

FLATHEAD NATIONAL FOREST
FLATHEAD AVALANCHE CENTER
2016-2017 ANNUAL REPORT



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Cover Images

Center: *Flathead Avalanche Center Logo*. Courtesy of and designed by Brad Lamson.

Upper Left: *Avalanche Debris in Skiumah Lake, Flathead Range*. Photo: FAC

Upper Right: *Avalanche Crown, Heavens Peak, Glacier National Park*. Photo: Jake Hutchinson

Lower Left: *Depth hoar in McGinnis Creek, Whitefish Range*. Photo: FAC

Lower Right: *Avalanche powder cloud, Glacier National Park*. Photo: Keith Meehan

Background

The Flathead Avalanche Center (FAC) began issuing public avalanche information for the season on November 16, 2016 and began daily advisories on December 5, 2016. The FAC advisory area consists of portions of the Swan Range, Flathead Range, Lewis Range (southern Glacier National Park), Apgar Range (Glacier National Park), and portions of the Whitefish Range (Figure 1). The FAC operated in its second year as a Type 1 avalanche center and provided daily avalanche advisories during the winter season. Type 1 avalanche centers generally employ three or more full-time avalanche specialists and have a robust network of paid or unpaid field observers assisting with operational data collection to support daily forecasts. This season's current funding and resources for FAC allowed for daily avalanche advisories and for FAC avalanche specialists and professional observers to collect snowpack and weather data from various locations throughout the advisory area. While partnering with the Friends of the Flathead Avalanche Center (FOFAC), the FAC also provided numerous education classes including free avalanche awareness, Introduction to Avalanche courses, companion rescue courses, and avalanche basics for school-aged children throughout Flathead Valley. Avalanche information product season totals:

- Pre-season avalanche information updates (beginning on 11/16/2016) = **9**
- Avalanche advisories (12/5/2016 through 4/9/2017) = **125**
- Post-season avalanche information updates (beginning on 4/9/2017) = **2**



Figure 1: Overview of the Flathead Avalanche Center advisory area (shaded in gray) as well as portions of the Kootenai National Forest. The FAC hosts the Kootenai National Forest advisory on their website.

It was a transition year for FAC as Todd Hannan served as the interim Director/Lead avalanche specialist between outgoing Director Erich Peitzsch and incoming Director Zach Guy. Mark Dundas served as an avalanche specialist, and the third avalanche specialist position was filled by part-time work of Seth Carbonari, Adam Clark (USGS), and Erich Peitzsch (USGS). Flathead National Forest Recreation personnel Guy Zoellner worked part-time for the FAC as a snowmobile observer as well. His duties included education about appropriate motorized recreation zones, avalanche education, and collecting field data for the FAC. Zack Gidley provided field assistance for FAC avalanche specialists as well. Overall, it was a team effort that produced the public products issued by the FAC.

The Friends of the Flathead Avalanche Center (FOFAC) continued ownership of the website and continues to fund associated fees for website maintenance and development (<http://flatheadavalanche.org>). Website statistics were collected since the introduction of the new site in November 2012. Site visits and use have increased substantially each year since then.

Table 1: Descriptive statistics of the FAC website for 2016-2017.

Total Visits (#)	Total Unique Visitors (#)	Page Views (#)	Pages/Visit (#)	Avg. Visit Duration (minutes)
70,371 Increase of 18% from 2015-2016	22,988 Decrease of 2% from 2015-2016	181783 Increase of 25% from 2015-2016	2.58	2:27

Media

FAC staff conducted eight interviews throughout the season with television, print, online, and radio outlets, with at least 14 additional features or mentions. The latter contained information derived from the FAC website or Flathead National Forest websites. These outlets included KPAX TV, KTMF TV, KECI-KCFW TV, KAJ TV, Montana Public Radio, The Missoulian, Daily Interlake, Flathead Beacon, Hungry Horse News, and Whitefish Pilot. Topics discussed included current conditions, avalanche fatalities and accidents, avalanche education opportunities throughout the season, and the new Director hire.

The FAC continues to expand and improve upon its social media presence. The center uses Twitter, Instagram, and Facebook on a daily basis to reach a broader audience while providing updates to avalanche conditions. The FAC also regularly produces YouTube videos to demonstrate avalanche concerns in the field.

The FAC Twitter account (<https://twitter.com/FACAvalanche> and @FACAvalanche) continues to grow in popularity. Followers increased from 333 to 405 this season. We published 153 tweets with 152 retweets, 118 likes, 56,795 impressions, and 1,487 engagements through this season. There were 749 URL clicks from our tweets this season.

The Friends of the Flathead Avalanche Center (FOFAC) maintained a Facebook page (<https://www.facebook.com/friendsofflatheadavalanchecenter> and @friendsofflatheadavalanchecenter) to host both FOFAC and FAC content. We made 163 posts this season. Our Facebook audience increased from 728 to 1,029 page likes, with 132,740 post reaches and 8,497 engagements.

Our Instagram account (<https://instagram.com/flatheadavalanche/> and @flatheadavalanche) featured images and short video clips from the field and various education classes. We posted 144 pieces of media this season and increased our followers from 374 to 637.

The Flathead Avalanche YouTube channel (<http://www.youtube.com/user/FlatheadAvalanche>) has become a popular and effective means of demonstrating avalanche conditions. We produced 24 YouTube videos this year with 8,826 total views, 13,337 minutes watched, and 82 subscribers. One of these videos was an educational production titled “Ride Another Day” (<https://www.youtube.com/watch?v=YO6nlxQyzdA>), a 5-minute video targeting users who access the backcountry from Whitefish Mountain Resort with an impactful story of a recent out-of-bounds fatality. This video was produced with several FAC partners and used professional filming and editing to publish a high quality product that we will continue to use for future outreach. Our most popular video of the season was the avalanche site visit on January 6th, 2017.

Anecdotal feedback from the backcountry user community showed that videos and photos are a welcomed and helpful means of communicating avalanche hazard. We plan to continue our avalanche-related social media products and look for new opportunities to expand and improve in this arena.

Weather, Snowpack, and Avalanche Summary

This winter season was characterized by an atypically cold and dry start, which abruptly transitioned to a very active back half of the season, bringing the snowpack to just above average. We issued four avalanche warnings for at least one portion of our advisory area this season. Often, the FAC avalanche specialists issue multiple hazard ratings for our advisory area based on location (mountain range) and/or elevation (Table 2). 50 reports of human or naturally occurring avalanches were submitted by the FAC staff or general public through our observations page, phone, or email. Of these reported avalanches, there were six individuals caught in five separate avalanches resulting in one fatality.

Table 2: Number of days each zone (mountain range) was rated High, Considerable, Moderate, or Low; (a) the highest rating (typically the upper elevations), and (b) the lowest rating for the day. Each zone in the advisory area is broken into 3 elevation bands, and potentially 1 to 3 danger rating levels could be issued given these elevation bands.

(a) Highest Rating

Zone	Extreme	High	Considerable	Moderate	Low
Flathead Range and Glacier NP	1	6	41	61	10
Swan Range	1	7	44	62	10
Whitefish Range	1	7	43	63	10

(b) Lowest Rating

Zone	Extreme	High	Considerable	Moderate	Low
Flathead Range and Glacier NP	0	3	10	29	76
Swan Range	0	3	11	31	78
Whitefish Range	0	3	11	31	78

Snow water equivalent (SWE) throughout the advisory area from October 1 to April 11 was above normal (116% of median), and precipitation this fall and winter was also above average (128%) (NRCS 2017). Overall, air temperature throughout the winter (defined as December through April) was approximately 1.4° F lower than the average winter temperature at the three major SNOTEL sites that generally represent the advisory area (Flattop Mountain, Stahl Peak, and Noisy Basin). However, air temperature at Flattop Mountain SNOTEL station in Glacier National Park stopped recording in early November. It is also noteworthy that average monthly air temperature at Noisy Basin and Stahl Peak during December and January were substantially lower. Noisy Basin air temperature was -5° F and -4° F lower than average during December and January, respectively. Stahl Peak air temperature was -11° F and -9° F lower than average during December and January, respectively. These low temperatures were a result of cold, arctic air masses that moved into the area from the north and remained entrenched over the advisory area for several days to weeks during those months.

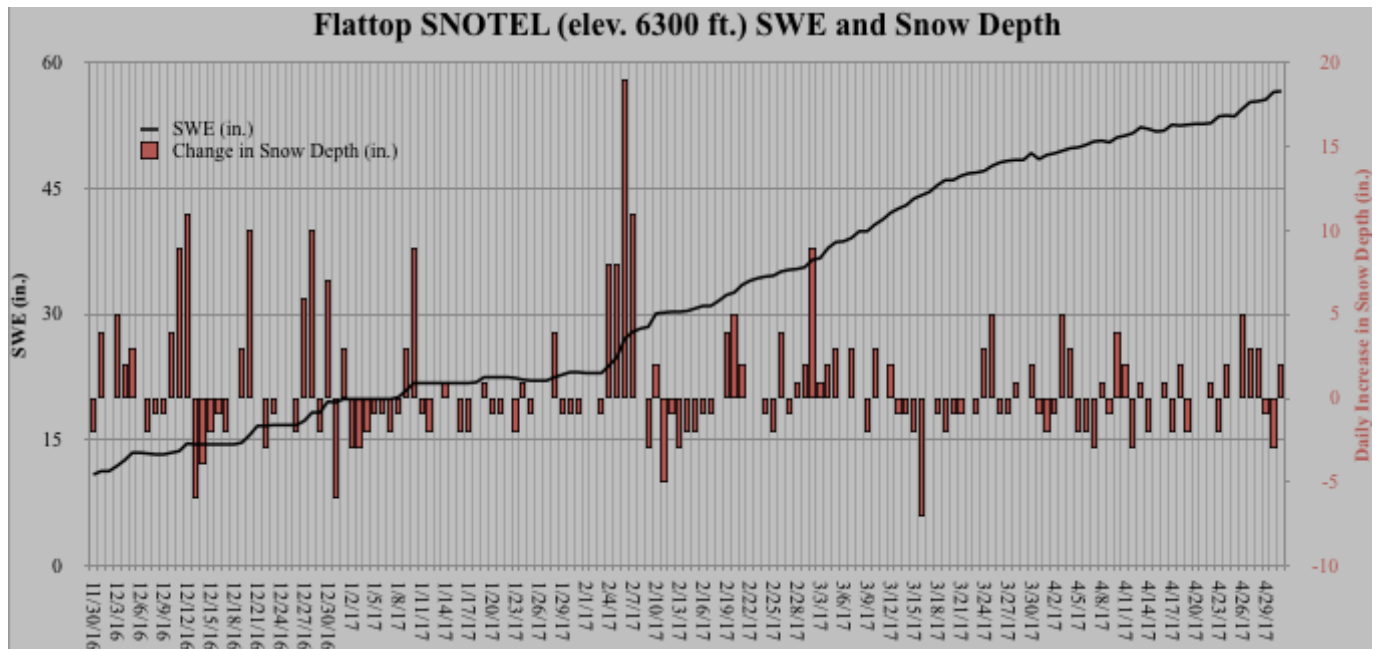


Figure 2: SWE and snow depth for Flattop Mountain SNOTEL (6300 ft.) in the Lewis Range. This SNOTEL station is adjacent to the advisory area but is representative of the Flathead Range and portions of southern Glacier Park, which is within our advisory area. Air temperature at Flattop Mountain SNOTEL station in Glacier National Park stopped recording in early November

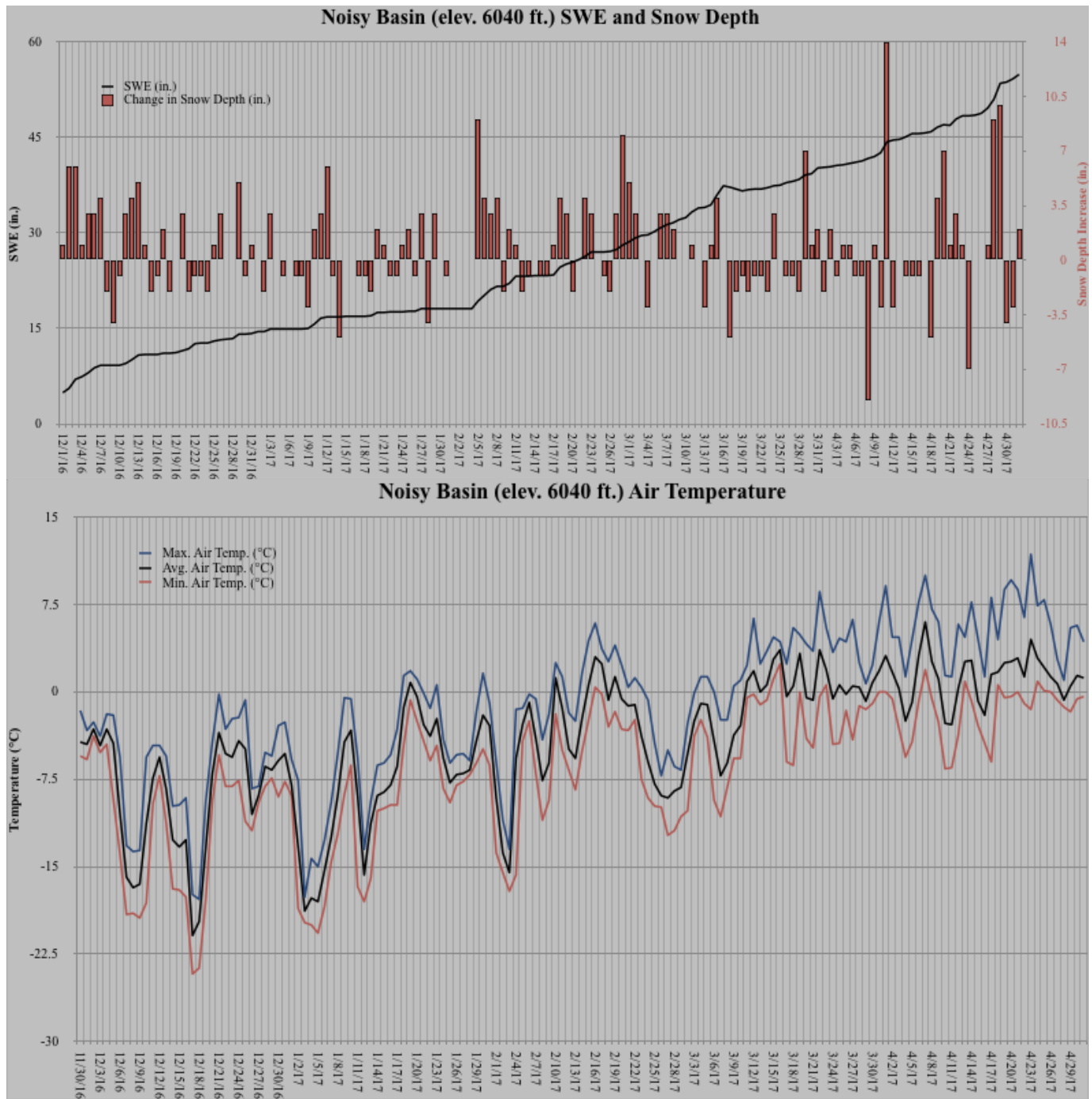


Figure 3: SWE, snow depth, and air temperature for Noisy Basin SNOTEL (6040 ft.) in the central Swan Range. This SNOTEL station is fairly representative of the Swan Range.

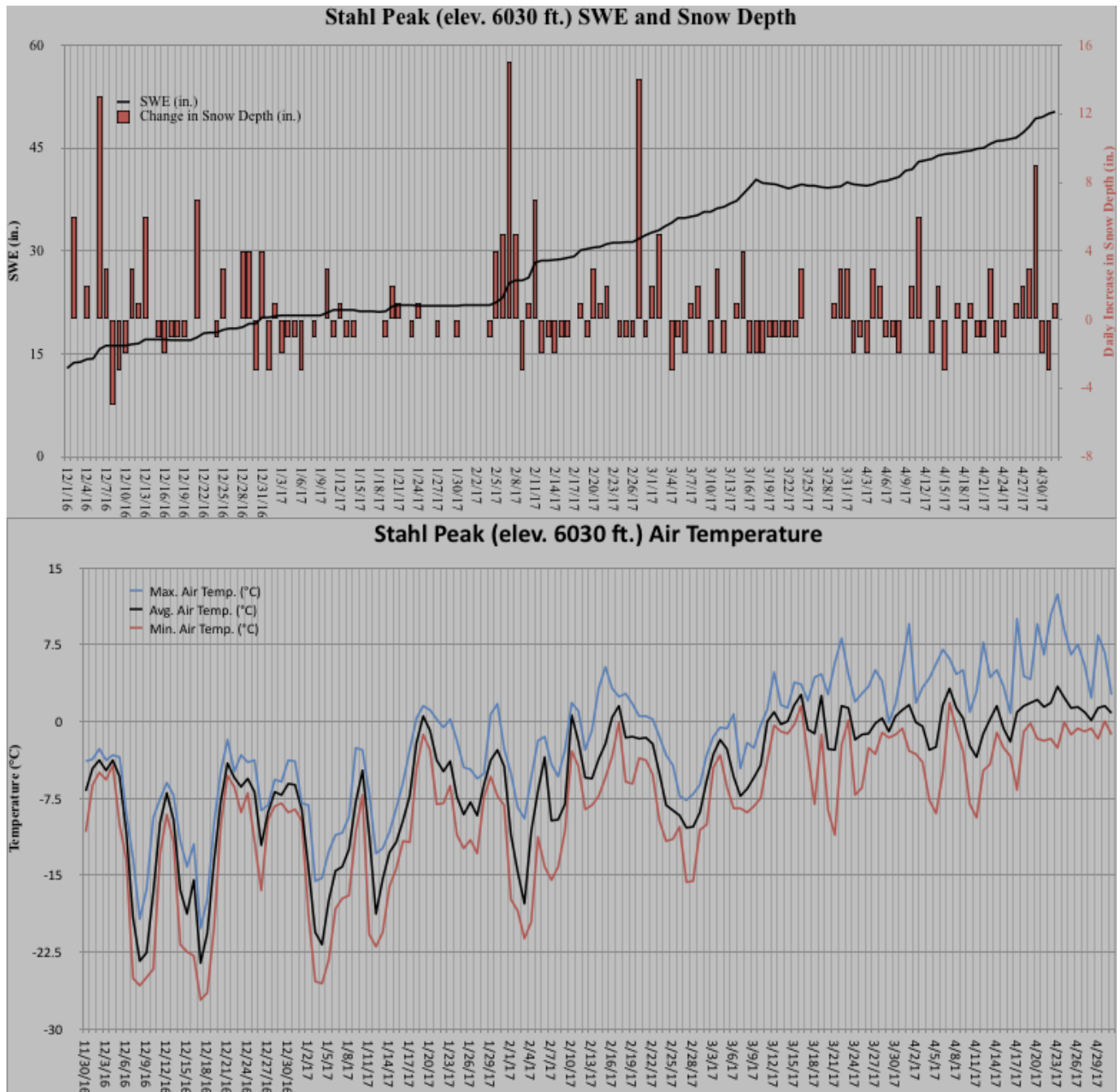


Figure 4: SWE, snow depth, and air temperature for Stahl Peak SNOTEL (6030 ft.) in the northern Whitefish Range. This station is adjacent to the advisory area and is fairly representative of the northern Whitefish Range.

November

Air temperature throughout the month was 8° to 9° F warmer than average temperatures for the month. Precipitation was also well above normal at upper elevation stations (147-166% of average). These conditions delayed the development of the snowpack and winter recreation use. Avalanche information updates began on 11/16/2016 with general early season avalanche condition information.

December

A storm on December 4 truly kicked off winter by depositing around one inch of precipitation on top of a weak and shallow early season snowpack, and we began issuing avalanche advisories with associated danger ratings. A fairly widespread natural and human triggered avalanche cycle ensued. Cold air moved into the advisory area during the middle of the month, and on December 21 a storm deposited over a foot of low-density snow accompanied by strong winds (Figure 5). Another widespread avalanche cycle occurred, and with this storm, winter began in earnest. As noted earlier, December was characterized by below normal temperatures. This created an unusually weak, faceted snowpack given the relatively shallow snow depth this early in the season.



Figure 5: Example of avalanche activity during the Winter Solstice storm in the southern Whitefish Range on December 21, 2016.

January

Another cold air mass from the north settled into the area on January 2-3, 2017. Strong northeast winds accompanied the precipitation, and this resulted in atypical wind loading patterns. High pressure with cold air settled over the advisory area the next few days. Tragically, on January 5, an avalanche fatality occurred on Stanton Mountain in Glacier National Park. Ben Parsons, who was caught and killed in a large slab avalanche, was a friend to many in the community (including those of us at the avalanche center), and Friends of the Flathead Avalanche Center board member.

The cold and dryspell came to a close on January 9th, issuing a prolonged period of active and snowy weather through the rest of spring. The snow depth began to gradually increase through the rest of January before the fire hose really turned in in February.



Figure 6: Skier triggered avalanche on Stanton Mountain in Glacier National Park that resulted in an avalanche fatality. January 5, 2017.

February

This month was characterized by abundant, consistent snowfall. On February 4, a storm began, and for the next 3 days, deposited over 50 inches of snow and 4.5 inches of SWE throughout the advisory area. A close-call involving multiple burials and a resuscitation with a group of snowmobilers occurred on February 4. This first system was quickly followed by another warmer and potent storm a day later bringing the storms' totals to 8 inches of SWE and at least 70 inches of snowfall. An avalanche warning went into effect February 5 and 6, and we issued the first Extreme rating ever issued by the FAC on February 6. The number and size of avalanches during this cycle was

impressive (Figure 7). We were able to tour around the advisory area in the following days and survey the results, and observed numerous destructive avalanches across our entire forecast area. A video describing some of these large and impressive avalanches can be found here: <https://youtu.be/n-HoJ9EZCP4>. The end of the month was punctuated by a storm that deposited 10-24 inches overnight favoring the Whitefish Range. This storm arrived with little wind and very light density snow (3-5%) that made for incredible riding, skiing, and decent stability.

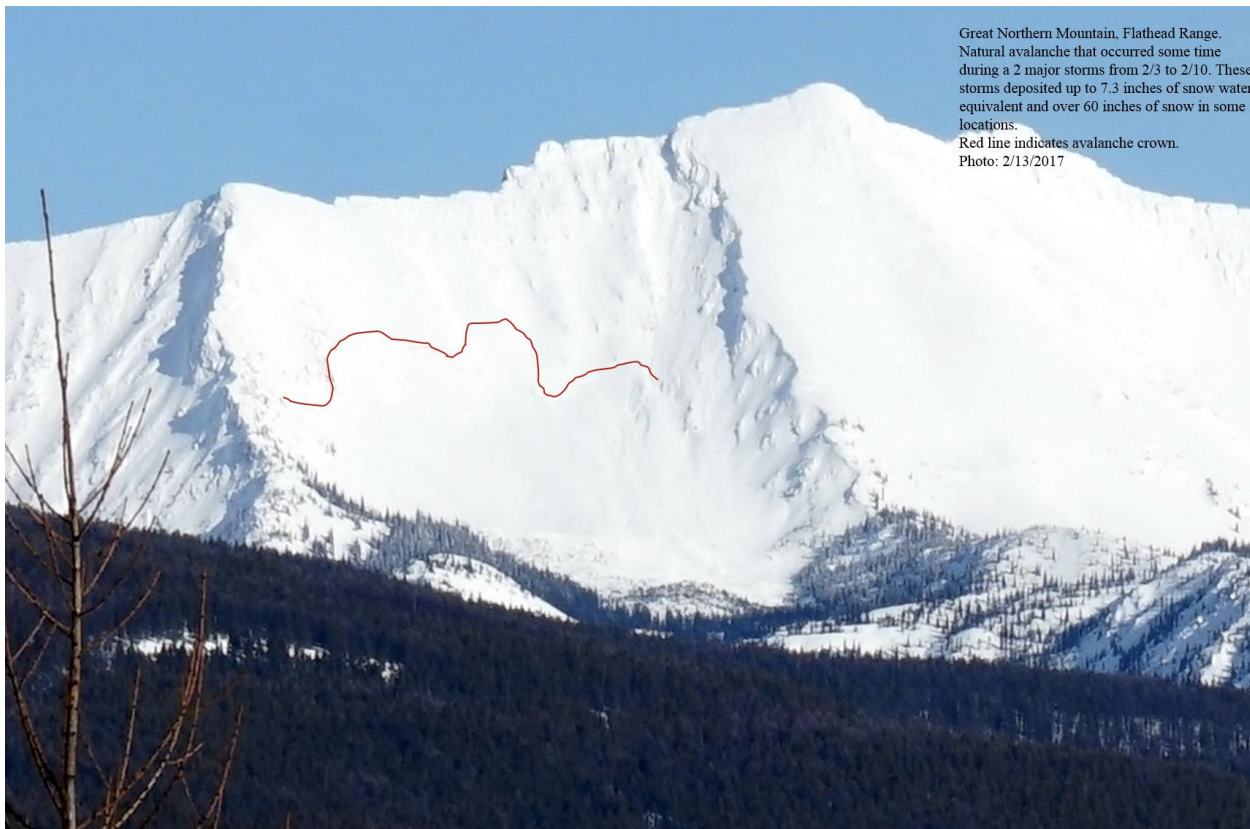


Figure 7: Very large slab avalanche on Great Northern Mountain, Flathead Range. This image was taken from the Swan Range, nearly 9 miles (13 km) away.

March

Warming spring temperatures had an effect on the snowpack this month. Rising snow levels and a very wet and somewhat surprising storm from March 13-16 dropped just over 3 inches of SWE. A large (D2 to D3), wet loose and wet slab avalanche cycle occurred. The rest of the month featured mostly good stability and typical spring avalanche concerns, including rain-on-snow, wet avalanches, and opening glide cracks.

April

We issued our last advisory on Sunday, April 9. April was a fairly wet and cool month that extended the backcountry riding and skiing. A large storm (up to 4" of SWE and likely 3 feet of snow in the highest elevations) and subsequent warm-up in late-April prompted a special avalanche statement on April 28. A natural cycle occurred, with several D2 to D3 slab avalanches observed and a widespread large wet loose avalanche cycle.

May

The first dramatic warmup and sustained sunny weather since the arrival of spring spurred continued wet avalanche activity in early May. Destructive glide avalanches, wet slabs, and wet loose avalanche activity peaked during the first week of May. The snowpack then trended toward a more consolidated spring-like snowpack through the rest of the month.



4/16/17. Powder cloud and debris

Figure 8: A large (size 3, Canadian classification) slab avalanche on Heavens Peak was intentionally skier triggered. Fortunately, no one was caught or injured. April 15, 2017..

Incidents

There was one avalanche fatality within the advisory area between November 1 and April 10 (our advisory season). On Thursday, January 5, 2017 Ben Parsons triggered an avalanche on the southwest face of Stanton Mountain in the Lewis Range of Glacier National Park, and subsequently died of injuries. After summiting, Ben, a 36 year old male, descended the first pitch immediately below the ridgeline. His partner, a 38 year old male remained on the ridge. Ben came to a spur ridge that divided two prominent southwest facing avalanche paths and moved on to the slope. He weighted his skis several times to test the snow pack and triggered an avalanche that broke just above him. The avalanche caught Ben and carried him an estimated 1000 vertical feet down the slope. His partner watched as he was carried down the path and out of sight, and immediately initiated a beacon search and descended the entire path without picking up a signal. When he reached the bottom of the debris, he removed his skis and began climbing back up the debris field. He was still unable to obtain a signal but was able to locate Ben with a faint yell. He found Ben injured against a tree, but still conscious. He dialed 911 for medical evacuation, and warmed and cared for Ben until the helicopter arrived. Ben was in critical condition when rescuers arrived and he died from his injuries during the rescue effort.

The average slope angle of the starting zone was 35 degrees (Figure 6). The crown face depth ranged from 1 to almost 4 feet. The avalanche was approximately 270 feet wide and traveled downslope approximately 2300 vertical feet, and a total of 4100 feet in length. The crown was located at approximately 7360 feet in elevation and the toe of the debris was estimated at 5100 feet. The avalanche is classified as SS-ASu-R2-D2-O. This means that it was a soft slab avalanche (SS) unintentionally triggered by a skier (ASu). It was small, relative to the path (R2), and large enough to bury, injure, or kill a person (D2). The avalanche released within the old snow (O) on weak, faceted snow above a firm, wind scoured layer.

The full incident report can be found here:

<http://www.flatheadavalanche.org/sites/default/files/20170105avalancheincidentreport.pdf>

We, at the Flathead Avalanche Center, are deeply saddened by this tragedy, and offer our sincere condolences to Ben's family and other friends. We will fondly remember Ben's infectious approach to recreating in the mountains, and appreciate his time spent helping the Friends of the Flathead Avalanche Center as a board member. #BennyUp

During our operational season, there were numerous observed avalanches (<http://www.flatheadavalanche.org/observations>), with five **reported** incidents with six individuals caught in avalanches (<http://www.flatheadavalanche.org/incidents>).

On February 4, a close call avalanche incident occurred in the Lost Johnny drainage in the Swan Range involving five snowmobilers. Two riders were caught with one partial burial and one full burial. The non-buried riders were able to resuscitate the fully buried rider once they extracted him. They were all able to walk out to safer terrain where they were met by North Valley Search and Rescue personnel waiting for them. We are grateful the incident had a positive outcome and thank these snowmobilers for sharing this information as it helps everyone learn.

Education

The FAC hosted a variety of classes this year including a snow and avalanche workshop, 15 avalanche awareness classes and 6 Introduction to Avalanches classes. We presented to 1629 students, nearly twice the number of attendees compared to last season. We diversified our student demographics by teaching several women specific and motorized specific courses. Many of these were held at various retailers and businesses throughout northwest Montana. The FAC would like to thank those entities for their support in hosting these very valuable classes. Other classes are listed in the table below (Tables 3-4).

Youth (school-aged) programs for Flathead Valley Schools and other youth programs continued this year and reached 970 total students with 17 youth-specific classes. This is a combined effort of in-class sessions with FAC instructors and field classes with the Flathead National Forest Winter Program at Whitefish Mountain Resort. Teresa Wenum coordinates and leads the winter education program for school-aged children with Jennifer Cloutier and Megan Chaisson. This is a program where students learn how to be safe while having fun in the winter environment. Students also explore the dynamics of snow while learning about avalanches.

Table 3: List of education classes provided by FAC or affiliated with FAC

Date	Class	Location	City	Attendees 2016/2017	2016/2017 # Attendees < 21 y/o
11/5/2016	Northern Rockies Snow and Avalanche Workshop	O'Shaughnessy	Whitefish	210	30
11/10/2016 Thursday	General Avalanche Awareness	Sportsman and Ski Haus	Kalispell	40	3
11/29/2016	Motorized Avalanche Awareness	Fastoys	Kalispell	10	0
12/1/2016	General Avalanche Awareness	Rocky Mountain Outfitter	Kalispell	29	0
12/8/2016	General Avalanche Awareness	Sportsman and Ski Haus-WF	Whitefish	25	
12/14/2016	Motorized Avalanche Awareness	Penco Power Products	Kalispell	30	2
12/14/2016	High School Avalanche Awareness Talk	Glacier HS	Kalispell	25	25

12/15/2016, 12/17/2016	Introduction to Avalanches	Flathead Valley Community College and Whitefish Mountain Resort	Kalispell and Whitefish	21	
12/22/2016	General Avalanche Awareness	Stumptown Snowboards	Whitefish	17	2
12/28/2016- 12/29/2016	Introduction to Avalanches-Non Motorized-Border Patrol	HHR	Hungry Horse	12	
1/4/2017	Glacier National Park Interpretive Staff Training	WMR	Whitefish	12	
1/5/2017, 1/7/2017	Introduction to Avalanches - Ladies	Flathead Valley Community College and Whitefish Mountain Resort	Kalispell and Whitefish	21	
1/5/2017- 1/6/2017	Introduction to Avalanches-Motorized-Border Patrol	Hungry Horse/WMR	Hungry Horse, Whitefish	14	
1/7/2017- 1/8/2017	Episcopal Academy	Episcopal Academy	Whitfish	20	20
1/13/2017	General Avalanche Awareness	Stonefly Lounge	Coram	45	45
1/14/2017- 1/15/2017	Introduction to Avalanches-Search and Rescue-Motorized	HHR	Hungry Horse	12	
1/17/2017	General Avalanche Awareness	Browning Hospital	Browning	20	2
1/17/2017	WLP Youth	Lion Mountain	Whitefish	28	22
1/19/2017 and 1/22/2017	Introduction to Avalanches- Motorized	Flathead Valley Community College and Canyon Creek, Flathead National Forest	Kalispell and Columbia Falls	10	1
1/22/2016	WLP Winter Trails Day	Lion Mountain	Whitefish	14	4
1/24/2017	General Avalanche Awareness	Flathead Vo-Ag	Kalispell	18	17
1/31/2017	WLP Youth	Lion Mountain	Whitefish	24	20
2/7/2016	WLP Youth	Lion Mountain	Whitefish	25	20
2/12/2017	General Avalanche Awareness DREAM	WMR	Whitefish	22	
2/16/2017	General Avalanche Awareness-Ladies	The White Room	Whitefish	21	8
2/17/2017	WLP Youth	Lion Mountain	Whitefish	27	24
2/20/2017	Ruder Elementary		Columbia Falls	93	90
3/4/2017	Beacon Rally	Bonsai	Whitefish	45	5
3/7/2017	WLP Youth	Lion Mountain	Whitefish	32	28
3/9/2017	General Avalanche Awareness/Wet Snow-Motorized	Penco	Kalispell	10	2
3/10/2017	FVSEF Coach Awareness Talk	WMR	Whitefish	10	0
3/11/2017	FVSEF Youth Field Day	WMR	Whitefish	36	32

3/15/2017	Whitefish Middle School 5th Grade	WMR	Whitefish	38	32
3/16/2017	GHS Earth Science Avalanche Awareness	Glacier High School	Kalispell	153	150
3/21/2017	Olney-Bissell Outdoor Club Avalanche Awareness	Olney-Bissell	Whitefish	17	16
3/23/2017	Sam Kavanagh @ Edgerton	Edgerton Elementary	Kalispell	128	125
1/7/17 to 3/15/17	FNF Winter Safety	WMR	Whitefish	297	229
4/6/2017	Whitefish Independent High School	WIHS	Whitefish	18	16
			Total	1629	970

Table 4: Participant totals of avalanche education component of FAC and Flathead National Forest.

All classes (taught by Friends and Center)	All students	Motorized specific classes	Motorized Users
38	1629	6	86
Students (<21 y/o)	Awareness Classes	Intro. To Avalanches Classes (2-day)	School Visits
970	11	6	6

Finances

The Avalanche Center was funded and supported by federal dollars, grants, and community partners. The Friends of the Flathead Avalanche Center (FOFAC) (a 501(c)3 organization) was able to work with community partners in a wide variety of ways. Federal and state contributors include the U.S. Forest Service Region 1, Glacier National Park, Flathead National Forest, the United States Geological Survey, and yearly grants from Montana Department of Fish Wildlife and Parks Recreation Trails Program. Flathead Valley Community College also provided assistance by compensating instructors for the Introduction to Avalanches classes in conjunction with FOFAC.

Table 5: Income for the Flathead Avalanche Center Winter 2016-2017.

Forest Service cash (\$)	63,000.00	Flathead National Forest and U.S. Forest Service Region
Forest Service office, vehicles, & in-kind (\$)	5,200.00	Flathead National Forest
Glacier National Park cash (\$)	23,000.00	Glacier National Park for general avalanche center operations within and around GNP and training for GNP staff.
Other agencies cash(\$)	35,000.00	Montana Department of Fish, Wildlife and Parks (FWP) Recreational Trails Program (RTP) Grant
Other agencies cash(\$)	3,000.00	U.S. Border Patrol funding for avalanche education for their staff.

Other agencies in-kind (\$)	3,000.00	Kootenai National Forest for their own avalanche specialist that produced a 1x/week snowpack summary for Kootenai NF. FAC hosted this advisory and posted it for KNF personnel.
Outside support in-kind (\$)	10,800.00	FOFAC assisted with support for weather station maintenance, Northern Rocky Snow and Avalanche Workshop, and avalanche education. Flathead Valley Community College provided funds for instructors for the Intro to Avalanches workshop.
Total Budget(\$)	143,000.00	

Observations

The Observations page was developed to provide a simple, quick method to use crowd-sourced information to assist avalanche specialists with additional field data related to avalanche, snowpack, and weather. These additional data helped improve advisory accuracy and provide an additional resource for backcountry users. The need for this observation network is based on the fact that the FAC advisory provides an avalanche forecast that covers a large geographic area, and objective accuracy of the FAC advisory is dependent on the amount of data available from different locations within the advisory area. Simply, the more useful data available to FAC avalanche specialists, the more accurately the FAC advisory will represent current conditions.

Thank you to all of you who provided us with important and valuable observations! There was a steady flow of observations this season from the beginning through early April. A total of 162 observations from the public and cooperating professional organizations were posted on the FAC website. The Friends of the Flathead Avalanche Center also conducted a raffle to those who submitted observations during the month of February and March. The winner was selected at random and awarded a \$50 gift card to their favorite local outdoor retailer. It was a noticeable success with observation submissions increasing in both of those months.

We also greatly appreciate the support and continual data flow from Ted Steiner and Adam Clark of the BNSF Railway Avalanche Safety Department as well as the professional ski patrol at Whitefish Mountain Resort, particularly Lloyd Morsett. Their expertise and observations are a tremendous asset to the avalanche specialists of FAC. FAC is looking forward to continuing to work with these partner avalanche professionals in the future.

Volunteers

Volunteers for FAC were extremely valuable and without their efforts much of the work we do would not be possible. These volunteers assisted with field days as well as educational classes and the Northern Rockies Snow and Avalanche Workshop (Figure 10). We at FAC personally extend our gratitude to these amazing individuals:

Brock Bolin
Seth Carbonari
Jen Carpenedo
Adam Clark
Jenny Cloutier
Kim Corrette

Laura Fay
Zach Gidley
Chelaine Keyser
Zach Miller
Lloyd Morsett
Amy Moore
Craig Moore
Dan'l Moore
Kevin Oberholser
Conor O'Neil
Emily O'Neil
Michael Reavis
Louis Schmidt
Ted Steiner

These volunteers donated over **700** hours to FAC this season! This is an astonishing amount of time from dedicated individuals, and we at the FAC greatly appreciate everyone's time.

Partnerships:

The FAC strengthened existing partnerships and forged new ones this season.

One of the part-time forecaster positions for the FAC was funded by the U.S. Geological Survey Northern Rocky Mountain Science Center (USGS). This is a great example of interagency cooperation focusing on both an applied/operational program as well as combining it with a research component, and we hope to continue working with the USGS and their research component improve our forecasting operations.

One extremely valuable partnership exists with Glacier National Park. The National Park Service supported the FAC this year both financially and through observations from GNP rangers. All of their assistance is greatly appreciated and, without their support, the FAC would not be able to function as a Type 1 avalanche center providing daily advisories and robust education.

The FAC also partnered with Flathead Valley Community College (FVCC) for the Introduction to Avalanches classes. This was a very important collaboration as FVCC provided instructor compensation, logistical support, and classroom space. We hope to continue this relationship with FVCC into the future, and truly enjoy working with the folks in the Continuing Education Department at FVCC.

Another great partnership exists with Whitefish Mountain Resort. The Ski Patrol has been invaluable in assisting with some maintenance of the Big Mountain Summit weathers station as well as providing ease of access for FAC personnel when necessary. Additionally, their snowpack and avalanche observations are an asset to our forecasting operations. The the BNSF Railway Avalanche Safety Department continues to provide a partnership for observation sharing and remote weather stations. We greatly appreciate the support and value our partnerships with these two professional organizations.

The FAC also continued to collaborate with the Flathead Snowmobile Association, Penco Power Products, and Fastoys in Kalispell to provide free motorized specific avalanche education seminars. These businesses hosted classes and often provided discount and raffle items to attendees. Jesco Marine and Power Sports sponsored a companion rescue event in Whitefish. FAC also partnered with Sportsman & Ski Haus, Stumptown Snowboards, and Rocky Mountain Outfitter to host general avalanche awareness classes as well. These retailers also offered discounts on avalanche safety gear. The generous support of these community retailers continues to foster a thriving and educated backcountry community.

The FAC partnered with the Flathead Beacon, RoundUp for Safety, The Whitefish Community Foundation, Whitefish Mountain Resort and FOFAC to produce a 5-minute avalanche education video titled “Ride Another Day”, which targeted toward backcountry use adjacent to the Whitefish Mountain Resort boundary. (<https://www.youtube.com/watch?v=YO6nlxQyzdA>) Last year, the FAC, Flathead Beacon, Flathead County Search and Rescue, North Valley Search and Rescue, and Two Bear Air Rescue produced a successful 30 second public service announcement for motorized users.

For this year’s video, FOFAC received a Round-Up For Safety Grant through Flathead Electric Cooperative. These organizations provided financial support for this project and the final video was unveiled at the Northern Rockies Snow and Avalanche Workshop. This is a tremendous educational opportunity that allows us to reach a wide and broad audience, and showcases the Flathead Avalanche Center’s goal and purpose.

The FAC also worked with Flathead Nordic Backcountry Patrol (FNBP) during the field days of the Introduction to Avalanches courses. FNBP’s involvement was essential to accommodate the participation of these popular courses. FNBP also worked with the Flathead National Forest and completed backcountry educational patrols to help educate backcountry users about general avalanche conditions and to provide informal evidence of the safety gear carried by backcountry travelers.

The National Weather Service-Missoula (NWS) continues to be a strong operational partner with FAC in assisting with weather products as well as disseminating avalanche information via their numerous outlets, including social media. The NWS expands the reach of FAC’s avalanche warnings by publishing these products.

The Flathead National Forest and FAC hosted a weekly snowpack summary for the Kootenai National Forest. FAC staff provided avalanche advisories for the Flathead National Forest advisory area while Kootenai National Forest staff focused their efforts in the Cabinet and Purcell mountain ranges on the Kootenai National Forest. Ben Bernall served as the avalanche specialist for the Kootenai National Forest this year.

Friends of the Flathead Avalanche Center (provided by Jenny Cloutier)

FOFAC volunteers invested substantial time in continuing the mission of financial support of FAC and delivering lifesaving avalanche education and resource opportunities for Northwest Montana. For more information about FOFAC email friends@flatheadavalanche.org.

Current Board of Directors:
President - Mike Block
Vice President – Ronald Bachrach
Secretary – Lloyd Morsett
Treasurer - Roland Frey
Dow Powell
Ted Steiner
Ben Parsons – In Memoriam

FOFAC's mission is to financially support the Flathead Avalanche Center and to save lives through avalanche education. A variety of event income, grants, and private donations came together to make for the organizations most successful year financially. This was the organization’s most productive year since its inception on the educational front, with more courses than ever before and a considerable increase in students reached.

The Northern Rockies Snow and Avalanche Workshop (NRSAW) is FOFAC’s largest event of the year and fits perfectly with the group’s mission. This educational event provides the community with lectures from world

renowned experts in the snow science field and raises considerable funds for future educational offerings. Over 200 attendees gathered at Whitefish's O'Shaughnessy Center for this day long learning opportunity that generated over \$7,000.

In addition to the Avalanche Safety Workshop, FOFAC was involved with several other successful fundraising events. The Great Fish Community Challenge, sponsored by the Whitefish Community Foundation (WCF), helped raise \$24,155. FOFAC also had outstanding community support through our annual Snowball held at the Great Northern Bar as well donations from private individuals and businesses.

FOFAC was very successful this season in supporting the Flathead Avalanche Center's increased education and outreach to the winter sports community. Our program offerings continue to grow this year with FAC reaching 1,645 class participants. Of those students, 970 were under the age of 21. Outreach to local youth and the motorized community increased considerably this season. More than 600 additional youth participated in avalanche educational programming and we added a number of various motorized courses.

A few highlights on the youth education season included a new partnership with the Flathead Valley Ski Education Foundation and the Whitefish Mountain Resort Freestyle Ski and Snowboard Team, increased classroom visits, and the addition of a Snow Safety Educational Trunk. This trunk, available for check out through the Flathead National Forest, provides local educators with various lessons and materials to help students better understand the mechanics of avalanches and safe travel in avalanche terrain.

On the motorized front, two additional free courses were provided this season and the Motorized Introduction to Avalanches course, provided in conjunction with FVCC, saw a threefold increase in participant numbers. FOFAC also teamed up with Jesco Marine and Power Sports to produce a Beacon Rally at the Bonsai Brewing Project in Whitefish. This new companion rescue training event saw 45 participants visit various stations to hone their avalanche transceiver, probe and shoveling skills.

FOFAC volunteers invested substantial time in continuing the mission of financial support of FAC and delivering lifesaving avalanche education and resource opportunities for Northwest Montana. For more information about FOFAC please email friends@flatheadavalanche.org.

Table 6: Donation structure and number of supporters for FOFAC for 2016-2017 season.

Extreme - Sponsors who donated more than \$500



AGL Foundation



Becky Smith-Powell



Morgan Stanley Global Trust



Tom & Therese Quinn Fund



High - Sponsors who donated between \$250 and \$499

Bayne Family Fund	Jim Watson & Carol Bibler	Kramer Family Fund	NW Imaging
Glacier Guides Montana Raft Co.	Kalispell Brewing Co.	Mammut	Seth Carbonari
Great Northern Brewing Co.	Kim Corette	National Ski Patrol	Whitefish Mountain Resort

Considerable - Sponsors who donated between \$100 and \$249

Anders Broste	Kent & Kim Taylor	Parkside Credit Union	Ron Bachrach
Fred & Sarah Jones	Kim Givler	Replay Sports	The White Room
Jeremy Rossman	Mike Block	Roland Frey	Whitefish Lake Services
Karen Perser			

Moderate - Sponsors who donated between \$50 and \$99

Adam & Aubrey Clark	Gary Danczyk	Martha Hunt	Sydney Lillard
Alan Myers-Davis	Kellsey Perkins	Matt Baldwin	The Cuisine Machine
Becca Wheeler	Kim Richards	Matt Kennedy	Tim Strand
Coon Hollow Forge	Linda Engh-Grady	Nancy Sugars	Whitefish Freestyle Team
Courtney Feldt	Louis Schmidt	Ron Brandt	William Sugars
David & Jeannine Trousdale	Marc Sugars		

Low - Sponsors who donated between \$25 and \$49

Allison Withey	Charles Cameron	Grete Gansauer	Jerry Lundgren
Brigid Fray	Debbie Huntington	Jen Mittelstadt	Mike McCabe
Burket Kniveton	Don Lewis	Jenny Cloutier	Robert Novy

The Future of FAC

The Flathead National Forest has outlined a general plan looking into the future for the FAC.

2018 Goals:

- Continue training and staffing with 1 full time avalanche director/avalanche specialist, and 2 full time avalanche specialists, with continued support from professional observers. Work towards expanding the staff to include a lead avalanche specialist.
- Continue to provide and improve upon the quality and accuracy of daily avalanche advisories
- Expand the forecast boundaries of the Whitefish Range to include the northern range, and potentially expand the forecast area to include areas near Lake MacDonald in Glacier National Park.
- Organize a fall meeting for all agency, organizations, individuals, and partners involved with avalanche information and education.
- Continue partnership with Friends of the Flathead Avalanche Center group to actively support community outreach and public involvement. Expand fundraising efforts to support the FAC's mission and operating budget.

- Continue to provide Avalanche Awareness, Introduction to Avalanches, and motorized specific classes.
- Increase public observations through creative outreach methods and improved observation platforms.
- Increase and improve social media presence to reach more users.
- Be responsive to requests for short avalanche education classes such as evening classes, one day field days, or other requests that can be accommodated within the given budget.
- Continue working with partners that share common goals and working relationship; i.e. GNP, USGS, The Patrol Fund Inc., FNBPA, and others.
- Accept community support when and where appropriate
- Respond when an incident occurs and work closely with all rescue agencies and personnel involved. Prepare a timely report on incident.
- Write the Montana Fish, Wildlife, and Parks Recreation Trails Program grant for funding.

FAC would like to extend our gratitude to all of the partners, collaborators, volunteers, supporters, and USDA Forest Service personnel who helped FAC produce advisories, teach classes, provide observations, and generally help in disseminating avalanche information. Thank You!

Any questions regarding this report or the Flathead Avalanche Center can be directed to Zach Guy, 406.407.1394 or zach@flatheadavalanche.org.

References

NRCS (National Resources Conservation Service). 2017. Snow Telemetry (SNOTEL) and Snow Course Data and Products. <https://www.wcc.nrcs.usda.gov/snow/>. Last accessed: June 19, 2017.