
THE FLATHEAD

AVALANCHE CENTER

AND FRIENDS OF THE FLATHEAD AVALANCHE CENTER



2020-2021
ANNUAL REPORT

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THE FLATHEAD AVALANCHE CENTER

Background

The purpose of the Flathead Avalanche Center is to prevent the loss of human life, limb, and property by human and naturally occurring avalanches through information and education to the community. The FAC operates as a Type 1 Avalanche Center. With four full-time forecast staff, a professional observer, and an intern program. Current resources allow for daily avalanche forecasts and fieldwork for three zones: the Swan Range, the Whitefish Range, and the Flathead Range and Glacier National Park. This season, the FAC issued 184 products, starting on October 19, 2020, and finishing on May 19, 2021. The center conducted regular fieldwork and daily forecasts for 124 days, starting on December 9, 2020, and ending on April 11, 2021.





DIRECTOR'S SUMMARY



*Written by Blase Reardon
Director, Flathead
Avalanche Center*

What a winter. Rising backcountry use, a growing audience for FAC and FOFAC products, COVID protocols, difficult access and riding conditions, a treacherous mid-season weak layer, and a spate of near-misses and accidents. The FAC and FOFAC staff are, however, experienced, dedicated, and adaptable, so the teams weathered the ups and downs with humor and innovation. They made what felt daunting at first – my first season as FAC Director – feel much easier and smoother than it should have. A huge thank you to them, to all the volunteers who assisted with FAC’s fieldwork and classes, to our partners at Whitefish Mountain Resort, to the program’s supporters at the Flathead National Forest and Glacier National Park, and to everyone who contributed observations, near-miss or accident information, or donations. We couldn’t have fulfilled our mission without such contributions and support. We’re looking forward to building on this winter’s lessons in coming winters, and continuing to find new ways to create more effective products. Please let us know if you have any ideas or suggestions.

STAFF AND OPERATIONS

Overview

The Flathead Avalanche Center operates as a program of the Flathead National Forest, with financial contributions from Glacier National Park, the Montana Recreation and Trails Program, and the Friends of the Flathead Avalanche Center, a non-profit partner. The center is based out of the Hungry Horse Ranger Station in northwest Montana. For the 2021 season, the FAC was staffed by four avalanche specialists and a pro observer, all of whom brought a wealth of diverse experience to the team.



STAFF AND OPERATIONS

Meet the Flathead Avalanche Center Staff



Blase Reardon
Blase stepped in as Director after two seasons as Lead Forecaster and 16 seasons forecasting in Montana, Idaho and Colorado.



Clancy Nelson
Clancy held steady for his third year following 12 years of on-the-snow professional experience in the Eastern Sierra.



Mark Dundas
Our most seasoned forecaster, Mark, returned to daily operations after a year on medical leave.



Cameron Johnson
Cam applied his 6 years of ski patrol and snow safety experience in Utah to his second season as part of the forecast team.



Guy Zoellner
Guy contributed to the fieldwork and educational efforts as a part-time professional observer.



Chris Prew
The program is supervised by Chris Prew, the Recreation Program Manager for the Flathead National Forest.

20-21 Interns

Zach Armstrong, Jeremy Primmer, and Sarah Williams served as the FAC's interns this season.



The center also draws on the resources and staff from the Hungry Horse - Glacier View Ranger District for field and administrative support.

Meet the FOFAC Staff



Emily Struss
Emily is the Director at FOFAC, helping to organize various programs and fundraising efforts on behalf of the Center.



Meg Killen
Meg returned for her second season serving as the Education Coordinator helping orchestrate our education programs throughout the season.




Kira Frye
Kira returned for her second season serving as the Education Associate and Mentorship Coordinator.



SHARING OUR STORY IN 20-21

Overview

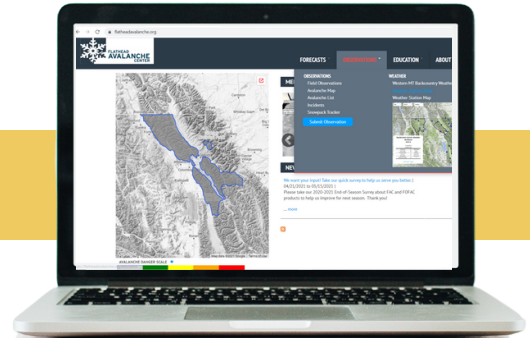
Over the past year, the Flathead Avalanche Center was featured in at least 24 media pieces, including television, newspaper, online news, podcasts, and radio outlets from regional to national level. The media subjects most frequently focused on avalanche conditions, particularly during periods of heightened danger. Some also highlighted education, avalanche accidents, research, resources provided by the center, and more.



A stout melt-freeze crust extents up to at least 7200' on southerly aspects. Skyland area 3/9/21

WEBSITE

FLATHEAD AVALANCHE.ORG



The FAC website is the primary source for communicating avalanche information to the public. The website houses all of the avalanche forecasts, observations, media, reports, and other information provided by the FAC. FOFAC owns the website and funds website maintenance and development. A data visualization tool called Snowpack Tracker allows forecasters and public users to view trends in weather station data, avalanche activity, and danger ratings (snowpacktracker.com/fac/seasontracker).

Website statistics have been collected since the introduction of the new site in November 2012. Site visits and use show substantial growth during this time period. This year's website statistics show the second most dramatic growth since the website was born, highlighted by a 43% increase in unique visitors. Website page views have more than doubled since 2015. The FAC emails daily avalanche forecasts to a growing list of email subscribers which increased to 1,412 users this year.



SOCIAL MEDIA

Details by Site



@friendsoflatheadavalanchecenter

We have 4,057 followers, up from 3,737 last season.



@flatheadavalanche

We have 5,699 followers, up from 4,116 last season. Instagram is the most common way folks are engaging with us through social.



@FACAvalanche

We have 769 followers, up from 697 at the end of last season.



FlatheadAvalanche

232 Subscribers to our YouTube account. Our most popular video of the season was posted on 2/23/21 entitled "Instability O'Plenty"

RADIO

For the third season, the Flathead Avalanche Center broadcast daily avalanche summaries on four regional radio stations (FM 96.5 - KGEZ, FM 98.5 - KBBZ, FM 103.1 - KRVO, and AM 600 - KGEZ). The summaries highlighted the bottom lines and danger ratings for the region. The four stations aired the one-minute clips every morning during the daily forecast season.

TV

Hard at work: Up close look at routine of a Flathead Avalanche



The team got on TV a handful of times this season to report on conditions and an up-close on what it's like to work for the Avalanche Center.

NEWSPAPERS/ ONLINE NEWS

Several features in local and national media highlighted the FAC staff's expertise and perspectives.

An Unforgiving Winter
 RECREATION
 Avalanche fatalities nationwide this winter have already surpassed yearly averages, while the increasing ages of victims reveals experience does not necessarily equal expertise
 2/11/2021

Knowledge is power in the backcountry
 By Daily Inter Lake
 February 11, 2021 12:00 AM
 It's been a devastating week in the U.S. backcountry with avalanches claiming the lives of 15 people, the most in a seven-day stretch this year, 21 people have died in avalanches in the U.S. — and it's only February.
 Sadly, among those killed was a local man snowmobiling with friends last weekend on terrain in Swan Range east of Kalispell.

Old Dogs, New Tricks: Community-Building Communication
 February 11, 2021
 This post by Flathead Avalanche Center Director Blaise Reardon originally appeared on the FAC's Forecaster's Corner, where Flathead Avalanche Forecasters and other avalanche professionals contribute to the conversation on the current avalanche situation. It's being reprinted here with FAC's permission. You can check out the original article here, and poke around the Forecaster's Corner while you're at it.

Old dogs, new tricks: Community-Building Communication (part 1)
 Two recent backcountry encounters have prompted me to think more about an avalanche safety tool that doesn't get much mention in classes, forecasts, or research.

LINKS TO POPULAR ARTICLES

1. Flathead Beacon article announcing the installation of the new Tunnel Ridge weather station. [Click here for the full article.](#)
2. KPAX News Story highlighting rising avalanche danger. [Click here for the story.](#)
3. Daily Interlake Editorial urging daily use of FAC forecasts and continued USFS funding for the center. [Click here for the editorial.](#)
4. Flathead Beacon feature describing local and national avalanche accident trends for the 2021 winter. [Click here for the story.](#)
5. The Avalanche Review featured an article reprinting a FAC blog post about inter-community communications in the backcountry. [Click here for the article.](#)
6. KPAX News Story showing a forecaster's daily routine. [Click here for the story.](#)



PRODUCTS & SERVICES

DAILY PRODUCTS

Mountain-range specific avalanche forecasts are a powerful public safety tool; they allow forecasters to highlight which areas are most dangerous on a given day, thus giving travelers the resources to make more informed decisions. We issue daily forecasts for three zones; when conditions are similar, we combine them into one product. We split the forecast into two or three distinct products when conditions between zones necessitate different bottom lines, avalanche problems, or problem descriptions. The discussion remains the same for all products because it tends to highlight the rationale for different products or changes between days. The forecast season runs from early December to early April, bookended by early- and late-season snowpack summaries with no danger ratings.

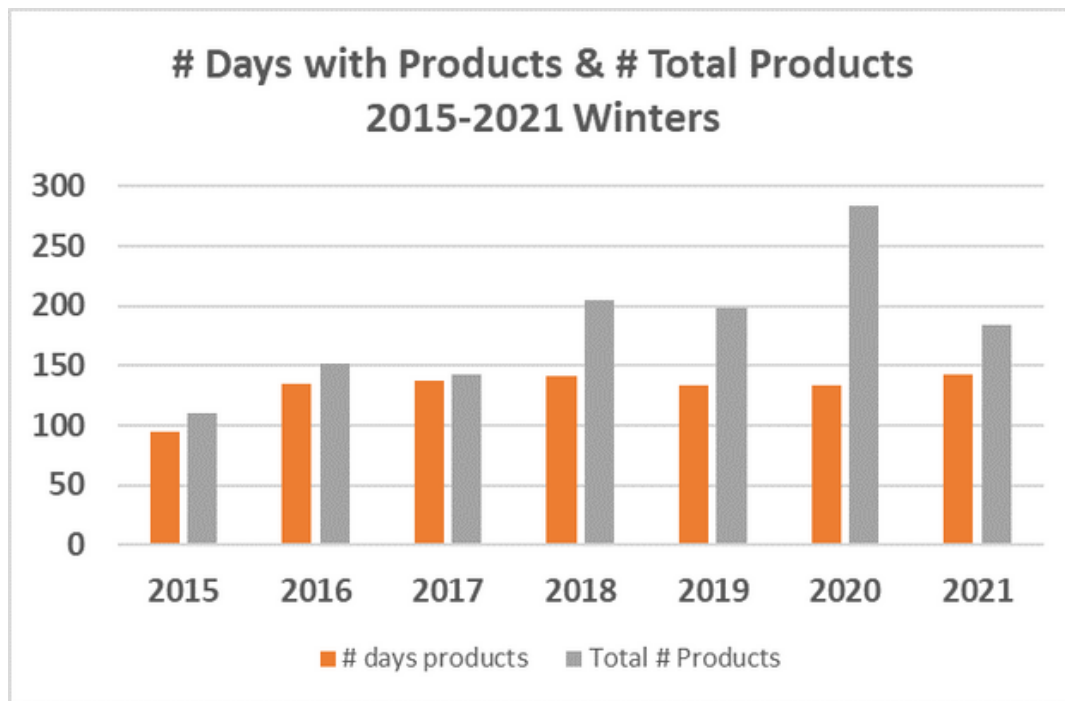


Chart 1: Columns represent the number of days the FAC issued products (orange) and the number of products issued (gray) for the 2015-27 winters. The FAC began issuing 7-day-a-week forecasts in the 2015-16 winter.

DAILY PRODUCTS

For the 2020-21 season, the FAC issued 184 products on 143 days (Chart 1). The products tally include early- and late-season conditions updates that don't list danger ratings and zone-specific forecasts during regular operations when danger ratings or problems differ between mountain regions. We issued our first conditions update on Oct. 19, about a week later than the average for the previous six seasons. We issued daily forecasts from Dec. 9 to April 12, a 124-day period slightly above the average (121 days) for the past seven seasons (Table 1). We continued issuing conditions updates until May 19 because of a significant late-season storm.

This winter's 143 days of products are slightly more than typical; on average, the FAC has issued products on 138 days for the past seven seasons. However, the total number of products decreased this season, down from 284 in the 2019-20 winter to 184 for 2020-21. That decline it appears is mostly due to common conditions across the three zones. In February, dangerous weather and avalanche conditions may have also contributed; they limited fieldwork, leading to less data that could help forecasters draw distinctions between zones.



Winter	# days products	Total # Products	1st Product	Start Daily Fx	End Daily Fx	Last Product	# Days D:
2015	95	110	Oct. 29	Dec. 6	Apr. 5	Apr. 5	120
2016	135	152	Oct. 28	Dec. 9	Apr. 10	Apr. 11	123
2017	138	143	Oct. 9	Dec. 5	Apr. 9	Apr. 30	125
2018	141	205	Oct. 2	Dec. 9	Apr. 8	Apr. 15	120
2019	133	198	Oct. 12	Dec. 9	Apr. 6	Apr. 15	118
2020	134	284	Sep. 22	Dec. 7	Apr. 5	Apr. 23	119
2021	143	184	Oct. 19	Dec. 9	Apr. 11	May 19	123

Table 1: Tallies of total products, days with products issued, and days of daily forecasts, along with start and end dates, for the 2015-2021 winters.

DANGER RATINGS

During the 124-day span from Dec. 9 to Apr. 11, the FAC issued 165 products which included danger ratings for one or more of the forecast regions' three zones (Chart 2). While the overall danger was most often Moderate (51% of products), nearly a third of products included an overall Considerable rating (31%).

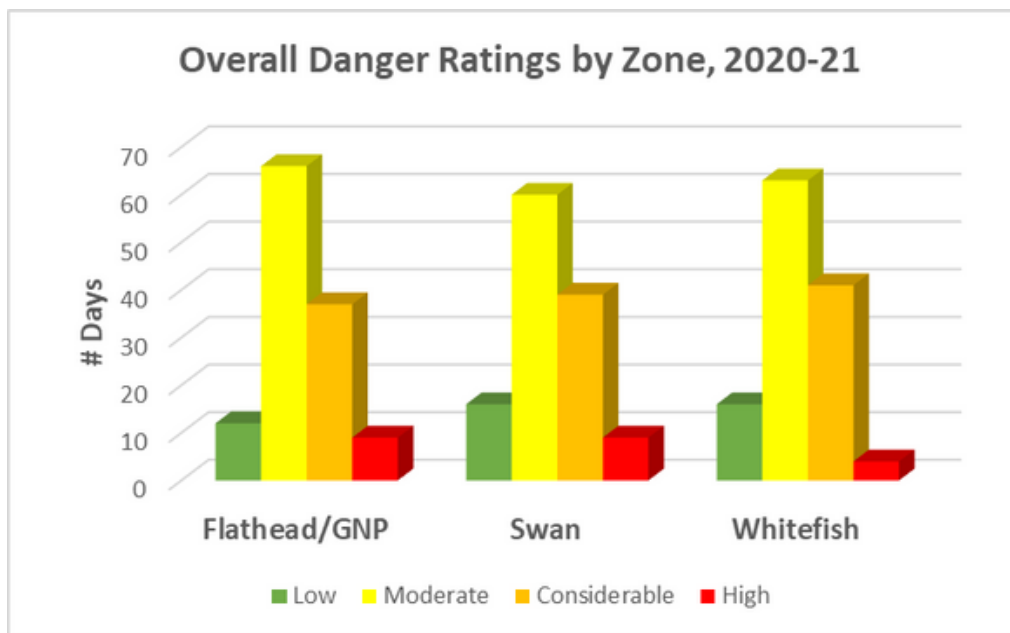


Chart 2: Columns represent the number of days the FAC forecasts listed the danger as Low (Green), Moderate (Yellow), Considerable (Orange), or High (Red) for each of the three zones during the 2020-21 winter.

The avalanche danger scale is exponential; the seriousness of avalanche conditions increases profoundly with each step up in the scale. Compared to previous seasons, the danger ratings during the 2020-21 season skewed higher (Chart 3), with over a third of products published with overall danger of Considerable or High (Table 2). These conditions were concentrated in February and included an unusual 5-day stretch of High danger (February 4-8).

DANGER RATINGS

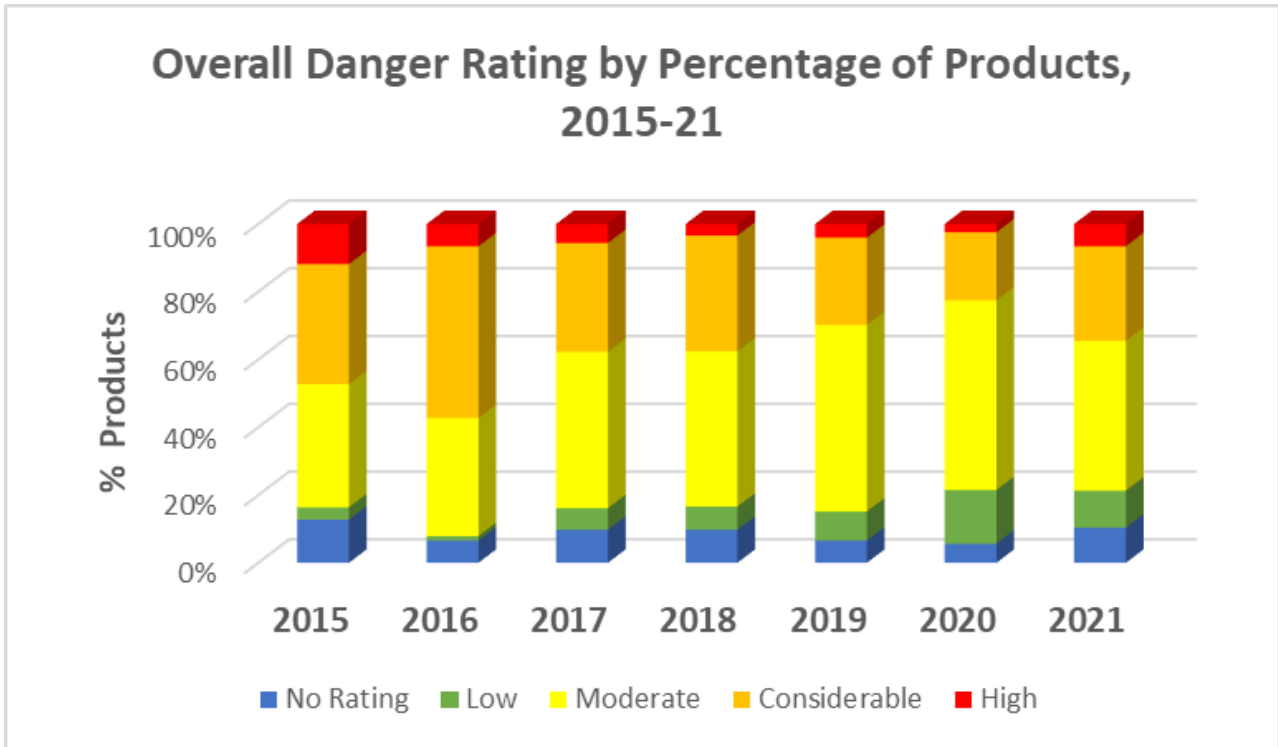


Chart 3: Colors represent the percentage of total products issued with a given danger rating for the 2014-15 to 2020-21 seasons. The total number of products per season varies from 95 (2015) to 284 (2020).

Zone	Low	Moderate	Considerable	High
Flathead/GNP	12	66	37	9
Swan	16	60	39	9
Whitefish	16	63	41	4
Number products	44	189	117	22
% Total	12%	51%	31%	6%

Table 2: Days at each overall danger rating for the three forecast zones for the 124 days we issued daily forecasts in the 2020-21 season.

OBSERVATIONS

Field observations are the key to accurate descriptions of avalanche hazards across the FAC’s roughly 1,600 mi² forecast region. They alert forecasters to snowpack variations and changes in weather conditions and help validate predicted avalanche activity. The FAC relies on observations from the public, FAC forecasters, and professional snow workers. The last group consists of workers collecting observations as part of their professional duties: FAC interns, paid observers, and professional forecasters at the Whitefish Mountain Resort, the BNSF Railway, and the Going-to-the-Sun avalanche safety programs.

In the 2020-21 winter, the FAC logged 517 observations between October 15 and April 29 (Chart 4, Table 4). That represents an 5% increase over the previous season, slightly less growth than in recent seasons. Most of that increase came in public observations, continuing a positive trend from the previous five seasons. Observations by FAC forecasters and snow workers declined by about 17 percent. The tallies for the two most recent years don’t include the 16 or 17 weekly summaries and videos produced each Friday and posted on the Field Observations page.

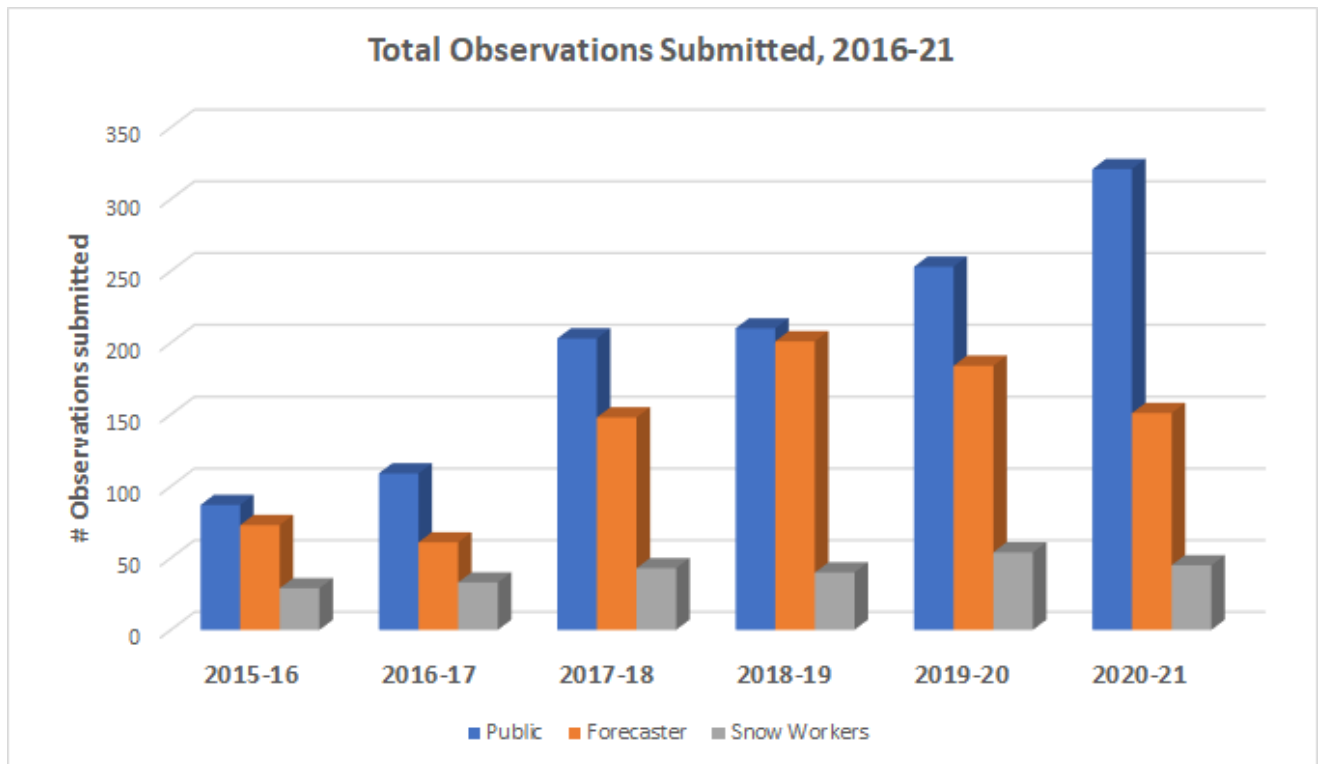


Chart 4

OBSERVATIONS

This season’s growth continues trends that started when the FAC became a Type 1 avalanche center in 2017. The total number of observations submitted in the 2020-21 season is 2.7 times what it was in the 2015-16 season (517 vs. 189). Even more importantly, the number of public observations is up nearly fourfold (321 vs 87). That trend reflects escalating backcountry use, heightened engagement with the FAC, and a growing appetite for FAC’s information.

Table 4: Tallies of observations by observer type for the 2016-21 winters

Winter	Public	Forecaster	Pro Observer	Total	Increase	% Increase
2015-16	87	73	29	189		
2016-17	109	61	33	203	14	7
2017-18	203	148	43	394	191	94
2018-19	210	201	40	451	57	14
2019-20	255	202	51	508	40	9
2020-21	321	151	45	517	26	5

The public observations also demonstrate a substantial investment by the parties who contributed them. Over 90 people submitted observations this season. The FAC offers a heartfelt, enthusiastic thank you to each of them.

HUGE THANKS!

5 or more observations

- Mark Ambre
- Joel Anderson
- Adam Clark
- Paul Fotter**
- Jake Frerk
- Kim Givler
- Rob Millsbaugh
- Jeremy Primmer
- Mike Reavis
- Ryan Spencer
- Sarah Williams
- Tom Whipple

15 or more observations

- Jackson George
- Chris Gotschalk
- Kevin Oberholser**
- Alex Slader
- David Steele

The time you devoted at the end of a day in the mountains helped us issue more accurate information the following morning. Thank you, all!

**CONGRATS

Two lucky observers took home a Patagonia Touring Backpacks this season. Huge thanks to Patagonia for the donation of packs and goods for 20-21 season! Randomly Drawn Name from all Observers: Paul Fotter
Most observations this season: Kevin Oberholser

OBSERVATIONS

The primary contributor in the Snow Workers category is the Avalanche Safety Program for the Burlington-Northern Santa Fe Railroad. The forecasters for this program, Ted Steiner and Adam Clark, share detailed observations for each day of their fieldwork. Those reports, along with their network of automated weather stations, improve our understanding of snow conditions in the southeastern corner of our forecast region, between Essex and Marias Pass. Many thanks to Ted and Adam of Dave Hamre Associates.

Other Snow Workers included the FAC's Professional Observer Guy Zoellner and the center's interns, Zach Anderson, Jeremy Primmer, and Sarah Williams. Lloyd Morsett at Whitefish Mountain Resort, Charles Hlavac at Teton Pass Ski Resort, and Erich Pietzsch and Gabrielle Antonioli at the USGS Going-to-the-Sun Road Forecasting program also shared their expertise.



SEASON SUMMARY

October/November

Heavy snow, scouring winds, Arctic cold, sustained warming: that was just three weeks in October and November. But unlike recent years, 2020-21's early-season conditions didn't create a weak layer that would haunt the region for months. Instead, the antagonist in this winter's story was an unusually reactive structure that formed in January and proved to be the culprit in 13 near-misses or accidents in the month that followed.

The FAC issued its first conditions report on October 19, after a week of storms left one to two feet of snow on the ground at upper elevations. The next three weeks saw an unusual sequence of weather events that ultimately affected riding conditions more than avalanche danger. Northerly and easterly winds scoured many upper-elevation start zones in the Flathead and Swan Ranges. Temperatures plunged well below zero near the Continental Divide as a bitterly cold Arctic air mass poured south from Alberta. The near-surface snow faceted. That might have been the setup for a nagging basal weak layer. Except that within days, Chinook winds and a wet Pacific storm arrived. Warm air and over an inch of rain ate away the snowpack. The effects were most pronounced in the Flathead Range, where the height of snow at the new Tunnel Ridge weather station (5895 feet) dropped from 22 inches to zero by Nov. 6. The loss of snow at low and mid-elevations would make access into popular areas in the Flathead Range difficult for the rest of the season.

By Thanksgiving, regular snowfall had rebuilt the upper-elevation snowpack. Start zones held two to four feet of snow, with the eastern half of the region favored. The FAC continued publishing conditions reports. At the end of the month, a strong high-pressure ridge settled over the region, bringing mild temperatures and blocking precipitation for nearly over 10 days at most stations.



SEASON SUMMARY

December

The FAC started daily operations on December 9, with **Moderate** avalanche danger at upper elevations in all three zones. Steady snowfall and strong westerly winds led to the season's first notable avalanche cycle near the Winter Solstice, with 40 D2's and a handful of D3's recorded December 20 to 22. One of those slides caught and briefly carried a ski patroller, the winter's first avalanche incident.

January

The New Year brought more snow, increasing winds, and the season's first **High** danger rating, for the Swan Range. The danger remained at **Moderate** or Considerable for the other zones. The steady snowfall markedly improved riding conditions at mid and upper elevations.

The winter's most significant storm arrived in mid-January. Weather stations above 6000 feet recorded 2.0 or more inches of SWE on January 12 and 13. The Hornet, Tunnel Ridge, and Aeneas Ridge stations reported wind gusts over 90 mph. Sadly, the storm closed with a sequence of temperature swings that left a two-month legacy. First, temperatures warmed above freezing and the snow changed to rain below about 7200 feet elevation. Within hours, a cold front swept through, plunging temperatures down to the teens and low 20s at upper elevations.



SEASON SUMMARY

January (continued)

The storm produced a remarkably widespread natural avalanche cycle. The FAC recorded over 240 natural avalanches. That number didn't fully reflect the extent of the cycle; there were simply too many slides to count. Nearly every slope steep enough to slide had in fact slid, most in avalanches large enough (D2) to bury or injure a person. Debris piles filled the runouts of start zones with little recent history of avalanches. Yet while widespread, the avalanches were limited in size; only about 10 percent were larger than D2. The minimal snow accumulation on the debris piles suggested the slides ran late in the storm, triggered by the increasing load, rapid warming, or rain.

Also left behind by the mid-January storm was an ice lens or melt-freeze crust 1 to 3 centimeters thick. Even in country where crusts are common, this one was heartbreaking. It capped one to two feet of low-density snow that could have made for epic riding. Instead, the riding was often downright dangerous. Where it wasn't supportable, it trapped boards, skis, and snowmobile skis, making turns nearly impossible. Where it was supportable, it was slick, creating slide-for-life conditions. More significantly, it created a bed surface for a lethal and lingering avalanche problem.

A storm on January 17 dropped over an inch of SWE in the Swan Range, while other areas saw about half that. The next ten days saw the longest dry spell of the winter, accompanied by generally cold temperatures. By the end of the month, the upper snowpack consisted of surface hoar and/or a few inches of faceted snow above the knife-hard, mid-January crust and ice. These extended to at least 7200 feet – the crest of the Swan Range, and near the summits of many peaks in the Whitefish and Flathead Ranges. The thought of burying this structure left the FAC staff and local avalanche professionals with long faces.



SEASON SUMMARY

January (continued)

Snowfall returned the last few days of January. The first few inches of snow accumulation were enough to produce reports of shooting cracks, whumping collapses, propagating snowpack tests, and remotely and unintentionally triggered avalanches. Snowfall rates and accumulations picked up the first few days of February. So did the size and number of triggered slabs, though natural avalanches remained isolated. By Friday, February 5, the slabs had thickened to several feet and were breaking the full width of start zones, often with remote triggers. The FAC started receiving reports of avalanche incidents. The first, on January 31, was a near-miss involving sidecountry riders in the southern Whitefish Range. The next day, a skier was caught and carried several hundred feet in the Flathead Range. The rider lost skis but escaped a full burial and significant injury.



February

As the week progressed, FAC staff grew increasingly concerned about the conditions. On February 4, the FAC bumped the danger in the Swan and Flathead to **High**, followed two days later in the Whitefish Range. The danger remained elevated until February 7 as storms continued loading the fragile weak layer above the January crust. While most of the region received over an inch of SWE in this period, the Noisy Basin SNOTEL recorded 3.8 inches, a substantial load over such a reactive weak layer.

SEASON SUMMARY

February (continued)

The combination proved fatal on Saturday, February 6, when a party of snowmobilers in the Swan Range triggered a large avalanche that caught all five of them. The group rode up the Wounded Buck drainage from Hungry Horse Reservoir. They parked in what they thought was a safe zone while one rider broke trail to the ridge. A slide hit the parked riders from above, likely triggered by the lead rider, who was out of sight at the time. The group freed their partially buried sleds and found the lead rider, who he had unfortunately passed. The accident was heartbreaking for many in the community.

Another pool of Arctic air poured over the Divide that weekend, shutting off the snowfall and plunging the region back into bitter cold temperatures. The avalanche danger and weather kept many riders out of the backcountry for the next week or ten days. As people trickled back into avalanche terrain, it quickly became apparent that the slab above the January crust and facets remained very reactive and dangerous. One February 12, a skier was caught and carried near Stryker Ridge, in the northern Whitefish Range. Two other incidents occurred on February 15, with a rider caught and carried near Ninko Cabin and a solo skier narrowly escaping a full burial in the sidecountry in the southern Whitefish Range. Two days later, a snowmobiler had a near miss in Canyon Creek. Three separate incidents occurred on February 20, one in each of the three zones. The most serious, on Doris Ridge in the Swan Range, involved a snow biker who was caught and carried. He rode out with what he thought were minor injuries but underwent surgery several days later.

The danger spike back up to **High** the following two days, when a storm dumped 0.6-2.5 inches of water across the region. Gusty westerly winds accompanied the snow. On February 23, a very large natural avalanche released in the Shed 7 west path above the Burlington-Northern Santa Fe Railroad. The debris ran over the snowshed. Avalanche mitigation the next day produced very large avalanches in three of the six paths tested. All released on facets above the mid-January crust, a month after they'd been buried. Two more incidents occurred in subsequent days, one in the Whitefish Range and another in the Skyland area of the Flathead Range.

SEASON SUMMARY

March

After a grueling February, March was anti-climactic. Warm, sunny days and cold nights produced an unusually early and robust melt-freeze cycle. Winter returned for the Spring Equinox; 1.5 to 2.5 inches of SWE accumulated over a four-day period. A cycle of natural loose snow and small, dry slab avalanches ensued. As temperatures warmed in the last days of the month, the wet snow avalanche danger bumped to Considerable, though the cycle wasn't especially widespread or large. The danger dropped back to Low and Moderate as temperatures dipped below freezing in early April. The FAC closed out its daily operations on April 11.

Post Season

An eventful month followed, with the FAC publishing eight conditions updates. On April 13, a skier triggered a shallow wind slab in the Flathead Range. The slide carried him about 1700 feet downslope, much of it under the surface of the debris.

Fortunately, he came to rest on top of the snow, relatively unscathed. Snowfall at the end of April seemed like the last hurrah. May 8, however, saw the largest one-day snow accumulation of the season – over 2.8 inches of SWE and at least 28 inches of snow in less than 14 hours. The storm was highly localized to the Swan Range, and other parts of the region saw only a few inches. The FAC issued eight its last conditions update on May 19.



NEAR MISSES & ACCIDENTS

Unfortunately, the number of reported near-misses and accidents spiked in the 2020-21 season, with more incidents than we can detail in this report.

Our accident reports and this summary aim to document what happened when things went wrong, in hopes readers can learn lessons that will keep them safer. We tally all three categories because all of them offer learning opportunities.

FOR OUR RECORDS, WE USE THE FOLLOWING DEFINITIONS:

- Near-miss: an unintentionally-triggered slide in which no one was caught but which had a high potential for burying, injuring or killing someone should something have gone differently.
- Incident: any time a rider comes into contact with moving avalanche debris.
- Accident: A person is partially or fully buried, injured, or killed by an avalanche.



NEAR MISSES & ACCIDENTS

These numbers reflect all of the incidents that people reported to us. Where possible, we confirmed details with at least one member of the party involved. Thank you to all of the groups that contributed to learning opportunities by sharing. Undoubtedly, there are other near-misses or accidents that go unreported.

Date	Location	Type	Caught	Partial Burial	Buried	Injured	Killed	D Size	Setting	Activity	Zone
Dec. 20	Whitefish Mtn Resort	I	1					2	Ski Area	Ski Patroller	Whitefish
Jan. 1	Stryker Ridge	NM						2	Backcountry	Mechanized Guide	Whitefish
Jan. 1	Crystal Creek	NM						2	Backcountry	Backcountry Tourer	Flathead
Jan. 31	Spruces	NM						2	Sidcountry	Sidcountry Rider	Whitefish
Feb. 1	Paola Ridge Wounded	A	1					2.5	Backcountry	Backcountry Tourer	Flathead
Feb. 6	Buck Creek	A	5	1			1	2.5	Backcountry	Snowmobiler	Swan
Feb. 6	Whale Creek	I	1					2	Backcountry	Snowmobiler	Whitefish
Feb. 12	Stryker Peak	I	1					2	Backcountry	Hybrid Rider	Whitefish
Feb. 15	Whale Creek	I	1					2	Cabin/ Yurt	Hybrid Rider	Whitefish
Feb. 15	Canyon Creek	A	1	1				2	Sidcountry	Sidcountry Rider	Whitefish
Feb. 17	Canyon Creek	NM						2	Backcountry	Snowmobiler	Whitefish
Feb. 20	Devils Hump	NM						3	Backcountry	Backcountry Tourer	Flathead
Feb. 20	East Doris Ridge	A	1	1		1		2.5	Backcountry	Snow Biker	Swan
Feb. 20	Dorothy's	NM						2	Sidcountry	Sidcountry Rider	Whitefish
Feb. 22	Doris Ridge	NM						1.5	Backcountry	Hybrid Rider	Swan
Feb. 27	Skyland	A	1	1				2	Backcountry	Snowmobiler	Flathead
Feb. 27	Stryker Peak	NM						2	Backcountry	Hybrid Rider	Whitefish
Apr. 13	Skiumah Creek	A	1			1		2	Backcountry	Backcountry Tourer	Flathead
Totals		8	14	4		2	1				

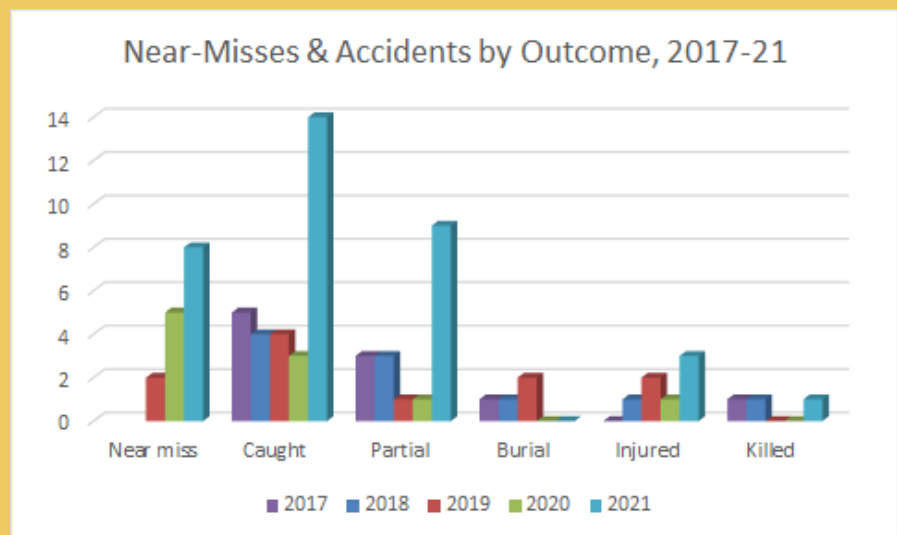
Outcomes for the eighteen near-misses, incidents, and accidents described in the text, along with characteristics for the riders involved and setting. In the "Type" column, NM = Near Miss, I = Incident, and A = Accident.

NEAR MISSES & ACCIDENTS

February saw 13 of the season's 18 near-misses and accidents, a rate of nearly one event every other day. Increased use driven by the pandemic doesn't solely account for this spike, because other months did not see more events than typical in the past five winters. The culprit – apart from terrain choices – was a remarkably reactive snow structure that consisted of very weak snow on or just above the January 13 crust. The prolonged instability dissuaded many people from backcountry riding. So did bitterly cold temperatures in the middle of the month.

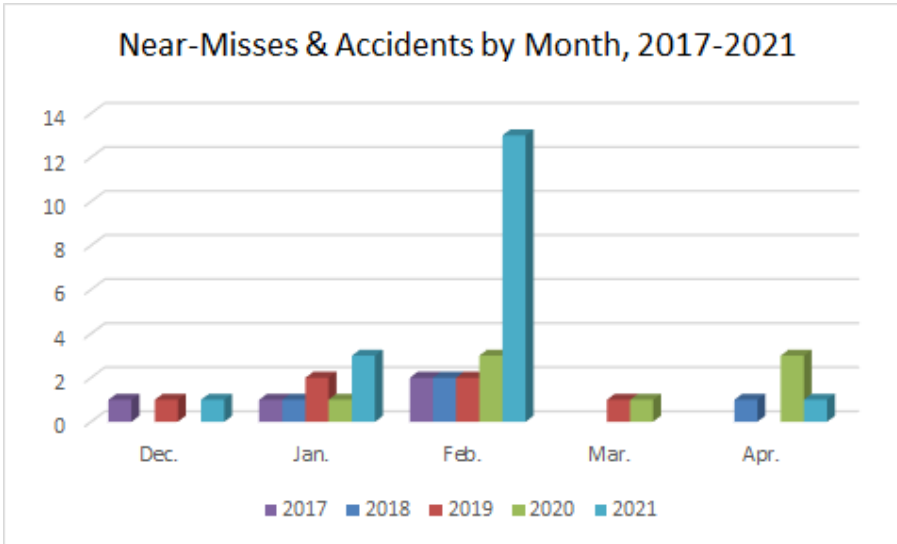
Had conditions been more favorable, the spike may have been even more pronounced. The February peak in the Flathead forecast region echoed a similar spike nationally. Over the 28-day period from January 30 to February 27, 27 people died in avalanches, an unfortunate record for any four-week period since World War II.

Reported near-misses and accidents by outcome for the 2017 through 2021 winters. The partial category also includes people injured or killed. The number of events more than doubled during the 2021 winter, driven largely by a spike in accidents in February, 2021



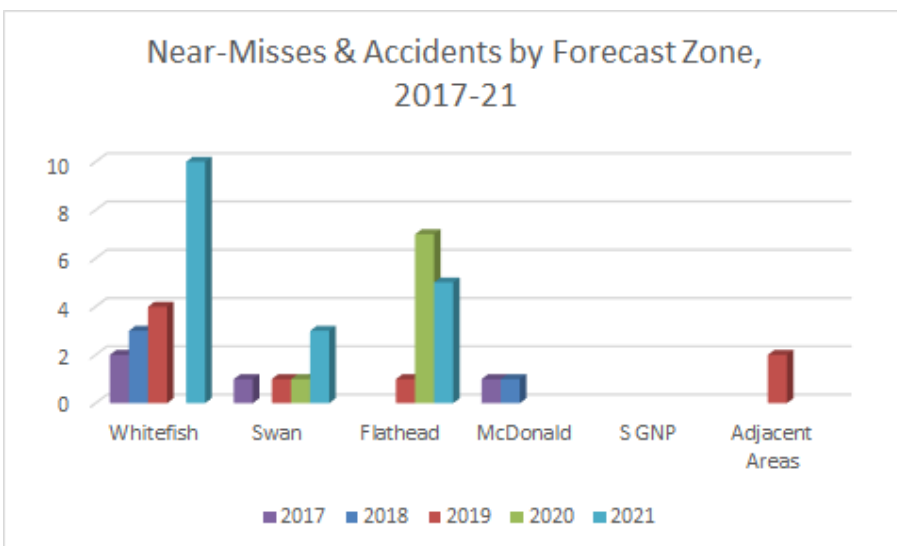
The season's reported near-misses and accidents were also concentrated spatially, with 10 occurring in the Whitefish zone. The concentration of events coincided with increased use in what is already the busiest part of the forecast region due to easy access from Whitefish Mountain Resort and groomed snowmobile trails. Difficult access and poor riding conditions likely account for a dip in the number of events in the Flathead zone. The season's most serious accidents occurred in the Swan Range. On February 6, five snowmobilers were caught in an avalanche in Wounded Buck Creek, on the east side of the Swan Range. Sadly, one of those riders did not survive. Two weeks later, a snow biker was partially buried and injured in a slide that broke on the same layer, also on the east side of the Swan Range. Though he managed to ride out, he underwent surgery a few days later.

NEAR MISSES & ACCIDENTS



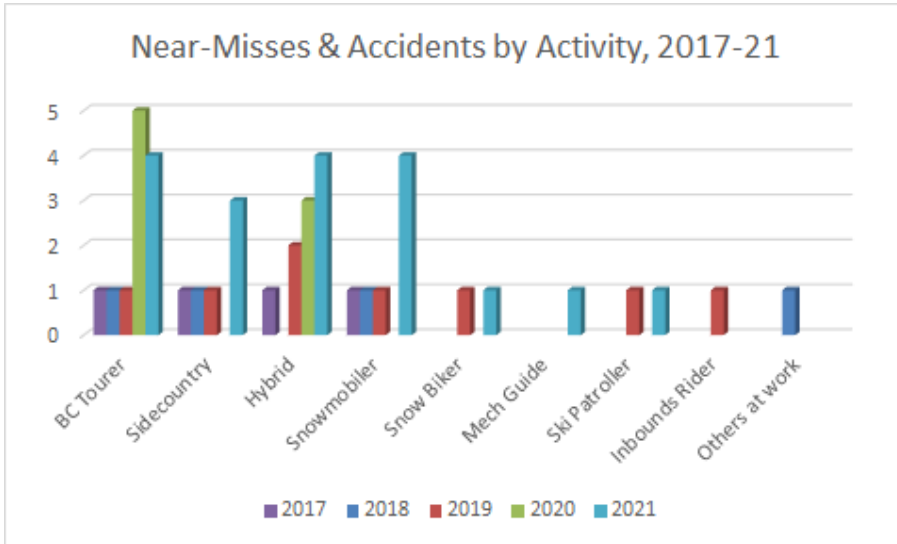
Reported near-misses and accidents by month for the 2017 through 2021 winters. While events are typically spread through the winter, 2021 saw a dramatic spike in February.

The parties involved in the reported near-misses and accidents were about evenly split between motorized and non-motorized activities. Four of the parties were traveling by snowmobile and one by snow bike. Those five parties comprise 28% of the season’s events, a percentage very similar to the percentage of fatalities nationally involving snowmobilers and snow bikers (30%) in the past decade. Four additional parties (“Hybrid Riders”) used snowmobiles to access skiing and snowboarding terrain, though the incidents occurred while they were on foot. The number of reported events involving Hybrid Riders in the forecast region has grown steadily in the past five seasons, perhaps as people seek out remote terrain to avoid crowding, perceived or actual. The remaining seven parties consisted of people who traveled by ski or snowboard from a trailhead (“Backcountry Touring”) or from a ski area (“Sidecountry Riders”).



Reported near-misses and accidents by Forecast Zone, 2017-21. The Flathead zone includes the Lake McDonald and southern Glacier National Park areas, though those areas are distinguished in this chart.

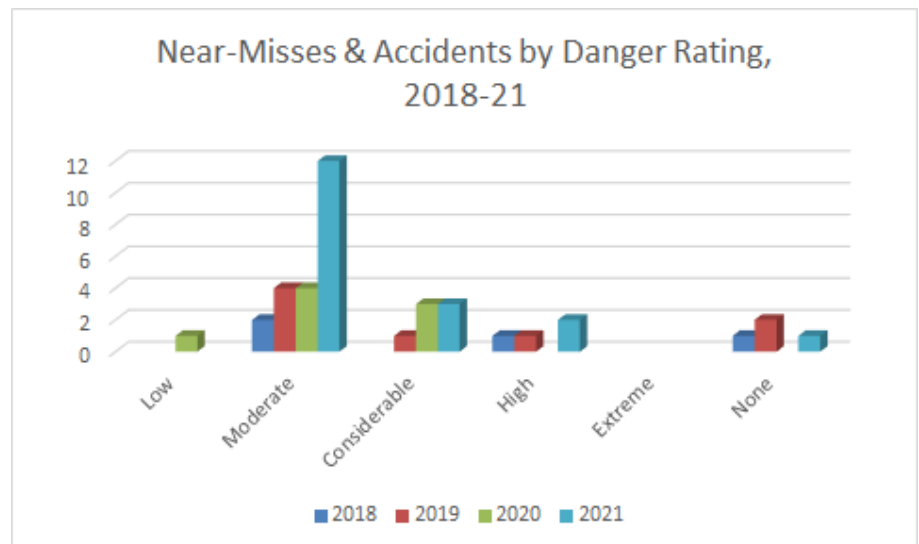
NEAR MISSES & ACCIDENTS



Reported near-misses and accidents by Activity, 2017-21. The activity categories follow those used by the Colorado Avalanche Information Center, which maintains the record of fatal avalanche accidents for the U. S.

The 2020-21 near-misses and accidents were distributed among the danger ratings similarly to other years, with one striking exception (Figure TK#). Two-thirds of the winter’s events occurred in terrain where the danger was rated as Moderate (Level 2 of 5). That’s three times the tally in recent years. We suspect that the lingering nature and reactivity of February’s danger contributed to this anomaly. It was perhaps one in ten- or twenty-year conditions and thus outside the frame of reference for many backcountry users. It left a classic Persistent Slab avalanche problem: few natural avalanches occurred yet specific slopes remained sensitive to human triggers.

Reported near-misses and accidents by danger rating for the terrain where the event occurred. In most cases, that rating equaled the highest rating for the day for that zone.



NEAR MISSES & ACCIDENTS

The number of accidents this season precludes a summary of each event. Let's hope that's not the new normal. For more details about the individual events, look for near-misses on our Field Observations tab, and incidents and accident on our Incidents page. Find them by date.

We're thankful to all the riders who reported events and corroborated details. That information goes a long way towards helping others in the backcountry community. Our deep condolences to the family and survivors of the February 6 accident in Wounded Buck Creek.



WEATHER STATIONS

We've been busy enhancing snow safety through weather stations installations in popular snow sports areas.

Automated mountain weather stations in the Flathead forecast region are sparse, particularly in comparison to other regions in the western US. Prior to the 2019-20 season, both the Swan Range and the Flathead range lacked wind stations at upper elevations. The Flathead Range was also short of precipitation sensors above 4400 feet.

After we installed the Aeneas Ridge wind station in 2019, we had ridgetop wind data to compliment the Noisy Basin SNOTEL station. That left only the Flathead Range lacking upper elevation weather data. In July of 2020, FAC staff and partners installed wind (6796 feet) and snow depth (5895 feet) instruments on Tunnel Ridge, on the east side of the range. Both stations also have temperature and relative humidity sensors. Data from the stations is telemetered into the BNSF avalanche safety network, operated by Dave Hamre Associates.

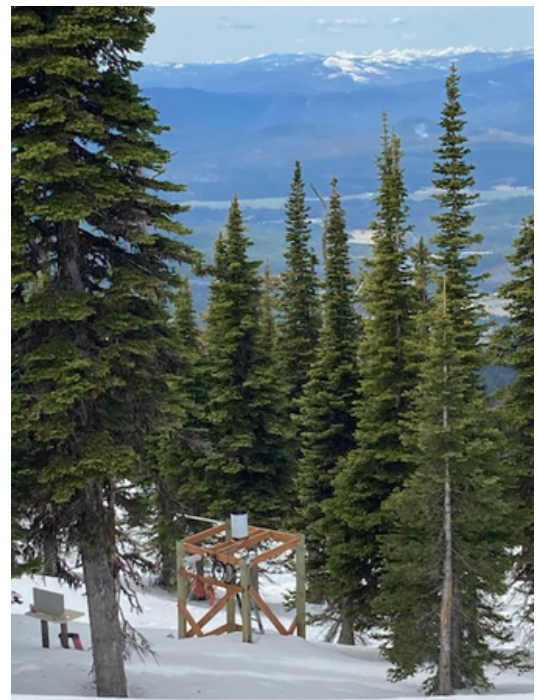


WEATHER STATIONS

The Tunnel Ridge stations worked almost flawlessly during the 2020-21 winter, and we relied on data from them daily. The stations provide data that reflects conditions in the popular east-facing drainages of the range, where terrain factors often produce locally intense storms that aren't apparent on other stations. It's hard to imagine how we did without!

The original station in the FAC network, at the summit of Whitefish Mountain Resort, has been operating since 2014. That's a long time in a harsh environment. The same conditions that produce the resort's famous snow ghosts are also notorious for riming up the wind sensors, making them inoperable. Cleaning the rime has required WMR patrollers to climb up to the sensors on icy ladders. In April, we replaced the existing sensors with heated sensors that minimize riming and ideally eliminate the need for people to climb to the sensors. The upgrade should improve the reliability of the data from the sensors and reduce a significant safety hazard.

Many thanks to all the people and organizations who made the Aeneas and Tunnel Ridge stations and the WMR upgrade possible! Foremost among these partners is the Round-Up for Safety program, which provided substantial grants for the Tunnel Ridge and WMR projects. Other key partners include BNSF Railway and Whitefish Mountain Resort. Special thanks to Dan Howlett, without whose unmatched expertise the stations would have succumbed to their harsh environments! Now, to get a wind station in the central Whitefish Range, above popular snowmobiling and skiing areas!



Huge thanks to these weather station program supporters!



2020-2021

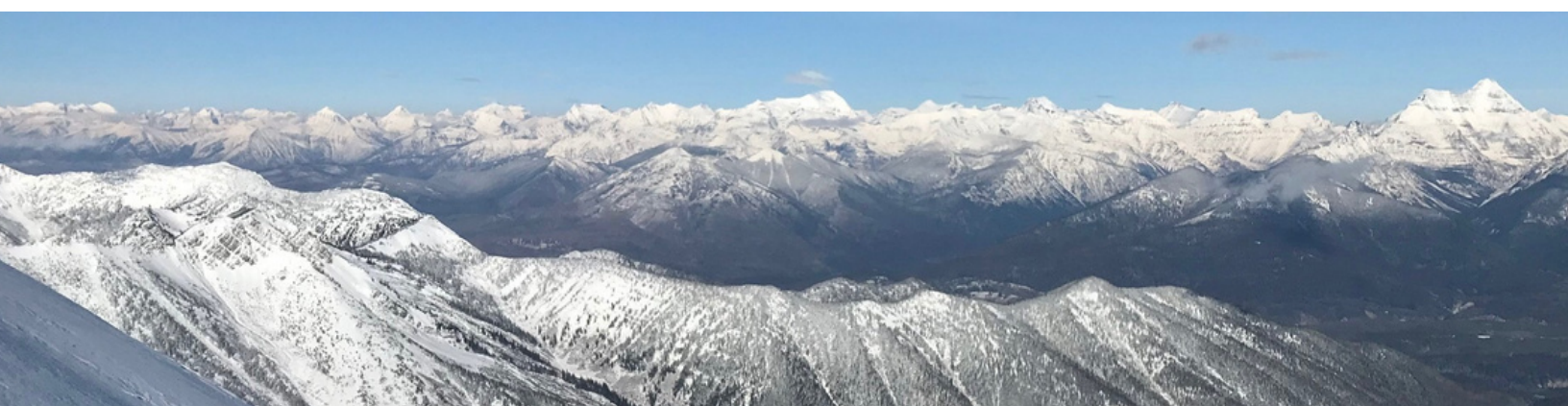
SEASON FINANCIALS

Overview

The Flathead Avalanche Center is funded through federal dollars, public and private grants, and community partners. The U.S. Forest Service Region 1, Glacier National Park, Flathead National Forest, and the Montana Department of Fish Wildlife and Parks Recreation Trails Program are the major federal and state contributors. The Friends of the Flathead Avalanche Center (FOFAC) is a 501(c)3 organization that leverages funding through grants, private donations, sponsorships, events, and other fundraising opportunities. FOFAC financially supports the avalanche center by absorbing the costs of the website, education programming, and various purchases and travel expenses. The USFS provides additional operational support outside of FAC’s budget including office space, administrative and vehicle support, and resources from other USFS programs.

FAC Expenses Table

Source	Value (\$)	Details
Forest Service	68,000	U.S. Forest Service, Flathead NF appropriated funding
Glacier National Park	23,000	Glacier National Park funding for avalanche center operations within GNP and training for GNP staff.
State of Montana	45,000	Montana Department of Fish, Wildlife and Parks (FWP) Recreational Trails Program (RTP) Grant
FOFAC	20,000	Contribution for wages and equipment
Total Cash Revenue	156,000	



FAC Expenses Table

Expense	Value (\$)	Details
Salary	149,004	Forecaster and pro observer salary
Vehicles	5,000	Maintenance and fuel for trucks and snowmobiles
Gear & Supplies	5,996	Uniforms, snow safety gear, and office supplies
Training & Travel	495	Registration for professional development
Total Expenses	160,495	
Source/ Expense	Estimated Value (\$)	Details
Forest Service in-kind	10,000	Vehicles, office space and maintenance, admin, supplies and field support
FOFAC: Snowmobile equipment	2,920	Maintenance, equipment, and upgrades for snowmobiles used for fieldwork and classes
FOFAC: Website	12,412	Website maintenance, services, and development
FOFAC: Weather Station	1,900	Summit weather station sensor upgrade
Whitefish Mountain Resort	2,000	Summit weather station platform upgrade
Total in-kind	29,232	

FAC In-kind Support

Source/ Expense	Estimated Value (\$)	Details
Forest Service in-kind	10,000	Vehicles, office space and maintenance, admin, supplies and field support
FOFAC: Snowmobile equipment	2,920	Maintenance, equipment, and upgrades for snowmobiles used for fieldwork and classes
FOFAC: Website	12,412	Website maintenance, services, and development
FOFAC: Weather Station	1,900	Summit weather station sensor upgrade
Whitefish Mountain Resort	2,000	Summit weather station platform upgrade
Total in-kind	29,232	

SAVING LIVES THROUGH EDUCATION

Overview

One of the primary areas of work for both the FAC and FOFAC is education. Getting participants in the field to touch and analyze snow is a crucial part of learning avalanche safety. The 2020-2021 season presented some challenges due to COVID but we didn't let that slow us down. We introduced our new Topics Class series, piloted a mentorship program, and grew our motorized audience. Overall, the 2020-2021 education season was a success and we look forward to incorporating a mix of in-person and virtual offerings next season.



20-21 CLASSES

1,188 PARTICIPATED VIRTUALLY

919 ATTENDED OR VIEWED NRSAW

186 YOUTH SERVED THROUGH TEN CLASSES

54 MOTORIZED PARTICIPANTS IN FOUR CLASSES

40 CLASSES SCHEDULED FOR THE 20-21 SEASON

3 MOTORIZED LEVEL 1 COURSES HOSTED THIS WINTER

1,682 STUDENTS SERVED

Motorized growth!

While we were forced to cap our classes at smaller numbers due to the pandemic, we hosted and engaged with the motorized community in the Flathead more than ever. Huge thanks to our friends at the Flathead Snowmobile Association for their work filling classes and getting this important curriculum in front of more motorized users.



20-21 CLASSES

Class Types

These are the types of classes hosted in the 20-21 Season:

Awareness Class

One hour class at a local establishment or online. They are public or private classes, following the Know Before You Go curriculum.

Topic Class

One-to-two hour virtual sessions on a variety of avalanche safety topics facilitated by FAC and FOFAC.

Tune-up Class

Two-to-three hour class that includes a refresher presentation, room for more Q & A, and one hour of instructed beacon park time.

Partner Rescue Class

Eight hour field course. One hour refresher and then hitting the hill for some hands-on practice.

Introduction to Avalanches

Two day, mixed classroom and field course. Three hour classroom session with a field day the following day. This caters to general users, ladies only, motorized, and other specialized user groups

Motorized Level 1

Three day, mixed classroom and field course. Three hour classroom session with two field days following. We currently only offer a motorized Level 1.

Impacts of COVID:

Like many nonprofits and programs, FOFAC's education program was not untouched by this challenging year. We were limited with our in-person engagements and felt the biggest hit in our youth programs. We are hopeful that we will be back in full capacity next season.



TOPICS CLASSES

Topics classes are not a totally new offering for FOFAC, but in the 20-21 season, we formalized this learning opportunity by offering a new topics class every month from November through April. Those classes will remain posted at flatheadavlaanche.org.



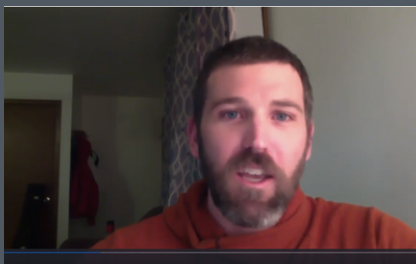
Gear with RMO!
We worked with our friends at Rocky Mountain Outfitters to present on Packing for your Tour.



Solving for Z
Zahan Bilimoria shared his latest film with Patagonia, Solving for Z, and stuck around for a Q&A.



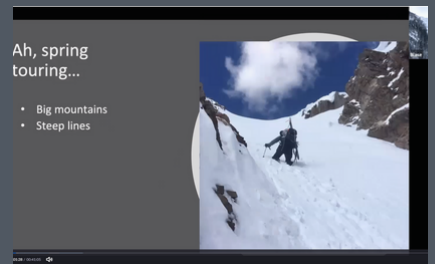
Normalization of Deviance with Cody Townsend
Talking heuristics with one of our favorite pro athletes!



Ice Climbing and Avalanche Safety
There are some considerations while ice climbing in avalanche country.



Avalanche Rescue Dogs
We learned what it takes to be an avalanche rescue dog handler and work with these amazing pups!



Spring Touring
Avalanche conditions change drastically come spring. We shared what folks should keep in mind this time of year.

PARTICIPANTS

Like many in our industry, our response to COVID included introducing a suite of virtual learning opportunities. We welcomed this as a chance to extend our reach and attract viewers from around the country. It was incredible to educate beyond our Valley, and we look forward to proceeding next season with a hybrid virtual/in-person model.

AVALANCHE SAFETY MENTORSHIP PILOT PROGRAM

The FOAC Mentorship Program was designed to foster continued learning in avalanche safety through a one-on-one mentorship approach. Six teams met four times for an in-depth review and excursion into the field for valuable practice throughout the season. Mentorship has long been adopted as a teaching strategy in sports like climbing, but there aren't many examples of snow safety mentorships. We are excited to help cultivate the next generation of backcountry enthusiasts through this powerful learning model.

How it worked

After reviewing 60 applications for mentors and mentees the respective six were selected.

We conducted a partner rescue training in January to determine everyone's baseline skills and then kicked the season into gear with mentorship sessions from February through April.

Participants were given a location and a topic for that month's training and then worked with the mentorship coordinator, Kira Frye, to complete their field days.

Teams connect with our Mentorship lead to review terrain, route, and other aspects of the field day. Following the excursion, teams report back on the day and submit an observation for the forecasters.

Teams are monitored through in-reach devices to add a layer of safety.



Next Season

In any pilot program, there are things learned in practice that help shape and grow a program. While overall the feedback was positive, there are a couple of changes we plan to incorporate into next season.

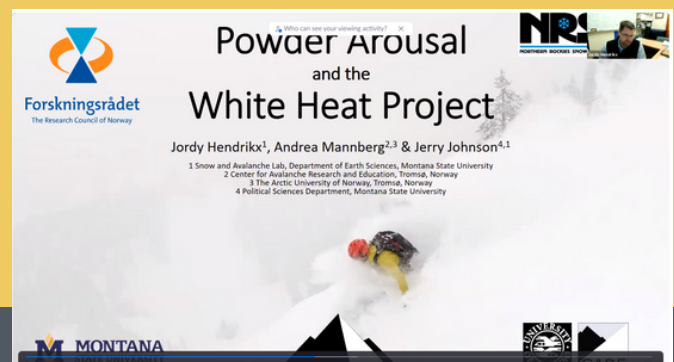
NORTHERN ROCKIES SNOW & AVALANCHE WORKSHOP

We knew our tenth annual Northern Rockies Snow and Avalanche Workshop was going to be memorable. So when faced with the choice of canceling or proceeding virtually we rose to the occasion and turned some lemons into lemonade. Not only did we host a unique and meaningful workshop, but we were also able to engage with participants from around the world. Going virtual also made it possible to add recorded sessions to our website which resulted in the most NRSAW viewers we've ever had.

We are so grateful to the speakers and participants for rolling with our learning curves and helping create a really memorable experience for this milestone year.

Next Season

We are already back at work planning the 11th Northern Rockies Snow and Avalanche Workshop. With life adapting to a new sense of normal, we are taking this opportunity to adapt ourselves, offering a hybrid in-person/virtual experience. Join us on Thursday, November 11th virtually, and Saturday, November 13th in-person at the O'Shaughnessy. Following our event on the 13th we'll host a fundraiser in Whitefish to support the Avalanche Center's 21-22 season at the Great Northern.



FRIENDS OF THE FLATHEAD AVALANCHE CENTER

Financially supporting the Flathead Avalanche Center and Saving Lives through Avalanche Education.

The bottom line is, the Flathead Avalanche Center cannot do this work alone. Pulling together the additional resources to run FAC and support avalanche education throughout our community, they would come up short without the help of FOFAC. As a government program, they need a nonprofit counterpart for community fundraising, sponsorships, and the flexibility to orchestrate education and outreach. With significant user growth in backcountry winter recreation in the Flathead, FOFAC is working hard with FAC to match the increased enthusiasm with classes and resources for our community. This past season has tested us in new ways and provided the opportunity to evolve. We are so proud of the impact we've made on the Flathead community through forecasts, classes, and other tools that support safe winter recreation.



BOARD OF DIRECTORS

Thank you for all you do!

All aspects of FOFAC's work are substantially supported by volunteer efforts, primarily in the form of event and class support by the Board of Directors. The individuals listed to the right have contributed approximately 116 hours to this mission since the start of the Fiscal Year in October 2020. We couldn't fulfill this meaningful and important mission without these folks and grateful for their service for our 2020-2021 season.

2021 Board of Directors

- Dow Powell..... President
- Ron Bachrach..... Vice President
- Roland Frey..... Treasurer (*in transition*)
- Felicia Ennis..... Treasurer (*in transition*)
- Becky Smith-Powell... Secretary
- Lloyd Morsett..... Board Member
- Jenny Cloutier..... Board Member
- Ed Visnovske..... Board Member
- Mike Block..... Board Member
- Chris Prew..... Ex-Officio Member
- Blase Reardon..... Ex-Officio Member



SUPPORT TAKES MANY FORMS

Coming together to support Avalanche Safety resources in the Flathead

Working together, we use community businesses for venues, sponsorships, outreach, field gear, and other needs as they arise. Several small businesses from gear shops to professional services offer in-kind items for various events throughout the season. Both FOFAC and FAC provide services our community wants and needs through daily advisories and education programs. The community rallies behind both groups' joint mission for avalanche information and education by providing donations, dollars, and using their time to further avalanche safety in the Flathead Valley.

We are so grateful to everyone who opened their doors, wallets, and minds for this important curriculum. We are so grateful to serve this wonderful winter-loving community!

Many Thanks to these folks!

Venue and capacity-building partnerships included Flathead Valley Community College and Whitefish Mountain Resort, as well as small businesses such as (but not limited to):



PARTNER SPOTLIGHT

Whitefish Community Foundation

We want to highlight one of FOAC's favorite community partners, the Whitefish Community Foundation. Their support of our mission through grants, special events, and classes has played a huge role in our success and growth over the years. From all of us at FOAC, thank you so much for your continued support.



Flathead Electric's Roundup for Safety Program

Huge thanks to the team at Flathead Electric and their Roundup for Safety Program which continued to support FOAC and FAC's weather station network through the Big Mountain Project this season. [Check out the full report here.](#)

Ski-Doo and Dream Marine's sled rental for the season

We are so grateful for being included in Ski-Doo's campaign to help Avalanche Center's around the country by providing a snowmobile rental for the season. And who better to provide that rental than the great team at Dream Marine out of Libby, Montana. This collaborative partnership allowed the FAC to be more effective in the field, and the boost in sled availability allowed FOAC to host more motorized avalanche safety classes. Forecasters put over 950 miles on the loaner sled! Wins across the board and huge kudos to these great partners.



SUPPORTERS

We would not be able to fulfill this important mission without the help and support from these incredible individuals, families, and business. Thank you so much for supporting the Avalanche Center's 20-21 season!

Platinum - Sponsors who donated between \$2000 to \$2999



Gold - Sponsors who donated between \$1000 to \$1999



AMERICAN
AVALANCHE
ASSOCIATION

Applied Materials Foundation
Dow Powell & Becky Smith-Powell
Tom & Teresa Quinn Fund

Silver - Sponsors who donated between \$500 to \$999



D.L. Morgan Revocable Trust
Denise and Jandy @ RMO
Felicia Ennis
Josie Bestwick

Malzahn Charitable Trust
North Valley Hospital Foundation
Richard and Lisa Steiner

SUPPORTERS

Bronze - Sponsors who donated between \$250 to \$499

Alan Meyers-Davis	John and Kate Rosso
Charles Hlavac	Kent and Kim Taylor
Colorado Mountain College	Seth Carbonari
Eli & Jai Chisholm	Steven Lefever
Gaia GPS	Weston Backcountry
Grant and Abby Hughes	Wheelie Creative
James and Catherine Heitel Foundation	Whistling Andy
Jesco Marine and Power Sports	

Copper - Sponsors who donated between \$100 to \$249

Adam & Aubrey Clark	Erin & Noah Bodman	Lynda Montgomery
Aidan Myhre	Fred and Sarah Jones	Matt and Saddle Baldwin
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Annika Silverman	Hidden Moose Lodge	Ron Bachrach
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Chris Gotschalk	Joshua Nielsen	Sydney Lillard and Karen Perser
Dan and Ann Fagre	Karen Black Scott and Jane Wheeler	Tamarack Foundation, Inc.
Dan Short	Kim and Jan Richards	Tanya and Judah Gersh
Danielle Coffman	Kim Givler	Terry Knupp
David Grady and Linda Engh-Grady	Kramer Family Fund	The Belanger Boys
Edgar Heger (in memory of Rob O'Neill)	Larry and Val Parsons	The Landlord
Erik Sanders	Leslie and Will Hunt	Timothy Strand and Susan Pfirman

Additional Supporters - Sponsors who donated between \$1 and \$99

Alice Ford	Jennifer Parsons	Rebecca Briber
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Gordon Johnson	Mike and LJ McClellan	William Thomas
Hans Fischer	Nathan & Betsy Russell and Kids	Woody's Weeds and Woods
Ian and Antonia Dennis	Pete Francisco	Zak Anderson

LOOKING TOWARDS THE FUTURE

Where do we go from here...

We are already looking ahead to next year working towards a couple of professional and community goals. Some of which include:

- An in-person/virtual hybrid NRSAW event;
- Increased Motorized Engagement and the first Motorized Level 2 Course in the Flathead;
- Reinvigorating our Youth Programs after COVID and field trip restrictions;
- Strengthening our growing winter community. With more backcountry users finding ways for groups to communicate to prevent multi-group accidents.
- Developing a proposal and funding for a weather station in the Flathead Range.

