United States
Department of
Agriculture

Forest
Service

**Southwestern
Region**

Air Quality Specialist Report

Forest Plan Revision EIS

Submitted by: __/s/ _____

Chris Nelson
Watershed Program Manager
Apache-Sitgreaves National Forests
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Contents

Specialist Report..... 1

Specialist Report

Introduction

This report evaluates and discloses the potential environmental consequences on air quality that may result with the adoption of a revised land management plan. It examines, in detail, four different alternatives for revising the 1987 Apache-Sitgreaves NFs land management plan (1987 forest plan).

The Forest Service coordinates National Forest activities with state, federal, local and tribal efforts to control air quality. This includes managing and mitigating air pollution from Forest Service activities such as prescribed fire, construction and use of roads, and special uses such as open road material pits. In addition, the Clean Air Act (CAA) gives the Forest Service an "affirmative responsibility" to protect Class I wilderness areas from adverse impacts created by external sources of air pollution, such as power plants. This responsibility requires coordination with the U.S. Environmental Protection Agency (EPA) and any state, county, or tribal air regulatory agency such as EPA Region 9, and the Arizona Department of Environmental Quality.

Relevant Laws, Regulations, and Policy that Apply

Congress gave the Forest Service specific legal direction to protect natural, cultural, and scenic resources on the public lands from air pollution. The majority of this direction is found in the Organic Act, the Wilderness Act, and the Clean Air Act. Direction also comes to the Forest Service through the Forest and Range Renewable Resources Planning Act, as amended by the National Forest Management Act of 1976 (16 U.S.C. 1604).

Clean Air Act of August 7, 1977, as amended (1977 and 1990)

Enacted to protect and enhance the quality of the Nation's air resources; to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial assistance to state and local governments in connection with the development and execution of their air pollution prevention and control programs; and, to encourage and assist the development and operation of regional air pollution prevention and control programs.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974

Directs the Secretary of Agriculture to prepare a Renewable Resource Assessment every ten years; to transmit a recommended Renewable Resources Program to the President every five years; to develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System; and to ensure that the development and administration of the resources of the National Forest System are in full accord with the concepts of multiple use and sustained yield. Organic Administration Act of June 4, 1897

It authorizes the President to modify or revoke any instrument creating a national forest; states that no national forest may be established except to improve and protect the forest within its boundaries, for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. It authorizes the Secretary of Agriculture to promulgate rules and regulations to regulate the use and occupancy of the national forests.

National Forest Management Act of October 22, 1976

The National Forest Management Act reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on National Forest System lands. The National Forest Management Act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of national forests.

Organic Administration Act of June 4, 1897

Authorizes the President to modify or revoke any instrument creating a national forest; states that no national forest may be established except to improve and protect the forest within its boundaries, for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. Authorizes the Secretary of Agriculture to promulgate rules and regulations to regulate the use and occupancy of the national forests

Wilderness Act of September 3, 1964

Established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as "wilderness areas" and administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness. It provides for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness. states that no Federal lands shall be designated as "wilderness areas" except as provided for in the Act or by a subsequent Act.

Apache-Sitgreaves NFs wilderness areas are designated under the following authorities:

- **Public Law 91-504** of October 23, 1970 designates Mount Baldy Wilderness
- **Arizona Wilderness Act of 1984** (Public Law 48-406) designates Escudilla and Bear Wallow Wilderness areas

40 CFR 51 300-308 Federal Regional Haze Rule

Require States to develop programs to assure reasonable progress toward meeting the national goal of preventing any future, and remedying any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution; and to establish necessary additional procedures for new source permit applicants.

Arizona Revised Statute Title 18 Chapter 2 Article 15

Forest and Range Management Burns, governs prescribed burning in the state of Arizona. This rule was update on March 15, 2004, and incorporates the necessary elements outlined in the Regional Haze Rule section 309 on for prescribed burning.

Methodology and Analysis Process

This section describes the methodology and analysis processes used to determine the environmental consequences on air quality from implementing the alternatives. Environmental consequences are not site-specific at the broad forest planning level and will be described with qualitative descriptions supported by past studies and observations. Much of the background information is found in the Ecological Sustainability Report (2009) and its supporting specialists reports.

This qualitative analysis describes general trends and projected conditions in relation to the National Ambient Air Quality Standards (NAAQS) and Regional Haze Rule (EPA 1999) as described in the State Implementation Plan (ADEQ 2011). Any differences in projected conditions due to proposed forest activities will be described in the affected environment section. Environmental consequences of air quality related to smoke are described in the fire specialist report.

There are six pollutants identified by the Environmental Protection Agency (EPA) that were reviewed in relation to sources within and outside the Apache-Sitgreaves NFs (EPA 1990):

- **Carbon monoxide** (CO) is a colorless, tasteless, odorless gas produced primarily by motor vehicles. Other sources include wood-burning stoves, fireplaces, wildland fires and industries that process metals or manufacture chemicals. High CO concentrations can occur in large urban areas and mountain valleys. CO is poisonous at high levels and can damage the heart and central nervous system.
- **Lead** in the air exists primarily as particulates. The major source used to be gasoline, but is currently metals processing. Other sources are waste incinerators, utilities, and lead-acid battery manufacturers. Lead particularly affects young children and infants, and is found at high levels in urban and industrial areas. Lead deposits on soil and water, and can harm other animals.
- **Nitrogen Dioxide** (NO2) has a reddish-orange-brown color and a pungent odor. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources are motor vehicles, electric utilities, and other industrial, commercial, and residential operations that burn fuels. Some nitrogen dioxide is emitted by wildland fires. NO2 is easily converted to nitrates, a major component of acid rain, contributing to impacts on vegetation, visibility, and soil and water quality. Nitrogen dioxide also impairs human health.
- **Ozone** is an unstable gas, and has a characteristic odor. Ozone forms when hydrocarbons and nitrogen oxides chemically react in sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, chemical solvents and natural sources emit compounds that form ozone. Ozone can trigger a variety of health problems including permanent lung damage after long-term exposure. It can also damage plants and ecosystems.
- **Particulate Matter** (PM) consists of particles of solid or semi-solid materials in the atmosphere. Most human-made particles are 0.1 to 10 micrometers in diameter. Particulates less than or equal to 10 micrometers (PM10) can cause respiratory problems, while larger particulates settle out of the air. Airborne dust, or particle pollution, causes significant problems with human health and the environment, and should be minimized. Particulates less than or equal to 2.5 micrometers (PM2.5) are generally created during combustion and are the major cause of visibility impairment. These fine particles move

over long distances by wind and settle on ground or water. High PM concentrations are often associated with large urban areas or mountain valleys where dust, smoke, and emissions are common. Health effects of PM include: respiratory problems, decreased lung function, asthma, chronic bronchitis, irregular heartbeat, nonfatal heart attacks, and premature death in people with heart or lung disease.

- **Sulfur dioxide** (SO2) is a colorless gas that easily dissolves in water to form acid. It is a major pollutant throughout the world and potentially carcinogenic. The main source is burning fossil fuels, but diesel fuel and gasoline also contribute to sulfur dioxide in the air.

A portion of the forests falls within a sulfur dioxide (SO2) maintenance plan (ADEQ, 2002) area near Morenci, AZ. Disturbances as described within this plan (e.g., vehicles traveling on unpaved roads, smoke from fires) may have an insignificant impact on air quality within this nonattainment area. Projects within the area must be analyzed to ensure that activities conform to the conditions set forth in the maintenance plan. Since the Morenci copper smelter was closed, measured values of SO2sulfur dioxide have been well below those stipulated in the maintenance plan (ADEQ, 2002).

In addition, Section 169A of the Clean Air Act (CCA) set forth a national goal to prevent any future (and the remedying of any existing) impairment of visibility in Class I areas where impairment is human-caused air pollution. The Regional Haze Rule, 40 CFR Part 51, calls for states to establish goals and emissions reduction strategies for improving visibility in all mandatory Class I national parks and wilderness areas. The national visibility goal for each Class I area is to return to natural visibility conditions by 2064.The nearest class I airshed to the Apache-Sitgreaves NFs is located above the Mt. Baldy wilderness area and attainment of air quality standards are measured at this site.

For this analysis air pollutants were separated into two categories: pollutants from sources outside the Apache-Sitgreaves NFs and pollutants from sources within the Apache-Sitgreaves NFs. The impacts of these sources were analyzed based on whether the emissions would cause the Mt. Baldy class I airshed to be in non-attainment.

Sources contributing some of the six pollutants from outside the Apache-Sitgreaves NFs are nearby coal-fired power plant emissions, motor vehicle emissions, and regional haze contributors (particulate matter emissions) including road dust and smoke from prescribed burning and road use. Sources contributing some of these six pollutants from within the Apache-Sitgreaves NFs are motor vehicle emissions and regional haze contributors including road dust and smoke from prescribed burning.

Assumptions

- The actual location, design, and extent of resource management activities proposed are not known at this time and will be a site specific (project by project) decision. Therefore this analysis refers to potential of the effect to occur, realizing that in many cases, these are only estimates. The effects analysis is useful in comparing and evaluating alternatives on a forestwide basis but is not to be applied to specific locations on the forests. Some resources are not within the Agency's ability to control; these will be noted.

- It is assumed that outside sources of air pollutants will either stay constant over the next 15 years or will improve (i.e. fewer emissions).

- It is assumed that forest restoration activities proposed in the EIS will occur to the extent necessary to achieve the goals and objectives of each alternative, and will adhere to air quality standards as set forth by Arizona DEQ.

Revision Topics Addressed in this Analysis

Air Quality

- Continued attainment of Air Quality Standards
    - Air pollution from outside sources contribute to loss of visibility in the Class I Airshed located above Mt. Baldy Wilderness Area
    - Indicator - Qualitative assessment of potential effects of off forest air pollution in combination with affects of forest management

Summary of Alternatives

A summary of alternatives, including the key differences among alternatives, is outlined in the Draft Environmental Impact Statement.

Description of Affected Environment (Existing Condition)

Existing Impacts of Air Pollution on the Apache-Sitgreaves NFs from Outside Sources

Emissions of air pollutants from outside the ANSFs come from nearby coal fired power plants, motor vehicles, and regional haze. These emissions as measured at the Mt. Baldy class I airshed, are currently in attainment and are expected to stay in attainment or even improve (ADEQ 2011).

Coal-fired power plants

Coal-fired power plants are located in the vicinity of the planning area. They produce air pollution emissions that are recognized as contributors to degraded air quality impacting the planning area. Air pollution, in the forms of gases and aerosols, reaches ecosystems on the ground through atmospheric deposition. Pollutants that are deposited include oxides of nitrogen and sulfur, ozone, and particulates. These compounds can impair terrestrial and aquatic ecosystems, impair visibility and impact human health. Specific concerns include maintaining air quality sufficient to comply with National Ambient Air Quality Standards (NAAQS); as well as those related to degradation of visibility and increased deposition. While impacts of air pollution on visibility have been well documented, in many cases the inventorying, monitoring, and research necessary to document air pollution effects on NFS ecosystems are insufficient.

Table 1: Proximity of coal-fired power plants to Forests and Class I airshed.

Coal-fired power plant near the ASNFs	Air Miles from Closest Point on Forest	Air Miles from Class I Airshed
Springerville Generating Station near Springerville	14	31
Coronado Generating Station near St. Johns	30	45
Cholla Generating Station near Holbrook	29	80

Several components of air pollution can affect vegetation, but ozone generally results in the greatest amount of damage. Visible effects on leaves or needles can include stipple (dark colored lesions resulting from pigmentation of injured cells), fleck (tiny light-colored lesions on the upper layers of the leaf), mottle (degeneration of the chlorophyll that cause a blotchy appearance), necrosis (death of tissue), and in extreme cases, mortality. Ozone exposure can also decrease plant growth rates. Ponderosa pine (*Pinus ponderosa*) is recognized as an ozone-sensitive species in the western United States.

Acidity in rain, snow, cloudwater, and dry deposition can affect soil fertility and nutrient cycling and can result in acidification of lakes and streams. Sulfate deposition to sensitive watersheds results in increasing soil acidification, and surface-water acidification. Deposition of excess nitrogen (nitrate and ammonium) in both terrestrial and aquatic systems can acidify streams, lakes and soils. Aquatic ecosystems in Arizona are generally well-buffered and not subject to episodic or chronic acidification except at the highest elevations in and around the Mount Baldy Wilderness Area (Blankenship 1991).

Motor vehicles

Emissions from motor vehicles contributing air pollutants are considered negligible in relation to the class I airshed at Mt. Baldy. Dilution and air mixing reduces impacts within a short distance. Although vehicle pollution can pose a problem when operated in confined areas, such as a city, the number of vehicles contributing emissions within the Mt. Baldy class I airshed is not deemed measurable. In addition, the majority of motor vehicles are approved to meet EPA emission standards, which reduce off-forest impacts further.

Regional haze

Regional haze is a contributor to visibility impairment and has been documented in all class I airsheds in Arizona and New Mexico. In the Intermountain West, sulfate, organics, and elemental carbon are the main cause of visibility impairment. Sources of regional haze contributing to the Mt. Baldy class I airshed is dust and smoke in the form of particulate matter (PM).

In the 1990 amendments to the Clean Air Act, Congress established the requirements to address regional haze. They gave EPA the authority to establish visibility transport commissions and promulgated regulations to address regional haze. The 1990 amendments also established a visibility transport commission (Grand Canyon Visibility Transport Commission or GCVTC) to investigate and report on regional haze visibility impairment in the Grand Canyon National Park and nearby Class I areas (including Mt. Baldy). The assessment (GCVTC 1996) indicated that road dust is a large contributor to visibility impairment on the Colorado Plateau which includes

the northern half of Arizona. However, due to considerable skepticism regarding the modeled contribution of road dust to visibility impairment, the Commission recommended further study in order to resolve the uncertainties regarding both near-field and distant effects of road dust, prior to taking remedial action. To date, such studies have not been done. However, since this emission source is potentially such a significant contributor to regional haze, the Commission felt that it deserved high priority attention and, if warranted, it deserved additional emissions management actions. Road dust is generated off-forest as well as on-forest on private, state and tribal lands. Most of the roads on the Colorado Plateau are not paved and contribute to visibility impairment.

The following summaries are from the most current State Implementation Plan (ADEQ 2011) as it relates to the Class I airshed, Mt. Baldy. On the 20 percent worst visibility days, the source of the majority of fine particulate matter (PM) at Mount Baldy comes from Arizona (figure 1). Both point sources and windblown dust from Mexico have a small potential to contribute to fine PM. General wind direction is from the southwest where PM can be generated from southern deserts, urban areas, reservations and from Mexico. Modeling for 2018 shows an increase in the potential for fine PM to affect Mt. Baldy.

Sources of windblown dust, fugitive dust, road dust, and natural fire from Arizona have the highest potential to contribute to coarse mass at Mt. Baldy (figure 2). Mexican point sources, road dust, and windblown dust have a small potential to contribute to coarse mass. Windblown dust from New Mexico also has the potential to affect Mt. Baldy.

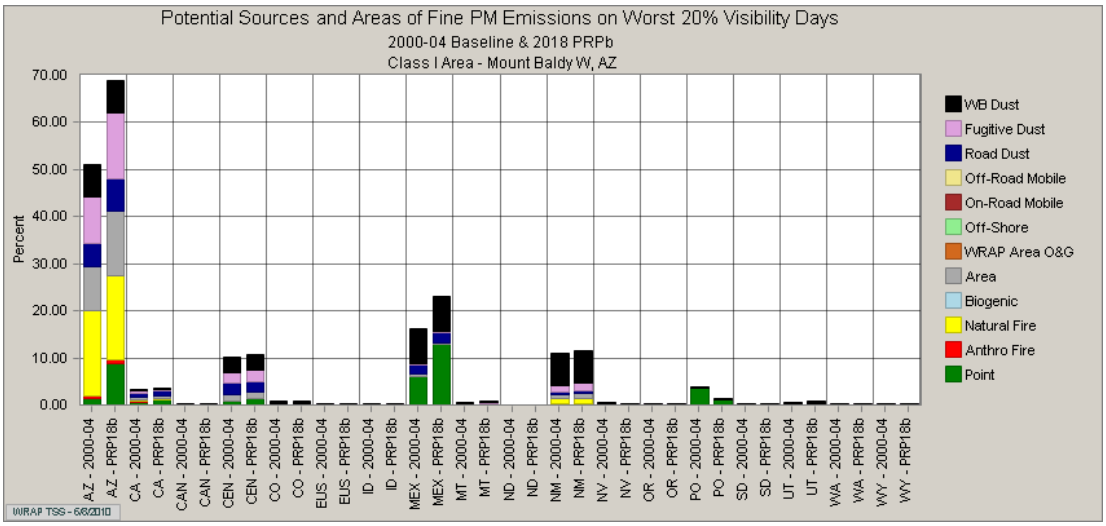

Figure 1. Weighted Emissions Potential for Fine Soil (BALD1) (ADEQ, 2011)

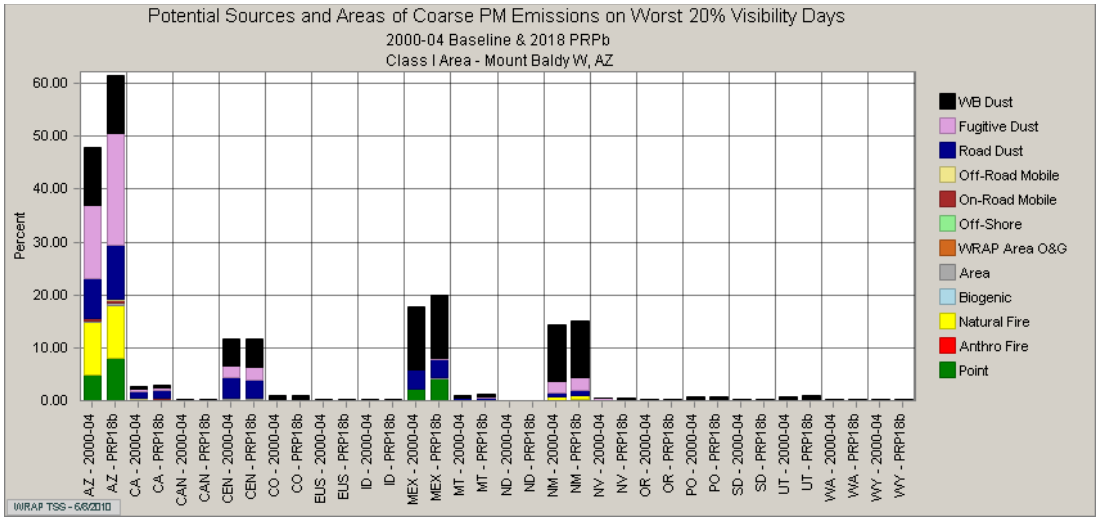

Figure 2. Weighted Emissions Potential for Coarse Particulate Matter (BALD1) (ADEQ, 2011).

Smoke is also a contributor to regional haze. The state has developed statutes for the management of smoke within each Smoke Management Zone (airshed) and regulates smoke from prescribed burning. Smoke management zones include multiple jurisdictions and land owners. This coordination results in mitigation of the cumulative effects of smoke from burning activities (See Fuels Specialist's Report).

Existing Impacts of Air Pollution from within the Apache-Sitgreaves NFs

Apache-Sitgreaves NFs management activities do not appreciably contribute to the increase of the six pollutants identified by the EPA, except for particulate matter. The primary source of particulate matter from the forests comes from road and fugitive[1] dust and emissions from smoke, contributing to regional haze. Motor vehicle use on the Forests also contributes to vehicle emissions.

Motor vehicles

Motor vehicle emissions from within the Apache-Sitgreaves NFs are deemed negligible in relation to the Mt. Baldy class I airshed. The number of vehicles operating across the forests is not considered to measurably impact air-quality. Additionally, Mt. Baldy is located upwind of all roads on the forests and has few roads which receives little traffic. In addition, the majority of motor vehicles are approved to meet EPA emission standards, which reduce forest impacts further.

[1] Fugitive dust is fine particulate matter from windblown soil and dust which becomes airborne.

Regional haze

A small portion of the Apache-Sitgreaves NFs falls within the non-attainment areas for sulfur dioxide near Morenci, Arizona. The rest of the forests are not in any non-attainment area of the listed pollutants (see Fuels Specialist's Report; EPA 2006). According to Arizona regulations (see conformity rules in Appendix C), this eliminates the need to do complex modeling or projections for minor projects and activities that do not have regional significance other than burning[2] except in the non-attainment area. Counties and municipalities may invoke additional requirements for projects or activities that are a source of pollutants, however, none have been identified in lands associated with the Apache-Sitgreaves NFs.

Dust generated from vehicles driving on unpaved national forest system roads can contribute to regional haze. There is no direct relationship between miles of roads on the forests and actual miles traveled by motor vehicles. This is more a function of peak usage times such as during summer holidays when the forests get high use. During winter, the same forest roads generate almost no usage by vehicles. Additionally, dust generated from unpaved roads generally settles out within a short distance (around 20 feet) of the point of generation. Larger particle sizes of road dust drop out within tens of feet, while smaller particles drop out within a quarter-mile. Unless winds carry road dust a farther distance, dust generated on the forests does not leave the forests.

Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities (including ground-disturbing actions) there can be no direct effects. However, there may be implications, or longer term environmental consequences, of managing the forests under this programmatic framework.

Impacts of Air Pollution on the Apache-Sitgreaves NFs from Outside Sources

In relation to sources of air pollution from outside the Apache-Sitgreaves NFs, the assumption applied to all alternatives that, overall, effects of these sources to visibility will either remain the same or decline over the next 15 years. Emissions from coal-fired power plants would likely remain the same or decrease as would emissions from motor vehicles. Some contributors to regional haze would increase such as from natural fire, road and windblown dust. The State's source emission projections found in the 2011 SIP describes decreases in sulfur dioxide, nitrogen oxides, elemental carbon and volatile organic compounds. Increases are projected in organic carbon, ammonia and fine and coarse particles. These haze pollutants are monitored near Mt. Baldy by the Interagency Monitoring of Protected Visual Environments (IMPROVE) (Colorado State University 2006) program.

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[2] The State Implementation Plan (40 CFR 51.309(d)(7) (ADEQ, 2003) for Arizona from December 23, 2003 states that "road dust is not a measurable contributor on a regional level to visibility impairment in the 16 Class I areas. Due to this finding, no additional road dust control strategies are needed…"

Table 2: Summary of 2018 Projected Visibility Conditions (from ADEQ 2011 p. 81)

Class I Area	20% Worst Days Visibility (dv[3])			20% Best Days Visibility (dv)		
	Worst Day Baseline (2004)	2018 URP[4] Goal	2018 Projected Visibility	Best Days Baseline (2004)	2018 Projected Visibility	2018 Projected less than Baseline
Mt. Baldy W.	11.85	10.54	11.52	2.98	2.12	Yes

None of Arizona's Class I areas, including Mt. Baldy, are projected to meet the Uniform Rate of Progress (URP) for 2018, however most will be below baseline conditions (Table 2). The state has listed a number of Long Term Strategies (LTS) to address regional haze visibility impairment in each Class I area in the state. Much of the air pollutants that affect Arizona originate from sources outside Arizona, such as Mexico, and surrounding states, and many are due to natural conditions. The key elements of the LTS include an evaluation and possible controls for non-Best Available Retrofit Technology sources (such as asphalt plants, cement plants and others), new smoke management improvements for prescribed burning, review and possible revision of state open burning regulations, and expected benefits associated with the revised $PM_{2.5}$ NAAQ standards. For further information on the LTS, refer to the 2011 State Implementation Plan at http://www.azdeq.gov/environ/air/plan/notmeet.html

Impacts of Air Pollution from within the Apache-Sitgreaves NFs

Sources of air pollution from within the Apache-Sitgreaves include smoke from prescribed burning and wildfires (see Fuels specialist report), emissions from motor vehicles and the generation of dust.

There would be continued use of forest roads by motor vehicles, which is expected to increase over the next 15 years due to projected increases in forest visitor use (Transportation Specialist Report). Under all alternatives, the environmental consequences from motor vehicle emissions would be slightly higher than described in the affected environment; however, would still not measurably impact air quality. The class I airshed above Mt. Baldy is in attainment of air quality standards and would continue to meet NAAQ standards as set by EPA.

[3] A deciview is the change in the haze index which is derived from a complex calculation from measured particulate concentrations data. One deciview is considered a humanly perceptible change under ideal conditions, regardless of background visibility conditions (ADEQ 2011).

[4] The uniform rate of progress (URP)is the calculation of the slope of the line between baseline visibilitycondtions and the natural visibility condition over the sixty year period to 2064. For the first regional haze plan, the first benchmark is the deciview (dv) level that should be achieved in 2018 (ADEQ 2011).

Expected increased use of motor vehicles on unpaved roads would result in the generation of dust, however, it is not expected to cause impairment in visibility and would not cause a measurable impact to the class I airshed at Mt. Baldy. Any proposed forest management activities that would contribute dust, would adhere to air quality standards as set by EPA and ADEQ and the effects would be mitigated at the project level.

Dust generated from mechanical treatments

The soils of the forests' undisturbed ecosystems resist wind through plant or litter cover, as well as naturally occurring crusts known as macrobiotic soil crusts. Soil crusts are fragile, however they resists wind and help prevent dust particles from becoming airborne. However, when the crust is broken through mechanical activities or grazing, small particles can get into the air during the activity, or later during high wind events. All land disturbing activities including wildland fire, would include site specific Best Management Practices (BMPs) or Soil and Water Conservation Practices (SWCPs) (FSH 2509.23 R3) that prescribe measures to reduce or mitigate formation of fugitive dust either by preventing loss of protective ground cover or by requiring re-establishment of ground cover

Dust generated from motorized equipment would be largely dependent upon the season of use, the amount of traffic, rainfall patterns, and materials selected for road construction. This dust generally settles quickly, but can become fugitive dust where conditions are typically dry, and/or where roads are constructed from fine-grained materials and do not have a paved or gravel surface. Dust mitigation (road watering, surfacing, chemical treatment) would occur when road visibility is reduced in high traffic areas, and where activities are close to private land or large campgrounds to prevent impacts to human health.

Dust generated from mechanical treatments would potentially be greatest for Alternative C, which proposes the highest amount of mechanical treatment and associated road use. It would be less in alternative B, followed by A, where burning treatment acres are much higher than mechanical treatment acres, and least in alternative D (see Table 2).

Dust generated from recreation activities

Recreation use of the transportation system can vary in intensity during late spring/early summer and late fall months, when dust can be problematic. Recreational use can occur on any open road. One of the most popular recreation uses on the forests is driving for pleasure (Kocis et al. 2002). Dust abatement measures may not be applied on most system roads due to budget limitations, and may not occur on any non-NFS road. Dust generated from recreation activities may increase in the long term as the general population increases in all alternatives. However, alternative C emphasizes motorized recreation opportunity over other alternatives, consequently, it would result in the highest level of dust generated from recreation activities.

Dust generated from grazing activities

Grazing management use of the transportation system is limited and effects to air quality from this activity would not be measureable. Fugitive dust may be generated in areas with the highest livestock concentration or from vehicles accessing allotments to conduct livestock management. There is no measurable difference expected between alternatives as related to dust generated from

livestock grazing activities. BMPs should be effective in retaining protective ground cover, reducing exposed soil susceptible to wind erosion and creation of dust.

Dust generated from special uses

Road use associated with mineral materials or energy development may require dust-abatement measures. Implementation of dust-abatement measures would reduce or eliminate impacts to air quality. There are no formal applications currently known. Effects of dust would be analyzed prior to issuance of each special use permit.

Climate Change

Based on current climate models, the climate change factors that may influence smoke and dust are projected increases in wildfire risk and national forest socioeconomic uses and demands (See Appendix A of the proposed land management plan). These indicate the need to improve forest health resulting in reduced wildfire risk, as well as preparing for increased use of forest materials and greater demand for recreation. All alternatives include desired conditions to manage for healthy, resilient forests, reduction of uncharacteristic wildfire, and provision of wood products and recreation opportunities.

Cumulative Environmental Consequences

The cumulative environmental consequences are spatially bounded by an area much larger than the Apache-Sitgreaves NFs proclaimed boundary. Some effects are limited to local airsheds which generally follow watershed boundaries. Others, such as those affecting visibility, can be generated as far away as Mexico, or California. Long range transport of pollutants was analyzed and displayed in the 2011 SIP (ADEQ,2011)

Pollutants affecting the forest from off forest activities affect visibility at the local watershed level include road dust, prescribed fire and emissions from industrial sources. Road dust is generated off-forest as well as on-forest on private, state and tribal lands. Most of the roads on the Colorado Plateau are not paved and contribute to visibility impairment. Vehicle use off-forest combined with vehicle use on-forest would occur in all alternatives and could contribute to visibility impairment.

Smoke is also a contributor to regional haze. The state has developed statutes for the management of smoke within each Smoke Management Zone (airshed) and regulates smoke from prescribed burning. Smoke management zones include multiple jurisdictions and land owners. This coordination results in mitigation of the cumulative effects of smoke from burning activities (See Fuels Specialist's Report).

Prescribed fires on other lands within the same airshed may affect the ability of the forests to use prescribed fire under all alternatives due to the cumulative environmental consequences of smoke. Wildfires are exempt from this rule, but may also affect the ability of the forests to use prescribed fire due to the cumulative environmental consequences of smoke.

Coal fired generating plants would continue to contribute pollutants known to degrade air quality as described in affected environment. Emissions are closely monitored and generating plants are regulated by the state as meeting best available control technology when new units are

constructed or old units are refurbished. Emissions such as sulfur dioxide and nitrogen oxides are expected to be reduced in the future (ADEQ 2011)

Summary Tables of Environmental Consequences

The following table identifies the treatment objectives (acres) by alternatives. The action alternatives identify a range of acreage that may be treated.

Table 2. Comparison of treatment objectives affecting air quality by alternative.

Comparison of Treatment Objectives	Alternative A	Alternative B	Alternative C	Alternative D
Total Acres of Burning Treatments	6,844	14,087 to 43,771	3,124 to 22,586	19,079 78,772
Total Acres of Mechanical Treatments	12,182	8,852 to 30,327	5,342 to 42,651	6,465 to 25,440

Table 3. Comparison of environmental consequences to air quality by alternative.

Comparison of Environmental Effect	Alternative A	Alternative B	Alternative C	Alternative D
Smoke Effects	Moderate amount of burning and smoke from management actions	Moderate amount of burning and smoke from management actions	Least Amount of burning and smoke from management actions	Most amount of burning and smoke from management actions
Dust Effects	Moderate opportunity for fugitive dust from mechanical and high severity management fires	Moderate opportunity for fugitive dust from mechanical and high severity management fires	Most opportunity for fugitive dust from mechanical equipment and least from high severity management fires	Least opportunity for fugitive dust from mechanical equipment, Most opportunity for dust from ash and bared soil from high severity management fires
Other Effects	Highest risk of smoke from wildfire as more acres left in FRCC3 in most vegetation types	Reduced risk of smoke from wildfire as FRCC3 is reduced in Forest Types, MPO and Grasslands	Reduced risk of smoke from wildfire as FRCC3 is reduced in PP, DMC and MPO	Reduced risk of smoke from wildfire as FRCC3 is reduced in most vegetation types

Comparison of Environmental Effect	Alternative A	Alternative B	Alternative C	Alternative D
Recreation Road Dust Effects	Recreation road dust not significant to warrant specific management action except in high concentration areas	Same as Alt. A	Same as Alt. A	Same as Alt. A
Road Construction Effects	Road construction dust mitigated when public safety is a concern or close proximity to residents and visitors	Same as Alt. A	Same as Alt. A	Same as Alt. A
Cumulative Effects	Smoke mitigated through State Rule for all jurisdictions within Smoke Mgt Zones Regional haze from dust a concern by WRAP for Colorado Plateau	Same as Alt. A	Same as Alt. A	Same as Alt. A

Adaptive Management

Smoke regulations require the forests to obtain authorizations daily. The forest adapts the burning program to fall within acceptable limits of smoke as regulated by the ADEQ.

Other Planning Efforts

The Western Regional Air Partnership (WRAP) is a voluntary organization of western states, Tribes, and federal agencies. Arizona is a state that is a member. It was formed in1997 as the successor to the Grand Canyon Visibility Transport Commission (GCVTC). It is a regional planning organization that provides assistance to western states to aid in the preparation of regional haze plans. The WRAP also implements regional planning processes to improve visibility in all Western Class I areas by providing the technical and policy tools needed by states

and Tribes to implement the federal regional haze rule. The WRAP is administered jointly by the Western Governors' Association (WGA) and the National Tribal Environmental Council (NTEC).

References

Arizona Department of Environmental Quality (ADEQ), Air Quality Division. Phoenix, AZ. http://www.azdeq.gov/environ/air/index.html

Arizona Department of Environmental Quality (ADEQ). (2002). Morenci Sulphur Dioxide Nonattainment Area State Implementation and Maintenance Plan - Final. Phoenix, AZ: Air Quality Division.

ADEQ 2004. Title 18 Environmental Quality, Chapter 2 DEQ Air Pollution Control. Article 15 Forest and Range Management Burns. Phoenix, AZ.

ADEQ Exceptional and Natural Events Policy, April 28, 1999. Phoenix, AZ. http://www.deq.co.pima.az.us/air/pdf/NEAP/BACM060501.PDF

ADEQ 2003. Arizona State Implementation Plan (SIP) to Maintain and Improve Air Quality. Phoenix, AZ. http://www.azdeq.gov/environ/air/haze/download/2sip.pdf

ADEQ 2011. Arizona State Implementation Plan (SIP) to Maintain and Improve Air Quality. Phoenix, AZ.

Blankenship, J.O. 1991. Air Quality Related Values, Sensitive Receptors, and Levels of Acceptable Change for the Mount Baldy Wilderness: A Workshop Report. Earth Resource Consultants, Tucson, AZ.

Colorado State University 2006. Interagency Monitoring of Protected Visual Environments (IMPROVE). http://vista.cira.colostate.edu/views/Web/Data/DataWizard.aspx

EPA, 1990. National Ambient Air Quality Standards (NAAQS). USEPA Office of Air and Radiation, Office of Air Quality Planning and Standards. http://www.epa.gov/air/criteria.html

EPA list of nonattainment areas. 2006. EPA Office of Air Quality Planning and Standards, Research Triangle Park, NC. http://www.epa.gov/oar/oaqps/greenbk/index.html

EPA Regional Haze Rule 40 CFR Part 51. 1999. US EPA Office of Air and Radiation, Technology Transfer Network, OAR Policy and Guidance Record. http://www.epa.gov/ttncaaa1/t1/meta/m31943.html.

GCVTC. 1996 “Grand Canyon Visibility Transport Commission: Recommendations for Improving Western Vistas”. http://www.wrapair.org/WRAP/reports/GCVTCFinal.PDF

Kocis, S.M., English, D.B.K, Zarnoch, S.J., Arnold, R, and Warren, L. 2002. National Visitor Use Monitoring Results: Apache-Sitgreaves National Forests. Report prepared for USDA Forest Service, Region 3.

National Atmospheric Deposition Program/National Trends Network (NADP/NTN). 2006. NADP Program Office, Illinois State Water Survey, Champaign, IL. http://nadp.sws.uiuc.edu/

Western Regional Air Partnership (WRAP). 2003. Preliminary 2018 Reasonable Progress Visibility Target Values for Sec. 309(g) and Sec. 308 of the federal Regional Haze Rule.

Western Governors' Association, Denver, CO. http://www.wrapair.org

APPENDIX A

Arizona Revised Statutes for evaluation of point and non-point source emissions.

R18-2-1402. Applicability for Conformity Determinations.

A. Except as provided for in subsection (F) or R18-2-1434, conformity determinations are required for all of the following:
   1. The adoption, acceptance, approval, or support of transportation plans developed pursuant to 23 CFR 450 or 49 CFR 613 by an MPO or USDOT.
   2. The adoption, acceptance, approval, or support of TIPs developed pursuant to 23 CFR 450 or 49 CFR 613 by an MPO or USDOT.
   3. The approval, funding, or implementation of FHWA or FTA projects.

B. Conformity determinations are not required under this Article for individual projects which are not FHWA or FTA projects. However, R18-2-1429 applies to such projects if they are regionally significant.

C. The provisions of this Article shall apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan.

D. The provisions of this Article apply with respect to emissions of the following criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, and particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

E. The provisions of this Article apply with respect to emissions of the following precursor pollutants:
   1. Volatile organic compounds and nitrogen oxides in ozone areas (unless the Administrator determines under § 182(f) of the CAA that additional reductions of NOx would not contribute to attainment).
   2. Nitrogen oxides in nitrogen dioxide areas.
   3. Volatile organic compounds, nitrogen oxides, and PM_{10} in PM_{10} areas if either of the following apply:
      a. During the interim period, the EPA Regional Administrator or the Director of ADEQ has made a finding (including a finding in an applicable implementation plan or a submitted implementation plan revision) that transportation-related precursor emissions within the nonattainment area are a significant contributor to the PM_{10} nonattainment problem and has so notified ADOT or the MPO where one exists and USDOT.
      b. During the transitional, control strategy, and maintenance periods, the applicable implementation plan or implementation plan submission establishes a budget for such emissions as part of the reasonable further progress, attainment, or maintenance strategy.

F. Projects subject to this Article for which the NEPA process and a conformity determination have been completed by FHWA or FTA may proceed toward implementation without further conformity determinations if one of the following major steps has occurred within the most recent three-year period: NEPA process completion; formal start of final design; acquisition of a significant portion of the right-of-way; or approval of the plans, specifications, and estimates. All phases of such projects which were considered in the conformity determination are also included, if those phases were for the purpose of funding, final design, right-of-way acquisition, construction, or any combination of these phases.

G. A new conformity determination for the project will be required if there is a significant change in project design concept and scope, if a supplemental environmental document for air quality purposes is initiated, or if no major steps to advance the project have occurred within the most recent three-year period.

APPENDIX B. Photo and map of Mt. Baldy Airshed

Figure 1. Picture of Mt. Baldy Wilderness Area. Photo from ADEQ, State Implementation Plan, 2011.

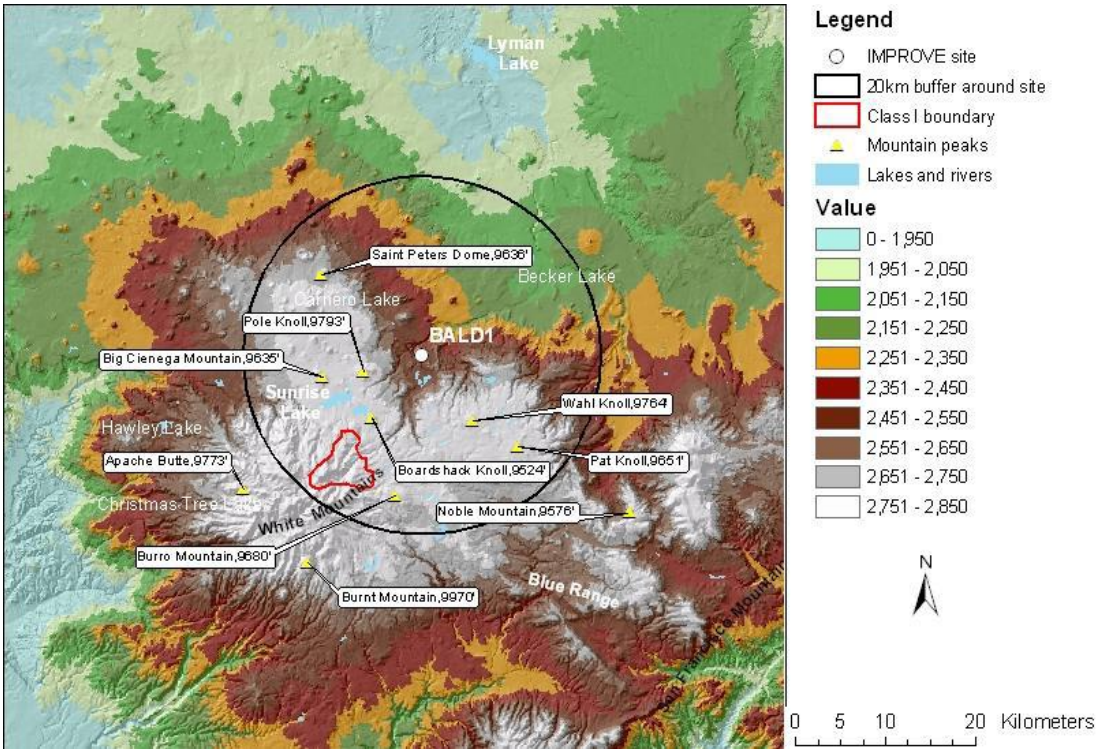

Figure 2. Relief map displaying the Mt. Baldy Wilderness Airshed, and IMPROVE air quality monitoring site Map from ADEQ, State Implementation Plan, 2011.