

COLORADO
NATURAL EVENTS ACTION PLAN
FOR WILDFIRE SMOKE
February 2006



2002 Hayman Fire - photo courtesy of 7NEWS and TheDenverChannel.com



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of Public Health
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LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
AQCC	Colorado Air Quality Control Commission
AQI	Air Quality Index
AQS	Air Quality System
CAAA	Clean Air Act Amendments of 1990
CDPHE-APCD	Colorado Department of Public Health & Environment – Air Pollution Control Division (Division)
CO	Carbon Monoxide
COPD	Chronic Obstructive Pulmonary Disease
EPA	U.S. Environmental Protection Agency
MACC	Multi-Agency Coordination Center
MCHD	Mesa County Health Department
NAAQS	National Ambient Air Quality Standard
NEAP	Natural Events Action Plan
NEP	Natural Events Policy
NEPA	National Environmental Policy Act
NFP	National Fire Plan
Pb	Lead
PM _{2.5}	Particulate Matter 2.5 Microns or less in diameter
PM ₁₀	Particulate Matter 10 Microns or less in diameter
SIP	State Implementation Plan
TSP	Technical Services Program or Total Suspended Particulates
USDA	United States Department of Agriculture
µg/m ³	Micrograms per cubic meter

EXECUTIVE SUMMARY

In the past, Colorado mountain communities have experienced elevated levels of PM₁₀ associated with wildfire that have caused violations of the National Ambient Air Quality Standards (NAAQS). Although these events are infrequent and localized, they represent a potential threat to public health that should be mitigated to the fullest extent possible. In 1996, the U.S. Environmental Protection Agency (EPA) issued a policy memorandum entitled “Areas Affected by PM₁₀ Natural Events” (see [Appendix A](#)). This policy, commonly called the Natural Events Policy (NEP), addresses the possible exclusion of PM₁₀ monitoring data in circumstances where uncontrollable natural events lead to exceedances of the NAAQS, provided a state develops and implements an action plan to respond to the adverse health impacts of natural events. Such a plan, called a Natural Events Action Plan (NEAP), should be developed by the responsible air pollution control agency in conjunction with the stakeholders affected by the plan.

This Natural Events Action Plan was developed in accordance with the 1996 policy but pertains only to wildfire smoke events impacting locations in Colorado with the goal of accomplishing the following objectives:

- (1) Provide a wildfire smoke notification system to warn the public of an event and to alert the public of unhealthful concentrations of PM₁₀ in the air.
- (2) Provide education and outreach programs to inform the public on how they may reduce their exposure to elevated PM₁₀ concentrations during wildfire smoke events.
- (3) Abate or minimize contributing sources through the implementation of PM₁₀ control measures during wildfire smoke events to reduce the elevated PM₁₀ concentrations and the frequency of violations of the NAAQS.

The Colorado Department of Public Health and Environment – Air Pollutant Control Division (Division) and participating stakeholders utilized the guiding principles of the U.S. EPA Natural Events Policy in the development of this NEAP. Protection of public health is the foundation of this action plan. This plan specifically addresses the NEP policy guidance by describing actions in the following categories: a) notifying and educating the public, b) minimizing public exposure, c) abating or minimizing controllable sources, d) implementing mitigation measures and e) periodically evaluating the plan.

SECTION 1: INTRODUCTION

The purpose of the Colorado Natural Events Action Plan (NEAP) for Wildfire Smoke is to protect public health in Colorado during natural wildfire events and fulfill the requirements of the EPA's Natural Events Policy (EPA, 1996). Development of this NEAP was prompted by violations of the PM₁₀ National Ambient Air Quality Standards (NAAQS) in western Colorado in late October 2003. Although the majority of the smoke impacts occurred in western Colorado, this NEAP applies statewide since smoke impacts potentially could occur anywhere within the state. As required by the Natural Events Policy (NEP), the NEAP must contain the following plan elements:

1. Public Notification and Education
2. Minimize Public Exposure
3. Abate or Minimize Controllable Sources
4. Identify, Study and Implement Mitigating Measures
5. Periodic Evaluation

The Division and participating stakeholders utilized the guiding principles of the EPA Natural Events Policy to develop this NEAP. Comments from the public and federal land managers have been sought in the development of this plan. For example, the draft NEAP was made available to the public at local libraries in Crested Butte, Delta and Grand Junction, Colorado. Public notifications were made in each of these communities' local newspapers indicating the availability of the documents for review. The draft NEAP also was posted at the Division's website for public comment from citizens throughout the state. For the land manager consultation, comments were sought from local, state and federal managers, including those from the Bureau of Land Management, the USDA Forest Service, National Park Service, the United States Army, the City of Fort Collins, and Boulder and Jefferson counties. Comments have been incorporated into this NEAP, where appropriate.

In April 2005, the Division submitted the Wildfire Smoke NEAP to EPA for review and comment. EPA prepared preliminary comments that required changes and additions to the original Wildfire Smoke NEAP that are reflected in this document.

This NEAP contains detailed information about the actions implemented in regions of Colorado to minimize public exposure to potentially high levels of PM₁₀ caused by wildfire smoke. The primary components of this plan include the following:

- ◆ Wildfire smoke forecast notification system;
- ◆ Public education and outreach programs; and
- ◆ Implementing PM₁₀ control measures during wildfire smoke events to reduce the elevated PM₁₀ concentrations and the frequency of violations of the NAAQS by abating or minimizing contributing sources.

Other natural events like high-wind/blowing dust are addressed on a case-by-case basis. The Division has developed high-wind specific plans for Lamar (in Prowers County) and Alamosa (in Alamosa County).

SECTION 2: BACKGROUND

a. National Ambient Air Quality Standards (NAAQS)

The U.S. Environmental Protection Agency (EPA) establishes the NAAQS to protect human health and welfare. These standards exist for the following six air pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead and particulate matter. An area that violates any of the standards is designated as "nonattainment" for the specific NAAQS.

Particulate matter (PM) is the pollutant of most concern for smoke emissions. There are two NAAQS for PM - PM₁₀ and PM_{2.5}. In 1987, EPA promulgated the standard for PM₁₀, which is an abbreviation for particulate matter less than 10 micrometers in aerodynamic diameter (equivalent to 1/25,000 of an inch). The annual standard is 50 µg/m³ and the 24-hour standard is 150 µg/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, data recovery of 75 percent is needed for each calendar quarter to be considered a valid quarter of data.

The standard for fine particles (PM_{2.5}) was promulgated by EPA in July 1997. PM_{2.5} is an abbreviation for particulate matter less than 2.5 micrometers in aerodynamic diameter. The annual standard is 15 µg/m³ and the 24-hour standard is 65 µg/m³. Any value monitored above these levels, as defined by federal rules and guidance, is considered an exceedance. Generally speaking, the highest two percent of the 24-hour exceedances within a year are discarded over three calendar years. The remaining 98 percent of the data are kept and the 98th percentile is compared to the 24-hour average standard. If greater than the standard, it's considered a violation.

Once an area has been designated as nonattainment, the Division must prepare an attainment plan to meet the NAAQS by EPA-specified deadlines. An attainment plan typically can take several years to complete and generally includes: background information, air quality and meteorological assessments, emissions inventories, control measures, modeled attainment demonstrations, and contingency measures for the specific nonattainment area.

The attainment plans become part of the State Implementation Plan (SIP). The SIP includes information on the Division's general authority to regulate air quality, stationary source permitting, compliance, enforcement, and monitoring programs, nonattainment area plans, rules, statewide emissions inventory, and air stagnation advisories.

b. Natural Events Policy

EPA issued the Natural Events Policy (NEP) to address PM₁₀ NAAQS violations caused by natural wildfire, volcanic and seismic activity, or high wind events ([see Appendix A](#)). At this time, the policy only addresses PM₁₀. However, EPA plans to revise the policy during 2006. In the NEP, EPA acknowledges that control of smoke emissions during major wildfire events can be limited. EPA also recognizes that smoke from wildfires can be a major source of particulate matter.

Under the NEP, when the NAAQS violation is due to a natural event, it is at EPA's discretion whether to designate areas as nonattainment. To avoid a nonattainment designation in these instances, the Division must develop and implement a Natural Events Action Plan (NEAP). EPA recognizes that nonattainment designation for areas impacted by uncontrollable natural wildfire events would result in unreasonable planning requirements on traditional sources, i.e., power plants and vehicles. Therefore, the NEAP provides reasonable actions to address air quality and public health impacts caused by natural events.

The Division has the primary responsibility for determining if a natural event has occurred; for flagging and documenting exceedances; and for developing, implementing, and periodically reevaluating the NEAP. EPA's responsibility is to review and comment on the NEAP rather than to approve or disapprove (see [Appendix B](#)). EPA's primary responsibility is to ensure states develop and implement a NEAP. EPA also is responsible for reviewing documentation of events to ensure a reasonable case has been made that a natural event occurred. Should NAAQS exceedances due to a natural wildfire event occur again in the future, the event will be documented and the NEAP may be revised if necessary. A new NEAP would not be required. The NEAP may be adopted into the SIP for Colorado, although this is optional and not mandated by EPA. This NEAP will be submitted to EPA for review and comment as required by the NEP, but it will not be adopted as a revision to the Colorado SIP. The NEAP must be reviewed every five years at a minimum.

The NEP does not address wildland fires or prescribed fires that are managed for resource benefits, nor when these same fires, upon escape, are converted to wildfires. These fires are covered under the EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (EPA, 1998). EPA defines the term *wildland fire*¹ to mean any non-structure fire, other than prescribed fire, that occurs on wildland to include unwanted (wild) fires and naturally ignited fires that are managed within a prescription to achieve resource benefits. The term *wildland* is defined as an area where development is generally limited to roads, railroads, power lines and widely scattered structures. The land is not cultivated (i.e., the soil is disturbed less frequently than once in 10 years), is not fallow and is not in the United States Department of Agriculture's (USDA) Conservation Reserve Program. The land may be neglected altogether or managed for such purposes as wood or forage production, wildlife, recreation, wetlands or protective plant cover.

Consequently, for purposes of determining whether wildfire smoke impacts causing violations to the PM₁₀ NAAQS can be designated as a natural event, this NEAP is limited to wildland wildfire events initially requiring suppression action that result in smoke impacts to areas within Colorado. However, this does not imply that smoke impacts from other types of fires would be ignored. Rather, any smoke impacts representing a threat to public health would be mitigated to the fullest extent possible as specified in this NEAP.

c. Health Effects of Smoke

Smoke is composed primarily of fine particulate matter (PM_{2.5}), gases and water vapor. Smoke particulate matter is one of the greatest health concerns since particles can build up in the respiratory system, causing a number of health problems including burning eyes, runny noses and illnesses like bronchitis. Particles also can aggravate existing heart and lung diseases like congestive heart failure, chronic obstructive pulmonary disease, emphysema and asthma.

¹ From EPA's Interim Air Quality Policy on Wildland and Prescribed Fires, April 23, 1998

Not everyone who is exposed to smoke will have health problems. Smoke-related health problems will depend on the level of exposure, individual age and susceptibility, and other factors. Healthy individuals will normally recover quickly from smoke exposure and may not suffer long-term consequences. However, certain sensitive populations may experience more severe acute and chronic symptoms from smoke exposure. Much of the information about how particulate matter affects these groups originates from studies conducted in cities with a mix of pollution sources. A few studies on wildfire smoke exposure suggest the health effects may be similar, but more research is needed. The following discussion on smoke effects on sensitive populations is from: "Wildfire Smoke: A Guide for Public Health Officials" (2002).

Individuals with Asthma and Other Respiratory Diseases

Levels of pollutants that may not affect healthy people may cause breathing difficulties for people with asthma or other chronic lung diseases. Asthma, derived from the Greek word for panting, is a condition characterized by chronic inflammation of the airways, with intermittent bronchoconstriction and airflow obstruction that causes shortness of breath, wheezing, chest tightness, coughing, and sometimes is accompanied by excess phlegm production. During an asthma attack, the muscles tighten around the airways and the lining of the airways becomes inflamed and swollen, constricting the free flow of air. Irritation creating minor problems for an adult may result in significant obstruction in the narrower airways of a young child. However, the highest mortality rates from asthma occur among older adults.

Individuals with chronic obstructive pulmonary disease (COPD), which is generally considered to encompass emphysema and chronic bronchitis, may also experience a worsening of their conditions because of exposure to wildfire smoke. Often COPD patients have an asthmatic component to their condition which may result in them experiencing asthma-like symptoms. However, because their pulmonary reserve typically has been compromised seriously, additional bronchoconstriction may result in symptoms requiring medical attention. Epidemiological studies have indicated that individuals with COPD run an increased risk of requiring emergency medical care after exposure to particulate matter or forest fire smoke. Exposure to smoke also may depress the ability to fight lung infection. People with COPD may develop lower respiratory infections after exposure to wildfire smoke which may require urgent medical care. In addition, because COPD is usually the result of many years of smoking, individuals with this condition may also have heart disease and are potentially at risk from both conditions.

Individuals with Cardiovascular Disease

Diseases of the circulatory system include (among others): high blood pressure; cardiovascular diseases like hardening of the arteries, coronary artery disease, and congestive heart failure; and cerebrovascular conditions like atherosclerosis. These chronic conditions can render individuals susceptible to angina pectoris attack, heart attack, sudden death by cardiac arrhythmia, acute congestive heart failure or stroke. Cardiovascular diseases represent the leading cause of death in the United States, responsible for about 40 percent of all deaths each year. The vast majority of these deaths are in people more than 65. Studies have linked particulate pollution to increased risk of heart attack, cardiac arrhythmia, and other adverse conditions in those with cardiovascular disease. People with chronic lung or heart disease may experience one or more of the following symptoms: shortness of breath; chest tightness; chest, neck, shoulder, or arm pain; palpitations; unusual fatigue; and lightheadedness. Chemical messengers released because of particle-related lung inflammation may increase the risk of blood clots, angina episodes, heart attacks and strokes.

Elders

In several studies, researchers have estimated that tens of thousands of elderly people die prematurely each year from exposure to particulate pollution. This is probably because the elderly are more likely to have preexisting lung and heart diseases. Therefore, they are more susceptible to particle-associated effects. The elderly also seem to be more affected because important respiratory defense mechanisms may decline with age. Particulate pollution can compromise the immune system, increasing susceptibility to bacterial or viral respiratory infections.

Children

All children - even healthy children - are considered a sensitive population because their lungs are still developing. Several factors lead to increased exposure in children:

- More time outside
- More vigorous activity
- More air is inhaled (and therefore more particles) per pound of body weight

Studies have shown that particulate pollution is associated with increased respiratory symptoms and decreased lung function in children, coughing and difficulty breathing. These can result in school absences and limitations on normal childhood activities.

Smokers

Smokers - especially long-term smokers – already have compromised their lung function. Because their lungs have adapted to ongoing irritation, smokers are less likely to report symptoms from exposure to irritant chemicals. However, their lungs still may be injured by wildfire smoke. Therefore, some smokers unwittingly may put themselves at greater risk of potentially harmful wildfire smoke exposure, believing that they are not being affected.

d. Fire History and Ecology

Wildland fire, along with climate and topography, has been important in shaping ecosystems (forest, woodland, shrubland and grassland) in the western United States (Crane and Fischer, 1986; Wellner, 1970). Before settlement, wildfires likely burned every 10-30 years in the pinyon-juniper woodlands, 2-10 years in ponderosa pine communities, 5-25 years in the mixed-conifer forests and 150 years or more in the high-elevation spruce-fir habitats (Grahame, John D. and Thomas D. Sisk, ed. 2002. Canyons, cultures and environmental change: An introduction to the land-use history of the Colorado Plateau. 12/05.

<http://www.cpluhna.nau.edu/>). The effects of these fires varied depending on the vegetative communities in which they occurred. In some communities, particularly those with “fire resistant” vegetation, the fires were primarily non-lethal, resulting in little change to the community. Fire was stand-replacing (lethal) in other vegetative types, resulting in more dramatic changes immediately after the fire. Studies by Wellner (1970) and Hockaday (unpublished, 1968) indicate fires may result after extended periods of dry weather conditions and insect epidemics that kill large numbers of trees. Recognition and documentation of the importance of fire for perpetuation of natural forest ecosystems and landscape diversity is steadily increasing (Arno, 1980; Habeck and Mutch, 1973; Romme, 1982; Wellner, 1970).

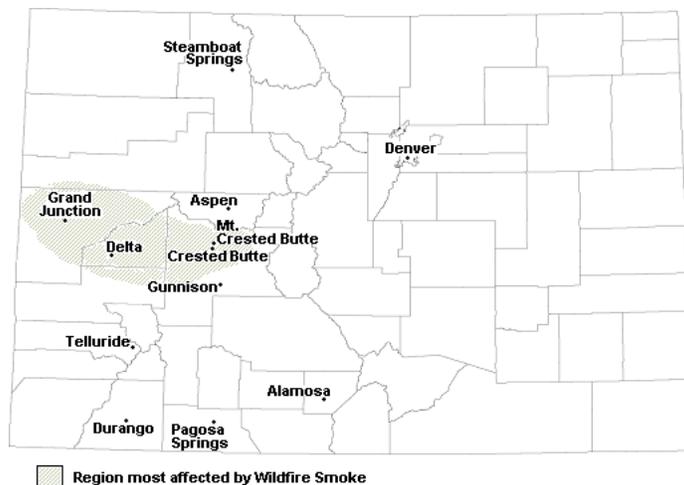
Human ignitions (planned or otherwise) have also been important in shaping ecosystems in the western United States. The studies of Barrett and Arno (1982) emphasize the extensive impact Native American burning had on maintaining vegetative structure and composition. In addition, prospectors, early settlers and farmers burned to clear land for human and economic development.

Early land management practices focused on fire suppression. This fire exclusion dramatically impacted ecosystems, particularly areas adapted to frequent fires. In many areas, fire return intervals have been lengthened, resulting in changes in species composition, stand structure and fuel loadings. Currently, fires in these once non-lethal vegetative communities can be difficult and dangerous to suppress, sometimes resulting in large, stand-replacing events. In other areas, fire intervals have been increased due to changes in vegetative composition from intentionally or unintentionally introduced non-native plants. Much of the native semi-arid grasslands and open pinyon-juniper woodlands of the Colorado Plateau have been or are at risk from invasion by cheat grass, an introduced annual. Cheat grass cures early in the summer and burns readily, resulting in fires that spread quickly. It immediately reestablishes and can burn each year. Changing elements like species composition, structure, fuel type and fuel loading have increased fire hazard in many areas. Currently conditions are such that many landscapes are at risk from future large wildfires.

e. 2003 Natural Wildfire Event

In late October 2003, western Colorado was impacted by wildfire smoke and high winds that contributed to exceedances of the daily PM₁₀ NAAQS in Crested Butte, Delta, Grand Junction and Mount Crested Butte (see Figure 1). As a consequence of the 2003 wildfire smoke event, the Division developed this Natural Events Action Plan, recognizing that smoke from a major wildfire event cannot be controlled and that wildfires can be a major source of harmful particulates in the air. The exceedances were caused by a combination of dense smoke transported from the massive wildfires in Southern California, and blowing dust from the desert Southwest and local sources. A local wildfire near Aspen also contributed to elevated particulate levels in the area. Throughout the natural event, staff meteorologists provided up-to-date smoke forecast information on the Division’s website (daily) and hotline (twice/day). Table 1 provides a summary of all the PM₁₀ and PM_{2.5} data from western Colorado for October 30, 2003, which includes data flagged as affected by a natural event. Two documents² in support of these findings were supplied to EPA Region VIII.

FIGURE 1 – COLORADO COMMUNITIES AFFECTED BY THE OCTOBER 2003 EVENT



² *Technical Support Document for the October 30, 2003 Natural Event (submitted on April 26, 2004) and Supplemental Information Concerning the October 30, 2003 Exceptional Event (submitted on July 23, 2004)*

TABLE 1 – PARTICULATE MONITORING DATA FROM THE OCTOBER 2003 EVENT

Date	Monitor Location	AQS #	PM10 STP	PM10 LTP	PM2.5
			($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
10/29/03	Alamosa - ASC	08-003-0001	43	35	
	Alamosa - Municipal	08-003-0003	56	45	
	Pagosa Spgs. - School	08-007-0001	33	27	
	Mt. Crested Butte	08-051-0004	31	24	
	Steamboat Spgs.	08-107-0003	28	24	
10/30/03	Alamosa - ASC	08-003-0001	80	65	
	Alamosa - Municipal	08-003-0003	99	81	
	Pagosa Spgs. - School	08-007-0001	111 *	91 *	19.1 *
	Delta	08-029-0004	215 *	188 *	33.2 *
	Crested Butte	08-051-0004	177 *	137 *	
	Mt. Crested Butte	08-051-0005	165 *	128 *	38.1 *
	Gunnison	08-051-0006	98 *	75 *	
	Durango - River City	08-067-0004	97 *	80 *	
	Durango - School	08-067-0008	104 *	86 *	29.0 *
	Durango - Tradewinds	08-067-0009	80 *	67 *	
	Durango - Cutler	08-067-0010	109 *	91 *	
	Durango - Courthouse	08-067-1001	90 *	75 *	
	Grand Jct. - MCHD	08-077-0003			35.8 *
	Grand Jct. - MCHD	08-077-0003			31.9 *
	Grand Jct. - Stocker	08-077-0014	129 (24hr) *		
	Grand Jct. - Powell	08-077-0017	234 *	206 *	12.4 *
	Grand Jct. - Powell	08-077-0017			38.9 **
	Aspen - Library	08-097-0006	103 (24hr) *		
Steamboat Spgs.	08-107-0003	57	48	8.2	
Telluride	08-113-0004	97 *	75 *	3.4	
10/31/03	Alamosa - ASC	08-003-0001	41	33	
	Alamosa - Municipal	08-003-0003	44	35	
	Pagosa Spgs. - School	08-007-0001	62	51	
	Mt. Crested Butte	08-051-0004	34	26	
	Steamboat Spgs.	08-107-0003	23	19	
<p>* Flagged in AQS as affected by natural event; ** Speciation data that needs to be flagged as affected by a natural event; STP - Standard Temperature and Pressure; LTP - Local Temperature and Pressure.</p>					

SECTION 3: PLAN ELEMENTS

This section describes the plan elements required by the NEP guidance:

1. Public Notification and Education
2. Minimize Public Exposure
3. Abate or Minimize Contributing Sources
4. Identify, Study and Implement Mitigating Measures
5. Periodic Evaluation

The measures specified in Elements 1-5 will be implemented to mitigate the harmful health effects from natural wildfire smoke impacts.

Element 1: PUBLIC NOTIFICATION AND EDUCATION

EPA suggests that public notification and education programs should be designed to educate the public about the short- and long-term harmful health effects of high concentrations of particulate matter. They suggest informing the public about certain types of natural events like wildfires and the effect these events have on air quality. The information should include that the natural event is imminent and that the state and local governments are taking actions to minimize the health impacts of the events.

a) General Public Notification and Education

Public notification and education outreach efforts are essential for Colorado residents to understand what the NEAP means to them and the actions they can take to minimize exposure. The Division's general education programs include information on open burning, wildfires, health effects of smoke, chemical components of smoke, regulatory requirements, smoke management and the benefits of fire as a management tool. The public can access the latest air quality information electronically by going to the Air Pollution Control Division - Technical Services Program (TSP) Homepage at <http://apcd.state.co.us/>. A copy of the website view of the TSP Homepage is included in [Appendix C](#).

Under the TSP Homepage, the following information can be obtained:

Colorado Open Burning Forecast at the following Internet address:

<http://apcd.state.co.us/psi/openbfst.phtml>, or by clicking on the "Current Air Quality" box on the left side of the TSP Homepage (which displays the "Air Quality Index Reporting System" webpage) and then clicking on the "Open Burning Forecast" link in the upper right corner. A copy of an open burning forecast webpage is included in [Appendix D](#). The public can access information on what is allowed for that particular day (during burn season) or general information on what is allowed during air pollution advisory days (during the winter months).

Wildfire Information at the following Internet address: <http://apcd.state.co.us/wildfire.phtml>, or by clicking on the "Wildfire Information" box on the right side of the TSP Homepage. A copy of the wildfire information webpage is included in [Appendix E](#). The "Wildfire Information" webpage allows public access in both English and Spanish that includes the following information:

1. Explanation of the Air Quality Index
3. Details regarding at-risk populations groups
4. Symptoms related to smoke exposure
5. Strategies for avoiding smoke and its effects
6. Known chemical components of smoke from wildfires
7. Relationship between fire smoke and ground level ozone concentrations
8. Fire ban status across Colorado (link to Colorado Department of Local Affairs)
9. Other sources of information about wildfire activity

Smoke Management Program at the following Internet address:

<http://www.cdph.state.co.us/ap/smoke/> or by clicking on the "Smoke Management Program" box on the left side of the TSP Homepage. A copy of the smoke management

program webpage is included in [Appendix F](#). The public can access policy information on prescribed burning, burning permit information, education on smoke ventilation.

Colorado Smoke Outlook at the following Internet address:

<http://apcd.state.co.us/psi/main.html> or by clicking on the “Current Air Quality” box on the left side of the TSP Homepage and scrolling to the bottom of the page. A copy of the smoke outlook webpage is included in [Appendix G](#). Partly in response to 2002’s unprecedented wildfire season in Colorado, meteorologists at the Colorado Department of Public Health and Environment (CDPHE) began including a smoke component to the daily air quality forecast when necessary. When smoke from wildfires in Colorado or elsewhere is affecting or is expected to affect communities in the state, smoke information is included as part of the air quality forecast. Health-related tips for residents in areas affected by smoke are included so that residents may better protect themselves and their families. If no mention of smoke is included in the forecast, it means that either no wildfire activity is ongoing or that smoke from active wildfires is not believed to be severely affecting any Colorado communities. Although the daily air quality forecast focuses on the Denver-metropolitan area and the communities of Fort Collins, Greeley and Colorado Springs, the smoke forecast component, when needed, applies to communities throughout Colorado. It is updated as often as necessary to provide accurate, timely information to residents in affected areas. Examples of smoke advisories that were issued in 2004 are included in [Appendix H](#)

Air Pollution Advisory at the following Internet address: <http://apcd.state.co.us/psi/main.html>

or by clicking on the “Current Air Quality” box on the left side of the TSP Homepage and viewing the advisory information on the upper left side of the page. Alternatively, a user can access the air pollution advisory by clicking on the term “advisory” on the left side of the page. The air pollution advisory webpage can be viewed in either English or Spanish, and a copy is included in [Appendix I](#).

The Division prepares a daily Air Pollution Advisory for the seven-county Denver-Boulder metropolitan area, and the communities of Fort Collins, Greeley and Colorado Springs. The advisory includes details of the day’s air quality and visibility, a forecast of the coming day’s air quality, residential burning restrictions, voluntary automobile driving curtailment requests, links to the open burning forecast (and what is covered by this program) and other important sites. Other Colorado communities also maintain and operate daily air quality forecasts with similar reporting parameters as described above. These include Mesa County on the Western Slope and the El Paso County and Colorado Springs area.

Air Quality Index & Visibility at the following Internet address:

<http://apcd.state.co.us/psi/main.html> or by clicking on the “Current Air Quality” box on the left side of the TSP Homepage and viewing the AQI and Visibility information by scrolling on the page. A copy of the AQI and Visibility webpage is included in [Appendix J](#). Daily AQI information is available for the Denver-Boulder metropolitan area, Fort Collins, Greeley, and Colorado Springs. The previous day’s AQI information is available for Grand Junction. The reported AQI includes the pollutant of highest value (CO, Ozone or PM) reported by the monitoring network.

The Division will continue to update its website by including information on rules; near real-time air quality data; health information and links to Division’s forecasts; fire potential assessments and current wildland fire information. General public notification and education programs also are available in Spanish. On this portion of the Division’s website, citizens can find easy-to-understand materials and a “frequently asked questions” section.

Any information on the website, also can be emailed, or printed and mailed to anyone by calling the Division at (303) 692-3100. The Division routinely participates in pre-season interagency media conferences and issues news releases. Further, when conditions warrant, the Division issues press releases for air quality advisories.

A toll-free hotline 1-888-484-3247 (1-888-4-THE-AIR) is available to anyone calling from outside the Denver Metro area (303 and 720 area codes) that provides current weather forecast information and specific information on wildfire smoke was added in 2002 to address impacts anywhere in Colorado. Division meteorologists update the recorded message at least daily but often provide multiple updates for wildfire situations or weather conditions that may impact public health. The recorded message includes specific information on areas that might be impacted and suggestions on reducing exposure to air pollutants.

At the Cherry Creek Campus, the Colorado Department of Public Health and Environment has established a Crisis Management Center (circa 2002) to address emergencies related to public health, including wildfires. The Division saw success in the use of this center in response to the Hayman Fire of 2002. The center is staffed full-time and various levels of response can be activated depending on need. Routine or targeted public notifications can be made from this center, as needed.

If situations require multi-agency coordination, the Colorado Multi-Agency Coordination Center (MACC) can be activated. The MACC is located in Centennial in a building shared with South Metro Fire & Rescue. An alternate location is at Camp George West in Golden, Colorado. The MACC allows for coordination of activities among local, state and federal agencies in support of a disaster or emergency. It has redundant communications systems, offers resource mobilization and tracking, and houses a policy room for affected elected officials. Moreover, it's capable of managing state support of large-scale incidents, is expandable to accommodate multiple agencies/jurisdictions, and has a secure video teleconferencing for direct continuity of government. The MACC maintains an emergency hotline that is answered in-house during office hours and by the Colorado State Patrol after hours. Calls received after hours are referred to a duty officer who is responsible for activating an appropriate level of response to any situation. The MACC has several redundant communications systems, including radio equipment, amateur radios with operator support, the Colorado Crime Information Computer, dedicated telephone circuits for federal and state National Alert Warning Systems, a full range of mobile radio equipment, and a variety of cellular phones.

In addition to state-level efforts, local communities also may develop their own programs to deal with public wildfire notification processes. For instance, both the communities of Alamosa and Lamar in Colorado have public notification systems. Both communities' plans are designed around blowing dust, but also can accommodate wildfire smoke impacts as determined by local health department staff. Further, the Division has developed and implemented a PM₁₀ Natural Events Action Plan for both of these communities.

Finally, the Division conducts periodic public hearings regarding various aspects of its state and local air quality programs. Many hearings are anticipated to have a direct and positive impact on reducing smoke. Citizens are invited and encouraged to participate in these processes to give further recommendations on improving the public notification efforts.

Element 2: MINIMIZE PUBLIC EXPOSURE

EPA criteria suggest, “The state should develop programs to minimize public exposure. The state should identify the people most at risk, notify the at-risk population that a natural event is imminent or currently taking place, and suggest actions to be taken by the public to minimize their exposure to high concentrations of fine particulate matter (PM_{2.5}). The state should also suggest precautions if exposure cannot be avoided.”

a) Monitoring

The Clean Air Act requires states to establish air quality surveillance systems. The Division has an extensive surveillance system consisting of a network of monitoring stations that measure ambient concentrations of criteria pollutants for which standards have been established. The network is operated according to required EPA protocols.

Figure 2 depicts the ambient particulate monitoring network within Colorado. Table 2 provides more detail on the location and types of monitors at each site. Such an extensive network provides the Division the ability to quickly and accurately minimize public exposure to harmful levels of particulates. This capacity serves communities well when coupled with the numerous public notification efforts described above.

FIGURE 2 – STATEWIDE PARTICULATE MONITORING NETWORK

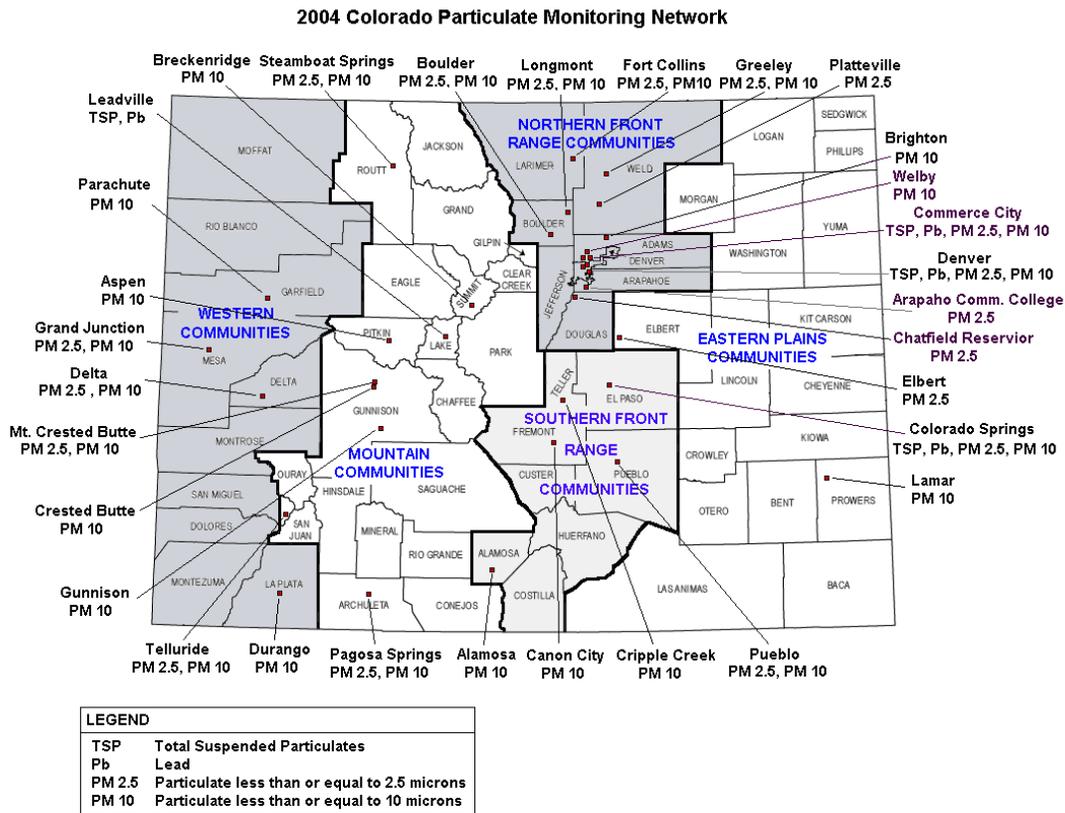


TABLE 2 – 2004 STATEWIDE PARTICULATE MONITORS

X - Monitors operated in 2004 A – Monitors added in 2004
 D – Monitors discontinued in 2004 H – Hourly particulate monitor

County	Site Name	Location	TSP	Pb	PM ₁₀	PM _{2.5}	
Eastern Plains Communities							
Elbert	Elbert	Wright-Ingraham Inst.				X	
Prowers	Lamar	100 2 nd St.			X		
		104 Parmenter St.			X		
		415 Camino de Santa Fe			A/D		
		3445 W. Road HH			A/D		
Northern Front Range Communities							
Adams	Brighton	22 S. 4 th Ave.			X		
	Commerce City	7101 Birch St.	X	X	X	X/H	
	Globeville	5400 Washington St.	X	X			
	Welby	78 th Ave. & Steele St.			X/H		
Arapaho	Arapahoe Comm.	6190 S. Santa Fe Dr.				X	
Boulder	Longmont	3 rd Ave. & Kimbark St.			X	X	
		Boulder	2440 Pearl St.			X	X
			2102 Athens St.				A/H
Denver	Denver CAMP	2105 Broadway	X	X	X/H	X/H	
	Denver Gates	1050 S. Broadway	X	X	X		
	Denver NJH	14 th Ave. & Albion St.				H	
	Denver Visitor	225 W. Colfax Ave.			X		
	Lowry	8100 Lowry Blvd.			X		
	Swansea	4650 Columbine St.				A	
Douglas	Chatfield Reservoir	11500 Roxborough Rd				A/H	
Larimer	Fort Collins	251 Edison St.			X	X	
Weld	Greeley	1516 Hospital Rd.			X	X/H	
	Platteville	1004 Main St.				X	
Southern Front Range Communities							
Alamosa	Alamosa	359 Poncha Ave.			X		
		425 4 th St.			X		
El Paso	Colorado Springs	3730 Meadowlands			X	X	
		101 W. Costilla St.	X	X	X	X	
Fremont	Cañon City	7 th Ave. & Macon St.			D		
		128 Main St.			A		
Pueblo	Pueblo	211 D St.			X	X	
Teller	Cripple Creek	209 Bennett Ave.			X		
Mountain Communities							
Archuleta	Pagosa Springs	309 Lewis St.			X	X	
Gunnison	Crested Butte	Colo. 135 & Whiterock			X		
	Mt. Crested Butte	9 Emmons Loop			X	X	
	Gunnison	221 N. Wisconsin Ave.			X		
Lake	Leadville	510 Harrison St.	X	X			
Pitkin	Aspen	120 Mill St.			X/H		
Routt	Steamboat Springs	136 6 th St.			X	X	
San	Telluride	333 W Colorado Ave.			X	X	
Summit	Breckenridge	County Justice Center			X		

TABLE 2 (CONTINUED) – 2004 STATEWIDE PARTICULATE MONITORS

*X - Monitors operated in 2004 A – Monitors added in 2004
D – Monitors discontinued in 2004 H – Hourly particulate monitor*

County	Site Name	Location	TSP	Pb	PM ₁₀	PM _{2.5}
Western Communities						
Delta	Delta	560 Dodge St.			X	X
Garfield	Parachute	100 E. 2 nd St.			X	
La Plata	Durango	1060 2 nd Ave.			X	
		623 E. 5 th St.			D	
		56 Davidson Creek Rd.			A	
		1235 Camino del Rio			X	
		1455 S. Camino del Rio			X	
		117 Cutler Dr.			X	
Mesa	Grand Junction	650 South Ave.			X	X
		645 ¼ Pitkin Ave.			A/H	

b) Fire and Meteorological Forecasts

The Division can provide real-time and rapid response to pollution events in a particular community. The Division conducts its own meteorological forecasting to determine the potential of wildfire smoke impacting Colorado communities. Such forecasting allows citizens to determine if exposure should be limited further. The public can access this information on the Division’s Technical Services Program webpage (see [Appendix C](#)) or by calling the toll free hotline at 1-888-484-3247 (1-888-4-THE-AIR).

c) At-Risk Populations

The Division appreciates that at-risk populations are particularly sensitive to poor air quality. In response, the Division provides information (on the web or on the toll free hotline) relevant to sensitive populations, and what steps individuals can take to reduce exposure and to minimize impacts from smoke on their health.

As described in Element 1, the CDPHE Crisis Management Center also provides the Division additional resources to minimize public exposure by quickly and accurately making information available to the public, including sensitive populations.

ELEMENT 3: ABATE OR MINIMIZE CONTRIBUTING SOURCES

EPA criteria indicate “programs to minimize particulate emissions during wildland fire episodes may include the prohibition of other burning activities and steps to minimize fuel loadings in areas vulnerable to fire.”

a) Federal Activities

Wildland Fire Use

The Federal Wildland and Prescribed Fire Management Policy requires federal land managers to decide within eight hours of discovering a fire whether to manage the fire for resource benefit or suppress the fire. This decision is based on many factors including the potential for unacceptable smoke impacts. Federal land managers may use Division meteorological services to provide them with meteorological support for smoke management purposes in making that decision. Colorado Air Quality Control Commission Regulation No. 9, Section VI requires a permit for areas where land managers may want to manage unplanned ignition natural fires for resource benefit. Regulation 9 is available for viewing or downloading at the following link: <http://www.cdphe.state.co.us/op/regs/airregs/100111openburning.pdf>.

National Fire Plan

The National Fire Plan (NFP) was developed in August 2000 following a landmark wildland fire season, with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. The NFP addresses five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance and Accountability.

During the past five years, the NFP has continued to evolve with the goal of providing invaluable technical, financial, and resource guidance and support for wildland fire management across the United States. The USDA Forest Service and the Department of the Interior are working together to successfully implement the key points outlined in the National Fire Plan by taking the following steps:

1. Assuring that necessary firefighting resources and personnel are available to respond to wildland fires that threaten lives and property.
2. Conducting emergency stabilization and rehabilitation activities on landscapes and communities affected by wildland fire.
3. Reducing hazardous fuels (dry brush and trees that have accumulated and increase the likelihood of unusually large fires) in the country's forests and rangelands.
4. Providing assistance to communities that have been or may be threatened by wildland fire.
5. Committing to the Wildland Fire Leadership Council, an interagency team created to set and maintain high standards for wildland fire management on public lands.

The NFP implements activities in the above five key program areas in order to respond to severe wildfires, reduce their impacts on rural communities and enhance firefighting capabilities

in the future. The National Fire Plan is a long-term investment that will help protect communities and natural resources and, most importantly, the lives of firefighters and the public. It is a long-term commitment based on cooperation and communication among federal, tribal, state and local governments, and interested persons. The federal wildland fire management agencies worked closely with these partners to prepare a 10-year Comprehensive Strategy, completed in August 2001. The 10-year Comprehensive Strategy can be found at the following Internet address: <http://www.fireplan.gov/reports/7-19-en.pdf>.

Under the National Fire Plan, limited funding is provided for fuels management and reduction to address the problem of dense wildland vegetation that has resulted from decades of wildfire suppression and fire exclusion on federal lands. Hazardous fuels reduction activities will focus on wildland/urban interface areas to reduce the risk to people and property. Joint projects will be implemented with states, tribes, and others, based on the collaborative identification of communities most vulnerable to wildland fire.

Treatments are planned on millions of acres of federal lands. Treatments also are planned on non-federal lands by state and local fire organizations. These funds were appropriated for the USDA Forest Service State Fire Assistance program. Collaborative efforts among interagency groups of land managers will set priority areas for hazard reduction activity. In Colorado, the USDA Forest Service and the Department of Interior have reduced hazardous fuels on about 290,000 acres (FY 2001 through FY 2003).

Under the National Fire Plan, funding also will be used to rehabilitate and restore watersheds, closely matching historical or pre-fire ecosystem structure, function, diversity and dynamics. Projects will focus on restoring watershed function, including protection of basic soil, water resources and biological communities. More information on the National Fire Plan can be found at the following Internet address: <http://www.fireplan.gov/index.html>. [Appendix K](#) includes the 2004 National Fire Plan report.

National Environmental Policy Act (NEPA)

Public review is required under the NEPA process where federal agencies disclose the potential adverse and beneficial environmental impacts of proposed plans and projects. It is through this process that the federal land manager discloses how air quality may be impacted from a proposed action. Federal agencies generally notify interested parties of new projects and plans through mailing lists, local newspapers and the Federal Register.

The EPA's Interim Air Quality Policy on Wildland and Prescribed Fires provides a list of elements that should be included in an environmental impact analysis for project and regional planning on federal lands.

According to the policy, an environmental impact analysis should include the following:

- Recent historic and projected annual or seasonal emissions from wildland and prescribed fires;
- Cumulative impacts of fires on regional and sub-regional air quality, when possible;
- Applicable regulations, plans or policies;
- Identification of sensitive receptors;
- Descriptions of planned measures to reduce smoke impacts;
- Identification of the potential for smoke intrusions into sensitive areas, and modeled air quality and visibility impacts, when possible, and;
- Descriptions of ambient air monitoring plans, when appropriate.

b) State Activities

Several activities and initiatives exist at the state level to minimize impacts of sources contributing to smoke. These include:

Colorado Smoke Management Program

The Technical Services Program website <http://www.cdphe.state.co.us/ap/smoke/> displays the Colorado Smoke Management Program webpage. A copy of the webpage is included in [Appendix F](#). This webpage acts as the portal for all information related to Colorado's open burning and smoke management programs. The smoke management program generally is specified in Colorado Air Quality Control Commission Regulation Number 9 - Open Burning, Prescribed Fire, and Permitting. The rule requires that "*No open burning activity shall be conducted in Colorado without first obtaining a permit from the Division or from a local agency.*" Regulation 9 is available for viewing or downloading at the following Internet address: <http://www.cdphe.state.co.us/op/regs/airregs/100111openburning.pdf>.

Although a few activities are exempt from permit requirements, an open burning permit is required for all non-exempt open burning activities. There are several different categories of open burning permits depending on the potential for smoke impacts. Each open burning permit issued by the Division contains a permit condition that suspends burning during publicly announced periods of air pollution emergencies or alerts in the area of the proposed burn. By declaring an emergency or alert, the Division can minimize smoke emissions from permitted burning activities during periods when wildland fire smoke may be impacting areas within the state.

General Open Burning Permit

Any person or entity may apply for a general open burning permit from the Division to conduct open burning if there is no other feasible alternative for disposal. In some Colorado counties, the general open burning programs have been delegated to local counties (permits are applied for and issued by the county). Some small prescribed fires also may be permitted under a general open burning permit. Open burning is defined in Colorado regulation as:

Burning of rubbish, wastepaper, wood, vegetative material or any other flammable material on any open premises, or on any public street, alley, or other land adjacent to such premises. For the purposes of this regulation, open burning does not include burning in the course of agricultural operations. "Agricultural operations" does not include forest or habitat management activities by land managers.

Prescribed Fire

Any person or entity seeking to conduct a prescribed fire for grassland or forest management must apply for and may obtain a permit for a planned ignition (e.g., human ignited) or unplanned ignition (e.g., lightning ignited) prescribed fire from the Division. Some small planned ignition prescribed fires may be below a smoke and emissions threshold and persons or entities can apply for a general open burning permit. Prescribed fire permits are valid for only certain dates and the calendar year within which they were issued. Daily or annual reporting of actual activity is required for all permit holders, regardless of whether the burn was completed. Large fires that receive the highest smoke risk rating also are subject to a 30-day public notice and comment period for public review of the Division's draft permit.

Significant Users of Prescribed Fire

Significant users of prescribed fire are defined as any federal, state, or local agency, or any person that collectively manages or owns more than 10,000 acres of grassland and/or

forestland within the state where the annual planned use of prescribed fire will generate more than 10 tons per year of PM₁₀ emissions.

Significant users of prescribed fire must submit planning documents to the Colorado Air Quality Control Commission. The planning documents must describe how decisions are made to identify fuel treatment alternatives to achieve resource objective goals, how decisions are made to select among various fuel treatment alternatives, and must demonstrate for lands selected for fuel treatment how compliance with the state standard will be achieved.

The “state standard” requires that “*all available, practicable* methods that are *technologically feasible* and *economically reasonable*” should be used to minimize air pollution emissions. The Commission must hold a public hearing to review each planning document. Following the hearing, the Commission must comment and make recommendations to the significant user regarding any change needed to comply with the state standard. The Division cannot issue general open burning or prescribed fire permits to significant users unless a planning document for the area to be burned has been submitted for review and the permit is consistent with the Commission comments and recommendations.

Information regarding this component of Colorado's Smoke Management Program can be found on the Division’s website (Please see [Appendix F](#)).

Voluntary Curtailment

Voluntary programs to curtail emissions from local residents, businesses and industrial sources may be requested through news releases and other informational resources. Curtailing emissions may include curtailing open burning, any wood stove usage, automobile driving or other non-essential emission sources, depending upon the circumstances.

Other State Initiatives

The Colorado Department of Local Affairs makes available publicly fire ban and restriction information via their website. It is anticipated that this information assists to further minimize and abate emission sources.

ELEMENT 4: IDENTIFY, STUDY AND IMPLEMENT MITIGATING MEASURES

According to EPA criteria (1996), “EPA expects the NEAP to include commitments to pilot new emission reduction techniques. The plan must include a timely schedule for conducting these studies and implementing measures that are technological and economically feasible.”

a) Smoke Dispersion Modeling

To better understand smoke releases and impacts, the Division has taken or is in the process of taking several steps. One initiative is the Smoke Impact Spreadsheet (SIS), a relatively new smoke dispersion and impact model. The Division is looking for a better model than ones used previously to evaluate the larger and more complex smoke permit applications. Data from seven burns in 2003 were collected to put in SIS. Pictures of smoke were taken to compare with model results. Division staff will continue to evaluate SIS by testing how sensitive SIS is to each of its many inputs.

b) Smoke Monitoring

The Division also has available portable air quality monitoring equipment that can be deployed in the field to better understand smoke emissions and impacts. During future wildfire events, the Division may deploy portable monitoring equipment to monitor smoke impacts (depending on the circumstances of the wildfire – i.e. duration and intensity)

c) Website Development

The Division will continue to develop its website to provide the public with the most current information in the following areas:

- Rules and regulations
- Smoke management programs
- Burn restrictions
- Contacts and hotlines
- Fire activity - current and potential
- Weather forecasts and satellite imagery
- Smoke affects on health
- Real-time air quality data
- Public advisories
- Educational materials and publications

d) Other Activities

The Division also is investigating additional ways the Air Quality Index can be used to further inform citizens of smoke impacts.

Finally, the Division is analyzing opportunities with other federal, state and local agencies to better understand the impacts of smoke. These opportunities range from studying ways to dovetail national air quality improvement programs with those of the Division (e.g., regional haze and state wide regional haze SIPs) to partnering with state universities on new research air quality activities (monitoring, modeling, etc.).

It is believed that these additional tools will better inform the Division about mitigation strategies for wildfire smoke.

ELEMENT 5: PERIODIC EVALUATION

Based on the 1996 NEP, “EPA requires a review of the conditions causing violations of a PM NAAQS in the area, the status of implementation of this wildfire plan and the adequacy of the actions being implemented. The state should reevaluate the plan for an area every five years at a minimum and make appropriate changes to the plan.”

This Colorado wildfire NEAP will be evaluated as needed, but no later than five years from the date of this plan. The Division will request further comment from interested parties. Each element will be evaluated for effective implementation. If any wildfire natural events occur in the future, event documentation will be prepared and made available to the public for review. Future regulations and research will be considered and incorporated as needed.

APPENDICES

Appendix A: EPA Natural Events Policy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

MEMORANDUM

DATE: May 30, 1996

SUBJECT: Areas Affected by PM-10 Natural Events

FROM: Mary D. Nichols
Assistant Administrator
for Air and Radiation (6101)

TO: Director, Air, Pesticides and Toxics Management
Division, Regions I and IV
Director, Air and Waste Management Division,
Region II
Director, Air, Radiation and Toxics Division,
Region III
Director, Air and Radiation Division,
Region V
Director, Air, Pesticides and Toxics Division,
Region VI
Director, Air and Toxics Division

Purpose

This memorandum sets forth the Environmental Protection Agency's (EPA's) policy for protecting public health in areas where the PM-10 (particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns) national ambient air quality standards (NAAQS) are violated due to natural events. This policy will be followed in implementing the PM-10 NAAQS until it is superseded.¹ The need for revisions to this policy will be considered by EPA, State agencies and the Federal Advisory Committee Act's Particulate Matter/Ozone/Regional Haze Subcommittee if the NAAQS for particulate matter are revised.

¹ This document contains EPA policy and, therefore, does not establish or affect legal rights or obligations. It does not establish a binding norm and it is not finally determinative of the issues addressed. In applying this policy in any particular case, the EPA will consider its applicability to the specific facts of that case, the underlying validity of the interpretations set forth in this memorandum, and any other relevant considerations, including any that may be required under applicable law and regulations.

Three categories of natural events have been identified as affecting the PM-10 NAAQS: (1) volcanic and seismic activity, (2) wildland fires, and (3) high wind events. These PM-10 natural events are defined further below. If other significant categories of natural events are identified, they may be added to this policy in the future².

Background

Prior to the 1990 Clean Air Act Amendments (Act), the Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events (exceptional events guideline) and Appendix K to 40 CFR, part 50, were issued by EPA to address, in part, the situation where natural sources strongly influence an area's PM-10 air quality. To avoid imposing potentially unreasonable State implementation plan (SIP) requirements on such areas, EPA provided for the exclusion of certain natural source data from nonattainment determinations. Thus, Appendix K provides, in part, that measured exceedances of the PM-10 NAAQS in an area may be discounted from decisions regarding attainment status if the data are shown to be influenced by uncontrollable events caused by natural sources of particulate matter. The 1986 exceptional events guideline contains EPA's guidance regarding the process States should follow when dealing with PM-10 air quality data that may be eligible for the adjustments authorized under section 2.4 of Appendix K.

Subsequently, the Act added section 188(f) which provides EPA with discretionary statutory authority to waive either a specific attainment date or certain planning requirements for serious PM-10 nonattainment areas that are impacted significantly by nonanthropogenic sources. The EPA states in current PM-10 guidance documents that it interprets the section 188(f) waiver provision to mean that the data exclusion policy contained in Appendix K and the procedures described in the exceptional events guideline no longer apply.

Under this natural events policy, those statements no longer reflect EPA's interpretation of the relationship between the section 188(f) waiver provision, Appendix K, and the exceptional events guideline and should be treated as revised to the extent described herein.

In establishing this natural events policy, EPA now believes that, under certain circumstances, it is appropriate to again exclude PM-10 air quality data that are attributable to uncontrollable natural events from the decisions regarding an area's attainment status. The discussion in the Appendix at the end of this memorandum briefly describes the legal rationale underlying this revised interpretation.

Description of Policy

The policy described in this document addresses PM-10 NAAQS violations caused by natural events in areas designated unclassifiable or attainment. It also addresses certain

² Other types of temporary or exceptional events that can impact ambient PM-10 concentrations are structural fires, chemical spills, industrial accidents, and clean-up activities following a major disaster. The EPA's Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events, July 1986, is still applicable for treating air quality data resulting from these types of exceptional, anthropogenic events.

reclassification and redesignation questions for PM-10 nonattainment areas. This policy applies at the time the State determines that a PM-10 NAAQS has been violated due to natural events and addresses the question of what should be done to protect public health. The policy provides that EPA will: (1) exercise its discretion under section 107(d)(3) not to redesignate areas as nonattainment if the State develops and implements a plan to respond to the health impacts of natural events; and, (2) redesignate nonattainment areas as attainment by applying Appendix K, on a case-by-case basis, to discount data in circumstances where an area would attain but for exceedances that result from uncontrollable natural events.

The guiding principles followed in developing this policy are:

1. Protection of public health is the highest priority of Federal, State, and local air pollution control agencies.
2. The public must be informed whenever the air quality in an area is unhealthy.³
3. All valid ambient air quality data should be submitted to the EPA Aerometric Information Retrieval System (AIRS) and made available for public access.
4. State and local agencies must take appropriate reasonable measures to safeguard public health regardless of the source of PM-10 emissions.
5. Emission controls should be applied to sources that contribute to exceedances of the PM-10 NAAQS when those controls will result in fewer violations of the standards.

Definition of PM-10 Natural Events

Volcanic and seismic activities: Ambient PM-10 concentrations caused by volcanic eruptions or seismic activity will be treated as due to natural events. Volcanic eruptions contribute to ambient PM-10 concentrations in two ways: (1) with emissions of primary PM-10 (e.g., ash), and (2) with emissions of precursor pollutants (e.g., sulfur dioxide) that react to form secondary particulate matter. Seismic activity (e.g., earthquakes) can also contribute to ambient PM-10 concentrations by shaking the ground, causing structures to collapse and otherwise raising dust (primary PM-10 emissions).

Also, emissions caused by anthropogenic activities that re-entrain volcanic ash during the first year (12 months) following an event will be treated as due to the natural event. One year is considered adequate time for cleaning ash deposits from areas where anthropogenic activities (e.g., vehicle traffic) would cause reentrainment. After 1 year, only emissions resulting from reentrainment of ash by high winds will be treated as due to a natural event.

³ The air quality is considered unhealthy whenever the 24-hour PM-10 NAAQS is exceeded. The short-term PM-10 NAAQS is exceeded when the 24-hour average PM-10 concentration is greater than 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The 24-hour NAAQS is violated when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu\text{g}/\text{m}^3$ is greater than 1.0, as determined by procedures described in Appendix K.

Wildland fires: Ambient PM-10 concentrations caused by smoke from wildland fires will be treated as due to natural events if the fires are unwanted fires, not designated or managed as prescribed fires, and requiring appropriate suppression action by the wildlands manager.⁴

For the purposes of this policy, wildland fire natural events are limited to unwanted fires that do not meet a prescription (wildfires) and, therefore, require appropriate suppression actions. Wildland prescribed fires, burning of forest harvest residues, agricultural burning, and fires for land clearing are not covered by this natural events policy. The EPA will develop broader guidance in the near future to address issues raised by smoke emissions from wildland prescribed fires and other policy issues surrounding prevention of significant deterioration, conformity, visibility protection programs and regional haze.

High Winds: Ambient PM-10 concentrations due to dust raised by unusually high winds will be treated as due to uncontrollable natural events under the following conditions: (1) the dust originated from nonanthropogenic sources, or (2) the dust originated from anthropogenic sources controlled with best available control measures (BACM).⁵

The BACM must be implemented at contributing anthropogenic sources of dust in order for PM-10 NAAQS exceedances to be treated as due to uncontrollable natural events under this policy. Therefore, BACM must be implemented for anthropogenic dust sources contributing to NAAQS exceedances in attainment and unclassifiable areas and in moderate PM-10 nonattainment areas. In unclassifiable and attainment areas, BACM must be implemented for those contributing sources for which it has been defined within 3 years after the first NAAQS violation attributed to high wind events or from the date of this policy. In these same areas, implementation should be as expeditious as practicable for sources for which BACM are undefined.

The conditions that create high wind events vary from area to area with soil type, precipitation and the speed of wind gusts. Therefore, the State must determine the unusually high wind conditions that will overcome BACM in each region or subregion of the State.

⁴ The EPA recognizes and endorses the Federal Wildland Fire Policies adopted by the Departments of Interior and Agriculture in December 1995. These policies refer to all fires on sparsely populated lands managed by Federal agencies (e.g., national parks, national forests, grasslands, etc.) as wildland fires. The wildland fires term includes unwanted fires that do not meet a prescription (wildfires), management-ignited prescribed fires, and naturally-ignited fires that meet a prescription (prescribed natural fire). Only wildland fires that meet a prescription may be used to accomplish land and resource management objectives.

⁵ BACM for PM-10 are techniques that achieve the maximum degree of emissions reduction from a source as determined on a case-by-case basis considering technological and economic feasibility (59 FR 42010, August 16, 1994).

Response to NAAQS Violations

If natural events cause ambient concentrations of PM-10 to violate a NAAQS, a plan should be developed to address future events.⁶ A natural events action plan (NEAP) should include commitments to:

1. Establish public notification and education programs. Such programs may be designed to educate the public about the short-term and long-term harmful effects that high concentrations of PM-10 could have on their health and inform them that: (a) certain types of natural events affect the air quality of the area periodically, (b) a natural event is imminent, and (c) specific actions are being taken to minimize the health impacts of events.
2. Minimize public exposure to high concentrations of PM-10 due to future natural events. Programs to minimize public exposure should: (a) identify the people most at risk, (b) notify the at-risk population that a natural event is imminent or currently taking place, (c) suggest actions to be taken by the public to minimize their exposure to high concentrations of PM-10, and (d) suggest precautions to take if exposure cannot be avoided.
3. Abate or minimize appropriate contributing controllable sources of PM-10. Programs to minimize PM-10 emissions may include:

(a) volcanic and seismic activities - cleaning ash and dust deposits from areas where it would be re-entrained into the air by anthropogenic activities;

(b) wildland fires - prohibition of other burning activities during wildland fire events and steps to minimize fuel loadings in areas vulnerable to fire. Appropriate suppression actions, as determined by the wildlands manager, should be taken for fires that do not meet a prescription. The Federal Wildland Fire Policies require that fire management plans (FMP) be developed for all Federal lands with burnable vegetation.⁷ It is anticipated that a goal of FMP

⁶ The annual PM-10 NAAQS is violated if the expected average annual arithmetic mean concentration for the past 3 calendar years is greater than 50 µg/m³. Several elevated 24-hour PM-10 concentrations caused by natural events can potentially cause the annual NAAQS (which is an annual arithmetic mean of 24-hour concentrations) to be exceeded. If natural events cause the annual NAAQS to be violated, one NEAP for the area will cover both the 24-hour and annual NAAQS.

⁷ FMP are not in place for all Federal lands at this time. These plans will be developed by Federal land managers in conjunction with all stakeholders including Federal, State and local air management agencies. The FMP will integrate fire, as a natural ecological process, into land and resource management plans and will form the basis for management actions taken on wildland fires. The FMP must include prescriptions for any use of fire to meet land and resource management objectives.

The EPA anticipates that FMP will achieve an acceptable balance between forest health and public health concerns. Public health concerns caused by the potential effects of smoke on air quality from wildland fires will be addressed in FMP through smoke management plans and other measures. Smoke management plans attempt to minimize smoke impacts by monitoring fire behavior, meteorology and air quality during the fire and by publicly announcing forecasts of likely smoke conditions in communities impacted by ongoing fires. Since FMP will treat fire as a natural ecological process, the impact of wildland fires on air quality and regional haze is expected to increase in the future. Therefore, EPA will encourage Federal land management agencies to support air quality monitoring near fires, to assess air and haze impacts, and to develop a fire information data base and regional-scale smoke management plans.

will be to prevent NAAQS exceedances caused by wildland fires. Therefore, EPA envisions treating future FMP as acceptable plans for mitigating the public health impacts of smoke from wildland fires on Federal lands. Similar FMP should be developed to serve the same purpose for State and private wildlands.

(c) High winds - application of BACM to any sources of soil that have been disturbed by anthropogenic activities. The BACM application criteria require analysis of the technological and economic feasibility of individual control measures on a case-by-case basis. The NEAP should include analyses of BACM for contributing sources. The BACM for windblown dust include, but are not limited to, application of chemical dust suppressants to unpaved roads, parking lots and open areas; dust suppression at construction sites; use of conservation farming practices on agricultural lands; tree rows and other physical wind breaks; restricting or prohibiting recreational off-road vehicle activities; and use of surface coverings. If BACM are not defined for the anthropogenic sources in question, step 4 below is required.

4. Identify, study and implement practical mitigating measures as necessary. The NEAP may include commitments to conduct pilot tests of new emission reduction techniques. For example, it may be desirable to test the feasibility and effectiveness of new strategies for minimizing sources of windblown dust through pilot programs. The plan must include a timely schedule for conducting such studies and implementing measures that are technologically and economically feasible.

5. Periodically reevaluate: (a) the conditions causing violations of a PM-10 NAAQS in the area, (b) the status of implementation of the NEAP, and (c) the adequacy of the actions being implemented. The State should reevaluate the NEAP for an area every 5 years at a minimum and make appropriate changes to the plan.

Form and Timing of the Response

The NEAP should be developed by the State air pollution control agency in conjunction with the stakeholders affected by the plan. Development of a NEAP for wildland fires should include input from Federal, State and private land managers in areas vulnerable to fire. Also, agencies responsible for suppressing fires and the citizens in the affected area should be involved in developing the plan. Development of a NEAP for high- wind events should include input from Federal, State and private managers of open desert lands, rangelands, agricultural lands; the construction industry; and organizations promoting the use of recreational off-road vehicles. Development of a NEAP for volcanic and seismic activities should include input from geophysicists and public works officials who will be responsible for ash removal and disposal. The plan should include documented agreements among the stakeholders as to planned actions, the implementation schedule, and the parties responsible for carrying out those actions.

At a minimum, States should develop NEAP for any areas where natural events cause or have caused a PM-10 NAAQS to be violated within 18 months of the violation or the date this policy is issued. The NEAP should be made available for public review and comment and may,

but are not required to, be adopted as revisions to the SIP if current SIP rules are not revised. Final plans should be submitted to EPA for review and comment.

Documentation of Natural Events

In circumstances where a State has reason to believe that natural events have caused measured exceedances of the NAAQS, the State is responsible for establishing a clear causal relationship between the measured exceedance and the natural event. Supporting documentation concerning the natural event could include filter analysis, meteorological data (e.g., wind speed and wind direction to support a source receptor relationship), modeling and receptor analysis, videos and/or photographs of the event and the resulting emissions, maps of the area showing sources of emissions and the area affected by the event, and news accounts of the event.

In the case of high-wind events where the sources of dust are anthropogenic, the State must document that BACM were required for those sources, and the sources were in compliance at the time of the high-wind event. If BACM are not required for some dust sources, the NEAP developed must include agreements with appropriate stakeholders to minimize future emissions from such sources using BACM.

The type and amount of documentation provided for each event should be sufficient to demonstrate that the natural event occurred, and that it impacted a particular monitoring site in such a way as to cause the PM-10 concentrations measured. This documentation should also provide evidence that, absent the emissions from the natural event, concentrations of PM-10 at the monitoring site under consideration would not cause a NAAQS exceedance.

The State should also make the documentation of natural events and their impact on measured air quality available to the public for review. This may be accomplished through a number of means, such as the publishing of newspaper announcements, periodic reports on air quality in the area, and through public hearings. This would serve to allow the public an opportunity to comment on whether the causal relationship between the natural event and the air quality measurement is convincing. Also, open hearings, where State and local regulatory boards review the documentation, are useful forums in which to notify the public of potentially important policy decisions.

When air quality data affected by a natural event are submitted to EPA for inclusion into the AIRS database, the State should request that a flag be placed on the data to indicate that a natural event was involved. Documentation to support the flagged data should be maintained by the State. A copy of the documentation should be sent to the relevant EPA Regional Office monitoring representative no later than 180 days from the time the exceedance occurred or from the date of this policy for past events. The Regional Office will acknowledge receipt of the documentation and confirm that the natural event data were flagged within 60 days.

Current PM-10 Nonattainment Areas

States may request that a moderate nonattainment area not be reclassified as serious if it can be demonstrated that the area would attain the standards by the statutory attainment date but for emissions caused by natural events. Similarly, States may request redesignation of nonattainment areas to attainment if it can be demonstrated that the area would be meeting the

NAAQS but for the emissions caused by natural events. This policy applies to emissions caused by natural events that have occurred since January 1, 1994.⁸

Approval of the above requests will be made by EPA on a case-by-case basis as determined by the sufficiency of the information submitted by the State to substantiate its claim. At a minimum, the State must have adopted a SIP for the area which demonstrates that, but for the emissions from natural events, the area would be able to attain the NAAQS. All of the requirements under section 107(d)(3)(E) of the Act must also be satisfied before an area can be redesignated to attainment. Those requirements include the submittal of a maintenance plan under section 175A, among other things. The maintenance plan for areas affected by natural events must include a NEAP.

Failure to Submit a Natural Events Action Plan

If a State fails to submit an adequate NEAP within 18 months in response to violations of a PM-10 NAAQS, EPA will notify the governor of the State that the area should be redesignated as nonattainment. The EPA's action, in such instances, would be authorized under the Act based on the conclusion that the health of citizens affected by such events is not being protected by the State.

Once the area violating the NAAQS is designated nonattainment, the State will be required to adopt a federally- enforceable SIP revision and address the sources of PM-10 emissions. Most likely, the SIP revision will include many of the same mitigative measures that could have been included in a NEAP.

⁸ The 1990 Amendments to the Clean Air Act required that control measures for anthropogenic sources in PM-10 nonattainment areas be implemented by the end of 1993. Therefore, this policy is made retroactive to January 1, 1994 so that NAAQS exceedances that may prevent areas from having sufficient clean air quality data to meet the standards will be covered by this policy.

APPENDIX

INTERPRETATION OF THE CLEAN AIR ACT (ACT) AS AMENDED IN 1990

Section 107(d)(4)(B) of the Act, as amended in 1990, provided EPA with the authority to designate initial areas as nonattainment for PM-10. Where such determinations involved an assessment of a potential PM-10 nonattainment area's air quality data, Congress expressly required such assessments to be made in accordance with Appendix K (section 107(d)(4)(B)(ii)). Since, upon enactment, Congress did not alter or revise Appendix K in any way, all the provisions of Appendix K, including section 2.4, remained applicable under the Act. Among other things, section 2.4 authorizes EPA to discount air quality data that are attributable to "an uncontrollable event caused by natural sources" of PM-10. Consequently, if an area's nonattainment problem was attributable to uncontrollable natural sources, application of section 2.4 of Appendix K would allow the data from the uncontrollable natural event to be excluded from regulatory determinations regarding an area's nonattainment status.

The Act also added section 188(f) which specifically addresses the adverse influence of nonanthropogenic PM-10 sources. This section provides EPA with discretionary authority to waive a specific attainment date for all areas or certain planning requirements for serious PM-10 nonattainment areas that are significantly impacted by nonanthropogenic sources.

The EPA previously interpreted the inclusion of such an express waiver provision in the 1990 Amendments as implying that Congress may have intended to limit the application of section 2.4 of Appendix K. The argument in support of this interpretation was that in contrast to section 2.4 of Appendix K, which contemplates the discounting of data due to emissions from certain events, the section 188(f) waiver provisions envisioned that adjustments prompted by adverse air quality impacts that are attributable to data from natural uncontrollable sources of PM-10 should be made only after all the data have been considered and the area has been designated nonattainment.

The EPA, however, believes that this is not the only reasonable interpretation of the Act's provisions that is possible. The EPA believes that the congressional directive in section 107(d)(4)(B)(ii) to base designation decisions on Appendix K, and the differences in how section 188(f) and Appendix K address issues related to emissions from natural sources, indicate that it is not necessary to conclude that section 188(f) limits the application of section 2.4 of Appendix K. Rather, it is possible to view both section 188(f) and section 2.4 of Appendix K as being operative and dealing with related but distinct aspects of the issues connected with emissions from natural PM-10 sources.

The starting point for this analysis is section 107(d)(4)(B)(ii), which, by operation of law, designated nonattainment any area with data showing a violation of the PM-10 NAAQS before January 1, 1989 "(as determined under part 50, appendix K of title 40 of the Code of Federal Regulations)." In that section, Congress required the use of Appendix K in designating areas nonattainment without indicating that any portion of Appendix K was to be considered invalid. Thus, that provision indicates that Congress intended designation decisions to be based on that appendix, including the procedures in section 2.4 regarding exceptional events.

Notably, section 2.4 defines an exceptional event as "an uncontrollable event caused by natural sources of particulate matter or an event that is not expected to recur at a given location." Thus, exceptional events include both uncontrollable natural sources and nonrecurring events related to any kind of source of particulate matter. Section 2.4 further provides that data from such events may be discounted (i.e., EPA may compensate for such data or exclude such data entirely from decisions regarding an area). Consequently, Appendix K contemplates that data from "exceptional events" may be discounted, including, but not limited to, data due to emissions from uncontrollable natural events.

On the other hand, section 188(f), which was enacted by Congress in the same amendments as section 107(d)(4)(B)(ii), discusses PM-10 natural sources in terms of whether they are "anthropogenic" or "nonanthropogenic." It does not discuss such sources or emissions in the terms of Appendix K (i.e., it does not discuss matters in terms of exceptional or nonexceptional events, nor does it distinguish between uncontrollable and controllable natural sources). In general, section 188(f) provides that EPA may waive certain requirements where EPA determines that anthropogenic sources do not contribute significantly to a violation of the PM-10 standard, and that EPA may waive a specific attainment date if it determines that the contribution of nonanthropogenic emissions to a violation is demonstrated to be "significant."

As Congress, without express exception, directed the use of Appendix K in determining whether areas were attaining the PM-10 standard, EPA believes it is reasonable to interpret section 188(f) as not limiting the use of that appendix, provided that such an interpretation does not render section 188(f) invalid. The EPA believes that the approach taken in this natural events policy does not do that, and that it represents a reasonable harmonization of these provisions of the Act and the language of Appendix K regarding exceptional events.

Under EPA's revised interpretation, section 188(f) continues to have force and effect. As section 188(f) addresses the issues in terms of "anthropogenic" and "nonanthropogenic" sources, not in terms of exceptional events (which are defined in Appendix K as both uncontrollable natural events and nonrecurring events from both natural and other sources), it is possible to view the waivers of section 188(f) as being potentially applicable only to areas that are designated nonattainment because the data do not qualify for adjustment under Appendix K. For such areas, it may be reasonable and appropriate to grant waivers from some requirements that simply do not make sense in light of the nature of the sources generating the PM-10 problem in the area. Thus, EPA's new interpretation does not render section 188(f) meaningless. Consequently, EPA believes that the exercise of its discretionary authority under Appendix K to discount or de-weight air quality data that are affected by uncontrollable natural sources of PM-10 is reasonable and appropriate.

Appendix B: EPA NEP Implementation Policy

EPA 1998 MEMORANDUM

NOTE TO DIRECTOR, AIR PROGRAM DIVISION, REGION I-X

DATE: August 17, 1998
SUBJECT: Implementation of the PM₁₀ Natural Events Policy

Sometime ago, in a conference call on PM₁₀ data issues, a question was raised about how active the EPA Regional Offices should be in reviewing and accepting natural event action plans (NEAP's) prepared by states in response to PM₁₀NAAQS violations caused by natural events. From my perspective, it is very important that the Regional Offices play an active role in implementing this policy. The role is different, however, than the regulatory oversight role played by EPA several years ago, when PM₁₀ state implementation plans were submitted. The Natural Events Policy was developed in partnership with state air quality agencies and implementation should also be viewed as an equal partnership. The partners agreed to five guiding principles when developing the policy (see page 3 of the policy statement). The first is that, "Protection of public health is the highest priority of Federal, State, and local air pollution control agencies." This policy relies on review by the public (the fourth partner) to make sure we follow the first guiding principle.

It was never the intent of the policy to increase the administrative burden to the States. The policy is a recognition that there are events which we cannot control which can have significant health effects. The primary purpose of the policy was not to hold states accountable for NAAQS violations due to these natural events while at the same time holding them accountable for mitigating public health impacts to the extent possible.

In view of the above, I am concerned that some states are raising the issue of burdensome oversight process of NEAP's and of excessive documentation of the event requirements being imposed upon them. The documentation process was never meant to be a high hurdle test, but was meant to be one that was clearly credible and could withstand public scrutiny and legal challenge. For the types of events covered in this policy, it was anticipated that news articles and supporting weather reports could be adequate.

I would encourage you to discuss these issues with your staff with regard to EPA's oversight role and make sure that we are complying with the intent of the policy and are not trying to revert to an approval/disapproval role on the NEAP's. My staff have provided in the attachment analysis of some of the key guiding principles which you and your staff may find helpful in implementing the policy.

I would also encourage you to discuss with your states the need to have credible documentation of the events as well as adequate NEAP's in place. Failure to do so on their part will seriously jeopardize the policy itself.

I hope this will be helpful to you. Please call me at 919/54105505 if you have any questions.

ATTACHMENT

Implementing the Natural Events Policy involves the following actions by state agencies, EPA, and the general public.

Flagging and Documentation of Natural Events Data

Guiding principles 2 and 3: “The public must be informed whenever the air quality in an area is unhealthy. All valid ambient air quality data should be submitted to the EPA Aerometric Information Retrieval System and made available for public access.”

State Actions

- Flag particulate matter (PM) data caused by natural events and document clear causal relationships between the measured values and the events. Show that the PM NAAQS would not have been exceeded if the event had not occurred (values normally below 150 $\mu\text{g}/\text{m}^3$). Document the sources of PM contributing to the event. Was the smoke from wildfires or fires managed to achieve resource benefits (fires managed within a prescription)? Did the dust entrained by high winds originate from anthropogenic sources (areas disturbed by human actions) or natural areas?
- Compare the conditions of high wind events with those determined to be likely to lead to high winds overcoming best available control measures (BACM) at anthropogenic sources. States are to identify the conditions (soil type, precipitation, wind speed, etc.) that can lead to high winds overcoming BACM in each region or subregion of the state.
- Send a copy of the documentation to the EPA Regional Office no later than 180 days from the time of the event.

EPA Regional Office Actions

- Review flagged data and the documentation. Is the documentation convincing?
- Review the actions taken to get public review. Has the public been treated as a partner and given adequate opportunity to review and comment on the data?
- Review the states' identification of conditions that can lead to high winds overcoming BACM. Is it reasonable to consider dust generated from anthropogenic sources with BACM to be due to uncontrollable, natural events under these conditions? What are the bases for the determinations?

Public Actions

- Review the states' treatment of air quality data, especially data above the NAAQS.
- Review the conditions identified as likely to lead to high winds overcoming BACM.

Best Available Control Measures

Guiding principle 5: “Emission controls should be applied to sources that contribute to exceedances of the PM₁₀NAAQS when those controls will result in fewer violations of the standards.”

State Actions

- Require BACM to be implemented at contributing anthropogenic sources of dust within three years of the first PM NAAQS violation due to high wind events. Anthropogenic sources of dust that become airborne during high wind events must be controlled with BACM to be included under the Natural Events Policy.
- Document BACM determinations.
- Secure firm commitments and schedules for BACM implementation.

EPA Regional Office Actions

- Review the list of anthropogenic sources documented as contributing to high wind events.
- Review the BACM requirements for those sources. Are the measures comparable to other BACM determinations for those source categories? Was BACM implemented before the PM NAAQS was violated? Is there a firm schedule for implementing BACM at those sources where it has not already been implemented? Is there a firm schedule for developing and implementing BACM at those sources for which BACM has not been defined?
- Look at the opportunity for public review. Was the public given adequate opportunity to review and comment on BACM determinations and implementation schedules?

Public Actions

- Look for anthropogenic sources of dust documented as contributing to high wind events.
- Review requirements for BACM for anthropogenic sources of dust.
- Review BACM implementation schedules.

Natural Events Action Plans

Guiding principle 4: “State and local agencies must take appropriate reasonable measures to safeguard public health regardless of the source of PM₁₀ emissions.”

State Actions

- Develop a natural event action plan (NEAP) for areas where natural events have caused PM NAAQS violations, within 18 months of the violation. Include the five requirements of a

NEAP listed in the policy. Confer with the EPA Regional Office and all other stakeholders in developing the NEAP.

- Include documented agreements with stakeholders, implementation schedules (especially for commitments to take action), and identify the parties responsible for carrying out actions.
- Seek and respond to public review and comment on the NEAP.
- Submit final NEAP's to the EPA Regional Office for review and comment.

EPA Regional Office Actions

- Discuss the goals, objectives and expectations of a NEAP with the State before it is developed.
- Monitor the public review process.
- Review and comment on the NEAP. Are the implementation schedules reasonable? Are the guiding principles of the policy being followed? Are “appropriate reasonable measures to safeguard public health” being taken?
- Notify the governor of the state that the area with a NAAQS violation should be redesignated as nonattainment, if the state fails to submit an adequate NEAP.

Public Actions

- Review and comment on the NEAP

Appendix C: APCD - Technical Services Program (TSP) – Homepage

Technical Services Program

Colorado Department of Public Health and Environment
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Google search entire web search www.cdphs.state.co.us

Air Pollution Control Division
Technical Services Program
 Sheila Burns, Program Manager

Contact Us
 AQI and your Health
 Today's Advisory
 Current Air Quality Conditions

Technical Services is responsible for the collection and analysis of air quality data throughout the state. Particulate and gaseous air monitors are distributed in most Colorado communities to track air quality trends and compliance with air quality standards. The program is also responsible for providing modeling analyses to determine the impacts various sources will have on air quality. Models are also used to create and evaluate control plan strategies and to provide a basis for health risk assessments.
 E-mail for questions or comments

State Page, Department Home, Division Home, Search, Environment, Health & Safety, Permits, Regulations, Statistics & Research Data, [Ext-Fac], [W-Reports], [Forecast Reports], [Lists]

For better experience, please use: Netscape 6 or higher, Internet Explorer 5 or higher

Current Conditions

- EPA Ozone Mapping
- EPA PM2.5 Mapping
- Front Range Cities Ozone 2004
- 8 hr Ozone Control Area

Information

- Wildfire Information
- Información de Incendios

Reports

- 2004 Annual Data Report
 - 2001 Quality Assurance Report
- EPA - The Particle Pollution Report 2003
- 2001 Report of Urban Air Toxics In Denver.
- Denver Pollen Report & Allergy Information from National Jewish
- 2001-2002 Report of Urban Air Toxics in Grand Junction (6678k)

Maps

- Attainment Areas
- Ozone Monitoring
- EPA Ozone Mapping
- EPA PM2.5 Mapping

Navigation Menu:

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Appendix D: TSP – Open Burning Forecast Webpage

Air Pollution Forecast



search

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It is now Thu Dec 29
16:05.

Colorado Open Burning Forecast

The open burning season for the greater metropolitan area is now over until March 1, 2006, except for pile and slash burning projects from wildland fuel reduction activities as follows:

- The burn is conducted under a valid permit issued by the Air Pollution Control Division.
- Burning will occur only on BLUE days as determined by the Air Pollution Control Division. Pile and slash burning is not allowed when a RED advisory is in effect.
- Burning will occur between 10:00 AM and 4:00 PM. Fires must be completely out without any significant residual smoke by 4:00 PM.
- Projects include only wood debris generated during hazardous fuel reduction activities (i.e., thinning, defensible space, and forest health).
- Reasonable alternatives, other than burning, for disposal of material do not exist.
- The project is at an elevation of 6400 feet or higher. A few exemptions may apply. Please see the [\[RED-BLUE Policy\]](#)
- All applicable State and local regulations must be met. The permit is for compliance with State air pollution control requirements only and is not a permit to violate any existing State or local laws, rules, regulations or ordinances regarding fire, zoning or building.

Policy on Prescribed Burning Along the Front Range During Winter High Pollution Season Restrictions [\[RED-BLUE Policy\]](#)

Always observe fire safety guidelines and check the National Weather service Fire Weather pages for local fire weather forecasts:

<http://www.crh.noaa.gov/den/fireidx.html>

<http://www.crh.noaa.gov/den/fir2mft.html>

[GO to the Main AQI/PSI reporting system page](#)

<http://apcd.state.co.us/psi/openbfat.php>11/29/2005 4:07:18 PM

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Appendix E: TSP – Wildfire Webpage

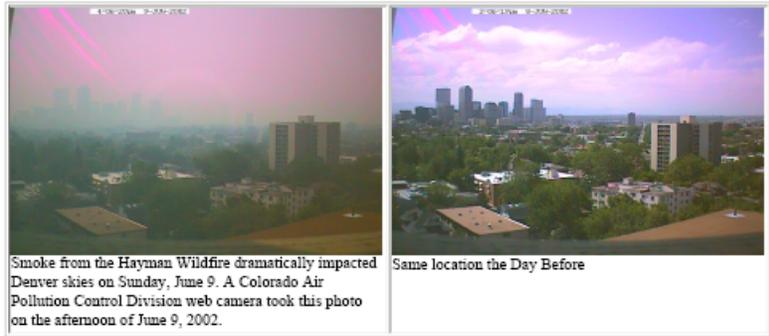
Page 1

Colorado WildFire Information

 **Colorado** Department of Public Health and Environment
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- [Symptoms of smoke exposure](#)
- [What's in the smoke?](#)
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- [Who is most likely to be affected?](#)
- [What's the smoke forecast?](#)
- [How does smoke from wildfires affect ground-level ozone pollution?](#)
- [Should I be concerned about air quality inside, too?](#)
- [Fire Bans](#)
- [WildFire info & links](#)



Wildfires

Colorado Open Burning Forecast *(It is now Fri Dec 16 09:57)*

No forecast has been Issued.
Always observe fire safety guidelines and check the National Weather service Fire Weather pages for local fire weather forecasts:

<http://www.crh.noaa.gov/den/fireindx.html>

<http://www.crh.noaa.gov/den/fir2znft.html>

How can I tell what the air quality is like where I am?

Air quality meteorologists at the Colorado Department of Public Health and Environment are using a system included in the Idaho Department of Environmental Quality's Wildfire Natural Events Action Plan that is designed to address, among other things, public awareness of fire risks, including smoke. You can use it too to help you categorize the risk from smoke where you are. The system enables air quality meteorologists to take both hourly pollution readings from air quality monitors (where available) and visible air quality and assign a risk category using the U.S. EPA's Air Quality Index Scale (AQI). In most cases, residents can use the visibility column to assess air quality in their areas.
The table below shows how the system is applied:

<http://epcd.state.co.us/wildfire.php.html> (1 of 3)/12/16/2005 9:59:17 AM

Wildfire Webpage continues on next page

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Air Quality Category (AQI)	24-Hr PM _{2.5} Reading (µg/m ³) ¹	1-Hr PM _{2.5} Reading (µg/m ³) ²	Visibility (miles) ³
Good ((0-50)	0.0 - 22.0	0.0 - 40.0	10 or more miles
Moderate (51-100)	15.5 - 40.4	40.1 - 80.0	5-10 miles
Unhealthy for Sensitive Groups (101-150)	40.5 - 65.4	80.1 - 175.0	3-5 miles
Unhealthy (151-200)	65.5 - 150.4	175.0 - 300.0	1.5 - 3 miles
Very Unhealthy (201-300)	150.5 - 250.4	300.1 - 500.0	1. - 1.5 miles
Hazardous (301-500)	≥250.5	≥ 500.1	≤ 1 mile

1. U.S. EPA Air Quality Index Reporting 40 CFR 58 (pages 42530-42549), August 4, 1999.

2. Fire, Smoke and Health Workshop, Seattle, WA, June 5-6, 2001 (<http://depts.washington.edu/wildfires>)

3. Based on Montana DEQ empirical study.

▲ Are you part of one of the population groups considered especially at risk from exposure to smoke from wildfires?

(Remember, even persons considered healthy can experience symptoms when exposed to smoke from wildfires)

At-Risk Population Groups

- Elderly persons.
- Young children (especially children 7-and-under).
- Individuals with pre-existing respiratory conditions like asthma, emphysema, and cardiovascular disease.
- Individuals with respiratory infections like colds or flus.

▲ What are some of the symptoms related to wildfire smoke?

- Eye, nose, mouth and/or throat irritation.
- Coughing.
- Trouble breathing.
- Tightness of the chest.
- The onset of symptoms related to pre-existing respiratory ailments like asthma or emphysema.

▲ What can you do if smoke from wildfires is affecting you and your family?

Residents are urged to consider simple actions that can minimize their exposure to smoke that makes its way into their community.

- If you smell smoke and/or are beginning to experience symptoms, consider temporarily locating to another area as long as it is safe for you to do so.
- Move indoors and stay there with doors and windows closed.
- Run the air conditioning, the fan feature on your home heating system (with the heat tuned off) or your evaporative cooler. The filtration systems on home systems can provide some benefit.
- Run HEPA room air filtration units.
- Reduce your physical activity level. Do not take on deliberate exercise.

If symptoms persist or become more severe, please contact your primary health care provider.

▲ What are the known chemical components of smoke from wildfires?

- *Particulate matter* - coarse visible and fine invisible particles including soot and ash that can reach deep into the lungs and may contain irritating and cancer causing compounds.
- *Polynuclear aromatic hydrocarbons* - a class of organic compounds found on the particulate matter from forest fires, wood stoves, pine needles, and fireplaces, some of which may be carcinogenic with extended exposure.
- *Carbon monoxide* - a colorless, odorless, toxic gas produced in highest amounts for a few minutes after dousing the fire or in smoldering forest fires. Firefighters working near the wildfire are at greatest risk for high doses of carbon monoxide. Areas downwind of the fire experiencing high particulate smoke levels typically will not have high levels of carbon monoxide. Signs of high carbon monoxide levels in the blood include headaches, dizziness, nausea, and decreased mental functioning.
- *Aldehydes* - compounds that are extremely irritating to the eyes and mucous membranes of the mouth and nose. Some like formaldehyde are carcinogenic, while others like acrolein can injure lung tissue.
- *Volatile organic compounds* - strong irritants, some of which are carcinogenic.

▲ Here are some links to websites that will help you gather more information about wildfire activity.

[Colorado Office of Emergency Management](#)

U.S. Forest Service Reports

<http://www.fs.fed.us/news/fire/mreport.shtml>

<http://www.fs.fed.us/r2/fire/macc>

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Appendix F: TSP – Smoke Management Webpage

APCD Smoke Home

		Department of Public Health and Environment											
Department Home About the Department Certificates Environment A to Z Health A to Z News Releases Permits Regulations													
<ul style="list-style-type: none"> Smoke Home Our Goals Proposed Burns References: <ul style="list-style-type: none"> Applications Implementation Program Public Comment Wildfire Smoke Contact Us <ul style="list-style-type: none"> Air Quality Monitoring Links <ul style="list-style-type: none"> APCD Home Site Map 	How do I get a permit?	Map of Permits	FAQs										
	Download All Forms	Fire Use	Red-Blue Policy										
	County Contacts	SASEM Inputs	Reg. 9										
	Public Comment Periods for High Smoke Risk Permits	SASEM Download	Examples of Good Applications										
	<h3>Colorado Smoke Management Program</h3>												
	<p><i>Our Latest News:</i></p> <ul style="list-style-type: none"> • For Front Range burners who work with red/blue days, we have clarified that no red/blue restrictions apply above 7,000'. (12/05) • Wonder how often ventilation is 'fair' compared to 'good'? How close are most burns to the nearest receptor? As part of proposing revisions to broadcast burn modeling, we wondered. See Patterns of Ventilation and Other Variables Affecting Burn Opportunities (658 KB). Also updated: discussion of SIS and future modeling. (11/05) • Winter '05/06 priorities for APCD's smoke staff are posted. (11/05) 												
	 <p>Old Man burn near Eagle, May 2004</p>	<table border="1"> <thead> <tr> <th>Featured Topics</th> </tr> </thead> <tbody> <tr><td>Newsletter</td></tr> <tr><td>SIS Model Tests</td></tr> <tr><td>General Open Burn Permits</td></tr> <tr><td>Air Curtain Destructors</td></tr> <tr><td>When Colorado Burns: Seasons and Timing</td></tr> <tr><td>Map of Permits (rudimentary!)</td></tr> <tr><td>Three-Year Vision</td></tr> <tr><td>Standard Permit Conditions</td></tr> </tbody> </table>			Featured Topics	Newsletter	SIS Model Tests	General Open Burn Permits	Air Curtain Destructors	When Colorado Burns: Seasons and Timing	Map of Permits (rudimentary!)	Three-Year Vision	Standard Permit Conditions
	Featured Topics												
	Newsletter												
	SIS Model Tests												
General Open Burn Permits													
Air Curtain Destructors													
When Colorado Burns: Seasons and Timing													
Map of Permits (rudimentary!)													
Three-Year Vision													
Standard Permit Conditions													
<p>Site last updated 8/11/05.</p>													

<http://www.cdph.state.co.us/sp/smoke/12/16/2005 3:58:10 PM>

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Appendix G: TSP – Colorado Smoke Outlook Webpage

The AQI and VSI Air Quality Reporting Systems

Air Pollution Control Division

Air Quality Index (AQI) Reporting System

Denver Metro Ft. Collins-Greeley Colorado Springs

Front Range Air Quality Forecast and Colorado Smoke Outlook

Today's Air Quality for the Denver Metro Area

At 7 AM on 12/30/05, the highest AQI value was 39 for PM2.5 which indicates [good](#) air quality. It was recorded by the [CHAT](#) monitor. This is the highest AQI value for the day so far.

Today's Air Quality for the Ft. Collins-Greeley Area

At 7 AM on 12/30/05, the highest AQI value was 22 for Ozone which indicates [good](#) air quality. It was recorded by the [FTC](#) monitor. The highest for the day so far was 27 for Ozone which indicates [good](#) air quality. It was recorded at 1 AM MST by the [FTC](#) monitor.

Today's Air Quality for Colorado Springs

At 7 AM on 12/30/05, the highest AQI value was 7 for CO which indicates [good](#) air quality. It was recorded by the [GLEN](#) monitor. This is the highest AQI value for the day so far.

Other Sites In Colorado

At the present, near real-time air quality measurements are not routinely available for other sites in Colorado. [Yesterday's Air Quality](#) measurements are available.

▲ COLORADO SMOKE OUTLOOK:
Wildfire smoke is not expected to be an issue today. For current air quality forecasts navigate to the advisory page.

Warning: The data reported in these pages have not been validated nor corrected. They appear just as reported by the collection

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Appendix H: Sample Public Health Advisories for Wildfire Smoke

Tuesday June 8, 2004, 9:00 AM:

FRONT RANGE OZONE FORECAST: Ozone levels are expected to be in the good-to-moderate category late Tuesday afternoon and evening along the Front Range from Colorado Springs to Fort Collins including the Denver metro area. Unusually sensitive people may want to consider limiting prolonged outdoor exertion between the hours of 2pm and 9pm today when moderate levels of ozone are expected to occur.

COLORADO SMOKE OUTLOOK: Smoke is possible in localized areas downwind of the Greasewood Gulch Fire near Meeker and the Deer Creek Park Fire southwest of Denver. Light to locally heavy smoke is possible in valleys downstream of the Greasewood Gulch Fire Tuesday morning and to the north and northeast of the fire this afternoon.

IF VISIBILITY IS LESS THAN 5 MILES DUE TO SMOKE IN YOUR NEIGHBORHOOD, SMOKE HAS REACHED LEVELS THAT ARE UNHEALTHY. If smoke is thick or becomes thick in your neighborhood you may want to remain indoors. This is especially true for those with heart disease, respiratory illnesses, the very young, and the elderly. Consider limiting outdoor activity when moderate to heavy smoke is present. Consider relocating temporarily if smoke is present indoors and is beginning to make you feel ill.

Monday July 12, 2004, 4:00 PM:

FRONT RANGE OZONE FORECAST: Ozone levels are expected to climb into the high moderate range this afternoon and evening along the Denver-area foothills from Boulder south and in the southwestern and southern suburbs of Denver. Unusually sensitive people in these areas may want to consider limiting prolonged outdoor exertion between 2 PM and 11 PM today. Ozone is likely to stay in the good range in Ft. Collins, Greeley and Colorado Springs all day today. Ozone levels are expected to climb back into the moderate range on Tuesday afternoon and evening especially in areas west of I-25 and along the foothills from Ft. Collins to Boulder, the western and southern suburbs of Denver, and in Colorado Springs. Unusually sensitive people throughout the Front Range region may want to consider limiting prolonged outdoor exertion between 2 PM and 10 PM on Tuesday.

COLORADO SMOKE OUTLOOK: Light to locally heavy smoke is possible in the vicinity of the Saddle Mountain Fire, which is burning in southeast Delta County east of the town of Delta, and the Spring Creek/Yearling fires which continue to burn on the upper end of Taylor Mesa near Stoner and Dolores. The greatest impacts are likely during the nighttime and morning hours in canyons and valleys downstream from these fires. Otherwise, light smoke from other fires in western states will be visible, at times, in parts of Colorado. This smoke will contribute to regional haze and reduce visibility but otherwise is not expected to have a significant impact on air quality.

IF VISIBILITY IS LESS THAN 5 MILES DUE TO SMOKE IN YOUR NEIGHBORHOOD, SMOKE HAS REACHED LEVELS THAT ARE UNHEALTHY. If smoke is thick or becomes thick in your neighborhood you may want to remain indoors. This is especially true for those with heart disease, respiratory illnesses, the very young, and the elderly. Consider limiting outdoor activity when moderate to heavy smoke is present. Consider relocating temporarily if smoke is present indoors and is beginning to make you feel ill.

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Appendix I: TSP – Air Pollution Advisory Webpage

The AQI and VSI Air Quality Reporting System

Air Pollution Control Division

Air Quality Index (AQI) Reporting System



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This is the Air Pollution Forecast issued at 4 p.m. on WEDNESDAY, DECEMBER 28, 2005.

A **BLUE** pollution advisory is now in effect for the seven-county Denver-Boulder metropolitan area. Good or moderate air quality conditions are expected. There are **NO** residential burning restrictions in place. This advisory will remain in effect until 4 p.m. Thursday, December 29, 2005.

Your actions to limit driving improve air quality. Many companies now offer employees telecommuting and flextime options that reduce weekly travel. Give a flexible work schedule a try. We'll all breathe easier!

At 01 pm, Thursday, December 29, 2005, the highest AQI value was 42 for pm10 which indicates good air quality. The current VSI is 90, Moderate. [Click here for a live picture.](#)

Brisk winds tonight and throughout the day on Thursday are expected to keep air quality in the good category. Fine particulate matter, carbon monoxide and ozone levels are expected to be in the good category throughout the advisory period. Good visibility is forecast for Thursday.

The High Pollution Advisory Program is coordinated by the Air Pollution Control Division of the Colorado Department of Public Health and Environment.

Air quality advisories are issued daily from October 31 through March 31 at 4 p.m.

RED advisories indicate that either current air quality is poor or conditions are expected to worsen later in the day or the next day. Red advisories trigger mandatory residential burning restrictions and voluntary driving reductions in the seven-county Denver-Boulder metropolitan area only ([see residential burning below](#)).

BLUE advisories indicate that air quality is good or moderate and no restrictions are in place while the advisory is in effect.

The **VISIBILITY STANDARD INDEX** reports the air's visual quality in the seven-county Denver-Boulder metropolitan area. The visibility standard is 0.076 per kilometer of atmospheric extinction, which means that 7.6 percent of the light in a kilometer of air is blocked. The level must exceed the standard based on a four-hour average for a violation to occur. On the Visibility Standard Index Scale, a value of 101 equates to the 0.076-km standard. Values between 0-50 are good, 51-100 moderate, 101-200 poor and 201-plus extremely poor.

The **AIR QUALITY INDEX** reports the daily level of air pollution on an hourly basis. The index reports the highest level of either carbon monoxide, fine particulates or ozone depending on which pollutant has the greatest hourly concentration. Values greater than 100 for carbon monoxide, fine particulates and ozone indicate exceedances of the pollutant's state and federal standards. Air Quality Index values between 0-50 are good, 51-100 moderate, 101-150 unhealthy for sensitive groups, 151-200 unhealthy, 201-300 very unhealthy, and over 300 hazardous.

RESIDENTIAL BURNING: During red advisories, mandatory residential burning restrictions generally apply to everyone in the entire seven-county Denver-Boulder metropolitan area below 7,000 feet. The restrictions will be enforced through local ordinances or a state regulation.

The state regulation applies to any community in the seven-county Denver-Boulder metropolitan area that did not have its own mandatory residential burning ordinance in effect on January 1, 1990. Under this regulation, the only exceptions to the residential burning restrictions are for residences above 7,000 feet in the seven-county Denver-Boulder metropolitan area; and those who use [Colorado Phase III \(Phase II EPA\)](#) certified woodburning stoves, Colorado approved pellet stoves, approved masonry heaters or those whose stoves or fireplaces are their primary source of heat. For more information on residential burning restrictions, call the Air Pollution Control Division at (303) 692-3100.

[Go to the main AQI/VSI Reporting System page](#)

Español

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Appendix J: TSP – AQI & Visibility Webpage

The AQI and VSI Air Quality Reporting Systems

Air Pollution Control Division

Air Quality Index (AQI) Reporting System

[Denver Metro](#) [Ft. Collins-Greeley](#) [Colorado Springs](#)

Front Range Air Quality Forecast and Colorado Smoke Outlook

Today's Air Quality for the Denver Metro Area

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COLORADO SMOKE OUTLOOK:
Wildfire smoke is not expected to be an issue today. For current air quality forecasts navigate to the advisory page.

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Appendix K: 2004 National Fire Plan Report



FY2004 Performance Summary

Now in its fourth year of implementation, the National Fire Plan (NFP) represents a long-term commitment and investment that is helping protect communities, natural resources, and the lives of firefighters and the public. This long-term commitment is shared among federal agencies, states, local governments, tribes, and interested publics. Collaboration, accountability, and priority setting are the guiding principles that will ensure the continued success of the NFP.

Hazardous fuels reduction goals under the National Fire Plan can now be expedited through provisions of the Healthy Forests Initiative (HFI) and the Healthy Forests Restoration Act (HFRA). Significant progress has been made through the use of these provisions to reduce hazardous fuels and improve land conditions. In Fiscal Year 2004, federal agencies used the HFI administrative tools on 564 projects covering 442,000 acres. Also during 2004, HFRA authorities were used on 60 projects covering 228,000 acres. Emphasis on collaboration and coordination are at the very core of the success realized through the four years of implementation of the NFP and the early stages of the HFI and the HFRA.

Long Term Strategy, Long Term Implementation Plan – Following the May 2002 signing of *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment*, and the subsequent approval of its implementation plan, significant progress has been made in tackling the complex problems of wildland fire. Between May 2002 and December 2004, 75 percent, or 96 of the 128 action items set forth in the plan, were completed. Below is a summary of the funding appropriated to implement National Fire Plan goals and objectives:

Summary of Appropriated Funding for the National Fire Plan*

Department of Agriculture and Department of the Interior, FY 2000-2004
(Dollars in thousands)

Agency	FY 2000	FY 2001	FY 2002	FY 2003 [^]	FY 2004
USDA Forest Service	\$645,125	\$1,487,629	\$1,354,349	\$2,289,968	\$1,647,816
Department of the Interior	\$490,957	\$977,099	\$678,421	\$875,152	\$685,177
NFP Total	\$1,136,082	\$2,464,728	\$2,032,070	\$3,129,120	\$2,396,993

*Funding levels do not include emergency suppression contingency funds.

[^]2003 figures include repayment for fire suppression costs.

The Western Governors Association (WGA) conducted a status summary of the 10-Year Implementation Plan. Their findings indicated that outstanding progress has been made on goals one and two, *Improving Fire Prevention and Suppression* and *Reducing Hazardous Fuels*. Their review highlighted a need to place additional emphasis on goals three and four, *Restoring Fire-adapted Ecosystems* and *Promoting Community Assistance*. A collaborative approach for updating the Implementation Plan is being prepared.

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Increased Accountability

In January 2004, the Wildland Fire Leadership Council commissioned the Strategic Issues Panel on Fire Suppression Costs to study the increasing costs of wildland fire suppression. The members of the panel included senior agency administrators, fire experts, tribal representatives, governors' representatives, and state and local government officials. The members were asked to look at a variety of fire suppression cost containment issues and barriers and their relationship to land and resource management planning. A report was presented to the Council in August, and feasibility studies for each of the cost containment proposals are now under way. The report can be viewed at fireplan.gov under the resources section.

Increased Contracting and Jobs

Both the Department of the Interior and the Forest Service have established objectives to significantly increase the level of funds for contracting of hazardous fuels projects, emergency stabilization and rehabilitation, and firefighting preparedness and suppression. The five wildland firefighting agencies initiated approximately \$140 million in contractual actions and awarded 86 stewardship contracts in FY 2004.

FY 2004 Selected Accomplishments:

Firefighting Preparedness - Provides the resources and infrastructure necessary to conduct fire and aviation management activities. Accomplishments include:

- Hired, trained, and maintained a firefighting workforce of over 16,000 personnel.
- Provided a firefighting fleet of 1,551 engines, 260 dozers and plows, 157 water/foam tenders, and 149 helicopters, among other equipment.
- Increased interagency fire training, with over 900 participants completing training.

Emergency Stabilization and Rehabilitation - Stabilization efforts focus on addressing post-fire emergency situations, such as erosion and possible floods. Rehabilitation efforts focus on improving lands that are unlikely to recover naturally from the effects of wildfires. Accomplishments include:

- Stabilized slopes with log structures, straw wattles, and straw mulch, and installed culverts and reseeded burned areas.
- Accomplished 657 rehabilitation projects on federal lands in 17 states, treating nearly 2.5 million acres.
- Completed more than 11,600 miles of trail reconstruction, roadwork, riparian enhancement, fencing, and boundary line location.

Hazardous Fuels Reduction – Using prescribed fire, mechanical thinning, grazing, or a combination of these methods, a record amount of federal and adjacent land was made less prone to the impacts of wildfire. Accomplishments include:

- A record 4.2 million acres of federal land and adjacent lands were treated, 2.4 million acres of which were in wildland/urban interface (WUI) areas.

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- 719,000 acres were treated by mechanical means; 2.3 million acres were treated with prescribed fire.
- 120,000 acres were treated through Wildland Fire Use (WFU).
- Of the total acres treated, 1.1 million acres were treated for other reasons, and reduced fuels levels as a secondary benefit.

Community Assistance – Provided grants for states and local fire agencies to increase fire protection capabilities and increase their ability to support federal agencies’ firefighting needs. Most grants require matching funds, which increases the value and scope of federal funding. Accomplishments include:

- Assisted over 14,000 communities with risk assessment plans, fuels treatments, development of local fire departments’ capacity, and wildfire preparedness.
- Increased firefighting capacity by providing technical assistance, training, supplies, equipment, and public education support to 8,752 volunteer fire departments and 1,848 rural fire departments.
- Reached approximately 2,500 people through national-level Firewise workshops. Another 60 one-day spin-off workshops drew approximately 2,000 more participants representing about 40 communities.

Research – Three different organizations provide research for federal wildland fire management, including the Joint Fire Science Program, Forest Service Research and Development, and the U.S. Geological Survey. Accomplishments include:

- With support from NFP funding, 72 Forest Service research teams studied aspects of wildland fire management including firefighter and public safety, fire weather and behavior, smoke dispersion, and post-fire susceptibility to invasive species.

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Community Assistance

Overview:

As the nation's demographics change, developed areas and individual homesites increasingly extend into wildland areas. These wildland/urban interface (WUI) areas exist wherever homes and businesses are built among trees, brush, and other flammable vegetation. WUI communities exist throughout the United States, in both rural and urban areas. Fires can move from brush or grasslands into communities or from communities into adjacent wildlands. Either way, community involvement is a critical element in reducing fire hazards near homes and communities and restoring damaged landscapes. Communities need many types of assistance and agencies provide support to meet these needs in educating citizens, community protection planning, training and equipping firefighters, purchasing equipment, and treating vegetation and landscapes around communities. Community assistance programs focus on building state and community capacity to develop and implement citizen-driven solutions that will lessen local vulnerability to risks associated with wildland fires.

Community Assistance Budget Summary (\$ in thousands)

National Fire Plan	FY 2001 USDA & DOI	FY2002 USDA & DOI	FY 2003 USDA & DOI	FY 2004 USDA & DOI
Rural Fire Assistance	\$9,978	\$10,000	\$9,935	\$9,877
State Fire Assistance*	\$77,828	\$50,383	\$66,252	\$51,063
Volunteer Fire Assistance*	\$13,251	\$8,262	\$8,168	\$8,138
Economic Action Programs	\$12,472	\$12,472	\$4,967	\$0
Community & Private Land Fire Assistance	\$34,923	\$0	\$0	\$0

* SFA and VFA funding includes National Fire Plan funding only. These programs receive funding from other budget line items not reflected in this table.

Rural Fire Assistance (Department of the Interior)

In FY 2004, Department of the Interior funding provided wildland fire-related training, equipment, and public safety education support to 1,400 rural fire departments, thus enhancing firefighter safety and strengthening local wildland fire protection capacity and capability.

State Fire Assistance (USDA Forest Service)

Forest Service funding in 2004 provided in excess of \$55 million for technical and financial assistance to states to enhance firefighting capacity at the state and local levels. This funding supported fire hazard mitigation projects in the WUI and facilitated an expanded series of Firewise workshops to help communities reduce the risks in fire-prone areas. State Fire Assistance provides key support to successful community programs such as Firewise Communities/USA and Fire Safe Councils. It will also support an

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expanded national public service fire prevention program. Many Community Wildfire Protection Plans (CWPPs) were also developed by communities and local fire departments in consultation with State Foresters to prioritize hazardous fuels treatments and reduce structural ignitability in communities with support from State Fire Assistance funding.

Volunteer Fire Assistance (USDA Forest Service)

In FY 2004, the Forest Service provided funding, through the states, to 8,752 volunteer fire departments. This funding helped improve communication capabilities, increase wildland fire management training, and purchase protective fire clothing and firefighting equipment for fire departments that serve communities of less than 10,000 people. Rural volunteer fire departments provide major assistance to state forestry agencies in the suppression of wildland fires, and in some states rural fire departments suppress all such fires.

Volunteer fire departments also play a major role in critical initial attack response and suppressing wildfires on federal lands. The USDA Forest Service and various Department of Interior land management agencies have entered into cooperative agreements with many rural volunteer fire departments for the purpose of protection of both communities and natural resources.

The Firewise Communities Program

The Firewise Communities Program – funded by the National Fire Protection Association, the Departments of Agriculture and the Interior, and other state, federal, and nonprofit partners – is a highly successful part of community hazard mitigation efforts. The program encourages communities and homeowners to take responsibility for hazard mitigation through land use planning, building codes, landscaping codes, zoning, and community fire protection planning. The year 2004 marked the fourth year of national-level workshops since the National Fire Plan was initiated. Approximately 2,500 people were reached through these workshops. Additionally, one-day spin-off workshops conducted around the United States amounted to about 60 one-day WUI/Firewise workshops representing about 40 communities and approximately 2,000 participants.

For FY 2004, the Forest Service made a commitment to work with each Region to focus on implementing and working with the Firewise program in the WUI areas. The *Communities and Wildlands* program was initiated to meet the goal of strengthening Forest Service understanding and commitment to Firewise principles and coordination with the national Firewise program through interaction with the National Fire Protection Alliance and Firewise stakeholders.

Community Wildfire Protection Plans

In FY 2004, assistance was provided for hazard assessments, and funding was provided for Community Wildfire Protection Plans (CWPPs) for communities at risk. CWPPs address issues such as wildfire response, hazard mitigation, community preparedness, and structure protection. They provide communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction plans on federal lands and how additional federal funds may be distributed for projects on nonfederal lands.

Economic Action Programs (USDA Forest Service)

Although no designated National Fire Plan (NFP) funding was provided for Economic Action Programs (EAP) in FY2004, EAP coordinators did involve 990 rural communities and organizations in NFP-related projects. EAP assistance has enabled wildfire and hazardous fuels management issues to be included as components in more than 485 local strategic plans over the last four fiscal years. More than 190 such plans were done in FY 2004 despite the lack of NFP-EAP funding. Funds allocated across the nation addressed a full range of financial and technical assistance programs, including fuels reduction and utilization projects, bio-energy feasibility studies, wood utilization and product/market feasibility studies, modification or development of long-term fuels hazard reduction projects, and community economic development planning to expand or diversify the use of forest products.

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Hazardous Fuels Reduction

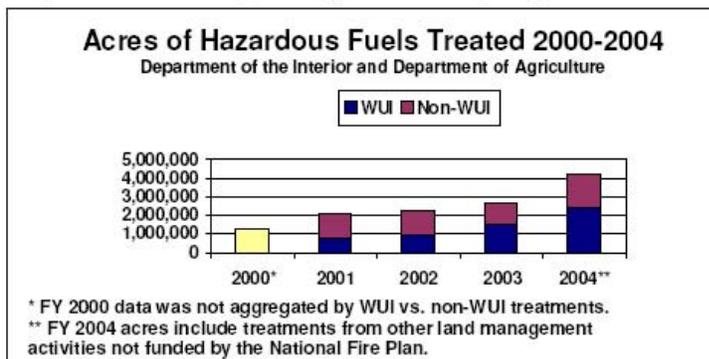
Fuels Reduction and Restoration Treatments

The hazardous fuels program reduces the impacts of wildland fires on communities and natural and cultural resources. Heavy fuels accumulation and altered vegetation composition and structure, in combination with sustained drought, are contributing to increased fire intensity, spread, and resistance to control through many parts of the United States. Fire occurrence records show an increase in the number of large wildland fires over the last two decades. The impacts of these fires are further compounded by the growth of communities adjacent to public lands, putting homes and other structures closer to areas where large wildland fires occur. In recent years, these changes have resulted in the need for wildland firefighters to spend more time and effort protecting structures.

In response to the risks posed by heavy fuel loads, the NFP established an expanded, intensive, long-term program of hazardous fuels reduction on federal and adjacent lands. This program emphasizes cooperation and collaboration among federal agencies, state, local, and tribal governments, and other stakeholders to achieve the fuels reduction goals and objectives of the 10-Year Comprehensive Strategy Implementation Plan. Fuels reduction and restoration treatments are designed to reduce the risks of catastrophic wildland fire to people, communities, and natural resources.

Fuels treatments accomplish these goals by removing or modifying wildland fuels to reduce the potential for severe wildland fire behavior, lessen post-fire damage, limit the spread and proliferation of invasive species and diseases, and restore and maintain healthy, diverse ecosystems. Treatments are accomplished using prescribed fire, mechanical thinning, herbicides, grazing, or combinations of these and other methods.

During FY 2004, the Forest Service and the Department of the Interior treated a record 4.2 million acres of hazardous fuels on federal and adjacent lands. Of the total acres treated, 2.4 million were in wildland/urban interface areas. An additional 120,000 acres of wildland fuels were treated on federal lands through wildland fire use (WFU). Wildland fire use is the management of naturally ignited wildland fires to accomplish specific resource management objectives including ecosystem maintenance and restoration.



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Planning for Fuels Treatments

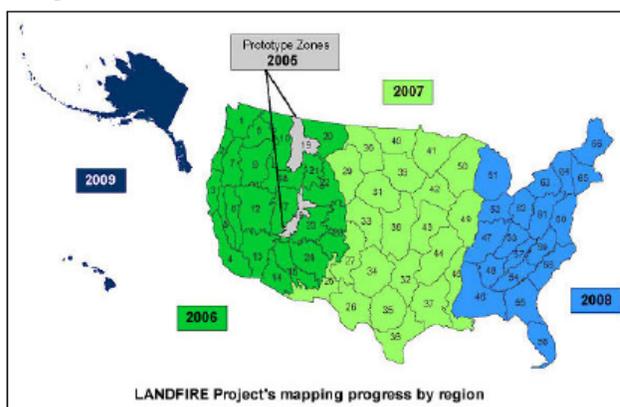
Project planning continues to be an important aspect of the program of work to prepare for fuels treatments in FY 2005 and into the future. Treatments must address high-priority needs, include local citizen-driven solutions, and be completed in a manner consistent with land use plans and environmental goals. With an emphasis on wildland/urban interface treatments, planning and consultation for fuels reduction projects involve more cooperators and a higher level of complexity than in the past.

In 2004, both Interior and Agriculture issued direction on priorities for planning fuels treatment projects in future years. Although this is not a comprehensive list, some key priorities include:

- All projects must result from a collaborative process.
- Funding will be targeted to the WUI and municipal watersheds.
- Within the WUI, focus should be on:
 - Projects near WUI communities at greatest risk of fire
 - Communities that have completed a Community Wildfire Protection Plan or its equivalent
 - Communities with active partnership with volunteer efforts, in-kind services, and/or where partners are contributing funding
- For non-WUI areas, focus on Condition Class 2 and 3 in Fire Regimes I, II or III, and Condition Class 1 where landscape conditions could quickly deteriorate to Condition Class 2 or 3.

Another planning tool is **Fire Management Plans (FMPs)**, strategic plans that define a program to manage wildland and prescribed fires and implement non-fire fuels treatments based on an area's approved Land Management Plan or Resource Plan. An interagency template was adopted to improve FMP consistency across agency boundaries and to facilitate developing multi-agency and landscape-scale FMPs. Federal wildland fire management agencies were committed to updating or completing FMPs on all administrative units with burnable vegetation by the end of FY 2004. All but one National Forest and 86 percent of DOI units completed their FMPs by the end of FY 2004. The agencies will ensure FMPs are reviewed annually and updated as needed.

The Departments of the Interior and Agriculture also established the multi-agency **LANDFIRE** project to develop a comprehensive package of Geographic Information System (GIS)-based spatial data layers, models, and tools to support analyses for prioritization and planning of fuels treatments at the national and local levels. Two prototype areas are under way in central Utah and northeastern Montana, with nationwide implementation planned from 2005-2009.



Forest Health Protection

In 2004 Forest Service funding of \$24.7 million was allocated to provide treatment and technical assistance to manage and control native and non-native forest insects and diseases and for the evaluation of forest health after fires. Key expenditures and accomplishments include:

- \$22 million allocated to implement insect and disease prevention, suppression, and restoration treatments on 315,204 acres (approximately \$70 / acre). Major expenditures of this funding include:
 - \$4.3 million for a southern pine beetle program focused on prevention and restoration
 - \$6.1 million was allocated to a western bark beetle prevention and restoration program
- \$1.7 million was allocated to treat a total of 54,000 acres for invasive weeds
- \$600,000 was allocated for forest health monitoring evaluation projects. These 13 projects targeted NFP issues, including fire risks, invasive species, and fire effects to determine cause, extent, and severity.

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Fire Preparedness and Facilities

Preparedness Resources

Fire preparedness, a key element of the National Fire Plan, incorporates all components necessary to prepare for and fight wildland fires, including workforce development, training, equipment availability, and facilities maintenance. All of this enables federal wildland fire management agencies to strengthen and enhance initial attack and fire suppression efforts.

Initial attack activities were highly successful in FY 2004, with over 99 percent of all wildland fires contained to less than 300 acres. NFP funding contributed to these successes by funding a highly trained, responsive firefighting workforce of 16,057 personnel. The workforce and equipment on hand to achieve this objective are displayed in the table below.

2004 Firefighting Resources

Resources	DOI	FS	Total
Firefighters, Fire Management, and Support Resources*	5,752	10,857	16,609
Helicopters	53	96	149
Engines and Heavy Equipment	781	770	1,551
Water Tenders	94	63	157
Dozers / plows	108	152	260
Boats	7	10	17
Type 1 or Hotshot Crews	25	66	91
Smokejumpers	153	277	430
Airtankers	29	8	37
Other Aircraft**	29	21	50

*Includes firefighters, management, overhead, support personnel, and prevention techs (399) for the FS.

**Other aircraft include helitankers, leadplanes, etc.

Workforce Development and Training

In addition to recruiting and retaining a highly qualified firefighting workforce, the agencies are pursuing an aggressive program of firefighter training and development. In FY 2004, with support from NFP funding, the agencies accomplished the following:

- On September 1, 2004 the National Advanced Resource Technology Center (NARTC) in Marana, Arizona, moved to a state-of-the-art facility called the National Advanced Fire & Resource Institute (NAFRI) in Tucson.
- The Incident Qualifications and Certification System (IQCS) implementation was completed in FY 2004. This system enables incident managers to consistently analyze training and

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workforce needs, design training programs, and find common solutions to workforce-related issues. The system also improves the efficiency of identifying appropriate personnel in the resource ordering system.

- The increasing importance of a workforce qualified in safe and effective hazardous fuels reduction techniques continues in the form of a multi-year program to improve the infrastructure and curricula of the Prescribed Fire Training Center and Fire Use Training Academy.
 - Fourteen agencies supported the *National Interagency Prescribed Fire Training Center*, where 121 participants completed training. Another 25 participants attended workshops.
 - The *Fire Use Training Academy*, with funding and support from the Department of Agriculture and the Department of the Interior, had 281 employees of federal and state agencies complete core courses for a total of 10,384 trainee hours; 67 students graduated from the Fire Use Training Academy in CY 2004.
- Five agencies, with support from the U.S. Department of Labor, continued to operate the *Wildland Firefighter Apprenticeship Program* in California. In FY 2004, 536 Forest Service apprentice firefighters were enrolled in the academy.
- At the end of the 2004 fiscal year, Interagency Fire Program Management (IFPM) was implemented on an interagency basis. This program was developed in response to the Interagency Management Review Team (IMRT) as a response item generated by the 14 firefighter fatalities that occurred on the South Canyon Fire in 1994. The program has identified competency and education standards for 14 key safety-related positions within the fire organization. This five-year transition to the proposed standards will affect thousands of individuals within the fire organization and transition a significant number of positions from the technical to the professional level.
- The Wildland Fire Lessons Learned Center continues to provide an on-line navigable library of information directed at safety, training, and workforce development from after-action reviews and studies. This website provides information and answers to questions on issues facing fire managers and firefighters.

Facilities, Construction, and Maintenance

- In FY 2004 the agencies accomplished work on 65 projects totaling \$24.7 million in expenditures. Projects included crew quarters, offices, guard stations, equipment facilities, fire stations, helibases, and lookouts.

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Emergency Stabilization and Rehabilitation

Overview:

Emergency stabilization protects life, property and natural resources from additional damage after a fire. A key part of protecting human life and property following a fire is an early warning system that measures precipitation levels and alerts residents downstream of potential landslides or floods. Emergency stabilization work must be completed within one year after the fire, and includes early soil stabilization, invasive species treatments, and adapting drainage features to handle predicted floods.

Post-fire rehabilitation work improves lands that are unlikely to recover naturally from the effects of wildfires. The work, often implemented over the course of several years following a wildfire, includes reforestation, road and trail rehabilitation, fence replacement, fish and wildlife habitat restoration, invasive plant treatments, and replanting and reseeding with native or other desirable vegetation.

Rehabilitation and Restoration Budget Summary (dollars in thousands)

Agency	FY2001	FY2002	FY2003	FY2004
USDA Forest Service	\$141,688	\$62,668	\$7,078	\$6,914
Dept of the Interior	\$66,769	\$40,000	\$19,870	\$36,523
Total	\$208,457	\$102,668	\$26,948*	\$43,437

*The Department of the Interior has an additional \$15.1 million in carryover funding from FY2002.

Fires in 2004 burned more than 8 million acres nationally across all ownerships. Some of these fires severely affected forest and rangeland resources, creating the need for emergency stabilization and rehabilitation on thousands of acres of forest and rangeland and hundreds of miles of streams, roads, and trails.

Emergency stabilization work in response to the fires of 2004 included reseeding burned areas, installing larger culverts to handle increased water flows, and stabilizing slopes with log structures, straw wattles, and straw mulch. Additional benefits from emergency stabilization treatments included enforcement and education to protect sensitive ecosystems damaged by wildland fire, site stabilization to protect oil and gas transmission lines from landslides, and protecting water quality by cleaning up hazardous waste in floodplains.

In FY 2004, National Fire Plan funding was used for 657 rehabilitation projects on federal lands in 17 states. These projects treated nearly 2.5 million acres through invasive plant control, cone and seed collection, seeding, planting, and watershed improvements. More than 11,600 miles of trail reconstruction, roadwork, riparian enhancement, fencing, and boundary line location were completed, in addition to repair or replacement of recreation facilities, water systems, road culverts, TES habitat structures, and other facilities and infrastructure.

Research is being conducted to enhance rehabilitation treatments for plants native to burned areas. Part of the research includes increasing the availability of varieties of native plant materials that are more site-specific and better able to compete with non-native invasive species. Additionally, methods of planting for maximum success are being researched.

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Research

USDA Forest Service Research and Development, U.S. Geological Survey, and the Joint Fire Science Program are the three primary federal organizations that carry out fire-related research and development for use by agency managers, communities, and industry. Colleges and universities and other partners also contribute greatly to wildland fire research. These organizations often leverage and complement each other to accomplish research goals. A Fire Research Coordination Council comprising leaders of major fire research programs guides fire science and technology transfer efforts.

In FY 2004, 72 teams continued work begun in FY 2001 and FY 2002 with National Fire Plan (NFP) funding and support. These teams are delivering products to the user community as well as continuing work on longer term projects. Joint Fire Science Program projects are more narrowly focused and are funded for discrete time periods.

Research and development activities funded through the National Fire Plan and the related Joint Fire Science Program generated products and continued study related to the goals of the NFP. Both Forest Service Research and Development and the Joint Fire Science program produce annual business summaries that fully detail accomplishments. The **National Fire Plan Research and Development 2004 Business Summary** includes a list of accomplishments, some of which are highlighted below:

- Researchers completed flight-testing the newly developed FireMapper thermal-imaging system. FireMapper uses new night-vision technology to measure thermal radiation from both spot fires and intense flaming fronts. Fire managers and researchers use FireMapper to improve fire suppression operations, firefighting safety, and our understanding of the behavior and impacts of wildland fire.
- Research scientists developed a computer model to aid the public in protecting their property from wildfire in wildland/urban interface areas. The model helps evaluate landscaping choices, such as retaining native vegetation, providing privacy, conserving water, and saving energy, while providing options for fire safety.
- Research scientists developed predictive tools to assess effects of fuel and restoration treatments on buildings and structures, fish, wildlife, threatened and endangered species habitat, air quality, carbon sequestration balances and dynamics, water resources and hydrological processes, and invasive species populations. Target audiences include fuels management specialists, resource specialists, National Environmental Policy Act (NEPA) planning team leaders, line officers in the Forest Service and Department of the Interior, community leaders, and educators.
- Research scientists developed a computer model called FERGI to determine where treatments can be useful and where they may not be. The model predicts changes in runoff and erosion given the topography, soils, fire severity, weather, and proposed treatments. This new source of information will help managers understand the costs, benefits, and alternatives of fuels and restoration treatments. A web-based application is in development.

Accomplishments for the JFSP are included in the 2004 Joint Fire Science Program Business Summary, available at jfsp.nifc.gov

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