



COLORADO SEVERE WEATHER AWARENESS WEEK APRIL 13 - 19, 2008

Governor Bill Ritter has proclaimed the week of April 13th through 19th as Severe Weather Awareness Week in Colorado. NOAA's National Weather Service Offices in Boulder, Pueblo, Grand Junction, and Goodland, Kansas along with the Colorado Division of Emergency Management ask your help in spreading severe weather safety information to the public. Every Spring, Summer, and Fall the state experiences thunderstorms which produce damaging lightning and wind, large hail, tornadoes, and flash flooding. Last year there were 55 tornadoes statewide.

Severe Weather Awareness week allows all of us to concentrate our safety education efforts into one week. This packet is intended to provide you with information that you can pass along to the public. The watches and warnings NOAA's National Weather Service issues do not accomplish anything if the public does not know where to go for information, or how to respond to a tornado, flood, or severe thunderstorm emergency.

NOAA's National Weather Service in Pueblo will test some severe weather communications during the week. This will be an excellent time for local emergency management officials to test their warning and response systems, and work with local businesses and schools to encourage safety drills during the week. For more information on Severe Weather Awareness week, and on severe weather safety, contact your local National Weather Service Office and ask for the Warning Coordination Meteorologist listed below. We look forward to working with you to promote Severe Weather Awareness Week!

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WATCHES AND WARNINGS

NOAA's National Weather Service uses specific terminology to relay the weather threat to the public. In the Spring, Summer, and Fall, there are a variety of watches and warnings you need to understand in order to be prepared.

- **Tornado Watch:** Means that conditions are favorable for severe thunderstorms and tornadoes to develop. It is normally issued for 4 to 6 hours, and includes many counties. If you are in or near the tornado watch area, stay informed through NOAA All Hazards Weather Radio, radio, or television. Keep your eye on the sky, and be prepared to take cover at a moment's notice, as tornadoes can occur with little warning.
- **Tornado Warning:** Means that a developing tornado has been reported by trained spotters or indicated on Doppler radar, or a tornado has been sighted. A warning is typically issued for a small area for less than an hour. If a tornado warning is issued for your area...take cover immediately!
- **Severe Thunderstorm Watch:** Means that conditions are favorable for thunderstorms to produce wind gusts to 58 mph or higher, or hail 3/4 inch in diameter or larger in the watch area. These watches are issued for a 4 to 6 hour time frame, and for a number of counties. Stay informed, watch the sky, and take cover if a severe thunderstorm approaches.
- **Severe Thunderstorm Warning:** Means that a severe thunderstorm has been detected by radar, or has been seen by a trained spotter. Take cover if you are near the severe thunderstorm.
- **Flood Watch:** Issued when heavy rain may develop and result in flooding or flash flooding in or near the watch area. A Flood Watch may also be issued for a potential dam break.
- **Flash Flood Warning:** Flash flooding in the warning area is imminent or has developed. Go to higher ground at once!
- **Flood Statement:** Local high water in creeks or drainage areas, or ponding of water on streets, or in low lying areas such as underpasses is imminent or occurring.
- **Hazardous Weather Outlook:** Issued by WFO Pueblo to discuss the hazardous weather of the day. This product details the type of severe weather expected and the timing and expected location of the severe weather. The Pueblo Office issues this outlook before 7:00 a.m. each day under the product header DENHWOPUB.

COLORADO TORNADO FACTS

The number of reported tornadoes in Colorado has risen since the 1970s. More residents, better communications, and more trained spotters have all contributed to more reported tornadoes.

In the past 10 years, there have been around 600 tornadoes in Colorado, an average of over 50 tornadoes a year. A record was established in 1996, with a total of 98 reported tornadoes.

Normally, Colorado tornadoes are weak, and are on the ground for only a short time. In 2007, there were 55 tornadoes in Colorado, and nearly all were weak. In southern Colorado last year 12 tornadoes were reported. Most occurred over open country and were weak.

Colorado is occasionally visited by strong tornadoes. Last year, a powerful EF3 tornado struck Holly. This was the first killer tornado in Colorado in 47 years. In 2001, two strong F2 tornadoes occurring at Ellicott in El Paso county. Around 100 mobile homes were damaged or destroyed and the Junior High-High School sustained major damage. Fortunately, no one perished. A strong F3 tornado struck just west of Lamar, wiping a house off its foundation, and obliterating cars in the adjacent yard.

Tornadoes have been reported nine months out of the year in Colorado. Tornado season typically lasts from mid-May through mid-August, but one of the bigger outbreaks occurred in October 1997 in southern Colorado! June is by far the month with the most recorded tornadoes.

Tornadoes have occurred every hour of the day, but over half of them develop between 3 p.m. and 6 p.m., and 88 percent occurring between 1 p.m. and 9 p.m. They can occur anywhere in the state, but the vast majority develops in eastern Colorado east of Interstate 25.

Since 1950 Weld and Adams counties have been visited by more tornadoes than any other counties in Colorado. In fact, Weld County has one of the highest frequencies of tornadoes across the country. It's mainly due to the size of the county, but it also lies in a geographical area prone to severe thunderstorm development.

The most well known tornado outbreak occurred in metro Denver on June 15, 1988. Five tornadoes resulted in seven injuries and damage in excess of \$15 million. The Holly tornado last year causes millions of dollars in damage, and reminds us that dangerous, powerful tornadoes do occasionally occur in the Centennial State.

TORNADO SAFETY

Do you know what to do if threatened by a tornado? Here are some helpful safety tips to follow at home, work, school, or while traveling. Remember: the greatest threat from tornadoes is windblown debris!

IN HOMES:

- * The safest spot is in your basement if you have one. Get under a sturdy workbench, table or under the staircase. Stay out of the corners, because that is where debris can collect.
- * If you do not have a basement, go to the lowest floor in an interior small room or hallway. Bathrooms and closets are good examples of places to go to for shelter.
- * Get away from your windows! Strong winds with a tornadic thunderstorm can shatter your windows and severely injure you.

IN YOUR VEHICLE:

- * If you are in open country, and the tornado is at a distance, you will probably be able to drive away from it.
- * It is unwise to try to outrun a tornado with your vehicle in an urban area. You could get caught in traffic. Quickly go to a sturdy building.

IN MOBILE HOMES:

- * Go to a sturdy building. If one is not available, you may want to consider staying in your vehicle. A vehicle can ride out winds below 130 mph.

IN HIGH RISE BUILDINGS:

- * You may not have time to go to the lowest floor, so go to a hallway or small room at the center of the building. Stay away from the windows, and out of elevators!

IN NURSING HOMES, SCHOOLS, HOSPITALS, SHOPPING CENTERS AND MALLS:

- * Go to your predesignated shelter. Interior hallways or small rooms on the lowest floor are usually your best choice. Be sure to stay away from large windows or glassed areas.
- * Do not go to dining halls, gyms or other large rooms, as roofs in these parts of a building are usually not as strong.

ALL AREAS:

- * Prepare a tornado plan. Make sure everyone knows where to go in the event of a tornado. Conduct periodic tornado drills.
- * Have a supply kit. Include a first aid kit, battery-powered radio, flashlight with extra batteries, canned or dried food, a can opener, and bottled water.
- * Learn where to get weather information, and learn the meaning of tornado watches and warnings!

LIGHTNING - THE UNDERRATED KILLER

By definition, thunderstorms contain lightning. There are more than 40 million lightning strikes every year in the United States, bringing nearly 50 fatalities. In Colorado, lightning is the number one life threatening weather hazard. In the past 10 years there has been an average of 3 fatalities and 20 injuries reported each year from lightning. The toll may be worse, as recent studies have shown that many lightning accidents are not reported.

Lightning heats the surrounding gases in the air to around 50,000 degrees!! This causes a rapid expansion of the air which produces thunder. A single lightning stroke also contains an enormous amount of electricity, enough to supply power to several homes for a month. The heat and electricity pose the greatest risk to the individual. Most lightning deaths and injuries occur when victims are outdoors. Lightning also causes many grassland and forest fires in Colorado.

KEEPING YOURSELF SAFE FROM LIGHTNING

- * Stay alert for fast-changing weather conditions. It does not have to be raining where you are for lightning to be a threat. Many people are struck before the rain begins or after it ends at their location.
- * Use the “30/30 rule”. After you see the lightning, see how many seconds elapse before you hear the thunder. If it’s less than 30 seconds, take cover. Since sound travels about one mile every 5 seconds, this means when lightning is closer than 6 miles, you may be in danger. Be aware that lightning can strike the ground ten or more miles away from the thunderstorm with blue sky above! The other 30 refers to how long you should stay sheltered before you venture outside after a storm has passed: 30 minutes.
- * Avoid being the tallest object, and stay away from other tall objects, such a small group of tall trees.
- * Get off farm equipment, golf carts or other open vehicles. A hard top car with the windows shut is relatively safe if you are not touching metal.
- * If hiking in the mountains, go early in the day, before thunderstorms develop. If caught in the mountains during a lightning storm, go into a cave, or canyon, or below tree line in a large group of small trees. Beware of flash flooding.
- * With a thunderstorm near or on top of you, get away from metal fences. Drop metal objects, such as golf clubs, and backpacks. Remember: metal is a very good conductor of electricity!
- * Lightning may be about to strike nearby if you feel your hair stand on end or you feel your skin tingle. Crouch down on the balls of your feet with your legs together and put your hands over your ears.
- * The safest place in a lightning storm is inside a sturdy structure. Get inside the building, but do not stand by open windows, doors or patios during a thunderstorm.
- * Unplug unnecessary appliances, stay off the phone, and out of the shower during the storm.

FLASH FLOODS

In the United States, flash floods are responsible for more deaths than any other thunderstorm phenomenon. Year to year in Colorado, only lightning is more deadly. Flash flooding usually is the result of very heavy rain over a short period of time over a small area, which causes small streams to rage out of control and out of their banks. It is hard to imagine the destructive force of moving water, but the result was clear to see after the Big Thompson Flood of July 31, 1976. That flood killed 145 people, destroyed 418 homes and 52 businesses, and resulted in \$35 million in damages. Survivors spoke of a wall of churning water racing down the canyon, and incredibly rapid rise in water level, and a loud roar. There was no way to outrace the water down the canyon, even with a vehicle. The only safety was found by climbing the steep canyon walls. During the evening of July 28th, 1997, over 10 inches of rain fell in less than six hours just west of Fort Collins. Flooding destroyed two mobile home parks and caused five drowning deaths. Damage in Fort Collins was estimated at around \$200 million. Flooding can also occur on the eastern plains.

Flooding in Colorado can also occur in the Spring when the mountain snow pack melts. Flooding of rivers and streams usually only occurs, though, when the snow runoff coincides with widespread heavy rainfall. But swift and high (non-flooding) water can be a definite safety hazard to rafters and other water enthusiasts.

If a dam fails, flash flooding will likely result. The destruction from flash flooding in July 1982 following the Long Lake Dam failure is preserved for all to see in Rocky Mountain National Park.

KEEPING YOURSELF SAFE FROM FLASH FLOODING

- * Remember...it does not have to be raining at your location for a flood to occur! If you are along a stream that has its source in the mountains, be aware of thunderstorms in the higher elevations upstream.
- * NEVER camp on low ground next to mountain streams.
- * Do not cross flooded roadways with a vehicle or on foot. It only takes about 12 inches of moving water for some vehicles to start floating. Also, the road bed may be washed out, making the water much deeper than you might think.
- * If your vehicle stalls, abandon it immediately, and go to higher ground.
- * Flooding frequently occurs during the evening hours. Be very cautious after dark when it is more difficult to recognize the flood dangers.
- * Get out of low spots, canyons, dry washes etc.
- * If you are advised to evacuate an area by local authorities, do so immediately!
- * Do not allow children to play around high water or near storm drains.
- * Stay in tune with the latest weather information by listening to NOAA All Hazards Weather Radio, or radio and/or television stations.

NOAA WEATHER RADIO ALL HAZARDS

You can get timely weather forecast updates from NOAA Weather Radio All Hazards, which broadcasts 24-hours a day from NOAA's National Weather Service offices across the country. You will hear the latest regional and area weather forecasts, weather conditions, and climatological data. Severe weather (tornado, flash flood, and severe thunderstorm) warnings are broadcast LIVE, seconds after the decision to warn is made. Specially built receivers can be set to audibly alarm when one of these warnings is broadcast. NOAA Weather Radio All Hazards can be purchased at many electronic stores. NOAA Weather Radio All Hazards is NOAA's National Weather Service's entry into the EAS (Emergency Alert System). Radio stations monitoring NOAA Weather Radio All Hazards will receive and quickly broadcast the warnings, and simultaneously send the warnings to other radio stations. The Emergency Alert System will allow for automatic dissemination of warnings by automated radio stations (those which are not manned).

NOAA Weather Radio All Hazards Broadcast Frequencies in southern Colorado (in MHz)

Alamosa	162.475	Colorado Springs	162.475
Pueblo	162.400	Walsenburg	162.550
La Junta	162.500	Fowler, CO	162.425
Lamar	162.525	Springfield	162.400
Canon City	162.500		

SHORT TERM FORECASTS

Timely updated weather forecasts are vital to all broadcasters and emergency managers, especially in rapidly changing conditions. Did you ever want to know if the clouds will increase in the next few hours, or whether it will still be raining at your location in two hours, or when thunderstorms will develop? These types of short period weather forecasts are available in the Short Term Forecast from the National Weather Service. This product is designed to provide a detailed weather forecast for six hours into the future, complementing the longer time frame zone forecasts. Look for the following products:

DENNOWPUB...for southeast and south central Colorado.

DENNOWDEN...for northeast and north central Colorado.

DENNOWGJT...for western Colorado.

TOPNOWGLD...for Yuma, Kit Carson and Cheyenne counties in extreme eastern Colorado.

Short term forecasts are available on NOAA Weather Radio All Hazards, the internet, and on the Weather Channel on some cable systems. If you have another weather forecast vendor, ask them to provide the Short Term Forecast.