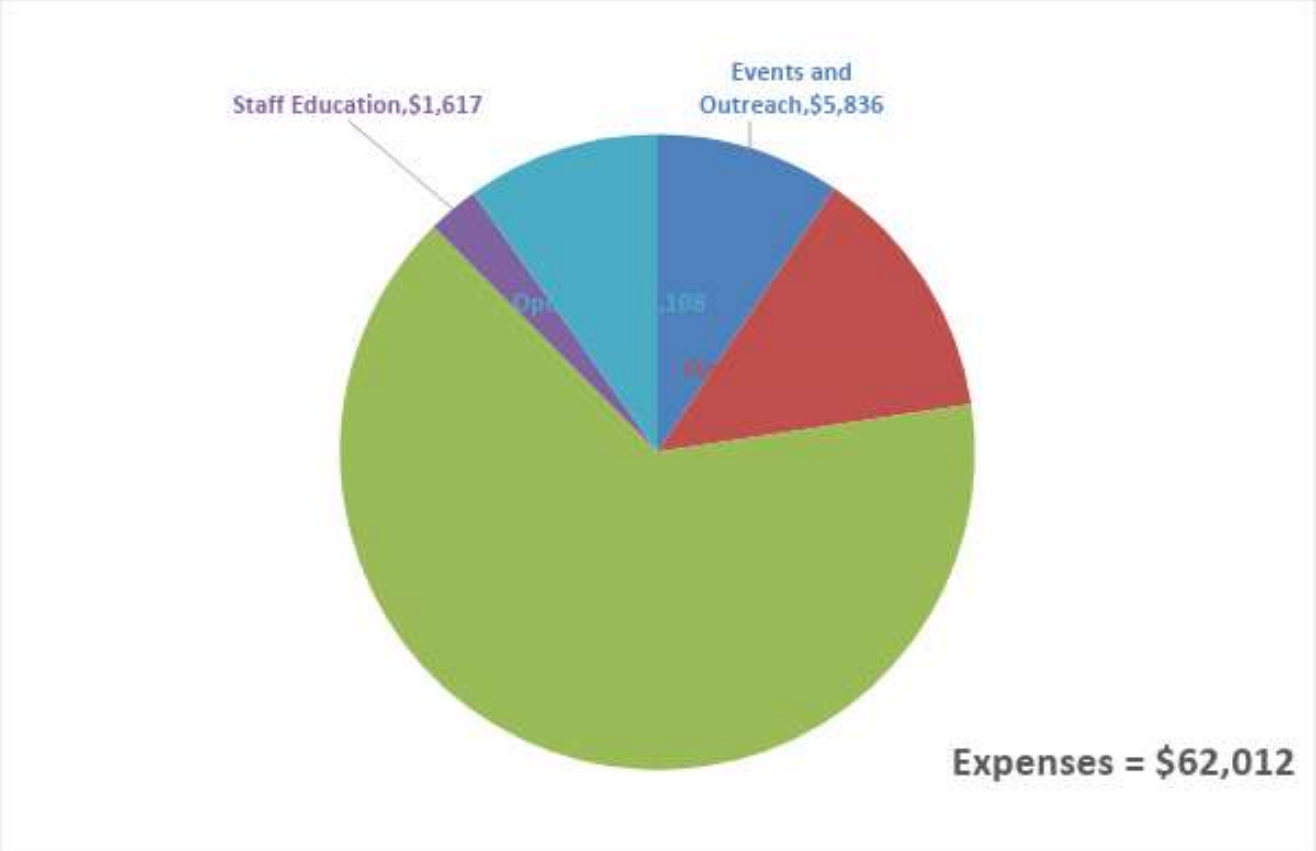

Figure 46: CBAC expenses for the 2016-2017 fiscal year.

Partners and Sponsors:

The CBAC strengthened existing partnerships and forged new ones this season. We would like to extend a sincere thank you to all of our partners and sponsors who help contribute to the quality of our product.

The CBAC has a valuable partnership with the Colorado Avalanche Information Center (CAIC) under the common goal of working cooperatively to promote avalanche safety. Both centers share weather, snowpack, and avalanche data, engage in daily meetings and consultations on data collection, the forecast process, and product delivery, and collaborate on accident investigations. The CBAC provides local avalanche specialists to collect, analyze, and log data into a statewide database, and the CAIC offers in-kind support including weather and forecasting tools, database management, and web support. By working together, our two forecast centers are able to provide high quality local and statewide forecast products, and we look forward to future collaborations.

Irwin Guides continues to be a major resource and valuable partner for CBAC operations. Their snow safety team shares daily snowpack, weather, and avalanche information from their cat ski tenure on a daily basis as well as observations of the surrounding backcountry along the Kebler Pass corridor. Irwin also provides remote data access to their Scarp Ridge wind station and Lake Irwin snow study plot. Their backcountry guides submit post-trip field observations to the CBAC as well, another tremendous resource. Irwin also provides financial support, training opportunities, and professional correspondence to the CBAC.

CBAC's media partners are an asset in circulating our avalanche information to the public. The KAYV broadcasts our advisories several times per day, KBUT plays our advisory every morning at 8:00 a.m., and CBTV relays our

avalanche danger rating across the TV screen while providing technical support for our YouTube videos. The Crested Butte News provides print space for our "Backcountry Notes" section in the newspaper.

We rely on the resources of several government agencies for our daily operations. The National Weather Service in Grand Junction provides weather products and resources while relaying avalanche watches and warnings. The National Resources Conservation Service (NRCS) maintains several SNOTEL weather stations (including Schofield Pass, Butte, Upper Taylor, and Park Cone), which are vital to our daily operations.

The CBAC would not be able to operate without the many businesses and donors that contribute financial resources. We would like to thank everyone who contributed through membership purchases and private donations, and want to acknowledge the donations this season made in memory of Brad Sethness, Dan Krajewski, and Kyle Mattingly. We also want to give a special thanks to the Budd Family, the Dugenskes, the Community Foundation of the Gunnison Valley, the Jean Thomas Lambert Foundation, Western State Colorado University, and the Town of Crested Butte for their generous donations or grants.

CBAC's business sponsors are a huge asset to our operation. Thank you to these businesses and to the many companies that donated in-kind goods or services for our events.

Whiteroom Sponsors
Journey's End Development, Irwin Guides, Black Diamond
Event Title Sponsors
Kooler Painting & Doors, Irwin Guides, Brick Oven, In Memory of Dan K
Waist Deep Sponsors
Skyhigh Offroad, KNS Reps, Avery Brewing, Black Tie Ski Rental, Griggs Orthopedic, Powder Hound Marketing, The Alpineer, Crested Butte Mountain Resort
Knee Deep Sponsors
BCA, Last Steep, CB Builders, Dragon Sheet Metal, Elk Mountain Lodge, Huckstep Law, Alpha Theory, Beckwith Builders/Brickworks, Brick Oven Pizza, CORE, Precise Painting, Romp Skis, Terrain Atlas
Boot Top Sponsors
Michael Vaughn Law, Colorado Adventure Rental, Teo Tamale, Shades of Crested Butte, Resource Engineering Group, Mikey's Pizza, Ibar Ranch, International Mountain Adventures, Eagle Sales of Crested Butte, Crested Butte News, Backountry Cannabis Club, Altitude Auto, Non-Native, Old Town Inn, Pat's Screen Printing, Ginger Cafe, CB Publishing & Creative, Summit Construction, Crested Butte Bank, Avalanche Bar and Grill, Alpine Acupuncture, Colorado Adventure Rentals, Mountain Spirits Liquor, Beth Appleton Law, Crested Butte Professional Ski Patrol Association, Colorado Structural, The Bean Coffeehouse, Mammut, Hammertime Construction, Alpine Acupuncture, High Alpine Brewing Co.

Thank you to the many partners and sponsors this year who support our mission to save lives and promote avalanche safety in the Gunnison Valley.

Volunteers

The CBAC relies on volunteer work to succeed in our mission. This season, we estimate approximately 1,200 hours were volunteered to the center. These hours were generally split three ways between event/fundraising efforts, field assistants, and work produced by our intern. A special thanks is in order for Than Acuff, who donates a huge amount of time to keep the fundraising wheels turning, Eric Murrow, our intern, and the entire board of directors for their time and energy. Thank you to everyone who volunteered this season.

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The Future of the CBAC

The CBAC is dedicated towards its mission to prevent the loss of life, limb and property to natural and triggered avalanches in Crested Butte, Mt Crested Butte and the surrounding backcountry. We have met many of our short-term goals in the past few years but we will continue to strive for excellence going into the future. The CBAC has developed a strategic 3 to 5 year plan based on the following goals:

Goal #1: Improve the quality and accuracy of our public safety products and advisories

- Infrastructure and Equipment: Purchase and maintain necessary field and forecasting equipment to allow for accurate, efficient, and/or more effective weather and avalanche forecasting. This includes snowmobiles, field safety gear, weather stations, and website.
- Research and development: Designate and ration a portion of the operating budget and shoulder season for the design and development of research to improve forecast accuracy and quality.
- Education and training: Continue to fund educational and training opportunities for CBAC forecasting staff, including ISSW, regional workshops, and forecaster exchange programs.
- Professional partnerships: Maintain and develop professional partnerships with local, regional, and national avalanche centers or snow safety programs. Goals include improved data and resource sharing with the CAIC and local ski/guiding operations, and collaboration with the National Avalanche Center to meet the standards of Type 1 Avalanche Centers.
- Staffing Needs: Meet the staffing needs for a 7-day week avalanche center by moving towards more full-time forecast positions
- Safety and sustainability of staff: Develop improved fieldwork protocols and supply personal protection equipment for staff to meet or exceed the safety standards of other full-time snow safety operations. Increase staff compensation and benefits to develop a more sustainable and competitive career opportunity for forecasters.

Goal #2: Increase our outreach and education to a broader audience

- Outreach and Education Opportunities: Designing and expanding community outreach and education opportunities to increase public reach. Free or affordable awareness classes to K-12 and WSCU students and educational programs for visitors or uneducated demographics.
- Diversify, Expand, and Improve Platforms: Goals include adapting to evolving social media to “stay with the times” and continued improvements in social media platforms.
- Resource allocation: Committing funding and staff hours towards research, development, and implementation of outreach and education improvements.

Goal #3: Develop a more sustainable and larger income to increase our operational budget.

- Staffing needs: Increasing the involvement of the development director to accommodate growth as necessary
- Donors: Increasing and diversifying the demographics of private donors through increased networking and outreach, new events catering to targeted donors, and life insurance and endowment designations
- Corporate Sponsors: Increasing donations from outdoor industry companies outside of the Gunnison Valley through networking and solicitation.
- Grant and foundation income: Researching and applying to larger regional or national grant opportunities while improving the internal non-profit structure, financials, and documentation of the CBAC.

Any questions regarding this report or the Crested Butte Avalanche Center can be directed to Than Acuff, 970.275.5761 or than@crestedbuttenews.com.