

COMMERCE CITY
OFFICE OF EMERGENCY MANAGEMENT

Weather Alert Definitions



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General

Outlook

A broad discussion of the weather pattern expected across any given area, generally confined to forecast periods beyond 48 hours

Watch

A watch is used when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough lead time so that those who need to set their plans in motion can do so.

Advisory

An advisory highlights special weather conditions that are less serious than a warning. They are for events that may cause significant inconvenience, and if caution is not exercised, it could lead to situations that may threaten life and/or property. Advisory is issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurring.

Warning

A warning is issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurring. A warning is used for conditions posing a threat to life or property.

Blizzard & Snow

Blizzard Defined

A winter storm with winds of 35 mph or more with snow and blowing snow reducing visibility to less than $\frac{1}{4}$ mile for 3 hours or more.

Blizzard Watch

Issued when blizzard conditions are possible in the next 12 to 36 hours.

Blizzard Warning (On the Plains)

Issued when winter storms with sustained or frequent winds of 35 mph or higher with considerable falling and/or blowing snow that frequently reduces visibility to $\frac{1}{4}$ of a mile or less. These conditions are expected to prevail for a minimum of 3 hours.

Blizzard Warning (In the Mountains and Foothills)

Issued when winter storms with sustained or frequent winds of 50 mph or higher at the higher elevations with considerable falling and/or blowing snow that frequently reduces visibility to $\frac{1}{4}$ of a mile or less. These conditions are expected to prevail for a minimum of 3 hours.

Blowing Snow

Wind-driven snow that reduces visibility.

Snow Flurries

Light snow falling for short durations with little or no accumulation.

Snow Showers

Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Snow Squalls

Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.

Excessive Heat

Excessive Heat Outlook

Issued when the potential exists for an excessive heat event in the next 3-7 days.

Excessive Heat Watch

Issued when an excessive heat event is expected in the next 12 to 48 hours where the heat index is expected to be greater than 105°F (41°C) across the northern states during the day, and combined with nighttime low temperature will be at least 80°F (24°C) or higher for two consecutive days.

Excessive Heat Advisory

Issued within 12 hours of the heat index reaching one of two criteria levels. In most areas, an advisory will be issued if there is a heat index of at least 105°F but less than 115°F for less than 3 hours per day and/or if nighttime low temperatures are above 80°F for 2 consecutive days.

Excessive Heat Warning

Issued within 12 hours of the onset of the following criteria: heat index of at least 105°F for more than 3 hours per day for 2 consecutive days, or heat index more than 115°F for any period of time.

Fire Weather (The Red Flag Program)

Red Flag Event

Red flag events are defined by critical weather and fire danger conditions that could lead to extensive wildfire occurrences and/or control problems on existing wildfires or prescribed burns.

Fire Weather Watch

A fire weather watch is issued to advise user agencies of the possible development of red flag conditions in the near future, generally the next 24 to 72 hours. Under certain conditions a watch can be issued for the first 12 hours.

Red Flag Warning

A red flag warning is issued to advise user agencies of occurring or imminent red flag conditions, generally within the next 12 to 24 hours.

Red Flag Criteria

Red flag events normally require the combination of critical fuel conditions and critical weather conditions. Several combinations of fuels and weather conditions may combine to produce red flag conditions. Fuel conditions are considered critical when fuel characteristics are favorable for large fire growth, as determined by the land management agencies. NWS forecasters determine when weather conditions are critical.

A. Primary Red Flag Criteria:

1. Relative humidity of 15% or less combined with sustained surface winds, or frequent gusts, of 25 mph or greater. Both conditions must occur simultaneously for at least 3 hours in a 12 hour period.
2. Widely scattered (or more) dry thunderstorms, 15% or more coverage, constituting a Lightning Activity Level (LAL) 6. A thunderstorm is considered “dry” if it produces less than 0.10 inch rainfall.

B. Contributing Red Flag Factors:

1. First significant lightning occurrence after a hot and dry period. This includes “wet” or “dry” thunderstorms, widely scattered (15%) coverage or more. After a hot and dry period, the first occurrence of thunderstorms can readily start wildfires. The RH does not need to meet the criteria listed above.
2. Significant cold frontal passage, expected to cause strong sustained and gusty winds, and an abrupt wind shift. Of heightened concern are dry cold fronts that have the above characteristics, but little or no rainfall, and expected when there are on-going wildfires or prescribed burns. The RH does not need to meet the criteria listed above.
3. Any combination of weather and fuels conditions that would create a critical fire control situation or extensive wildfire outbreak. These may include: long term drought, much higher than normal maximum temperatures coupled with very low humidity, low fuel moisture, poor nighttime RH recovery, high Energy Release Component (ERC) or Burning Index (BI), a Haines Index of 5 or 6, etc.

Flood/Flash Floods

Flash Flood Defined

A rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level following of heavy or excessive rainfall.

Flood/Flash Flood Watch

Issued when flooding or flash flooding is possible in your area within the next 6 hours.

Flood/Flash Flood Warning

Issued when flooding or flash flooding is already occurring or will occur soon in your area.

Cubic Feet per Second (cfs): A measure of streamflow. One CFS is equal to about 450 gallons per minute.

Stage: The height of water flowing in a river above a nearby reference point, for example, the height of the water above the river bed.

Action Stage: Color code is yellow on the Hydrograph. The stage at which some sort of action is taken for a point along the river. Action Stage is different for all points depending on the community's needs - it may be flooding of secondary roads or just a "heads up" that the river is rising. Action Stage is determined by the National Weather Service. Sometimes used interchangeably with Bank Full Stage.

Flood Stage

An established gage height for a given location above which a rise in water surface level begins to create a hazard to lives, property, or commerce. The issuance of flood (or in some cases flash flood) warnings is linked to flood stage.

Flood Stage Categories Terms

Each flood category is bounded by an upper and lower stage. The severity of flooding at a given stage is not necessarily the same at all locations along a river reach due to varying channel/bank characteristics or presence of levees on portions of the reach. Therefore, the upper and lower stages for a given flood category are usually associated with water levels corresponding to the most significant flood impacts somewhere in the reach. The flood categories used by the National Weather Service (NWS) are:

- **Minor Flooding:** Minimal or no property damage, but possibly some public threat. Color code is orange on the Hydrograph.
- **Moderate Flooding:** Some inundation of structures and roads near stream. Some evacuations of people and/or transfer of property to higher elevations. Color code is red on the Hydrograph.
- **Major Flooding:** Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations. Color code is purple on the Hydrograph.
- **Record Flooding:** Flooding which equals or exceeds the highest stage or discharge at a given site during the period of record keeping.

Note: all three of the lower flood categories (minor, moderate, major) do not necessarily exist for a given forecast point. For example, at the level where a river reaches flood stage, it may be considered moderate flooding. However, at least one of these three flood categories must start at flood stage.

Thunderstorms

Severe Thunderstorm Defined

A thunderstorm is considered severe if it produces hail at least 1 inch in diameter or has wind gusts of at least 58 miles per hour.

Severe Thunderstorm Watch

Issued when severe thunderstorms are possible in and near the watch area.

Severe Thunderstorm Warning

Issued when severe thunderstorms have been reported by spotters or indicated by radar.

Tornadoes

Tornado Defined:

A tornado is a violently rotating column of air extending from the base of a thunderstorm down to the ground. Tornadoes intensities are classified on the Enhanced Fujita Scale with ratings between EF0 (weakest) to EF5 (strongest).

- EF0 = 65-85 mph
- EF1 = 86-110 mph
- EF2 = 111-135 mph
- EF3 = 136-165 mph
- EF4 = 166-200 mph
- EF5 = Over 200 mph

Tornado Watch

Issued when a tornado is possible in and near the watch area.

Tornado Warnings

Issued when a tornado has been sighted or indicated by weather radar.

Wind Storms

High Wind Watch

Issued when high wind conditions are expected to develop in the next 12 to 36 hours.

High Wind Warning (Lower Elevations)

Issued when sustained winds of 40 mph or more for at least 1 hours or gust of at least 58 mph for any duration.

High Wind Warning (Mountain and Foothills)

Issued when sustained winds of 50 mph or more for at least 1 hour or gust of at least 75 mph for any duration.

Wind Chill Watch

Issued when wind chill warning criteria are possible in the next 12-36 hours.

Wind Chill Advisory (lower Elevations)

Issued when the wind chill temperature is expected to be between minus 18 to 24 degrees Fahrenheit.

Wind Chill Advisory (Mountain and Foothills)

Issued when the wind chill temperature is expected to be between minus 25 to 34 degrees Fahrenheit.

Wind Chill Warning (Lower Elevations)

Issued when the wind chill temperature reaches minus 25 degrees Fahrenheit or colder with sustained winds of at least 10 mph.

Wind Chill Warning (Mountain and Foothills)

Issued when the wind chill temperature reaches minus 35 degrees Fahrenheit or colder with sustained winds of at least 10 mph.

Dust Storm Warning

Issued when visibility reduced to $\frac{1}{4}$ mile or less in blowing dust and sustained winds of 25 mph or greater for at least one hour.

Winter Storms

Hazardous Weather Outlook

Issued daily and provides information on potentially hazardous weather out to 7 days.

Winter Storm Outlook

Issued when winter storm conditions are possible in the next 2 to 5 days.

Winter Storm Watch

Issued when winter storm conditions are possible within the next 12 to 36 hours.

Winter Weather Advisory

Issued when winter weather conditions are expected to cause significant inconveniences and may be hazardous. When caution is used, these situations should not be life threatening.

- In the mountain: 4 to 8 inches of snow falls in 12 hours or 6 to 12 inches in 24 hours.
- Lower elevations: 3 to 6 inches of snow falls in 12 hours or 4 to 6 inches in 24 hours

Winter Storm Warning

Issued when life-threatening, severe winter conditions have begun or will begin within 24 hours.

Warning Criteria for Heavy Snow

- In the mountain: 8 inches of snow in 12 hours, or 12 inches or more in 24 hours.
- Lower elevations: 6 inches of snow in 12 hours, or 8 inches or more in 24 hours.

Definitions of Precipitation

Rainfall rate is generally described as light, moderate or heavy. Light rainfall is considered less than 0.10 inches of rain per hour. Moderate rainfall measures 0.10 to 0.30 inches of rain per hour. Heavy rainfall is more than 0.30 inches of rain per hour. Rainfall amount is described as the depth of water reaching the ground, typically in inches or millimeters (25 mm equals one inch). An inch of rain is exactly that, water that is one inch deep. One inch of rainfall equals 4.7 gallons of water per square yard or 22,650 gallons of water per acre!

There are other terms used to describe precipitation: type (rain, snow, etc), intensity (light, moderate, or heavy), and character (showery, intermittent, or continuous). Meteorologists use these terms in their forecasts or an actual weather event, such as "today's light rain showers resulted in six tenths of an inch of precipitation."

Refer to the definitions of precipitation below:

- **Rain:** Falling drops of water larger than 0.02 inch in diameter. In forecasts, "rain" usually implies that the rain will fall steadily over a period of time. (See "showers" below).
- **Light rain:** Falls at the rate of 0.10 inch or less an hour.
- **Moderate rain:** Falls at the rate of 0.11 to 0.30 inch an hour.
- **Heavy rain:** Falls at the rate of 0.30 inch an hour or more.
- **Drizzle:** Falling drops of water smaller than 0.02 inch in diameter. They appear to float in air currents, but unlike fog, do fall to the ground.
- **Light drizzle:** Drizzle with visibility of more than 5/8 of a mile.
- **Moderate drizzle:** Drizzle with visibility from 5/16 to 5/8 of a mile.
- **Heavy drizzle:** Drizzle with visibility of less than 5/16 of a mile.
- **Showers:** Rain that falls intermittently over a small area. The rain from an individual shower can be heavy or light, but doesn't cover a large area or last more than an hour or so.
- **Snow:** Falling ice composed of crystals in complex hexagonal forms. Snow forms mainly when water vapor turns directly to ice without going through the liquid stage, a process called deposition.
- **Snowflakes:** Aggregations of snow crystals.
- **Snow flurries:** Light showers of snow that does not cover large areas and do not fall steadily for long periods of time.
- **Snow grains:** Very small snow crystals. The ice equivalent of drizzle.
- **Snow pellets:** White, opaque ice particles that form as ice crystals fall through cloud droplets that are below freezing but still liquid (super cooled). The cloud droplets freeze to the crystals forming a lumpy mass. Scientists call snow pellets "graupel." Such pellets falling from thunderstorms are often called "soft hail."
- **Sleet:** Drops of rain or drizzle that freezes into ice as they fall. They are usually smaller than 0.30 inch in diameter. Official weather observations list sleet as "ice pellets." In some parts of the country "sleet" refers to a mixture of ice pellets and freezing rain.

- **Freezing rain or drizzle:** Falling rain or drizzle that cools below 32°F, but does not turn to ice in the air. The water is "super cooled." When the drops hit anything they instantly turn into ice.
- **Ice storm:** A storm with large amounts of freezing rain that coats trees, power lines and roadways with ice. Often the ice is heavy enough to pull down trees and power lines.
- **Hail:** Falling ice in roughly round shapes at least 0.20 inch in diameter. Hail comes from thunderstorms and is larger than sleet. Hailstones form when upward moving air -- updrafts -- in a thunderstorm keep pieces of graupel from falling. Drops of super cooled water hit and freeze to the graupel, causing it to grow. When the balls of ice become too heavy for the updrafts to continue supporting them, they fall as hailstones. Sleet, in contrast, consists of raindrops that freeze on the way down.
- **Hail Sizes:** Typically refers to the diameter of the hailstones. Warnings and reports may report hail size through comparisons with real-world objects that correspond to certain diameters:

Description of Hail Size	Diameter in Inches of Hail Size
Pea	0.25
Marble or Mothball	0.50
Penny or Dime	0.75
Nickel	0.88
Quarter	1.00
Half Dollar	1.25
Ping Pong Ball	1.50
Golfball	1.75
Hen's Egg	2.00
Tennis Ball	2.50
Baseball	2.75
Tea Cup	3.00
Grapefruit	4.00
Softball	4.50

Weather Radar Color Codes

Color Coding

Doppler radar measures precipitation's intensity, velocity, size and range. To break these different value types down and put them into an understandable format, a color-coded scale was developed. The basis for the scale is a measurement known as dBZ -- decibels of Z, where Z represents the energy reflected back to the radar -- and colors range from light green, indicating light precipitation (rain, sleet or snow) to a hot pink for extreme conditions. The higher the dBZ score, the more reflectivity exists and the greater the intensity of precipitation present.

dBZ	Rainrate (in/hr)
65	16+
60	8.00
55	4.00
52	2.50
47	1.25
41	0.50
36	0.25
30	0.10
20	Trace

- Light and dark green indicate light and moderate precipitation levels that score 20 to 30 dBZ and a trace to 0.10 inch per hour rain or sleet falling rate.
- Yellow indicates a moderate, 36 dBZ, 0.25 inch per hour rain rate.
- Light brown has a 41 dBZ, 0.50 inch per hour rain rate.
- Orange indicates very heavy rain, scoring a 47 dBZ and 1.25 inches per hour rain rate.
- Red is used to indicate thunderstorms and a 52 dBZ, 2.5 inches per hour rain rate.

In the color areas past red, conditions are extreme and perhaps dangerous.

- Rust indicates 4.0 inches per hour rain rate and a dBZ of 55.
- Dark brown indicates a very heavy thunderstorm with hail possible. It scores 60 dBZ with 8.0 inches per hour rain rate.
- At the top end of the scale is hot pink. This color indicates the most severe of storms at 16.0 or more inches per hour rain rate with a dBZ of 65.