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The Clean Air Act and Prescribed Fire: What It Means for Arkansas

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- In October of 1948, residents in the Monongahela River Valley town of Donora, Pennsylvania, were forced to keep their lights on during the day just so they could see. A thick blanket of sulfur dioxide, carbon monoxide and metal particulates filled the entire valley, blocking out the sun. Over the next 5 days, 20 people died and more than 7,000 fell ill after breathing in the noxious slurry emanating from the city's coal burning furnaces and plants.

- In 1952 London, England, experienced what became known as the Great Smog. A deadly combination of smoke from the coal burning stoves that filled the city and heavy fog (first coined "smog" by a London physician) darkened London for days, resulting in nearly 12,000 deaths.

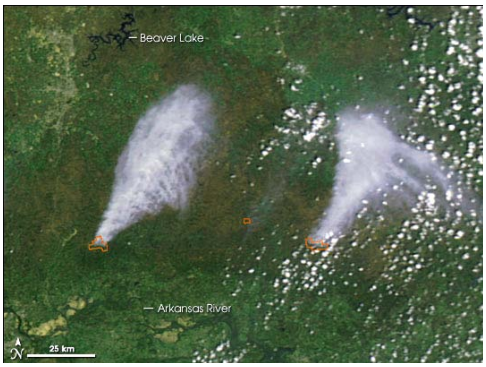

Figure 1. Satellite image of two fires in northwestern Arkansas' Boston Mountains, April 13, 2006.

These events and similar tragedies throughout the United States provided the momentum for the development of nationwide clean air legislation. Although initially states and local governments were responsible for pollution controls, the Donora tragedy impelled the federal government to enact national legislation in the form of the Air Pollution Control Act of 1955. Although the Air Pollution Control Act addressed research and technical assistance needs for controlling air pollution, the responsibility for controlling air pollution remained with the states. As metropolitan populations increased, concerns regarding air pollution and human health intensified and the development of air quality standards became crucial. State control of air pollution was not working. After 15 years of studying the air pollution problem, Congress passed the comprehensive Clean Air Act in 1970. This act placed regulatory control of air pollution at the federal level.

What Is the Clean Air Act?

Initially, the Clean Air Act of 1970 called for nationwide attainment and maintenance of ambient air quality standards to control emissions from stationary sources, such as steel mills. Throughout the decade, as industry and transportation systems expanded, there were many amendments to the act. These amendments included setting standards for auto emissions, the expansion of local air pollution control programs, the establishment of air quality regions and setting air pollution standards for industry.

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The 1970s also saw the creation of the Environmental Protection Agency (EPA). This new agency took over the enforcement of the air pollution laws. The regulatory responsibility of the EPA was focused on six areas of pollutants: particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3) and lead (Pb).

The Clean Air Act of 1990 labeled the most common pollutants as **criteria air pollutants**. Using science-based guidelines, the EPA set permissible levels of these pollutants based upon a set of standards. **Primary standards** protect human health, and **secondary standards** are intended to prevent environmental damage. If a region is below these national standards, it is said to be in attainment (good). An area with levels above is called a nonattainment area (not good). States with nonattainment areas must draft a plan indicating how they will improve air quality.

Figure 2. Upper Buffalo Wilderness

In 1997 the EPA reviewed and made adjustments to the standards for two air pollutants of most concern – ground-level ozone (smog) and particulate matter (PM). The agency began working on addressing the issue of regional haze, which is primarily the result of high levels of PM. The 1997 legislation requires that the viewscapes of designated Class 1 wilderness areas, such as the Caney Creek Wilderness area and the Upper Buffalo Wilderness area in Arkansas, be protected.

What Is Particulate Matter?

Dust, smoke and soot are all types of particulate matter or PM. PM comes from a variety of sources such as agricultural fields, unpaved roads, woodstoves and fireplaces, tobacco smoke, smog and forest fires. Under the right conditions, this material can travel vast distances. In 2003 smoke from wildfires in southern Russia extended across the Northern Hemisphere and was tracked into Alaska and Canada and back into Russia, thereby circling the entire globe. Particulate matter is classified as coarse (2.5 to 10 micrometers) or fine (< 2.5 micrometers). To get an idea of the size of these particles, the average human hair has a diameter of 70 micrometers. Particulate matter is a mixture of solid particles and liquid droplets which can be easily inhaled. Both coarse and fine particles enter the lungs and carry a variety of chemical pollutants. Scientific studies have linked the pollutants in PM to a variety of respiratory and pulmonary illnesses such as asthma, chronic bronchitis, irregular heartbeat, diminished lung function and heart and lung disease.

Do I Need to Worry About PM in Arkansas?

Currently, Arkansas has no areas labeled as nonattainment for PM. However, a growing issue for Arkansans is the potential conflict between federal environmental policies and state land management policies that involve prescribed burning, PM emissions and smoke management. Historic forest policies of fire suppression have resulted in higher than normal fuel loads on public and private forests throughout the country, which increases the risk of catastrophic fire. Prescribed fire, also known as controlled burning, is a tool used by land managers to lessen the risk of catastrophic wildfire by reducing these artificially high fuel levels. It's a case of fighting fire with fire. (*For more information on prescribed fire in Arkansas, see UACES Fact Sheet 5009*.)

Land management agencies in Arkansas, authorized by the Healthy Forest Restoration Act (HFRA) of 2002, developed a comprehensive fuels reduction strategy plan for the public forests in the state. As a result, it is expected that the use of prescribed fire, which is currently applied to approximately 300,000 acres of forestland in Arkansas annually, will increase.

Smoke from forest fires is composed of approximately 70 percent fine PM. Wildfires, such as the one in southern Russia, can be a significant source of smoke and thus PM. These wildfires are uncontrolled events that emit high levels of particulate pollution over short periods of time. There are growing concerns related to the potential increase in PM emissions by the increased use of prescribed fire to reduce the risk of uncontrolled wildfires in Arkansas.

Who Is in Charge of Prescribed Burning?

The Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for regulating open burning activities, such as the burning

of commercial waste, refuse and garbage. However, unless the ADEQ declares a reduction in air quality for a specific area, the use of prescribed fire for forest management and agricultural activities is exempt from direct ADEQ control. The Arkansas Forestry Commission (AFC) coordinates all prescribed fire activities associated with public and private forestlands with the onsite prescribed fire manager and provides a record of burning activities to the ADEQ.

Figure 3. Person with drip torch

What Is Smoke Management?

To stay in compliance with EPA regulations regarding air quality, it is recommended that states and tribes using prescribed fire develop a smoke management plan (SMP). The SMP is intended to help manage the smoke's impact on people and the environment. The SMP minimizes the impact of PM by helping land managers estimate how much fuel can be burned given specific climate conditions while maintaining attainment status.

The SMP details specific actions to meet these goals, such as adjusting the size of a burn, using alternate methods to reduce fuels prior to a burn and keeping track of wind speed and direction. The SMP is administered by the AFC in coordination with the onsite prescribed fire manager. By law, the prescribed fire manager is required to notify the AFC Dispatch Center of the prescribed fire and provide details of the burn, such as the number of acres to be burned, the location of the burn, the person in charge, the planned ignition time and the amount of fuel to be burned.

Prior to a prescribed burn, the AFC Dispatch Center retrieves the most current weather data from the U.S. National Weather Service, calculates the expected dispersion of smoke and advises the fire manager on the amount of PM that is allowed to be released into the air shed. The Dispatch Center also notifies all prescribed fire managers operating within a specific area about all planned and active prescribed fires within that area. The Dispatch Center is responsible for providing the ADEQ with records of all burning activities for air quality analysis.

Notifying the Public

Before a prescribed fire is conducted, fire managers should notify people in identified smoke-sensitive areas of the scheduled burn. Although great care will be taken to reduce any impacts to the smoke-sensitive areas in question, the weather can be unpredictable. Fire managers should have contingency plans in place if concentrations of PM become elevated beyond what is allowed. In some cases, this means terminating scheduled ignitions of additional burns prescribed in the area. Currently, the Forest Service office in the Ouachita National Forest does maintain a daily listing of scheduled prescribed fires on national forests on its web site, http://www.fs.fed.us/r8/ouachita/fire/rx_information.shtml, and the AFC will soon have a similar site for state and private lands on their web site, http://www.forestry.state.ar.us.

Figure 4. Handing out prescribed fire signs

Conclusions

The United States has come a long way since the 1950s in ensuring cleaner air. Although we have not experienced events as disastrous as those in London or Donora, concerns remain over the quality of air in this country.

- Air pollution has been linked to a variety of health issues.
- Air pollution has thinned the earth's protective ozone layer, causing damage to the environment and putting people at risk for skin cancer.
- Air pollution causes haze and reduces visibility on roadways and in scenic areas.

Prescribed fire emissions, although a sporadic source of air pollution, can significantly impact local communities. Individuals suffering from asthma, heart or lung disease or who have allergies to smoke may be asked to alter their activities on those days a burn is planned. These individuals may carry a higher risk for impaired breathing episodes and experience life-threatening conditions. But the SMP for Arkansas addresses these risks and tries to minimize potentially harmful conditions whenever possible.

For more information on air quality and fire and smoke management, visit the following web sites:

- ADEQ Air Division
  http://www.adeq.state.ar.us/air/
- EPA Clean Air Act
  http://www.epa.gov/air/oaq_caa.html/
- National Fire Plan (NFP)
  http://www.fireplan.gov/
- Department of Interior Wildland Fire Statistics
  http://www.nifc.gov/stats/
- U.S. Forest Service Fire Management
  http://www.fs.fed.us/fire/
- National Park Service
  http://www2.nature.nps,gov/air/regs/smokeFire.cfm

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Satellite imagery is by National Aeronautics and Space Administration (NASA). Upper Buffalo Wilderness photo is by Bill Bates. All other photos are by Larry Korhnak.

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