

AVALANCHE

DESCRIPTION

An **avalanche** is a mass of snow, ice, and debris flowing and sliding rapidly down a steep slope (*Colorado Natural Hazards Mitigation Plan*, 2013, p. 3-138). An avalanche is defined in Colorado state statutes as a “geologic hazard.”

Snow avalanches occur in the high mountains of Colorado seasonally as the result of heavy snow accumulations on steep slopes. When the snow pack becomes unstable, it suddenly releases and rapidly descends downslope either over a wide area or concentrated in an avalanche track. Only part of an avalanche may release at once. Avalanches may reach speeds of up to 200 miles per hour and exert forces great enough to destroy structures and uproot or snap off large trees. They may be preceded by an "air blast," which is a strong rush of air that can measure over 100 mph and is capable of damaging buildings. They are more common with powder avalanches (where snow grains are largely suspended by fluid turbulence) that occur in parts of Colorado.

Avalanche paths consist of a starting zone, a track, and a runout zone. Generally, the runout zone is the critical area for land use decisions because of its otherwise attractive setting for development. Avalanche-prone lands may pass many winters or even decades without a serious avalanche. Lack of vegetation or a predominance of quick-growing aspen and low shrubs often characterize active portions of an avalanche track and the runout zone, readily identifying the area of seasonal peril.

Avalanches can be deadly. Over the past ten years, an average of 28 people per year have died from avalanches in the U.S. (*Statistics and Reporting*, n.d.b) Since records began to be collected in the 1970s, over 990 deaths have been reported as a result of avalanches.

AVALANCHES IN COLORADO

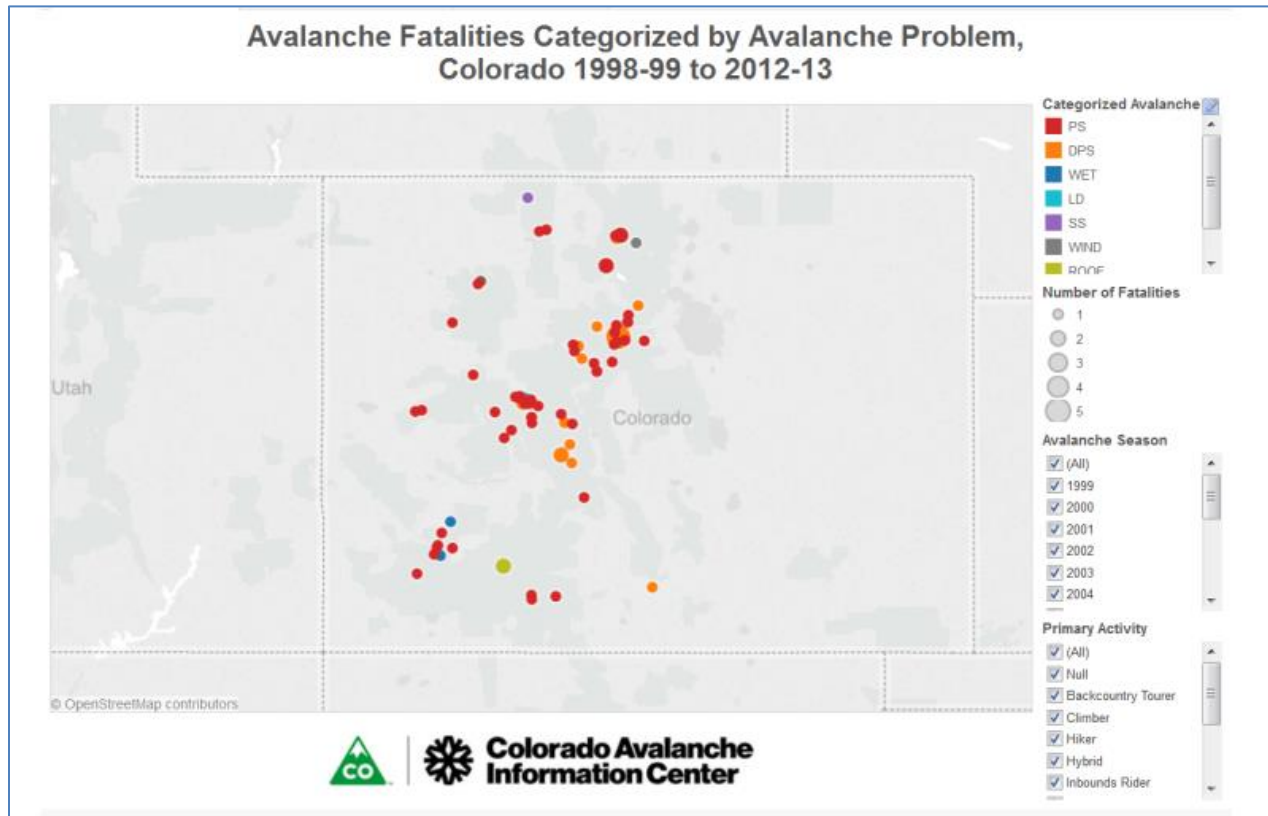
According to the Colorado Avalanche Information Center (CAIC), avalanches have killed more people in Colorado than any other natural hazard since 1950, and Colorado accounts for one-third of all avalanche deaths in the United States. Most deaths are backcountry recreationists and they most commonly occur on the steep mountain slopes in Western Colorado between November and April. Recorded property damage is relatively low, with a total of \$313,500 over the last 50 years, suggesting good recognition and avoidance of hazardous construction in known runout zones (*Colorado Natural Hazards Mitigation Plan*, 2013, p. 3-147). However many highways, roads, and railroads intersect with runout zones in Colorado and avalanches remain a constant threat to transportation safety. Road closures are common at various locations across the state due to avalanche threats, damages and cleanup, or mitigation



Large slab avalanche along U.S. Highway 550 at West Riverside, near Red Mountain Pass, Colorado.

Source: Colorado Geological Survey. Snow Avalanche. Photo by Don Bachman. coloradogeologicalsurvey.org/geologic-hazards/avalanches-snow/definition

activities. These closures may disrupt commerce and isolate communities with limited road access.



Sample Avalanche Problem Map, available from the Colorado Avalanche Information Center.

Colorado Avalanche Information Center. Statistics and Reporting. avalanche.state.co.us/accidents/statistics-and-reporting

RELATED HAZARDS

Avalanches generally occur independently of other hazards, although they are often caused by increased snow pack from winter precipitation. Earthquakes, thermal changes, and blizzards are also likely to trigger avalanches. Avalanche impacts (damaged structures, loss of lives, etc.) can be similar to those resulting from landslides, mud/debris flows, and rockfalls.

AVAILABLE DATA SOURCES

Colorado Avalanche Information Center (CAIC)

The CAIC is a program within the Colorado Department of Natural Resources. The program is a partnership between the Department of Natural Resources (DNR), Department of Transportation (CDOT), and the Friends of the CAIC (FoCAIC), a 501c3 organization. The mission of the CAIC is to provide avalanche information, education, and promote research for the protection of life, property, and the enhancement of the state's economy. The CAIC website provides useful information such as statistics, maps, photos, and videos about avalanches. avalanche.state.co.us

The Colorado Department of Transportation (CDOT) Avalanche Atlas

CDOT’s Avalanche Atlas contains 522 known avalanche paths across the state. CDOT regularly monitors conditions and implements control measures to help mitigate impacts to state highways. codot.gov/travel/winter-driving/AvControl.html

American Avalanche Association

The American Avalanche Association is a national organization whose mission is to promote and support professionalism and excellence in avalanche safety, education, and research in the United States. The Association provides information about snow and avalanches, provides direction for promoting and supporting avalanche education in the U.S., and promotes research and development in avalanche safety. The Association also provides and exchanges technical information and maintains communication among persons engaged in avalanche activities. americanavalancheassociation.org

APPLICABLE PLANNING TOOLS AND STRATEGIES

The table below cites applicable planning tools and strategies that are profiled in this guide.

APPLICABLE PLANNING TOOLS AND STRATEGIES – AVALANCHE	
Addressing Hazards in Plans and Policies	<ul style="list-style-type: none"> • Comprehensive plan • Climate plan • Hazard mitigation plan • Parks and open space plan • Pre-disaster planning
Strengthening Incentives	<ul style="list-style-type: none"> • Development agreement • Density bonus • Transfer of development rights
Protecting Sensitive Areas	<ul style="list-style-type: none"> • 1041 regulations • Cluster subdivision • Conservation easement • Land acquisition • Overlay zoning
Improving Site Development Standards	<ul style="list-style-type: none"> • Site-specific assessment • Subdivision and site design standards • Use-specific standards
Improving Buildings and Infrastructure	<ul style="list-style-type: none"> • Building code • Critical infrastructure protection
Enhancing Administration and Enforcement	<ul style="list-style-type: none"> • Application submittal requirements