

GNFAC Snowpack Summary 23-24

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July 31, 2024

The snowpack was historically low from when we started forecasts on December 7th through the beginning of February. We had long dry spells interrupted by a couple “storm cycles”. Snowfall was minimal with 1-2” of SWE over a week in December, and 2-4” of SWE over 2-3 weeks in January. That was enough to create a slab and widespread avalanche activity.



Large surface hoar crystals that were buried in early January.

Surface hoar grew prior to December’s snowfall, and daily from the last days of December into the first week of the New Year. The buried surface hoar was the biggest I, or maybe any of us have seen, standing 2-3cm tall.

During some previous seasons I have seen surface hoar grow and get buried, but it has never been as widespread as this season. I hypothesize, persistent high pressure prevented normal, strong Montana winds and allowed widespread surface hoar to grow and survive in



Multiple layers of buried surface hoar from early January produced avalanches all season.

starting zones before being buried. Additionally, surface hoar and other weak layers formed during the shortest days of the year with many clear, long nights. This minimized sun exposure and warmth and promoted weak layer growth and survival on many slopes.

If the surface hoar doesn’t get you, then the facets will. With a snowpack 2-3 feet deep at most, surface hoar formation was not independent of other weak layers growing during cold, clear nights and days. Facets and depth hoar formed on all slopes. Below the surface hoar there were weak facets, so if surface hoar didn’t exist on a slope, other very weak snow did.

The widespread distribution of various weak layers led to widespread instability when snow fell in mid-January. Throughout our forecast area we had reports of avalanches and large collapses every day for three weeks. Many avalanches were triggered remotely, by us and public backcountry users. Widespread remote triggered activity is uncommon here in my experience.



Avalanche we triggered from the flat ridge above as we walked towards the slope in Taylor Fork on January 11.

Every early season with persistent weak layers I see regular reports of remote triggers from our neighbors in Idaho, Utah, Colorado and Wyoming, while we get left out. This January was like no other with almost every slope easily avalanching, and many triggered remotely.

Danger was considerable to high for most of January, even when there was minimal or no new snow. Natural avalanches didn't seem likely on many days, while human-triggered avalanches were likely to very likely. Despite naturals being less likely, there were still natural avalanches on days that had minimal or no new snow or wind-loading.

At the end of January, Doug wrote, "This year is unique in my 29 years of avalanche forecasting in southwest Montana. Large avalanches are being triggered from hundreds of feet away long after the most recent snowfall. Even a few inches of new snow are causing us to elevate the danger. This is not like other seasons, and it's making our entire forecasting team nervous. We are recalibrating our risk and notching back our travel plans due to a great deal of uncertainty about what it will take for things to become more stable."

In February, snowfall picked up and the weak snowpack continued to produce large, easily triggered avalanches with any new snow. Remote triggered avalanches continued and became



Riders triggered this avalanche from the flats near where the photo is taken, near Big Sky on February 17.

larger by the week. We saw large avalanches in places we haven't seen slides before, and some of the largest avalanches we have seen in paths that we see slide often (paths that typically slide every year or multiple times per year). From January 8 to March 8 the danger was rated Considerable or High every day in the southern ranges of the forecast area.

Avalanches on persistent weak layers generally became larger while slowly becoming less likely through March. We continued to record natural and human-triggered deep slab avalanches in March that showed impressively wide propagation characteristic of this season's weak layer. In late March a pair of skiers triggered an avalanche while touring up a slope in Hyalite. One of the pair was caught and required a helicopter rescue due to a serious leg injury. The lingering threat of deep avalanches was mentioned in the forecast into April.

Above freezing temperatures and wet snow avalanches made an appearance in mid-March and were the main character at the start of April. We ended daily forecasts on April 14 with Considerable to High danger for wet snow avalanches.

Fortunately (for our snowpack and rivers), we received steady spring storms from late April until mid-June, along with a few reports of continued avalanche activity. On June 1 on Beartooth Pass (outside our advisory area) there was a human triggered avalanche involving layers of recent new snow, everyone was ok. On June 10 near Cooke City we saw the crown of a

very large R4/5-D4 wet slab, 10-20' deep and around 2,000' wide. It likely propagated on the early season persistent weak layers, and occurred on a north aspect at 10,000', likely after 4-5 days of above freezing temperatures at that elevation followed by rain.



This large avalanche ran in a spot that we haven't seen slide, adjacent to a common skintrack at Bacon Rind, on March 2.

Throughout the season there were an average number of close calls or incidents compared to previous years. This winter we had 46 incidents reported which resulted in 16 people caught or carried, 9 partial burials and 3 injuries. Despite a historically scary snowpack, we are thankful there were zero avalanche fatalities in our forecast area.

On Tuesday, April 9th, Doug Chabot wrote his final avalanche forecast for the Gallatin National Forest Avalanche Center. Doug, thank you for your friendship, mentorship and 29 years of service to Southwest Montana's community. Congratulations on your retirement!



A snowmobiler triggered this huge avalanche on Henderson Mtn. near Cooke City on March 7.



Natural avalanche that happened on or within a couple days of June 10 south of Cooke City.