

# Sawtooth Avalanche Center

## 2019-2020 Annual Report



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Cover Photo: B. VandenBos

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# ACKNOWLEDGMENTS

The Avalanche Center could not operate in its current capacity without the generous support of our community. Thanks to all the kind souls who accompanied us in the field and/or provided us with critical information about what they were seeing during their rides and tours. The following individuals were regular contributors or field partners: Matt Wieland, Terry O'Connor, Will Richmond, Ed Binnie, Brad Hatch, Josh Johnson, Evan Telford, Jeremy Lato, Parker Morris and Nate Scales.

We'd like to extend a special thanks to Kurt Nelson, Zach Poff, Susan James, Steve Frost, and Sarah Stalker. These USFS staff went above and beyond the call of duty to support the Avalanche Center.

Local ski guides and snow safety workers contributed 251 observations to our professional observations database. We owe a huge thank you to the guides at Sawtooth Mountain Guides, Sun Valley Heli Ski, Sun Valley Guides, Avalanche Science, Sun Valley Trekking, and Soldier Mountain Cat Skiing as well as the ski patrols at Sun Valley and Soldier Mountain.

We receive about half of our operating revenue from the Friends of the SAC. This group of amazing, dedicated volunteers raises money through sponsorships, donations, and events.



**Figure 1:** Sawtooth Mountains.



## FROM THE DIRECTOR

As we grow “wiser”, our remaining hair greys, “fitness” becomes relative, and the winters can blend together. Personally, I vividly remember a handful of the past 30 winters:



- The huge “Ninety Sick Ninety Heaven” 1996-97 season
- An amazing 2004 Big Sky, MT avalanche cycle
- A scary Big Sky post-control release in Dec 2007, and 14 knee surgeries soon after
- The 2012 “December to Remember” at Baldy during my first winter in Idaho
- The 2013-14 deep slab avalanche cycle and Frenchman Ck accident—both a tragedy and incredible survival story

While many winters get lost in the shuffle, the remarkable ones stand out. I’ll never forget any of the last three winters, and each one outdid the last (from this snow & avalanche geek’s perspective). While 2017-18’s lack of snow followed by a March rain-driven avalanche cycle near Ketchum and 2018-19’s unforgettable snowfall and avalanches were remarkable, this past season took the cake.

Hosting our Scandinavian intern Martin, adding a fourth forecasting position to almost double our forecast coverage area, and launching a new website platform were each significant fall milestones. The January storm and deep slab avalanche cycle that tragically ended with a fatality and the February “swimming in the Sahara” drought will be forever etched into my memory. And then March came, bringing the COVID-19 pandemic and a large earthquake during HIGH danger at the tail end of a major storm.

The SAC’s team atmosphere shines through in challenging winters like this year’s. Ethan, Chris, Ben, and Martin handled whatever was thrown at them and excelled. A huge thanks to them, and the Friends’ Board and Staff—Executive Director Steph Eisenbarth, Education Coordinator Stacey Ward, and Media Coordinator Amy David—for “kicking butt and taking names.” I’d also like to thank all of the individuals, businesses, and agencies that help the avalanche center provide valuable public safety information. All of you make the avalanche center the awesome community resource that it is. Happy turns and adventures to all this spring and summer, be it on snow, dirt, water, rock, or whatever strikes your fancy.

Sincerely,

*Scott Savage*

Director, Sawtooth Avalanche Center

# FORECAST SPONSORS



# PROFESSIONAL/AGENCY PARTNERS



# SIGNIFICANT ADDITIONAL SUPPORT



Rebecca Wilkinson and the Marshall Frankel Foundation

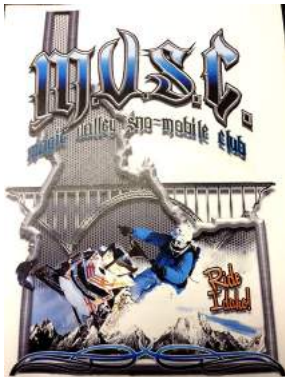


**The Elephant's Perch**  
208 East Ave, Ketchum ID 208-726-3497

**SMITH**

THE WATTIS DUMKE FOUNDATION

Nicholas Martin Jr Family Foundation



Crazy Karl Fostvedt



T/W JGS Family Trust as recommended by Nick and Hanna Thomson



Mike Hattrup





# STAFF

The Sawtooth Avalanche Center employed four full-time, seasonal employees during the winter season:



### **Avalanche Center Director: Permanent Seasonal Position**

Scott Savage returned for his eighth season at the avalanche center and sixth year as the Director. Prior to coming to the Sawtooth in 2012, Scott spent the better part of two decades as an avalanche forecaster and snow safety director at Big Sky Resort in Montana. He has frequently contributed articles to *The Avalanche Review*, written columns for regional and national newspapers and publications, and presented at international conferences and regional professional development seminars. Currently, Scott is a National Avalanche School instructor, President of Avalanche Worker Safety, and serves on the Advisory Board of the American Avalanche Association. He considers each day that he learns more than he forgets—as well as any day in the mountains, on rivers, or on rocks—to be a success.



### **Lead Forecaster – Avalanche Specialist: Permanent Seasonal Position**

Ethan’s interest in snow started at Anthony Lakes, a mom-and-pop ski hill in rural Eastern Oregon. He attended the University of Idaho, where he earned his Bachelor of Science in Geography and a minor in Mathematics. Following an interest in winter storms, he earned his Master's degree in Meteorology from Pennsylvania State University. After three years in a dark lab growing ice crystals, Ethan returned to the light as an avalanche forecaster in Alaska and Colorado before making his way home to Idaho. When not in the snow, you can find him with his family—hunting, hiking, or tying-in to climb at a local crag.



### **Forecaster – Avalanche Specialist: Permanent Seasonal Position**

Chris worked at Sawtooth Avalanche Center from 2004-2012, including two years as the Director. He left to pursue other interests in the snow and avalanche field but gravitated back to the SAC in 2018. Chris earned his Master’s degree from Montana State University-Bozeman with a focus in snow and avalanche science and presented his research at three International Snow Science Workshops. Over the years, his interests have shifted from pure snow science to the far more complex field of human psychology and decision-making. He has worked in many aspects of the avalanche industry over the past 20 years, including stints as a researcher, ski patroller, educator, ski guide, web developer, and forecaster. Chris lives in Stanley and enjoys mountain travel in all of its forms.



### **Forecaster – Avalanche Specialist: Seasonal Position**

After a youthful dalliance with the world of riding lifts at Bridger Bowl, Ben opened his eyes and embraced the rest of the mountains that surrounded his hometown of Bozeman, Montana. He earned a Bachelor’s of Science in Geology at the University of Montana in Missoula, where he also developed the masochism required for long approaches to questionable skiing and climbing while exploring the Bitterroot Range. In the following years, supported by off-season work as a geologist, Ben focused on the study of mountains and snow. When he’s not searching out first descents, he reads, picks up rocks, skis, climbs, and drinks a whole lot of coffee. If you see him, be prepared to discuss anything from stellar dendrites to the Paleogene trans-Challis dike swarm.



### **Volunteer Avalanche Specialist**

Martin Stefan joined our team this season as a Volunteer Avalanche Specialist. The Friends of the SAC supported Martin, a Norwegian resident and PhD Physicist, for his four month stay as part of the USFS International Visitors program. Martin contributed nearly 60 snowpack observations and issued two Daily Avalanche Forecasts. He was a great field partner and valuable addition to our team. We wish him the best of luck in all his future endeavors.

## **OPERATIONS**

Late October and early November were spent maintaining and improving weather stations, teaching professional avalanche classes, presenting at regional snow and avalanche events, preparing education materials, dialing in the snowmobiles, installing the beacon park, ironing out last minute details on our new website, and watching the early season snowfall turn to facets. We issued our first of ten early-season General Snow and Avalanche updates on October 18th and transitioned to Daily Avalanche Forecasts on December 13th.

The SAC fielded a full roster of returning staff members including Scott as Director and Ethan, Chris, and Ben as Forecasters. In December, Martin Stefan—a Swedish national living in northern Norway—joined the team as a Volunteer Avalanche Specialist. Our crew of 5 was the largest in SAC history, contributing to the jump in observations, photos, and video content.

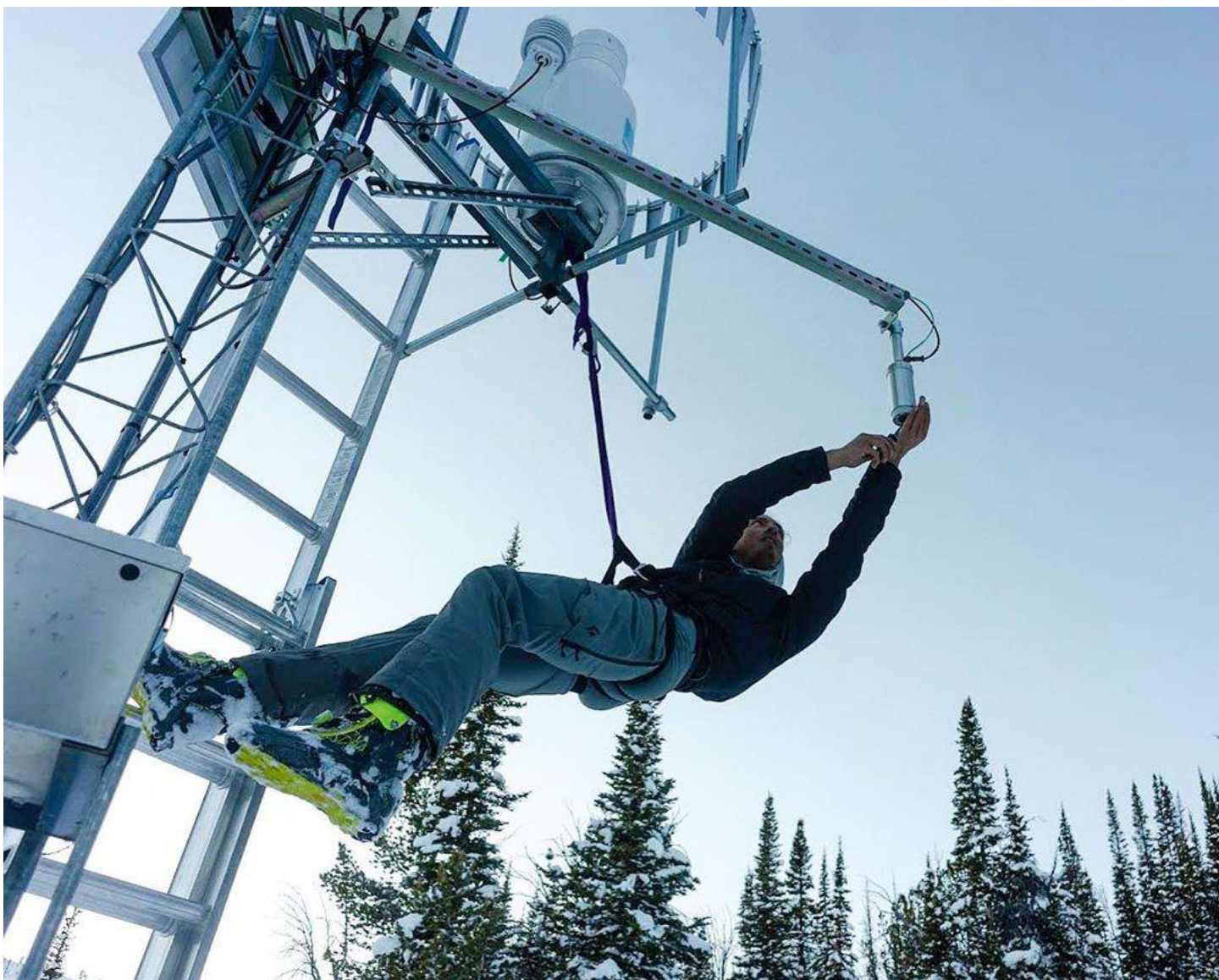
The SAC aims to have at least one forecaster in the field every day of the week. This season, we logged 250 field days for an average of two forecasters per day. Of these field days, 88% involved time on skis, and 20% included snowmobiles. We received 226 observations from the public, and approximately 23% of these were



from motorized users (up from 17% the year before). Local ski guides, snow safety workers, and USFS staff contributed 251 observations to our professional observations database. We owe a huge thank you to the guides at Sawtooth Mountain Guides, Sun Valley Heli Ski, Sun Valley Guides, Avalanche Science, Sun Valley Trekking, and Soldier Mountain Cat Skiing as well as the ski patrols at Sun Valley and Soldier Mountain.

SAC Forecasts and fieldwork continued with some field procedure modifications during the COVID-19 outbreak. We followed best practices of social distancing and were able to complete the season as planned, albeit shorthanded. Unfortunately, uncertain travel restrictions forced Martin to return home to Norway soon after issuing his first forecasts, over a month earlier than expected.

The pandemic disrupted all aspects of daily life. Ski resorts closed, and isolation orders were issued. It taxed our healthcare system and continues to strain the resilience of the area’s tourist based economy. As folks flocked to find solace in the mountains, SAC Daily Avalanche Forecasts, weather forecasts, and safety information were more valuable than ever.



**Figure 2:** Ben repairing a snow sensor on the Lower Titus weather station near Galena Summit.

## SEASON HIGHLIGHTS

- Our first General Snow and Weather Information product was issued on October 18th. Daily Avalanche Forecasts started on December 13th and continued through April 12th. In total, we produced 122 Daily Avalanche Forecasts in addition to 13 General Snow and Weather Information updates.
- Our forecasts received over 271,000 views via the web and email subscriptions.
- One skier and four snowmobilers were caught in avalanches.



**Figure 3:** Snowmobile tracks leading into the crown of an avalanche. This hard slab avalanche was triggered on a wind-loaded, east-facing slope in the Soldier Mountains. Fortunately, the rider escaped the slide. Photo: M. Westerdoll.

- We issued 3 AVALANCHE WARNINGS and 10 days of HIGH avalanche danger (compared to 8 AVALANCHE WARNINGS and 20 days of HIGH danger last year).
- We secured funding to make the 4th, part-time Forecaster a full-time position for the 2019-20 season.
- Working with the USFS International Visitors Program, we were able to learn from and mentor Volunteer Avalanche Specialist Martin Stefan from Norway.
- Of our 250 days in the field, we used skis 88% of the time and snowmobiles 20% of the time.
- In February, the Soldier & Wood River Valley Zone picked up a meager 1-4" of snow. For the entire month. Remote weather stations in this zone recorded just 4-14% of normal precipitation, the lowest values observed since these stations were established 40 years ago.
- There were 7 human-triggered avalanches in a 9-day stretch in late March and early April. Most of these were remotely-triggered from flatter terrain.
- Local professional groups contributed 250 observations, and the public sent us over 220 observations –



thanks! These observations are the equivalent of employing several additional avalanche forecasters, something we can't afford.

- SAC forecasters gave 32 interviews to local, regional, and national media outlets, a 24% increase over the recent average.
- Volunteers worked over 450 hours on Friends' of the SAC fundraising events and over 4,000 hours in the field.



**Figure 4:** An enthusiastic young ripper at one of the many community events hosted by the Friends.

- SAC and the Friends of the SAC gave 58 educational presentations to recreational and professional audiences. Our educational programs reached over 3,000 individuals this season.
- SAC forecasters and Friends of the SAC instructors presented avalanche education to over 600 motorized users across central and southern Idaho.
- SAC staff is leading an effort that includes Boise State University and Montana State University professors and graduate students to characterize and analyze the avalanche activity associated with the March 31, 2020 earthquake near Banner Summit.

- SAC staff is working with a Simon Fraser University professor and his graduate students to gain a better understanding of how users comprehend and integrate avalanche risk messaging and ultimately improve our products.

- SAC staff wrote pieces for or was featured in Powder Magazine online, WildSnow, The Avalanche Review, Powdercloud.com, and many local and regional publications. Staff appeared on Boise and Twin Falls television stations on several occasions.
- SAC staff collaborated with the USFS Utah Avalanche Center to produce an accident report on a fatality that occurred in sidecountry terrain adjacent to the Pebble Creek Ski Area in southern Idaho, an area not covered by any USFS avalanche center.
- The Friends hosted the third annual Homegrown Film Festival to a packed and enthusiastic audience in Ketchum. The films featured local filmmakers and athletes along with a healthy dose of stunning Idaho scenery.
- The Friends of the SAC provided nearly 50% of our operating costs. The avalanche center would not exist in its current state without the Friends!
- The US Forest Service increased funding levels for the SAC despite a difficult federal budget environment. The avalanche center is fortunate the USFS, and the Sawtooth NF and USFS Region 4 specifically, continue demonstrating a commitment to providing quality avalanche information and education.



# ACCOMPLISHMENTS

## Digging Deeper

It was a big sophomore season for Digging Deeper as the discussion series returned to wide acclaim. Due to popular demand, we expanded our venues to include locations in Stanley, Fairfield, and Boise. When COVID-19 threatened to cancel our final two events, we quickly pivoted to offer presentations as online streaming video via Facebook Live. We experimented with moderated discussions and even hosted a special session to include a traveling scholar.

Talks were aimed at intermediate to advanced backcountry users looking to add some tricks and knowledge to their playbooks. We discussed a wide range of topics including: spring skiing, weather phenomena, near misses, decision-making and spatial variability. This series proved to be very popular again this year with a total of 569 people attending live events and thousands viewing the online videos.

## Motorized Outreach

In Idaho, 20 of the last 21 backcountry avalanche fatalities were snowmobilers or snowbikers. Two snowmobilers died in avalanches in Idaho this season, including one in the Baker Creek drainage just north of Ketchum. Facilitating motorized avalanche education remains a top SAC priority. SAC forecasters and Friends of the SAC instructors reached over 600 motorized users this season through the Motorized Level 1 course, various speaking opportunities, and snowmobile club meetings.

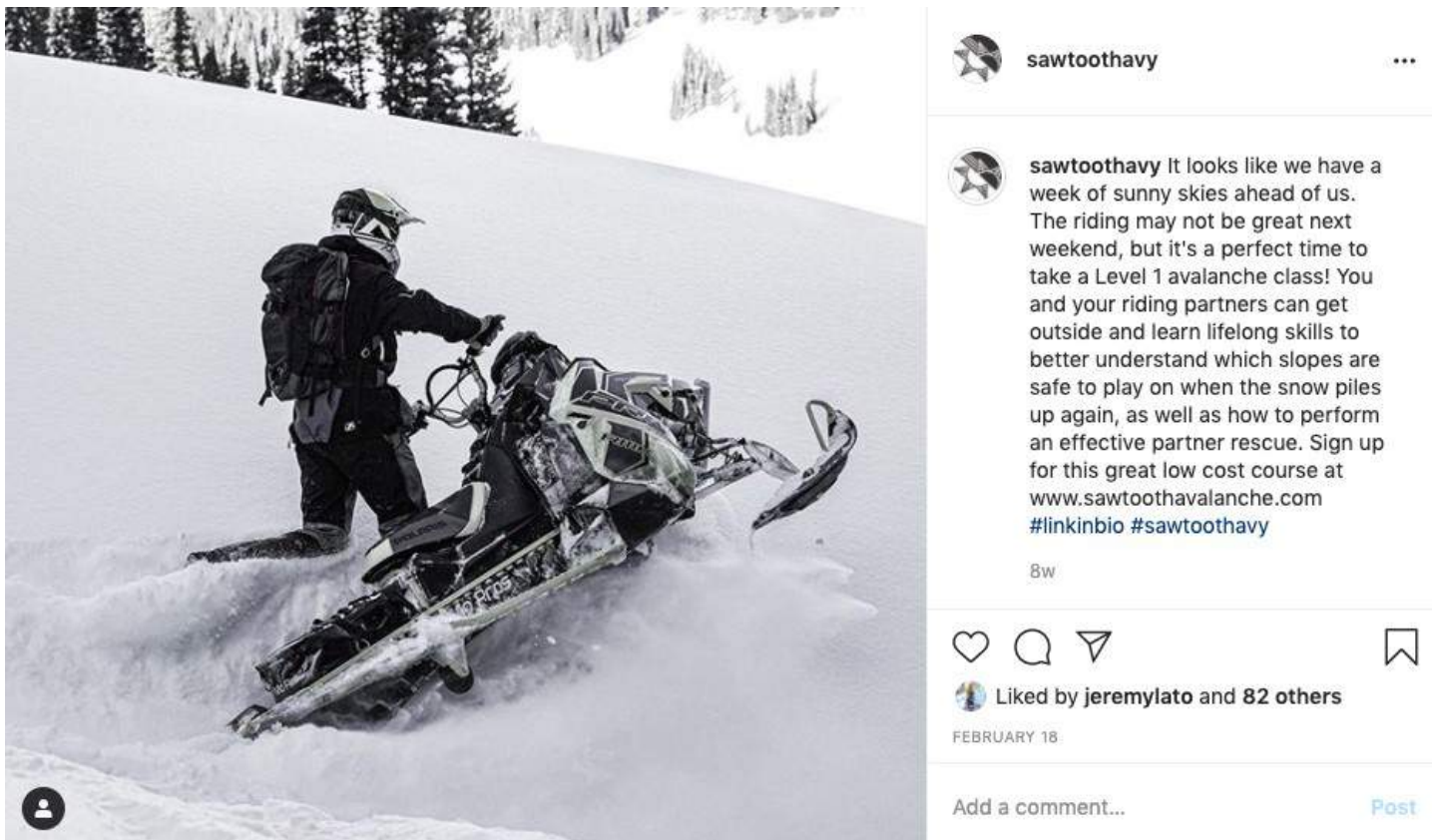
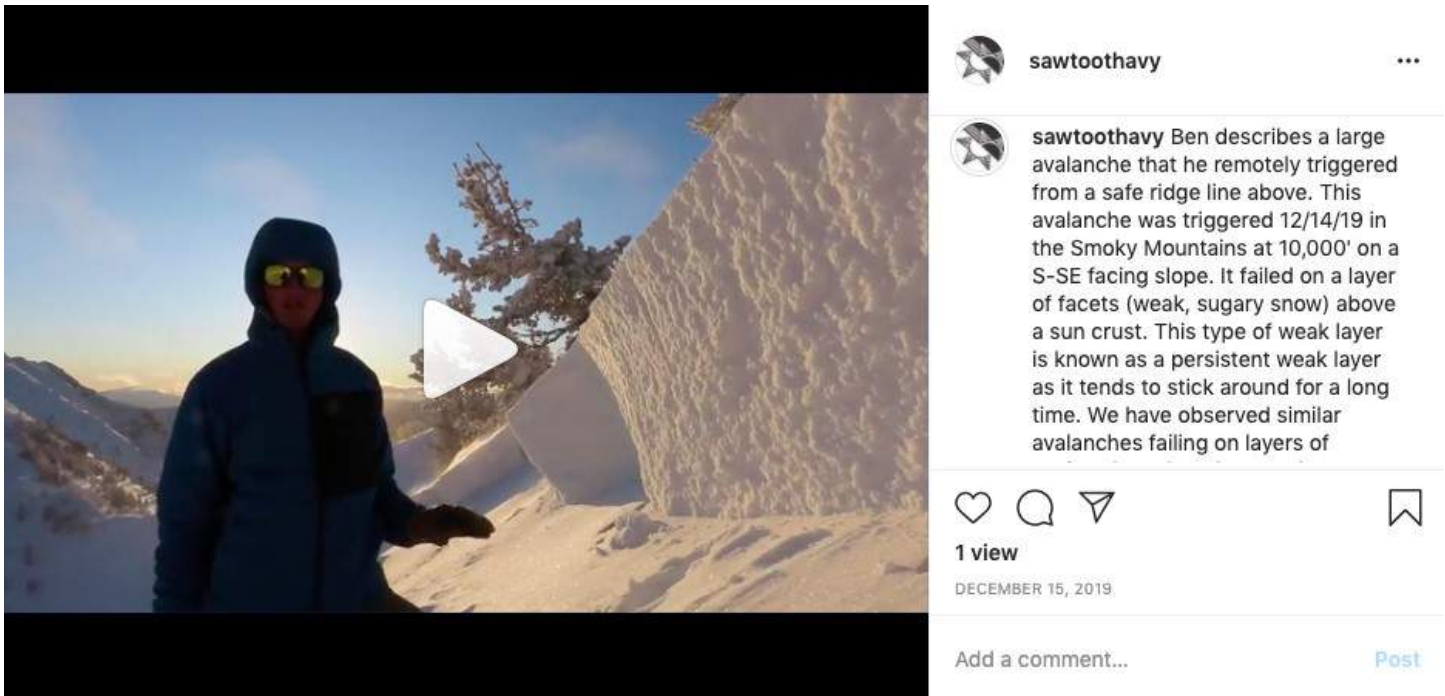


Figure 5: The SAC continues to offer low cost motorized avalanche education through our annual Level 1 avalanche class.

## InstaBOOM

Instagram is the Friends' and SAC's fastest growing social media platform. The @sawtoothavy handle added over 1,700 followers this season, the largest single season jump of any social media platform. Videos on Instagram were viewed over 38,000 times, more than the total views of Facebook and YouTube combined. This is particularly impressive when considering that videos embedded in the Daily Avalanche Forecast are linked to YouTube.



**Figure 6:** We doubled our video tally this season focusing on timely and succinct snowpack and avalanche observations.

## Conditions Blog and Weekend Update

Having trouble remembering when the last avalanche cycle was or when that pesky surface hoar was buried? The SAC's Conditions Blog is here to help. This semi-regular product returned for the 2019-20 season, summarizing avalanche cycles, human-triggered avalanches, and major weather patterns. Updates were announced via the website, email, and social media, receiving overwhelming use and support.

To compliment the Conditions Blog, we introduced the Weekend Update. Weekend Update videos offered a quick review of snow conditions and touched on what we might expect given the weather forecast headed into a weekend. Beginner to advanced recreationalists, snow professionals, and visiting skiers all benefited from these simple, concise products to catch up on snow conditions across the forecast area.

## Forecast Editing

SAC forecasters strive to provide clear, concise forecasts packed with actionable information to help keep you safe in the backcountry. Emily Wolfe, a freelance writer and Editor emeritus of both Mountain Outlaw magazine and the Explore Big Sky newspaper, returned to edit and discuss our writing. Emily, who lives in Bozeman, brings fresh eyes, insight, and new ideas to the way we communicate avalanche danger and offer travel advice. Our products continue to improve because of her skills and efforts.

## Forecast Reassessment

Following each Daily Avalanche Forecast, SAC forecasters reassessed the previous day's danger ratings. We took on this project to achieve the following goals:

1. Formalize a simple process to reassess the previous Forecast period's Danger ratings.
2. Collect data to identify and reduce Forecast product errors.
3. Collect data on confidence in forecasted and reassessed Danger ratings.

This data will provide valuable insight for SAC forecasters and provide the opportunity to compare our findings to other regional forecast centers.

## New Website and Forecast Template

The Friends of the SAC received a grant from the Ferris and Minor families and the Nicholas Martin Jr. Family Foundation, allowing us to build a new website platform. The new layout features a clean modern look, better viewing on mobile devices, improved media function, search features, and other improvements. We'll be working on a second phase of upgrades this summer.

The USFS National Avalanche Center and several major USFS avalanche centers across the western U.S. pooled resources to develop a common Avalanche Forecast Platform, a tool that provides back-end and forward-facing interfaces for creating and displaying avalanche forecasts. SAC staff built the platform, and the SAC was the first center to adopt and beta-test it. Four to five other avalanche centers are planning to adopt this framework for the 2020-21 season. This collaborative effort aims to make efficient use of avalanche centers' limited financial resources while improving consistency among avalanche center products, making it easier for recreationists to use the forecasts and to stay safe while traveling in the backcountry.



**Figure 7:** Valley fog burning off under an atmospheric inversion.

## Expanded Forecast Area and Reorganized Forecast Zones

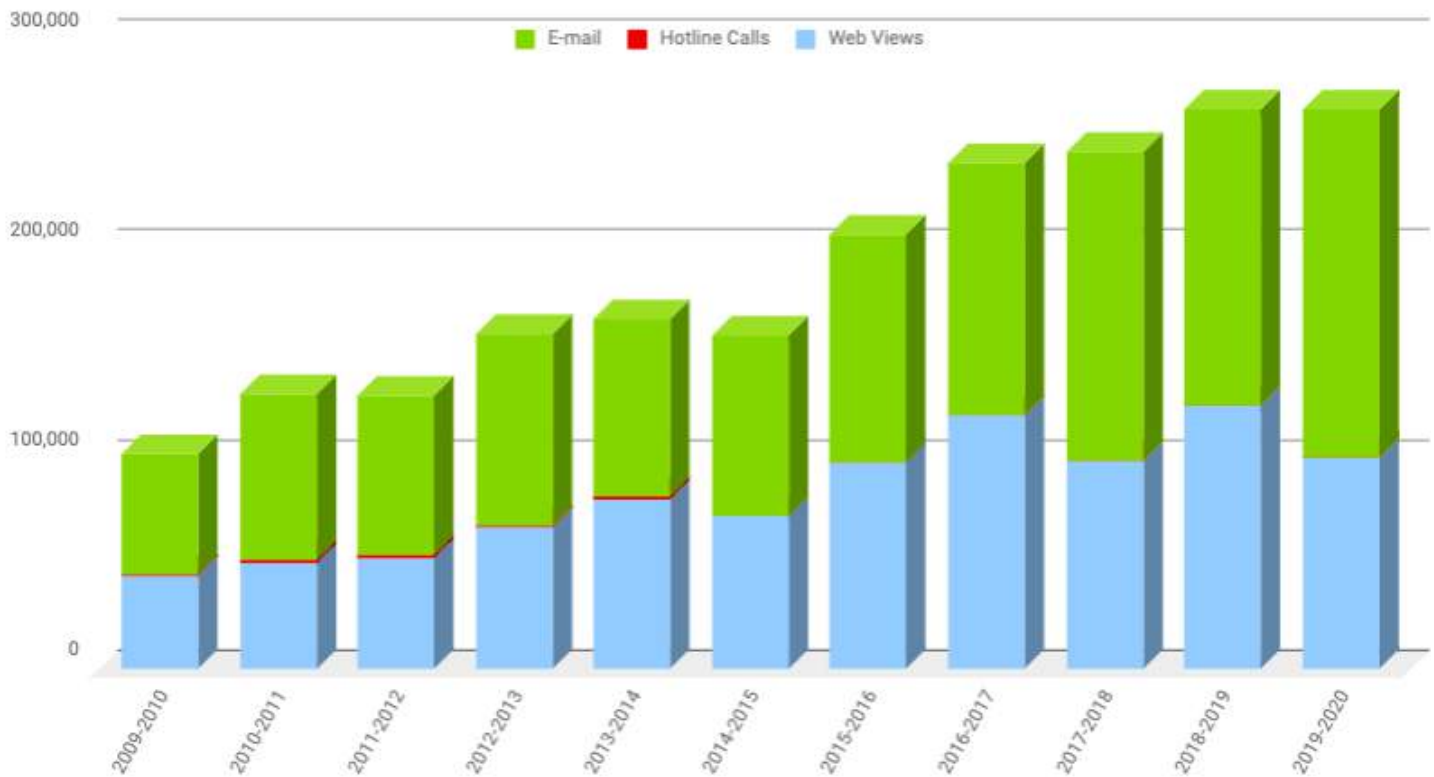
Thanks to an ORMV grant from the Idaho Department of Parks and Recreation, we added staffing to nearly double the area covered by our Avalanche Forecasts. The additional terrain on the Sawtooth, Boise, and Salmon-Challis National Forests near Banner Summit, Stanley, Smiley Creek, Atlanta, and Carey as well as additional Bureau of Land Management lands near Fairfield, Bellevue, and Carey increased our coverage area to over 2 million acres (1.15 million acres previously). SAC staff restructured the forecast zone boundaries to better reflect local snow climates, taking into account average precipitation, local weather patterns, and topography.



# FORECAST USE

We issued our first General Snow and Avalanche Information update on October 18th and began Daily Avalanche Forecasts on December 13th, issuing 122 advisories this season (compared to 118 last season, and 138 two seasons ago). Our email list grew yet again to top 1,250 subscribers compared to 1,100 last year. Daily danger ratings were also disseminated via Facebook and Twitter.

**USFS Sawtooth Avalanche Center  
Forecast Use Comparison**



# SOCIAL MEDIA

Social media plays a crucial role in communicating avalanche conditions and social event information:



**Figure 8:** This post with information about the earthquake was one of the most viewed and shared of the season.

- Amy David was hired as Media Coordinator for the Friends of the SAC. Amy’s skills in public relations, photography, videography, and social media were immediately apparent. Much of the success shared below is directly attributed to her efforts. Thanks Amy!
  - SAC staff made a concerted effort to increase our video content. We posted 40 videos across various platforms (up from 18 last year) receiving nearly 80,000 views! Instagram displaced Facebook and YouTube this season as our most watched video sharing platform.
  - The Friends of the SAC page now has 4,874 followers on Facebook (adding 600 new followers this season).
  - Based on public feedback, we continued posting the daily Danger rating to Facebook and Twitter pages, along with basic snow, avalanche, and weather updates.
  - Instagram is the Friends’ and SAC’s fastest growing social media account. We’ve increased our following by 82% in the past year.
  - We now have 729 followers on Twitter, a 41% increase from last season, marking our largest single season bump in followers.
  - Full Coverage Social, LLC audited the SAC and Friends of the SAC’s social media presence. The results were presented to SAC staff and Friends of the SAC’s Media Coordinator. Ideas generated through this review will guide decisions on post frequency, channel focus, and content.
- Thanks to the generous support of local radio stations KECH and KDPI, we provided daily 60-second spots during the morning commute hour and broadcast conditions updates during periods of heightened avalanche danger. This year we issued 86 weekday morning avalanche forecasts that were broadcast 172 times via our radio partners.

# EDUCATION

Avalanche education is a vital component of the SAC’s mission to provide avalanche safety information for people recreating, working, or traveling in the Sawtooth National Forest and surrounding areas. In her third year, Stacey Ward, the Education Coordinator for the Friends of the SAC, orchestrated general avalanche awareness outreach for schools and recreational groups. SAC forecasters handled professional-level training, specialty talks such as the Digging Deeper series, and the annual Motorized Level 1 course. During the 2019-2020 winter season, this two-pronged approach delivered 59 presentations to reach over 3,200 people (compared to 49 presentations reaching 2500 people last year).

The SAC continued its emphasis on motorized user outreach and education by providing avalanche education opportunities at snowmobile club meetings and motorsports locations throughout southern Idaho. SAC forecasters and Friends of the SAC instructors taught motorized specific courses on 10 occasions and reached over 600 riders. In response, publically submitted observations from motorized users have increased steadily over the last 4 seasons.

Avalanche education was provided to Blaine County youth on eight occasions, including talks and field sessions for Sun Valley Ski Education Foundation athletes as well as students at the Community School, Hemingway STEM School, and Wood River Middle School. With these efforts, the Friends’ education program successfully reached nearly every 8th grader in the Wood River Valley for a second straight year! With this precedent, every student will receive basic avalanche awareness and be familiar with essential avalanche rescue tools before entering high school.



**Figure 9:** Luis presenting avalanche education in both English and Spanish.

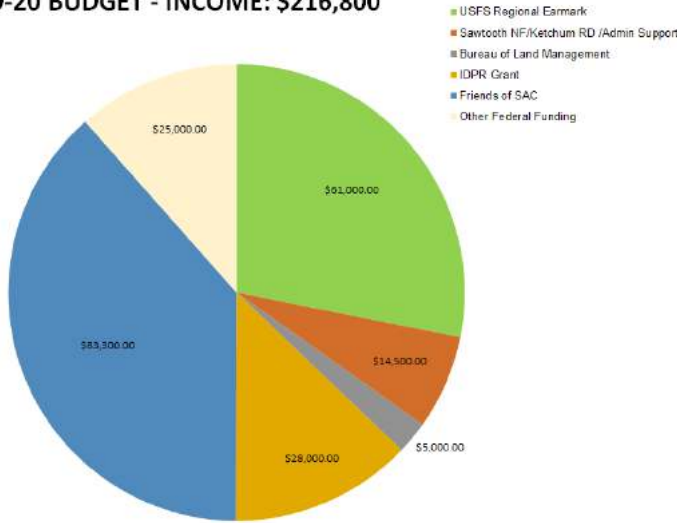
The Friends of the SAC teamed up with Rotarun and the Rota-Rippers program (5-11 year olds) to provide basic avalanche awareness in both English and Spanish. Friends of the SAC instructor Luis Lecanda presented to a packed audience of kids and parents, seamlessly transitioning between languages to deliver life-saving avalanche information to kids and parents. We hope this is just the start of a more comprehensive effort to reach the Spanish-speaking community in the Wood River Valley and beyond.

SAC forecasters presented for professional groups on 10 occasions. Scott taught at the National Avalanche School in Jordan, UT. He then swung through Jackson to present at the Wyoming Snow and Avalanche Workshop. Rounding out a busy fall, Scott also presented at the National Avalanche Center meeting, as well as the Montana Ski Patrol Avalanche Seminar. Ethan gave avalanche awareness presentations to Air St. Lukes in Boise and Twin Falls. He also gave a presentation to our partners at the National Weather Service in Pocatello. Chris provided avalanche education to USFS staff in Idaho City. He also presented snow and avalanche information at the Natural Resources Conservation Service ‘Snow School’ in Stanley.



# FUNDING AND PARTNERSHIPS

SAC 2019-20 BUDGET - INCOME: \$216,800

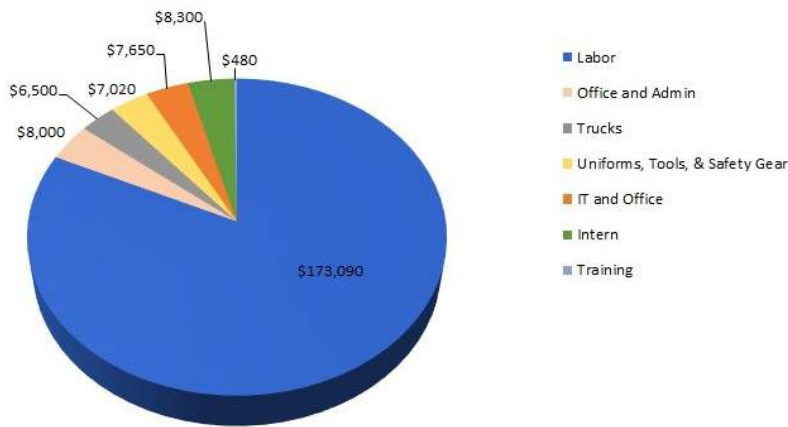


The SAC relies on a variety of partnerships and collaborative relationships. Over half of the Center’s budget comes from the Forest Service and BLM. Despite shrinking federal budgets, the USFS Region 4 and Sawtooth NF increased our funding this year; this support shows their continuing commitment to public safety. The Sawtooth NF and Ketchum RD provide vehicles, office space, administrative support, and maintenance facilities. The Bureau of Land Management also contributes \$5000 annually. Through an ORMV grant, the Idaho Department of Parks and Recreation contributed \$28,000 to fund the 4th forecaster position. An Idaho RAC

grant provided approximately \$12,000 for much needed repairs and maintenance of our remote weather stations.

***The Sawtooth Avalanche Center is a glowing example of a successful public-private partnership. The Friends of the Sawtooth Avalanche Center raise funds through sponsorship, private donations, grants, and fundraising events. The Friends’ success is indicative of strong community buy-in and support of the Avalanche Center’s mission.***

SAC 2019-20 BUDGET - EXPENSES: \$216,800



The Friends of the Sawtooth Avalanche Center (501c3) are the critical private partner in our mission; the center would not exist without their efforts and support. The Friends’ contribution covers salaries for the vast majority of 2 of our 4 full-time Forecasting positions and our intern’s equipment, per diem, and room & board expenses. In addition, they provide funds for website and IT maintenance and improvements, safety and field equipment, educational supplies, forecaster training, etc.. The Friends pay for about half of our standard operating costs.

# SNOWPACK SUMMARY

Longtime residents weren't fooled by the early dustings of snow in September or even the anomalous winter storm that had snowblowers roaring in mid-October. Sure enough, a month long drought ensued, mercifully coming to an end with a Thanksgiving snowstorm. Unfortunately, the damage had already been done; weak layer of facets formed at the bottom of the snowpack throughout the bulk of the forecast area and especially in the mountains near Galena Summit and to the north.

Following the Thanksgiving storm, a ridge of high pressure kept our area sunny, dry, and cold for five days, developing a widespread layer of surface hoar. This layer was observed across our entire forecast area, stretching from Banner Summit up north all the way south to the mountains above the Wood River Valley and west into the Soldiers. The character of the snowpack varied wildly across our forecast zones, but this layer would become a disturbing constant.



**Figure 10:** This photo shows one of the persistent slab problems that plagued the forecast area for much of the season.

Between December 7-13, two separate storms brought much needed snow. The storms generally favored the northern and western portions of our forecast zones where over 2' of snow fell. The mountains above the Wood River Valley picked up 8-12" in this timeframe. The combination of recently buried surface hoar and depth hoar near the ground produced several natural avalanches. From safe locations and with clear views of the terrain below, Ben remotely triggered 13 avalanches in one day (Friday the 13th, as it were). To the best of our knowledge, all of them failed on the surface hoar weak layer buried on December 7th.

The new decade started with a good shot of snow, extreme winds, and an Avalanche Warning in two of our forecast zones (Sawtooths & Western Smoky Mountains and Banner Summit). At Bald Mountain Ski Area, gusts reached 75 mph, just shy of breaking the 25-year record of 78 mph. Not to be outdone, the Soldiers recorded 100 mph winds for three consecutive hours, with the strongest gust hitting 122 mph. For reference, sustained wind at this speed is classified as a category 3 hurricane. Human-triggered avalanches were reported in the Soldier & Wood River Valley zone on each of the first three days of 2020. These slides failed where strong winds built stiff slabs on top of weak, sugary faceted snow.

The week of January 10-17 was one of the snowiest of the winter with total snow accumulations reaching 2-4 feet and exceeding that in places. One interesting characteristic of this storm cycle was its prolonged, intermittent nature. It's not often that we find ourselves in the storm track for more than one low-pressure storm in a week. In this case, three large storms brought heavy snowfall, separated by 12 to 18 hour dry spells. As skies cleared in the Sawtooths and the mountains near Banner Summit, we observed the aftermath

of one of the most condensed and widespread deep slab avalanche cycles we've seen in these mountains in years.



**Figure 11:** This very large deep slab avalanche was observed below the north face of Williams Peak in the Sawtooths. The crown spanned over 2,000' of terrain on a N-NE aspect between 9,000 and 9,500'. Photo: T. Haskins

Tragically, on Wednesday, January 15th, a snowmobiler was caught and killed in an avalanche in the Baker Creek drainage, approximately a half-mile northeast of Baker Lake. This was the first avalanche fatality in our area since February of 2014. [This video](#) contains information collected during the site investigation. The full accident report is [published here](#).



**Figure 12:** This avalanche claimed the life of a snowmobiler on January 15th, 2020. The slide released at an elevation of 9200 feet on a south-facing, wind-loaded slope. The slab broke 2-3 feet deep, 250-300 feet wide, and ran just over 600 vertical feet. Photo: Sun Valley Heli Ski



## February Drought

	SWE (inches)	Percent of Average (%)
Soldier RS (5740')	0.0	0
Swede Peak (7640')	0.3	9
Hyndman (7620')	0.2	3
Bald Mountain (9013')	0.2	N/A
Chocolate Gulch (6310')	0.2	7
Dollarhide Summit (8420')	2	N/A
Galena Summit (8780')	1.7	40
Vienna Mine (8960')	3.2	50
Banner Summit (7040')	2.3	44

**Table 1:** Snow Water Equivalent (SWE) at select stations from February 1 through March 6.

February was also memorable but for all the wrong reasons. A dearth of snowfall led to a lack of significant avalanche activity, a stabilizing snowpack, and finally all zones going to LOW danger on February 26th. The entire area received well below average snowfall in February, but our southern areas were hardest hit by the drought. By early March, the Salmon River Basin was at 86% of normal Snow Water Equivalent (SWE) while the Big Wood fell to just 61% of normal (Table 1).

It wasn't until late March that storms returned to the area with any regularity. By then, most south-facing slopes in the Wood River Valley were dirt. Where snow remained, spring storms buried a complex mixture of facets and crusts that produced seven human-triggered avalanches in a nine-day stretch. Most of these were remotely-triggered from low angle terrain.

On Tuesday, March 31st, in one of the more unique events in SAC history, a M6.5 earthquake rocked the forecast area during a period of HIGH danger at the tail end of a major storm. This event and the avalanches it likely caused are discussed in more detail below.

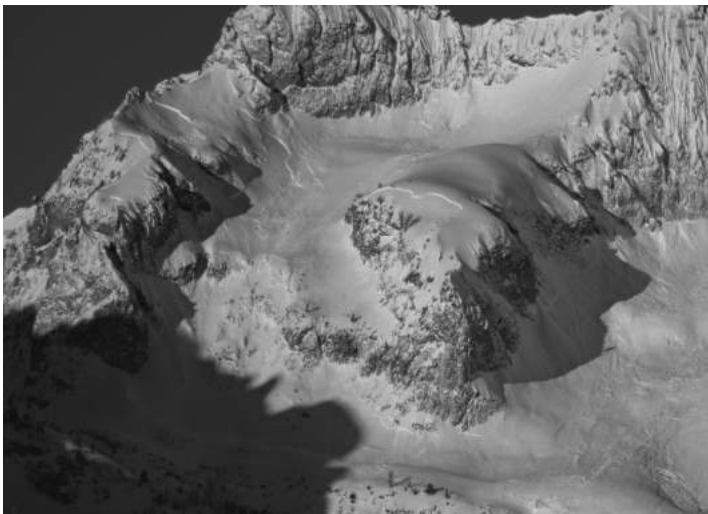
Valley temperatures climbed into the mid-60s F during our last week of forecasting in April. Over a dozen wet slab avalanches and countless wet loose slides occurred in a 4-day stretch. Luckily, a cold front arrived to lock up the snowpack before the wheels came off entirely. Despite a cool, wet late-March and early April, we'll head into summer with a snowpack that's anywhere from 65-85% of normal.

For an in-depth, week-by-week review of the 2019-2020 season including pictures and detailed descriptions of significant avalanches cycles, check out the [Conditions Blog](#) section on our website. For a complete list of this season's known human-triggered avalanches and involvements, [click here](#).

## M6.5 EARTHQUAKE CAUSES WIDESPREAD AVALANCHING

At 5:52 PM on Tuesday, March 31st, a 6.5 magnitude earthquake shook central Idaho and the surrounding area. The quake's [epicenter](#) was in the SAC Banner Summit zone, about 20 miles northwest of the town of Stanley. The earthquake occurred at the end of a major spring snowstorm that dropped 2-3 feet of new snow in the mountains adjacent to the earthquake. The avalanche danger was rated as HIGH on the day of the earthquake (see [Avalanche Forecast](#) for the day). HIGH danger means that “Very dangerous avalanche conditions exist. Natural and human-triggered avalanches are likely.”

In addition to feeling the obvious effects of the earthquake, many Stanley residents reported hearing the rumble of avalanches coming from the nearby Sawtooth Mountains when the earthquake occurred. Clearing weather on April 1 revealed incredibly widespread avalanching in the Sawtooth Mountains and in the mountains closer to the epicenter near Banner Summit. While some of these avalanches may have occurred naturally prior to the earthquake, evidence suggests that the majority of them released as a direct result of the earthquake.



**Figure 13:** Numerous avalanches on Merritt Peak that likely released as a result of the earthquake. Photo: T. Haskins

*By all accounts, a major earthquake occurring during a period of elevated avalanche danger resulting in widespread avalanching is a very rare and historic event for Idaho.*

**First Hand Account:** SAC Avalanche Specialist Chris Lundy was in the Sawtooth Mountains near Williams Peak when the earthquake struck. Here’s what he had to say:

“When the earthquake hit, all of the trees shook and snow was falling out of them—that image will remain in my mind forever. Almost immediately, we heard the rumbling sound of avalanches reverberating in the mountains. Even though we were in a location that was safe from avalanches, we felt very vulnerable as the mountains shook around us. The

next day, we climbed higher into the mountains to take advantage of good visibility and look at what happened. Avalanches were everywhere. Snow that had previously been clinging to the steep, rocky faces of the Sawtooths had been rattled off. Crown lines from slab avalanches were countless. Even on lower angled slopes that were not steep enough to avalanche, we found cracks in the snow as if the whole snowpack had shattered.”

**Additional Quote:** SAC Director Scott Savage

“When skies cleared and the proverbial—and maybe literal—dust settled the day after, the sheer carnage the earthquake caused quickly became apparent. In the northern Sawtooth Mtns near the epicenter, hundreds of steep slopes had avalanched. As you moved into the Smoky Mtns about 45 miles south of the epicenter, the number, type, location, and appearance of the natural avalanches still made it obvious that something unique triggered the slides. Our initial observations suggest the earthquake triggered avalanches to the south at least 60 miles away, not quite to Ketchum. We also heard about some folks enjoying a soak in a natural hot spring near the Sun Valley Ski Area when the earthquake struck. They reported watching a wet loose avalanche release, knock down a few trees, and cross the creek near them. Those hot springs are 63 miles from the epicenter.”

## NEXT SEASON'S GOALS

- Secure recurring funding for our 4th Forecaster position.
- Work with other avalanche centers to finalize the Avalanche Forecast Platform, improving consistency and ease-of-understanding for users traveling across the western U.S..
- Refine current web products and create new interfaces to provide easily understandable avalanche, snow, and weather information for novice through advanced users, focusing on simple map-based and visual navigation.
- Work with the Friends of the SAC to increase the volume and quality of our online video offerings.
- Continue working on Technology Transfer projects, including deep slab avalanche forecasting, earthquake-induced avalanches, and users' comprehension of avalanche forecast products.



**Figure 14:** Chris on a particularly deep day this winter.

- Work with the Friends of the SAC to increase local avalanche awareness offerings, especially to K-12 students and the Spanish speaking community.
- Continue to make inroads with, and increase outreach to, the motorized community, which makes up 20 of Idaho's last 21 backcountry avalanche fatalities.
- Continue our outreach efforts in Idaho Falls and other Snake River plain communities to provide basic avalanche education and an avalanche and weather information-sharing platform for eastern Idaho recreationists.
- Continue to encourage an increase in both quantity and quality of public observations.
- Continue instructing Motorized Level 1 courses and work on our riding skills!