

THE STATE OF COLORADO SEVERE WINTER WEATHER MITIGATION ANNEX

IN RESPONSE TO DR-1374-CO:
SEVERE WINTER STORMS
April 11-22, 2001
Updated 2007

Including
EM-3185-CO
March 17-20, 2003

EM-3270-CO
December 18-22, 2006

and
EM-3271-CO
December 28-31, 2006



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EXECUTIVE SUMMARY

The original State of Colorado Severe Winter Weather Mitigation Annex was developed as a requirement in response to severe winter storms of April 11-22, 2001 that earned a presidential disaster declaration - DR-1374-CO. An Interagency Hazard Mitigation Team (IHMT) was developed by FEMA to undergo the plan development process. The IHMT report was published by FEMA in Spring of 2001 and was used as a foundation for the annex.

This annex was updated in the Spring and Summer of 2007 to present new information for the state plan. The Colorado Division of Emergency Management took the lead in updating this annex. Winter storm-related comments made as a result of other planning processes were evaluated and more information was included in this document. Comments on this update were solicited at the July 12, 2007 State Hazard Mitigation Team meeting and through email to team members. Specific comments were sought from content experts, including the Colorado Climate Center and the National Weather Service.

Risk assessment of the state, including information from the State of Colorado Natural Hazards Mitigation Plan 2004, indicates that for most hazards associated with winter weather, including extreme cold, snowfall, blizzard conditions, etc. the entire state is at risk. Example: If you look at the extreme cold temperature for the four corner counties of the state (Moffat, Montezuma, Baca and Sedgwick), and select a few counties mid-state (Gunnison, Costilla, Elbert, and Larimer), the extreme cold temperatures are extreme. Table excerpt below is from a larger, complete table on page 5.

COUNTY	EXTREME TEMPERATURE (°F)	COUNTY	EXTREME TEMPERATURE (°F)
Moffat	-61	Sedgwick	-37
Gunnison	-60	Larimer	-39
Montezuma	-27	Elbert	-38
Costilla	-38	Baca	-26

The natural hazards survey summary completed in 2003/4 by local emergency managers for DEM showed that every region in the state listed winter storm as high or moderate-high risk except one region (San Luis Valley) listed winter storm as moderate.

The State has a successful history of backing winter safety programs. The Colorado Department of Transportation is one of the leading agencies for safety for winter weather. Highways closures and travel advisories occur throughout the state as storm conditions deteriorate. The Colorado Department of Transportation has done an excellent job of providing Road Weather Conditions and Travel Advisories at www.cotrip.org/. A section on Winter Driving is available at <http://www.cotrip.org/winterdriving/default.htm>. Information includes Winter Driving Tips, Snow Removal, Road Conditions, Chain Regulations, and Winter Road Treatments. The Department also works with the media to get important information out to the public. The Department also has an avalanche mitigation program.

The Colorado Avalanche Information Center is another excellent forum for analysis and relaying important safety information. The Center is a joint agency effort between the CDOT and the Colorado Geological Survey (<http://avalanche.state.co.us/>).

These examples of programs and approaches, including public information, preparedness, and actual physical mitigation, demonstrate strong success and are extremely effective.

State assets at risk from winter weather are discussed in detail in the state plan. It has been determined that winter weather occurrence is at least an annual event. Seasons include fall, winter and spring, and even the occasional summer storm. Every state department is affected by winter weather, including employee attendance, employee safety onsite, employee housing, property losses, power losses, etc. Nine state departments provide housing to special needs populations. The human at-risk population includes winter sports recreationers, elderly, motorists, first responders, public works and transportation personnel, and others. At risk critical assets include: life, economic loss, power outages, agricultural assets, property loss, equipment loss.

WINTER WEATHER IN THE U.S.

According to National Weather Service figures, in an eight year period from 1996 through 2003, 580 people in the United States died due to cold temperatures, winter storms, and ice conditions. In Colorado, over the three-year period from 1996-1998, 19 deaths were attributed to these conditions. Ten people were in vehicles, eight people were outside in the open, and one was in a permanent home.

SUMMARY OF REPORTED DEATHS, INJURIES, AND DAMAGE COSTS DUE TO EXTREME COLD TEMPERATURES, WINTER STORMS, AND ICE IN THE UNITED STATES: 1996-2003

EVENT	DEATHS	INJURIES	PROPERTY DAMAGE (\$Millions)	CROP DAMAGE (\$Millions)
Cold	192	113	31.2	1,642.1
Storm	374	2,423	3,968.2	104.9
Ice	14	374	2.5	0.0
Total	580	2,910	4,001.9	1,747.0

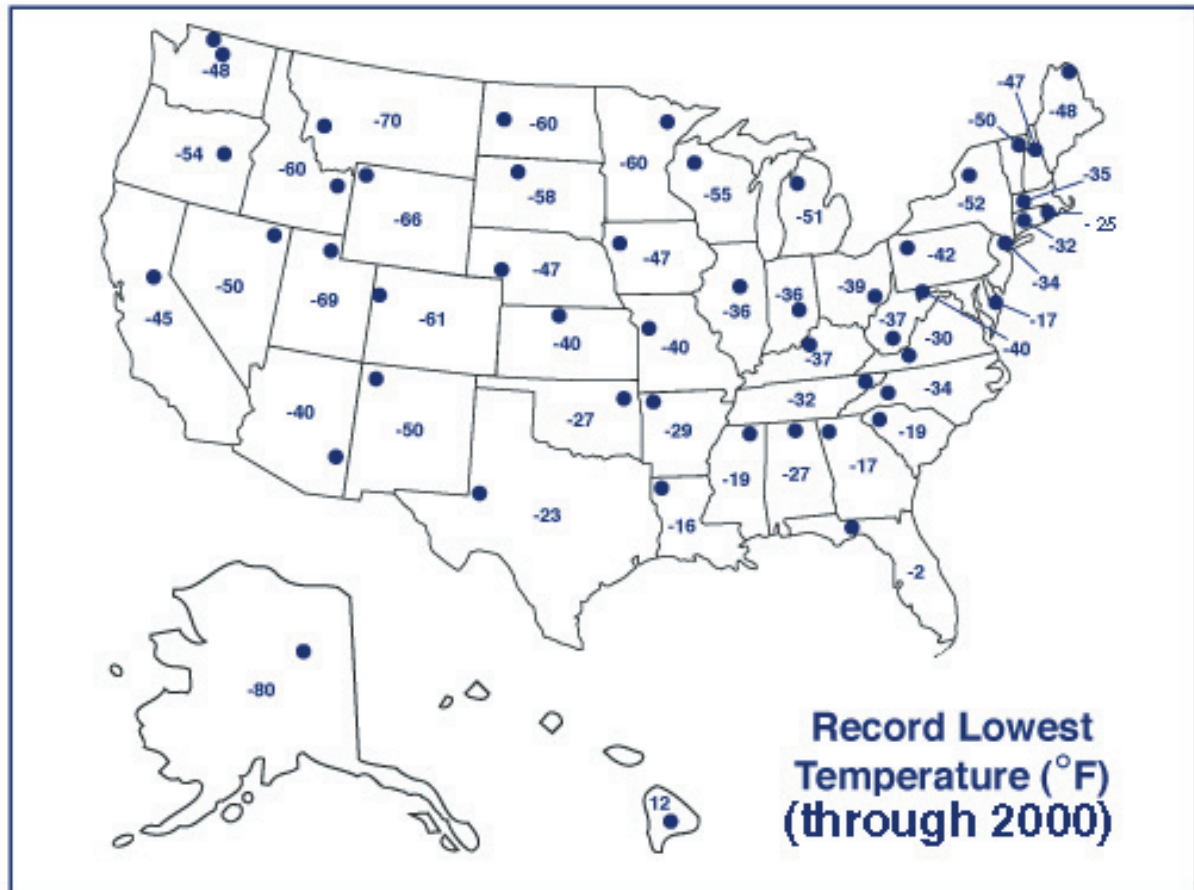
Source: www.nws.noaa.gov/om/severe_weather/

The map below and the following table show the lowest recorded temperature for each state. Data reflects information collected through 2000. Colorado registered the fifth lowest temperature (-61°F), recorded at the Maybell station in Moffat County, in northwest Colorado.

LOWEST RECORDED TEMPERATURES IN THE UNITED STATES THROUGH 2000

STATE	TEMP °F	STATE	TEMP °F
Alabama	-27	Montana	-70
Alaska	-80	Nebraska	-47
Arizona	-40	Nevada	-50
Arkansas	-29	New Hampshire	-47
California	-45	New Jersey	-34
Colorado	-61	New Mexico	-50
Connecticut	-32	New York	-52
Delaware	-17	North Carolina	-34
Florida	-2	North Dakota	-60
Georgia	-17	Ohio	-39
Hawaii	12	Oklahoma	-27
Idaho	-60	Oregon	-54
Illinois	-35	Pennsylvania	-42
Indiana	-36	Rhode Island	-23
Iowa	-47	South Carolina	-19
Kansas	-40	South Dakota	-58
Kentucky	-37	Tennessee	-32
Louisiana	-16	Texas	-23
Maine	-48	Utah	-69
Maryland	-40	Vermont	-50
Massachusetts	-35	Virginia	-30
Michigan	-51	Washington	-48
Minnesota	-60	West Virginia	-37
Mississippi	-19	Wisconsin	-55
Missouri	-40	Wyoming	-66

Source: www.ncdc.noaa.gov/ol/climate/



WINTER WEATHER IN COLORADO

A DECADE OF RECORDS

Most residents of Colorado are familiar with the dangers associated with winter weather, however, every year residents and visitors are caught in life and death situations. While the State of Colorado is famous for its topography, the topography increases risk and adds to the dilemma of how best to protect people.

Extreme winter weather conditions, including ice, snow, wind, cold, may wreak havoc on residents, travelers, farmers, ranchers, business owners, and local government safety, public works and maintenance crews. Extreme winter weather may have devastating effects on crops and animals, close offices and businesses, strand motorists, cause electric lines to fail, bring on hypothermia from exposure, and cause local government budget deficits due to expensive snow removal, clean-up, and rescue and shelter operations.

Four of the seven presidential declarations in the last decade (1997-2006) have been related to severe winter weather events. In December 2006 Colorado received two presidential emergency declarations for record snowfall and extreme conditions. Twenty-six counties were included in these declarations. Roughly 300 eligible State agencies, local governments, and private nonprofits received approximately \$10 million in Public Assistance. No hazard mitigation funds were included in these emergency declarations.

In 2003, Colorado received a presidential declaration for snow emergency for the winter snowstorms of March 17th through the 20th. Twenty-nine counties requested assistance. The state and communities received \$6.2 million in federal funds through the public assistance program. No hazard mitigation funds were included with the emergency declaration.

In April 2001, the state incurred severe winter storms. High winds and ice snapped power poles and downed lines, leaving many residents and businesses without power. The state requested and received a presidential disaster declaration for severe winter storms. Over \$550,000 was received in hazard mitigation funds.

In October 1997, the state declared an emergency for severe snowfalls. Travelers in the metro area were stranded on highways and at the Denver International Airport. Agricultural losses were severe.

HAZARD IDENTIFICATION

In surveys administered by the Colorado Division of Emergency Management in both 2003/4 and 2007, winter weather and its associated hazards have been

ranked by the emergency managers and State Hazard Mitigation Team members as one of Colorado's highest priority hazards due to the high probability of occurrence and high losses and costs associated with these events.

For the purposes of this plan, winter weather can include blizzards (heavy snowfall, high winds, extreme cold, and ice), and extreme cold, heavy snowfall, and ice storms. Avalanches are included to some extent in this annex; they are covered in the state plan.

The table reflects the lowest temperatures recorded in Colorado by county by the Natural Resources Conservation Service (U.S.D.A.) at their Temperature and Precipitation Stations (TAPS). Most county data covers a 30-year period from 1961 to 1990. The data demonstrates that all counties are susceptible to extreme cold conditions, well below freezing. No individual dates were listed with the data. The lowest was -61, recorded at the Maybell station in Moffat County in the northwest.

SUMMARY OF EXTREME COLD TEMPERATURES IN COLORADO BY COUNTY: 1951-1990

COUNTY	EXTREME TEMPERATURE (°F)	COUNTY	EXTREME TEMPERATURE (°F)
Adams	-33	Kit Carson	-29
Alamosa	-42	La Plata	-35
Arapahoe	-32	Lake	-55
Archuleta	-42	Larimer	-39
Baca	-26	Las Animas	-32
Bent	-29	Lincoln	NA
Boulder	-34	Logan	-35
Broomfield	NA	Mesa	-36
Chaffee	-32	Mineral	-45
Cheyenne	-30	Moffat	-61
Clear Creek	-33	Montezuma	-27
Conejos	-34	Montrose	-23
Costilla	-38	Morgan	-32
Crowley	NA	Otero	-28
Custer	-41	Ouray	-22
Delta	-31	Park	-54
Denver	-25	Phillips	-33
Dolores	-36	Pitkin	NA
Douglas	-35	Prowers	-28
Eagle	-51	Pueblo	-30
El Paso	-35	Rio Blanco	-48
Elbert	-38	Rio Grande	-41
Fremont	-25	Routt	-45
Garfield	-38	Saguache	NA
Gilpin	NA	San Juan	-39
Grand	-46	San Miguel	-32
Gunnison	-60	Sedgwick	-37
Hinsdale	-38	Summit	-46
Huerfano	-36	Teller	NA
Jackson	-50	Washington	NA
Jefferson	-41	Weld	NA
Kiowa	-27	Yuma	NA

As recorded at USDA NRCS Temperature and Precipitation Stations (TAPS). Note: not all data covers a 30-year period. NA=not available. Source: www.wcc.nrcs.usda.gov/water/climate/

The table below reflects the number of deaths reported, number of injuries reported, amount of property damage, and amount of crop damage in Colorado as listed in the NOAA National Climatic Data Center Storm Events database. Snow and Ice events listed were from 1993 through 2006. In that 14-year period, most, but not all of the deaths and injuries were attributed to avalanche activity.

SUMMARY OF REPORTED DEATHS DUE TO SNOW AND ICE EVENTS IN COLORADO: 1993-2006			
DEATHS	INJURIES	PROPERTY DAMAGE (\$Millions)	CROP DAMAGE (\$Millions)
53	44	104	5
Source: www4.ncdc.noaa.gov			

NOTABLE EXTREME COLD EVENTS IN COLORADO: 1983-1999/2000	
DATE	DESCRIPTION, INCLUDING DEATHS, INJURIES, CROP AND PROPERTY DAMAGE (\$MILLION)
1983	Cold spell. Readings to -21°F, coldest recorded temperature in 20 years.
1989	Extreme cold, snow, wind. Main airport closed. Poor visibility. 46-car pile-up on I-25
3/23-27/95	Freeze. West Colorado. Readings below critical values in orchard areas. 10% of crops damaged.
4/11/95	Extreme Cold. Arapahoe area. Readings to 13°F. Wheat damaged. ~ \$1M crop damage.
1/17-18/96	Extreme wind chill. Southeast. Wind chills from -30 to -50°F.
2/1-4/96	Extreme wind chill. Southeast plains. Wind chill -25 to -50°F. Lows Pueblo -26°F, Colorado Springs -18°F.
3/24-25/96	Extreme wind chill. Southeast. Bitter cold, gusty. Wind chill -25 to -40°F.
12/16-18/96	Extreme wind chill. Eastcentral, northeast. Readings -30 to -45 °F. Southcentral, southeast. Wind chill -20 to -40°F. Denver area. Low -9°F.
12/25-26/96	Extreme wind chill. Southeast. Wind chills of -20 to -35°F.
1/11-16/97	Extreme wind chill. Southeast, foothills. Wind chills -25 to -35°F. Northeast. Wind chill -25 to -50°F.
4/09-10/97	Extreme cold. Eastcentral. Single digit temperatures, highs below freezing, freezing drizzle, light snow. Schools closed 1-2 days for ice. Many car accidents.
4/12-13/97	Freeze. West. Temperatures dropped below critical levels for most fruit varieties. Majority of stone fruits lost, most apples and pears survived. ~ \$9M crop damage
10/24-25/97	Blizzard. Front range, east. Snow to 4' in foothills. Gusts to 70 mph. Wind chill -25 to -40°F. State of emergency declared. 5 deaths; 2 injuries; 24,000+ cattle lost
6/6/98	Extreme cold. East central. Record cold AM temperatures, lows below freezing. Crop and garden damage.
12/18-24/98	Extreme cold. Denver, northeast. 6 days dipped below 0°F. Low -19°F. Power outages, cracked water pipes. 5 deaths; 15 injuries.
1/2-3/99	Extreme wind chill. Far eastern Colorado. Readings below -35°F.
4/16/99	Extreme cold. Mesa County. Ruined part of fruit crop. Lows 10s to 20s°F. ~\$8.8M crop damage
6/5/99	Extreme cold. Southwest. Late freeze destroyed grapes and vegetables. ~\$0.004M crop damage
Source: www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwevent~storms	

**The coldest recorded temperature in Colorado is -61° Fahrenheit.
The temperature was recorded on February 1, 1985 at Maybell (5,920 feet).**

SUMMARY OF EXTREME SNOWFALL IN COLORADO BY COUNTY							
COUNTY	SNOWFALL (1-DAY, 2-DAY, AND 3-DAY IN INCHES)			COUNTY	SNOWFALL (1-DAY, 2-DAY, AND 3-DAY IN INCHES)		
Adams	24.0	28.0	28.0	La Plata	32.0	51.0	59.5
Alamosa	18.5	26.1	26.1	Lake	31.0	35.5	37.0
Arapahoe	16.0	21.0	21.0	Larimer	40.0	50.0	52.0
Archuleta	39.0	46.0	55.0	Las Animas	36.0	40.0	42.0
Baca	16.0	19.0	19.0	Lincoln	16.0	30.0	30.0
Bent	30.0	31.5	31.5	Logan	20.0	20.0	21.0
Boulder	46.0	50.0	51.0	Mesa	15.0	24.0	26.0
Chaffee	38.0	43.0	44.0	Mineral	55.0	90.0	104.0
Cheyenne	15.0	20.0	20.0	Moffat	26.0	34.0	36.0
Clear Creek	63.0	83.0	90.0	Montezuma	19.0	25.0	30.0
Conejos	39.5	56.0	61.0	Montrose	19.0	22.0	25.0
Costilla	13.0	17.0	17.0	Morgan	15.0	16.0	16.0
Crowley	18.0	18.0	18.0	Otero	18.8	25.0	25.0
Custer	30.0	36.0	46.3	Ouray	20.0	26.0	28.0
Delta	16.0	25.0	30.5	Park	30.0	43.4	48.4
Denver	22.9	29.5	31.8	Phillips	20.0	20.0	24.0
Dolores	37.7	37.7	46.4	Pitkin	25.0	38.0	43.0
Douglas	36.0	36.0	45.0	Prowers	22.0	30.0	30.1
Eagle	14.9	22.8	24.7	Pueblo	28.0	39.5	50.0
El Paso	54.0	64.0	66.0	Rio Blanco	26.0	31.0	45.0
Elbert	28.0	28.0	28.0	Rio Grande	17.0	20.4	22.0
Fremont	22.5	27.0	30.0	Routt	24.0	32.5	36.5
Garfield	20.4	28.0	41.0	Saguache	28.5	32.0	34.0
Gilpin	NA	NA	NA	San Juan	30.0	40.0	46.0
Grand	48.0	49.0	54.0	San Miguel	28.5	51.0	51.0
Gunnison	31.0	44.5	53.5	Sedgwick	18.0	26.0	26.0
Hinsdale	30.0	35.0	38.0	Summit	24.0	34.0	37.0
Huerfano	34.0	40.0	42.0	Teller	24.0	36.0	39.0
Jackson	24.0	29.0	29.0	Washington	18.0	20.0	22.5
Jefferson	33.0	49.0	55.0	Weld	30.0	30.0	30.0
Kiowa	18.0	24.0	32.0	Yuma	18.0	24.0	26.0
Kit Carson	19.4	28.6	28.6				
Source: www.ncdc.noaa.gov/ussc/5Options5?state=Colorado&short=05							

Important note: The severe winter weather of 2006 is not included in the above table, as NCDC has not incorporated this information in time for this version of this publication. Please refer to the NCDC website for more details on information included in this analysis.

Colorado Snowfall and Snow Depth Extremes Table

	Snow Amount (inches)	Location		Ending Date	Number of Years of Non-Missing Data	Data Period Analyzed
		COOP Station Number	Station Name			
Greatest daily snowfall.	63.0	053261	GEORGETOWN	12/04/1913	47	1893-2006
Greatest 2-day snowfall (snowed both days).	90.0	059183	WOLF CREEK PASS 4 W	01/28/1956	26	1939-1971
Greatest 3-day snowfall (snowed all 3 days).	104.0	059183	WOLF CREEK PASS 4 W	01/28/1956	26	1939-1971
Greatest 4-day snowfall (snowed all 4 days).	115.0	059183	WOLF CREEK PASS 4 W	01/29/1956	26	1939-1971
Greatest 5-day snowfall (snowed all 5 days).	134.0	059181	WOLF CREEK PASS 1 E	01/01/1965	35	1958-2001
Greatest 6-day snowfall (snowed all 6 days).	142.0	059181	WOLF CREEK PASS 1 E	01/01/1965	35	1958-2001
Greatest 7-day snowfall (snowed all 7 days).	143.0	059181	WOLF CREEK PASS 1 E	01/01/1965	35	1958-2001
Greatest monthly snowfall total	217.0	056258	PAGOSA SPRINGS	01/1937	56	1906-1998
Greatest Aug-July snowfall total	520.0	059183	WOLF CREEK PASS 4 W	1948	3	1939-1971
Greatest daily Snow Depth	116.0	056258	PAGOSA SPRINGS	02/26/1937	38	1935-1998

Missing data may cause apparent discrepancies between the daily extreme, monthly total, and seasonal total snowfall values. The monthly and seasonal totals were based on complete data; if any days were missing, then the monthly or seasonal total could not be computed for that year. Daily snowfall extremes were not as susceptible to missing data. Consequently, it may be possible for a 1-day extreme to be greater than a multiple-day extreme, a daily extreme to be greater than a monthly total, and a monthly total to be greater than a seasonal total. Checking the 'number of years with non-missing data' parameter is an important part of using this snow climatology.

EM-3271-CO: SNOWFALL

December 28th through the 31st, 2006 a severe winter storm blasted the southeastern and central eastern part of the state, setting into motion an enormous multijurisdiction response and recovery effort. As of January 2, 27 local governments had made local emergency or disaster declarations.

Parts of highways affected by closures and/or deteriorating conditions included but were not limited to I-70, I-25, CO-71, US-36, US-24, US-50, CO-86, US-40, US-385, US-287, and US-160. On December 31st it was reported that 658 people were being sheltered. One fatality was confirmed along I-70 in Kit Carson County due to the snowstorm.

Ten counties were designated for public assistance based on record or near record snowfall: Baca, Bent, Cheyenne, Crowley, Huerfano, Kiowa, Las Animas, Otero, Prowers, and Pueblo. The state and communities received reimbursement of over \$1.5 million for expenditures incurred over a 48-hour period



Snowfall in Huerfano County

Photo provided by John Galusha through the public assistance program. Storm costs exceeded \$? million. Snow load did millions of dollars in property damage, especially to roofs and porches. Livestock were stranded; state agencies, local governments, and others including the Cattlemen's Association ran missions and efforts to locate and feed



Huerfano County

Photo provided by Marilyn Ortiz



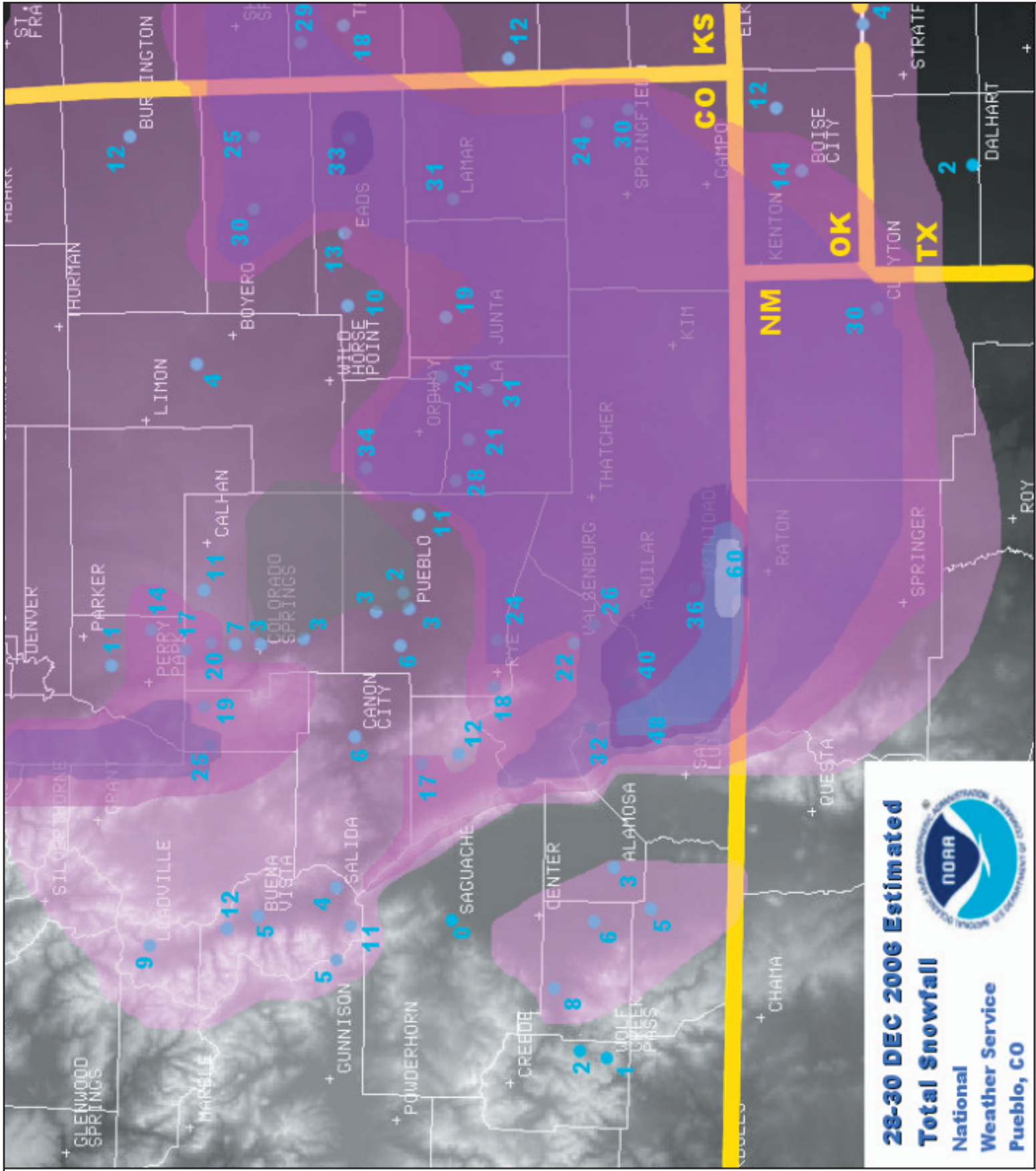
Photo provided by Colorado Department of Transportation



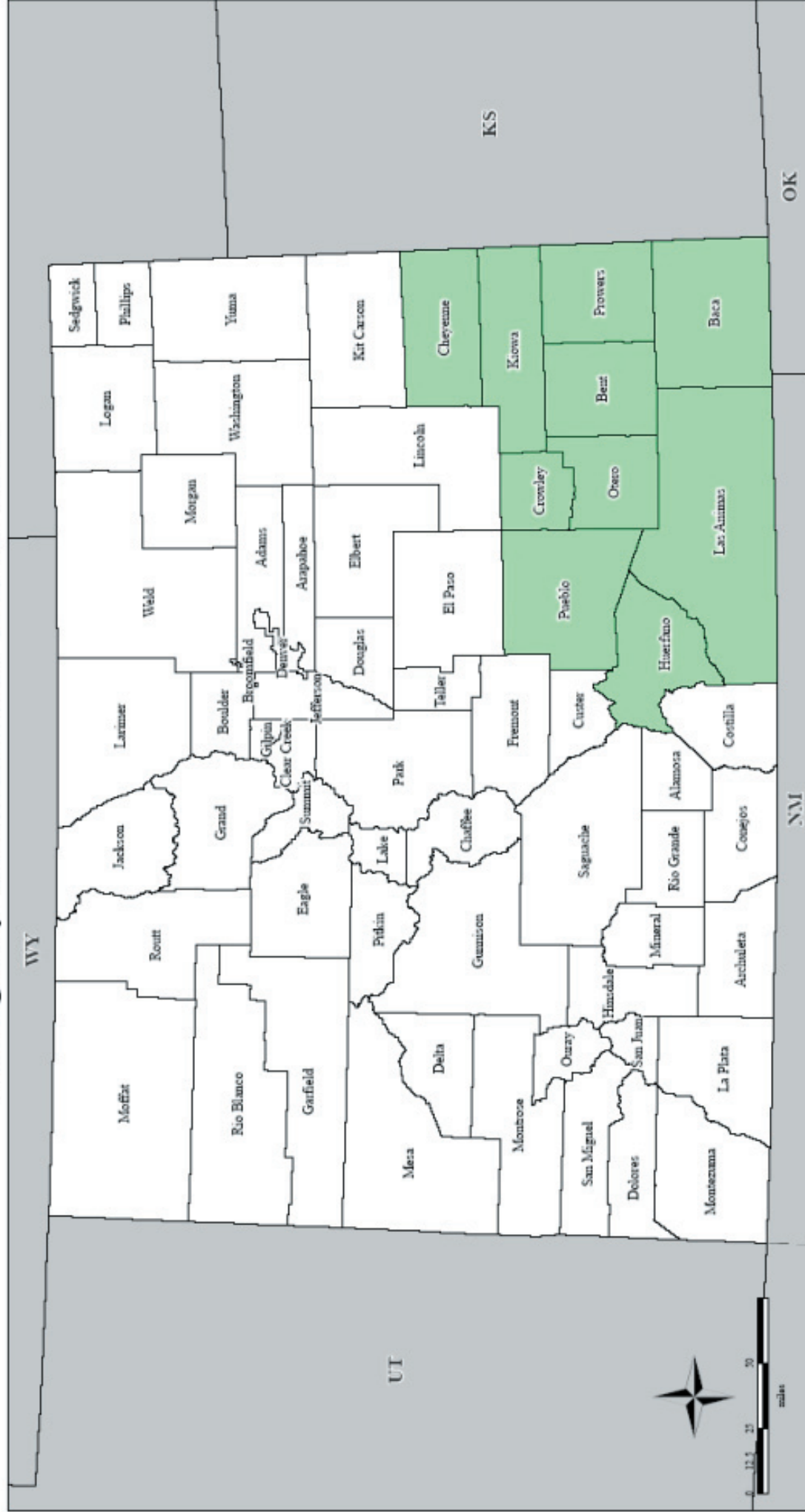
Sheridan Lakes, Kiowa County Photo by Mike Umscheid Photography, UnderTheMesa.com

surviving livestock. A state emergency was declared, the state emergency operations center was activated and many state and local agencies mobilized for life safety and livestock missions, including, but not limited to the Department of Transportation, Department of Military and Veterans Affairs, Department of Public Safety, Department of Natural Resources, Department of Agriculture, Salvation Army, American Red Cross, ARES/RACES, Civil Air Patrol, and Division of Emergency Management. Air mission resources were requested and received from Wyoming and Oklahoma. Many local governments and businesses were closed for several weeks while the residents were being dug out. The state EOC was deactivated on January 10, 2007.

The map on the next page was copied from the National Weather Service Pueblo site and gives snowfall totals for the southeast region. The map following was copied from the FEMA website for declared disasters and depicts the ten counties presidentially declared.



FEMA-3271-EM, Colorado Emergency Declaration as of 02/12/2007



Location Map



Legend

Designated Counties

No Designation

Public Assistance (Category B - Snow Removal)*



FEMA

ITS Mapping & Analysis Center
Washington, DC

02/13/07 -- 7:45 AM EST

Source: Disaster Federal Registry Notice
Amendment No. 3 -- 02/12/2007

* For any continuous 48-hour period during or proximate to the incident period

EM-3270-CO: SNOWFALL

December 18th through the 22nd, 2006 a severe winter storm blasted mountain, eastern, and front range foothills parts of the state. Large multijurisdictional response and recovery efforts were impeded by severe conditions, including blowing snow and abandoned vehicles. Many local governments, state agencies, and the Denver International Airport shut down normal operations due to conditions. Approximately 40,000 were stranded at the airport. Greyhound had to cancel all bus routes.

Parts of highways affected by closures and/or deteriorating conditions included but were not limited to I-70, I-25, E-470, I-76, US-36, CO-85, CO-96, US-287, CO-86 and most mountain passes. Four fatalities were attributed to the snowstorm.



Morgan County Photo provided by Kevin Kurelich



Larimer County drifts Photo provided by Mike Gavin



Larimer County drifts Photo provided by Mike Gavin

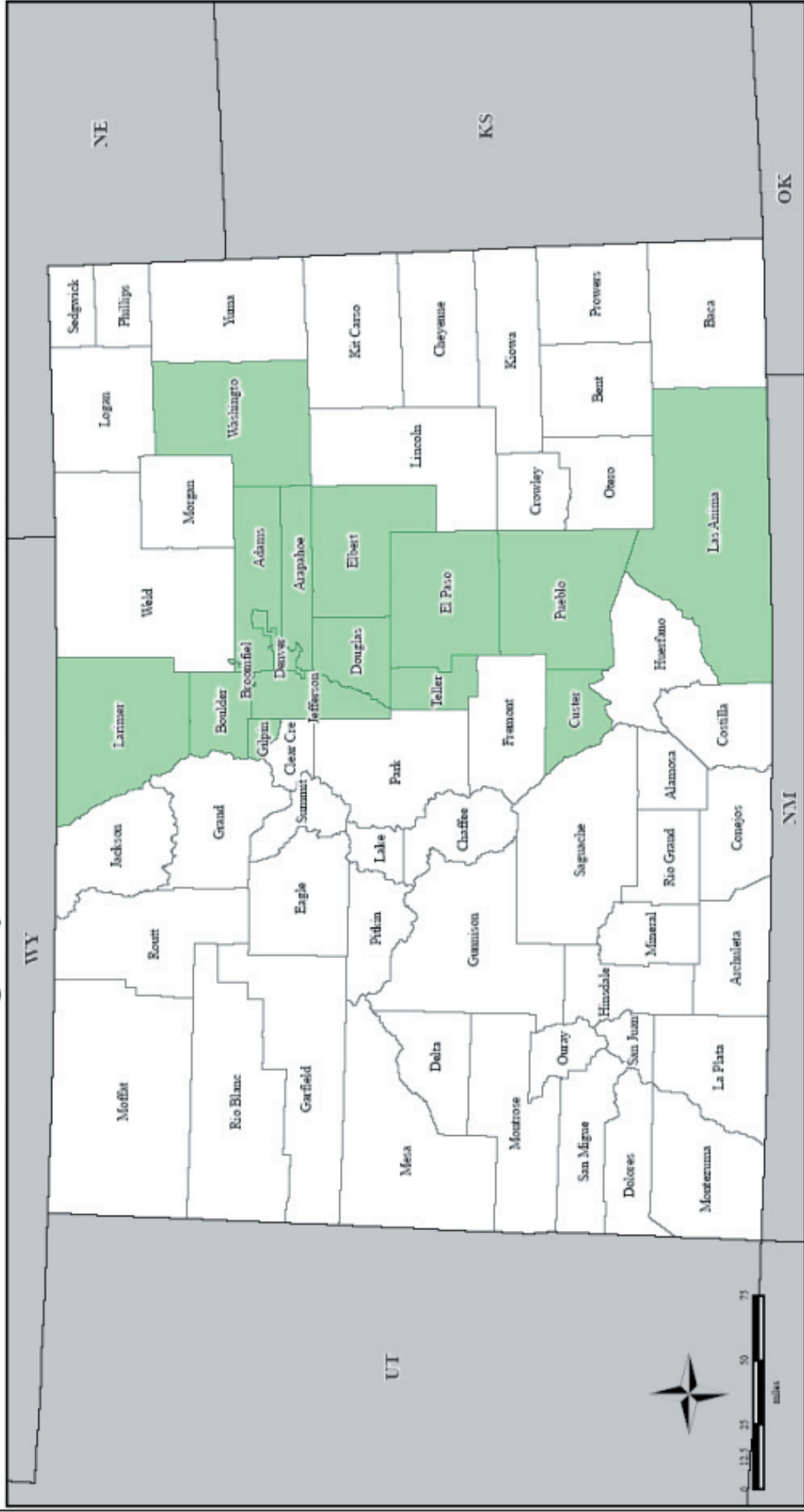
Sixteen counties were designated for public assistance based on record or near record snowfall: Adams, Arapahoe, Boulder, Broomfield, Custer, Denver, Douglas, El Paso, Elbert, Gilpin, Jefferson, Larimer, Las Animas, Pueblo, Teller, and Washington. State agencies, communities, special districts, and eligible private nonprofits received reimbursement of over \$9 million for expenditures incurred over a 48-hour period through the public assistance program. Snow load did millions of dollars in property damage.

A state emergency was declared, the state emergency operations center was activated, and many state and local agencies mobilized for life safety missions, including, but not limited to the Department of Transportation, Department of Military and Veterans Affairs, Department of Public Safety, Salvation Army, American Red Cross, ARES/RACES, and Division of Emergency Management. Many local governments and businesses were closed for several days while residents and businesses dug out. The state EOC was deactivated on December 22, 2006.

The map on the next page was copied from the National Weather Service Denver/Boulder site and gives snowfall totals for the northeast region. The map following was copied from the FEMA website for declared disasters and depicts the 16 counties presidentially declared.

Some of the same areas were hit again by the second storm of December 28-31, 2006. Most of the same counties, with the exceptions of Las Animas and Pueblo, had significant and impacting snowfalls, but were not declared for EM-3271.

FEMIA-3270-EM, Colorado



Legend

Designated Counties

- ☐ No Designation
☒ Public Assistance



FEMA

ITS Mapping & Analysis Center
Washington, DC
02/08/07 -- 8:30 AM EST

Source: Disaster Federal Registry Notice
Amendment No. 3 - 02/07/2007

EM-3185-CO: SNOWFALL

From Sunday, March 16th through March 18th, 2003 a severe winter upslope storm blasted the eastern foothills, adjacent plains and mountains. Large multi-jurisdictional response and recovery efforts were difficult.

Twenty-nine counties were designated for public assistance for record or near record snowfall: Jackson, Grand, Summit, Park, Fremont, Custer, Weld, Huerfano, Las Animas, Teller, Costilla, Clear Creek, Gilpin, Alamosa, Saguache, El Paso, Chaffee, Gunnison, Elbert, Douglas, Arapahoe, Larimer, Boulder, Denver, Morgan, Jefferson, Adams, Pueblo, and Broomfield.

The state and communities received reimbursement of over \$6 million for expenditures incurred over a 72-hour period through the public assistance program. Storm costs exceeded \$8 million. Snow load did millions of dollars in property damage, especially to roofs and porches.

Photos to the right were taken in Golden at Camp George West by Marilyn Gally. The emergency operations center was activated for three 24-hour shifts. State officials closed state government for a day for all employees except essential personnel because transportation conditions in the metro area were so difficult. Many local governments were also closed.



PUBLIC INFORMATION STATEMENT NATIONAL WEATHER SERVICE PUEBLO CO 600 AM MDT SAT NOV 4 2006

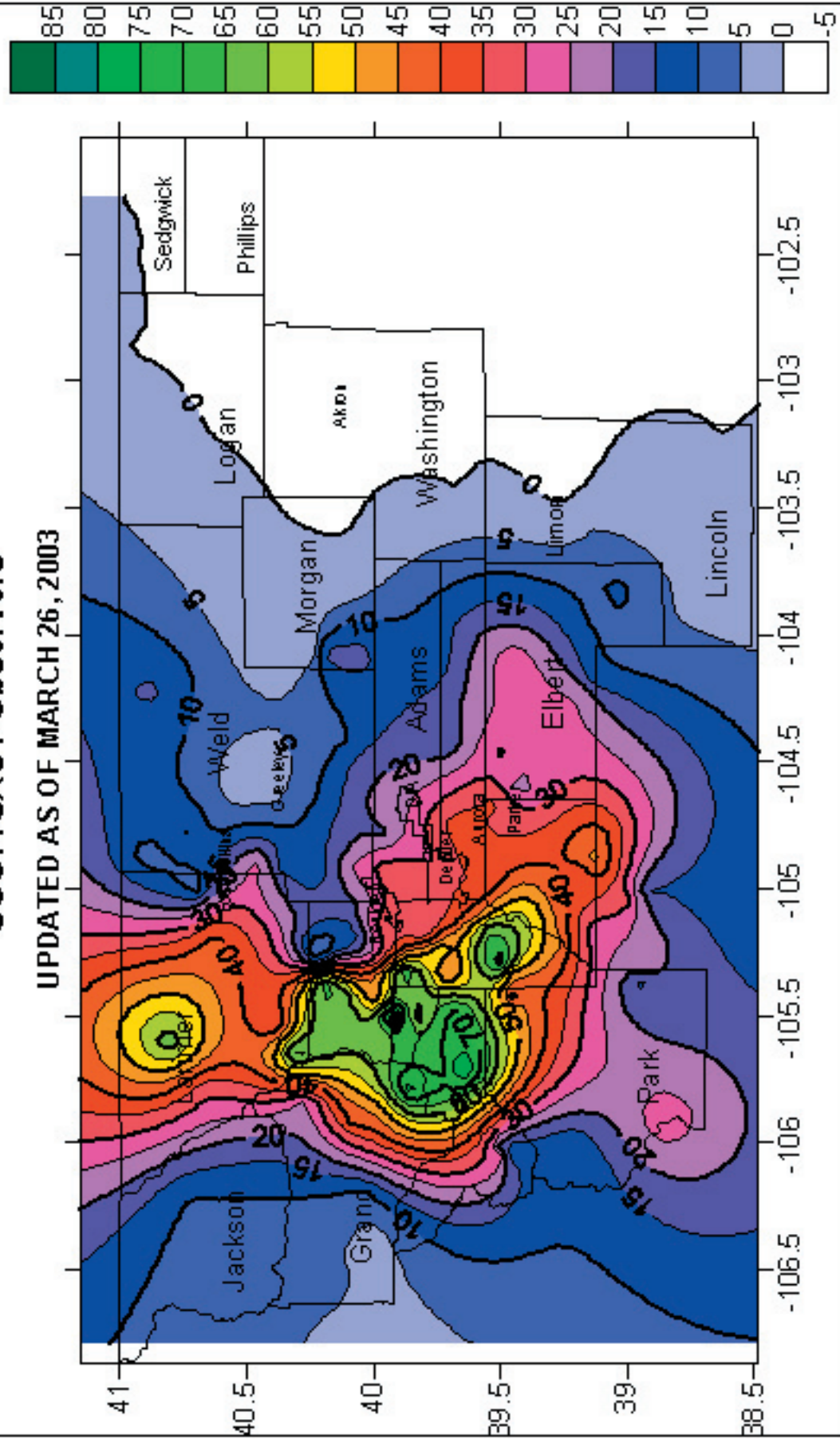
Another more recent example of severe winter weather occurred in March of 2003 across the eastern foothills...adjacent plains...and mountains. Snowfall amounts ranged from 80 to 110 inches... along with high winds in some areas. The Denver metro area averaged nearly three feet of snow. The storm was well forecast ... and people...for the most part...heeded the warnings. Consequently casualties and impacts were mitigated.

-http://www.crh.noaa.gov/bou/include/showProduct.php?product=wntrwrap_pn7.txt

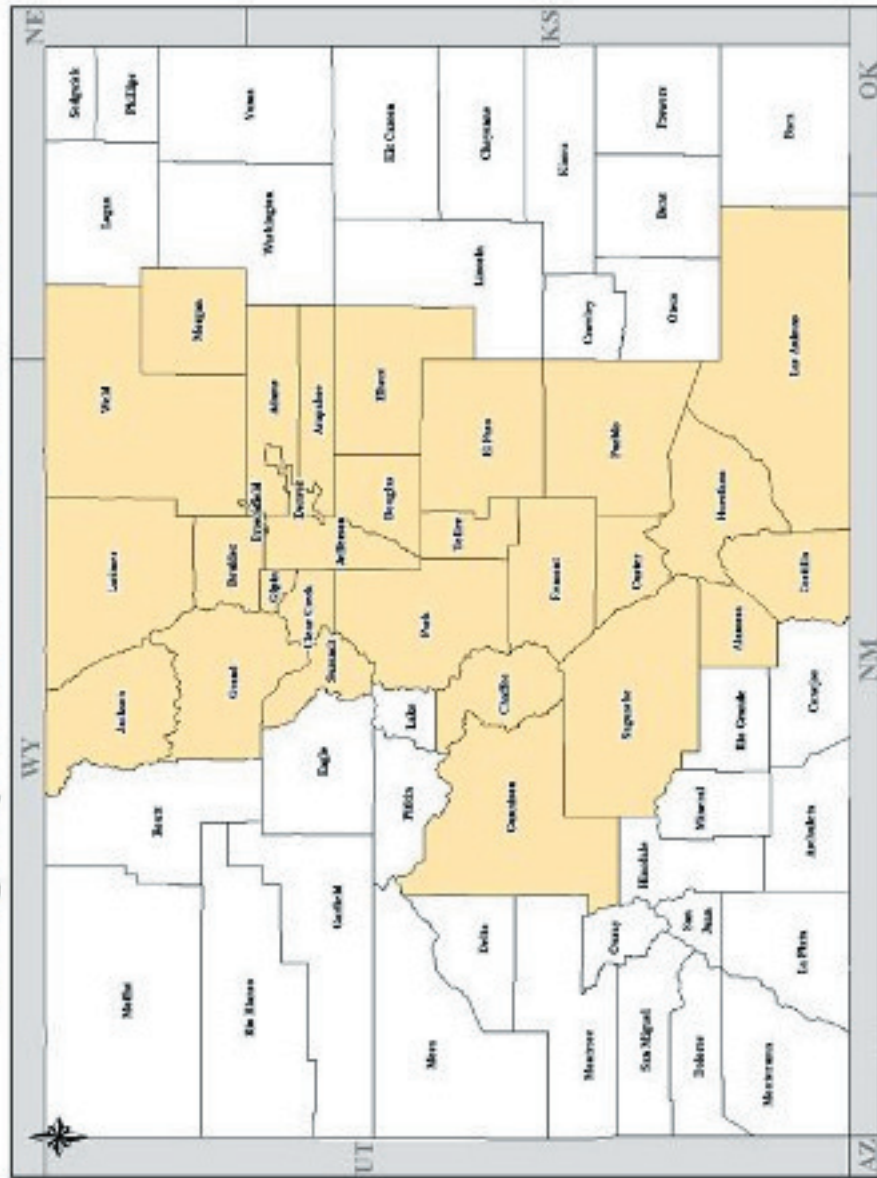
MARCH 17-20, 2003 SNOWFALL

COOP/CAST Observers

UPDATED AS OF MARCH 26, 2003



FEMA - 3185 - EM, Colorado **Emergency Declaration as of 04/17/2003**





FTS Mapping and Analysis Center
 Washington, DC
 4/18/2003 -- 09:10:06 EDT

Legend

Designated Counties
 Public Assistance Category B (75 hours (25))

Location Map



es_2003.mxd

OCTOBER 1997

A major blizzard tormented eastern Colorado October 24th-25th, 1997. Reported snowfall totals ranged from 51 inches (Coal Creek Canyon) to 24 inches. Winds during the peak of the storm were sustained at 25-35 miles per hour with gusts of 50-60 miles per hour on the northeast plains. Snow drifts ranged from 4-8 feet in parts of northeast Colorado. The wind chill ranged from -25 to -40 degrees. At times, visibility dropped to zero. Heavy snow fell over Monument and Palmer Lake with 52 inches of snow with 15 foot drifts in Palmer Lake and 48 inches of snow with 6 to 10 foot drifts in Monument.

Four thousand people were stranded at the Denver International Airport. The Colorado Department of Transportation, the Colorado State Patrol, and the Colorado National Guard were called upon to conduct safety and rescue missions to aid stranded motorists. Hundreds of cars were abandoned along highways.

Governor Romer declared an emergency for the state. Six deaths and two injuries were attributed to this storm. Three people in El Paso County died from carbon monoxide poisoning while waiting in their vehicles for help. Another person froze to death in a vehicle on post at Fort Carson. An elderly woman froze to death in Otero County while trying to walk home after her vehicle became stuck. A man in Bent County froze while hunting or looking for other hunters. Another man died in a vehicle accident in Pueblo. Two people were injured in Colorado Springs when a canopy at a gas station collapsed under the weight of deep snow on top. Losses included 24,000 head of cattle and greater than \$1.2 million in property. Air carriers estimated their losses at \$20 million.

PUBLIC INFORMATION STATEMENT
NATIONAL WEATHER SERVICE
PUEBLO CO
600 AM MDT SAT NOV 4 2006

... A tragic example of what can happen during the winter weather season was the blizzard of 1997. With mild temperatures just before the blizzard in October... Many residents and visitors to Colorado had a difficult time believing that a widespread blizzard could be possible over eastern Colorado. The blizzard of 1997 is an example of national weather service weather warnings going unheeded by many. Several deaths occurred... Due to exposure... Carbon monoxide poisoning... And overexertion.

-http://www.crh.noaa.gov/bou/include/showProduct.php?product=wntrwrap_pn7.txt

OTHER STORMS

Exerpts from "WEATHER HIGHLIGHTS OF THE 1900'S" from <http://www.crh.noaa.gov/pub/climate/co1900.txt>.

1913...See full description.

1921 April 16..Spring storm reached from Colorado Springs to Castle Rock, dropping 15 to 20 inches of snow... Cars and snow plows were stalled in the city, while numerous trains were stranded on their tracks across Eastern Colorado.

1977 March 19...Colorado Springs receives 13.4 inches of snow with winds gusting to 52 mph. East of the city, 82 mph winds were reported. The worst of the storm was from Colorado Springs to Limon. Army helicopters and halftracks were used to rescue stranded people. Five known dead, and \$4 million in property loss and damage.

1982 December 24...Snow started falling in the early morning on Christmas Eve and continued until sunrise Christmas Day. Winds gusting to 45 mph kept visibility near zero most of the day. Snow plows were unable to keep up with the storm until the 25th, as snow drifts of 6 to 10 feet were common.

1984 October 15-16th..The BRONCO blizzard. Storm started while the Bronco's were playing on national TV. Denver received 1 to 3 feet of snow... Winds gusted to 55 mph shutting down I-25 from Denver to Colorado Springs, and numerous flights in/out of Colorado Springs and Denver were canceled due to blowing and drifting snow.

1987 January 15...Snowfall totals include: Colorado Springs 22 inches; Rye 42 inches; Colorado City 20 inches; Pueblo 9 inches; Canon City 10 inches.

1990 February 21...Snow, fog and ice cause a 30 car demolition derby on I-25 from north of Colorado Springs to 4 miles north of Monument. No serious injuries, but the road was closed for several hours to clear up the mess.

1991 November 16-17th...Winter storm arrives and leaves 16.6 inches on snow in Colorado Springs, 12.8 inches at Pueblo and 5.7 inches in Alamosa. Winds gusted to 50 mph at times.

1995 May 18...18 inches of snow falls at Woodland Park.

1997 October 24-26..See full description.

1997 November 29...Blizzard conditions force the closing of I-25 south of Pueblo as 27 inches of snow falls at Walsenburg. North of Pueblo, 19 inches of snow fell at Divide, 18 inches in Cripple Creek and 12 inches at Woodland Park.

1999 December 3rd Lots of snow and some records fall. Cuchara receives a record breaking 61.25 inches of snow, 32.4 inches at Rye, 10 inches of snow in the Black Forest and Woodland Park, 16 inches at Beulah as winds gust to 45 mph and higher in some areas.

DECEMBER 1913

The December 4th blizzard of 1913 dumped 4 feet of snow in Golden, Arvada, and Morrison, and 5 feet in Evergreen. Two deaths were attributed to this snowstorm (http://www.co.jefferson.co.us/archives/archives_T77_R66.htm). The greatest snowfall from one storm in Denver: 45.7 inches December 1-6, 1913 with 37.6 inches recorded between December 4-5th 1913 (<http://www.crh.noaa.gov/bou/awebphp/snow-stat.php>).



Photos from <http://www.flickr.com/photos/etching/tags/denver/>



Photos from <http://www.flickr.com/photos/etching/tags/denver/>



Photos from <http://www.flickr.com/photos/etching/tags/denver/>

PUBLIC INFORMATION STATEMENT
NATIONAL WEATHER SERVICE
PUEBLO CO
300 PM MST THU JAN 06 2000

... WEATHER HIGHLIGHTS OF THE 1900'S

1913 December 3-5th.. The granddaddy of blizzards reached from Cheyenne, Wyoming to Trinidad, Colorado with snow, and wind gusts to 50 mph. Snow drifts reached to the eaves on houses, and were as high as the tops of trolley cars. Numerous trains stalled at different locations in eastern Colorado due to the heavy snowfall.

-<http://www.crh.noaa.gov/pub/climate/co1900.txt>



Photos from <http://www.flickr.com/photos/etching/tags/denver/>



Photos from <http://www.flickr.com/photos/etching/tags/denver/>

DR-1374-CO: SEVERE STORMS

Spring Storms of April 2001

Residents of Colorado deal with severe weather events on a regular basis. April 2001 was no exception, however, it is the first presidential disaster declaration the State of Colorado received for severe winter storms. This Severe Weather Annex was originally written in response to the declaration, dated May 21, 2001.

On two weekends in April 2001 (April 11-15 and April 20-22), ice storms ravaged eastern Colorado. Miles of power lines were downed and thousands of power poles snapped. Rural electric associations determined damages to be around \$5 million. Thousands of people went without power for days. Governor Bill Owens declared a state disaster emergency on Tuesday, May 8, 2001, for 21 eastern counties affected by two heavy, wet spring snowstorms. Counties affected included Adams, Baca, Bent, Boulder, Cheyenne, Crowley, El Paso, Kiowa, Kit Carson, Larimer, Las Animas, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Sedgwick, Washington, Weld, and Yuma. Governor Owens requested and received a presidential disaster declaration (DR-1374). Counties with rural electric associations meeting the damage criteria, making the REAs eligible for Public Assistance as of May 17, 2001 were Baca, Bent, Cheyenne, Crowley, Kiowa, Lincoln, Logan, Morgan, Phillips, Weld, Prowers, Sedgwick, Washington, and Yuma. All counties were eligible for the Hazard Mitigation Grant Program.



Rural electric damages Photo provided by Bill Cordova



Rural electric damages Photo provided by Bill Cordova

The following describes the disaster:

Snow depths were recorded up to 18 inches. Extremely strong winds blew the snow into impassable drifts. The storms caused approximately \$5 million in damage, primarily to rural electric utility cooperatives; damages were estimated at 4,000 power poles and seven miles of transmission lines. Thousands of customers went without power for days while the lines were being repaired. The agricultural and ranching industry was severely affected, both by the storm and by the loss of power. Crops of winter wheat, barley, alfalfa, and fruit were lost due to winds and freezing temperatures. Freezing temperatures and lack of power for water resulted in loss of livestock.

The Hazard Mitigation Survey Team met on June 29, 2001 at the Colorado Office of Emergency Management's Offices at Camp George West. The team identified long and short-term hazard mitigation recommendations, strategies, and opportunities for implementation at all levels of government. Participants included the Federal Emergency Management Agency, the National Weather Service, representatives from several state departments (Colorado Department of Natural Resources, Colorado Department of Transportation, Colorado Department of Local Affairs, Colorado Department of Regulatory Agencies), and representatives from rural electric associations. Several invited local emergency managers from declared counties and other representatives from state agencies were not available to attend.

The Top 12 Denver Snow Storms Since 1948"

The National Weather Service has determined the top 12 snow storms in Denver to be the following by order of snow amounts:

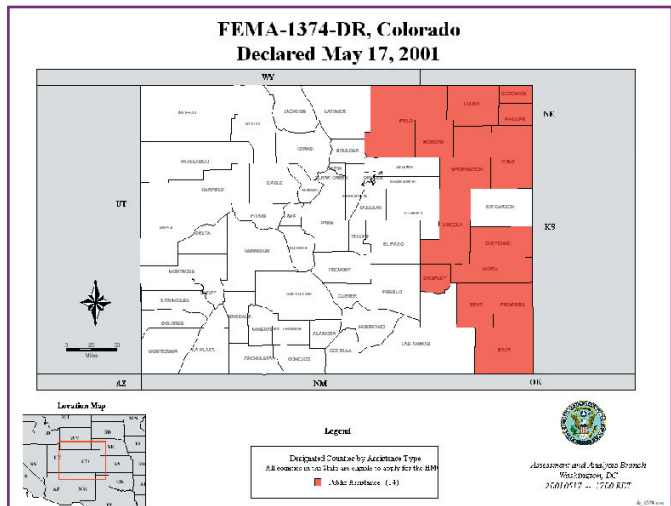
December 24	1982	23.8 inches	April 1	1957	17.3 inches
October 25	1997	21.9 inches	March 20	1952	16.9 inches
November 27	1983	21.5 inches	October 3	1969	16.0 inches
November 19	1991	21.1 inches	April 26	1972	15.8 inches
March 5	1983	18.7 inches	September 16	1971	15.6 inches
November 19	1979	17.7 inches	October 29	1972	15.5 inches

Note: This does not include more recent storms than 1997.



Highway Gate For Closing the Road
Photo by Marilyn S. Gally, COEM

In Colorado, highways are closed when conditions deteriorate to the point that it is no longer safe to travel. As a result, motorists may become stranded and need to find emergency accommodations.



Mitigation Measures

Increase public awareness and education efforts on personal/family protection, including winter survival kits and community shelter options.

Increase public awareness and education efforts on home improvements, including weatherproofing structures susceptible or prone to winter weather damage. Distribute information regularly throughout the season.

Increase public awareness and education efforts on preparing the car for winter and surviving as a stranded motorist. Distribute information regularly throughout the season.

Expand Winter Weather Awareness Week participation.

Promote the use of backup generators and living tree fences to protect valuable resources.

Promote the hardening of utilities to prevent damage from occurring.

Increase the use of warning and communication systems.

Encourage winter weather preparedness and safety plans. Encourage practicing the plan regularly.

Sources:

Benson, M. Fort Collins Coloradoan. "Larimer, 20 other counties declared disasters after April snowstorms." May 9, 2001.

Insurance Information Institute. "Surviving Severe Cold Weather."

National Climate Data Center. <http://www4.ncdc.noaa.gov>

National Weather Service. <http://www.nws.noaa.gov>.

Natural Resource Conservation Service. www.wcc.nrcs.usda.gov/water/climate/

Rocky Mountain News. "Aid sought after snowstorms." Wednesday, May 9, 2001.

The Hazard Mitigation Survey Team met for approximately four hours. During that time, issues were identified and classified into the following categories:

- Communications/Logistics

 - Warning notification

 - Communications during severe weather event

 - Logistics of transportation systems

- Public Education and Awareness

 - Public education and information regarding severe weather events

 - Public awareness of community shelters

 - Public awareness of secondary hazards from a severe precipitation event

 - Public awareness and education

- Response and Recovery

 - Damage assessment

 - Debris removal and logistics

 - Memorandums of understanding for snow removal assistance

 - Right of way/access for damage assessment

- Utility Retrofitting

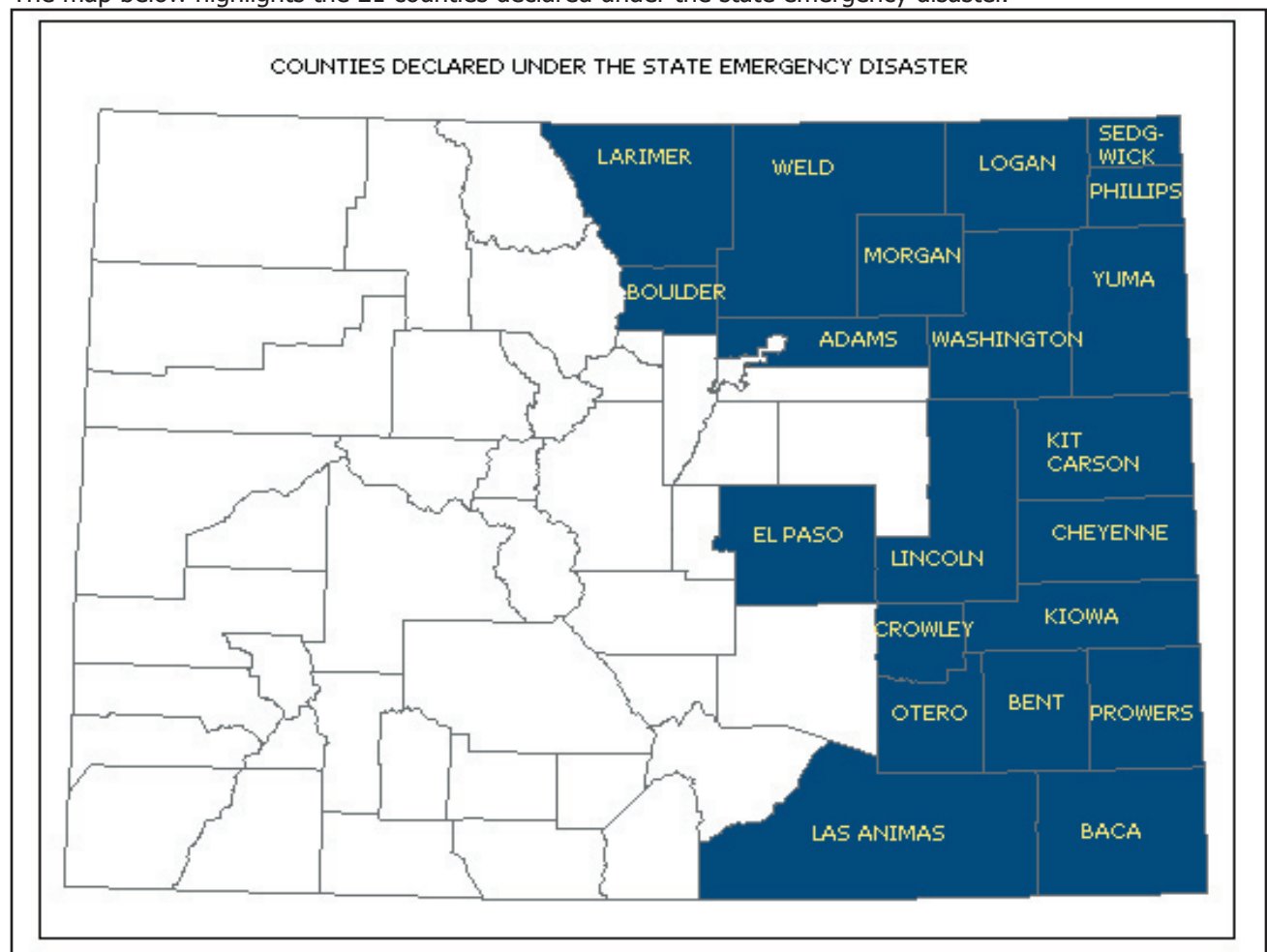
 - Mitigation or maintenance

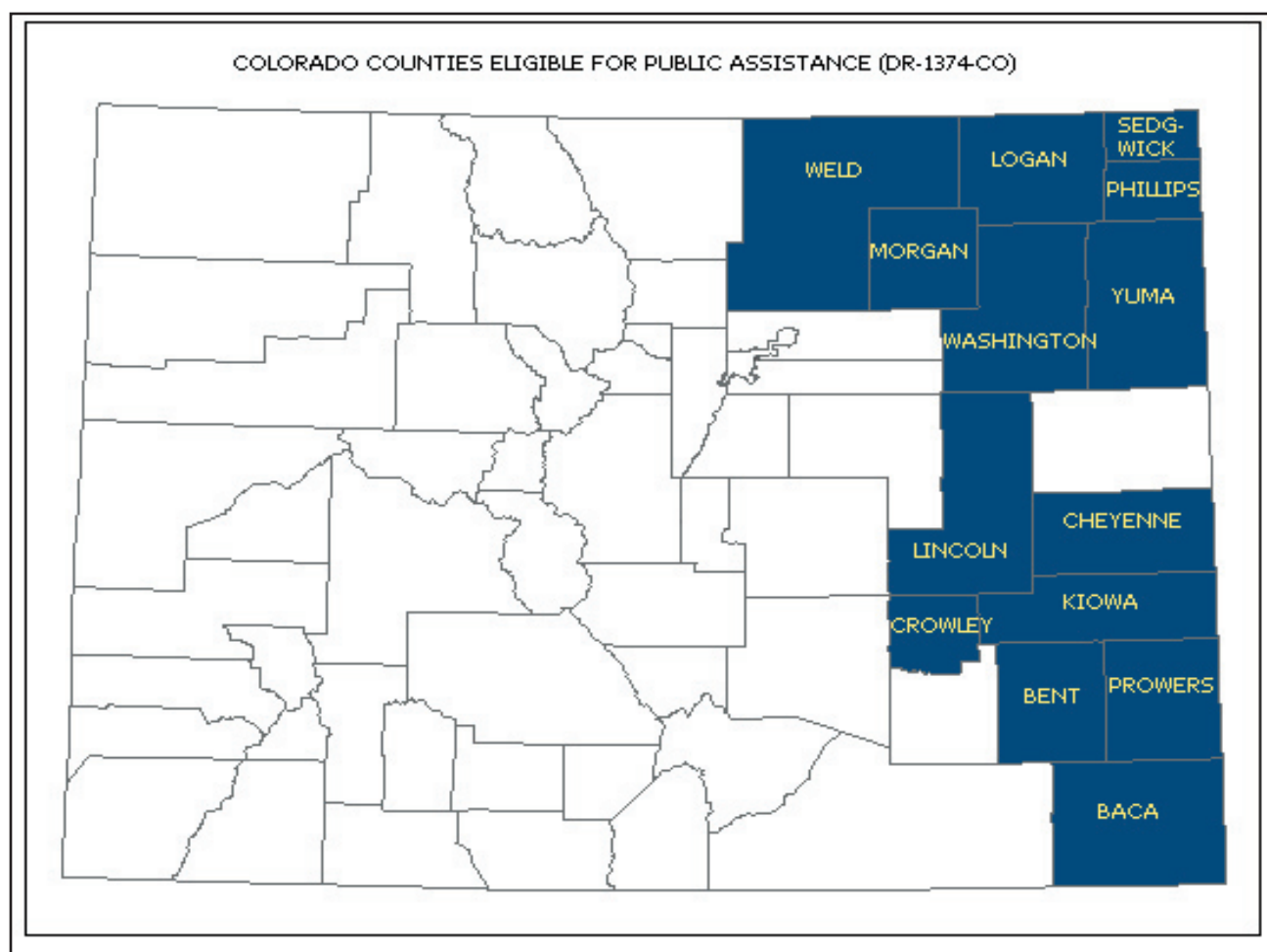
- Preparedness

 - Emergency operations and maintenance plans

The details of the above items are located in the Hazard Mitigation Survey Team Report, State of Colorado, In Support of: FEMA 1374-DR-CO Severe Winter Storms, Declared May 21, 2001, dated August 24, 2001 and are discussed in that chapter of this document.

The map below highlights the 21 counties declared under the state emergency disaster.





The map above highlights the counties declared under the presidential disaster declaration.

The mitigation goals of the State of Colorado are as follows:

Reduce the loss of life, personal injury, critical facilities and infrastructure, property, and economic injury from natural and technological disasters and their cumulative and secondary (cascading) impacts, and minimize the costs of disaster response and recovery.

The mitigation strategy for the state includes the following:

- ☐ Promote the most reasonable and beneficial mix of mitigation approaches, appropriate to the circumstances.
- ☐ Evaluate current state hazard annexes.
- ☐ Update the mitigation strategy and plan annually or as needed.
- ☐ Create and continue partnerships with other agencies to promote hazard identification, risk assessment, mitigation planning, and best practices in implementation.
- ☐ Foster and develop a business contingency and continuity program.
- ☐ Continue to develop hazard mitigation demonstration projects.
- ☐ Continue to fund hazard mitigation projects when appropriate. Encourage multi-objective projects, when ever possible. Develop and update potential project lists annually.
- ☐ Identify and assist communities eligible and interested in existing mitigation programs, i.e. StormReady.
- ☐ Strengthen lifelines.
- ☐ Track overall progress. Report successes and failures.

MITIGATION APPROACHES IN COLORADO

Four basic mitigation approaches are widely used. Different words have been used in different documents to express the ideas, but the ideas are the same. The ideas are to:

- alter (act on) the hazard,
- avert (redirect) the hazard,
- adapt to (interact with) the hazard, and/or
- avoid the hazard.

Alter The Hazard

The hazard can be acted upon (altered) in such a manner as to reduce or even eliminate the frequency and intensity of the occurrence. An example includes using explosives to trigger avalanches in a controlled environment.



The photograph at left depicts an avalanche control device at the Arapahoe Basin ski area. Photo by Marilyn Gally.

Avert The Hazard

This approach does not eliminate the hazard; it redirects the impacts of the hazard away from more vulnerable areas. There are both structural and nonstructural methods. Structural methods may include building a levee to redirect water flow. A nonstructural example would be vegetation management to redirect runoff.



The photograph at left depicts a living tree snowfence along Highway 93. Snowfences are used to keep blowing snow off highways. Photo by Marilyn Gally.

Adapt To The Hazard

This involves reducing vulnerability to a hazard. Examples include retrofitting structures to be more resistant to damage from hail, high winds, fires, or earthquakes, or building safe rooms for protection from tornados.

The roof on the structure in the photo at right has a very steep slope designed with consideration of snow load. Photo by Marilyn Gally.



Avoid The Hazard

This involves removing or not placing people and structures in risk areas. An increasingly popular example is to create open spaces and restrict building commercial and residential structures in areas most prone to wildfires, landslides or flooding.

The photo at right shows a road closed gate on Highway 6. Many major highways throughout Colorado have access gates. Gates are closed if conditions warrant. Photo by Marilyn Gally.



PROGRAMS IN COLORADO

Mitigation Strategies and Severe Weather

The State of Colorado promotes weather safety and prevention through mitigation and preparedness programs. The following are programs and activities used to promote severe weather awareness and safety.

StormReady Program

The National Weather Service does an excellent job of promoting StormReady in Colorado. The program is very successful and Colorado communities consider it quite an achievement to be designated "StormReady". The following is an excerpt from the National Weather Service StormReady brochure for Colorado:

"When Seconds Count: Colorado StormReady Communities are Prepared

Ninety percent of presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly \$14 billion in damage. To help Americans guard against the ravages of severe weather, the National Weather Service with the assistance of the Colorado Office of Emergency Management has designed StormReady, a program aimed at arming America's communities with the communication and safety skills necessary to save lives and property.

About StormReady in Colorado

StormReady recognizes communities that are already prepared to respond to the threat of all kinds of severe weather, and assists other communities in reaching this level of readiness.

... Participation is strictly voluntary. Communities will be recognized as StormReady if they have accomplished the following achievements:

- ☐ Establish a 24-hour warning point and emergency operations center,
- ☐ Have more than one way to receive severe weather forecasts and warnings to alert the public,
- ☐ Created a system that monitors local weather conditions,
- ☐ Promote the importance of public readiness through community seminars, and
- ☐ Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises."

The State of Colorado has **many** StormReady communities. Yuma County was the state's first recipient. The National Weather Service meteorologists and Colorado Division of Emergency Management work with communities interested in obtaining StormReady status.

The recipient community receives media recognition and signage (see photo).

Counties:

Cheyenne, Delta, Douglas, El Paso, Kit Carson, Logan, Morgan, Prowers, Pueblo, Washington, Weld, Yuma
Communities: Colorado Springs, Lake City, Lamar, Pueblo



Communities

have successfully applied for State Hazard Mitigation Program grants to complete projects in anticipation of achieving StormReady status.

Enhanced Snowpack Assessment (SNODAS)

The CWCB and the USBorR are collaborating on the "Enhanced Snowpack Assessment" Project that uses modeled snowpack from the Snow Data Assimilation System (SNODAS) and tailors model output to 1km resolution for Colorado's eight major river basins. The project uses the USGS' eight digit Hydrologic Unit Code (HUC) basins to then create sub-basin data. The two major goals are to 1) develop quantitative snowpack numbers, and 2) link modeled snowpack to hydrologic models for streamflow forecasts.

Current online mapping products are:

- SWE & Basin average SWE
- SWE Change & Basin average SWE change
- Snow depth & Basin average Snow depth
- 24 hour snowmelt & Basin average 24 hour snowmelt
- 24 hour snowpack temperature & 24 hour snowpack temperature average

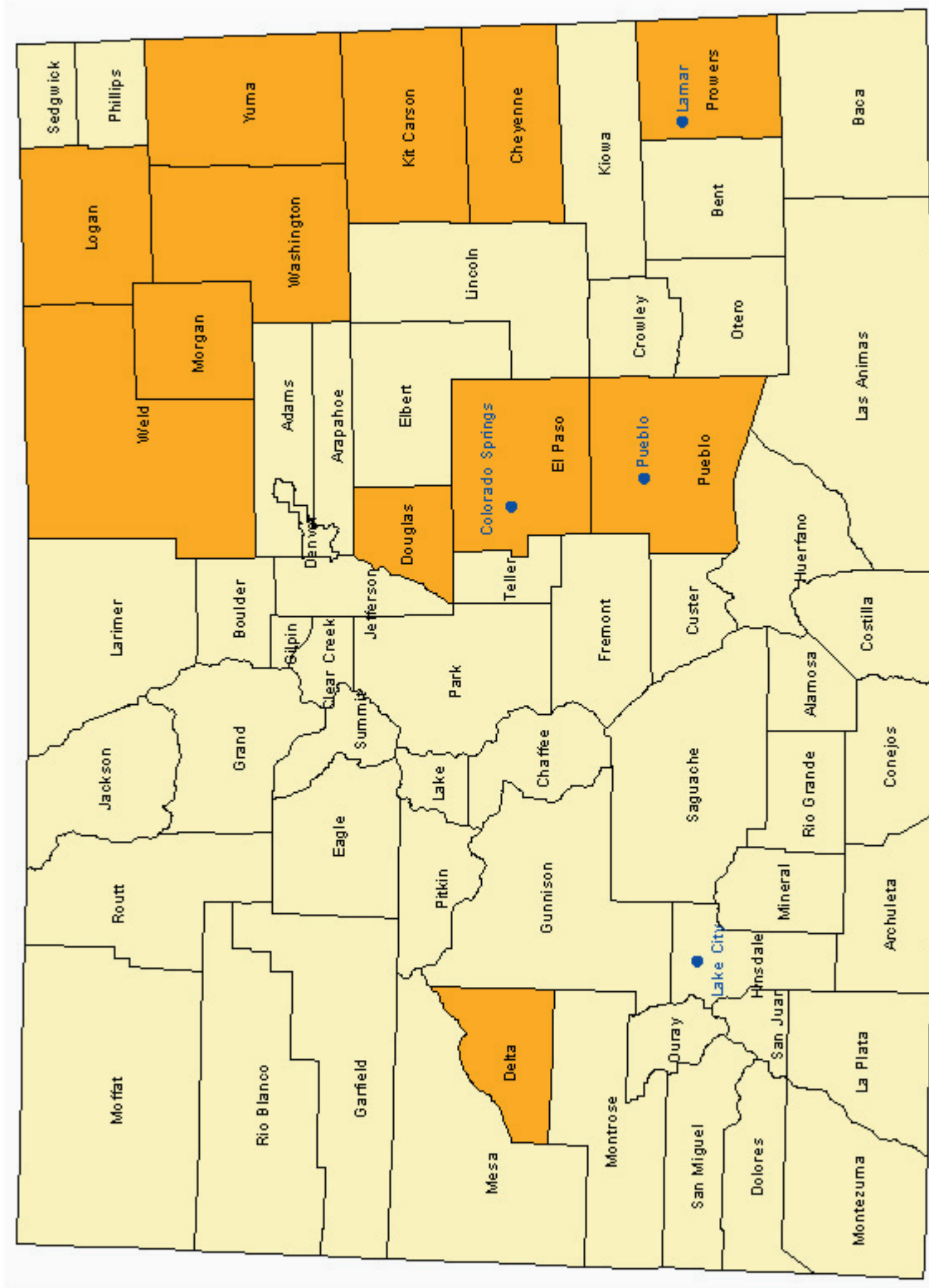
SNODAS calculations account for the entire area of a basin and are not just an average of all of the SNOTEL sites near the basin. Therefore, basin averages compute to much less than NRCS basin averages and are potentially more meaningful for assessing the conditions within the entire basin.

HOUSE BILL 06-1313

WATER AND IRRIGATION

SECTION 10. Continuation of the enhanced snowpack assessment program - appropriation. (1) In addition to any other appropriation, there is hereby appropriated, out of any moneys in the Colorado water conservation

Colorado: 16 StormReady Designations: 12 Counties and 4 Communities



board construction fund not otherwise appropriated, to the department of natural resources, Colorado water conservation board, for the fiscal year beginning July 1, 2006, the sum of one hundred thousand dollars (\$100,000), or so much thereof as may be necessary, for the board to continue to collaborate with the United States bureau of reclamation on an enhanced snowpack assessment project that will develop modeled snowpack data and mapping to provide benefits to all water resource planners and managers in Colorado. (2) The moneys appropriated in subsection (1) of this section shall remain available for the designated purposes until the project is completed.

State Hazard Mitigation Program

Through the State Hazard Mitigation Program (SHMP), communities are encouraged to apply for grants to conduct severe weather preparedness and mitigation activities. Regional planners and mitigation planners work with communities to develop ideas on how best to achieve the communities' goals. Weather projects that have been partially funded through the SHMP grant program include public information weather brochures and newsletters created by and distributed through local groups, weather preparedness calendars, NOAA weather transmitters, the Colorado Collaborative Rain and Hail Study (CoCoRAHS), weather spotter training, and NOAA radios for special needs populations.

Hazard Mitigation Grant Program

Funds from the Hazard Mitigation Grant Program may be used for severe weather mitigation projects. Under DR-1374-CO, the current declaration for severe winter storms, severe weather projects were highly encouraged by the state and received highest priority. According to the State of Colorado Hazard Mitigation Grant Program Administrative Plan dated November 2001, the following projects are eligible and were encouraged in the following order:

- Mitigation plans;
- School and community shelters/saferooms, including shelters/saferooms in daycare facilities;
- Warning systems;
- Acquisition of hazardprone property and conversion to open space;
- Retrofitting existing buildings and facilities;
- Elevation of floodprone structures;
- Vegetative management/soil stabilization;
- Infrastructure protection measures;
- Stormwater management;
- Minor structural flood control projects; and
- Post-disaster code enforcement activities.

The highest priority project submitted under the notice of intent, a school shelter in Ellicott, was determined by the Governor's Office in consultation with the Governor's Authorized Representative and the Director of the Department of Local Affairs, as a result of a severe tornado event which occurred May 28, 2001 in Ellicott in El Paso County. The application falls under the highest project priority as listed in the DR-1374-CO Administrative Plan, school shelters, also found as 'strengthen lifelines' under the mitigation strategies. These work toward achieving the highest mitigation goal for the State of Colorado, which is to 'reduce the loss of life'.

The situation report, as recorded by the Colorado Office of Emergency Management, included the following event description: "Severe thunderstorms struck the Front Range and eastern plains of Colorado during the afternoon and evening of May 28, 2001. A tornado hit the town of Elliott damaging mobile homes, a school and injuring 15 to 18 people...

Regional planner Bill Cordova (COEM), reports that 34 people are still at the ARC shelter this morning, which is located at a convenience store due to damage to schools. Jim Mesite (El Paso County emergency manager) confirmed that the elementary school is a total loss and the middle/senior high school sustained major damages. A propane tank at the high school was thrown from its moorings and is spewing gas. Eighteen residents had minor injuries, the worst being a broken leg. Flight for Life is currently providing its helicopter for a flyover of the area and aerial damage assessment. Jim Mesite will provide updated damage figures when available." The photo was provided by El Paso County Emergency Management.



Hazard Mitigation Grant Program Status

The following are descriptions of projects completed and the item (issue) addressed in the State of Colorado Interagency Hazard Mitigation Team Report "Long Term Recovery Strategy In Response To 1276-DR-CO; Declared May 17, 1999; Severe Storms, Flooding, Landslides, and Mudslides July 1999."

HMGP DR-1276-CO - closed.

Otero County Acquisition Project: Fifty-three homes damaged during the 1999 flood event were acquired and demolished under the Community Development Block Grant (CDBG), Hazard Mitigation Grant (HMGP), and Unmet Needs (UN) Programs. The largest single block of funding was obtained through the CDBG program, with \$1 million. This project addressed the issue of acquisition of flood-prone structures.

Manitou County Acquisition Project: Three homes damaged during the 1999 event were acquired and demolished and the slopes were stabilized. Funding was provided under the HMGP and the Unmet Needs program (photo at right). This project addressed the issue of acquisition of hazard-prone structures.

Crowley: Building modification took place as a result of damage during the 1999 flooding in Crowley County. This project addressed the issue of flood-proofing historic structures.

Otero County Flood Plan: The plan is completed.

Unmet Needs DR-1276-CO - closed.

Fort Collins Floodproofing and Early Warning System: Completed. The early warning system project addressed the issue of improve emergency warning systems. The floodproofing project addressed the issue of floodproofing structures.

Otero County Acquisition Project: Fifty-three homes damaged during the 1999 flood event were acquired and demolished under the Community Development Block Grant (CDBG), Hazard Mitigation Grant (HMGP), and Unmet Needs (UN) Programs. The largest single block of funding was obtained through the CDBG program, with \$1 million. This project addressed the issue of acquisition of flood-prone structures.

La Junta Lift Station

Otero County Drainage Project

Colorado Springs Landslide Acquisition Project:

Twenty-eight homes acquired and demolished after substantial landslide damage or imminent threat determined. This project addressed the issue of acquisition of hazard-prone structures.



Manitou County Acquisition Project: Three homes damaged during the 1999 event were acquired and demolished and the slopes were stabilized. Funding was provided under the HMGP and the Unmet Needs program (photo above). This project addressed the issue of acquisition of hazard-prone structures.

Pueblo Early Warning System: Five precipitation gages and a RAWS station.

Colorado Water Conservation Board Floodplain Training

HMGP DR-1186-CO - closed.

Sterling: Design and engineering for a drainage improvement project.

Canon City: Four detention ponds

Fort Collins Floodproofing and Early Warning System

Larimer County Drainage Improvements: Drainage improvement project along West Vine.



Pre-Disaster Mitigation

The State is very interested in developing projects for the PDM program that deal with severe winter weather concerns. No projects have been identified in previous years by local and state agencies with this emphasis for this program.

Project Impact

The state had many Project Impact communities: Clear Creek County, City of Delta, El Paso County, City of Fort Collins, Morgan County, and the San Luis Valley. The Project Impact program provided communities the opportunity to develop mitigation plans and projects at the local level, rather than have the federal and state governments dictate the terms. All communities are closed out.

Local highlights under Project Impact:

Fort Collins put together an extensive flood warning system, including precipitation gages, monitoring devices, decision software, and warning and notification devices.

Clear Creek County did extensive coordination on mitigation of problems, especially in Virginia Creek canyon. Efforts included flood mitigation, and coordination on mine-related mitigation issues.

Morgan County has done many projects, including a tornado safe room in a day care facility (see photo at left),



weather monitoring equipment, tornado safe-room displays, flood mitigation projects, and a model mitigation house. Photo by William Rakocy.

The San Luis Valley, Delta, and El Paso County were the final additions to the Project Impact program. The San Luis Valley and Delta entered the program in 2000; El Paso County entered in 2001.

PUBLIC INFORMATION

The Colorado Division of Emergency Management strives to provide quality information to the public in multiple user-friendly formats. The following pages depict examples of public information available from the CDEM website and in hard copy. Examples shown are primarily for winter weather and focus on preparedness and mitigation activities. Information is located on the CDEM website at <http://www.dola.state.co.us/oem/oemindex.htm>.

www.cotrip.org

from <http://www.cotrip.org/winterdriving/default.htm>
It is not uncommon for travel conditions around the state to vary significantly, not only between the plains and the mountains, but literally from mile to mile on the same road. At times temperatures can hover in the fifties near Denver while snow is falling a short 30 minute drive west of town. High winds across the plains can limit visibility during snow storms or shaded areas on mountain and canyon roads can present icy conditions on otherwise dry highways. Although uncommon, Colorado has even had snow in the higher elevations on the 4th of July! All of these factors make Colorado a distinctive place to drive during the winter. In an effort to minimize the effects of Colorado's special weather and road conditions, reduce the number of travel delays and in a proactive approach to fighting air pollution, Colorado has implemented intensive public information campaigns, adopted strict chain guidelines for Commercial vehicles and begun widespread use of alternative de-icing compounds.

The CDOT Winter Driving Initiative is a comprehensive safe driving program designed to educate motorists in Colorado regarding winter driving conditions. The Winter Driving Initiative focuses on providing information and answering questions in four areas: Road treatments, snow removal, road conditions, and winter driving preparedness. By providing a single source of information in these areas, CDOT hopes to raise awareness of winter driving issues and help keep Colorado roads safer in the winter months.

Severe Weather Awareness Weeks

Severe weather awareness weeks are conducted twice annually, focusing on winter weather awareness in the fall and severe weather awareness in the spring. The weeks are a collaborative effort between the National Weather Service, the Governor's Office, and the Colorado Office of Emergency Management. The Governor's Office issues a proclamation in honor of the week. The National Weather Service and the Colorado Office of Emergency Management conduct activities aimed at increasing public awareness and preparedness. Many websites include interactive and informative activities. A proclamation is on the next page.

Honorary Proclamation



BILL OWENS
GOVERNOR

WINTER STORM AND Y2K PREPAREDNESS WEEK *October 10-16, 1999*

WHEREAS, Colorado has experienced the physical and emotional consequences - - suffering and loss of life and damage to property - - caused by severe winter storms, such as those in 1983, 1986, 1989, and 1997; and

WHEREAS, the hazard of one or more severe winter storms is a threat to the entire state each year; and

WHEREAS, the transition into the new millenium (Y2K) occurs during the winter months and could be complicated by severe winter weather; and

WHEREAS, recommended preparedness measures for Y2K are similar to those recommended for severe winter storms; and

WHEREAS, emergency preparedness is a responsibility of government that depends on the leadership of elected officials and the efforts of informed citizens, volunteers and government employees; and

WHEREAS, with an informed and prepared citizenry and organized disaster emergency teams, the State of Colorado can reduce the risk to life and property;

Now Therefore, I, Bill Owens, Governor of the State of Colorado, do hereby proclaim October 10-16, 1999, as

WINTER STORM AND Y2K PREPAREDNESS WEEK

in the State of Colorado.



*GIVEN under my hand and the
Executive Seal of the State of
Colorado, this fifth day of October
1999*

Bill Owens.

Bill Owens
Governor

Colorado Office of Emergency Management

Public Information

Timely, accurate information is critical before, during and after an emergency. The Colorado Office of Emergency Management tries to ensure the general public and the media are informed of emergency situations that could affect public safety, health, and property. While we may never be able to control Mother Nature's fury and prevent every other type of emergency, there are several things you can do to protect yourself. Create a Family Disaster Plan; assemble a Home Emergency Kit; and keep a Car Emergency Kit in every vehicle. Be aware of hazards around your home and community which might endanger your family. Be informed about how to protect yourself in an emergency situation.



Other Fact Sheets

[Watches & Warnings](#)
[Winter Storm Preparedness Tips](#)
[Winter Emergency Car Kit](#)
[72-Hour Family Emergency Kit](#)
[Family Emergency Preparedness Guide](#)
[Pets in Disasters](#)

Links

[Colorado OEM Weekly Information Report](#)
[Resources for Disaster Proofing Your Business](#)
[Rocky Flats Colorado](#)
[Department of Health and Environment](#)
[CSEPP/Pueblo County](#)
[Interactive Weather Information Network](#)
[Severe Weather Information](#)
[Federal Emergency Management Agency](#)
[Snotel data](#)
[Press Releases](#)

FACT SHEET: WINTER STORMS

A major winter storm can be lethal. Preparing for cold weather conditions and responding to them effectively can reduce the dangers caused by winter storms.

Blizzards are severe winter storms that pack a combination of blowing snow and wind resulting in very low visibilities. While heavy snowfalls and severe cold often accompany blizzards, they are not required. Sometimes strong winds pick up snow that has already fallen, creating a blizzard.

In 1998, winter weather caused 77 fatalities; 64 from winter weather, 4 from ice, and 9 from an avalanche. This number is down 18% from the 1997 total of 94.



Of the 68 fatalities from winter storms and ice (excluding avalanche fatalities), 36 were in vehicles and 15 others were out in the open. Nearly two and a half times as many males (47) as females (20) died of winter storms and ice. The 40- to 50-year-old age group suffered the highest number of fatalities with 16.

Extreme cold claimed 11 lives in 1998, down dramatically from the 51 recorded in 1997. The most significant severe storm occurred from December 18-24 in northeastern Colorado when overnight temperatures were below zero for 6 consecutive days, causing 3 deaths.

Winter Storm Preparedness Tips

BEFORE the storm...

- Be familiar with winter storm warning messages.
- Service snow removal equipment and have rock salt on hand to melt ice on walkways and kitty litter to generate temporary traction.
- Make sure you have sufficient heating fuel; regular fuel sources may be cut off.

Winterize your home

- Insulate walls and attic.
- Caulk and weather-strip doors and windows.
- Install storm windows or cover windows with plastic from the inside.

Have safe emergency heating equipment available.

- Fireplace with ample supply of wood.
- Small, well-vented, wood, coal, or camp stove with fuel.
- Portable space heaters. (Kerosene Heaters: Check with your local fire department on the legality of using kerosene heaters in your community. Use only the correct fuel for your unit and follow the manufacturer's instructions. Refuel outdoors only, and only when cool. Keep your kerosene heater at least 3 feet away from furniture and other flammable objects.)

Install and check smoke detectors.

Contact your local emergency management office or your local American Red Cross chapter for more information on winter storms.

Keep pipes from freezing.

- Wrap pipes in insulation or layers of old newspapers.
- Cover the newspapers with plastic to keep out moisture.
- Let faucets drip a little to avoid freezing.
- Know how to shut off water valves.

Have disaster supplies on hand, in case the power goes out.
(Refer to your [72-Hour Family Preparedness Kit](#))

- Flashlight and extra batteries
- Portable, battery-operated radio and extra batteries.
- First aid kit
- One-week supply of food (include items that do not require refrigeration or cooking in case the power is shut off)
- Manual can opener
- One-week supply of essential prescription medications.
- Extra blankets and sleeping bags
- Fire extinguisher (A-B-C type)

Develop an emergency communication plan.

- In case family members are separated from one another during a winter storm (a real possibility during the day when adults are at work and children are at school), have a plan for getting back together.
- Ask an out-of-state relative or friend to serve as the "family contact."
- After a disaster, it's often easier to call long distance. Make sure everyone knows the name, address, and phone number of the contact person.
- Make sure that all family members know how to respond after a severe winter storm.
- Teach children how and when to call 9-1-1, police, or fire department, and which radio station to tune to for emergency information.

DURING the storm...

If Indoors --

- Stay indoors and dress warmly.
- Conserve fuel.
- Lower the thermostat to 65 degrees during the day and 55 degrees at night. Close off unused rooms.
- If the pipes freeze, remove any insulation or layers of newspapers and wrap pipes in rags.
- Completely open all faucets and pour hot water over the pipes, starting where they were most exposed to the cold (or where the cold was most likely to penetrate).
- Listen to the radio or television to get the latest information.

If Outdoors --

- Dress warmly.
- Wear loose-fitting, layered, light-weight clothing. Layers can be removed to prevent perspiration and chill. Outer garments should be tightly woven and water repellant. Mittens are warmer than gloves because fingers generate warmth when they touch each other.
- Stretch before you go out.
- If you go out to shovel snow, do a few stretching exercises to warm up your body. Also take frequent breaks.
- Cover your mouth.
- Protect your lungs from extremely cold air by covering your mouth when outdoors. Try not to speak unless absolutely necessary.
- Avoid overexertion. Cold weather puts an added strain on the heart. Unaccustomed exercise such as shoveling snow or pushing a car can bring on a heart attack or make other medical conditions worse. Be aware of symptoms of dehydration.
- Watch for signs of frostbite and hypothermia.
- Keep dry.

- Change wet clothing frequently to prevent a loss of body heat. Wet clothing loses all of its insulating value and transmits heat rapidly.
- Remember to help your neighbors who may require special assistance--infants, elderly people, and people with disabilities.

Wind Chill

"Wind chill" is a calculation of how cold it feels outside when the effects of temperature and wind speed are combined. A strong wind combined with a temperature of just below freezing can have the same effect as a still air temperature about 35 degrees colder.

Winter Storm Watches and Warnings

A winter storm watch indicates that severe winter weather may affect your area. A winter storm warning indicates that severe winter weather conditions are definitely on the way.

A blizzard warning means that large amounts of falling or blowing snow and sustained winds of at least 35 miles per hour are expected for several hours.

Frostbite and Hypothermia

Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in fingers, toes, or nose and ear lobes are symptoms of frostbite.

Hypothermia is a condition brought on when the body temperature drops to less than 90 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

If frostbite or hypothermia is suspected, begin warming the person slowly and seek immediate medical assistance. Warm the person's trunk (mid-body) first. Use your own body heat to help. Arms and legs should be warmed last because stimulation of the limbs can drive cold blood toward the heart and lead to heart failure. Put person in dry clothing and wrap their entire body in a blanket.

Never give a frostbite or hypothermia victim something with caffeine in it (like coffee or tea) or alcohol. Caffeine, a stimulant, can cause the heart to beat faster and hasten the effects the cold has on the body. Alcohol, a depressant, can slow the heart and also hasten the ill effects of cold body temperatures.

[More Winter Storm Preparedness Tips](#)
[Is Your Car Ready for Winter?](#)

Winter Preparedness Safety Tips

Timely preparation, including structural and non-structural mitigation measures to avoid the impacts of severe winter weather, can avert heavy personal, business and government expenditures. Experts agree that the following measures can be effective in dealing with the challenges of severe winter weather:

BEFORE SEVERE WEATHER ARRIVES

- Store drinking water, first aid kit, canned/no-cook food, non-electric can opener, radio, flashlight and extra batteries where you can get them easily, even in the dark.
 - Keep cars and other vehicles fueled and in good repair, with a winter emergency kit in each.
 - Get a NOAA Weather Radio to monitor severe weather.
 - Know how the public is warned (siren, radio, TV, etc.) and the warning terms for each kind of disaster in your community; e.g.:
 - "winter storm watch" --- Be alert, a storm is likely
 - "winter storm warning" --- Take action, the storm is in or entering the area
 - "blizzard warning" --- Snow and strong winds combined will produce blinding snow, near zero visibility, deep drifts, and life-threatening wind chill--seek refuge immediately!
 - "winter weather advisory" --- Winter weather conditions are expected to cause significant inconveniences and may be hazardous, especially to motorists
 - "frost/freeze warning" --- Below freezing temperatures are expected and may cause damage to plants, crops, or fruit trees
 - "flash flood or flood watch" --- Be alert to signs of flash flooding and be ready to evacuate on a moment's notice
 - "flash flood warning" --- A flash flood is imminent--act quickly to save yourself because you may have only seconds
 - "flood warning" --- Flooding has been reported or is imminent--take necessary precautions at once. Know safe routes from home, work and school to high ground.
- Know how to contact other household members through a common out-of-state contact in the event you and have to evacuate and become separated.
 - Know how to turn off gas, electric power and water before evacuating.
 - Know ahead of time what you should do to help elderly or disabled friends, neighbors or employees.
 - Keep plywood, plastic sheeting, lumber, sandbags and hand tools on hand and accessible.
 - Winterize your house, barn, shed or any other structure that may provide shelter for your family, neighbors, livestock or equipment. Install storm shutters, doors and windows; clear rain gutters; repair roof leaks; and check the structural ability of the roof to sustain unusually heavy weight from the accumulation of snow--or water, if drains on flat roofs do not work.
 - If you think you might want to volunteer in case of a disaster, now is the time to let voluntary organizations or the emergency services office know--beforehand.

DURING A SEVERE WINTER STORM

- Monitor your NOAA Weather Radio or keep a local radio and/or TV station on for information and emergency instructions.
- Have your emergency survival kit ready to go if told to evacuate.
- If you go outside for any reason, dress for the season and expected conditions:
- For cold weather, wear several layers of loose-fitting, lightweight, warm clothing rather than one layer of heavy clothing. Outer garments should be tightly woven and water-repellent. Mittens are warmer than gloves. Wear a hat. Cover your mouth with a scarf to protect your lungs from extremely cold air. Wear sturdy, waterproof boots in snow or flooding conditions.
- Conserve fuel, if necessary, by keeping your house cooler than normal. Temporarily shut off heat to less-used rooms.
- If using kerosene heaters, maintain ventilation to avoid build-up of toxic fumes. Keep heaters at least three feet from flammable objects. Refuel kerosene heaters outside.
- Avoid travel if possible. If you must travel, do so during daylight.
- Don't travel alone. Stay on main roads, and keep others informed of your schedule.
- If advised to evacuate, tell others where you are going, turn off utilities if told to, then leave immediately, following routes designated by local officials.

IF A BLIZZARD TRAPS YOU IN YOUR CAR

- Pull off the road, set hazard lights to flashing, and hang a distress flag from the radio aerial or window. Remain in your vehicle; rescuers are most likely to find you there.
- Conserve fuel, but run the engine and heater about ten minutes each hour to keep warm, cracking a downwind window slightly to prevent carbon monoxide poisoning. Exercise to maintain body heat but don't overexert. Huddle with other passengers and use your coat for a blanket.
- In extreme cold use road maps, seat covers, floor mats, newspapers or extra clothing for covering--anything to provide additional insulation and warmth.
- Turn on the inside dome light so rescue teams can see you at night, but be careful not to run the battery down. In remote areas, spread a large cloth over the snow to attract the attention of rescue planes.
- Do not set out on foot unless you see a building close by where you know you can take shelter.
- Once the blizzard is over, you may need to leave the car and proceed on foot. Follow the road if possible. If you need to walk across open country, use distant points as landmarks to help maintain your sense of direction.

AFTER THE STORM

- Report downed power lines and broken gas lines immediately.
- After blizzards, heavy snows or extreme cold, check to see that no physical damage has occurred and that water pipes are functioning. If there are no other problems, wait for streets and roads to be opened before you attempt to drive anywhere.
- Check on neighbors, especially any who might need help.
- Beware of overexertion and exhaustion. Shoveling snow in extreme cold causes many heart attacks. Set your priorities and pace yourself after any disaster that leaves you with a mess to clean up. The natural tendency is to do too much too soon.

Is Your Car Ready for Winter?

Colorado Office of Emergency Management

FACT SHEET: IS YOUR CAR READY FOR WINTER?

The leading cause of death during winter storms is from automobile or other transportation accidents. Be prepared for winter by having an emergency kit in each of your cars. The kit should include:

- a battery powered radio (with fresh batteries),
- flashlight and extra batteries,
- blanket,
- jumper cables,
- fire extinguisher (5 lb. A-B-C- type),
- first aid kit, bottled water, and
- non perishable high energy foods like granola bars, raisins and peanut butter.



72-Hour Family Emergency Kit



For Additional Information Contact:

Colorado Office of Emergency Management
15075 South Golden Road
Golden, Colorado 80401-3879
(303) 273-1622

How to Store Water

Store your water in thoroughly washed plastic, glass, fiberglass or enamel-lined metal containers. Never use a container that has held toxic substances.

Emergency Outdoor Water Sources

If you need to find water outside your home, you can use these sources. Be sure to purify the water by:

- ☐ Boiling
- ☐ Disinfection (household liquid bleach: 16 drops/gal. of water, stir & let stand 30 min.)
- ☐ Distillation (boil ? pot water & collect the vapor by tying a cup to the upside down pot lid - the cup shouldn't dangle in the water--it will condense back to water in the cup)

Sources:

Rainwater
Streams, rivers & other moving bodies of water
Ponds & lakes
Natural Springs

Other Considerations

- Stock supplies to last several days to a week for each family member.
- Be prepared to relocate to a shelter during a prolonged power outage.
- Have extra cash on hand in case electronic transactions (ATM card, credit cards, etc.) cannot be processed.
- Work with your family in talking about the steps each needs to take to be ready if disaster happens.
- Preparedness is everyone's job. Not just government agencies but all sectors of society -- service providers, businesses, civic and volunteer groups, industry associations and neighborhood associations, as well as every individual citizen -- should plan ahead for disaster.
- During the first few hours or days following a disaster, essential services may not be available.
- People must be ready to act on their own.**

The 72-Hour Emergency Kit should be individually tailored to meet the basic survival needs of your family for three days to a week. Most families prefer to store their emergency supplies in one location that is relatively safe, yet easily accessible if evacuation is required. Items may be stored in a 32-gallon trash can, suitcase, duffel bag, footlocker or individual pack.

Emergency Needs

- Battery Powered Radio
- First Aid Kit & Manual
- Sleeping Bags & Blankets (wool & thermal)
- Manual Can Opener
- Waterproof/Windproof Matches
- Non-Perishable Foods
- Flashlight
- Water Storage (1 gal./day)
- Water purification tablets
- Utility Knife
- Emergency Candles
- Extra Eyeglasses/Contact Lenses
- Essential Medications
- Extra Clothing

Suggested non-perishable food items: Ready-to-eat goods in unbreakable containers, canned meats, juice, fruits & vegetables, powdered milk, infant care foods, crackers, peanut butter, freeze-dried & dehydrated goods.

Sanitation Kit

- Plastic Bucket w/Tightly Fitted Lid
- Plastic Bags & Ties
- Disinfectant
- Improvised Toilet Seat
- Paper Cups & Plates
- Personal Toiletries
- Baby Supplies
- Toilet paper
- Aluminum Foil
- Paper Towels
- Personal Hygienic Needs
- Plastic Utensils
- Soap

Other Emergency Needs

- Pen & Paper
- Money
- Address & Phone Numbers
- Work Gloves
- Basic Tools

Standard First Aid Kit

- First Aid Manual
- Aspirin or Pain Relievers
- Laxatives
- Rubbing Alcohol
- Diamine Medsoline
- Petroleum Jelly
- Soap
- Salt
- Gauze
- Band-aid
- Triangular Bandage (36"x38"x52")
- Elastic Bandage
- Cotton Balls
- Cotton Swabs
- Safety Pins
- Scissors
- Thermometer
- Sanitary Napkins (Pressure Dressing)
- Disposable Diapers (Dressing/Spill/Padling)
- Micropore Adhesive, Paper Tape
- Matches
- Needles
- Tweezers
- Small Splints, Popsicle Sticks
- Heavy String
- Syrup of Ipecac
- Individual Medical Needs
- Baking Soda (½ tsp. soda + 1 tsp. salt = 1 qt. water for shock)

Car Survival Kit

- Always Maintain at Least ½ Tank of Gas
- First Aid Kit & Manual
- Class ABC Fire Extinguisher
- Radio & Batteries
- Non-Perishable Food Stored in Coffee Can
- Bottled Water
- Bag of Sand, Snowal & Tools
- Blankets or Sleeping Bags
- Sundry Kit, Paper & Penkil, Map, Tissues, Premoistened Towels, Plastic Bags, Essential Medications
- Flashlights & Batteries
- Reflectors & Flares
- Waterproof Matches & Candles
- Jumper Cables
- Short Rubber Hose for Siphoning

Make Copies of All Legal Papers

- Marriage License
- House Mortgage
- Vacation Home / Property Ownership
- Automotive Ownership
- Motor Home Ownership
- Wills
- Jewelry Appraisals
- Drivers Licenses
- Trailers, Snowmobiles, Boat Ownerships
- Insurance Policies
- Bank Accounts

Establish an Out-Of-State 24-Hour Telephone Contact

1. Calls out will not overload phone lines as will calls coming into a disaster area.
2. All relatives should be informed now on procedures to call the phone contact, not after a disaster has occurred. Individual location and status should be requested.
3. Take color pictures of every room plus pictures of valuables. Send one copy of legal papers and one copy of pictures to an out-of-state contact.

Plan How Your Family Will Stay in Contact if Separated by Disaster

Pick two meeting places:

- 1) a location a safe distance from your home in case of fire
- 2) a place outside your neighborhood in case you can't return home

When Assembling Emergency Supplies for the Household, Include Items for Pets.

- Extra food (The food should be dry and relatively unappealing to prevent overeating. Store the food in sturdy containers.)
- Kitty Litter
- Large capacity self-feeder and water dispenser
- Extra medications

Meet with Neighbors

Plan how the neighborhood could work together after a disaster. Know your neighbors' skills (medical, technical). Consider how you could help neighbors who have special needs, such as elderly or disabled persons. Make plans for child care in case parents can't get home.

Contact Your Local Emergency Management Office

- Find out which disasters are most likely to happen in your community.
- Ask how you would be warned.

Winter Storms

Here is advice that will help protect you and your family against the hazards of winter storms/blizzards, heavy snows, ice storms, freezing rain and/or sleet.



Keep Posted on Weather Conditions.

Use your radio, television, and newspapers to keep informed of current weather conditions and forecasts in your area. Even with a few hours warning you may be able to avoid being caught in it, or at least be better prepared to cope with it. You should also understand the terms commonly used in weather forecasts:

- ❑ **A Blizzard** is the most dangerous of all winter storms. It combines cold air, heavy snow, and strong winds. These strong winds will cause considerable blowing snow, which may reduce visibility to only a few yards. A Blizzard Warning is issued when the National Weather Service expects considerable snow, temperatures below freezing, and winds of 35 miles per hour or more.
- ❑ **A Winter Storm Warning** for the lower elevations of Colorado usually means an expected snowfall of 6 inches or more in a 12-hour period, or 8 inches or more in a 24-hour period. A Heavy Snow Warning or Winter Storm Warning for the MOUNTAINS means an expected snowfall of 8 inches or more in a 12-hour period.

- ❑ **Freezing Rain or Freezing Drizzle** occurs when rain is likely to freeze on the ground, depositing a coating of ice or glaze on roads and everything that is exposed. If a substantial layer of ice is expected to accumulate from the freezing rain, a Winter Storm Warning is issued addressing the problems expected to be caused by the accumulation of ice.

Be Prepared for Isolation at Home in a Winter Storm

- ❑ Stock an emergency supply of food and water, as well as emergency cooking equipment such as a camp stove. Some of this food should be of the type that does not require refrigeration or cooking.
- ❑ Make sure you have a battery-operated radio and extra batteries on hand so that if your electric power is cut off you can still hear weather forecasts, information, and advice broadcast by local authorities. Also, flashlights and lanterns will be needed. Portable propane-type heaters could prove valuable in these types of situations, but use with proper precautions.
- ❑ Keep on hand the simple tools and equipment needed to fight a fire. Also, be certain that all family members know how to take precautions that would prevent fire at such a time, when the help of the fire department might not be available immediately.

In a Winter Storm, Travel Only If Necessary.

Avoid all unnecessary trips. If you must travel, use public transportation if possible. However, if you are forced to use your automobile for a trip of any distance, take these precautions:

Dress for the Season. If you spend a lot of time outdoors, wear layers of loose-fitting, lightweight, warm clothing rather than a single layer of thick clothing. Mittens are warmer than gloves. Use a stocking cap to protect your head and a facemask that covers your mouth to protect your lungs from extremely cold air.

- ❑ Make sure your car is in good condition, properly serviced, and equipped with chains or snow tires.
- ❑ Take another person with you if possible.
- ❑ Make sure someone knows where you are going, your approximate schedule, and your estimated time of arrival at your destination.
- ❑ If you see downed power lines - **KEEP AWAY**.
- ❑ It is recommended that you have a full tank of gasoline in your vehicle, along with emergency winter storm supplies, such as a container of sand, shovel, windshield scraper, tow chain or rope, and flashlight. It is also good to have heavy gloves or mittens, overshoes; extra woolen socks, winter headgear to cover your head and face; battery-operated radio and food.
- ❑ Travel by daylight and use major highways if you can. Keep the vehicle radio tuned for weather information and advice.

- ❑ Drive with caution. Don't try to save time by traveling faster than weather conditions permit. Stay off closed roads.
- ❑ Don't be daring or foolhardy. Stop, turn back, or seek help if conditions exist that may test your ability or endurance, rather than risk being stalled, lost, or isolated. Don't risk becoming stranded in a **BLIZZARD**.

Keep Calm If You Get in Trouble. If your vehicle breaks down during a storm or if you become stalled or lost, don't panic. Think the problem through, decide what's the safest thing to do, and do it slowly and carefully. If you are on a well-traveled road, show a trouble (flasher) signal. Set your directional lights to flashing, raise the hood of your vehicle, or hang a cloth from the radio antenna or vehicle window. Then stay in your vehicle and wait for help to arrive. If you run the engine to keep warm, remember to open a window enough to provide ventilation and make sure the exhaust pipe is clear of snow to protect you from carbon monoxide poisoning. Run your engine for only brief intervals. Keep a dome light on; you can help keep yourself warm by performing simple exercises while sitting in your automobile.

Wherever you are, if there is no house or other source of help in sight, do not leave your vehicle to search for assistance as you may become confused and get lost.

Avoid Overexertion. Every winter many unnecessary deaths occur because people - especially the elderly, but younger ones as well - engage in more strenuous physical activity than their bodies can stand. Cold itself, **WITHOUT** any physical exertion, puts an extra strain on your heart.

Family Emergency Preparedness Guide

If you add to this physical exertion, especially exercise that you are not accustomed to -- such as shoveling snow, pushing an automobile, or even walking fast or far -- you are risking a heart attack, a stroke, or damage to your body. In winter weather, and especially in winter storms, be aware of this danger and avoid overexertion.

Hypothermia. Hypothermia can occur in an exposure to severely cold weather. Symptoms can range from frost bite, a white or waxy appearance of the skin with pain or numbness, to severe hypothermia, where the victim may have an altered level of consciousness, slurred speech, staggering gait, or breathing problems. If this occurs, remove the person from the cold. Remove wet clothing and replace with dry clothing or a blanket. Warm the patient gradually with blankets or chemical warming packs. Do **NOT** rub the body. Treat gently. Rough or excessive handling could cause the condition to worsen. Do **NOT** give coffee or alcohol. Warm fluids can be given **after** re-warming has taken place.

For additional information, contact
**Your local Emergency Management Office
or American Red Cross.**