AFTER THE FIRE

KNOW THE SNOW TO PREPARE FOR THE FLOW

USDA United States Department of Agriculture
Natural Resources Conservation Service

If you can look uphill from where you are and see an area burned by wildfire, you are at risk.

Lands damaged by wildfire experience a higher risk for flash flooding. Even areas that aren't traditionally prone to flooding are at risk, because the burned soils can't absorb as much water. Flooding after a fire can cause significant soil erosion and trigger debris slides (such as ash, rocks, and burned trees) that can damage roads and infrastructure.

Flash Flooding, Snowpack & Rainfall

The potential for flooding depends greatly on rainfall intensity. Heavy rainfall on melting snow is a trigger for flash flooding. Generally, you can look at the density of the snowpack to gage snowmelt. Higher-density readings are an indicator that the snow is getting ready to melt. A general rule of thumb is that half an inch of rain falling in less than one hour is enough to cause flash flooding in a burned area, but this can be more or less depending on the fire severity and the steepness of the terrain.

Understanding the current snowpack conditions in your area and the potential for rain-on-snow events can help you stay better informed and prepared to anticipate flash flooding after a wildfire.

The USDA Natural Resources Conservation Service (NRCS) Snow Survey Program in Oregon measures snowpack and other pertinent data at about 300 mountain sites across Oregon and Washington. This data is available in near real-time online, so be sure to check the website for the latest information.

A view of the damage from the Canyon Creek Wildfire that blazed through John Day, Oregon in the summer of 2015.

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LEARN MORE

Scan code with your smartphone for more information on Oregon snow survey data. Requires QR reader app.

Or Visit Us Online at:
www.or.nrcs.usda.gov/snow

What factors should I look for in the snowpack as it relates to flood risk after a fire?

Heavy rainfall–and heavy rainfall in conjunction with melting snow–are the primary factors to consider for flood risk. There are several indicators you can look for to gage when the snowpack is starting to melt.

First, check the snowpack density at the sites in your area. If densities reach 40% or more, there is a greater risk for flooding if a moderate or heavy rainstorm falls on top of that snow. A high snow density means that the snowpack is reaching a point where melting is imminent. Density is calculated by dividing the snow water equivalent (SWE)–which refers to the amount of water stored in the snow–by the snow depth, multiplied by 100%. A 40% dense snowpack means that the snow is 40% water.

$$\frac{\text{SWE (inches)}}{\text{Snow Depth (inches)}} = \frac{10}{25} \times 100\% = 40\%$$

It's also important to note the trend in SWE. If there's a pattern of decreasing SWE levels, this also means the snowpack is beginning to melt, and thus the chances for flooding during a rainstorm are higher. Keep in mind that it's normal to see a gradual decrease in snow depth as the snow settles–so a downward trend in depth doesn't always indicate snowmelt.

As the snowpack begins to melt, which typically begins after the peak of the season in March and April, there's a greater risk for higher run-off as the snowmelt flows into streams and rivers.

At remote mountain sites, NRCS staff must manually measure the snowpack using a carefully-calibrated set of tubes and a scale. These sites are called Snow Courses and are typically measured about once a month. Most sites are equipped with automated SNOTEL stations that record data every hour, available online.

Be sure to check the National Weather Service River Forecast Center to see if rivers in your area are approaching flood levels.

View the Northwest River Forecast online at:
http://water.weather.gov/ahps2/index.php?wfo=pdt

How long will there be an elevated risk of flash flooding?

This depends on the severity of the wildfire and how much erosion occurs, but most burned areas are prone to flash flooding and debris flows for at least two years after the wildfire. It could take many years for trees and plants to re-establish. Vegetation is the primary factor that slows down the precipitation run-off that creates flash flooding and debris flows. Each burned area poses its own unique risk due to many factors including proximity to population centers, burn severity, steepness of terrain, and size of the burned area.

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