

Technical Support Document
For the Multiple High Wind Events of
February and March 2002



Colorado Department
of Public Health
and Environment

Prepared by the Technical Services Program
Air Pollution Control Division
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1.0 Introduction

PM₁₀ Standards

In July 1987, EPA promulgated National Ambient Air Quality Standards for Particulates with an aerodynamic diameter of 10 microns or less (PM₁₀). This is a size that can be inhaled into the alveolar regions of the lungs. The standard has two forms, a 24-hour standard of 150 ug/m³ and an annual arithmetic mean standard of 50 ug/m³. The 24-hour standard is attained when the expected number of exceedances for each calendar year, averaged over three years, is less than or equal to one. The estimated number of exceedances is computed quarterly using available data and adjusting for missing sample days. The annual arithmetic mean standard is attained when the annual mean, averaged over three years is less than or equal to the level of the standard. Each annual mean is computed from the average of each quarter in the year, with adjustments made for missing sample days. In both cases, a data recovery of 75 percent is needed for each calendar quarter to be considered a valid quarter of data. This standard was modified in by EPA in July 1997, but was subsequently nullified back to this form in May 1999.

PM₁₀ exceedances were monitored on February 8 and 25, 2002 (215 ug/m³ and 182 ug/m³ respectively) and on March 23, 2002 (164 ug/m³) at Alamosa. On February 9, 2002 (246 ug/m³) and on March 7, 2002 (246 ug/m³), exceedances were monitored at the Lamar Power Plant site. The elevated levels coincided with successive low pressure systems and widespread high winds and gusty conditions that moved across the state. A wildland fire west of Lamar on March 7, 2002 is also suspected of contributing to elevated PM₁₀ levels on that date.

EPA's Natural Events Policy enables states to demonstrate that PM₁₀ exceedances were caused by natural events (volcanic and seismic activities, wildland fires, or high winds) and therefore are not to be taken into account in determining compliance with National Ambient Air Quality Standards (NAAQS). The Natural Events Policy requires that sufficient documentation be submitted to EPA to demonstrate:

1. That an event occurred that meets the definition of a natural event. This can include monitored particulate data, videos and photographs of the event, eyewitness accounts, and news accounts.
2. That there is a cause and effect relationship between the event and the exceedance. This can include meteorological data, receptor analyses, dispersion modeling, etc.
3. Should a PM₁₀ NAAQS violation occur due to a natural event, a Natural Events Action Plan (NEAP) should be implemented. Due to past PM₁₀ exceedances
4. , NEAP's are in place for Lamar and Alamosa.

In this report, the Air Pollution Control Division (APCD) provides documentation to support that PM₁₀ exceedances monitored on February 8, 9, and 25, 2002, and March 7 and 23, 2002 were caused by a natural event.

2.0 Meteorological Data (including precipitation data)

2.1 Meteorological Analysis Of The February 8, 2002, Blowing Dust Event And PM10 Exceedance At Alamosa, Colorado.

On Friday February 8, 2002, Alamosa recorded an exceedance of the twenty-four-hour PM10 standard with a reading of 215.3 ug/m³. A double-centered surface low-pressure system moved through southeast Colorado and the northern High Plains on February 8. It is apparent from regional data that strong winds and sufficiently dry surface soils resulted in areas of blowing dust in many areas of eastern and southern Colorado. The surface weather map for 0Z February 9 (5 PM MST, February 8) in Figure 1 shows a storm system with a central pressure of 1000 millibars (mb) over the southeast corner of Colorado. The central pressure of the storm is significant since storms of about 1000 mb or lower were identified as a typical precondition for blowing dust in eastern Colorado when soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). A strong Pacific cold front had also crossed most of Colorado by 5 PM on February 8. Notice that the observation for Denver indicates blowing dust (a yellow “D”).

Sustained winds and gusts in Colorado exceeded blowing dust criteria. Many sites showed wind speeds in excess of 30 miles per hour (mph) and gusts in excess of 40 mph. These are the speed and gust thresholds for blowing dust that apply in southeastern Colorado when surface soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Table 1 below lists wind speeds and gusts for Alamosa on February 8. The 30 mph blowing dust threshold applies to hourly average winds. Wind speed observations at stations like Alamosa are made just prior to the reported hour of observation. In most cases, these recorded speeds are not hourly average speeds but represent a several-minute average. If these spot observations show that speeds are above the 30 mph threshold for successive hours, then it can be reasonably assumed that hourly average winds are also above 30 mph. Winds at Alamosa were close to the blowing dust thresholds for three consecutive “hourly” observations on February 8, and gusts were as high as 41 mph.

The single reported gust of 41 mph at Alamosa meets the blowing dust criteria, while “hourly” observations were close to the blowing dust criteria. Wind data from Bureau of Land Management RAWS stations surrounding the San Luis Valley are presented in Tables 2, 3 and 4. A map showing the locations of these stations is presented in Figure 2. Winds gusted at or above blowing dust criteria levels at each of these RAWS sites. Big Horn recorded gusts of 40 to 49 mph from the west to southwest for several hours. These winds were blowing toward Alamosa. The data suggest that conditions were favorable for widespread blowing dust in the San Luis Valley.

High winds were the norm across much of Colorado on February 8, 2002. Many stations recorded winds of 30 to 40 mph with gust of 50 to 63 mph for much of the afternoon and evening. La Veta Pass, for example, measured gusts of 54, 60, and 59 mph. Greeley recorded two gusts of 51 mph, and Broomfield registered a gust of 58 mph. The National Weather Service reported blowing dust for several hours at Denver International Airport. The National Weather Service also reported blowing dust at Broomfield. Detailed weather observations for February 8 have been included in Attachment A.

Figure 3(a) shows the January 2002 precipitation for Lamar, Alamosa, and Pueblo. Figure 3(b) shows the February 1 through 10, 2002, precipitation at these stations. While each

site received only about a half inch of water during the entire period, much of this fell during the last few days of January. Pueblo received 0.19 inches during January 30 to 31. Alamosa received 0.32 inches on the last two days of January, and Lamar received 0.45 inches on January 31. Alamosa's precipitation on January 30 and 31 was not significant in the context of the longer-term precipitation history of the area.

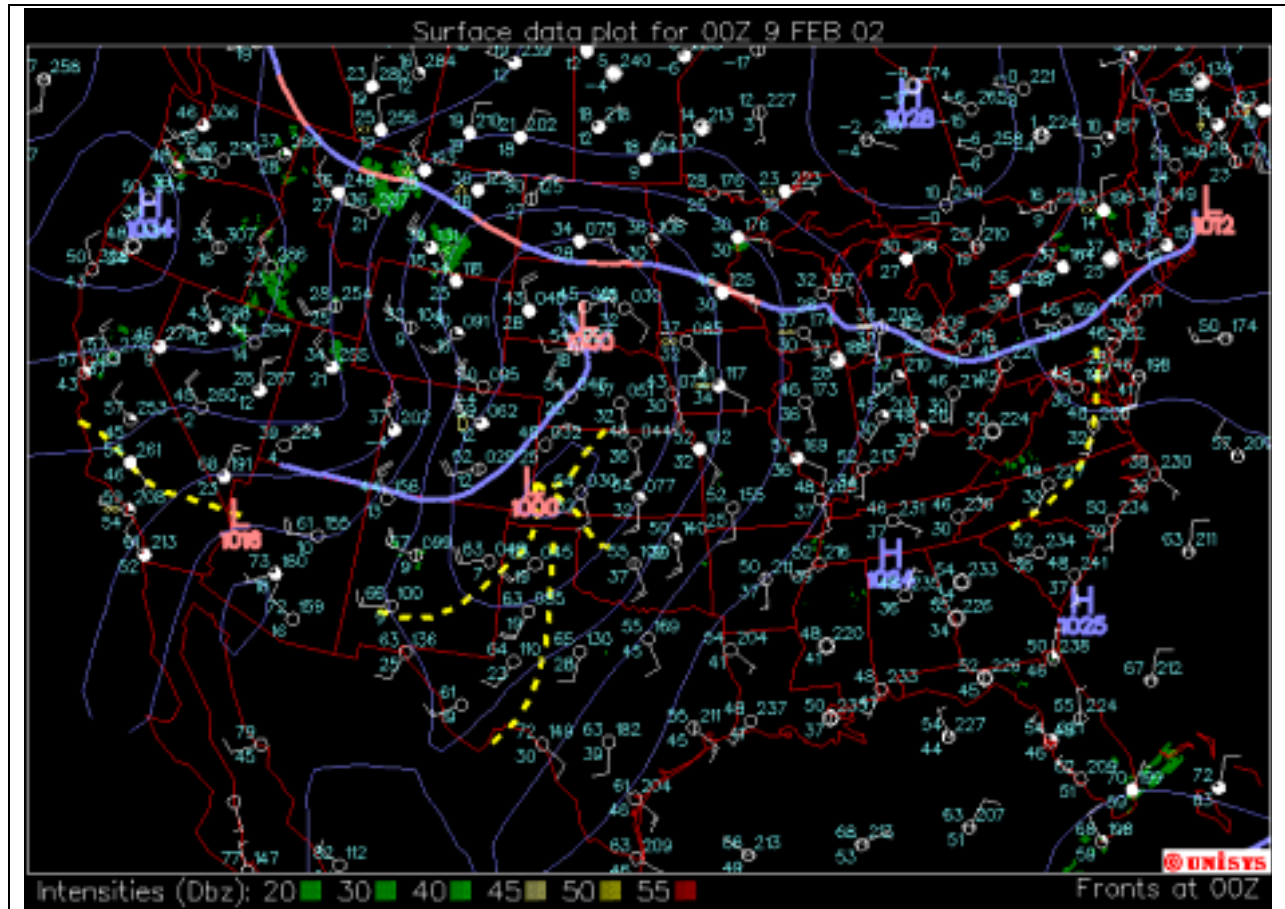


Figure 1. Surface weather map for 0Z February 9, 2002, or **5 PM MST February 8, 2002.**

Table 1. Wind observations for Alamosa reported by the National Weather Service on February 8, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Weather	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Remarks
5:00 PM	Mostly Cloudy	Northerly	9	25	
6:00 PM	Cloudy	Northerly	23	35	
7:00 PM	Cloudy	Northerly	24	36	
8:00 PM	Cloudy	Northerly	31	39	
9:00 PM	Mostly Cloudy	Northwesterly	29	38	
10:00 PM	Partly Cloudy	Northwesterly	28	41	
11:00 PM	Clear	Northwesterly	14	-	

Table 2. Wind observations for Blue Park RAWS station on February 8, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Time in MST	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:55	4	80	11	40	72	9
1:55	4	72	9	41	66	6
2:55	2	9	13	27	35	9
3:55	2	187	16	20	333	12
4:55	4	76	10	29	58	8
5:55	7	68	8	33	45	10
6:55	2	347	15	17	73	11
7:55	6	66	14	23	47	11
8:55	1	332	30	6	82	8
9:55	4	230	35	4	295	9
10:55	8	292	34	5	245	14
11:55	12	269	33	8	251	23
12:55	16	250	35	7	220	39
13:55	12	306	32	9	238	33
14:55	17	270	33	7	261	36
15:55	15	296	28	20	310	37
16:55	15	306	21	32	321	33
17:55	13	294	16	33	260	38
18:55	15	297	13	20	311	40
19:55	9	297	8	69	305	37
20:55	13	326	7	36	276	31
21:55	16	299	7	33	282	33
22:55	14	302	6	35	269	31
23:55	9	288	6	39	332	34

Table 3. Wind observations for Big Horn RAWS station on February 8, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Time in MST	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:54	4	218	21	30	198	6
1:54	2	173	20	33	248	8
2:54	4	246	23	34	247	8
3:54	2	201	18	37	210	13
4:54	4	184	17	37	269	8
5:54	4	246	16	38	273	8
6:54	3	201	20	31	155	8
7:54	3	153	21	30	208	9
8:54	4	97	34	19	121	9
9:54	6	294	40	13	18	19
10:54	19	228	38	12	14	34
11:54	23	236	38	15	117	42
12:54	25	230	38	19	225	45
13:54	26	224	38	24	221	47
14:54	24	245	38	24	243	48
15:54	19	239	37	22	251	49
16:54	20	253	34	24	222	40
17:54	17	258	32	26	254	39
18:54	15	277	30	31	238	42
19:54	17	274	29	32	293	30
20:54	11	269	25	20	272	30
21:54	7	334	19	33	1	21
22:54	13	302	18	23	316	35
23:54	7	300	17	21	301	33

Table 4. Wind observations for Willis Creek RAWS station on February 8, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Time in MST	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:52	4	91	31	14	248	10
1:52	1	38	27	22	298	14
2:52	2	321	29	19	157	10
3:52	3	272	29	20	274	18
4:52	2	339	30	20	324	15
5:52	4	299	29	20	317	18
6:52	10	313	35	12	341	36
7:52	13	168	34	12	288	37
8:52	9	322	39	11	211	36
9:52	12	224	38	11	316	47
10:52	11	281	38	12	173	32
11:52	9	280	42	13	1	32
12:52	8	260	43	14	281	26
13:52	5	281	44	14	278	22
14:52	6	306	43	16	304	22
15:52	6	300	33	33	7	18
16:52	7	311	30	34	341	23
17:52	4	299	28	40	312	16
18:52	8	297	24	29	251	22
19:52	12	307	21	23	284	33
20:52	12	311	18	26	291	37
21:52	13	333	15	29	304	37
22:52	11	320	15	19	303	28
23:52	10	321	15	21	345	35

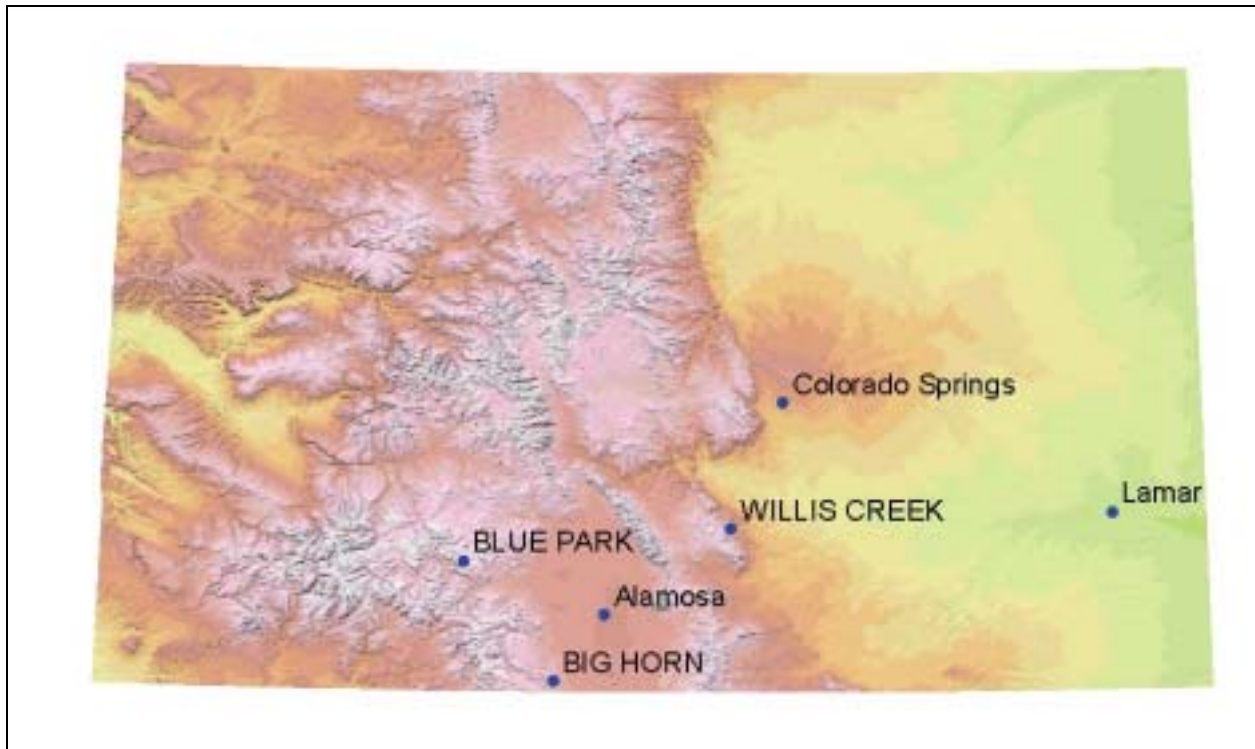
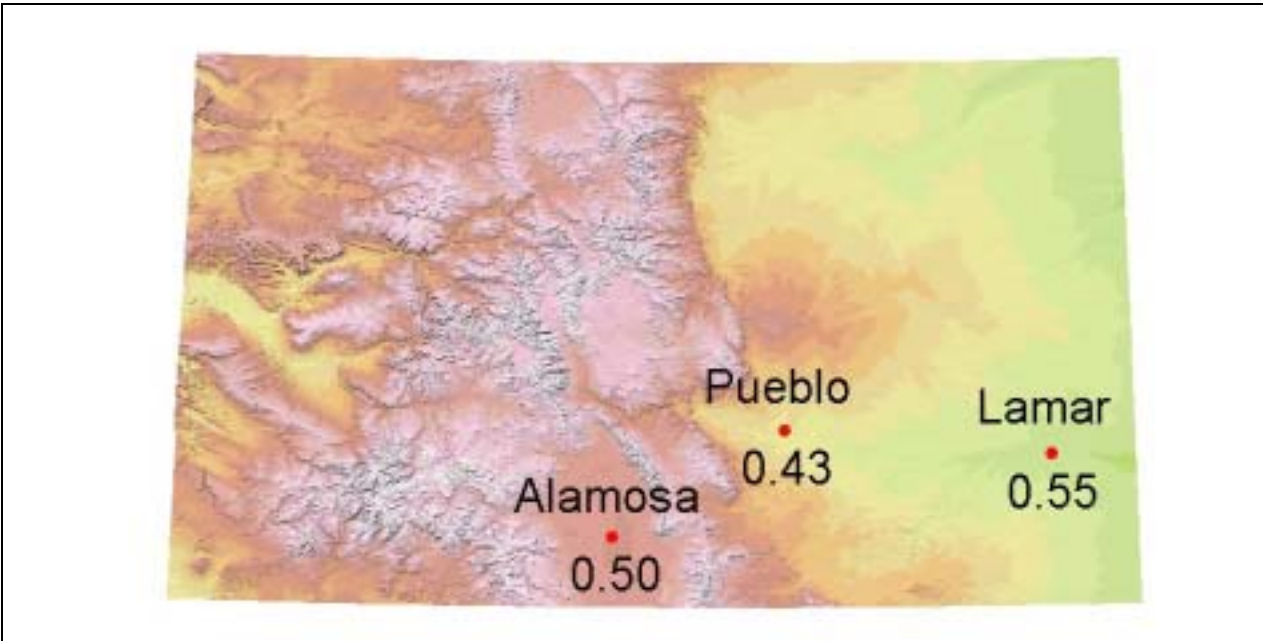


Figure 2. Locations of RAWS meteorological stations nearest to Alamosa (RAWS station names are listed in all-capital letters).

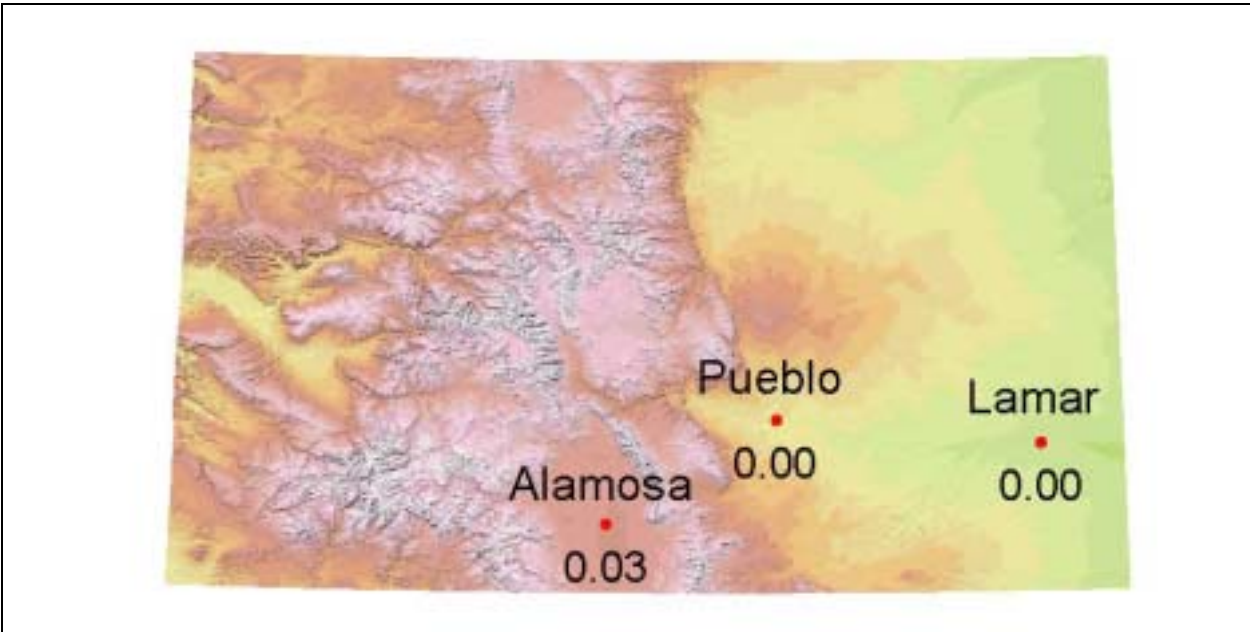
Figure 4 shows that the area around Alamosa had been experiencing a moderate drought. Figure 5 shows that the region around Alamosa received as little as one to two inches of precipitation from December 2001 through February 2002. Consequently, the 0.32 inches of water received in late January was probably not enough to consolidate chronically dry soils. The National Weather Service reported snow cover of three inches at Alamosa on the morning of February 8. It is likely, however, that snow cover was inconsistent throughout the San Luis Valley and that strong winds would have been able to scour exposed soils.

Reference

Colorado Department of Public Health and Environment, City of Lamar, Prowers County Commissioners, *Natural Events Action Plan for High Wind Events – Lamar, Colorado*, April 1998.



(a)

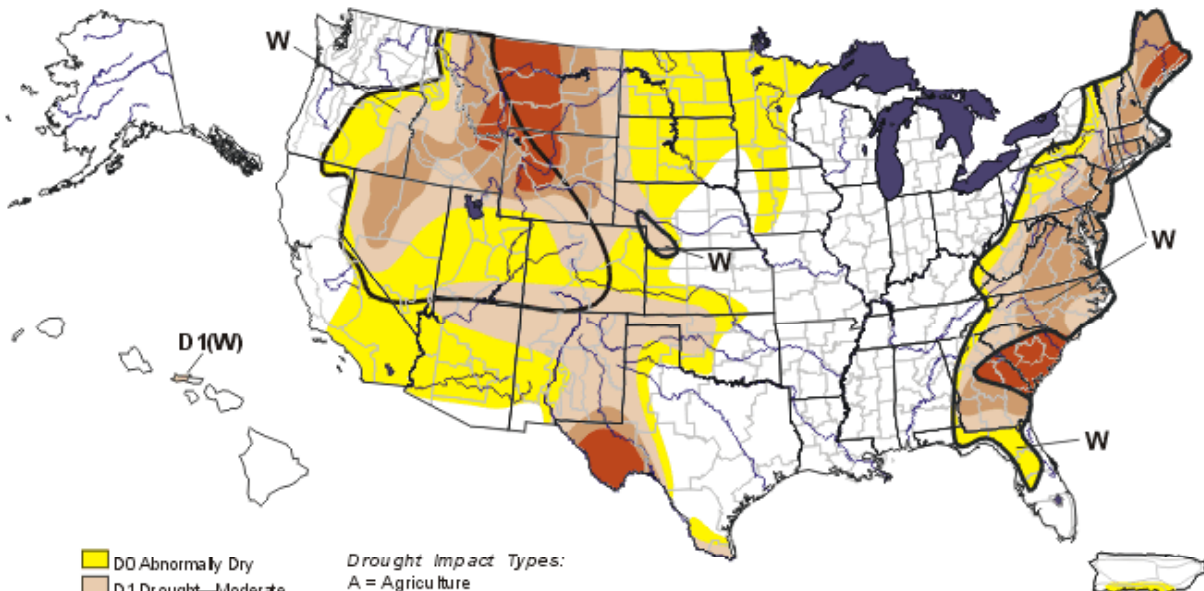


(b)

Figure 3(a) Total precipitation in inches of water for January 2002, and (b) February 1- 10, 2002.

U.S. Drought Monitor

February 12, 2002
Valid 8 a.m. EST



- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
— Delineates dominant impacts
(No type = All impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See a accompanying text summary for forecast statements.

<http://drought.unl.edu/monitor/monitor.html>



Released Thursday, February 14, 2002

Author: Mark Svoboda, NDMC

Figure 4. Drought status for the United States on February 12, 2002 (source: the USDA, NOAA, and the National Drought Mitigation Center at: <http://drought.unl.edu/monitor/monitor.html>).

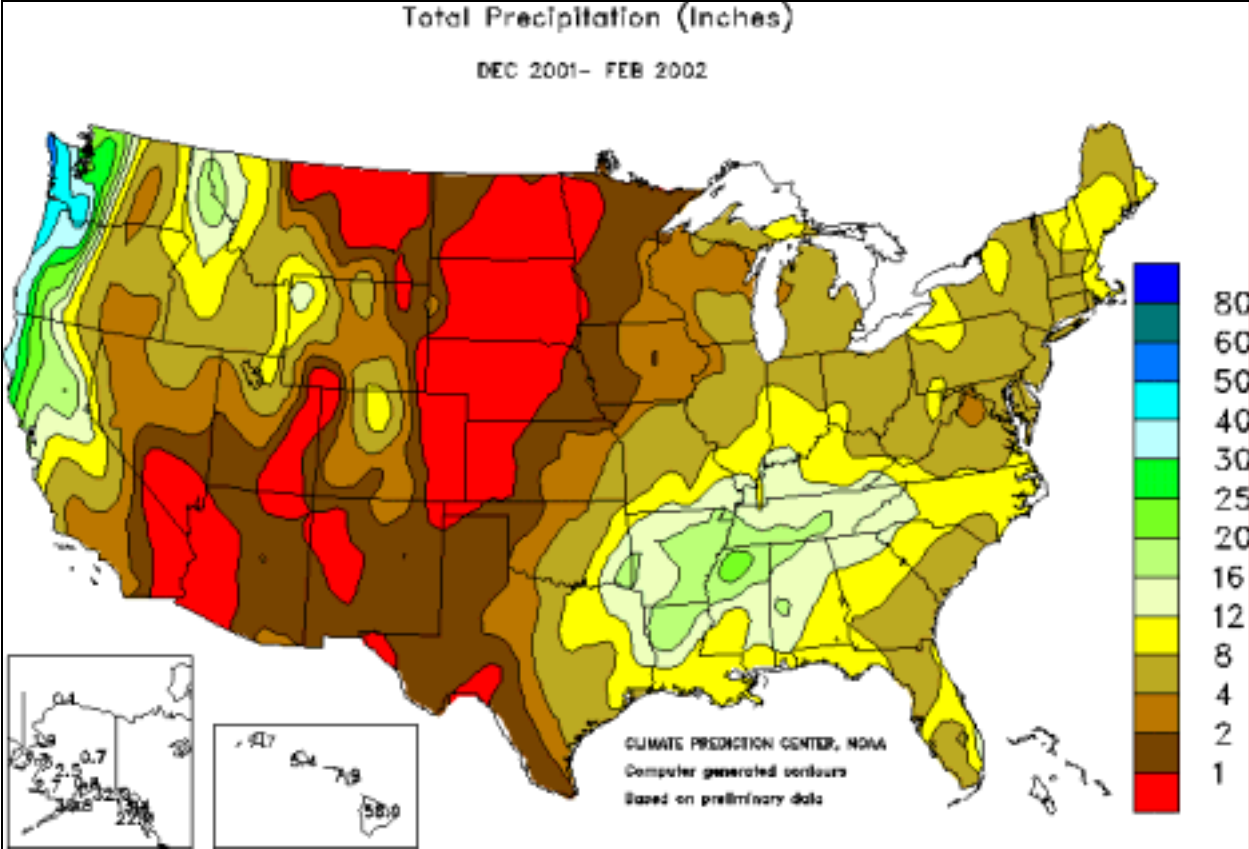


Figure 5. Seasonal precipitation totals (December 2001 through February 2002) for the United States, showing one to two inches of total precipitation in areas of the San Luis Valley of southern Colorado.

Attachment A
Colorado Surface Weather Observations for February
8, 2002, Reported by the National Weather Service

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 100 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
EAGLE	PTSUNNY	36	19	51	SW30G38	29.90F	
RIFLE	CLOUDY	38	18	44	NW28G36	29.94S	
DURANGO	MOSUNNY	49	6	17	SW28G33	29.94F	
CORTEZ	MOSUNNY	51	3	14	W24G32	29.99F	
TELLURIDE	PTSUNNY	37	9	30	W16G29	29.97F	
WOLF CREEK PAS	FAIR	21	16	79	W28G43	29.91F	WCI 3
COPPER MTN	HVY SNOW	12	7	79	W26G41	N/A	VSB 1/4 WCI -8
GUNNISON	PTSUNNY	14	0	52	CALM	29.94F	
MONARCH PASS	CLOUDY	16	9	73	SW48G59	29.91F	WCI -8
ALAMOSA	SUNNY	35	14	42	S8	29.87F	WCI 29
LA VETA PASS	FAIR	34	19	55	SW26G44	29.82F	WCI 21
DENVER INTL AP	BLWGDUST	56	8	14	W35G39	29.66F	
PUEBLO	SUNNY	61	6	11	W28G37	29.70F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 200 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONTROSE	PTSUNNY	37	19	48	NW31G40	29.99R	
DURANGO	N/A	48	7	18	W33G41	29.90F	
WOLF CREEK PAS	FAIR	23	19	86	W30G43	29.84F	WCI 5
ALAMOSA	SUNNY	42	17	36	SW18	29.81F	
LA VETA PASS	FAIR	34	21	60	SW36G54	29.77F	WCI 19
A. F. ACADEMY	MOSUNNY	50	9	18	SW22G38	29.70F	
GREELEY ARPT	FAIR	54	16	22	NW31G39	29.67S	
PUEBLO	SUNNY	61	10	13	W30G36	29.66F	
MONARCH PASS	CLOUDY	14	9	79	SW44G63	29.88F	WCI -10

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 300 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	FAIR	25	19	80	W31G52	29.81F	WCI 8
ALAMOSA	MOSUNNY	41	16	36	SW24	29.79F	
LA VETA PASS	FAIR	32	21	64	SW37G60	29.74F	WCI 16
DENVER INTL AP	BLWGDUST	48	9	20	W31G45	29.64S	
GREELEY ARPT	FAIR	46	19	34	NW38G47	29.68R	
PUEBLO	SUNNY	60	13	15	W30G38	29.66S	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 400 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	MOSUNNY	44	10	25	NW25G40	29.88R	
CORTEZ	MOSUNNY	40	15	36	N30G39	30.03R	
WOLF CREEK PAS	FAIR	21	18	86	W31G44	29.82R	WCI 3
COPPER MTN	HVY SNOW	5	1	85	W17G41	N/A	VSB066-090000-
ALAMOSA	MOSUNNY	39	16	39	SW15	29.79S	
LA VETA PASS	FAIR	30	19	64	SW36G59	29.74R	WCI 14

DENVER INTL AP	BLWGDUST	43	13	29	W36G46	29.67R
AURORA	PTSUNNY	43	12	28	NW30G40	29.69R
ENGLEWOOD	PTSUNNY	43	13	29	NW30G37	29.70R
BROOMFIELD	PTSUNNY	39	12	33	W29G40	29.75R
LOVELAND	FAIR	45	10	24	NW28G44	29.76R
COLO. SPRINGS	MOSUNNY	50	-4	10	W33G46	29.69S
A. F. ACADEMY	PTSUNNY	45	7	21	W29G38	29.71R
TRINIDAD	SUNNY	56	6	13	W24G41	29.71R
GREELEY ARPT	FAIR	43	12	28	NW41G51	29.69F
AKRON	CLOUDY	47	21	35	N26G33	29.69R
PUEBLO	PTSUNNY	54	11	18	W26G35	29.67R
LA JUNTA	SUNNY	61	13	15	NW24G33	29.62F

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
500 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	MOCLDY	37	-4	17	NW30G39	30.06S	
RIFLE	MOCLDY	34	5	29	NW24G35	30.03R	WCI 21
WOLF CREEK PAS	CLOUDY	18	16	93	W29G40	29.83S	WCI -2
COPPER MTN	SNOW	1	-2	85	W24G38	N/A	WSB 1/2 WCI -22
MONARCH PASS	HVY SNOW	9	7	92	SW31G41	29.85S	WSB066-090100-
ALAMOSA	MOCLDY	36	18	48	N9G25	29.82R	
LA VETA PASS	MOCLDY	27	19	74	W21G35	29.79R	WCI 13
DENVER INTL AP	BLWGDUST	39	12	33	W31G38	29.74R	
ENGLEWOOD	MOCLDY	37	14	38	W24G39	29.76R	
BROOMFIELD	MOCLDY	32	12	43	W40	29.78R	WCI 16
LOVELAND	FAIR	37	10	32	W30G40	29.80R	
A. F. ACADEMY	MOCLDY	39	16	38	W28G36	29.73R	
LIMON	CLOUDY	41	17	38	N30G40	29.73R	
GREELEY ARPT	FAIR	37	9	30	NW39G51	29.73R	
AKRON	CLOUDY	43	17	35	N26G38	29.75R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
600 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
COPPER MTN	HVY SNOW	0	-4	85	W26G41	N/A	WSB066-090200-
ALAMOSA	CLOUDY	30	15	53	N23G35	29.85R	HAZE WCI 17
LA VETA PASS	LGT SNOW	19	19	100	W15G29	29.82R	WSB 3/4 WCI 5
AURORA	MOCLDY	34	9	35	W28G39	29.79R	WCI 20
BROOMFIELD	BLWGDUST	30	12	47	W40G58	29.81R	WCI 13
LOVELAND	FAIR	36	9	32	W35G43	29.83R	
GREELEY ARPT	FAIR	36	3	25	W28G40	29.76R	
BURLINGTON	CLOUDY	47	15	27	N30G40	29.70R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
700 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	CLOUDY	12	12	100	NW22G32	29.85	WCI -7
MONARCH PASS	LGT SNOW	1	-2	85	W24G37	29.90R	WCI -22
ALAMOSA	CLOUDY	26	12	55	N24G36	29.86R	WCI 11
LA VETA PASS	LGT SNOW	16	16	100	W22G33	29.82R	WCI -2

DENVER INTL AP	PTCLDY	31	4	31	W26G37	29.79F	WCI	17
AURORA	MOCLDY	32	7	34	W29G39	29.82R	WCI	18
ENGLEWOOD	PTCLDY	30	3	31	W32G46	29.82S	WCI	14
COLO. SPRINGS	MOCLDY	34	7	32	NW30G38	29.78R	WCI	20
GREELEY ARPT	FAIR	34	5	29	W33G43	29.79R	WCI	19
AKRON	CLOUDY	37	10	32	NW29G38	29.84R		
BURLINGTON	MOCLDY	42	12	29	N31G37	29.76R		
PUEBLO	PTCLDY	41	18	39	W26G38	29.75R		
LA JUNTA	MOCLDY	46	22	38	N29G36	29.74R		
LAMAR	CLOUDY	50	19	29	N24G35	29.70R		
SPRINGFIELD	N/A	46	14	27	NW14	29.67R		

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
800 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	PTCLDY	29	-1	27	NW24G37	30.01R	WCI 15
COPPER MTN	HVY SNOW	-2	-6	84	NW22G39	N/A	VSB 1/4 WCI -26
MONARCH PASS	LGT SNOW	1	-2	85	W26G39	29.90S	WCI -23
ALAMOSA	CLOUDY	27	4	37	N31G39	29.91R	WCI 10
LA VETA PASS	CLOUDY	16	12	86	W22G36	29.81F	WCI -2
DENVER INTL AP	PTCLDY	30	5	34	W29G36	29.82R	WCI 15
AURORA	MOCLDY	32	5	32	W29G39	29.83R	WCI 18
ENGLEWOOD	PTCLDY	29	5	36	W21G37	29.85R	WCI 16
FORT CARSON	PTCLDY	34	3	27	N24G36	29.78R	WCI 21
LIMON	CLOUDY	32	10	40	N28G33	29.84R	WCI 18
MONUMENT HILL	FAIR	25	14	63	W23G33	29.81F	WCI 10
GREELEY ARPT	FAIR	34	3	27	W24G38	29.82R	WCI 21
BURLINGTON	CLOUDY	38	13	35	NW31G41	29.77R	
LAMAR	CLOUDY	45	24	43	N24G36	29.78R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
900 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
COPPER MTN	HVY SNOW	-2	-6	84	W24G38	N/A	VSB 1/4 WCI -27
ALAMOSA	MOCLDY	21	0	39	NW29G38	29.95R	WCI 3
LA VETA PASS	CLOUDY	12	9	85	W17G32	29.83R	WCI -5
ENGLEWOOD	MOCLDY	29	-1	27	W24G38	29.83F	WCI 15
COLO. SPRINGS	PTCLDY	30	-4	23	NW30G38	29.80R	WCI 15
MONUMENT HILL	FAIR	25	10	54	W30G41	29.79F	WCI 8
TRINIDAD	PTCLDY	35	14	42	W26G37	29.86R	WCI 22
BURLINGTON	CLOUDY	38	3	23	NW31G47	29.82R	
PUEBLO	MOCLDY	37	5	26	W22G31	29.87R	
LA JUNTA	CLOUDY	39	8	27	N26G36	29.83R	
LAMAR	CLOUDY	42	18	37	N25G36	29.82R	
SPRINGFIELD	N/A	42	21	43	NW29G46	29.76R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1000 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
COPPER MTN	N/A	-2	-8	78	NW22G36	N/A	WCI -26
MONARCH PASS	CLOUDY	-2	-6	84	W25G31	29.92F	WCI -27

ALAMOSA	PTCLDY	20	-1	40	NW28G41	29.97R	WCI	2
LA VETA PASS	CLOUDY	9	3	78	W23G38	29.81S	WCI	-12
LOVELAND	FAIR	37	3	23	NW33G43	29.84R		
COLO. SPRINGS	PTCLDY	29	0	28	NW38G44	29.80S	WCI	12
LIMON	CLOUDY	30	3	31	NW29G35	29.82S	WCI	15
GREELEY ARPT	FAIR	34	10	37	NW30G39	29.85R	WCI	20
SPRINGFIELD	N/A	40	20	44	NW26G35	29.81R		

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1100 PM MST FRI FEB 8 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	CLOUDY	-2	-8	78	W31G38	29.92S	WCI -29
ALAMOSA	CLEAR	17	-2	43	NW14	29.98R	WCI 3
LA VETA PASS	FAIR	7	1	78	W28G31	29.85R	WCI -16
LOVELAND	FAIR	37	7	28	NW36G45	29.85R	
COLO. SPRINGS	PTCLDY	28	-1	28	NW25G40	29.82R	WCI 13
GREELEY ARPT	FAIR	34	12	40	NW30G40	29.84S	WCI 20
AKRON	MOCLDY	30	15	53	NW23G38	29.82R	WCI 17

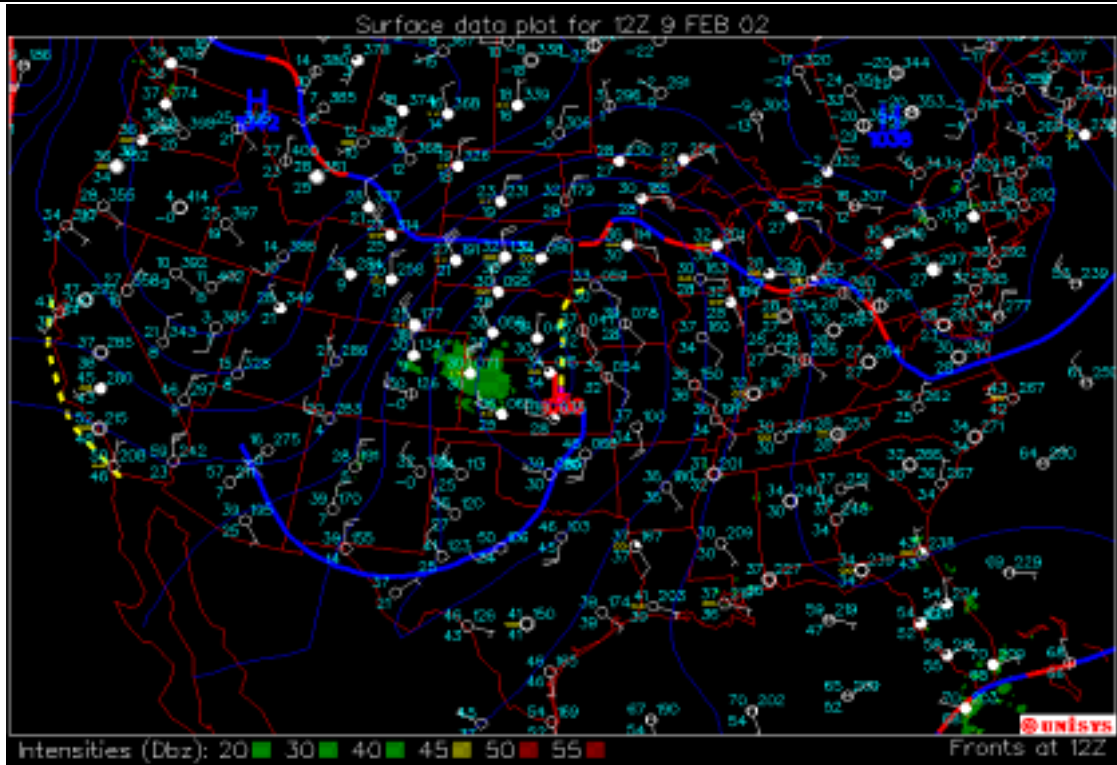
2.2 Meteorological Analysis Of The February 9, 2002, Blowing Dust Event And PM10 Exceedance At Lamar.

On Saturday February 9, 2002, Lamar recorded an exceedance of the twenty-four-hour PM10 standard with a reading of 246.3 ug/m³. An intense surface low-pressure system moved through southeast Colorado on February 8 and into Kansas on February 9. It is apparent from regional data that strong winds and sufficiently dry surface soils resulted in areas of blowing dust in many areas of eastern Colorado. The surface weather map for 12Z February 9 (5 AM MST, February 9) in Figure 1(a) shows a storm system with a central pressure of 1005 mb in Kansas. The central pressure of the storm is significant since storms of about 1000 mb or lower were identified as a typical precondition for blowing dust in eastern Colorado when soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Figure 1(b) shows surface weather conditions for 5:00 PM MST. Notice that the observation for Denver indicates blowing dust (a yellow “D”).

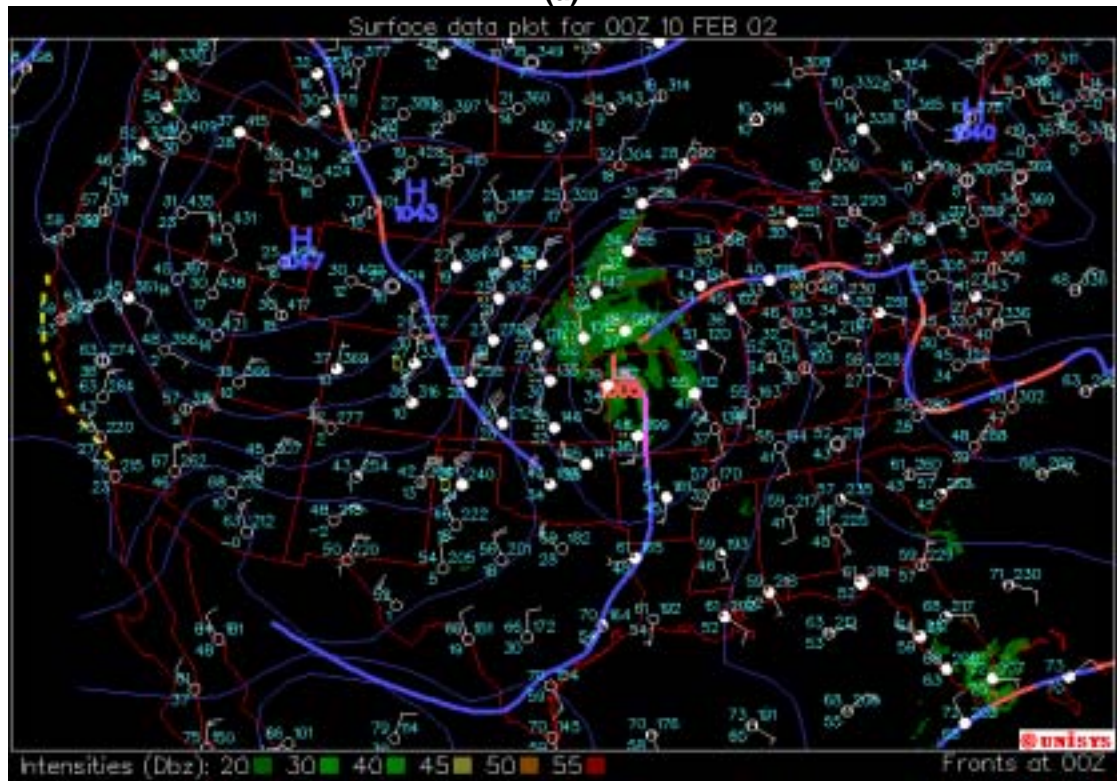
Sustained winds and gusts in eastern and southeastern Colorado exceeded blowing dust criteria. Many sites showed wind speeds in excess of 30 miles per hour (mph) and gusts in excess of 40 mph. These are the speed and gust thresholds for blowing dust that apply in southeastern Colorado when surface soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Table 1 below lists wind speeds and gusts for Lamar, Colorado on February 9. The 30 mph blowing dust threshold applies to hourly average winds. Wind speed observations at stations like Lamar are made just prior to the reported hour of observation. In most cases, these recorded speeds are not hourly average speeds but represent a several-minute average. If these spot observations show that speeds are above the 30 mph threshold for successive hours, then it can be reasonably assumed that hourly average winds are also above 30 mph. Winds at Lamar were above the blowing dust thresholds for nine consecutive hours on February 9, and gusts were as high as 55 mph.

High winds were the norm across eastern and southeastern Colorado on February 9, 2002. Many stations recorded winds of 30 to 49 mph with gust of 50 to 66 mph for much of the morning, afternoon, and early evening hours. Limon, for example, measured winds of 51 mph with a gust to 60 mph at 1:00 PM MST. Springfield recorded gusts of 54 mph to 66 mph for eight consecutive hours. The National Weather Service reported blowing dust for 11 consecutive hours at Denver International Airport. The National Weather Service also reported six hours of blowing dust at Aurora. Detailed weather observations for February 9 have been included in Attachment A.

Figure 2(a) shows the January 2002 precipitation for Lamar, Alamosa, and Pueblo. Figure 2(b) shows the February 1 through 10, 2002, precipitation at these stations. While each site received only about a half inch of water during the entire period, much of this fell during the last few days of January. Pueblo received 0.19 inches during January 30 to 31. Alamosa received 0.32 inches on the last two days of January, and Lamar received 0.45 inches on January 31. Lamar’s precipitation on January 31 was a significant amount just 9 days prior to the blowing dust event. In the context of longer term precipitation



(a)



(b)

Figure 1. (a) Surface weather map for 12Z February 9 2002 or **5 AM MST February 9 2002**; (b) surface weather map for 00Z February 10 2002 or **5 PM MST February 9, 2002**.

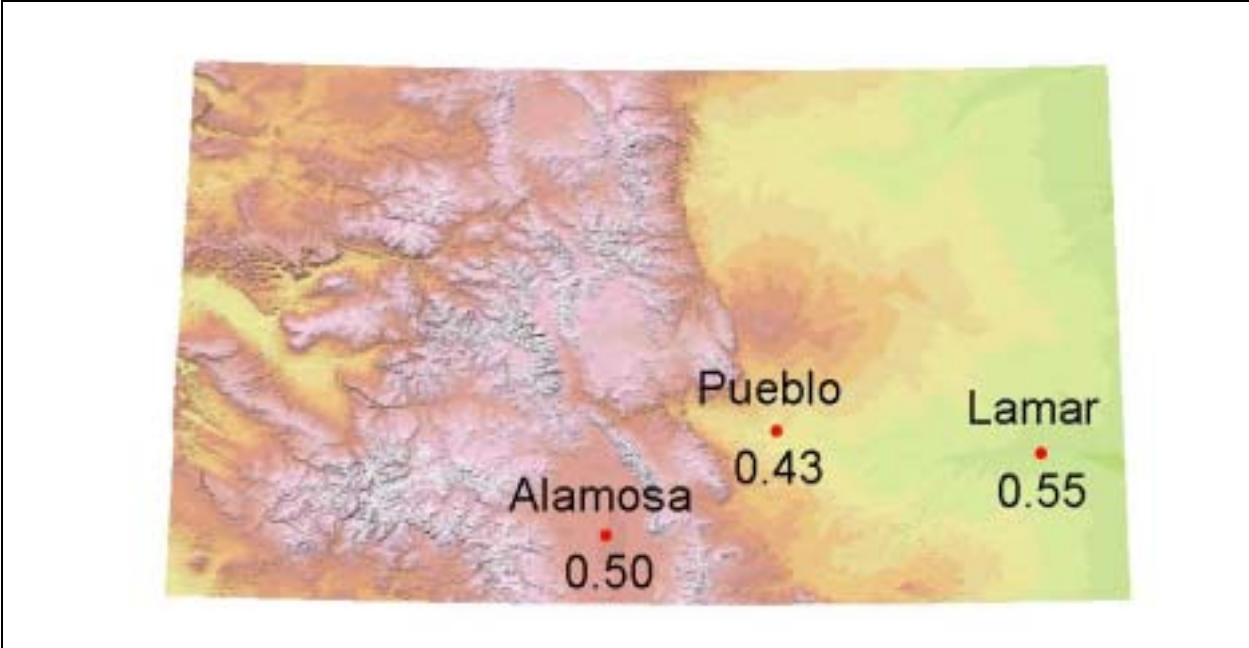
Table 1. Wind observations for Lamar, Colorado, reported by the National Weather Service on February 9, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Weather	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Remarks
3:00 AM	Cloudy	Northwesterly	21	31	
4:00 AM	Cloudy	Northwesterly	23	32	
5:00 AM	Cloudy	Northwesterly	22	-	
6:00 AM	Cloudy	Northwesterly	33	40	
7:00 AM	Cloudy	Northwesterly	30	41	
8:00 AM	Cloudy	Northwesterly	33	46	
9:00 AM	Cloudy	Northerly	41	48	Haze
10:00 AM	Cloudy	Northerly	35	55	Haze
11:00 AM	Cloudy	Northerly	36	45	Haze
12:00 PM	Cloudy	Northerly	31	41	Haze
1:00 PM	Cloudy	Northerly	35	44	Haze
2:00 PM	Cloudy	Northerly	39	52	
3:00 PM	Cloudy	Northerly	36	48	
4:00 PM	Cloudy	Northerly	38	48	
5:00 PM	Cloudy	Northerly	37	47	
6:00 PM	Cloudy	Northerly	26	38	
7:00 PM	Cloudy	Northerly	29	40	
8:00 PM	Mostly Cloudy	Northerly	24	32	
9:00 PM	Partly Cloudy	Northerly	26	30	
10:00 PM	Clear	Northerly	26	36	

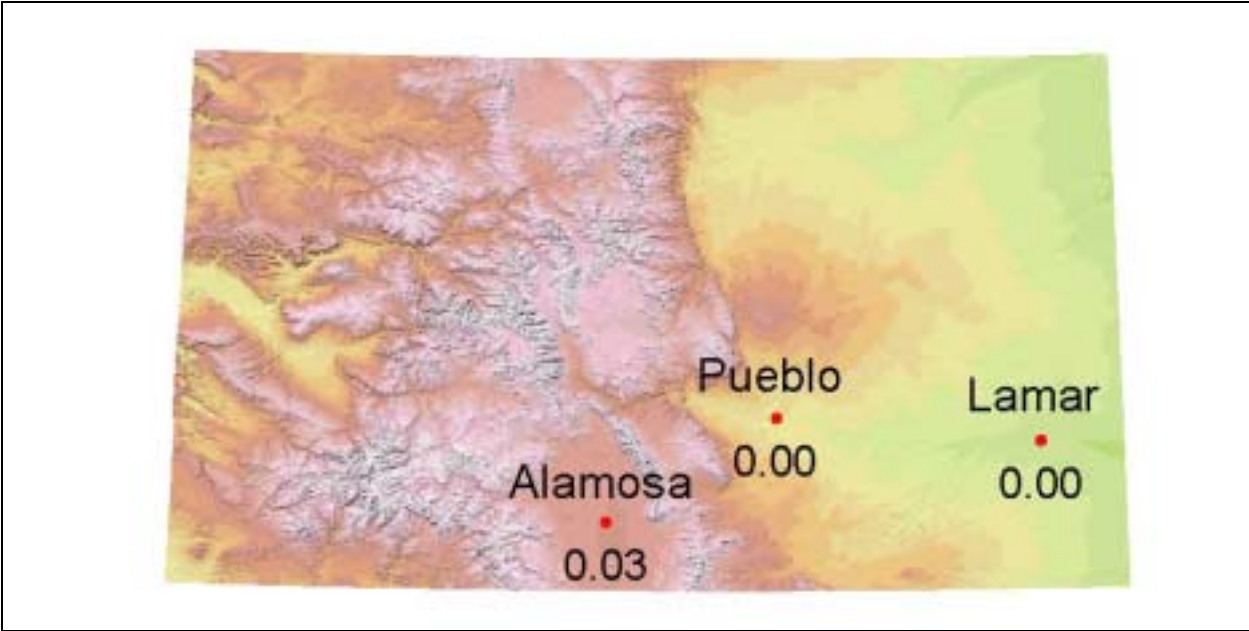
history, however, the area was in a drought. Figure 3 shows that the area around Lamar had been classified as abnormally dry to experiencing a moderate drought. Figure 4 shows that much of eastern Colorado received an inch or less of precipitation from December 2001 through February 2002. Consequently, 0.45 inches of water in late January was probably not enough to consolidate chronically dry soils.

Reference

Colorado Department of Public Health and Environment, City of Lamar, Prowers County Commissioners, *Natural Events Action Plan for High Wind Events – Lamar, Colorado*, April 1998.



(a)

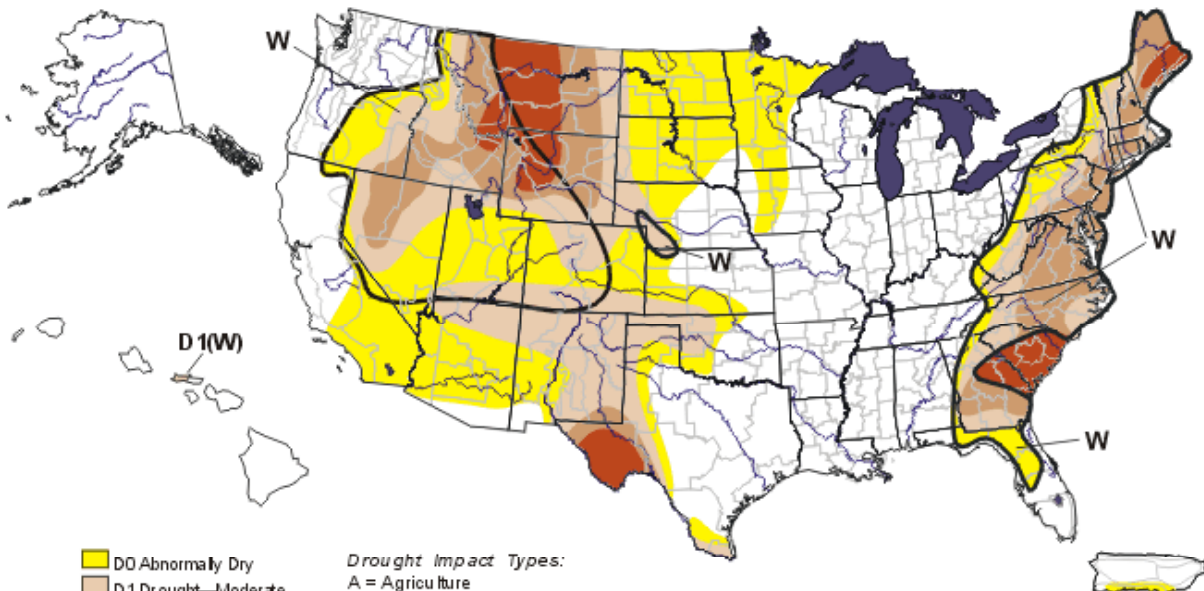


(b)

Figure 2(a) Total precipitation in inches of water for January 2002, and (b) February 1- 10, 2002.

U.S. Drought Monitor

February 12, 2002
Valid 8 a.m. EST

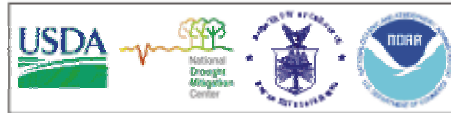


- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
— Delineates dominant impacts
(No type = All impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See a accompanying text summary for forecast statements.

<http://drought.unl.edu/monitor/monitor.html>



Released Thursday, February 14, 2002

Author: Mark Svoboda, NDMC

Figure 3. Drought status for the United States on February 12, 2002 (source: the USDA, NOAA, and the National drought Mitigation Center at: <http://drought.unl.edu/monitor/monitor.html>).

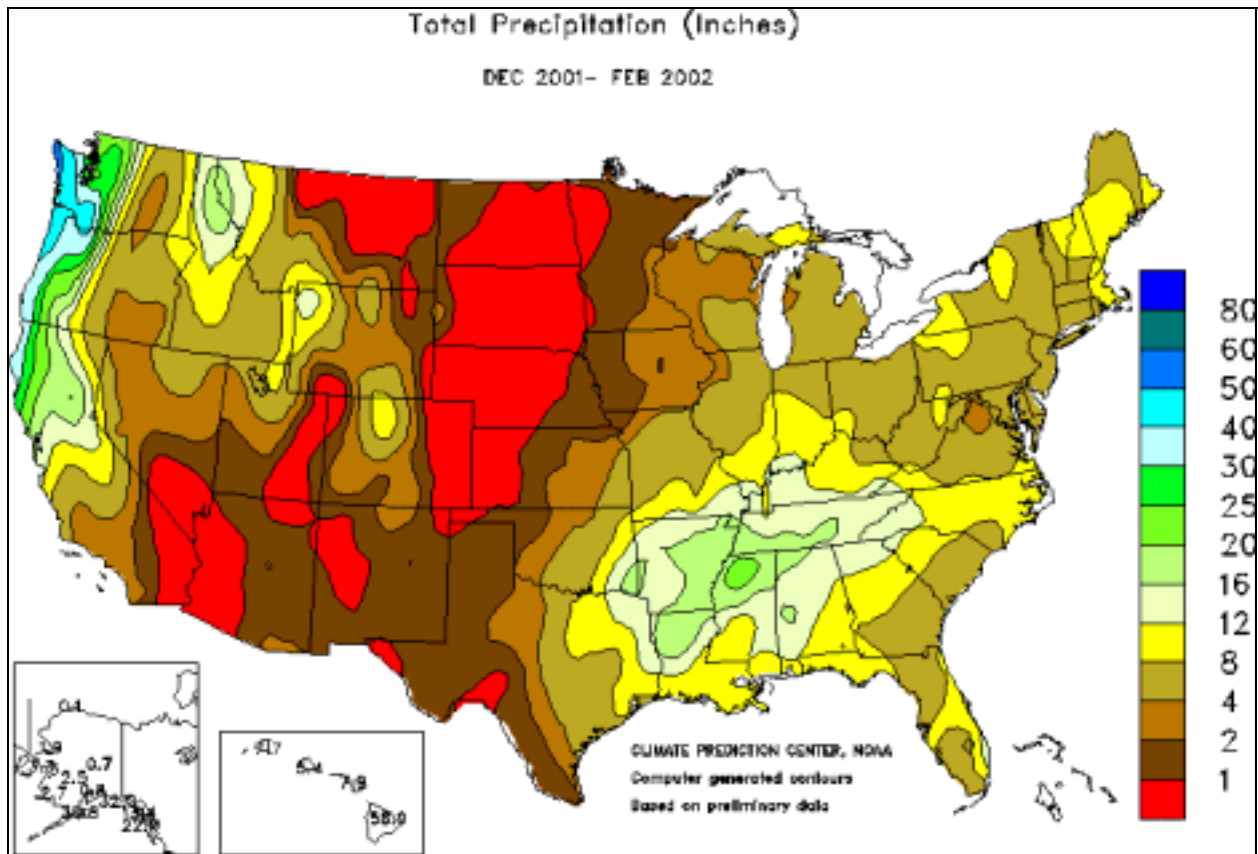


Figure 4. Seasonal precipitation totals (December 2001 through February 2002) for the United States, showing an inch or less of total precipitation in eastern Colorado.

Attachment B
Surface Weather Observations for February 9, 2002,
for Eastern Colorado Reported by the National
Weather Service

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 300 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
LIMON	CLOUDY	28	17	63	N35G48	29.83S	WCI 11
GREELEY ARPT	FAIR	32	16	51	NW30G45	29.88R	WCI 18
AKRON	LGT SNOW	29	24	82	N35G48	29.83R	WCI 12
BURLINGTON	CLOUDY	31	25	78	NW35G43	29.76S	WCI 15
LA JUNTA	MOCLDY	31	19	61	N15	29.88S	WCI 20
LAMAR	CLOUDY	33	25	72	NW21G31	29.86S	WCI 21
SPRINGFIELD	N/A	33	17	51	NW28G47	29.84R	WCI 20

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 400 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
LIMON	LGT SNOW	27	19	72	N40G48	29.85R	WCI 9
GREELEY ARPT	FAIR	32	14	47	NW36G44	29.91R	WCI 16
AKRON	LGT SNOW	29	23	78	N37G49	29.84R	WCI 12
BURLINGTON	MIX PCPN	30	26	85	NW29G43	29.76S	WCI 15
PUEBLO	PTCLDY	33	0	24	W20	29.89	WCI 21
LA JUNTA	PTCLDY	27	19	72	NW10	29.89R	WCI 17
LAMAR	CLOUDY	33	23	66	NW23G32	29.86S	WCI 21
SPRINGFIELD	N/A	33	19	56	NW24G33	29.85R	WCI 20

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 500 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
PUEBLO	PTCLDY	31	0	26	W17	29.92R	WCI 19
LA JUNTA	PTCLDY	30	15	53	NW16	29.92R	WCI 19
LAMAR	CLOUDY	33	22	63	NW22	29.88R	WCI 21
SPRINGFIELD	N/A	32	19	58	NW26G35	29.85S	WCI 18

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 600 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	CLOUDY	30	9	41	N29G38	29.96R	WCI 15
AURORA	CLOUDY	30	10	43	N18G29	29.95R	WCI 18
ENGLEWOOD	CLOUDY	30	2	30	NW13	29.95R	WCI 20
BROOMFIELD	PTCLDY	32	3	29	N9	29.98	WCI 24
LOVELAND	FAIR	34	10	37	NW31G46	29.96R	WCI 20
COLO. SPRINGS	CLOUDY	29	0	28	N22G29	29.93R	WCI 15
A. F. ACADEMY	CLOUDY	27	7	43	NW26G37	29.92R	WCI 11
LIMON	CLOUDY	26	20	77	N32G43	29.90R	WCI 9
MONUMENT HILL	FLURRIES	23	18	80	NW24G39	29.91R	WCI 7
TRINIDAD	PTCLDY	28	-3	26	W18	29.96R	WCI 15
GREELEY ARPT	FAIR	30	16	55	NW31G51	29.97R	WCI 15
AKRON	CLOUDY	29	20	69	N36G54	29.90R	WCI 12
BURLINGTON	HVY SNOW	28	27	96	NW38G49	29.79R	VSB 1/4 WCI 11
PUEBLO	PTCLDY	29	1	30	W10	29.95R	WCI 20
LA JUNTA	CLOUDY	33	19	56	NW29G36	29.93R	WCI 19

LAMAR	CLOUDY	34	23	64	NW33G40	29.89R	WCI	20
SPRINGFIELD	N/A	33	17	51	NW29G36	29.88R	WCI	19

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 700 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	9	40	N26G33	30.00R	WCI 16
AURORA	CLOUDY	30	9	40	N20G29	30.00R	WCI 18
LOVELAND	FAIR	34	9	35	NW36G52	29.99R	WCI 19
COLO. SPRINGS	PTCLDY	28	6	39	N28G37	29.96R	WCI 13
A. F. ACADEMY	CLOUDY	27	10	50	N28G33	29.96R	WCI 11
LIMON	FLURRIES	26	20	77	N29G38	29.94R	WCI 10
MONUMENT HILL	CLOUDY	23	18	80	NW22G30	29.95R	WCI 8
GREELEY ARPT	FAIR	30	16	55	NW30G40	30.00R	WCI 15
AKRON	LGT SNOW	27	20	75	N47G55	29.94R	WCI 8
BURLINGTON	LGT SNOW	27	27	100	NW37G44	29.83R	VSB 3/4 WCI 9
LA JUNTA	CLOUDY	34	17	50	NW33G44	29.96R	WCI 20
LAMAR	CLOUDY	34	22	61	NW30G41	29.93R	WCI 20
SPRINGFIELD	N/A	33	18	53	NW32G44	29.90R	WCI 19

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 800 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	31	9	39	NW29G37	30.06R	WCI 16
AURORA	CLOUDY	32	10	40	N31G44	30.06R	WCI 17
ENGLEWOOD	CLOUDY	30	2	30	NW16G28	30.05R	WCI 19
COLO. SPRINGS	MOSUNNY	29	7	39	N26G35	30.00R	WCI 14
A. F. ACADEMY	MOSUNNY	27	10	50	NW32G44	29.98R	WCI 10
LIMON	LGT SNOW	26	22	84	N30G44	29.98R	VSB 1 WCI 10
MONUMENT HILL	CLOUDY	25	14	63	NW21G29	29.99R	WCI 10
BURLINGTON	FOG	27	26	96	N40G52	29.87R	VSB 1/2 WCI 9
LA JUNTA	PTSUNNY	35	17	47	NW29G36	30.00R	WCI 22
LAMAR	CLOUDY	35	22	58	NW33G46	29.96R	WCI 21
SPRINGFIELD	N/A	34	19	54	NW40G47	29.92R	WCI 18

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 900 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	31	11	43	N33G46	30.12R	WCI 15
AURORA	BLWGDUST	32	12	43	N30G45	30.12R	WCI 18
ENGLEWOOD	PTSUNNY	31	6	35	N28G39	30.11R	WCI 17
BROOMFIELD	CLOUDY	34	3	27	N29G40	30.13R	WCI 20
COLO. SPRINGS	MOSUNNY	30	8	39	N41G47	30.03R	WCI 13
A. F. ACADEMY	CLOUDY	27	10	50	N31G46	30.03R	WCI 10
LIMON	FOG	23	22	96	N40G53	30.02R	VSB045-048>051-
AKRON	CLOUDY	25	17	72	N40G58	30.05	HAZE WCI 6
BURLINGTON	FOG	26	25	96	N35G55	29.92R	VSB 3/4 WCI 9
LA JUNTA	CLOUDY	38	12	34	NW45G53	30.02R	
LAMAR	CLOUDY	36	20	52	N41G48	29.99R	HAZE
SPRINGFIELD	N/A	35	20	54	NW36G48	29.94R	WCI 21

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1000 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	12	47	N31G49	30.17R	WCI 15
AURORA	BLWGDUST	32	12	43	NW36G55	30.18R	WCI 16
ENGLEWOOD	PTSUNNY	31	8	38	N36G40	30.17R	WCI 15
BROOMFIELD	CLOUDY	34	7	32	N23G35	30.20R	WCI 22
LOVELAND	PTSUNNY	36	10	35	N31G44	30.18R	
COLO. SPRINGS	MIX PCPN	30	13	49	N39G48	30.06R	WCI 13
LIMON	FOG	23	22	96	N46G59	30.06R	VSB045-048>051-090-091-091800-
GREELEY ARPT	CLOUDY	32	18	55	N39G53	30.18R	WCI 16
AKRON	CLOUDY	25	18	74	N37G45	30.10R	WCI 7
BURLINGTON	CLOUDY	26	24	92	NW40G52	29.96R	FOG WCI 7
PUEBLO	PTSUNNY	39	10	30	NW30G36	30.10R	
LA JUNTA	CLOUDY	38	15	39	NW43G54	30.06R	
LAMAR	CLOUDY	34	18	52	N35G55	30.04R	HAZE WCI 19
SPRINGFIELD	N/A	33	23	66	NW41G63	29.97R	WCI 17

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1100 AM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	14	51	N39G45	30.24R	WCI 13
AURORA	BLWGDUST	30	14	51	N36G49	30.24R	WCI 14
ENGLEWOOD	CLOUDY	30	8	39	N31G52	30.23R	WCI 15
BROOMFIELD	CLOUDY	34	7	32	N35G40	30.26R	WCI 19
LOVELAND	FAIR	37	10	32	N30G43	30.28R	
COLO. SPRINGS	HVY SNOW	26	20	77	N40G54	30.10R	VSB 1/4 WCI 7
A. F. ACADEMY	SNOWSHWR	23	21	93	NW37G44	30.13R	VSB 1 WCI 4
LIMON	FOG	23	22	96	N43G52	30.12R	VSB045-048>051-
GREELEY ARPT	PTSUNNY	34	18	51	N43G61	30.25R	WCI 18
AKRON	BLWGSNOW	25	19	78	N46G53	30.15R	WCI 5
BURLINGTON	FOG	25	25	100	N38G45	30.01R	VSB 1/2 WCI 6
PUEBLO	PTSUNNY	38	13	35	NW30G39	30.14R	
LA JUNTA	CLOUDY	35	20	54	N31G37	30.13R	WCI 22
LAMAR	CLOUDY	33	18	53	N36G45	30.11R	HAZE WCI 18
SPRINGFIELD	N/A	35	21	56	NW49G66	30.00R	WCI 19

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1200 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	31	14	49	N35G44	30.29R	WCI 15
AURORA	LGT SNOW	30	16	55	N35G49	30.29R	WCI 14
ENGLEWOOD	LGT SNOW	29	13	51	N43G49	30.28R	WCI 11
BROOMFIELD	CLOUDY	34	5	29	N25G35	30.29R	WCI 21
LOVELAND	FAIR	39	9	28	N30G41	30.33R	
COLO. SPRINGS	LGT SNOW	28	21	75	N46G62	30.13R	VSB 1 WCI 9
A. F. ACADEMY	SNOW	23	21	93	N37G55	30.18R	VSB 1/2 WCI 4
LIMON	FOG	23	23	100	N37G54	30.16R	VSB045-048>051-
GREELEY ARPT	PTSUNNY	34	16	47	N43G53	30.31R	WCI 18
AKRON	MIX PCPN	27	19	72	N41G52	30.18R	WCI 8

BURLINGTON	FOG	26	24	92	N37G52	30.03R	VSB 3/4	WCI	8
PUEBLO	PTSUNNY	38	15	39	NW33G47	30.20R			
LA JUNTA	CLOUDY	35	19	52	N39G47	30.17R	WCI	20	
LAMAR	CLOUDY	34	18	52	N31G41	30.13R	HAZE	WCI	20
SPRINGFIELD	N/A	32	19	58	NW46G62	30.04R	WCI	15	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
100 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	13	49	N36G46	30.32R	WCI 14
AURORA	BLWGDUST	32	12	43	N31G47	30.31R	WCI 17
ENGLEWOOD	CLOUDY	32	8	36	N35G41	30.30R	WCI 17
BROOMFIELD	CLOUDY	34	3	27	N29G36	30.32R	WCI 20
LOVELAND	FAIR	37	9	30	NW31G44	30.35R	
COLO. SPRINGS	MIX PCPN	29	20	69	N36G48	30.20R	WCI 12
A. F. ACADEMY	SNOW	25	21	86	N35G51	30.19R	VSB 1/2 WCI 7
LIMON	FOG	24	24	100	N51G60	30.17R	VSB045-048>051-
GREELEY ARPT	FAIR	34	18	51	NW45G55	30.34R	WCI 18
AKRON	LGT SNOW	27	20	75	N43G52	30.22R	WCI 8
BURLINGTON	CLOUDY	28	23	81	N43G55	30.07R	HAZE WCI 10
PUEBLO	CLOUDY	38	16	40	NW40G48	30.25R	
LA JUNTA	CLOUDY	35	18	49	N37G51	30.20R	WCI 21
LAMAR	CLOUDY	35	19	52	N35G44	30.15R	HAZE WCI 21
SPRINGFIELD	N/A	30	25	81	NW45G54	30.06R	WCI 12

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
200 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	11	45	N37G47	30.34R	WCI 14
AURORA	BLWGDUST	32	10	40	N30G44	30.33R	WCI 18
ENGLEWOOD	PTSUNNY	31	7	36	N30G38	30.32R	WCI 16
BROOMFIELD	CLOUDY	34	3	27	N23G35	30.36R	WCI 22
LOVELAND	FAIR	36	9	32	NW32G41	30.39R	
COLO. SPRINGS	CLOUDY	31	12	45	N41G58	30.20S	WCI 14
A. F. ACADEMY	LGT SNOW	27	16	63	N43G53	30.21R	WCI 8
LIMON	FOG	25	24	96	N46G59	30.21R	VSB045-048>051-
GREELEY ARPT	FAIR	34	14	44	N41G52	30.38R	WCI 18
AKRON	MIX PCPN	28	19	69	N45G55	30.27R	WCI 9
BURLINGTON	FOG	27	25	92	N44G51	30.10R	VSB 3/4 WCI 8
PUEBLO	CLOUDY	38	15	39	NW26G38	30.30R	
LA JUNTA	CLOUDY	36	19	50	N44G53	30.23R	
LAMAR	CLOUDY	35	19	52	N39G52	30.20R	WCI 20
SPRINGFIELD	N/A	31	23	72	NW45G56	30.10R	WCI 14

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
300 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	BLWGDUST	30	11	45	N38G45	30.39R	WCI 13
ENGLEWOOD	CLOUDY	30	6	36	N35G41	30.36R	WCI 14
BROOMFIELD	CLOUDY	34	5	29	N23G35	30.39R	WCI 22
LOVELAND	PTSUNNY	36	9	32	NW31G41	30.44R	

COLO. SPRINGS	CLOUDY	29	11	47	N35G56	30.24R	WCI	12	
A. F. ACADEMY	LGT SNOW	27	14	59	N41G53	30.25R	WCI	8	
LIMON	FOG	24	23	96	N45G59	30.26R	VSB045-048>051-		
GREELEY ARPT	FAIR	32	12	43	N43G51	30.43R	WCI	15	
AKRON	CLOUDY	29	21	72	N43G55	30.32R	WCI	11	
BURLINGTON	FOG	27	26	96	N44G58	30.15R	VSB 3/4	WCI	8
PUEBLO	CLOUDY	38	10	31	NW31G46	30.32R			
LA JUNTA	CLOUDY	36	20	52	N43G54	30.27R			
LAMAR	CLOUDY	35	21	56	N36G48	30.22R	WCI	21	
SPRINGFIELD	N/A	30	24	78	NW46G61	30.14R	WCI	12	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
400 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS		
DENVER INTL AP	BLWGDUST	29	9	43	N37G46	30.42R	WCI	12	
AURORA	BLWGDUST	30	14	51	N22G47	30.42R	WCI	17	
ENGLEWOOD	CLOUDY	29	7	39	N30G40	30.40R	WCI	13	
BROOMFIELD	CLOUDY	32	5	32	N23G35	30.43R	WCI	19	
LOVELAND	FAIR	36	10	35	N25G29	30.47R			
COLO. SPRINGS	PTSUNNY	27	9	46	N39G49	30.32R	WCI	9	
A. F. ACADEMY	CLOUDY	25	14	63	N45G56	30.29R	WCI	5	
LIMON	FOG	24	23	96	N41G55	30.31R	VSB 1/4	WCI	4
MONUMENT HILL	LGT SNOW	21	18	86	N43G52	30.32R	WCI	0	
TRINIDAD	CLOUDY	34	9	35	N23G36	30.32R	WCI	22	
GREELEY ARPT	FAIR	34	9	35	N43G53	30.46R	WCI	18	
AKRON	CLOUDY	28	20	71	N39G53	30.36R	WCI	10	
BURLINGTON	LGT SNOW	28	25	88	N44G55	30.21R	FOG	WCI	10
PUEBLO	CLOUDY	37	12	35	NW32G37	30.36R			
LA JUNTA	CLOUDY	35	19	52	N44G60	30.30R	WCI	19	
LAMAR	CLOUDY	35	20	54	N38G48	30.28R	WCI	20	
SPRINGFIELD	N/A	31	22	69	NW47G64	30.18R	WCI	13	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
500 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS		
DENVER INTL AP	BLWGDUST	27	9	46	N28G41	30.46R	WCI	11	
AURORA	MOCLDY	28	16	59	N22G38	30.45R	WCI	15	
ENGLEWOOD	MOCLDY	27	8	44	N28G37	30.43R	WCI	11	
LOVELAND	FAIR	34	9	35	N26G33	30.50R	WCI	21	
COLO. SPRINGS	MOCLDY	26	9	48	N32G43	30.36R	WCI	9	
A. F. ACADEMY	CLOUDY	25	12	58	N33G49	30.33R	WCI	7	
LIMON	FOG	23	21	92	N39G51	30.34R	VSB 3/4	WCI	3
MONUMENT HILL	FLURRIES	21	18	86	N26G41	30.36R	WCI	4	
TRINIDAD	CLOUDY	33	8	35	N32G43	30.36R	WCI	19	
GREELEY ARPT	FAIR	30	9	40	N35G44	30.49R	WCI	14	
AKRON	CLOUDY	28	19	69	N39G46	30.40R	WCI	10	
BURLINGTON	MIX PCPN	27	23	85	N43G55	30.25R	FOG	WCI	8
PUEBLO	CLOUDY	36	10	34	NW29G39	30.41R			
LA JUNTA	CLOUDY	33	18	53	N44G52	30.37R	WCI	17	
LAMAR	CLOUDY	34	20	56	N37G47	30.35R	WCI	19	
SPRINGFIELD	N/A	32	20	61	NW49G58	30.23R	WCI	14	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 600 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	MOCLDY	26	8	46	N22G30	30.50R	WCI 12
AURORA	NOT AVBL						
ENGLEWOOD	MOCLDY	25	11	55	N20G26	30.48R	WCI 11
BROOMFIELD	MOCLDY	28	7	40	N23G35	30.49	WCI 14
LOVELAND	FAIR	32	7	34	NW22G31	30.54R	WCI 19
CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
COLO. SPRINGS	PTCLDY	24	6	46	N25G37	30.40R	WCI 8
LIMON	PTCLDY	21	18	88	N36G43	30.39R	FOG WCI 1
MONUMENT HILL	FAIR	19	18	93	N31G41	30.38R	WCI 0
TRINIDAD	CLOUDY	30	9	41	N25G37	30.40R	WCI 16
GREELEY ARPT	FAIR	28	10	47	N24G30	30.54R	WCI 14
AKRON	MOCLDY	25	16	68	N33G39	30.44R	WCI 7
BURLINGTON	MIX PCPN	26	21	81	N39G49	30.29R	VSB 1 WCI 8
PUEBLO	MOCLDY	32	12	43	N25G32	30.47R	WCI 19
LA JUNTA	CLOUDY	31	17	56	N36G47	30.43R	WCI 15
LAMAR	CLOUDY	33	20	58	N26G38	30.40R	WCI 20
SPRINGFIELD	N/A	31	18	58	NW46G56	30.28R	WCI 13

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 700 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	PTCLDY	24	9	52	N14	30.53R	WCI 12
AURORA	PTCLDY	25	10	54	N18G25	30.53R	WCI 11
ENGLEWOOD	PTCLDY	25	6	44	N23G32	30.50R	WCI 10
LOVELAND	FAIR	30	7	37	NW15	30.56R	WCI 19
COLO. SPRINGS	PTCLDY	23	9	55	NW28G35	30.45R	WCI 6
LIMON	FOG	20	17	88	N37G46	30.42R	VSB 1 WCI 0
MONUMENT HILL	FAIR	18	16	93	N30G38	30.42R	WCI -2
TRINIDAD	CLOUDY	27	12	53	N24G41	30.45R	WCI 12
GREELEY ARPT	FAIR	25	10	54	NW12	30.56R	WCI 14
AKRON	CLEAR	23	15	71	N28G38	30.48R	WCI 6
BURLINGTON	MIX PCPN	26	23	88	N36G51	30.34R	FOG WCI 8
PUEBLO	MOCLDY	31	9	39	N21G29	30.51R	WCI 18
LA JUNTA	CLOUDY	30	12	47	N32G40	30.48R	WCI 14
LAMAR	CLOUDY	32	15	49	N29G40	30.44R	WCI 18
SPRINGFIELD	N/A	30	19	63	NW37G49	30.34R	WCI 14

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 800 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	PTCLDY	24	8	50	N17	30.56R	WCI 11
AURORA	PTCLDY	25	10	54	N15	30.55R	WCI 12
ENGLEWOOD	MOCLDY	24	4	42	N20	30.53R	WCI 10
LOVELAND	FAIR	30	5	34	NW16G29	30.59R	WCI 19
COLO. SPRINGS	CLEAR	23	7	50	N30G37	30.47R	WCI 5
LIMON	CLEAR	20	17	88	N33G45	30.46R	FOG WCI 0
MONUMENT HILL	FAIR	18	12	79	N29G41	30.44R	WCI -2
TRINIDAD	CLOUDY	26	2	35	N32G44	30.50R	WCI 9

GREELEY ARPT	FAIR	27	10	50	NW16	30.58R	WCI	14
AKRON	CLEAR	22	14	71	N23G35	30.51R	WCI	6
BURLINGTON	PTCLDY	25	22	88	N30G44	30.39R	WCI	8
PUEBLO	MOCLDY	30	5	34	NW18	30.54R	WCI	18
LA JUNTA	MOCLDY	29	11	47	N31G40	30.53R	WCI	13
LAMAR	MOCLDY	30	16	56	N24G32	30.50R	WCI	16
SPRINGFIELD	N/A	28	17	63	NW36G44	30.38R	WCI	11

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
900 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	PTCLDY	23	6	48	NW17	30.59R	WCI 9
ENGLEWOOD	PTCLDY	23	2	40	N17	30.56R	WCI 9
BROOMFIELD	MOCLDY	23	1	39	N8	30.59	WCI 14
LOVELAND	FAIR	30	3	31	NW15G25	30.60R	WCI 19
COLO. SPRINGS	CLEAR	23	7	50	NW25G33	30.50R	WCI 7
LIMON	CLEAR	20	16	84	N36G41	30.49R	FOG WCI 0
MONUMENT HILL	FAIR	18	12	79	NW25G35	30.47R	WCI -1
TRINIDAD	PTCLDY	25	5	42	N18G31	30.54R	WCI 11
GREELEY ARPT	FAIR	27	9	46	NW18G23	30.59R	WCI 13
AKRON	CLEAR	21	15	78	N24G35	30.53R	WCI 4
BURLINGTON	CLEAR	24	22	91	N31G38	30.44R	WCI 7
PUEBLO	PTCLDY	29	7	39	NW16	30.58R	WCI 17
LA JUNTA	PTCLDY	28	14	55	N26G35	30.56R	WCI 13
LAMAR	PTCLDY	29	17	61	N26G30	30.53R	WCI 14
SPRINGFIELD	N/A	27	14	58	NW37G52	30.42R	WCI 9

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1000 PM MST SAT FEB 9 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DENVER INTL AP	PTCLDY	22	5	48	NW10	30.60R	WCI 11
AURORA	NOT AVBL						
ENGLEWOOD	PTCLDY	23	0	36	NW16	30.58R	WCI 10
BROOMFIELD	PTCLDY	25	-2	30	N9	30.61R	WCI 15
LOVELAND	FAIR	30	7	37	NW16	30.62R	WCI 19
COLO. SPRINGS	CLEAR	23	4	44	NW23G35	30.53R	WCI 7
LIMON	CLEAR	20	15	81	N29G35	30.51R	WCI 1
MONUMENT HILL	FAIR	18	10	73	NW25G32	30.50R	WCI -1
TRINIDAD	PTCLDY	24	7	48	NW13	30.57R	WCI 12
GREELEY ARPT	FAIR	27	9	46	NW21	30.61R	WCI 13
AKRON	CLEAR	21	15	78	N26G35	30.55R	WCI 4
BURLINGTON	CLEAR	23	22	96	N28G43	30.47R	WCI 6
PUEBLO	PTCLDY	27	4	37	NW9	30.60R	WCI 18
LA JUNTA	PTCLDY	28	12	51	N24	30.58R	WCI 14
LAMAR	CLEAR	28	17	63	N26G36	30.55R	WCI 13
SPRINGFIELD	N/A	26	14	60	NW40G48	30.43R	WCI 7

2.3 Meteorological Analysis Of The February 25, 2002, Blowing Dust Event And PM10 Exceedance At Alamosa, Colorado.

On Friday February 25, 2002, Alamosa recorded an exceedance of the twenty-four-hour PM10 standard with a reading of 182 ug/m³. A weak surface low-pressure system moved through south-central Colorado on February 25. A cold air mass moving into eastern Colorado and the Great Plains brought gusty winds and some snow to these areas. The surface weather map for 12Z February 25 (5 AM MST) in Figure 1 shows a storm system with a central pressure of 1015 millibars (mb) over the Alamosa area. This is not the typical surface weather scenario for blowing dust in southern and southeastern Colorado identified in the *Natural Events Action Plan for High Wind Events – Lamar*. Figure 2 shows the 700 mb features for 12Z February 25. Moderate winds of 15 to 35 knots were present in the region with a zone of 40-knot winds and tighter height gradients entering western Colorado. These mid-level winds could be expected to generate gusty conditions along the slopes of the higher terrain bordering the San Luis Valley.

Sustained winds and gusts in Colorado exceeded blowing dust criteria in some areas of western, southwestern, and southern Colorado. A few sites showed wind speeds in excess of 30 miles per hour (mph) and/or gusts in excess of 40 mph. These are the speed and gust thresholds for blowing dust that apply in southeastern Colorado when surface soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Table 1 below lists wind speeds and gusts for Alamosa on February 25. The 30 mph blowing dust threshold applies to hourly average winds. Wind speed observations at stations like Alamosa are made just prior to the reported hour of observation. In most cases, these recorded speeds are not hourly average speeds but represent a several-minute average. If these spot observations show that speeds are above the 30 mph threshold for successive hours, then it can be reasonably assumed that hourly average winds are also above 30 mph. During the afternoon of February 25, moderately strong winds at Alamosa were close to the blowing dust thresholds but never exceeded these thresholds.

Wind data from Bureau of Land Management RAWS stations surrounding the San Luis Valley are presented in Tables 2, 3 and 4. A map showing the locations of these stations is presented in Figure 3. Winds gusted at or above blowing dust criteria levels at each of these RAWS sites. Blue Park recorded gusts of 40 to 46 mph from the west to northwest for several hours. These winds were blowing toward Alamosa. These data suggest that conditions were favorable for blowing dust in and around the San Luis Valley.

Moderate winds were the norm across much of Colorado on February 25, 2002. Some stations recorded stronger winds of 29 to 56 mph with gust of 40 to 66 mph for much of the day. Monarch Pass, which is northwest of Alamosa, measured gusts of 41 to 66 mph for most of the day. Montrose, Wolf Creek Pass, the Air Force Academy, Copper Mountain, and Durango each recorded isolated gusts of 40 to 47 mph. Detailed weather observations for the windier sites in Colorado on February 25 have been included in Attachment A. Reports of haze at Alamosa and La Veta Pass are consistent with blowing dust under these conditions (see Table 1 and Attachment A).

Figure 4(a) shows the January 2002 precipitation for Lamar, Alamosa, Saguache, Salida, and Pueblo. Figure 4(b) shows the February 1 through 24, 2002, precipitation at these stations. Precipitation amounts were low everywhere, especially at Saguache which received a total of 0.13 inches from January 1 through February 25. Cumulative precipitation at Saguache is probably indicative of soil moisture conditions in the San Luis Valley upwind of Alamosa on

February 25. No precipitation fell on Alamosa and Salida on February 25, while 0.01 inches fell on Saguache on that day.

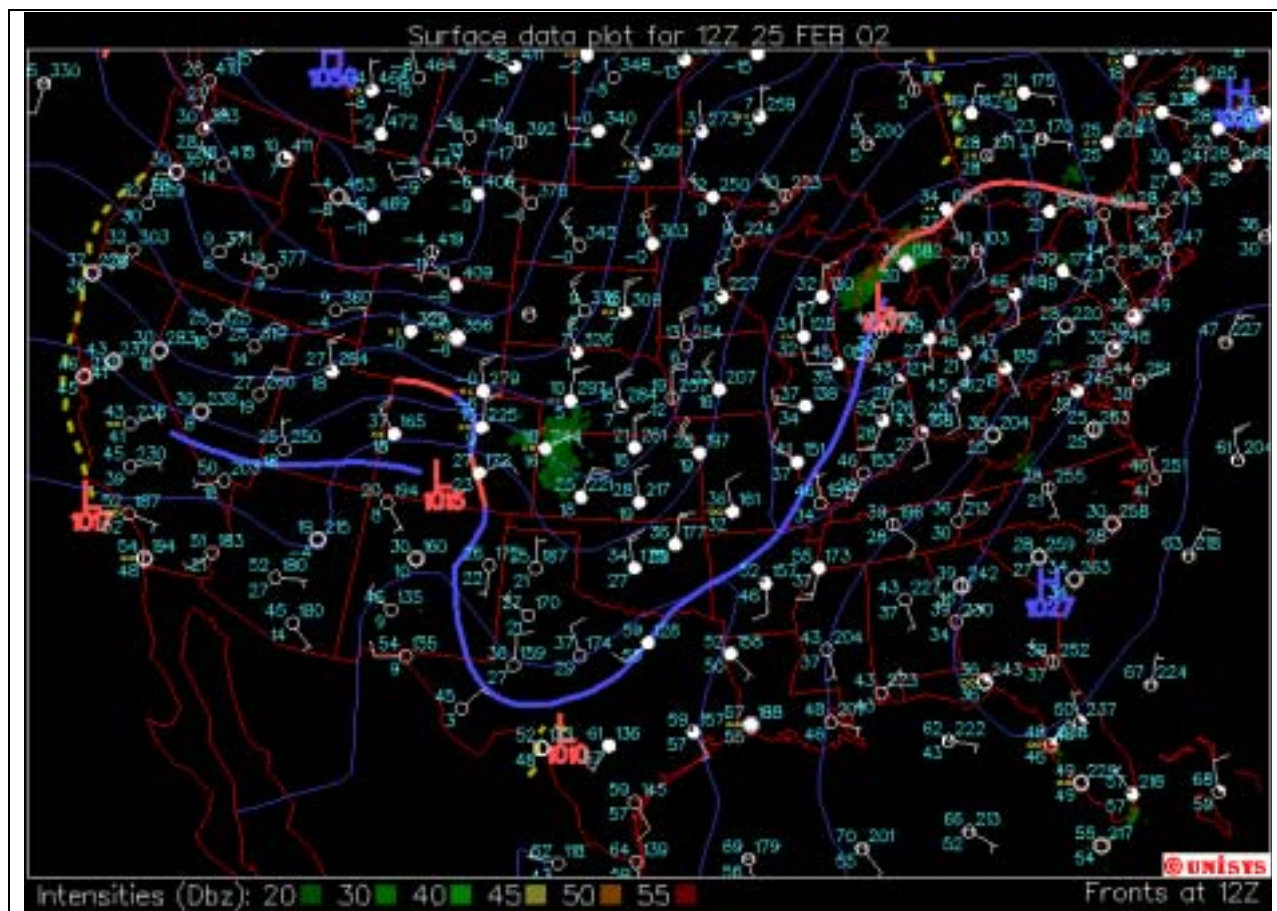


Figure 1. Surface weather map for 12Z February 25, 2002, or **5 AM MST February 25, 2002**.

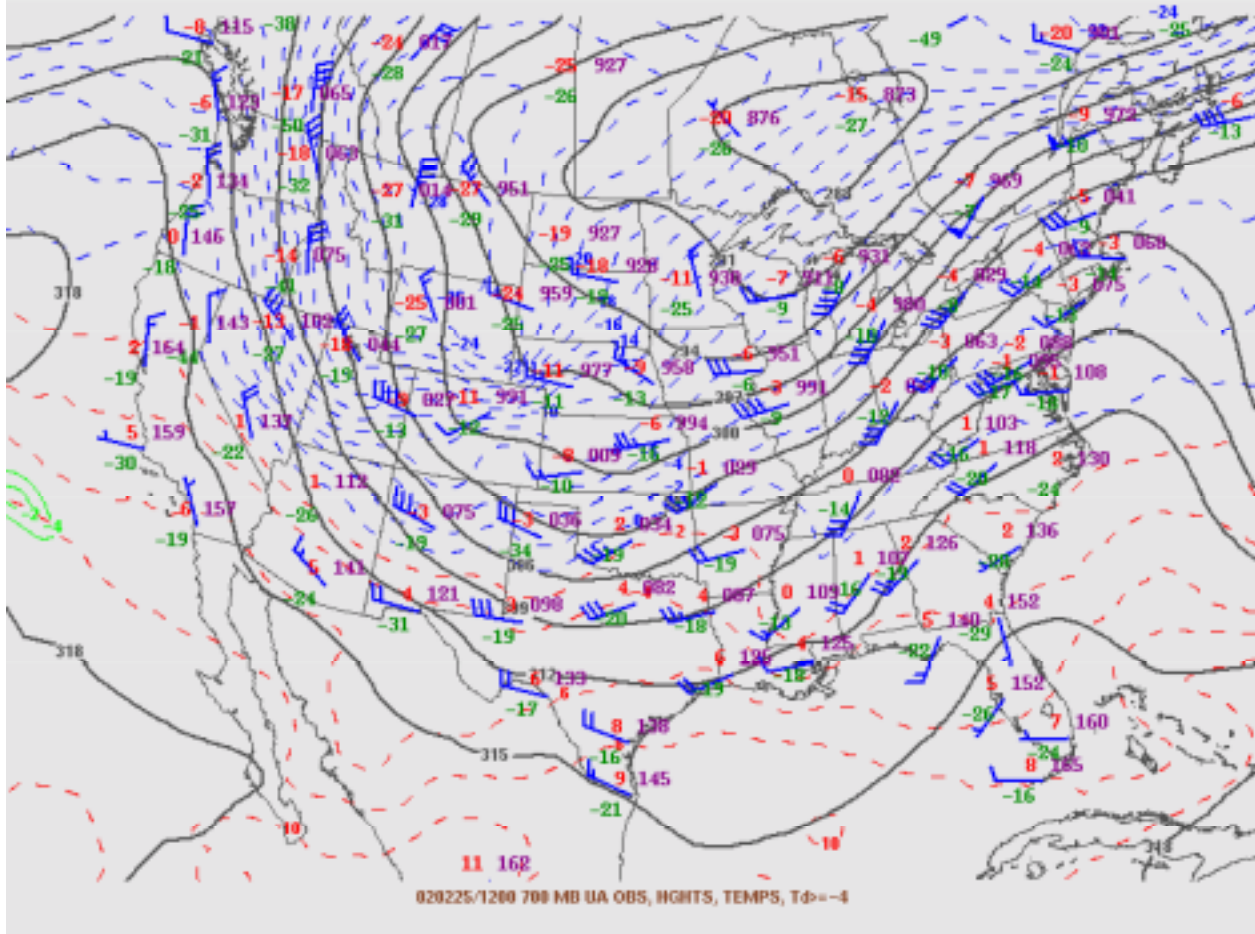


Figure 2. 700-millibar (approximately 10,000 feet above sea level) weather map for 12Z February 25, 2002, or **5 AM MST February 25, 2002**.

Table 1. Wind observations for Alamosa reported by the National Weather Service on February 25, 2002.

Mountain Standard Time	Weather	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Remarks
12:00 PM	Cloudy	Northerly	25	33	HAZE
1:00 PM	Partly Sunny	Northerly	29	36	HAZE
2:00 PM	Cloudy	Northerly	26	35	HAZE
3:00 PM	Partly Sunny	Northerly	24	36	HAZE
4:00 PM	Mostly Sunny	Northerly	22	29	
5:00 PM	Mostly Cloudy	Northerly	24	35	

Table 2. Wind observations for the Big Horn RAWS station on February 25, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:54	3	201	26	35	68	9
1:54	12	262	27	33	243	29
2:54	6	249	26	35	228	28
3:54	7	238	25	39	237	16
4:54	5	303	25	35	231	18
5:54	8	260	26	36	238	27
6:54	9	254	25	42	215	28
7:54	15	237	27	42	240	32
8:54	15	261	29	36	257	29
9:54	14	269	31	32	246	38
10:54	16	261	33	27	276	37
11:54	16	248	34	26	223	42
12:54	21	259	33	20	258	37
13:54	14	253	35	18	258	33
14:54	15	263	35	16	278	31
15:54	19	239	33	18	253	33
16:54	17	240	31	14	256	31
17:54	10	239	27	15	232	29
18:54	5	236	25	16	240	19
19:54	13	241	23	20	257	25
20:54	3	292	21	23	248	27
21:54	7	321	19	23	318	18
22:54	5	333	19	19	335	17
23:54	6	349	19	16	0	22

Table 3. Wind observations for the Blue Park RAWS station on February 25, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:55	5	286	16	33	261	11
1:55	5	301	16	30	260	12
2:55	5	316	16	31	314	14
3:55	4	314	16	31	299	11
4:55	9	261	18	24	251	22
5:55	13	299	18	38	302	37
6:55	19	307	18	27	323	39
7:55	14	308	16	42	323	36
8:55	14	280	18	33	312	34
9:55	15	294	18	22	306	42
10:55	16	294	17	17	303	34
11:55	14	277	18	16	298	31
12:55	16	299	19	7	283	40
13:55	19	303	19	4	313	46
14:55	17	310	20	4	313	41
15:55	14	287	22	4	313	34
16:55	13	274	20	4	318	36
17:55	14	278	16	4	310	34
18:55	15	299	15	4	274	31
19:55	12	287	14	4	303	32
20:55	11	295	13	4	283	29
21:55	13	292	13	5	338	33
22:55	14	289	11	8	306	35
23:55	15	286	10	8	266	40

Table 4. Wind observations for the Willis Creek RAWS station on February 25, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:55	5	286	16	33	261	11
1:55	5	301	16	30	260	12
2:55	5	316	16	31	314	14
3:55	4	314	16	31	299	11
4:55	9	261	18	24	251	22
5:55	13	299	18	38	302	37
6:55	19	307	18	27	323	39
7:55	14	308	16	42	323	36
8:55	14	280	18	33	312	34
9:55	15	294	18	22	306	42
10:55	16	294	17	17	303	34
11:55	14	277	18	16	298	31
12:55	16	299	19	7	283	40
13:55	19	303	19	4	313	46
14:55	17	310	20	4	313	41
15:55	14	287	22	4	313	34
16:55	13	274	20	4	318	36
17:55	14	278	16	4	310	34
18:55	15	299	15	4	274	31
19:55	12	287	14	4	303	32
20:55	11	295	13	4	283	29
21:55	13	292	13	5	338	33
22:55	14	289	11	8	306	35
23:55	15	286	10	8	266	40

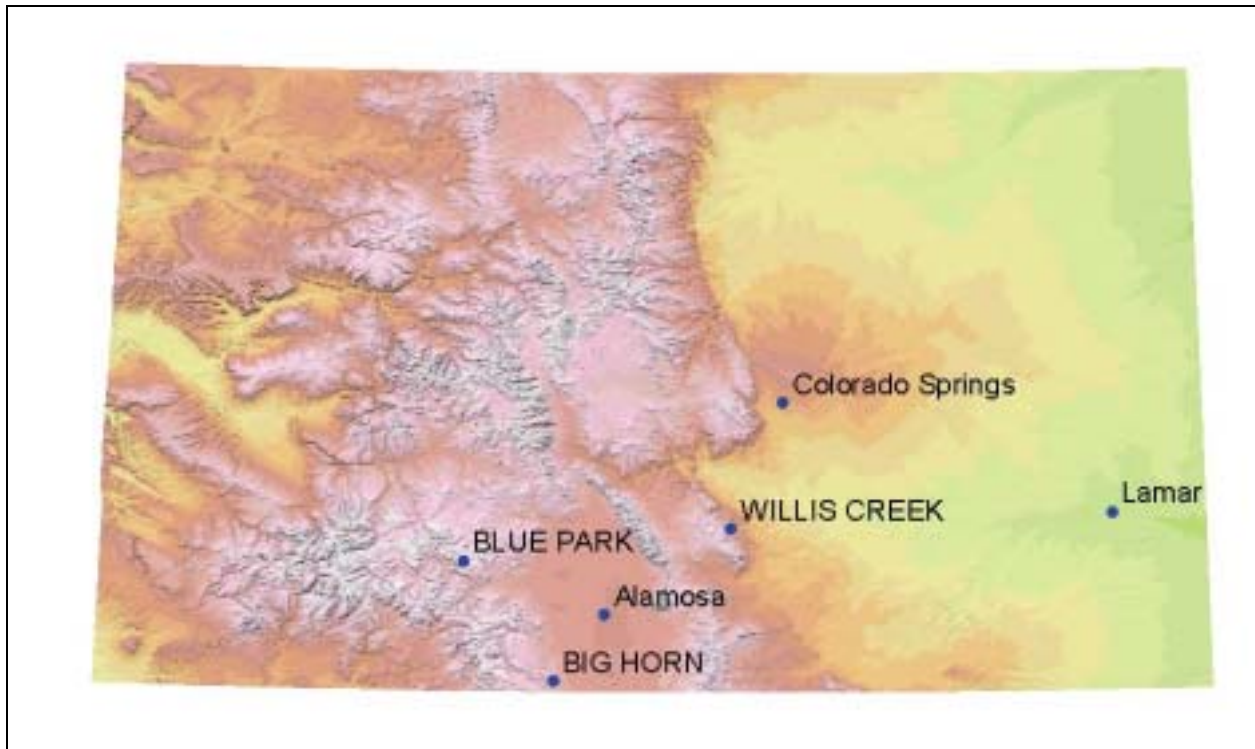
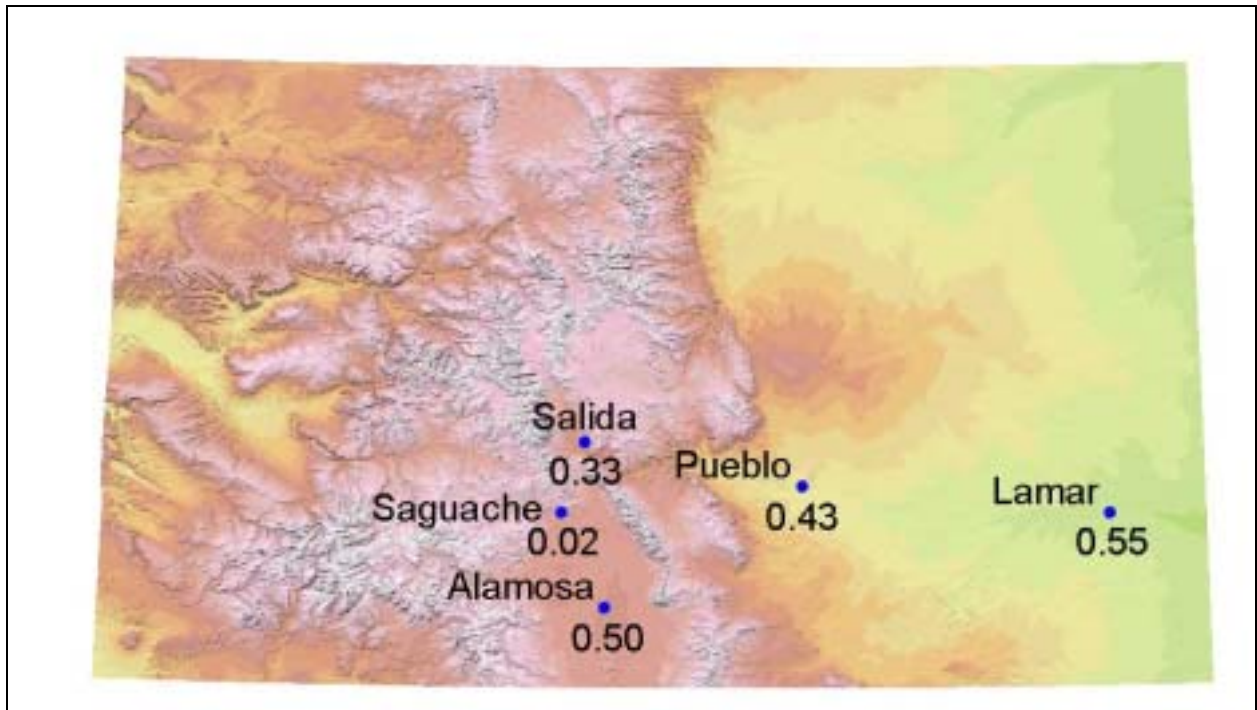


Figure 3. Locations of RAWS meteorological stations nearest to Alamosa (RAWS station names are listed in all-capital letters).

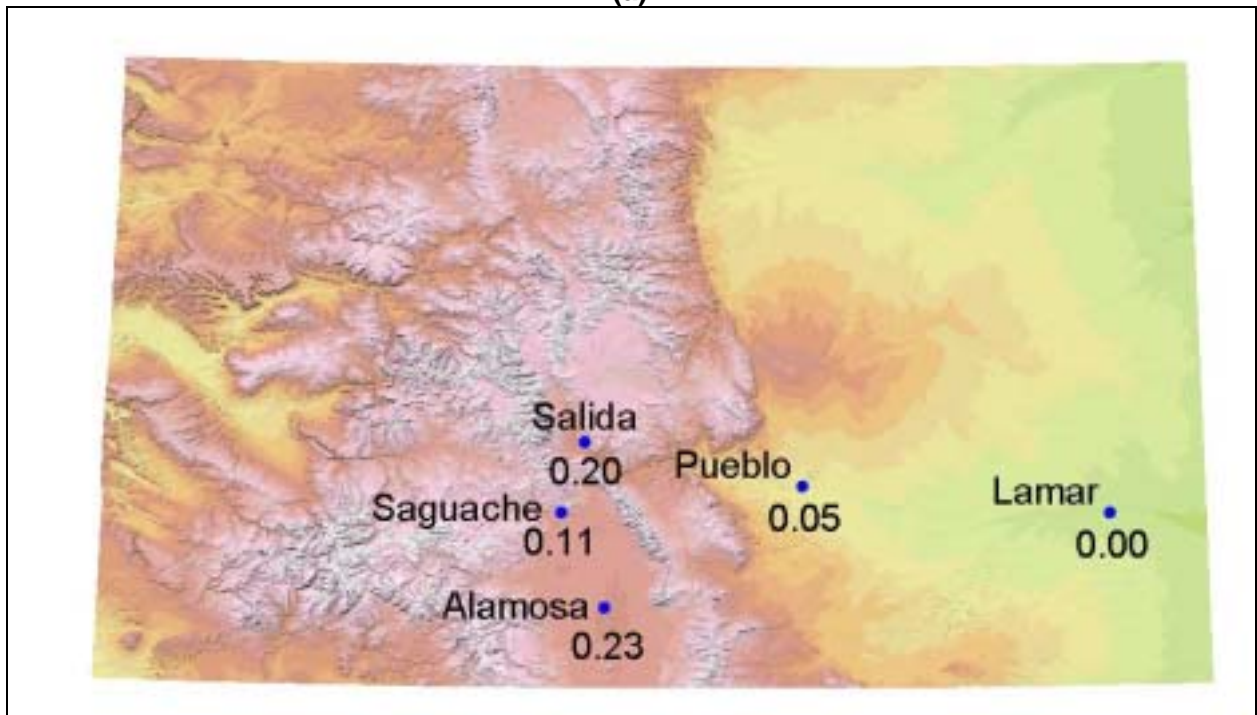
Figure 5 shows that the U.S. Drought Monitor had declared that a moderate drought was underway in most of Colorado including the area around Alamosa. This designation was made on February 26 and was representative of conditions in place on February 25.

Reference

Colorado Department of Public Health and Environment, City of Lamar, Prowers County Commissioners, *Natural Events Action Plan for High Wind Events – Lamar, Colorado*, April 1998.



(a)



(b)

Figure 4(a) Total precipitation in inches of water for January 2002, and (b) February 1- 24, 2002.

U.S. Drought Monitor

February 26, 2002

Valid 8 a.m. EST

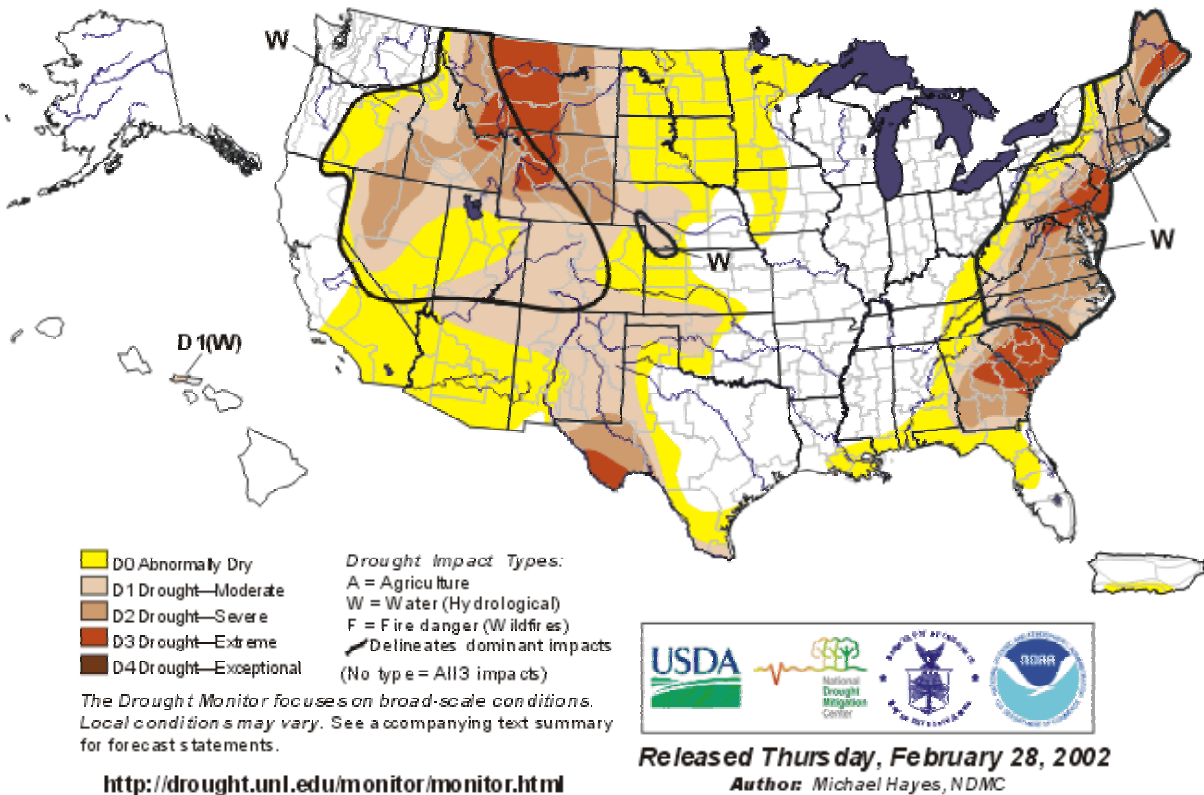


Figure 5. Drought status for the United States on February 26, 2002 (source: the USDA, NOAA, and the National Drought Mitigation Center at: <http://drought.unl.edu/monitor/monitor.html>, released on February 28, 2002).

Attachment C
Colorado Surface Weather Observations for February
25, 2002, Reported by the National Weather Service

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 100 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
LEADVILLE	BLWGSNOW	19	6	57	W16G31	29.91F	WCI 4
MONARCH PASS	HVY SNOW	12	9	85	NW32G45	29.98F	VSB066-250900-
ALAMOSA	CLEAR	19	17	92	W5	30.02S	WCI 12
LA VETA PASS	FAIR	18	18	100	W18G25	29.97S	WCI 2

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 200 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	LGT SNOW	10	9	92	NW36G45	29.97F	VSB 3/4 WCI -13
ALAMOSA	CLEAR	20	18	92	VRB6	30.02S	WCI 12
LA VETA PASS	FAIR	19	16	86	W26G32	29.95F	WCI 1

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 300 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	SNOW	10	7	85	S33G41	29.92F	VSB 1/2 WCI -13
ALAMOSA	PTCLDY	17	15	92	SW3	29.99F	
LA VETA PASS	FAIR	18	16	93	W25G31	29.93F	WCI -1

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 400 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	SNOW	10	7	85	W36G51	29.92F	VSB 1/2 WCI -13
ALAMOSA	CLEAR	15	12	88	S5	29.97F	WCI 8
LA VETA PASS	FAIR	16	16	100	SW23G31	29.92S	WCI -2

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 500 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
EAGLE	MOCLDY	32	16	51	W25G33	29.99R	WCI 19
RIFLE	CLOUDY	29	20	69	NW28G37	30.05R	WCI 14
GUNNISON	CLOUDY	34	12	40	W17G31	29.95R	WCI 23
LEADVILLE	SNOW	15	10	80	NW22G30	29.87R	VSB 1/2 WCI -3
MONARCH PASS	LGT SNOW	9	5	85	SW43G56	29.88F	VSB 3/4 WCI -17
ALAMOSA	CLEAR	13	9	84	SE6	29.96F	WCI 4
LA VETA PASS	FAIR	16	16	100	SW22G29	29.92F	WCI -2
LOVELAND	CLOUDY	10	1	67	N25G31	30.19R	VSB 3/4 WCI -10
GREELEY ARPT	CLOUDY	9	3	78	N23G30	30.20R	VSB 1 WCI -12

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 600 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	MOCLDY	34	10	37	NW26G33	30.12R	WCI 21
MONTROSE	MOCLDY	37	14	38	W25G32	30.06R	
WOLF CREEK PAS	CLOUDY	9	9	100	W31G38	29.94S	WCI -14
ASPEN	HVY SNOW	19	17	92	N21G31	30.01R	VSB 1/4 WCI 3
GUNNISON	CLOUDY	27	19	74	W15G21	29.98R	VSB 1 WCI 15
MONARCH PASS	HVY SNOW	9	7	92	SW40G56	29.89R	VSB 1/4 WCI -17
ALAMOSA	PTCLDY	16	9	74	SW6	29.95F	WCI 7
LA VETA PASS	CLOUDY	16	16	100	W17G28	29.91F	WCI 0
DENVER INTL AP	SNOW	6	3	87	N23G36	30.19R	VSB 1/2 WCI -15
AURORA	SNOW	9	9	100	N24G37	30.16R	VSB 1/2 WCI -12
ENGLEWOOD	HVY SNOW	9	7	92	N23G30	30.14R	VSB 1/4 WCI -11
A. F. ACADEMY	FLURRIES	16	10	79	N24G30	30.01R	WCI -3

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 700 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	PTCLDY	30	-2	25	NW31G37	30.19R	WCI 15
MONTROSE	CLOUDY	30	15	53	NW29G40	30.16R	WCI 15
MONARCH PASS	HVY SNOW	9	5	85	SW47G58	29.90S	VSB066-251500-
ALAMOSA	CLOUDY	20	13	74	N10	29.97R	WCI 9
LA VETA PASS	CLOUDY	18	12	79	SW20G28	29.92S	WCI 1
COLO. SPRINGS	LGT SNOW	16	7	67	N28G38	30.04R	WCI -4
A. F. ACADEMY	BLWGSNOW	10	7	85	N30G37	30.08R	VSB 1/2 WCI -12
FORT CARSON	LGT SNOW	18	16	93	N29G38	30.05R	VSB 1 WCI -2

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 800 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONTROSE	PTSUNNY	28	3	34	NW21G35	30.23R	WCI 15
DURANGO	MOSUNNY	36	11	35	W31G45	30.07R	
MONARCH PASS	HVY SNOW	5	1	85	SW44G55	29.93R	VSB 1/4 WCI -23
ALAMOSA	PTSUNNY	21	16	81	CALM	30.00R	
LA VETA PASS	PTSUNNY	18	16	93	W8	29.96R	WCI 7
DENVER INTL AP	LGT SNOW	3	-1	83	N18G30	30.30R	VSB 3/4 WCI -17
COLO. SPRINGS	CLOUDY	11	1	64	N24G31	30.12R	WCI -9
A. F. ACADEMY	SNOWSHWR	7	1	78	N28G38	30.13R	VSB 1/4 WCI -16
FORT CARSON	LGT SNOW	12	10	92	N31G38	30.13R	FOG WCI -10
LIMON	LGT SNOW	10	4	76	N23G32	30.22R	WCI -10

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 900 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MEEKER	PTSUNNY	17	0	47	NW20G30	30.27R	WCI 1
MONTROSE	MOSUNNY	29	-2	26	NW28G31	30.27R	WCI 14
EAGLE	PTSUNNY	21	0	39	W29G36	30.21R	WCI 3
DURANGO	SUNNY	36	11	35	W21G32	30.09R	

CORTEZ	MOSUNNY	38	9	30	N20G36	30.24R			
MONARCH PASS	LGT SNOW	7	3	85	SW35G46	29.97R	VSB 3/4	WCI	-18
ALAMOSA	MOSUNNY	31	17	56	N3	30.01R			
LA VETA PASS	HVY SNOW	9	9	100	NE13G21	29.99R	VSB 1/4	WCI	-7
COLO. SPRINGS	LGT SNOW	8	1	73	N20G31	30.17R		WCI	-11
A. F. ACADEMY	FLURRIES	5	-2	72	N25G31	30.15R		WCI	-18
FORT CARSON	LGT SNOW	10	7	85	N29G39	30.17R	FOG	WCI	-11
LIMON	LGT SNOW	7	2	80	N24G33	30.25R		WCI	-14
GREELEY ARPT	CLOUDY	7	0	72	N24G30	30.37R		WCI	-15
BURLINGTON	HVY SNOW	10	7	87	N23G31	30.29R	VSB 1/4	WCI	-10

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1000 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	SUNNY	36	5	27	W22G36	30.13R	
CORTEZ	MOSUNNY	35	-5	18	NW25G30	30.28R	WCI 23
TELLURIDE	CLOUDY	16	0	48	NW20G36	30.18R	HAZE WCI -1
MONARCH PASS	LGT SNOW	3	0	85	SW43G51	30.00S	WCI -25
ALAMOSA	MOSUNNY	36	9	32	NW20G25	30.03R	
LA VETA PASS	SNOW	3	3	100	NE12	30.01S	VSB 1/2 WCI -13
COLO. SPRINGS	PTSUNNY	11	0	61	N26G32	30.19R	WCI -10
A. F. ACADEMY	FLURRIES	5	-4	66	N30G40	30.17R	WCI -19
LIMON	LGT SNOW	6	0	76	N24G32	30.29R	WCI -16
BURLINGTON	FOG	8	5	87	N29G32	30.32R	VSB 1/4 WCI -15
LA JUNTA	SNOW	18	14	84	NE31G36	30.31R	VSB 1/2 WCI -2

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1100 AM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	SUNNY	37	1	22	SW29G36	30.15R	
WOLF CREEK PAS	FAIR	19	10	68	NW29G43	30.02R	WCI 1
ASPEN	LGT SNOW	16	7	67	N16G32	30.18R	WCI 1
COPPER MTN	CLOUDY	-6	-9	84	NW17G36	29.93R	WCI -28
ALAMOSA	MOSUNNY	35	6	29	N21G29	30.04R	WCI 24
LA VETA PASS	SNOW	3	3	100	E8	30.03S	VSB 1/2 WCI -10
A. F. ACADEMY	MOSUNNY	5	-4	66	N32G38	30.18R	WCI -20
AKRON	BLWGSNOW	7	0	73	N25G30	30.37R	WCI -15
BURLINGTON	BLWGSNOW	9	4	80	N23G30	30.36R	VSB 3/4 WCI -11
SPRINGFIELD	N/A	18	14	84	N29G36	30.26R	WCI -1

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1200 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
EAGLE	FAIR	21	-2	35	W20G30	30.28S	WCI 6
DURANGO	FAIR	39	3	22	W25G37	30.15S	
LEADVILLE	SNOW	7	-2	66	W24G33	30.05R	VSB 1/2 WCI -14
MONARCH PASS	PTSUNNY	1	-2	85	SW56G66	30.01F	FOG WCI -30
ALAMOSA	CLOUDY	33	3	28	N25G33	30.05R	HAZE WCI 20
LA VETA PASS	LGT SNOW	3	3	100	E3	30.01F	VSB 3/4
LIMON	BLWGSNOW	8	0	69	N23G30	30.32R	WCI -13
SPRINGFIELD	N/A	20	13	74	N22G31	30.26S	WCI 3

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 100 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
EAGLE	MOSUNNY	23	0	36	W20G30	30.27F	WCI 8
COPPER MTN	HVY SNOW	-6	-9	84	NW22G33	29.91F	VSB 1/4 WCI -31
LEADVILLE	LGT SNOW	6	-5	60	W22G31	30.04F	WCI -15
MONARCH PASS	PTSUNNY	1	-2	85	W47G59	30.02S	WCI -29
ALAMOSA	PTSUNNY	34	-3	20	N29G36	30.05S	HAZE WCI 20
LA VETA PASS	LGT SNOW	10	10	100	W16G24	30.01S	WCI -7
SPRINGFIELD	N/A	17	10	74	N23G30	30.29R	WCI -1

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 200 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	SUNNY	40	-11	11	W28G37	30.13F	
COPPER MTN	HVY SNOW	-6	-11	77	NW32G47	29.89F	VSB 1/4 WCI -35
LEADVILLE	BLWGSNOW	8	-3	61	W22G33	30.04S	VSB 3/4 WCI -12
MONARCH PASS	FAIR	1	-2	85	W49G60	30.03S	WCI -29
ALAMOSA	CLOUDY	33	-8	17	N26G35	30.07R	HAZE WCI 20
LA VETA PASS	FAIR	23	9	54	W24G35	29.98F	HAZE WCI 7
LIMON	PTSUNNY	11	2	67	N23G30	30.30F	WCI -9
AKRON	PTSUNNY	10	-1	61	N23G31	30.38S	WCI -10
SPRINGFIELD	N/A	15	6	67	N23G31	30.29S	WCI -3

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 300 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	SUNNY	40	-8	13	W26G37	30.13S	
COPPER MTN	HVY SNOW	-6	-11	77	W20G41	29.91R	VSB 1/4 WCI -29
LEADVILLE	BLWGSNOW	7	-8	50	W25G35	30.04S	WCI -15
MONARCH PASS	FAIR	3	-8	60	W53G59	30.01F	WCI -27
ALAMOSA	PTSUNNY	33	-7	17	N24G36	30.07S	HAZE WCI 20
LA VETA PASS	FAIR	21	9	58	W23G36	30.00R	WCI 5
GREELEY ARPT	CLOUDY	12	1	62	N7	30.37R	WCI 2
AKRON	CLOUDY	11	-1	58	N28G31	30.38S	WCI -10
BURLINGTON	MOSUNNY	11	0	61	N26	30.35F	WCI -10

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 400 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
EAGLE	SUNNY	25	-6	26	W20G30	30.27R	WCI 11
DURANGO	SUNNY	39	-6	14	W28G35	30.15R	
WOLF CREEK PAS	FAIR	21	10	63	SW20G31	30.08F	WCI 6
COPPER MTN	LGT SNOW	-6	-13	71	W25G35	29.90F	VSB 1 WCI -32
LEADVILLE	BLWGSNOW	7	-9	48	W24G35	30.04S	WCI -14
MONARCH PASS	FAIR	3	-13	47	W52G61	30.02F	WCI -27
ALAMOSA	MOSUNNY	34	-10	15	N22G29	30.08R	WCI 22
LA VETA PASS	FAIR	18	5	57	W21G36	30.01S	WCI 1

AKRON	CLOUDY	10	-1	61	N25G32	30.38S	WCI	-11
BURLINGTON	MOSUNNY	11	1	64	N23G32	30.35S	WCI	-9

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 500 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	SUNNY	37	-4	17	W21G37	30.17R	
COPPER MTN	SNOW	-6	-17	59	W26G41	29.89F	VSB 1/2 WCI -32
MONARCH PASS	FAIR	3	-11	51	SW40G47	30.06R	WCI -24
ALAMOSA	MOCLDY	31	-14	13	N24G35	30.09R	WCI 17
LA VETA PASS	FAIR	16	1	53	W26G39	30.03R	WCI -3

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 600 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	FAIR	16	7	67	SW18G30	30.10S	WCI -1
MONARCH PASS	FAIR	0	-9	65	SW31G41	30.06R	WCI -27
ALAMOSA	CLEAR	25	-10	21	N23	30.10R	WCI 10
LA VETA PASS	FAIR	12	0	57	NW25G33	30.05R	WCI -8

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 700 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	FAIR	0	-9	65	SW43G49	30.04F	WCI -30
ALAMOSA	CLEAR	22	-8	26	N18G23	30.11R	WCI 7
LA VETA PASS	FAIR	12	-2	52	NW17G23	30.05S	WCI -5

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 800 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	CLEAR	30	-8	19	W23G31	30.21F	WCI 17
MONARCH PASS	FAIR	-2	-11	65	W37G44	30.05R	WCI -31
ALAMOSA	CLEAR	20	-7	30	VRB5	30.14R	WCI 13
LA VETA PASS	FAIR	10	-2	56	NW21G29	30.05S	WCI -9

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 900 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MEEKER	PTCLDY	17	-8	32	NW26G35	30.34R	WCI -2
COPPER MTN	SNOW	-8	-11	84	NW21G30	29.93S	VSB 1/2 WCI -32
MONARCH PASS	FAIR	0	-11	60	W41G52	30.05F	WCI -30
ALAMOSA	CLEAR	17	-5	37	CALM	30.17R	
LA VETA PASS	FAIR	9	-2	61	NW17G26	30.05S	WCI -10
AKRON	CLOUDY	5	-7	57	N25G30	30.43R	WCI -18

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1000 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	FAIR	3	3	100	SW24G30	30.08S	WCI -20
COPPER MTN	SNOW	-8	-13	77	W20G36	29.94R	VSB 1/2 WCI -32
MONARCH PASS	CLOUDY	0	-9	65	W38G51	30.04S	WCI -29
ALAMOSA	CLEAR	15	-4	42	CALM	30.16F	
LA VETA PASS	FAIR	9	-2	61	NW15G20	30.06F	WCI -8

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1100 PM MST MON FEB 25 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
COPPER MTN	LGT SNOW	-11	-17	77	W22G38	29.93S	VSB 1 WCI -38
ALAMOSA	CLEAR	12	0	58	CALM	30.15F	
LA VETA PASS	FAIR	9	-2	61	NW22G30	30.04F	WCI -11

2.4 Meteorological Analysis Of The March 7, 2002, Blowing Dust/Wildfire Smoke Event And PM10 Exceedance At Lamar.

On Thursday March 7, 2002, Lamar recorded an exceedance of the twenty-four-hour PM10 standard with a reading of 246 ug/m³. This report addresses the conditions conducive to blowing dust but not the wildfire on the same day. A stationary cold front followed a northwest to southeast line across the eastern plains running between La Junta and Pueblo at 5:00 AM on March 7. A surface low-pressure developed in northeast Colorado later in the day. It is apparent from regional data that strong winds developed over dry surface soils in many areas of eastern and southern Colorado. The surface weather map for 12Z March 7 (5 AM MST) in Figure 1(a) shows the location of the stationary front. Figure 1(b) shows surface weather conditions for 5:00 PM MST. Notice that a surface low-pressure system with a central pressure of 998 millibars (mb) had developed in northeastern Colorado. The central pressure of the storm is significant since storms of about 1000 mb or lower were identified as a typical precondition for significant blowing dust in eastern Colorado when soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document).

Sustained winds and gusts in eastern and southern Colorado exceeded blowing dust criteria. Many sites showed wind speeds in excess of 30 miles per hour (mph) and gusts in excess of 40 mph. These are the speed and gust thresholds for significant blowing dust that apply in southeastern Colorado when surface soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Table 1 below lists wind speeds and gusts for Lamar, Colorado on March 7. The 30 mph blowing dust threshold applies to hourly average winds. Wind speed observations at stations like Lamar are made just prior to the reported hour of observation. In most cases, these recorded speeds are not hourly average speeds but represent a several-minute average. If these spot observations show that speeds are above the 30 mph threshold for successive hours, then it can be reasonably assumed that hourly average winds are also above 30 mph. Winds or wind gusts at Lamar were above the blowing dust thresholds for seven consecutive hours on March 7, and gusts were as high as 48 mph. These strong winds started around noon as the stationary front moved to the north of Lamar.

High winds were common across eastern and southern Colorado on March 7, 2002. Many stations recorded winds of 30 to 53 mph with gust of 40 to 64 mph for much of the day. The Air Force Academy, for example, measured wind gusts to 52 mph. Trinidad recorded gusts as high as 51 mph. La Junta measured a gust of 54 mph, and Pueblo recorded a gust of 45 mph. Detailed weather observations for March 7 have been included in Attachment A.

Figure 2 shows the precipitation for southern and southeastern Colorado for (a) January, (b) February, and (c) March 1 through 7, 2002. Pueblo, Rocky Ford, and Lamar only received about a half of an inch of water during the entire period. From February 1 through March 7, Pueblo, Rocky Ford, and Lamar received 0.07, 0.16, and 0.01 inches, respectively. Figure 3 shows that the area around Lamar had been classified as abnormally dry to experiencing a moderate drought. Figure 4 shows that much of eastern Colorado received an inch or less of precipitation from December 2001 through February 2002.

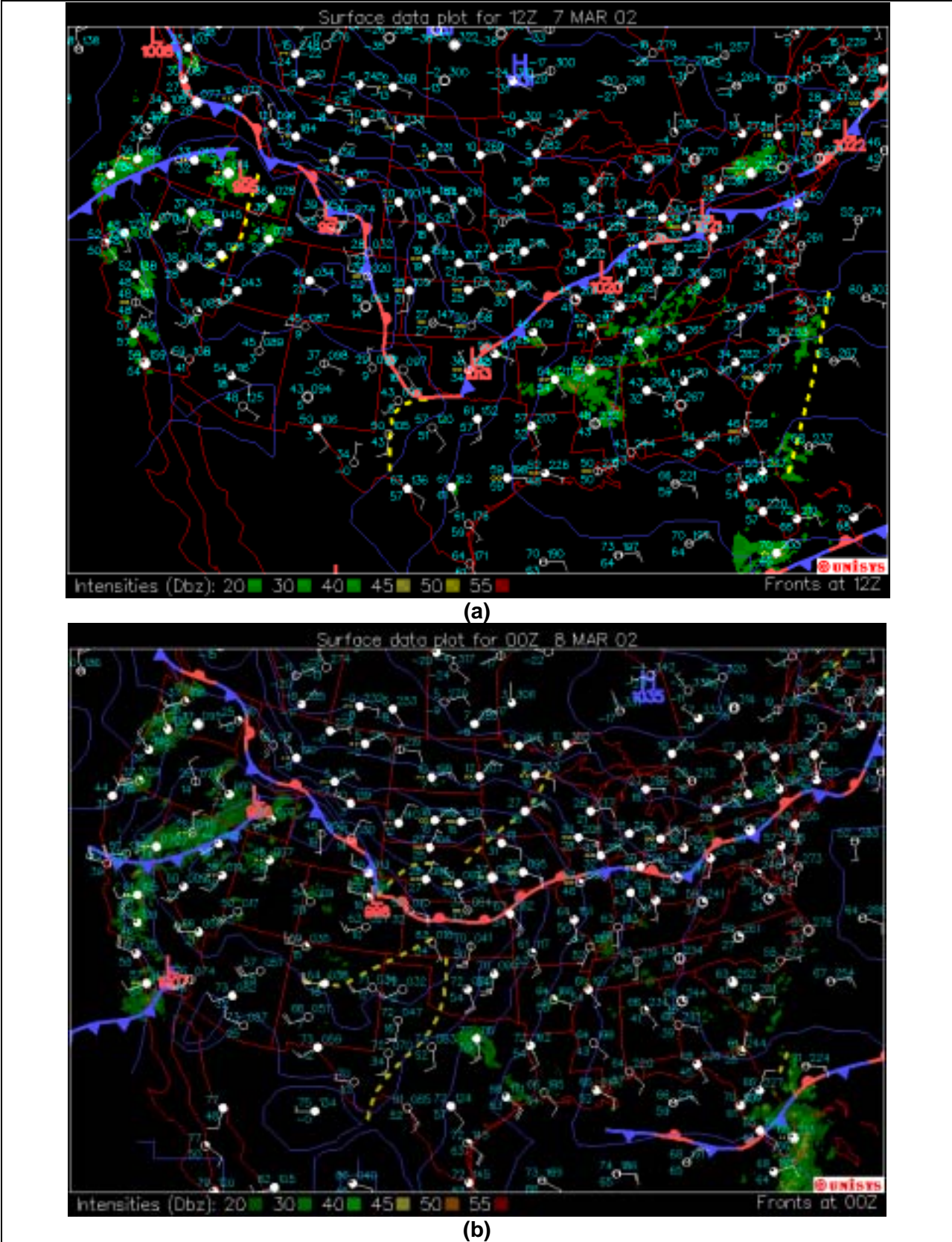


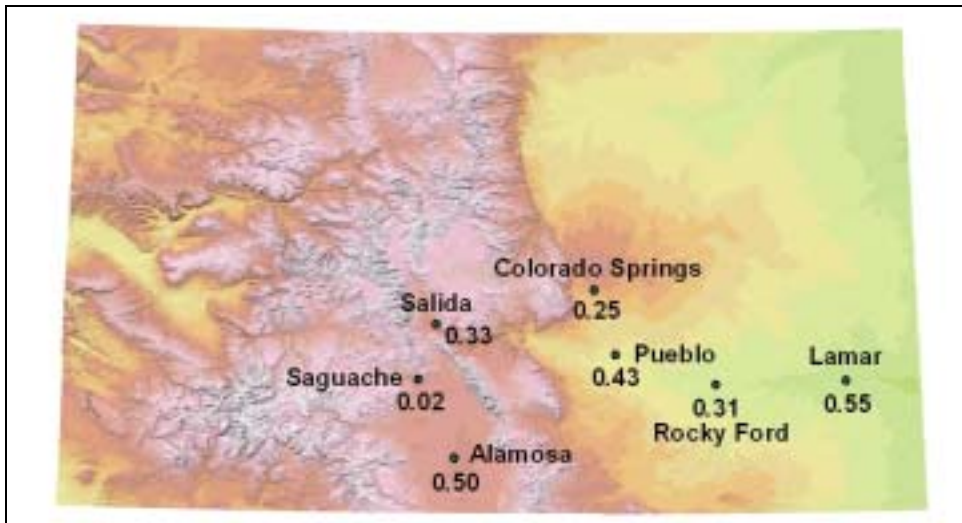
Figure 1. (a) Surface weather map for 12Z March 7 2002 or **5 AM MST March 7 2002**; (b) surface weather map for 0Z March 8 2002 or **5 PM MST March 7 2002**.

Table 1. Wind observations for Lamar, Colorado, reported by the National Weather Service on March 7, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

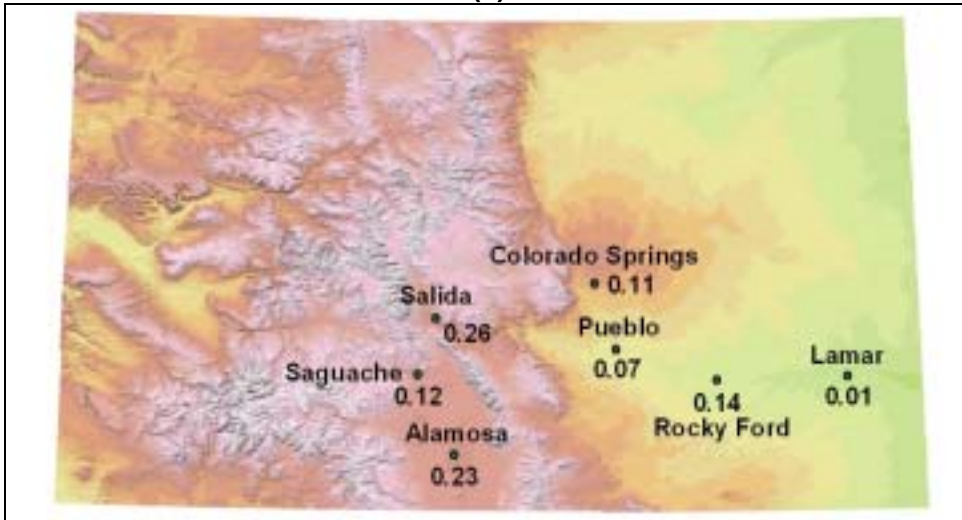
Mountain Standard Time	Weather	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Remarks
9:00 AM	Partly Sunny	Variable	5		
10:00 AM	Cloudy	Northwesterly	3		
11:00 AM	Partly Sunny	Westerly	6		
12:00 PM	Mostly Sunny	Westerly	26	40	
1:00 PM	Sunny	Westerly	38	48	
2:00 PM	Sunny	Westerly	36	46	
3:00 PM	Sunny	Westerly	32	41	
4:00 PM	Sunny	Westerly	35	48	
5:00 PM	Clear	Westerly	31	41	
6:00 PM	Clear	Westerly	29	40	
7:00 PM	Clear	Westerly	18		
8:00 PM	Clear	Westerly	7		
9:00 PM	Partly Cloudy	Southwesterly	10		
10:00 PM	Mostly Cloudy	Westerly	7		
11:00 PM	Fair	Calm	Calm	Calm	

Reference

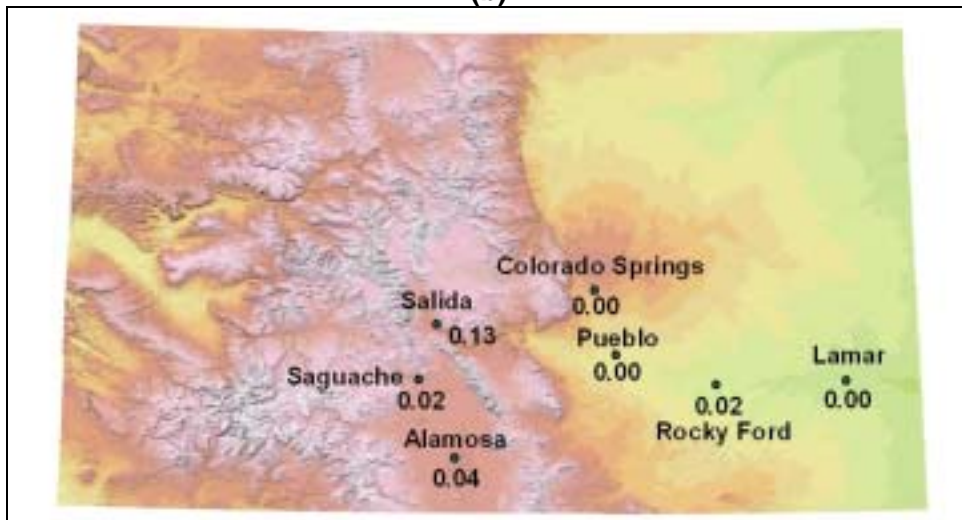
Colorado Department of Public Health and Environment, City of Lamar, Prowers County Commissioners, *Natural Events Action Plan for High Wind Events – Lamar, Colorado*, April 1998.



(a)



(b)



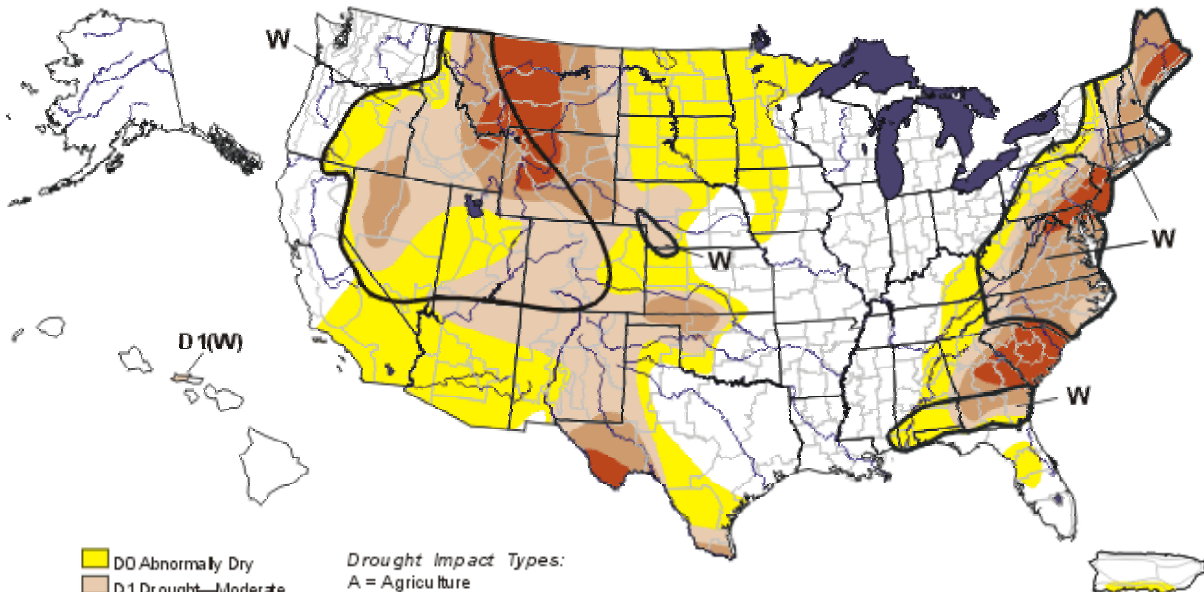
(c)

Figure 2. Total precipitation in inches of water: (a) January, (b) February, and (c) March 1 through 7 - 2002.

U.S. Drought Monitor

March 5, 2002

Valid 8 a.m. EST

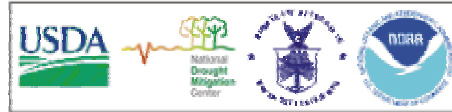


- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
— Delineates dominant impacts
(No type = All impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See a accompanying text summary for forecast statements.

<http://drought.unl.edu/monitor/monitor.html>



Released Thursday, March 7, 2002

Author: Douglas LeComte, NOAA/ICPC

Figure 3. Drought status for the United States on March 5, 2002, released on March 7 (source: the USDA, NOAA, and the National Drought Mitigation Center at: <http://drought.unl.edu/monitor/monitor.html>).

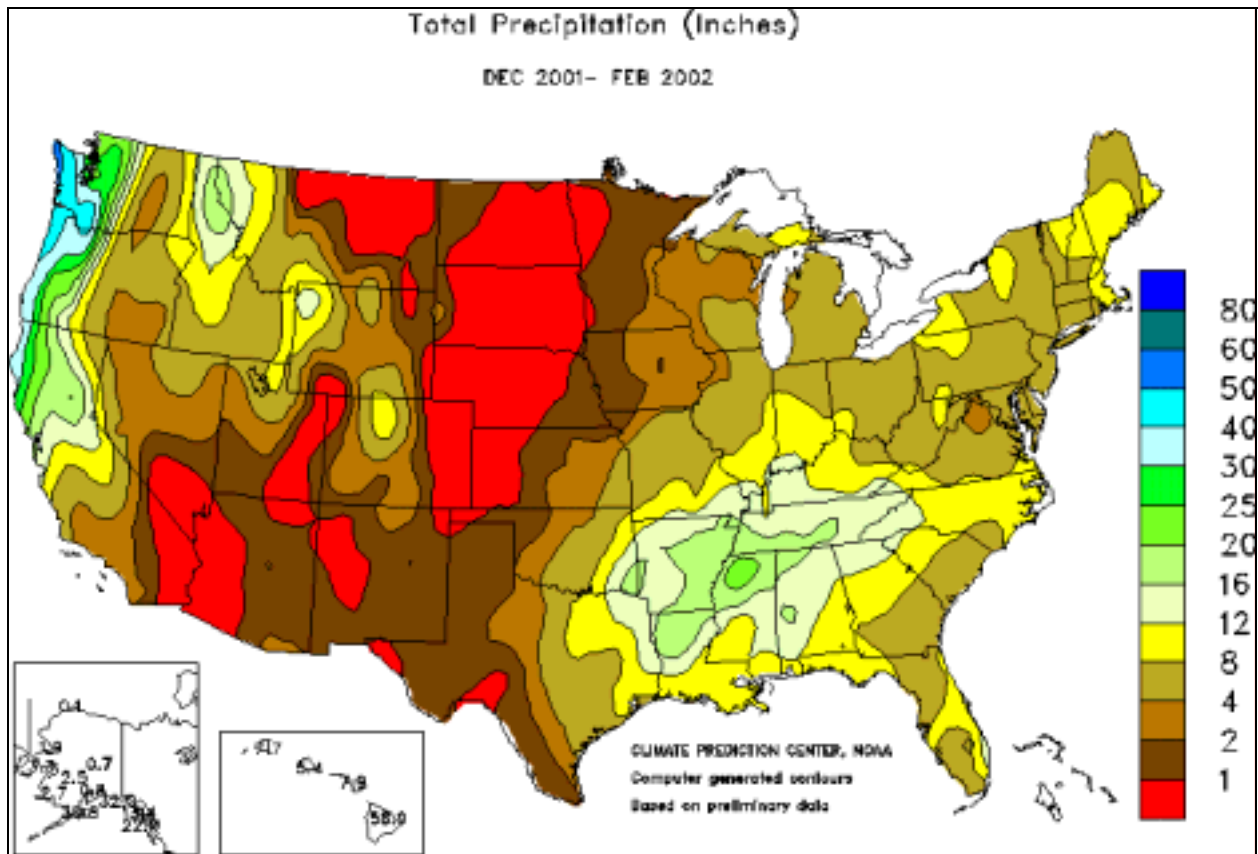


Figure 4. Seasonal precipitation totals (December 2001 through February 2002) for the United States, showing an inch or less of total precipitation in eastern Colorado.

Attachment D
Surface Weather Observations for March 7, 2002, for a
Selection of Colorado Stations Reported by the
National Weather Service

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 900 AM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
ALAMOSA	MOSUNNY	40	18	41	W25G32	29.88R	
LA VETA PASS	CLOUDY	27	16	63	SW26G39	29.87R	WCI 11
ENGLEWOOD	MOSUNNY	50	19	29	SW31G37	29.59F	
A. F. ACADEMY	MOSUNNY	50	16	25	W39G51	29.65F	
FORT CARSON	PTSUNNY	54	12	19	SW29G38	29.67F	
LIMON	PTSUNNY	30	23	75	S9	29.64F	WCI 22
BURLINGTON	CLOUDY	30	26	85	S17	29.68F	FOG WCI 18
PUEBLO	PTSUNNY	47	20	34	SW13	29.70F	
LA JUNTA	PTSUNNY	36	21	54	W8	29.71F	
LAMAR	PTSUNNY	33	24	69	VRB5	29.73S	WCI 29
SPRINGFIELD	N/A	62	6	11	SW26G32	29.69F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1000 AM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
CORTEZ	MOSUNNY	51	20	29	SW24G39	29.88F	
ALAMOSA	MOSUNNY	40	19	43	SW24G35	29.87F	
LA VETA PASS	CLOUDY	27	21	80	W25G32	29.87F	WCI 11
COLO. SPRINGS	MOSUNNY	54	12	18	W24G32	29.67F	
A. F. ACADEMY	MOSUNNY	50	16	25	W40G52	29.59F	
FORT CARSON	MOSUNNY	55	14	19	SW26G38	29.63F	
LIMON	PTSUNNY	43	24	47	CALM	29.63F	
MONUMENT HILL	FAIR	48	28	46	SW20G26	29.66F	
TRINIDAD	SUNNY	60	6	11	SW37G41	29.75	
GREELEY ARPT	FAIR	34	27	75	CALM	29.60S	
AKRON	PTSUNNY	38	23	55	NW10	29.63R	
BURLINGTON	PTSUNNY	36	25	64	S20	29.65F	
PUEBLO	SUNNY	59	16	18	SW36G43	29.70S	
LA JUNTA	MOSUNNY	57	19	22	SW16	29.68F	
LAMAR	CLOUDY	37	23	56	NW3	29.71F	
SPRINGFIELD	N/A	64	6	10	SW16G28	29.69S	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1100 AM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
CORTEZ	PTSUNNY	53	19	26	SW23G31	29.86F	
TELLURIDE	FAIR	34	12	40	SW9	29.87F	WCI 26
GUNNISON	MOSUNNY	43	16	33	SW18G36	29.79F	
ALAMOSA	MOSUNNY	41	23	48	SW30G36	29.87S	
LA VETA PASS	CLOUDY	27	25	93	SW30G41	29.85F	WCI 10
DENVER INTL AP	MOSUNNY	57	16	20	W25G38	29.56	
AURORA	MOSUNNY	57	12	17	SW17G24	29.56F	
ENGLEWOOD	MOSUNNY	56	17	21	SW26G37	29.58F	
BROOMFIELD	MOSUNNY	57	16	19	W25G40	29.57F	
COLO. SPRINGS	MOSUNNY	56	11	16	W24G38	29.65F	
A. F. ACADEMY	MOSUNNY	54	18	24	W33G47	29.59S	
FORT CARSON	MOSUNNY	57	16	19	W35G47	29.58F	
LIMON	PTSUNNY	61	15	16	W24G30	29.60F	

MONUMENT HILL	FAIR	48	28	46	W26G35	29.65F
TRINIDAD	SUNNY	58	12	16	SW38G51	29.79R
PUEBLO	SUNNY	58	21	24	SW36G45	29.67F
LA JUNTA	SUNNY	66	15	14	W32G45	29.67F
LAMAR	PTSUNNY	52	23	32	W6	29.68F
SPRINGFIELD	N/A	69	8	9	SW17G29	29.67F

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1200 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
ALAMOSA	MOSUNNY	47	18	31	SW30G40	29.84F	
LA VETA PASS	FAIR	30	27	86	SW36G52	29.82F	WCI 14
ENGLEWOOD	MOSUNNY	57	13	17	W22G35	29.55F	
BROOMFIELD	MOSUNNY	57	16	19	N17G29	29.55F	
COLO. SPRINGS	MOSUNNY	57	11	16	W24G32	29.63F	
A. F. ACADEMY	MOSUNNY	54	12	19	W37G49	29.59S	
FORT CARSON	MOSUNNY	59	14	17	SW36G52	29.60R	
LIMON	SUNNY	61	13	15	W25G39	29.59F	
MONUMENT HILL	FAIR	52	30	43	W29G37	29.62F	
TRINIDAD	SUNNY	60	15	17	SW28G38	29.77F	
BURLINGTON	PTSUNNY	60	21	22	SW22G28	29.59F	
PUEBLO	SUNNY	63	17	17	SW30G40	29.64F	
LA JUNTA	SUNNY	67	13	12	SW39G49	29.64F	
LAMAR	MOSUNNY	71	17	12	W26G40	29.63F	
SPRINGFIELD	N/A	72	10	9	SW20G32	29.64F	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
100 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
DURANGO	PTSUNNY	55	18	23	SW25G35	29.81F	
CORTEZ	PTSUNNY	56	18	22	W22G38	29.80F	
TELLURIDE	FAIR	34	14	44	SW14	29.84F	WCI 24
MONARCH PASS	LGT SNOW	19	12	73	W47G64	29.86F	WCI -3
ALAMOSA	MOSUNNY	48	15	26	SW25G41	29.82F	
LA VETA PASS	PTSUNNY	32	27	80	SW31G48	29.79F	WCI 17
DENVER INTL AP	MOSUNNY	61	12	15	W29G38	29.52	
ENGLEWOOD	MOSUNNY	58	13	17	W28G40	29.53F	
BROOMFIELD	MOSUNNY	61	16	17	VRB14G21	29.54F	
COLO. SPRINGS	MOSUNNY	58	0	9	W36G54	29.63S	
A. F. ACADEMY	MOSUNNY	52	7	16	W18G38	29.63R	
LIMON	MOSUNNY	63	12	13	W26G33	29.56F	
MONUMENT HILL	FAIR	52	28	40	W37G46	29.60S	
BURLINGTON	MOSUNNY	68	12	11	W28G36	29.53F	
PUEBLO	SUNNY	66	17	15	W22G30	29.62F	
LA JUNTA	SUNNY	67	14	13	W43G54	29.61F	
LAMAR	SUNNY	71	11	10	W38G48	29.61F	
SPRINGFIELD	N/A	72	11	9	W17G30	29.61F	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
200 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
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MONARCH PASS	CLOUDY	19	10	68	W53G64	29.85F	WCI	-4
ALAMOSA	MOSUNNY	49	13	23	SW30G40	29.78F		
LA VETA PASS	PTSUNNY	36	25	64	SW40G58	29.76F		
DENVER INTL AP	MOSUNNY	61	12	14	W30	29.51F		
ENGLEWOOD	MOSUNNY	57	14	18	SW30G39	29.51F		
BROOMFIELD	MOSUNNY	59	16	18	W35G46	29.49F		
COLO. SPRINGS	MOSUNNY	58	2	10	W33G49	29.62F		
LIMON	MOSUNNY	63	13	14	W22G30	29.54F		
MONUMENT HILL	FAIR	52	28	40	SW32G39	29.59S		
TRINIDAD	SUNNY	61	11	14	SW31G37	29.72		
PUEBLO	MOSUNNY	63	13	14	S24G29	29.61F		
LA JUNTA	SUNNY	67	15	13	W41G51	29.59F		
LAMAR	SUNNY	70	14	11	W36G46	29.60F		
SPRINGFIELD	N/A	71	10	9	W29G38	29.61S		

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
300 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	CLOUDY	21	10	63	W44G55	29.85F	WCI 0
ALAMOSA	MOSUNNY	49	15	25	W35G41	29.76F	
LA VETA PASS	FAIR	36	25	64	SW46G59	29.75F	
DENVER INTL AP	MOSUNNY	58	14	17	W17	29.54R	
ENGLEWOOD	MOSUNNY	56	15	20	SW32G40	29.54R	
COLO. SPRINGS	MOSUNNY	58	5	12	SW31G35	29.63R	
A. F. ACADEMY	PTSUNNY	54	7	15	W17G30	29.62R	
LIMON	MOSUNNY	64	9	11	W23G36	29.55R	
MONUMENT HILL	FAIR	52	28	40	W22G35	29.61R	
TRINIDAD	SUNNY	61	10	13	W26G30	29.70F	
PUEBLO	MOSUNNY	65	14	14	W21G24	29.60F	
LA JUNTA	SUNNY	67	13	12	W40G51	29.58F	
LAMAR	SUNNY	70	13	11	W32G41	29.58F	
SPRINGFIELD	N/A	70	8	9	SW22G32	29.61S	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
400 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	LGT SNOW	23	23	100	SW36G58	29.79R	WCI 4
MONARCH PASS	CLOUDY	21	10	63	W41G54	29.87R	WCI 0
ALAMOSA	MOSUNNY	49	13	23	SW30G37	29.75F	
LA VETA PASS	CLOUDY	34	25	69	SW31G48	29.77R	WCI 20
ENGLEWOOD	MOSUNNY	54	17	23	SW26G38	29.56R	
BROOMFIELD	MOSUNNY	55	N/A	N/A	SW25G35	29.56R	
COLO. SPRINGS	MOSUNNY	57	6	13	W30G38	29.63S	
LIMON	MOSUNNY	61	8	12	W22G36	29.56R	
MONUMENT HILL	FAIR	52	28	40	W23G26	29.63R	
TRINIDAD	SUNNY	62	9	12	SW25G36	29.68F	
PUEBLO	SUNNY	64	11	12	SW15	29.60S	
LA JUNTA	SUNNY	66	9	10	W37G48	29.59R	
LAMAR	SUNNY	70	10	10	W35G48	29.58S	
SPRINGFIELD	N/A	69	11	10	W17G28	29.60F	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO

500 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	CLOUDY	23	23	100	SW30G48	29.79R	FOG WCI 5
MONARCH PASS	CLOUDY	21	10	63	W44G55	29.87S	WCI 0
ALAMOSA	MOSUNNY	47	16	29	SW21G28	29.77R	
LA VETA PASS	FAIR	36	25	64	SW36G46	29.77R	
DENVER INTL AP	PTCLDY	55	15	20	W15	29.57R	
ENGLEWOOD	MOSUNNY	53	15	22	SW24G28	29.58R	
LOVELAND	FAIR	55	19	24	SW8G17	29.56S	
COLO. SPRINGS	MOSUNNY	53	7	15	W23G28	29.65R	
LIMON	MOCLDY	58	8	13	W17	29.59R	
MONUMENT HILL	FAIR	48	27	43	W18G26	29.64R	
TRINIDAD	SUNNY	58	13	17	SW29G38	29.69R	
PUEBLO	SUNNY	63	11	13	W16	29.62R	
LA JUNTA	CLEAR	65	9	11	W24G33	29.61R	
LAMAR	CLEAR	67	9	10	W31G41	29.58S	
SPRINGFIELD	N/A	66	9	10	W17G25	29.61R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
600 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	CLOUDY	23	23	100	SW41G52	29.80S	FOG WCI 3
MONARCH PASS	CLOUDY	19	12	73	SW28G41	29.88R	WCI 1
ALAMOSA	PTCLDY	40	22	48	W16G24	29.78R	
LA VETA PASS	FAIR	30	27	86	SW37G54	29.77S	WCI 14
AURORA	PTCLDY	52	19	28	SW8	29.60F	
ENGLEWOOD	PTCLDY	50	15	24	SW23G30	29.60R	
BROOMFIELD	PTCLDY	46	14	27	S12	29.59	
LOVELAND	FAIR	48	19	32	W14G21	29.59R	
COLO. SPRINGS	PTCLDY	51	10	19	SW22	29.67R	
A. F. ACADEMY	MOCLDY	48	12	23	SW12	29.65R	
LIMON	PTCLDY	52	10	18	W14	29.62R	
MONUMENT HILL	FAIR	43	25	49	W10	29.65R	
TRINIDAD	CLEAR	55	18	23	SW17G26	29.71R	
PUEBLO	CLEAR	56	13	18	SW8	29.63R	
LA JUNTA	CLEAR	60	12	15	W20	29.62R	
LAMAR	CLEAR	64	11	12	W29G40	29.59R	
SPRINGFIELD	N/A	56	5	13	W8	29.63R	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
700 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	CLOUDY	21	21	100	SW36G54	29.81S	FOG WCI 2
MONARCH PASS	CLOUDY	19	12	73	SW22G32	29.89R	WCI 3
ALAMOSA	PTCLDY	39	21	48	NW10	29.77F	
LA VETA PASS	FAIR	28	27	93	SW24G39	29.80R	WCI 14
AURORA	PTCLDY	48	18	29	SW5	29.62R	
ENGLEWOOD	PTCLDY	47	16	29	SW18	29.61R	
BROOMFIELD	PTCLDY	43	16	33	W8	29.63R	
LOVELAND	FAIR	46	21	36	SW5	29.62R	
COLO. SPRINGS	PTCLDY	47	12	24	W12	29.69R	
LIMON	PTCLDY	35	8	32	NW7	29.65R	WCI 29

MONUMENT HILL	FAIR	37	25	60	SW6	29.67R
TRINIDAD	PTCLDY	51	19	28	S5	29.71S
PUEBLO	CLEAR	48	12	23	CALM	29.64R
LA JUNTA	CLEAR	52	14	22	W15	29.63R
LAMAR	CLEAR	59	14	17	W18	29.60R
SPRINGFIELD	N/A	51	9	18	SW9	29.66R

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
800 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	CLOUDY	18	12	79	SW31G41	29.89S	WCI -2
ALAMOSA	PTCLDY	39	19	44	W9	29.77S	
LA VETA PASS	MOCLDY	28	27	93	SW22G31	29.82R	WCI 15
DENVER INTL AP	PTCLDY	41	21	44	N9	29.64R	
AURORA	CLEAR	45	19	36	SW9	29.63R	
ENGLEWOOD	PTCLDY	46	15	28	SW16	29.63R	
BROOMFIELD	PTCLDY	48	18	29	SW7	29.64R	
LOVELAND	FAIR	43	19	39	NW6	29.62S	
COLO. SPRINGS	PTCLDY	45	13	27	SW10	29.70R	
LIMON	CLEAR	27	8	44	NE6	29.66R	WCI 20
MONUMENT HILL	FAIR	39	25	56	SW15	29.67S	
TRINIDAD	MOCLDY	49	18	29	SW10	29.71S	
PUEBLO	CLEAR	38	8	29	NW8	29.66R	
LA JUNTA	CLEAR	54	14	20	SW18	29.64R	
LAMAR	CLEAR	51	16	24	W7	29.62R	
SPRINGFIELD	N/A	47	15	27	VRB6	29.66S	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
900 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONARCH PASS	CLOUDY	18	12	79	SW32G36	29.87F	WCI -3
ALAMOSA	MOCLDY	36	21	54	NW8	29.77S	
LA VETA PASS	CLOUDY	28	27	93	SW18G26	29.82S	WCI 16
DENVER INTL AP	PTCLDY	38	21	50	E9	29.64S	
AURORA	CLEAR	45	19	36	SW7	29.64R	
ENGLEWOOD	PTCLDY	43	17	35	W8	29.65R	
BROOMFIELD	PTCLDY	43	18	36	S6	29.64S	
LOVELAND	FAIR	39	19	45	E9	29.61S	
COLO. SPRINGS	PTCLDY	44	14	29	W7	29.70S	
LIMON	CLEAR	26	8	46	N5	29.66S	WCI 20
MONUMENT HILL	FAIR	39	27	60	SW14	29.66S	
TRINIDAD	MOCLDY	49	21	33	SW13	29.71S	
PUEBLO	CLEAR	35	11	36	NW9	29.66S	WCI 28
LA JUNTA	PTCLDY	53	18	25	SW22	29.64S	
LAMAR	PTCLDY	44	14	29	SW10	29.64R	
SPRINGFIELD	N/A	51	18	27	SW12	29.66S	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1000 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
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WOLF CREEK PAS	SNOW	19	N/A	N/A	SW26G39	29.80S	VSB	1/2	WCI	1
MONARCH PASS	CLOUDY	19	12	73	SW35G47	29.87F	WCI		-1	
ALAMOSA	MOCLDY	34	21	59	NW6	29.76F	WCI		29	
LA VETA PASS	MOCLDY	28	27	93	SW21G28	29.82R	WCI		15	
DENVER INTL AP	PTCLDY	37	22	54	SE9	29.64S				
AURORA	CLEAR	43	18	36	S6	29.64S				
ENGLEWOOD	PTCLDY	39	18	42	VRB3	29.64F				
LOVELAND	FAIR	37	21	52	E8	29.63R				
COLO. SPRINGS	CLEAR	45	15	30	W5	29.69F				
LIMON	CLEAR	25	11	55	N7	29.66S	WCI		17	
TRINIDAD	CLOUDY	50	24	36	SW9	29.71S				
PUEBLO	CLEAR	34	10	37	VRB3	29.66S				
LA JUNTA	MOCLDY	48	19	31	SW17	29.65R				
LAMAR	MOCLDY	44	14	29	W7	29.64S				
SPRINGFIELD	N/A	46	17	31	SW9	29.66S				

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
1100 PM MST THU MAR 7 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	LGTSN	19	N/A	N/A	SW26G46	29.77F	WCI 1
MONARCH PASS	CLOUDY	18	14	86	SW25G31	29.85F	WCI -1
ALAMOSA	MOCLDY	32	20	61	W5	29.74F	WCI 27
LA VETA PASS	CLOUDY	28	27	93	SW17G25	29.81F	WCI 16
DENVER INTL AP	PTCLDY	36	21	54	S9	29.62F	
AURORA	CLEAR	37	21	52	S8	29.61F	
ENGLEWOOD	PTCLDY	41	19	41	SW7	29.62F	
COLO. SPRINGS	CLEAR	43	15	32	SW15	29.68F	
LIMON	CLEAR	23	11	60	CALM	29.65F	
MONUMENT HILL	FAIR	36	27	69	SW12	29.65F	
PUEBLO	CLEAR	41	16	36	W8	29.64F	
LAMAR	FAIR	48	17	29	CALM	29.63F	
SPRINGFIELD	N/A	42	17	36	SW8	29.66S	

2.5 Meteorological Analysis Of The March 23, 2002, Blowing Dust Event And PM10 Exceedance At Alamosa, Colorado.

On Saturday March 23, 2002, Alamosa recorded an exceedance of the twenty-four-hour PM10 standard with a reading of 163 ug/m³. A small but fairly deep surface low-pressure system moved through southern Colorado on March 23. Surface pressure gradients associated with this moderately intense low-pressure system caused strong winds, especially in southern Colorado. The surface weather map for 00Z March 24 (5 PM MST on March 23) in Figure 1 shows a storm system with a central pressure of 995 millibars (mb) over southeastern Colorado. The central pressure of the storm is significant since storms of about 1000 mb or lower were identified as a typical precondition for significant blowing dust in eastern Colorado when soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document).

Sustained winds and gusts in Colorado exceeded blowing dust criteria in some areas of Colorado, especially in south-central Colorado in and around the San Luis Valley. A number of sites showed wind speeds in excess of 30 miles per hour (mph) and/or gusts in excess of 40 mph. These are the speed and gust thresholds for blowing dust that apply in southeastern Colorado when surface soils are dry (see reference for the *Natural Events Action Plan for High Wind Events – Lamar, Colorado* at the end of this document). Table 1 below lists wind speeds and gusts for Alamosa on March 23. The 30 mph blowing dust threshold applies to hourly average winds. Wind speed observations at stations like Alamosa are made just prior to the reported hour of observation. In most cases, these recorded speeds are not hourly average speeds but represent a several-minute average. If these spot observations show that speeds are above the 30 mph threshold for successive hours, then it can be reasonably assumed that hourly average winds are also above 30 mph. During the late morning and afternoon of March 23, winds at Alamosa exceeded the blowing dust thresholds for five consecutive hours.

Wind data from Bureau of Land Management RAWS stations surrounding the San Luis Valley are presented in Tables 2, 3 and 4. A map showing the locations of these stations is presented in Figure 3. Winds gusted at or above blowing dust criteria levels at each of these RAWS sites. Big Horn recorded gusts of 40 to 53 mph from the southwest for six hours. Blue Park recorded gusts of 42 to 55 mph from the southwest to west-northwest for seven hours. These sites are along the higher terrain southwest and northwest of Alamosa and are indicative of the strength of the winds entering the San Luis Valley upwind of Alamosa. These data suggest that conditions were favorable for blowing dust in and around the San Luis Valley.

Moderately strong winds were the norm across much of Colorado on March 23, 2002. Many stations recorded winds of 30 to 45 mph with gusts of 45 to 62 mph for several hours of the day. Monarch Pass, which is northwest of Alamosa, measured gusts of 43 to 58 mph. Montrose, Wolf Creek Pass, Colorado Springs, La Veta Pass, Trinidad, and La Junta each recorded gusts of 40 to 62 mph. Detailed weather observations for the windier sites in Colorado on March 23 have been included in Attachment A. Reports of haze at Alamosa and Copper Mountain are consistent with blowing dust under these conditions (see Table 1 and Attachment A).

Figure 3(a) shows the January 2002 precipitation for Lamar, Alamosa, Saguache, Salida, Colorado Springs, Rocky Ford, and Pueblo. Figure 3(b) shows the February 2002 precipitation at these stations, and Figure 3(c) shows the March 1 through 23, 2002, precipitation at these sites. Precipitation amounts were low everywhere, especially at Saguache which received a total of 0.21 inches from January 1 through March 23. Alamosa received only

0.06 inches from March 1 through 23. Cumulative precipitation at Saguache is probably indicative of soil moisture conditions in much of the San Luis Valley upwind of Alamosa on March 23.

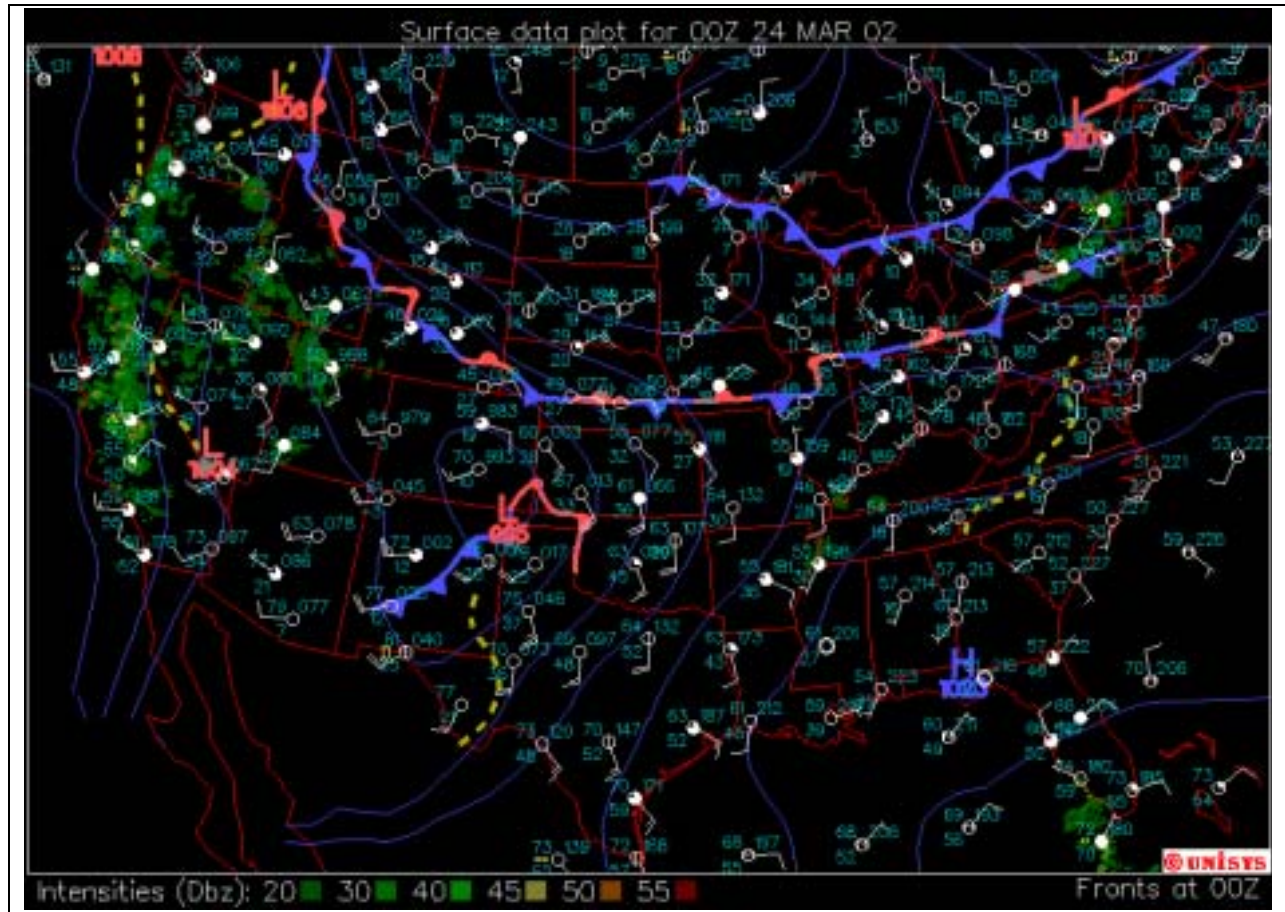


Figure 1. Surface weather map for 00Z March 24, 2002, or **5 PM MST March 23, 2002.**

Figure 4 shows that the U.S. Drought Monitor had declared that a **severe** drought was underway in most of Colorado including the area around Alamosa. This designation was made on March 26 and was representative of conditions in place on March 23.

Reference

Colorado Department of Public Health and Environment, City of Lamar, Prowers County Commissioners, *Natural Events Action Plan for High Wind Events – Lamar, Colorado*, April 1998.

Table 1. Wind observations for Alamosa reported by the National Weather Service on March 23, 2002. Wind speeds or gusts at or above the blowing dust threshold are highlighted in bold and yellow.

Mountain Standard Time	Weather	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Remarks
9:00 AM	Sunny	Southwesterly	13		
10:00 AM	Sunny	Southwesterly	16	31	
11:00 AM	Mostly Sunny	Southwesterly	24	35	
12:00 PM	Sunny	Southwesterly	32	39	HAZE
1:00 PM	Cloudy	Southwesterly	33	40	
2:00 PM	Mostly Sunny	Westerly	44	55	HAZE
3:00 PM	Partly Sunny	Southwesterly	37	53	HAZE
4:00 PM	Partly Sunny	Westerly	26	40	
5:00 PM	Partly Sunny	Southwesterly	26	36	
6:00 PM	Partly Cloudy	Southwesterly	26	33	
7:00 PM	Partly Cloudy	Westerly	20		

Table 2. Wind observations for the Big Horn RAWS station on March 23, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:54	5	247	31	39	276	8
1:54	3	231	32	37	285	8
2:54	11	232	42	26	237	20
3:54	23	233	44	23	234	38
4:54	19	229	43	22	238	40
5:54	13	227	42	23	237	29
6:54	9	217	43	23	247	21
7:54	10	231	47	19	222	23
8:54	13	229	49	14	216	34
9:54	16	247	50	15	260	36
10:54	10	219	53	10	188	29
11:54	17	255	53	9	211	46
12:54	22	218	54	9	222	43
13:54	22	234	52	9	237	53
14:54	22	225	52	10	200	44
15:54	20	237	50	12	225	46
16:54	15	241	49	11	233	37
17:54	15	241	47	9	232	31
18:54	13	245	44	8	227	32
19:54	18	230	42	9	235	33
20:54	14	241	41	11	225	33
21:54	13	251	39	13	260	26
22:54	11	251	38	10	239	23
23:54	8	241	36	11	257	21

Table 3. Wind observations for the Blue Park RAWS station on March 23, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:55	5	276	37	6	224	10
1:55	4	79	29	17	312	15
2:55	3	68	27	20	50	7
3:55	1	299	29	20	202	7
4:55	4	70	26	20	56	7
5:55	2	136	28	19	60	8
6:55	3	225	33	15	66	7
7:55	9	270	38	9	247	25
8:55	9	240	42	4	249	20
9:55	14	230	42	4	233	32
10:55	14	251	43	4	204	31
11:55	20	249	41	4	261	48
12:55	19	224	41	4	217	42
13:55	20	253	40	4	220	44
14:55	18	263	41	4	303	46
15:55	17	251	39	4	233	55
16:55	20	267	38	4	278	49
17:55	15	262	35	4	245	50
18:55	11	253	34	4	241	29
19:55	13	265	32	4	238	37
20:55	10	259	31	4	233	26
21:55	8	260	30	4	272	24
22:55	4	295	28	4	248	19
23:55	1	6	25	5	313	7

Table 4. Wind observations for the Willis Creek RAWS station on March 23, 2002. Wind and gust speeds at or above the blowing dust threshold have been highlighted in yellow and bold type.

Mountain Standard Time	Wind Speed (mph)	Wind Direction in Degrees	Temperature in Degrees F	Relative Humidity	Gust Direction	Gust Speed (mph)
0:52	1	0	40	20	1	11
1:52	2	337	37	23	333	6
2:52	3	359	39	21	331	15
3:52	7	10	45	15	217	30
4:52	8	23	46	12	37	31
5:52	9	25	44	15	5	24
6:52	10	18	44	18	191	30
7:52	9	19	47	18	163	34
8:52	10	117	50	15	72	34
10:52	NA	NA	53	9	NA	NA
13:52	9	278	52	6	310	46
14:52	5	3	50	8	203	38
16:52	7	319	47	8	24	26
17:52	8	0	46	9	79	22
18:52	5	9	44	8	327	24
19:52	8	329	42	6	277	21
20:52	6	92	40	6	285	22
21:52	1	359	36	11	24	15
22:52	5	356	36	11	10	13
23:52	5	352	35	10	294	21

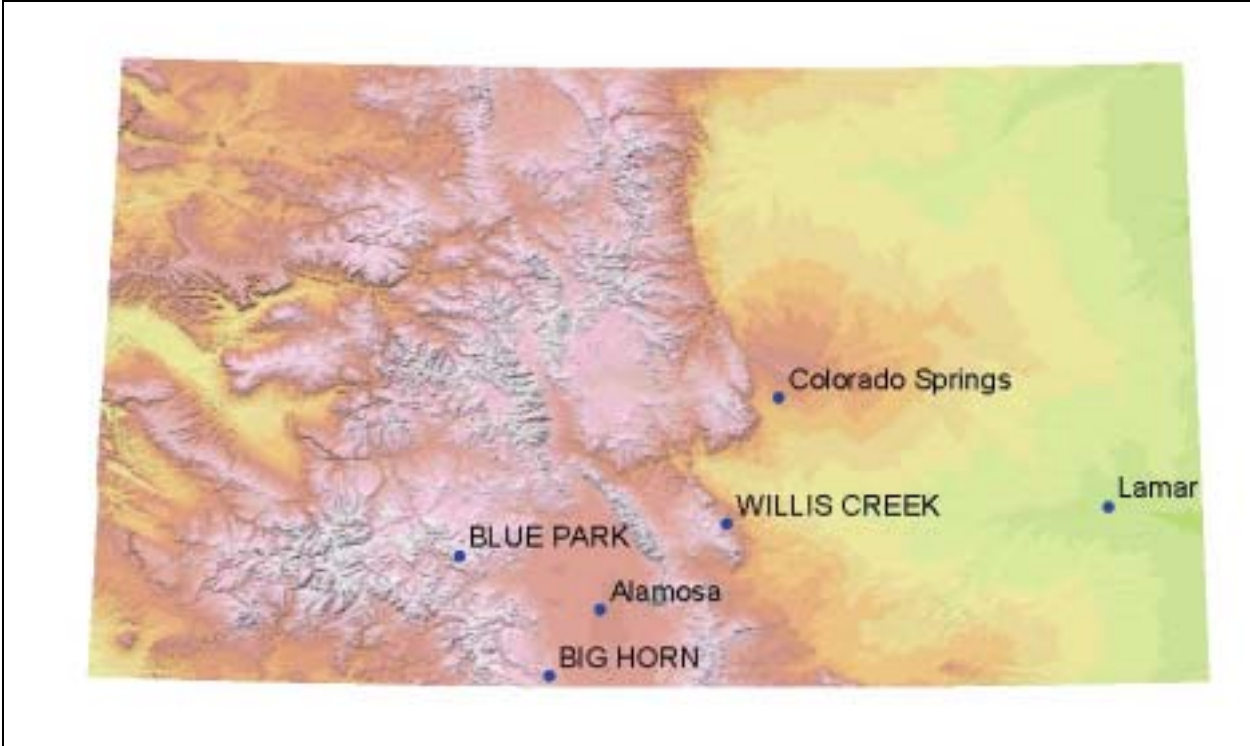
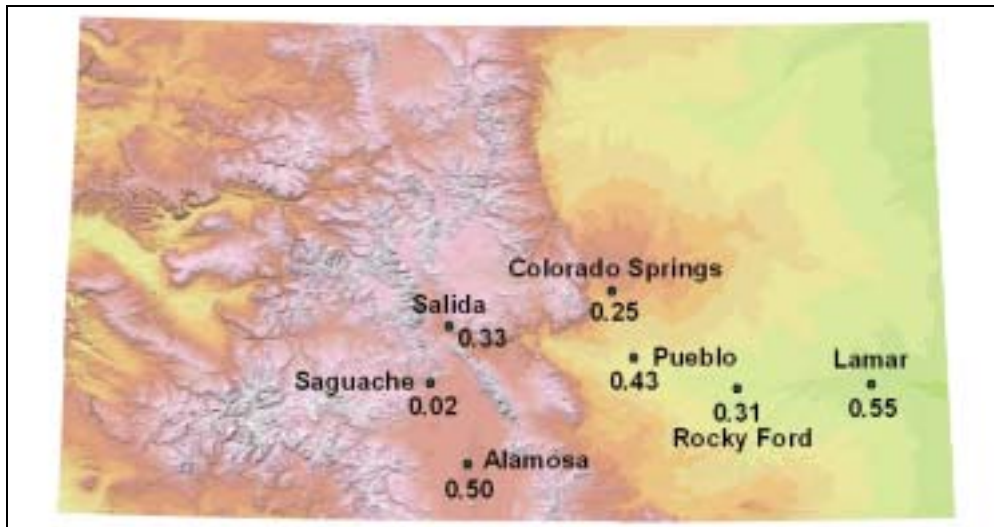
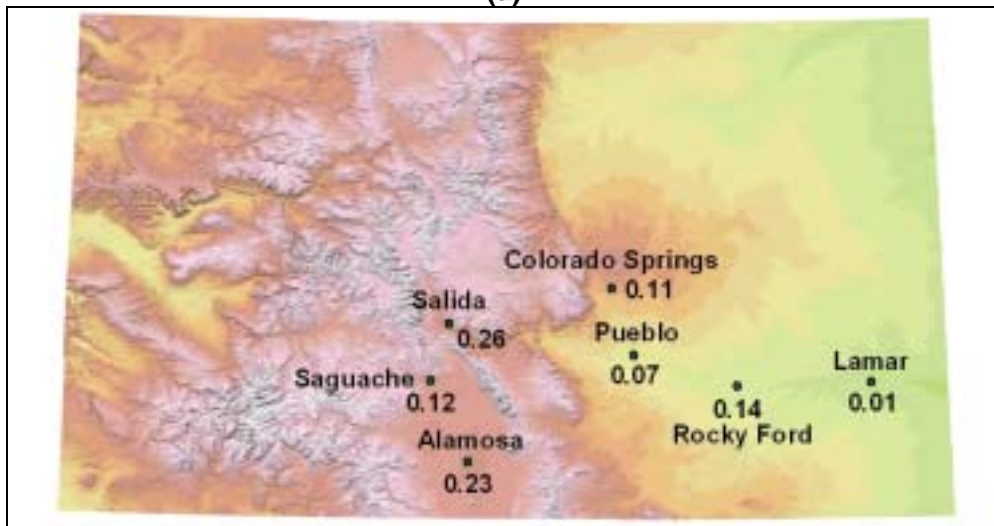


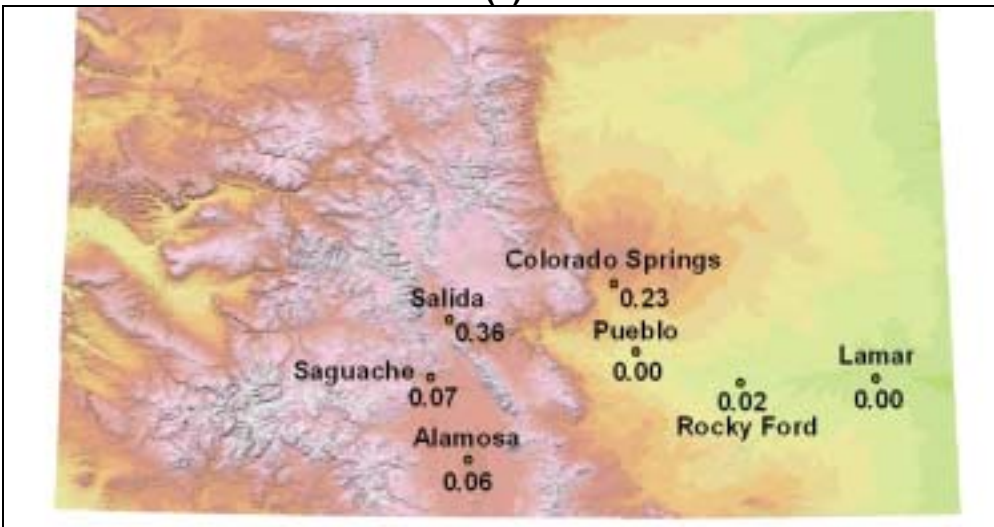
Figure 2. Locations of RAWS meteorological stations nearest to Alamosa (RAWS station names are listed in all-capital letters).



(a)



(b)



(c)

Figure 3. Total precipitation (inches of water): (a) January, (b) February, and (c) March 1-23, 2002.

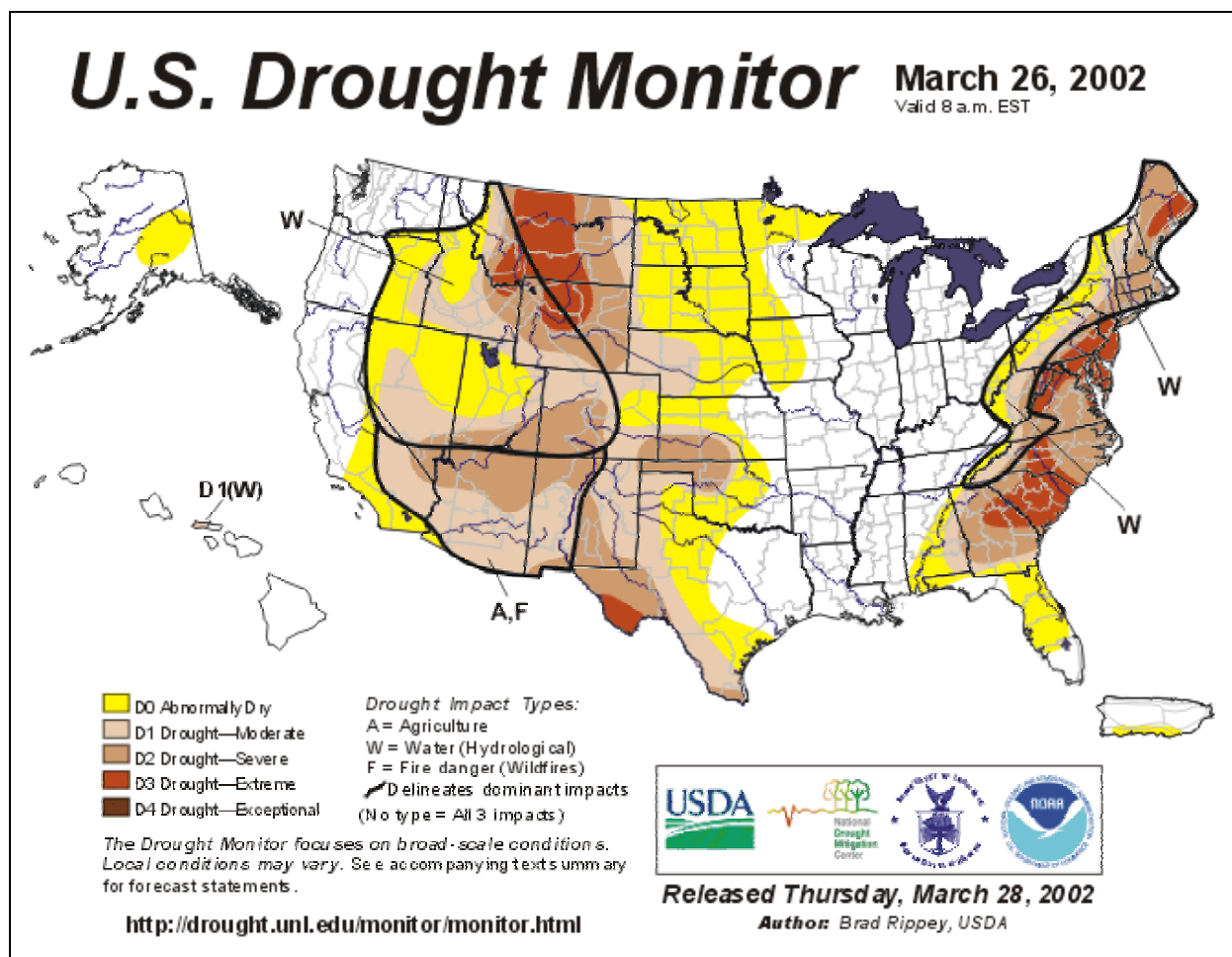


Figure 4. Drought status for the United States on March 26, 2002 (source: the USDA, NOAA, and the National Drought Mitigation Center at: <http://drought.unl.edu/monitor/monitor.html>, released on March 28, 2002).

Attachment E
Colorado Surface Weather Observations for
Selected Stations on March 23, 2002,
Reported by the National Weather Service

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 900 AM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
CORTEZ	MOSUNNY	59	5	11	S21G29	29.89S	
TELLURIDE	FAIR	43	1	17	S12G24	29.96F	
MONARCH PASS	CLOUDY	30	3	31	SW20G30	30.15F	WCI 18
ALAMOSA	SUNNY	53	8	16	SW13	29.96F	
LA VETA PASS	FAIR	41	27	56	SW22G31	30.05S	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1000 AM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONTROSE	PTSUNNY	62	5	10	SW24G30	29.80F	
CORTEZ	PTSUNNY	61	3	10	SW18G26	29.88F	
TELLURIDE	FAIR	45	-6	12	S12G29	29.94F	
WOLF CREEK PAS	CLOUDY	27	25	93	S21G31	30.05F	WCI 13
MONARCH PASS	CLOUDY	34	3	27	S25G31	30.11F	WCI 21
ALAMOSA	SUNNY	57	0	10	SW16G31	29.92F	
LA VETA PASS	PTSUNNY	39	27	60	SW28G31	30.01F	
TRINIDAD	SUNNY	70	11	10	W23G32	29.80F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1100 AM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	PTSUNNY	63	30	28	S21G29	29.71F	
MONTROSE	PTSUNNY	62	5	10	SW20G37	29.79F	
EAGLE	PTSUNNY	57	16	19	W29G36	29.81F	
CORTEZ	MOSUNNY	62	-11	5	SW18G39	29.86F	
TELLURIDE	FAIR	43	-4	14	SW26G45	29.92F	SQUALL
WOLF CREEK PAS	CLOUDY	30	25	80	SW24G31	30.00F	WCI 16
COPPER MTN	PTSUNNY	30	1	29	S17G30	29.95F	WCI 18
MONARCH PASS	CLOUDY	34	-4	19	SW38G49	30.05F	WCI 19
ALAMOSA	MOSUNNY	59	-3	8	SW24G35	29.89F	
LA VETA PASS	FAIR	45	25	45	SW33G45	29.95F	
TRINIDAD	SUNNY	73	12	9	SW25G38	29.77F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 1200 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	CLOUDY	65	28	24	S25G32	29.67F	
MONTROSE	CLOUDY	62	5	10	SW21G29	29.76F	
EAGLE	PTSUNNY	55	16	21	W14G32	29.80F	
CORTEZ	CLOUDY	62	0	8	SW29G37	29.84F	

WOLF CREEK PAS	FAIR	34	25	69	SW24G49	29.96F	WCI	21
COPPER MTN	CLOUDY	30	1	29	SW16G32	29.93F	WCI	19
MONARCH PASS	PTSUNNY	36	-2	20	SW30G54	30.03S		
ALAMOSA	SUNNY	61	-2	8	SW32G39	29.85F	HAZE	
LA VETA PASS	FAIR	46	27	46	SW45G62	29.88F		
COLO. SPRINGS	MOSUNNY	68	9	10	SW30G44	29.69F		
TRINIDAD	SUNNY	74	13	9	W24G40	29.74F		
PUEBLO	MOSUNNY	76	9	7	SW22G36	29.64F		
LAMAR	CLOUDY	65	17	15	VRB5	29.67F		
SPRINGFIELD	N/A	80	17	9	SW18G30	29.67F		

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 100 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	MOSUNNY	68	30	24	S21G35	29.64F	
MONTROSE	CLOUDY	63	5	10	S32G39	29.74F	
RIFLE	PTSUNNY	63	11	13	S12G30	29.66F	
DURANGO	CLOUDY	60	2	9	W23G30	29.83F	
CORTEZ	CLOUDY	61	2	9	SW29G35	29.80F	
MONARCH PASS	CLOUDY	34	-2	21	SW38G47	30.01F	WCI 19
ALAMOSA	CLOUDY	61	-1	8	SW33G40	29.80F	
LA VETA PASS	FAIR	46	27	46	W37G53	29.86F	
COLO. SPRINGS	MOSUNNY	69	8	9	W28G35	29.68F	
A. F. ACADEMY	PTSUNNY	68	7	9	SW21G37	29.65F	
MONUMENT HILL	FAIR	64	21	19	SW25G35	29.67F	
TRINIDAD	MOSUNNY	75	13	9	SW28G36	29.70F	
PUEBLO	PTSUNNY	77	11	8	SW20G28	29.61F	
LA JUNTA	SUNNY	79	18	10	SW28G36	29.59F	
LAMAR	PTSUNNY	75	24	15	E7	29.61F	
SPRINGFIELD	N/A	80	18	10	SW15G31	29.62F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 200 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	PTSUNNY	67	30	25	SW26G37	29.61F	
MONTROSE	CLOUDY	63	5	10	SW22G31	29.72F	
EAGLE	PTSUNNY	55	12	18	SW29G44	29.73F	
DURANGO	CLOUDY	61	4	10	SW23G32	29.79F	
CORTEZ	CLOUDY	62	1	8	SW26G37	29.77F	
WOLF CREEK PAS	PTSUNNY	32	25	74	SW36G56	29.87F	WCI 16
COPPER MTN	CLOUDY	27	3	36	S21G30	29.90S	WCI 13
MONARCH PASS	CLOUDY	34	-4	19	SW39G56	29.97F	WCI 18
ALAMOSA	MOSUNNY	61	-1	8	W44G55	29.77F	HAZE
LA VETA PASS	FAIR	45	25	45	SW35G59	29.84S	
COLO. SPRINGS	PTSUNNY	69	8	9	SW29G37	29.62F	
LIMON	PTSUNNY	72	13	10	W24G36	29.56F	
TRINIDAD	PTSUNNY	73	12	9	SW26G38	29.65F	

PUEBLO	CLOUDY	76	9	7	SW24G40	29.58F
LA JUNTA	CLOUDY	79	18	10	W31G41	29.55F
LAMAR	PTSUNNY	79	29	16	VRB3	29.54F

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
300 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MONTROSE	PTSUNNY	63	5	10	SW28G45	29.72S	
RIFLE	PTSUNNY	65	6	10	SW23G33	29.61F	
DURANGO	CLOUDY	60	0	9	W24G35	29.77F	
CORTEZ	CLOUDY	61	-2	8	SW22G36	29.76F	
TELLURIDE	FAIR	43	1	17	SW16G39	29.83F	
ALAMOSA	PTSUNNY	59	0	9	SW37G53	29.76F	HAZE
COLO. SPRINGS	PTSUNNY	67	5	8	SW30G38	29.61F	
LIMON	CLOUDY	74	14	10	W23G39	29.55F	
MONUMENT HILL	FAIR	63	18	17	W17G30	29.63S	
PUEBLO	CLOUDY	74	6	7	SW29G39	29.57F	
LA JUNTA	CLOUDY	79	18	10	W32G37	29.54F	
LAMAR	CLOUDY	80	29	15	W6	29.52F	
SPRINGFIELD	N/A	82	18	9	S22G31	29.53F	

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
400 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	PTSUNNY	65	29	25	W20G32	29.61R	
MONTROSE	PTSUNNY	62	3	9	SW26G41	29.70F	
EAGLE	PTSUNNY	55	9	15	SW24G36	29.70R	
DURANGO	CLOUDY	57	-4	8	W29G38	29.77S	
CORTEZ	CLOUDY	59	-3	8	W26G37	29.77R	
WOLF CREEK PAS	FAIR	32	25	74	SW36G53	29.86R	WCI 16
COPPER MTN	CLOUDY	27	-4	26	SW20G39	29.86R	HAZE WCI 13
GUNNISON	CLOUDY	52	1	12	W23G36	29.75S	
ALAMOSA	PTSUNNY	58	1	10	W26G40	29.76S	
LA VETA PASS	PTSUNNY	41	25	52	W32G51	29.81S	
COLO. SPRINGS	PTSUNNY	64	2	8	SW26G36	29.61S	
LIMON	PTSUNNY	69	11	10	SW30G38	29.54F	
MONUMENT HILL	FAIR	61	18	18	SW28G33	29.63S	
TRINIDAD	MOSUNNY	72	11	9	SW35G40	29.62F	
GREELEY ARPT	FAIR	70	18	13	E21G30	29.55R	
LA JUNTA	CLOUDY	77	16	10	W31G40	29.52F	
LAMAR	CLOUDY	81	28	14	NW20G26	29.52S	
SPRINGFIELD	N/A	80	15	8	SW28G37	29.51F	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 500 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
GRAND JUNCTION	PTSUNNY	64	-3	7	W17G30	29.61S	
MONTROSE	MOSUNNY	60	1	9	SW32G39	29.71R	
EAGLE	PTSUNNY	54	7	15	SW25G44	29.69S	
DURANGO	CLOUDY	55	-1	10	SW28G36	29.77S	
CORTEZ	CLOUDY	59	-7	6	W23G36	29.76F	
WOLF CREEK PAS	FAIR	30	21	69	SW36G48	29.84F	WCI 14
COPPER MTN	PTSUNNY	25	-2	30	SW31G38	29.84S	HAZE WCI 8
GUNNISON	PTSUNNY	50	1	13	W20G30	29.74F	
MONARCH PASS	FAIR	30	-2	24	SW35G58	29.95S	WCI 14
ALAMOSA	PTSUNNY	55	2	11	SW26G36	29.74F	
LA VETA PASS	FAIR	41	23	48	W36G56	29.79S	
LIMON	CLOUDY	66	8	10	SW29G36	29.53F	
SPRINGFIELD	N/A	77	11	8	S29G39	29.51S	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 600 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
CORTEZ	MOCLDY	55	-6	8	W24G31	29.77R	
WOLF CREEK PAS	FAIR	27	18	69	SW41G55	29.83F	WCI 8
MONARCH PASS	FAIR	28	-2	26	SW36G43	29.95S	WCI 12
ALAMOSA	PTCLDY	51	-4	10	SW26G33	29.74S	
LA VETA PASS	MOCLDY	39	25	56	W29G45	29.81R	
A. F. ACADEMY	MOCLDY	57	1	10	W15G30	29.64R	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 700 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
MEEKER	MOCLDY	46	22	38	NW25G35	29.69R	
WOLF CREEK PAS	FAIR	25	18	74	S32G48	29.86R	WCI 7
MONARCH PASS	MOCLDY	27	-2	28	W25G36	29.97R	WCI 11
ALAMOSA	PTCLDY	48	-5	11	W20	29.76R	
LA VETA PASS	FAIR	36	19	51	W32G41	29.83R	
TRINIDAD	MOCLDY	61	2	9	SW23G32	29.66R	

COLORADO STATE WEATHER ROUNDUP
 NATIONAL WEATHER SERVICE DENVER CO
 800 PM MST SAT MAR 23 2002

CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	FAIR	25	18	74	SW25G36	29.89R	WCI 9
MONARCH PASS	FAIR	25	-4	28	W32G39	29.97R	WCI 7
ALAMOSA	PTCLDY	44	-5	12	W12	29.79R	
LA VETA PASS	FAIR	36	19	51	W28G40	29.84R	

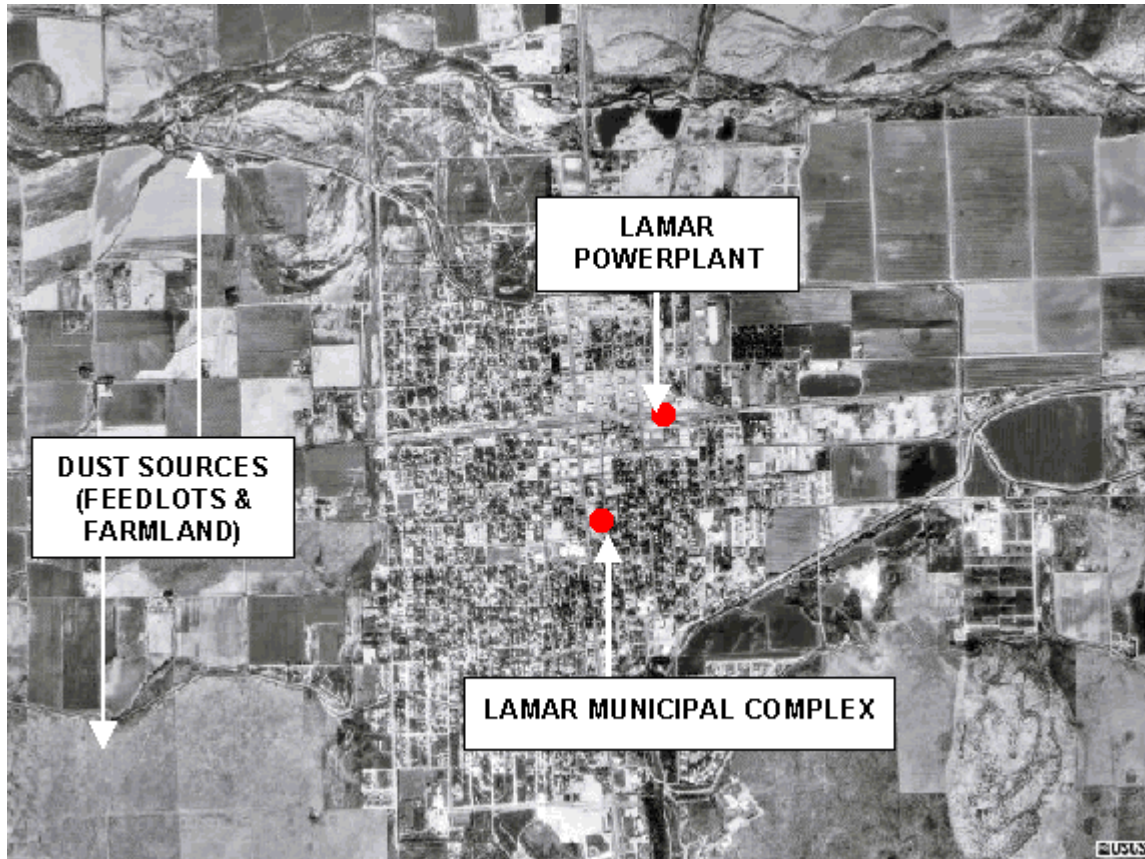
LIMON PTCLDY 42 25 50 NE24G30 29.63R

COLORADO STATE WEATHER ROUNDUP
NATIONAL WEATHER SERVICE DENVER CO
900 PM MST SAT MAR 23 2002

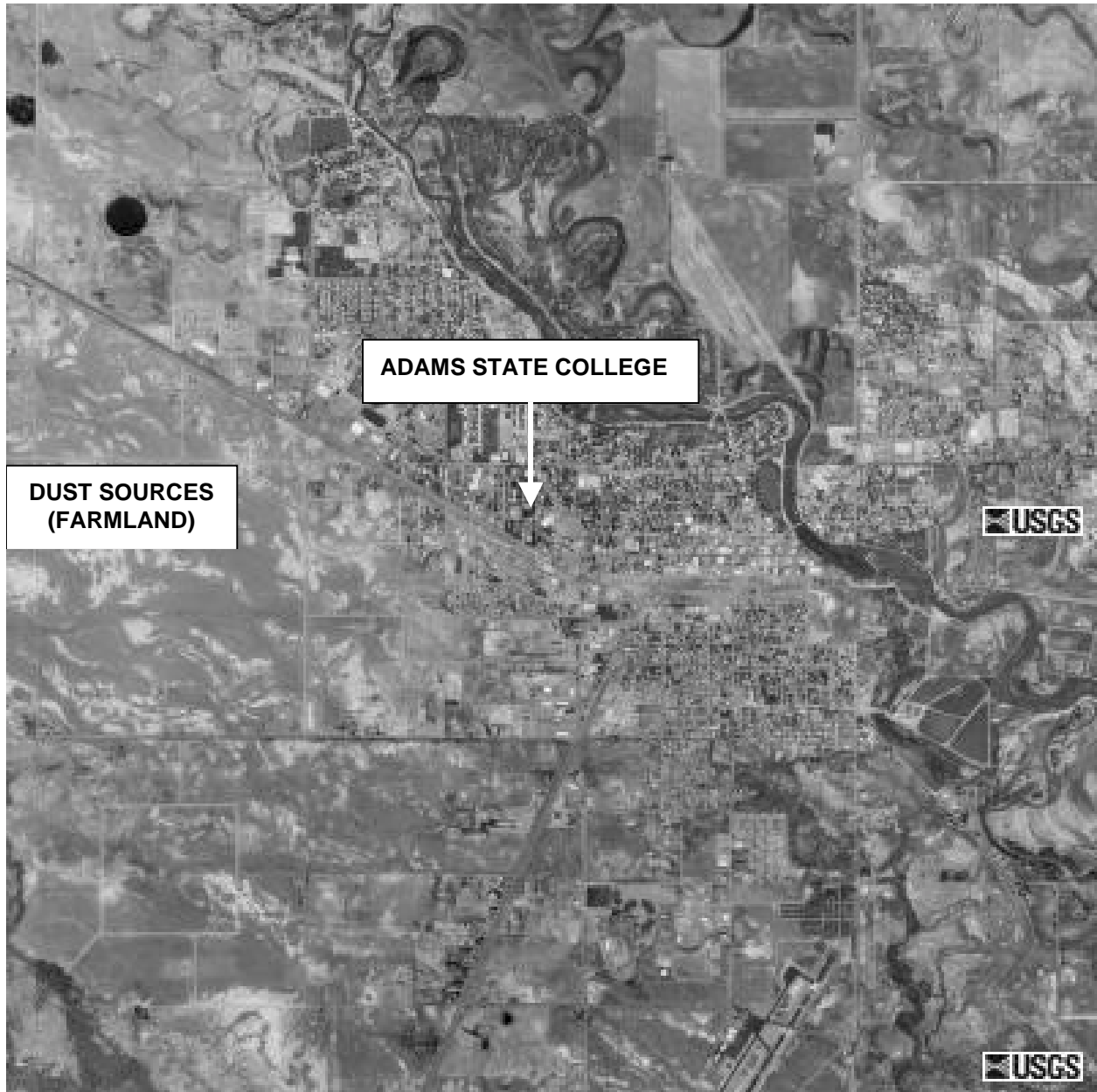
CITY	SKY/WX	TMP	DP	RH	WIND	PRES	REMARKS
WOLF CREEK PAS	FAIR	21	14	73	SW32G40	29.89S	WCI 2
MONARCH PASS	FAIR	21	-9	25	SW33G44	29.97S	WCI 2
ALAMOSA	PTCLDY	42	-6	13	W15	29.80R	
LA VETA PASS	FAIR	34	18	51	W28G35	29.86R	WCI 20
LIMON	PTCLDY	39	26	59	NE26G35	29.65R	
TRINIDAD	PTCLDY	57	-2	9	SW21G32	29.70R	

3.0 Aerial Views of the Sites

Lamar



Alamosa



4.0 News Accounts

 Print this Article  E-Mail to a Friend

Lamar Daily News

Saturday storm blamed for deaths of two children on I-70

February 11, 2002

By Jim Farmer
for the Lamar Daily News

HUGO - High winds whipped a light snow on Saturday into ground blizzards that resulted in the death of two children in eastern Colorado.

Roads were closed throughout the state as the winds also created dust storms that resulted in zero visibility in some areas.

The line of snow was mostly along I-70 stretching down to south of Hugo and dust storms stretched into Southeast Colorado and Western Kansas.

Communities near I-70 became isolated by 10:30 Saturday morning as CDOT closed roads due to whiteout conditions and an accident on I-70.

According to an Associated Press report, Yvette Ortega, 10, and her sister Fabiola Ortega, 9, both of Garden City, Kan., were killed Saturday when a car driven by their mother was rear-ended by a tractor-trailer on westbound I-70 near Arriba, 95 miles southeast of Denver.

Their mother, Hilda Soto, 32, and another passenger, Edeimiro Rodriguez-Torrez, 33, were treated and released at a Denver-area hospital, Colorado State Patrol Capt. Jim Wolfenbarger said Sunday.

Soto is also from Garden City. Rodriguez-Torrez's hometown wasn't released.

The driver of the tractor-trailer, Norman Osborne of Denver, was cited for careless driving causing death and injury.

The blizzard brought wind gusts of more than 90 mph and snow drifts up to five feet deep Saturday. The interstate was closed from Denver to Hays, Kan., 300 miles east.

Hugo, Burlington, Limon and many eastern Colorado towns quickly filled with stranded travelers. Hotel rooms sold out by noon Saturday.


Charlie and Tami Crockett, of Brandon, found a quick trip to Denver resulting in an overnight stay at the Lincoln Bed and Breakfast in Hugo and a chance encounter to meet with other stranded travelers, including Ron and Verlayn Keller of Houston, TX. Proprietor Maye Gene Lee, had some of the last rooms in town and they were quickly snapped up.

On a positive side, Keller enjoyed his visit so much he said, " I will never just drive through Hugo again with out fondly remembering the evening. Next time I plan on stopping by to say Hi' (to Mrs. Lee) and just might spend the night again."

Just a few blocks away nearly thirty travelers and a couple of dozen trucks waited out the weather at

the Hugo Loaf and Jug until the highway reopened at 12:30 a.m. Sunday.

Sunday morning, Hugo was covered in a mix of snow and mud that was the result of the dust storm and blowing snow.

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Fort Morgan Times

Weldon games off

February 11, 2002

Weldon Valley's home boys and girls basketball games with Haxtun Saturday were postponed due to snow and wind in the Haxtun area.

No makeup date has been announced yet.

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Fort Morgan Times

Semi crash closes I-76 3 1/2 hours

February 11, 2002

Interstate 76 near Hillrose was closed for 3 1/2 hours Saturday following a semi-truck crash caused by high winds.

The driver, Joseph L. Melton, 24, Aurora, was treated at Colorado Plains Medical Center in Fort Morgan for a neck injury, then released, officials said.

Melton was eastbound on I-76 seven miles east of Brush with an empty box trailer, Trooper Gaylon Grippin of the Colorado State Patrol said, when a strong gust of wind blew the trailer off the right side of the road.

The truck began to spin and slid sideways before rolling onto its right side and sliding to a stop, the officer added.

Melton was cited on a charge of careless driving in the 1:20 p.m. crash.





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Lamar Daily News

LCC baseball sweeps Opening Day doubleheader against CSU Club Team

February 12, 2002

By DAVE KIEFER
Lamar Daily News

Opening Day for the LCC men's baseball team at Merchants Park brought cool weather, hot bats, and two victories for the Runnin' Lopes.

With temperatures in the low 40's and wind gusts up to 25 miles per hour on Sunday, LCC (2-0) swept the visiting Colorado State Rams Club Team 4-2 and 20-2, as 15 different Lopes collected hits in the two victories.

"We are just pleased to start the season 2-0," LCC head coach Scott Crampton said. "Game one made us a little nervous. Their first two pitchers were comparable to good junior college pitchers, and they made us work to manufacture runs."

In Game One of the doubleheader, LCC struck first.

Vicente Ramirez, who finished 2-3, singled to lead off the bottom of the first.

Ramirez then stole second base, one of his three stolen bases on the day, and scored on Scott Balster's RBI single to leftfield.

Shortstop Doug Beck was then hit by a pitch, and Todd Morben's double drove in both Balster and Beck to put the Lopes up 3-0.

The score remained that way until a CSU solo home run in the top of the fourth off LCC starting pitcher Sean Clancy (1-0), who allowed only two hits in four innings of work, cut the lead to 3-1.

CSU added another run in the fifth, but a Jason Cox triple in the bottom of the inning plated Beck to extend LCC's lead to 4-2.

Ben Buck then worked a scoreless seventh and struck out two of the final three batters to earn his first save.

Game Two featured a LCC offensive barrage, as the Lopes tallied 20 runs on 18 hits.

Andy Scholl paced the attack going 3-5 with six RBIs and a home run, while Beck finished 3-5 and Morben 2-2.

"We swung the bats exceptionally well in the second game," Crampton said, "and we were pleased with the output."



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'Biblical'-level help needed for drought

Record-dry S. Colo. near emergency status as fears for '03 arise

By Mark H. Hunter
 Special to The Denver Post

Monday, April 22, 2002 - ALAMOSA - The drought gripping southern Colorado is so bad that some residents are praying for 40 days and 40 nights of rain.

Even if their prayers are answered soon, officials say, it already may be too late to reinvigorate the parched landscape and avoid economic and environmental disasters.

Colorado drought managers could decide as early as this week whether to activate the state's emergency drought plan, saying that swaths of southern Colorado are the driest they have been in a century.

"If we don't get some rain - in biblical proportions - I doubt we'll have enough water for next year's crops," said Ray Wright, a potato-grain farmer and president of the Rio Grande Water Conservation District's board.

"If you are not praying for rain, you'd better get started," said Steven E. Vandiver, an engineer for the state Division of Water Resources. "Forty days and 40 nights of rain would help. We need sustained rain now and significant snowpack next year to even start to turn this situation around."

In the San Luis Valley, where a \$500 million agricultural economy depends on water, the aquifer is sinking and the mighty Rio Grande is nearly a trickle, with the river's flow at 13 percent of normal.

Hundreds of farmers and ranchers who rely on Rio Grande water delivered through a 1,000-mile web of canals and ditches won't get a drop; the river is

Already parched

Farmers in central and southern Colorado, including the San Luis Valley, are praying for rain as water levels in the Gunnison River and Rio Grande are far below normal. State officials may decide this week whether to enact Colorado's drought emergency plan.



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already below some diversion structures.

Record-low snowpack in the San Juan and Sangre de Cristo mountains evaporated with the spring winds. The 2 million-acre Rio Grande National Forest is tinder dry. Sheriffs in four of the valley's six counties have declared bans on open outdoor fires, a restriction expected to become commonplace across much, if not all, of southern Colorado over the next few weeks.

Some towns are restricting outdoor water use.

Just how parched is it?

Two weeks of high winds blowing through the valley have carried tons of topsoil from yet-to-be-planted fields into the air, authorities said, blotting out the sun and forcing motorists to turn on their headlights to see through clouds of swirling dust.

And near La Jara last week, the state unleashed snowplows on U.S. 285 to clear off several inches of dirt.

John Allen Davey is a water engineer who's tracked the valley's aquifer since 1976. Water is measured by the acre-foot, which is enough to cover an acre of land a foot deep, or 325,851 gallons. An average American family of four uses one acre-foot a year. It takes two to three acre-feet of water to grow a crop - or keep a lawn green, according to officials.

In 1977, the aquifer decreased by 500,000 acre-feet, according to Davey's records, and it's already down 300,000 acre-feet this year. In normal years, mountain snowmelt recharges about 2 million acre-feet in the watershed and aquifer, but that didn't happen this year.

"If this year goes like 1977, the bucket will be dry in a lot of places," Davey said.

His records show the aquifer has fallen 5 feet in some areas and 15 feet in others.

Colorado's San Luis Valley and its surrounding mountains lie at the top of the 1,800-mile-long Rio Grande watershed, a 4,000-square-mile area that during a normal year delivers 725,000 acre-feet of water to New Mexico, Texas and Mexico.

Meantime, water officials say, more than half the ranchers in the Upper Gunnison Basin will be forced to operate without their usual water supplies this year because of drought.

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Some ranchers say they expect to see just a quarter of their normal supply.

Denver Post staff writer Theo Stein and, The Associated Press contributed to this report.

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Drought threatens Colorado

2002 could become first time in 20 years at least half the state is dry at the same time

By Joe Garner, News Staff Writer

Colorado is staring down the barrel of a third straight dry summer, but a typical wet spring would ease the threat of drought.

"So far, we are not seeing any major impacts because this is a low water usage time of year," said Jeff Brislawn, chairman of the Colorado Drought Task Force. "But there are things we can anticipate."

This is the month Colorado begins its annual teetering between a wet or dry summer, with important ramifications for farmers, wildland firefighters and even urban vegetable gardeners. The state is semiarid, so one quadrant or another routinely is in or near drought, according to the Colorado Climate Center.

But 2002 is setting up to be the one year in 20 when moderate or greater drought encompasses at least half of Colorado at the same time.

Despite the shallowest March 1 snowpack in 20 years and lower-than-average reservoirs, Denver Water and other Front Range water suppliers have no plans to restrict use this summer. However, farmers are braced for water shortages because the snowpack, which supplies 80 percent of the state's surface water requirements, cannot build up significantly from the current 56 percent of average in the few weeks remaining when snowfields can grow.

Still, agricultural officials anticipate rains in the next few weeks along the Front Range, where spring historically is the wettest season.

"I would hesitate to say it's time to get worried. It's early yet, but it has been dry all winter," said Lance Fretwell, deputy state statistician with the Colorado Agricultural Statistics Service. "Winter wheat fields look a lot like your lawn right now. They just haven't started their growth yet."

Brislawn said the members of a drought task force, which meets again March 21, are reviewing the Colorado Drought Plan, which focuses on drought's impact in such areas as wildfires, wildlife,

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tourism and municipal water supplies.

Some public agencies already are gearing up for drought.

The Jefferson County wildfire task force is meeting this week -- about a month earlier than usual, said Rocco Snart, wildfire mitigation specialist.

"We just want to start meeting earlier than usual to be sure we're all on the same page," Snart said. "We're banking on March and April providing us some springtime snow. But, if it doesn't come, we'll just continue in our unusually dry state."

In southwest Colorado, the Durango Fire & Rescue Authority is asking for increased public cooperation because eight controlled burns have been whipped out of control since January by dry, windy conditions.

Elsewhere across the West, firefighters already have been called out to combat grass fires on the plains of Montana and in dense vegetation in the Arizona mountains. In Kansas, ranchers are hauling in water or selling cattle.

The National Weather Service doesn't hold out much hope for precipitation across Colorado, at least through March 20. The forecast is for below-normal precipitation statewide.

Urban Front Range residents may not realize that farmland is dry or that mountain streams are flowing at less than half the usual depth because tapwater will flow.

Denver Water always advocates conservation and the agency does not anticipate water restrictions even though its reservoirs are low, said water resource engineer Bob Steger. The reservoirs are 78 percent full this March, compared with an average of 82 percent.

"The Denver water system is designed to withstand drought," Steger said. "That's why we have reservoirs. We get them full in wet years to get us through dry years."


The last time Denver Water customers were on mandatory restrictions was 1981, when March 1 snowpack was 40 percent of average, compared with this year's 56 percent.

Similarly, the Northern Colorado Water Conservancy District, which serves the Front Range from Broomfield to Greeley, is not considering restriction, although its reservoirs are only 50 percent of capacity, said spokesman Brian Werner.

Agencies that fight wildfires are bracing for a repeat of the 2000 fire season, when Colorado wildfires consumed 75 homes and charred 127,000 acres, an area more than three times the size of Denver International Airport.

Colorado will be home base this summer to three Hot Shot firefighting crews, compared with two in 2000, said Lynn Young, Forest Service spokesman for the Rocky Mountain region. And a fourth will be in training in Durango -- the first elite crew on the Western Slope.

Despite the concern over low precipitation, Colorado enjoyed its second-longest sustained wet period in recorded history in 1982-99, said Roger Pielke Sr., state climatologist.

	<p>"Because this winter has been dry does not indicate the spring and summer will be dry," Pielke said. "We still don't know how this will evolve."</p>
<p>Contact Joe Garner at (303) 892-5421 or garnerj@RockyMountainNews.com.</p>	
<p>March 11, 2002</p>	

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5.0 Credible Eyewitness Accounts

From: STEVE Wynn
To: Burns, SHEILA
Date: 3/8/02 12:12PM
Subject: Lamar wind on March 7, 2002

Sheila.....Yesterday while calibrating the PM10's on the roof of the Lamar Power Plant, I encountered very moderate wind speeds; actually none to 5-10 mph at times. The time would have been between 0800 to 0930. It was not until I was driving home between Las Animas and La Junta did I encounter a very strong front with extremely high wind speeds at about 1015. The winds were so strong, in fact, that the plastic bug deflector on the front of the Jeep was raised at one corner and snapped off, while driving. There was a very noticeable dust cloud headed east towards Lamar and that vicinity with very wicked winds blowing steadily. At Ordway, I observed a range fire just north of town along RT. 71 just west of the cemetery. The local fire department was on hand, but did not appear to be concerned with the 15 foot high wall of flame, since it did not appear to be headed toward any structures at that time, just tombstones. But of course I did not stick around to observe what actions were eventually taken.

Most of eastern Colorado is brown with interesting color accents of brown.

Steve Wynn

From: COLEEN Campbell
To: Burns, SHEILA; Pierce, GORDON
Date: 3/14/02 9:56AM
Subject: More Info on the Lamar Fires

Terry Marinelli, Colorado Division of Wildlife, Rocky Ford SWA called around and found out more details on the fires that occurred in Lamar.

The fire on the North side of town that burned along Highway 50 and went through the KOA campground, was an agricultural fire. They were burning ditches. Lamar does require a permit for ag burns. Terry was not sure who issues those. I would imagine the Fire Department. This fire burned up some sheds and haystacks.

The second fire was in town and is suspected to have started in a trash barrel. This is the fire that caused evacuation of the School. Not because of fire hazard, but because of the smoke impacts. This fire burned two businesses. One of which may have been a machine shop.