



COLORADO

**Department of Public
Health & Environment**

**Mitigation Plan for High Wind Events
Involving PM₁₀ in Alamosa County,
Colorado**

Prepared by the
Air Pollution Control Division
Colorado Department of Public Health and Environment

August 15, 2018

CONTENTS

1	Introduction.....	1
1.2	Mitigation Plan Requirements.....	1
2	Mitigation Plan Components.....	3
2.1	Public Notification and Education.....	3
2.2	Mitigation Methods	5
2.3	Processes to Collect and Maintain Data	17
2.4	Mechanisms to Consult with other Air Quality Managers.....	18
2.5	Periodic Review, Evaluation, and Public Comment.....	18
3	Submission of Mitigation Plan	19
	Appendix A: Public Notice Comments and Division Responses.....	20
	Appendix B: Air Quality Health Advisory for Blowing Dust Template	21
	Appendix C: Blowing Dust Health Advisory Brochure.....	22

Abbreviations

AQS	Air Quality System
CRP	Conservation Reserve Program
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
NAAQS	National Ambient Air Quality Standard
NRCS	Natural Resources Conservation Service
OPPI	Office of Planning, Partnerships and Improvement
PM	Particulate Matter
PM ₁₀	Particulate Matter less than or equal to 10 microns in aerodynamic diameter
USDA	U.S. Department of Agriculture

Figures

Figure 1: Alamosa County Drought Monitor Time Series, 1/4/2011-6/22/2018	12
Figure 2: CRP Enrollment Map, 3/31/16	13

Tables

Table 1: Mitigation Plan Checklist	2
Table 2: State Regulations Regulating Particulate Matter (PM) Emissions	5
Table 3: Rules and Ordinances Regulating PM Emissions in Alamosa.....	7
Table 4: Alamosa County Monitoring Location and Parameters Monitored	17

1 INTRODUCTION

In 2007, the EPA promulgated an Exceptional Event Rule (EER), based on the 2005 amendments to Section 319 of the Clean Air Act, which established a process for the treatment of data influenced by exceptional events. The Revised EER became effective September 30, 2016 and included the requirement for areas with recurring events to develop mitigation plans. 40 CFR 51.930 defines “historically documented or known seasonal events” as three events of the same type and pollutant that recur in a three-year period, for which affected data has either been flagged as having been influenced by an exceptional event, or was the subject of an initial notification to the U.S. Environmental Protection Agency (EPA) of a potential exceptional event.

Under 40 CFR 51.930, the Colorado Department of Public Health and Environment - Air Pollution Control Division, hereafter referred to as “Division”, is required to develop and submit a mitigation plan for particulate matter less than 10 micrometers in diameter (PM₁₀) for Alamosa County. The mitigation plan components and how the Division is implementing them are described in detail below. This mitigation plan meets the requirements under 51.930 and will assist both the city and the county of Alamosa in addressing blowing dust due to uncontrollable winds.

According to the relevant timeframes in the Revised EER, Alamosa County had experienced more than three windblown dust events, causing elevated PM₁₀ in the prior three-year period between January 1, 2013 and December 31, 2015. Since the Division had submitted more than three demonstrations for Alamosa under the provisions of 40 CFR 50.14 in a three-year period, Alamosa County was included in Table 6 of the preamble to the final rule. The EPA utilized this action to provide written notice to Colorado that Alamosa County is henceforth subject to the requirements in 51.930(b) and is subsequently required to develop and submit a mitigation plan to EPA in accordance with the requirements of the rule.

1.2 Mitigation Plan Requirements

The purpose of this mitigation plan is to protect public health from exceedances of the National Ambient Air Quality Standard (NAAQS) through the implementation of the following three mitigation plan components. At a minimum, the state must:

- Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events;
- Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event, and;
- Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard.

In order to meet these requirements, each mitigation plan must contain provisions for the following:

- 1) Public notification to and education programs for affected or potentially affected communities. Such notification and education programs shall apply whenever air quality concentrations exceed or are expected to exceed a NAAQS with an averaging time that is less than or equal to 24 hours.

- 2) Steps to identify, study and implement mitigating measures, including approaches to address each of the following:
 - a) Measures to abate or minimize contributing controllable sources of identified pollutants.
 - b) Methods to minimize public exposure to high concentrations of identified pollutants.
 - c) Processes to collect and maintain data pertinent to the event.
 - d) Mechanisms to consult with other air quality managers in the affected area regarding the appropriate responses to abate and minimize impacts.
 - e) Provisions for periodic review and evaluation of the mitigation plan and its implementation and effectiveness by the state and interested stakeholders.

Each of these requirements are addressed in this document. To exhibit the completeness of this document and for the ease of the reviewer, Table 1 below includes a description of each air agency mitigation plan requirement and accompanying citation, in addition to the page number where the is addressed in this document. This checklist was taken directly from the EPA Mitigation Checklist document, available on the EPA Exceptional Events Implementation Tools, Templates and Links website¹. Note that the original checklist contains both EPA and air agency responsibilities. This table includes air agency responsibilities for brevity.

Table 1: Mitigation Plan Checklist

40 CFR 51.930 Mitigation of Exceptional Events Regulatory Citation		Plan Page Number(s)
51.930(b)(2)	<i>Plan components. At a minimum, each mitigation plan...shall contain provisions for the following:</i>	
51.930(b)(2)(i)	Public notification to and education programs for affected or potentially affected communities. Such notification and education programs shall apply whenever air quality concentrations exceed or are expected to exceed a NAAQS with an averaging time that is less than or equal to 24-hours.	3-4
51.930(b)(2)(ii)	Steps to identify, study and implement mitigating measures, including approaches to address each of the following:	5-17
51.930(b)(2)(ii)(A)	Measures to abate or minimize contributing controllable sources of identified pollutants.	5-17
51.930(b)(2)(ii)(B)	Methods to minimize public exposure to high concentrations of identified pollutants.	3-17
51.930(b)(2)(ii)(C)	Processes to collect and maintain data pertinent to the event.	17-18
51.930(b)(2)(ii)(D)	Mechanisms to consult with other air quality managers in the affected area regarding the appropriate responses to abate and minimize impacts.	18
51.930(b)(2)(iii)	Provisions for periodic review and evaluation of the mitigation plan and its implementation and effectiveness by the State & interested stakeholders.	18-19
51.930(b)(2)(iii)(A)	<i>With the submission of the initial mitigation plan according to the requirements in 51.930(b)(3) that contains the elements in 51.930(b)(2), the State must:</i>	
51.930(b)(2)(iii)(A)(1)	Document that a draft version of the mitigation plan was available for public comment for a minimum of 30 days;	Appendix A
51.930(b)(2)(iii)(A)(2)	Submit the public comments received along with its mitigation plan to the Administrator; and	Appendix A
51.930(b)(2)(iii)(A)(3)	In its submission to the Administrator, for each public comment received, explain the changes made to the mitigation plan or explain why the State did not make any changes to the mitigation plan.	Appendix A

¹ <https://www.epa.gov/air-quality-analysis/exceptional-events-implementation-tools-templates-and-links>

40 CFR 51.930 Mitigation of Exceptional Events Regulatory Citation		Plan Page Number(s)
51.930(b)(2)(iii)(B)	The State shall specify in its mitigation plan the periodic review and evaluation process that it intends to follow for reviews following the initial review identified in 51.930(b)(2)(iii)(A).	18-19
51.930(b)(3)(i)	States shall submit their mitigation plans within 2 years of being notified they are subject to 51.930(b).	19

2 MITIGATION PLAN COMPONENTS

2.1 Public Notification and Education

The Revised EER requires air agencies to provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard. Whenever PM₁₀ air quality concentrations exceed or are expected to exceed the NAAQS of 150 µg/m³, the Division provides prompt public notification to the citizens of Alamosa County. This public notification is multifaceted and designed to reach the greatest number of people possible. The approaches utilized include:

- Issuance of blowing dust advisories that are posted to the Colorado Air Quality Summary webpage².
- The Division sends the dust advisories (template included in Appendix B) to members of the public and local representatives who are on the “colorado.airquality” list serve. This list serve is open to anyone who subscribes by emailing aq_subscribe@state.co.us.
- The Division posts the advisory on its Facebook page³.
- The Division posts the advisory on its Twitter feed⁴.
- The Division contacts Alamosa County staff when a blowing dust advisory is issued.
- Alamosa County posts the alert on their Facebook page and shares the advisory information with the local media outlets. Alamosa County staff also issue an alert if visibility is less than one mile.

The foundation of the public notification system is the identification of exceedances that are occurring or may occur in the near future. This identification relies upon the team of expert meteorologists in the Division. These meteorologists issue forecasts seven days a week and are on duty 365 days a year. This enables rapid identification of exceedances and potential exceedances so that alerts and advisories are sent out promptly.

A forecast or analysis for the potential for blowing dust in Colorado and in the Alamosa region specifically is completed on a daily basis throughout the year, and multiple times per day when the forecast for blowing dust is indicative of elevated PM₁₀ concentrations. These forecasts are based on a full meteorological forecast for the current and subsequent days, an assessment of state wide and regional soil moisture conditions, review of output from two models that forecast blowing dust in the United States, an assessment of any blowing dust or wind advisory forecasts issued by National Weather Service Forecast (NWS) offices in

² http://www.colorado.gov/airquality/colorado_summary.aspx

³ <https://www.facebook.com/cdphe.apcd/>

⁴ <https://twitter.com/cdpheapcd?lang=en>

Colorado, Utah, New Mexico, and Arizona, and the evaluation of a variety of satellite data products, surface weather observations, and regional webcams.

The Division worked closely with the City of Alamosa, Alamosa County Commissioners, and interested stakeholders to educate the public regarding the issues associated with elevated levels of PM₁₀ in the Alamosa area. Over the years numerous meetings have taken place with the City and County governments to discuss these issues and to develop a plan to address future high wind events in Alamosa. Elements of the program include: explaining what the public can expect when high wind events occur; what steps will be taken to control dust emissions during future high wind events; and, how to minimize their exposure to high concentrations of PM₁₀ during high wind conditions. The public education programs have included but are not limited to:

- An informational and health-related brochure (Blowing Dust Health Advisory Brochure) distributed by the local governments, the Alamosa County Health Nurses, Alamosa County conservation and agricultural extension agencies to sensitive populations (elderly and local school districts) as well as to the general public. Distribution of the brochure began in March 2000 (see Appendix C). Based on feedback received during the development of this plan, the Division is developing online resources to educate the public about dust and health.
- Ongoing development of educational materials available through various County offices, including the County Land Use Office, County Building Code Office, and included in County tax announcements.
- Each Blowing Dust Advisory issued by the Division (discussed above under public notification) includes information on what actions individuals can take to reduce personal exposures. The following public health recommendation language is included in each advisory:

“If significant blowing dust is present and reducing visibility to less than 10 miles across a wide area, People with heart or lung disease, older adults, and children in the affected area should reduce prolonged or heavy indoor and outdoor exertion.”

- The Colorado Department of Public Health and Environment Office of Planning, Partnerships and Improvement (OPPI) Frequently Asked Questions for Public Health Leaders document⁵ is provided to city and county governments and includes resources for dust complaint response. The OPPI also provides city and county government staff with the Fugitive Dust Best Management Practices⁶ pamphlet developed by Boulder County Public Health.
- The City of Alamosa discourages the use of dust-producing equipment (e.g., leaf blowers) in an effort to reduce PM₁₀ emissions through public education and outreach efforts.

This public notification and education processes discussed in this section fulfill the 51.930(b)(2)(i) requirements while working to minimize public exposure to high concentrations of identified pollutants per 51.930(b)(2)(ii)(b). As discussed, the public is notified promptly regarding PM₁₀ exceedances or expected exceedances. The education programs and components that have been put into place are ongoing and apply regardless of exceedance status.

⁵ https://www.colorado.gov/pacific/sites/default/files/LPHA_EH-FAQ-resource-guide-August-2016_1.pdf

⁶ <https://assets.bouldercounty.org/wp-content/uploads/2017/02/fugitive-dust-best-management-practices.pdf>

2.2 Mitigation Methods

The Revised EER requires a mitigation plan to include steps to identify, study and implement mitigating measures. The following section details various activities to reduce high wind dust in Alamosa County.

Table 2: State Regulations Regulating Particulate Matter (PM) Emissions

Rule/Ordinance	Description
<p>Colorado Department of Public Health and Environment Regulation 1- Emission Control For Particulate Matter, Smoke, Carbon Monoxide, And Sulfur Oxides</p>	<p>Applicable sections include but are not limited to: Everyone who manages a source or activity that is subject to controlling fugitive particulate emissions must employ such control measures and operating procedures through the use of all available practical methods which are technologically feasible and economically reasonable and which reduce, prevent and control emissions so as to facilitate the achievement of the maximum practical degree of air purity in every portion of the State. Section III.D.1.a). Anyone clearing or leveling of land greater than five acres in attainment areas or one acre in non-attainment areas from which fugitive particulate emissions will be emitted are required to use all available and practical methods which are technologically feasible and economically reasonable in order to minimize fugitive particulate emissions.(Section III.D.2.b) Control measures or operational procedures for fugitive particulate emissions to be employed may include planting vegetation cover, providing synthetic cover, watering, chemical stabilization, furrows, compacting, minimizing disturbed area in the winter, wind breaks and other methods or techniques approved by the APCD. (Section III.D.2.b) Any owner or operator responsible for the construction or maintenance of any existing or new unpaved roadway which has vehicle traffic exceeding 200 vehicles per day in the attainment/maintenance area and surrounding areas must stabilize the roadway in order to minimize fugitive dust emissions (Section III.D.2.a.(i))</p>

<p>Colorado Department of Public Health and Environment Regulation 3- Stationary Source Permitting and Air Pollutant Emission Notice Requirements</p>	<p>Construction Permit required if a land development project exceeds 25 acres and spans longer than 6 months in duration (Section II.D.1.j). All sources with uncontrolled actual PM₁₀ emissions equal to or exceeding five (5) tons per year, must obtain a permit. The new source review provisions require all new and modified major stationary sources in non-attainment areas to apply emission control equipment that achieves the "lowest achievable emission rate" and to obtain emission offsets from other stationary sources of PM₁₀.</p>
<p>Colorado Department of Public Health and Environment Regulation 4- New Wood Stoves and the Use of Certain Woodburning Appliances During High Pollution Days</p>	<p>Regulates wood stoves, conventional fireplaces and woodburning on high pollution days. Prohibits the sale and installation a wood-burning stove in Colorado unless it has been tested, certified, and labeled for emission performance in accordance with criteria and procedures specified in the Federal Regulations and meets emission standards. (Section II) Section III regulates pellet stoves. Section IV regulates masonry heaters. Section VII limits the use of stoves on high pollution days.</p>
<p>Colorado Department of Public Health and Environment Regulation 6- Standards of Performance for New Stationary Sources</p>	<p>Implements federal standards of performance for new stationary sources including ones that have particulate matter emissions. (Section I)</p>
<p>Colorado Department of Public Health and Environment Regulation 9- Open Burning, Prescribed Fire, and Permitting</p>	<p>Prohibits open burning throughout the state unless a permit has been obtained from the appropriate air pollution control authority. In granting or denying any such permit, the authority will base its action on the potential contribution to air pollution in the area, climatic conditions on the day or days of such burning, and the authority's satisfaction that 31 there is no practical alternate method for the disposal of the material to be burned. Among other permit conditions, the authority granting the permit may impose conditions on wind speed at the time of the burn to minimize smoke impacts on smoke-sensitive areas. (Section III)</p>
<p>Colorado Department of Public Health and Environment Common Provisions Regulation</p>	<p>Applies to all emissions sources in Colorado When emissions generated from sources in Colorado cross the state boundary line, such emissions shall not cause the air quality</p>

	standards of the receiving state to be exceeded, provided reciprocal action is taken by the receiving state. (Section II A)
Federal Motor Vehicle Emission Control Program	The federal motor vehicle emission control program has reduced PM ₁₀ emissions through a continuing process of requiring diesel engine manufacturers to produce new vehicles that meet tighter and tighter emission standards. As older, higher emitting diesel vehicles are replaced with newer vehicles; the PM ₁₀ emissions in areas will be reduced.

Regulatory Measures - City and County:

The Division, the City of Alamosa, and Alamosa County are responsible for implementing regulatory measures to control emissions from agricultural sources, stationary sources, fugitive dust sources, and open burning in the area. Alamosa’s ordinances of PM₁₀ emissions are summarized in Table 3.

Table 3: Rules and Ordinances Regulating PM Emissions in Alamosa

Rule/Ordinance	Description
City of Alamosa Code of Ordinances Article VII of Section 21-140 (5)	Addresses dust control for home occupations.
City of Alamosa Code of Ordinances Article V Sec. 17-87(3))	Requires all new roads and alleys to be paved.
City of Alamosa Code of Ordinances (Article VI Sec. 21-119(g)(3)).	New large commercial/retail establishments must install underground automatic irrigation systems for all landscaped areas.
Alamosa County Land Use and Development Code (1.4.2)	Agriculture is an important part of the economy and adds intrinsic value to life in Alamosa County. Agriculture, as a business, brings dust and other inconveniences. To maintain this way of life, Alamosa County intends to protect agricultural operators from unnecessary, intrusive litigation. Therefore, no inconvenience shall be considered a nuisance so long as it occurs as a part of non-negligent and legal agricultural practice, as stated in C.R.S. 35-3.5-101, 102 and 103.
Alamosa County Land Use and Development Code (3.5.2(A)(8))	For feed lot, animal waste treatment, or animal waste collection facilities fugitive dust shall be confined on the property.
Alamosa County Land Use and Development Code (3.5.6(D)(2))	For a proposed oil and gas well installation, any interior transportation network shall be paved, or the company shall undertake appropriate dust abatement measures.
Alamosa County Land Use and Development Code (3.5.7(G))	All roads, driveways, parking lots and loading and unloading areas within 500 feet

	of any lot line shall be graded and paved with an approved concrete or asphalt/concrete surface as to limit adjoining lots and public roads the nuisance caused by wind-borne dust.
Alamosa County Land Use and Development Code (4.2.3(C)(2))	Where off-street facilities are provided for parking or any other vehicular use area, they shall be surfaced with asphalt bituminous, concrete or other dustless material approved by the administrator and shall be maintained in a smooth, well-graded condition.

City of Alamosa

The City of Alamosa has been active in addressing potential PM₁₀ sources in the area through various efforts. Some of these efforts, plus other potential future measures, include the adoption of local ordinances to reduce PM₁₀.

Street Sweeping:

The City of Alamosa sweeps on an every 4-week schedule or as needed, as determined by local officials on a case by case situation (e.g., following each snowstorm and/or where sand was applied). Sweeping occurs on every single City street with an emphasis on the downtown corridor where public exposure is expected to be greatest. Street sweeping in the downtown corridor takes place twice per week.

Unpaved Roads within the City:

The City of Alamosa (as of 2008) requires all new roads and alleys to be paved according to the Municipal Code (Article V Sec. 17-87(3)) and some existing unpaved roads are being treated with dust suppressants until all underground utilities are installed. No new development is allowed until paving is complete unless a performance bond is in place.

According to the City’s Public Works Director, less than 3% of City roads were unpaved; most of these unpaved roads are legacy annexations. The remaining unpaved roads are all low traffic (less than 100 vehicles per day/average daily traffic) and the City continues to seek funding sources for paving these streets.

Sod/Vegetative Cover Projects in the City of Alamosa:

The City of Alamosa places vegetative cover in all city parks with irrigation systems to maintain the cover. In 2013, the City began emphasizing more low-water use landscaping with shrubs, mulch, etc. including both organic and rock. All turf areas do have irrigation systems which utilize drip systems for specimen plantings.

Alamosa County:

Alamosa County has also been active in addressing blowing dust as detailed below.

Unpaved Roads:

Alamosa County continues to address unpaved roads and lanes that are anticipated to contribute to PM_{10} emissions in the community. In 2002, Alamosa County was nearing the end of its five-year road paving plan and was developing their next plan with the intention of paving on a yearly basis, based on traffic, community needs/priorities, and funding availability.

In 2002, Alamosa County addressed approximately ten (10) miles of unpaved roads. This included the stabilization of approximately five section roads, the seal coating of two roads, and the overlay (repaving) of four (4) additional roads.

In 2003, approximately 14 miles of roads were paved. This includes the Seven Mile Road (three miles long), Road 109 (one mile long), and 10th Street (also one mile long). These roads are in close proximity to the City of Alamosa, are upwind (prevailing) from the city, and have heavy traffic. Paving is anticipated to greatly reduce blowing dust and impacts in the vicinity.

No paving projects took place between 2004 and 2010 due to lack of funding. Between 2010 and 2013, the County was able to get funding but only for maintenance paving on previously paved roads that needed repair. Now that the county is caught up on maintenance paving, it is focusing on paving the remaining unpaved roads. The County's goal is to pave about 2.5 miles of unpaved road per year depending on funding availability.

In 2013, Alamosa County had funding to pave approximately 2.5 miles of County Road 106 North (located north of Alamosa off of Highway 17) which is currently unpaved. After this paving project the County will only have 2.5 miles of unpaved road remaining on the 106 North.

In the summer time, the County regularly hauls water and wets down the unpaved roads (mostly gravel, clay and sand) to reduce the fugitive particulate emissions. The County wets the unpaved roads on an as needed basis based on weather conditions and traffic volume in the summer and wets down some of the more sandy roads in the winter when temperatures drop below a threshold in the area. Once the water soaks in and freezes, good dust suppression is seen. Road construction areas are also being dampened with water for dust control. These practices reduce PM_{10} emissions in and near Alamosa. This control measure is balanced with the availability of water in the area.

Alamosa County previously assessed the need to use magnesium chloride treatment(s) on roads in front of residences that request such service. This practice stopped in 2004 when funding was lost. Assessments included the sensitivity to dust of residents, the materials of the road base for safety reasons, and possible environmental concerns of the neighborhood. Most requests for treatment were granted. Other areas for treatment, such as commercial construction zones or gravel pits, were investigated on a case by case basis. The County hopes to be able to start offering this service again when funding is restored and anticipates that paving will continue in the near future.

Dust Control Plans:

Alamosa County requires dust control plans for selected construction/developments. The dust control plans are typically done through a negotiated agreement by the Alamosa Land Use Department and is supported by zoning codes.

Wind Erosion of Open Areas:

To reduce PM₁₀ emissions from open areas outside of the City limits, low tilling and other soil conservation practices continue to be utilized in the community. The Mosca-Hooper Conservation District and Natural Resources Conservation Service is working on education efforts to promote cover crops and no-till agriculture. In addition, the community is strategically using the Colorado State Forest Service's program to purchase and plant trees for a windbreak, shelterbelt, or for reforestation, erosion control, wildlife, visual screening or noise barriers⁷. Nursery seedlings from the program have been sold in Alamosa County since 1956.

These trees have a demonstrated advantage for the community and for air quality. Once the trees reach maturity, it is anticipated that the equivalent of 112 miles of double-rowed trees will be in place. The survival rate of the tree seedlings varies but according to the District Coordinator for the Seedling Tree Program, potted seedlings have about a 60% to 80% survival rate and the bare root seedlings have about a 40% to 60% survival rate. The Seedling Program recommends Siberian elm and Rocky Mountain juniper trees for low maintenance, drought resistance windbreaks in the valley, but offers over 40 varieties to suit specific site conditions. The Colorado State Forest Service and the Mosca-Hooper Conservation District promote the windbreak program through workshops and consulting landowners. Colorado State University also provides guidance for windbreak planning and management⁸.

In addition, there is ongoing planting of trees (approximately 50) on newly developed Alamosa County property south/southwest of Alamosa (prevailing winds from southwest) and the Airport south of Alamosa for added air quality improvement. Also, The Bureau of Reclamation has an ongoing project to plant windbreaks along their Closed-Basin Canal.

Sod and Vegetative Projects in the County:

The development and construction of a local park, Eastside Park, is complete in Alamosa County. It has been completed with turf grass, shrubs, and landscape rock. No exposed soil remains. Numerous other projects to reduce blowing dust and its impacts have happened or are happening at the County Airport. For example:

- Through additional grounds maintenance of the 40-acre Alamosa County airport south of the city, "Xeriscape" landscaping (the use of native drought resistant vegetation and/or rock cover) has been installed for aesthetics and dust control.
- Decorative rock and xeriscape landscaping have been implemented in the landscaping of the Alamosa County property. These measures have directly abated blowing dust at the Airport.
- The widening of the airport's safety areas (250 feet on either side of the runway) is complete. Seeding of natural grasses was incorporated in the project. Trees and grass were incorporated in the approaches to the airport and have provided additional wind-break advantages to South Alamosa. In other areas where watering is a problem, xeriscape is being encouraged for County owned property and for all other property owners.

⁷ <https://csfs.colostate.edu/alamosa/al-seedling-trees/>

⁸ <https://static.colostate.edu/client-files/csfs/pdfs/Living-Snow-Fences-Final-lo-rez.pdf>

Colorado State University Co-Op Extension Office:

In response to extremely dry conditions, the need to maintain area topsoil, and reduce impacts, the Colorado State University Co-Op Extension Office of Alamosa County provides the following outreach efforts and recommendations:

- Modification of grazing practices to improve protective crop cover;
- Increasing crop residues left in the fields to reduce blowing dust;
- Planting of fall crops to maintain fields;
- Application of manure to protect top soils from blowing away;
- Staggering of the harvest to minimize blowing dust;
- Outreach programs on soil conservation efforts;
- Development of outreach/education materials (e.g., news articles, newsletters, fact sheets, etc.); and
- Attendance at statewide workshop to educate other Co-Op offices to various practices to reduce blowing top soil and minimize impacts.

These control strategies are not meant to be enforceable. They are meant only to demonstrate the regional nature of cooperation in addressing blowing dust and its impacts on the community.

U.S. Department of Agriculture (USDA): Natural Resources Conservation Service (NRCS) and Conservation Reserve Program (CRP):

Alamosa County is home to 322 farms consisting of 182,420 acres of agricultural land⁹, over 39% of the total land in the county. Alamosa County is a predominately agricultural area where limited water, coupled with the frequent high winds experienced during late fall and early spring, can destroy crops, encourage pests, and damage soil surfaces lending them susceptible to wind erosion. Alamosa has a semi-arid climate with approximately 7.25 inches of precipitation annually. Consequently, soils in all areas are typically a mixture of silt and sand with limited vegetation due to low precipitation. In winter and spring, windstorms are common, especially in drier years. It is due to these high velocity windstorms that Alamosa experiences most of the PM₁₀ problems for the area. Thus, activities that improve the topsoil and prevent its lifting during high wind events are encouraged. Some notable NRCS and agricultural examples include:

- Local Conservation Districts and farmers hold monthly meetings as an informal Soil Health Group, discussing ways to improve soil health. Cover crops, compost applications, and reduced tillage are the targeted practices. Public tours are held twice a year;
- NRCS continues to work with area farmers in the development of conservation compliance plans to also protect topsoil;

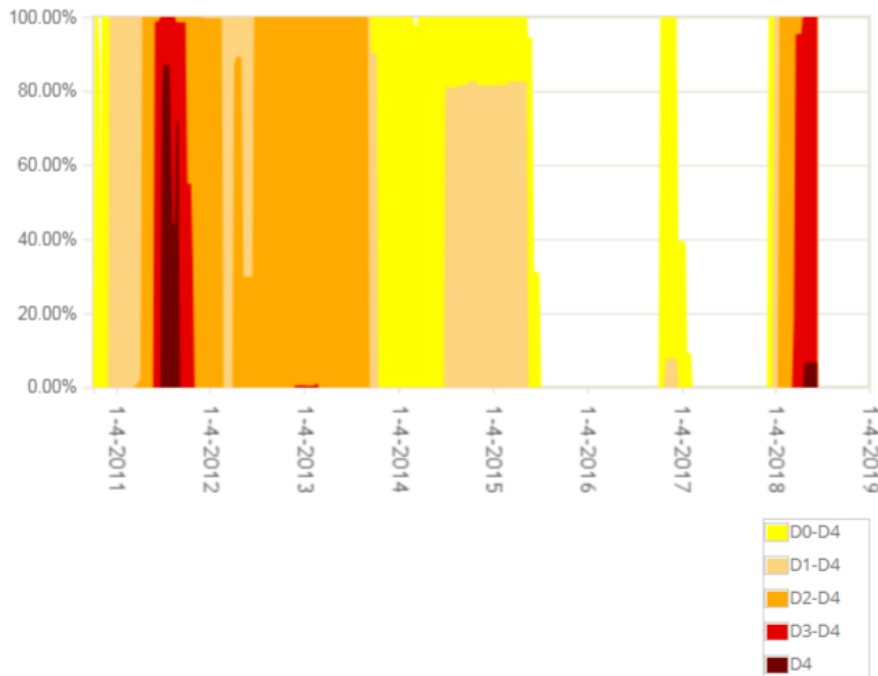
9

https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1_Chapter_2_County_Level/Colorado/st08_2_001_001.pdf

- NRCS encourages planting perennial grasses or the leaving weeds undisturbed or mowed on the corners of center pivots (instead of tilling that might lead to open, barren lands) to reduce soil blowing;
- NRCS “cost shares” on soil health practices and perennial grass seeding conservation practices with local farmers to prevent soil erosion; and
- The NRCS is working with Colorado State University, local Water Conservation District, and Farm Service Agency to encourage retirement of marginal cropland in the Conservation Reserve Program (CRP) and seeding those acreages back to native grass, forbs and shrubs. Other successful agricultural practices encouraged in the area include: timing of tillage, crop rotation, amount of crop residue left on the land, and proper water usage. These control strategies are not meant to be enforceable. They are meant only to demonstrate the regional nature of cooperation in addressing blowing dust and its impacts on the community.

As shown in Figure 1, Alamosa County experienced varying ranges of drought severity in 2011 with abnormally dry, moderate, severe, and exceptional conditions. The area experienced a prolonged period of moderate drought in 2012 and 2013, with abnormally dry and moderate conditions lasting through 2014 to mid-2015. Aside from a period of abnormally dry conditions and a brief span of moderate conditions, the county experienced prolonged periods free of drought for from mid-2015 to 2018. Extreme drought conditions returned to the area in 2018.

Figure 1: Alamosa County Drought Monitor Time Series, 1/4/2011-6/22/2018

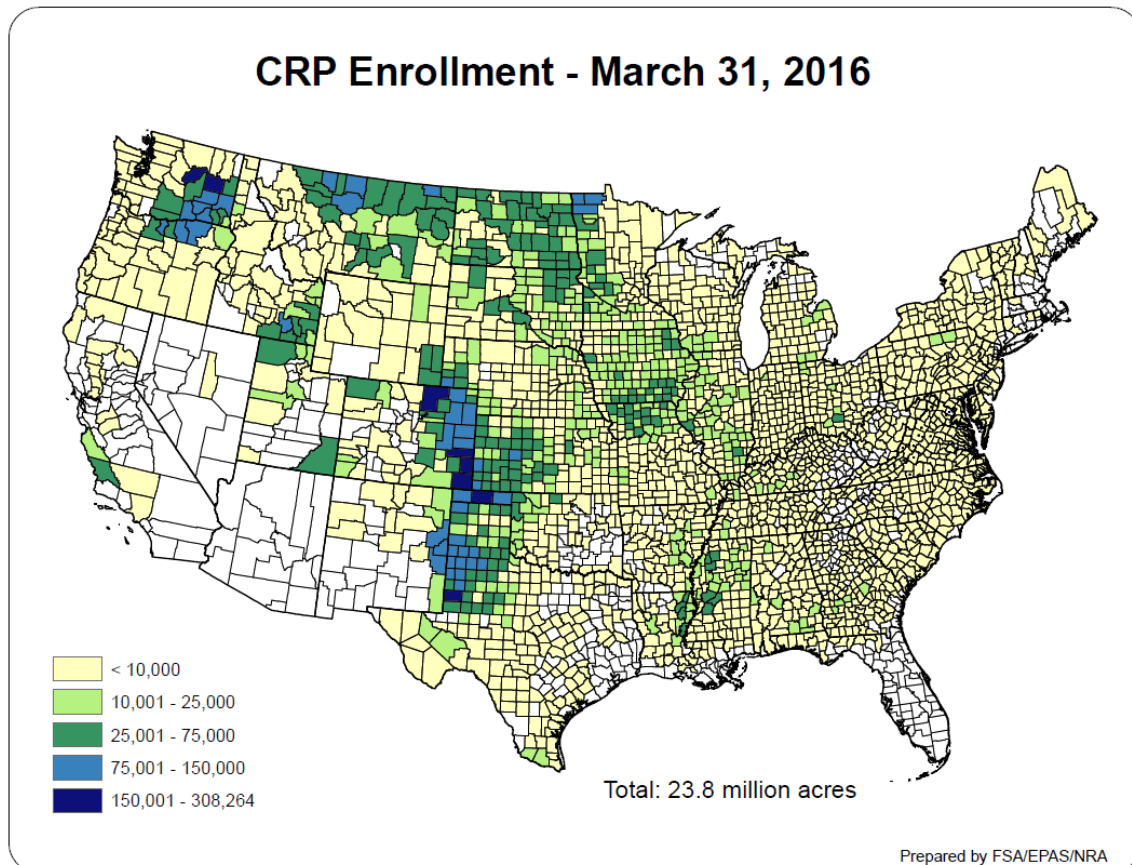


United States Drought Monitor, Time Series. 2018. Retrieved from: <http://droughtmonitor.unl.edu/Data/Timeseries.aspx>

Recognizing the problems associated with erodible land and other environmental-sensitive cropland, USDA included conservation provisions in the Farm Bill. This legislation created the CRP, referenced above, to address these concerns through conservation practices aimed at

reducing soil erosion and improving water quality and wildlife habitat. The CRP is a voluntary program that contracts with agricultural producers so that environmentally sensitive land is not farmed or ranched, but instead used for conservation benefits. Participating landowners receive annual rental payments for the land and cost-share assistance for establishing those practices. The CRP currently has 3,477 acres currently under contract in Alamosa County. Figure 2 shows CRP enrollment by county across the U.S.

Figure 2: CRP Enrollment Map, 3/31/16



United States Department of Agriculture, Farm Service Agency [cartographer]. (2016). CRP Enrollment - March 31, 2016 [map]. Retrieved from <https://www.fsa.usda.gov/programs-and-services/conservation-programs/reports-and-statistics/conservation-reserve-program-statistics/index>

To maintain interest and garner new interest, the Farm Service Agency provides information on CRP year-round through local and state newsletters provided via the USDA e-gov delivery system. The NRCS Colorado CRP has a number of informational brochures and references on their website¹⁰ outlining the program and its benefits. The state and counties also provide information through national press releases. These efforts have been successful in minimizing the lands lost from the program.

Additional Measures:

¹⁰ https://www.nrcs.usda.gov/wps/portal/nrcs/detail/co/programs/?cid=nrcs144p2_062739

Rio Grande Basin Roundtable:

The upper Rio Grande drainage in south central Colorado encompasses roughly 7.5% of the State's land (approximately 8,000 square miles). Its borders are defined by the Colorado-New Mexico state line on the south, the La Garita range on the north, the San Juan Mountains and Continental Divide on the west, and the Sangre de Cristo and the Culebra mountains on the east. This area includes Alamosa County.

The Rio Grande Basin Implementation Plan (the Plan) was developed in response to Governor John Hickenlooper's 2013 Executive Order, which launched a Colorado-wide initiative to develop strategies to address the State's growing water demands. The Rio Grande Basin Roundtable is one of nine basin roundtables established by the "Colorado Water for the 21st Century Act."

The Plan highlights the challenges that dust on snow events presents to the environmental management of the Rio Grande Basin¹¹. Driven by high winds that transport and deposit dust onto the winter snowpack, the phenomenon known as dust on snow has a measurable effect on the rate at which snow melts. Dust on snow events are exacerbated by prolonged and lingering periods of drought. It may cause the peak runoff to occur as much as three weeks earlier than historically has occurred and may decrease annual runoff by as much as 5%. The Plan calls for the following:

- The formation of additional groundwater management subdistricts in the area to engage in coordinated cooperative projects with local, state, and federal agencies and conservations groups to address the challenges presented by climate change;
- Improvement of snow streamflow forecasting using modeling;
- Strategic crop development and irrigation improvements, and;
- Projects to enhance soil health in the area, including grazing management efforts.

Alamosa and Monte Vista National Wildlife Refuge Complex:

The Alamosa National Wildlife Refuge (11,169 acres) is located six miles east of the City of Alamosa. A portion of the Monte Vista National Wildlife Refuge (14,800 acres) is located approximately 18 miles west of the City of Alamosa (see Figure 3 below). The purpose of the Alamosa and Monte Vista National Refuge Complex is to provide healthy plant communities in a variety of successional and structural stages which best support migratory birds. The Complex's Comprehensive Conservation Plan relies heavily upon biological monitoring and recognizes the role that drought plays on the local habit and wildlife¹².

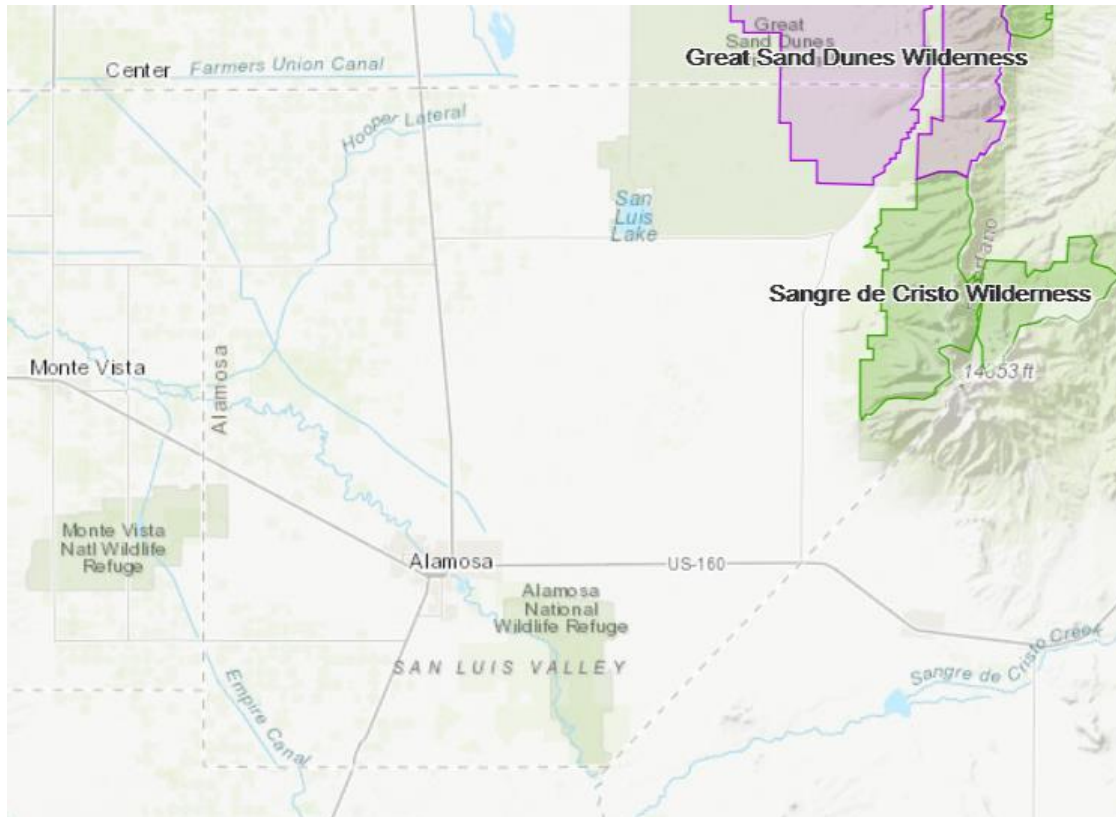
The current biological monitoring program includes procedures which have been used in the past that continue to meet management decision needs as well as new procedures including those that document how management treatments are meeting habitat goals and objectives. The monitoring program will evaluate and consider more than just the presence of wildlife but examine habitat components. All procedures are evaluated and incorporated into the program primarily based on how the subsequent results will be used in management decisions. Monitoring procedures will be appropriate for the life cycle needs of wildlife and vegetation. Most Complex monitoring is intended to detect trends and does not need to have the statistical power required in research. However, future efforts will be as quantitative and

¹¹ <https://www.colorado.gov/pacific/sites/default/files/rgbip-es-final.pdf>

¹² https://www.fws.gov/mountain-prairie/refuges/completedPlanPDFs_A-E/alm_mtv_2003_ccpfinal_all.pdf

repeatable as possible, and contain an appropriate level of statistical analysis. The key elements of the program will continually change as more information is gathered by the program and as information from literature reviews and other study results are incorporated. Priorities may also shift as plant and wildlife species and vegetation communities become rare or are threatened or when unforeseen severe habitat or other conditions exist, such as extreme drought.

Figure 3: Map of Alamosa County, Wilderness Areas, and Refuges



Wilderness Connect. 2018 Wilderness Areas of the United States. Retrieved from <https://www.wilderness.net/NWPS/stateview?state=CO>

Great Sand Dunes Wilderness/National Park and Preserve:

Over half of the 149,056 acre Great Sand Dunes National Park and Preserve is located in the northeast corner of Alamosa (see Figure 3 above). As a Class I air quality area, the Park's General Management Plan¹³ includes strategies to maintain park and regional air quality, including:

- Coordinated efforts with state and federal agencies, industries, nearby communities, and land managers to maintain and improve air quality in the area.
- Park staff and other scientists will continue to inventory and monitor the park's air quality and expand this program to detect and measure changes to the expanded park's air shed.

¹³ https://www.nps.gov/grsa/learn/management/upload/grsa_gmp_summary_2007.pdf

- Consistent with provisions of the Clean Air Act, the National Park Service will review, comment on, and recommend actions to minimize or reduce emissions from source being proposed within 64 miles of Great Sand Dunes National Park and Preserve.
- Park managers will attempt to minimize the effects of in-park pollution source on air quality, including:
 - Establishing non-burn days or banning wood burning altogether for campfire management.
 - Continue to require bus tour companies to comply with regulations that reduce air pollution levels (e.g., turning off engines when buses are parked).

Sangre de Cristo Wilderness

Portions of the Sangre de Cristo Wilderness are located within Alamosa County. The Sangre de Cristo Wilderness Management Guide includes provisions for “guarding against air pollution¹⁴”. This document includes a section on acid deposition, nitrogen deposition, changes in visibility, and light pollution. To address these challenges, a range of management actions including techniques, regulations, or responses are outlined in the Guide:

- Campsite management;
- Crowding guidelines;
- Recreational stock-use;
- Noxious weed control;
- Wilderness character monitoring.

Wilderness character includes air quality measures to assess visibility based on average deciview and sum of anthropogenic fine nitrate and sulfate, in addition to ozone monitoring based on concentration of N100¹⁵ episodic and W126¹⁶ chronic ozone exposure affecting sensitive plants.

Western Regional Air Partnership:

The Western Regional Air Partnership provides technical analyses and databases to assist states, tribes, federal land managers, local air agencies and the EPA with understanding current and evolving regional PM_{2.5}, PM₁₀, nitrogen deposition and critical loads, and mercury air quality issues in the west.

The regional effort on PM, nitrogen deposition and critical loads, and mercury includes, but is not limited to:

¹⁴ [https://www.fs.fed.us/r2/recreation/wilderness/training/2011-winter-meeting/sangre-de-cristo-wild/sangre-mgmt-guide-DRAFT-wo-maps-022211\(opt\).pdf](https://www.fs.fed.us/r2/recreation/wilderness/training/2011-winter-meeting/sangre-de-cristo-wild/sangre-mgmt-guide-DRAFT-wo-maps-022211(opt).pdf)

¹⁵ Number of hours when the measured ozone concentration is greater than or equal to 0.100 parts per million (ppm).

¹⁶ Seasonal ozone exposure, developed as a biologically meaningful way to summarize hourly average ozone data, places a greater weight on measured values as concentrations increase

- Analyses to support air quality planning and management by individual WRAP member jurisdictions and agencies for the PM_{2.5} and PM₁₀ NAAQS, ecosystem critical loads, and related indicators for nitrogen and mercury deposition;
- The nature and causes of these air quality issues, and how the sources and impacts are related to ozone, regional haze, and other pollutants;
- Emissions sources from all sectors, both domestic and international;
- Effects of air pollution transport; and
- Effects of climate change on regional air quality.

To accomplish this, the Partnership develops, maintains, and shares databases, supports technical analyses, and provides access to data and results from various information sources to produce consistent, comparable, and complete results for use by individual Partnership member jurisdictions and agencies. The Partnership website offers access to the Particulate Matter Deterministic & Empirical Tagging & Assessment of Impacts on Levels Project¹⁷. The tool will quantify the impact of prescribed and other fire sources on PM levels across the continental U.S.

2.3 Processes to Collect and Maintain Data

The Revised EER requires air agencies to develop processes to collect and maintain data pertinent to the event. This section provides background information about high wind events in the area and the Division’s efforts to collect and maintain data related to the events.

Alamosa is located within Colorado’s San Luis Valley Region, where agriculture and tourism are the primary industries. The valley is semiarid and croplands of potatoes, head lettuce, and barley are typically irrigated. Due to the semiarid nature of this area, Alamosa is susceptible to windblown dust events. Section 2.2 includes a discussion of factors that may contribute to these events and efforts to prevent or minimize them.

Alamosa currently has one PM₁₀ monitoring site located at the Alamosa Municipal Building (425 4th Street) that commenced operation in May 2002. The site was established to be closer to the center of the city than the former Adams State College site, in order to be more representative of the population exposure in the area. This is a population oriented neighborhood scale SLAMS monitor that is on a daily sample schedule. See Table 4 for the monitor location and parameters monitored. The Adams State College PM₁₀ site (208 Edgemont Blvd.) commenced operation in July 1989 and was discontinued in December 2016 as it was redundant to the Municipal Building site and was influenced by trees that had grown near the site.

Table 4: Alamosa County Monitoring Location and Parameters Monitored

AQS#	Site Name	Address		Site Started	Elevation (m)	Latitude	Longitude
	Parameter	POC	Parameter Started	Orient/Scale	Monitor	Type	Sample
08 003 0003	Alamosa Municipal Bldg.	425 4 th St.		05/2002	2,301	37.469585	-105.863175
	PM ₁₀	2	05/2002	P.O. Neigh	SA/GMW-1200	SLAMS	1 in 1

¹⁷ <https://www.wrapair2.org/pm.aspx>

The Alamosa Municipal Building PM₁₀ monitor is a filter based sampler and the Division enters into an annual contract with a local contractor in Alamosa to conduct air monitoring site visits to perform first-line maintenance, install clean filters, and collect sampled filters and data. The sampled filters are collected every four days and sent to a lab for analysis. The Division receives the data from the lab approximately two months later and the data are entered into the EPA AQS database.

The Division visits the site quarterly to conduct flow verification and calibration. Quality assurance is conducted quarterly in accordance with 40 CFR 58¹⁸. See the Colorado 2018 Annual Monitoring Network Plan¹⁹ and the 2016 Air Quality Data Report²⁰ for a description of the Division's data quality assurance and quality control procedures. Additionally, the Division maintains a PM tracking workbook. This workbook is used to track PM₁₀ exceedances of the NAAQS by monitor and date. Information regarding the number, type, and location of air quality advisories the Division issues each year is logged in a spreadsheet for future reference. The Division also saves an electronic copy of each air quality advisory that is forwarded to the county health department in the affected area.

2.4 Mechanisms to Consult with other Air Quality Managers

The Division has a history of coordination with Alamosa County Public Health and Environment as well as the City of Alamosa, as discussed in Section 2.1 and detailed in the Final Alamosa Natural Events Action Plan²¹. As detailed in Section 2.1, discusses the Division developed air quality health advisory procedures utilizing social media and a list serve to notify Alamosa County staff and the public of impending events expected to affect air quality and public health.

For the development of this plan the Division has communicated and coordinated with the Western U.S. PM₁₀ Mitigation Plan Workgroup, in addition to various Federal, county, and city staff. The Division also hosts educational webinars through the Colorado Air Quality Collaborative, a group with members from over 30 county public health and environment departments across Colorado. The main goal of the Collaborative is to promote consistency and collaboration on air quality issues in local communities, cities and counties through education and outreach. The Collaboration also offers local governments a direct point of contact for any air quality concerns they may have. The Division plans to host a high wind dust events webinar in 2018 and will continue to consult with Alamosa County and City of Alamosa staff as needed.

2.5 Periodic Review, Evaluation, and Public Comment

The Division has made provisions for periodic review and evaluation of the mitigation plan and its implementation and effectiveness by the State and interested stakeholders. A draft

¹⁸ <https://www.gpo.gov/fdsys/pkg/CFR-2015-title40-vol6/pdf/CFR-2015-title40-vol6-part58.pdf>

¹⁹ https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=2018AnnualNetworkPlan.pdf

²⁰ https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=2016AnnualDataReport.pdf

²¹

https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=AlamosaNaturalEventsActionPlan2003.pdf

version of this plan was posted on the Division's webpage²² for a 30-day public comment period of August 15, 2018 to September 14, 2018. The mitigation plan was also distributed to the Division's Public Permit Notice list serve on August 15, 2018. A copy of the public notice communication, along with any comments received, will be included in Appendix A and submitted to EPA, consistent with the requirements of 40 CFR 51.930(b)(2)(iii)(A)(2). With each comment, the Division will include an explanation of the changes that were made to the plan as a result of the comment or why no changes to the plan were necessary.

Per 51.930(b)(2)(iii)(B) and as recommended in the Revised Exceptional Event Rule²³, the Division will conduct a review and revision, if appropriate, and recertification of this mitigation plan five years after this mitigation plan is finalized. The review process will consider the adequacy and status of the main elements of the mitigation plan. If any substantive changes related to major elements of this plan occur, such as a related rulemaking that impacts this plan, or more than three high wind dust exceptional events occur within a three-year period, the Division will evaluate and update the mitigation plan at an earlier time.

The Division is currently evaluating the effectiveness of the public notification and education process and will continue to do so as new technology methods of communication become available. The evaluation of this plan will also consider conditions that contribute to PM₁₀ exceedances in Alamosa County, the status and effectiveness of control measures and availability of new control measures, and methods to build upon the current consultation process.

The Division will consult with the Alamosa County Health Department and the City of Alamosa to gain their feedback and suggestions for mitigation plan revisions. While EPA is requiring air agencies to submit public comments on their initial mitigation plans, it is not requiring the agencies to submit public comments on subsequent reviews and plan reassessments. The Division will determine whether a public comment period is necessary for the mitigation plan revisions based on the type and extent of changes to the plan.

3 SUBMISSION OF MITIGATION PLAN

EPA issued notice that the Division was subject to 51.930(b) on September 30, 2016, therefore this mitigation plan was due to EPA no later than September 30, 2018. The Division submitted this plan to EPA on XXX, within the two year window pursuant to 51.930(b)(3)(i).

²² https://www.colorado.gov/airquality/tech_doc_repository.aspx

²³ https://www.epa.gov/sites/production/files/2016-09/documents/exceptional_events_rule_revisions_2060-as02_final.pdf

APPENDIX A: PUBLIC NOTICE COMMENTS AND DIVISION RESPONSES

[This section will be updated after the public comment period closes]

APPENDIX B: AIR QUALITY HEALTH ADVISORY FOR BLOWING DUST TEMPLATE

Air Quality Health Advisory for Blowing Dust

Issued for portions of [region] Colorado

Issued at [time, day, month, and year]

Issued by the Colorado Department of Public Health and Environment

Affected Area: [description of the affected counties and cities]

Advisory in Effect: [time, date, month, year when the advisory was issued and is in effect until]

Public Health Recommendations: If significant blowing dust is present and reducing visibility to less than 10 miles across a wide area, *People with heart or lung disease, older adults, and children in the affected area should reduce prolonged or heavy indoor and outdoor exertion.*

Outlook: [forecast description, for example, "Strong and gusty winds ahead of an approaching cold front are causing areas of blowing dust in parts of south-central and southeastern Colorado. The threat for blowing dust will diminish Tuesday evening as winds decrease."]

For the latest Colorado statewide air quality conditions, forecasts, and advisories, visit: http://www.colorado.gov/airquality/colorado_summary.aspx

Social Media:

<http://www.facebook.com/cdphe.apcd>

<http://twitter.com/#!/cdpheapcd>

*** You are subscribed to Colorado.AirQuality. If you wish to unsubscribe, or modify your preferences please visit <https://mailman.listserve.com/listmanager/listinfo/colorado.airquality> ***

APPENDIX C: BLOWING DUST HEALTH ADVISORY BROCHURE

cause wheezing, coughing and respiratory irritation in individuals with sensitive airways.

What is being done to reduce the PM10 pollution?

The city of Lamar has implemented numerous dust and PM10 controls over the years, and the "Lamar Natural Events Action Plan" has been developed to reduce emissions of PM10 during high wind events. The following describes many past, present and future efforts designed to reduce PM10 emissions:

- Intensive sweeping of paved roads within the City limits
- Tree planting to form windbreaks
- Closure of the East Lamar Landfill during extremely windy conditions
- Sodding of numerous parks and recreation areas
- Stabilization and dust suppression along the Burlington Northern/Santa Fe rail line
- Placement of highly erodible and environmentally sensitive agricultural lands into long-term conservation areas
- Implementation of Land Use Plans that reduce dust emissions from construction activities, gravel pits, and other open areas
- Controls for industrial sources
- Programs to reduce emissions from woodstoves and fireplaces

How to get additional information:

Lamar Area

Environmental Health Southeastern
Colorado Offices - (719) 336-8721
City of Lamar - (719) 336-4376

State Assistance

Colorado Air Pollution Control Division -
(303) 692-3127



COLORADO
Department of Public
Health & Environment

BLOWING DUST HEALTH ADVISORY BROCHURE

Lamar Area



March 2018

Why are there blowing dust health advisories for the Lamar area?

The Lamar area is subject to episodes of blowing dust during periods of high winds and drought conditions. During many of these events, the amount of dust in the air has exceeded the national and state air quality standards for particulate matter, subjecting Lamar residents and visitors to unhealthy levels of air pollution.

What is the blowing dust advisory program?

Though dust storms can occur throughout the year in southeastern Colorado, the typical season for large scale or major blowing dust episodes in the Lamar area is between September 1st and May 31st. During this period, the Environmental Health Southeast office will issue

Advisories will be broadcast on local radio stations KLMR and KVAY

advisories when wind speeds and other conditions are

currently or are forecasted to be favorable for blowing dust episodes. The National Weather Service in Pueblo and the Colorado Air Pollution Control Division in Denver will assist with the forecasting.

What actions should be taken during a blowing dust advisory?

When an advisory is issued by the Environmental Health Southeast office, Lamar area residents and visitors will be asked to:

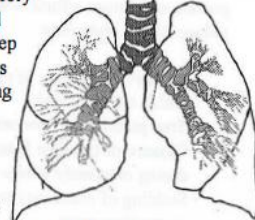
- Avoid outdoor exercise and strenuous activities and stay indoors with windows shut. This is especially important for persons with coronary or respiratory illnesses, and other major health problems.
- Reduce or avoid driving as this generates dust.
- Stop all woodburning and open burning activities.
- Reduce or postpone tilling, plowing, construction and other activities that will raise dust.

What is Particulate Matter and how is your health affected?

Particulate matter pollution consists of very tiny liquid and solid particles floating in the air. The size of the particles are less than 10 microns in diameter, or 1/7th the thickness of a human hair. This size of particulate matter is commonly referred to as "PM10." PM10 can be made of a mixture of particles including dust, soot, smoke, salts and metals. Some particles are capable of undergoing chemical reactions in the atmosphere and can be formed from gases. Because PM10 is so

small and is capable of being inhaled deep into the lungs, it is an important public health and environmental concern - especially in areas susceptible to frequent wind storms where dust and soils can be easily lifted into the air and transported.

While larger particles are kept from the lungs by mechanical means, such as impaction in the nose, throat and larynx, the smaller PM10 particles can slip past these respiratory defenses and penetrate deep into the lungs and harm lung tissue.



While PM10 can cause health problems for everyone, certain people are more vulnerable to PM10's health effects than others. These sensitive populations include children, the elderly, those suffering from asthma or bronchitis, exercising adults, and those who already have heart and lung disease, especially among the elderly. Particulate matter air pollution is especially harmful to people with lung disease such as asthma and chronic obstructive pulmonary disease which includes chronic bronchitis and emphysema. Lung disease is the third leading cause of death in the United States. Exposure to particulate air pollution can trigger asthma attacks and