# Air Quality

## Introduction

This section discusses the current condition and proposed project's effects on air quality. The primary air quality concerns associated with forest management activities include fugitive dust produced from unpaved roads and smoke from wildfires and prescribed burns.

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA), as amended in 1990 and 1999. The CCA was designed to "protect and enhance" air quality. The CAA encourages reasonable Federal, state, and local government actions for pollution prevention. State Implementation Plans (SIP) are developed to implement the provisions of the Clean Air Act. The primary means by which this is to be accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). Under the CAA, the EPA sets standards for air quality to provide both health and visibility protection. The State of Montana has also set standards to help project air quality.

The EPA has established NAAQS for six criteria pollutants that have been determined harmful to the public and the environment, including carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, and ozone. The main air quality concern associated with this specific project is the amount and concentration of particulate matter (PM) produced by prescribed burning. Particles 10 microns and smaller (PM 10) may be inhaled deep into the lungs, posing a threat to public health. Particles 2.5 microns and smaller (PM 2.5) are of highest concern for potential health effects. Smoke particles also have the potential to reduce visibility.

If a community does not meet or "attain" the NAAQS, it is designated as a non-attainment area and must demonstrate to the public and the EPA how it will meet standards in the future. This demonstration is done through the SIP. Kalispell, Whitefish, and Columbia Falls are non-attainment areas addressed in this report.

## Analysis Area Description

### Airsheds

The Montana State Air Quality Bureau has divided Montana into 10 airsheds. These airsheds are established for the purpose of organizing and operating the Montana Cooperative Smoke Management Plan. The Flathead National Forest lies primarily within Airshed #2, which includes the majority of Flathead and Lake Counties, most of Sanders County, the northern portions of Missoula and Powell counties including the Swan River and South Fork of the Flathead River drainages and the northern half of Mineral County. The Kootenai National Forest, which is entirely Airshed #1, lies immediately to the west and north of the Tally Lake Ranger District on the Flathead National Forest.

### Sensitive Areas

Impacts from any burning within the Porter Mount Area usually occur downwind in an easterly direction since prevailing westerly winds are a dominant feature. Bigfork and Kalispell, both non-attainment areas, are located 12 miles to the northeast and can be influenced by burning from this area. Sensitive areas potentially affected include; the Class I Airsheds of Glacier National Park, 30 miles to the northeast and the Bob Marshall Wilderness Complex, approximately 35 miles to the east. The remainder of the Flathead National Forest is included in Class II Airsheds, where visibility standards are less strict (Project File Exhibit I-3).

### Air Quality Impact Zones/Non-attainment Areas

The State Airshed Group has also established Air Quality Impact Zones. These zones consist of the local airshed's surrounding cities where emissions from prescribed burning could have adverse effects on air quality. The Flathead Valley is Impact Zone K which includes the previously mentioned non-attainment areas. Areas within the State that exceed the ambient air quality standards are classified as non-attainment.

Special air dispersion conditions and other factors are closely monitored and considered for each scheduled emission event in the impact zone. The intent is to continue to permit emissions from needed treatments of resource areas under best possible ventilation conditions.

## Affected Environment

### Historic Condition

There is no known air quality data indicating the condition of Montana Airsheds from a historical viewpoint. Within the natural ecosystems, it is known that fire played a major role in the vegetative dynamics of the northern Rocky Mountains ecosystems as evidenced by the burn mosaics of the forested lands. The annual amount of smoke generated from forest fires, including wildland fires and prescribed fires, has generally decreased since the early 1900's. Prior to that, there were probably 1500 to 2000 fires burning annually throughout the northwest. These fires would have generated smoke for as short as a few hours to as long as 90 to 120 days and would have been extinguished by fall precipitation. The effect of settlement and subsequent fire protection has been to reduce the amount of burned area and to reduce the duration of smoke emissions from wildland fires. In the case of prescribed fire, the amount of smoke generated has been reduced by forest managers scheduling burns for periods of good smoke dispersion.

Use and treatment of fuels by prescribed fire has been common over the past 30 years on the Flathead National Forest and within the Porter Mount Analysis Area. Smoke emissions have been commensurate with the reduction of fuels and subsequent burning of forest residue on the entire Swan Lake Ranger District and have averaged 1000 to 2000 acres per year through the past decade. These acres were mostly slash and activity fuel reduction prior to 1990 and prescribed ecosystem burning with fewer acres after that. During seasons of low risk of escaped fire (typically mid to late spring or fall) and periods of good ventilation and dispersion, smoke from these activities on National Forest and private lands are released into the airshed. According to the EPA's Report AP-42, Compilation of Air Pollution Emission Factors, some air pollution is generated by prescribed burning, although the net amount is believed to be a relatively smaller quantity than that produced by wildfires. The EPA states in this report that "prescribed fire is a cost-effective and ecologically sound tool for forest, range and wetland management. Its use reduces the potential for destructive wildfires and thus maintains long-term air quality." The planning, scheduling, coordinating, and monitoring of prescribed fire on National Forest lands follows the guidelines described in the 1967 CAA and Amendments to the Act (I 972, 1977 and 1990) that provide direction to protect and enhance the quality of the nation's air resources and to protect public health and welfare.

### Existing Condition

Air quality in the various airsheds is affected by smoke, dust, industrial sources, and motor vehicle exhaust. Smoke is generated from occasional wildfires, prescribed burning, residential wood burning, and agricultural field burning. Along with local sources, smoke and dust is blown into the area from Washington, Idaho, and Canada. Re-entrained road dust, primarily from vehicle traffic on gravel and native surface roads in summer, spring and fall, on paved sanded roads in all seasons, and from wind erosion on agricultural lands, also affects air quality. Industrial sources locally of airborne pollutants include an aluminum plant in Columbia Falls, and local sawmills.

Visibility in the Class I Airsheds is monitored by the State Air Quality Bureau. Monitoring sites are located in Glacier National Park and the Bob Marshall Wilderness. Visibility is generally good in the Class I Airsheds. Some impairment of visibility occurs in the spring and fall due to the cumulative effects of actions across Montana and adjoining states.

Air Quality in Montana Airshed #2 is generally considered good to excellent through a majority of the year. Seasonal variations occur, resulting from weather conditions such as temperature inversions. Areas within the airshed not adjacent to or within urban areas are generally well within acceptable levels of particulate matter.

Air-quality monitoring by the Montana Department of Health and Environmental Quality (DEQ) in Kalispell, Columbia Falls, and Whitefish PM 10 Impact Zones has shown that air quality is generally fair to good. Some populated valleys have periods of poor air quality that is attributed to stagnant air and high pressure systems that trap pollutants, particularly in the winter months. Source apportionment studies indicate only a small percentage of the particulate matter (generally less than 2 percent) in these airsheds is attributed to prescribed burning of forest residue. Studies taken by the DEQ indicate that the majority of particulate matter is attributed to re-entrained road dust and residential wood burning. Since 1990, Kalispell has only exceeded the NAASQ 24 hour PM 10 standard twice; both were at the Universal Athletic Monitoring Site and occurred during in February 1991. These are attributed to re-entrained road dust and residential wood burning. The Columbia Falls Monitoring Site has not exceeded the NAAQS 24 hour PM 10 standard since 1990. In addition, the Whitefish Monitoring Site has not exceeded the NAAQS 24 hour PM 10 standard since 1994.

The downward trend in the maximum values for 24 hour particulate matter and the annual arithmetic average for all three non-attainment areas since 1994 is attributed to the mitigation measures implemented. These mitigation measures are:

- Increased miles of gravel surface travel ways which have been paved,
- Automated road sweeping/ washing,
- Use of liquid road deicer, and
- Reduction in the use of sand on paved road surfaces during adverse cold weather conditions.

This has reduced the quantity of the primary source of particulate matter impairing these airsheds, re-entrained road dust. Also, not exceeding the national standards or a trend of air quality degradation during the fall season indicates that the monitoring program operated by the Montana Airshed Group is working successfully to limit burning when good smoke dispersal can occur.

Most wildland fires have contributed little in the production of smoke, due to effective initial attack. However large escaped fires can have obvious effects. Smoke from a large wildland fire generally has a detrimental impact on air quality because acreages are larger, fire duration is longer, dispersion conditions may not be optimal, fuel consumption is greater, and fire locations are not predicable.

Smoke production from prescribed fire is also sporadic, but is directly related to forest management activities that implement prescribe fire. Most of the smoke from prescribed burning that occurs in the assessment area is from agricultural burning as far away as eastern Washington and from the Kootenai National Forest. The most recent prescribed fire activity was the Patrick Stoner Ecosystem Burn during April 1998, in an adjacent watershed to the east of the Porter Mount Area. Smoke duration was short, though intense for several hours on the day of the ignition. The burn was extinguished by wetting rains in June.

Prescribed fires are planned and regulated for conditions that minimize effects to air quality, these conditions are:

- Atmospheric conditions which are optimal for smoke dispersion
- Less fuel that is consumed
- Fuel that is consumed more efficiently
- Smoke that will be less likely to enter Class I Airsheds.

Smoke production from prescribed fires may increase due to increased funding and emphasis on returning fire to the landscape.

# Environmental Consequences

## A. Fugitive Dust

### Alternative A – No Action
### Direct and Indirect Effects

Alternative 1, the no action alternative, would not produce fugitive dust beyond the amount produced by routine forest management activities. None of the burning activities included in the project proposal would be implemented. There would not be any fugitive dust associated with post-decisional project road use or ground disturbances. Therefore, there would be no direct or indirect effects to air quality from the implementation of this alternative.

### Effects Common to All Action Alternatives
### Direct and Indirect Effects

This analysis considered the impacts to air quality from dust associated with project implementation, specifically, road dust. The direct effects include reduced visibility on and adjacent to roads and an increased level of small diameter particulates, specifically PM 2.5 and PM 10 (of concern for human health reasons). This analysis considered the total maximum dust production during the implementation of the Alternative B to be 10.5 tons of PM 10. The actual amount produced would be influenced by dust mitigation measures taken directly by the Forest Service and by Flathead County as general road maintenance, dust abatement on roads during log haul in dry weather, as well as actual precipitation, and timing of log hauling.

Indirect effects are limited to the air quality degradation, because of PM 2.5 and PM 10 particulates, since larger diameter materials would settle out near the point of production. PM 2.5 and PM 10 levels would rapidly disperse as they are carried by local and general winds.

### Alternatives B and C
### Cumulative Effects

The Cumulative Effects Worksheet, located in the Air Quality Project File (Project File Exhibit I-4) considers and describes proposed activities in addition to the past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively affect air quality are discussed below.

The cumulative effects of fugitive dust on air quality, as a result of the implementation of the action alternatives, would result in a small but incremental decrease in air quality as PM 2.5 and PM 10 particles from this source combine with other particles produced both by the implementation of other aspects of this project, specifically prescribed burning, as well as other local and regional sources

located upwind. Prescribed burning of logging slash, on other Federal, state or private lands, would also contribute particulates, as would agricultural burning and fugitive dust from tilled ground. Particulates from industrial and automotive sources also contribute to regional particulate loading. Other vehicle traffic, agricultural and industrial sources within the analysis area would also contribute to the cumulative particulate loading. It is not possible to predict the amount of particulates contributed by these other sources. However, the Monitoring Unit takes these sources into account, when they prepare smoke dispersion forecasts.

This process of monitoring and forecasting has been effective at achieving the Airshed Group's objectives, which are listed in the Montana/Idaho Smoke Management Agreement.

The cumulative effects on air quality, resulting from the implementation of the action alternatives and from other local and regional pollutant sources, would likely result in PM 10 loadings, on an average daily loading equal to or less than the maximum annual arithmetic mean of 50 micrograms per cubic meter or a maximum daily concentration of PM 10 at or below 150 micrograms per cubic meter. There may be days when regional air quality does not meet these standards but, because of the Montana/Idaho Air Shed Group Monitoring Group's effectiveness, it is unlikely that any source associated with this project or any other present or reasonably foreseeable future burning project, would be a significant contributor.

## B. Prescribed Burning

### Alternative A – No Action
### Direct and Indirect Effects

There would be no direct effects to the air quality of human health from Alternative A. Alternative A would not implement any prescribed smoke producing activities, such as prescribed burning and would not directly contribute to air quality impacts. However, prescribed burning of logging slash, on other federal, state or private lands, would contribute particulates, as would agricultural burning and fugitive dust from tilled ground. Particulates from industrial and automotive sources would also contribute to regional particulate loading. Other vehicle traffic, agricultural and industrial sources within the analysis area would also contribute to the cumulative particulate loading. It is not possible to predict the amount of particulates contributed by these other sources.

### Alternatives B and C
### Direct and Indirect Effects

The estimated amount of smoke emissions, produced by prescribed burning associated with an action alternative, is portrayed in the Table 3-25. The project file contains the calculations used to develop these estimates. The actual amount of smoke produced would be equal to or less than these figures since worst-case conditions were used.

**TABLE 3-25**
**PARTICULATE AMOUNTS (TONS PER ACRE) PRODUCED BY PRESCRIBED BURNING ASSOCIATED WITH ALL ACTIVITIES**

| Alternatives | PM 10 total tons produced | PM 2.5 total tons produced |
|---|---|---|
| **A** | 0 | 0 |
| **B and C** | 510 | 304 |

The effects of smoke from prescribed burning smoke are reduced visibility and increased levels of small diameter particulates, specifically PM 2.5 and PM 10. These are of concern for human health reasons, particularly PM 2.5 which is smaller and tends to be inhaled deeper into the lungs where it is

much harder to expel. Much of the PM 10 particles which are inhaled are trapped in the mucus membranes of the nose and throat.

Burning slash piles could temporarily affect air quality in the analysis area and surrounding area. This pile burning would produce light smoke emissions. It also would require monitoring of smoke transport and dispersion conditions to minimize effects to airshed quality. Coordination of smoke generating activities with the Montana Airshed Group assures that effects comply with the Montana Air Quality Act and Federal Clean Air Act.

Fire intensities, fuel moisture levels, and utilization of the flaming phase of combustion would all be monitored and used to reduce particulate production and airshed impact. By burning under optimum conditions, particulate amounts would be drastically reduced as compared to amounts generated by a wildland fire of the same acreage. PM 2.5 and PM 10 levels would rapidly disperse as they are carried by local and general winds.

### Alternatives B and C
### Cumulative Effects

The cumulative effects on air quality of prescribed burning smoke, produced as a result of the implementation of the action alternatives, would result in an incremental decrease in air quality in the Porter Mount Area as PM 2.5 and PM 10 particles from this source combine with other particles produced both by the implementation of other aspects of this project, specifically fugitive road dust, as well as other local and regional sources located upwind. Prescribed burning of logging slash, on other Federal, state or private lands, would also contribute particulates, as would agricultural burning and fugitive dust from tilled ground. Particulates from industrial and automotive sources also contribute to regional particulate loading. Other vehicle traffic, agricultural and industrial sources within the analysis area would also contribute to the cumulative particulate loading.

## C. Wildland Fire

### Alternative A – No Action
### Direct and Indirect Effects

The direct effect of wildland fire smoke on air quality from implementing Alternative A is that fire occurrence, intensity and size would be similar to fires in the recent past. Historic records from the past thirty years show that, on average, one fire occurs within the analysis area every ten years.

These fires are generally small, burning less than 1 acre each. However, there is an increasing probability that one of these fires would escape initial attack and grow to several hundred to thousands of acres, burning for several days or even weeks. Fires of this scale and duration would impact air quality to varying degrees during the time the fire would be active.

Additional effects of wildland fire smoke, from implementing Alternative A, the No-Action Alternative, would be the gradual change in the existing fuel complexes as dead woody fuels accumulate secondary to insect, disease and weather disturbance. Live fuels, especially ladder fuels, would also increase over time as stand density declines and understory shade tolerant species increase in response to increased sunlight. As the fuel loading increase the incidence and intensity of wildland fires, and the smoke they produce, would increase.

## Alternative A – No Action
## Cumulative Effects

As discussed above, over time, the cumulative affect of the No Action Alternative would be to leave the buildup of fuel load in the analysis area unaltered. In can be reasonably foreseen that stand conditions would be expected to continue to see increased in-growth in the understory and increasing ground fuel buildup as described in the Vegetation and Fire Sections of this document. Due to the increase in fuels over time, it can be anticipated that the intensity and extent of wildfires would increase in the analysis area as compared with historic more frequent interval fires as discussed in the Fire Section of this document. Associated smoke from such wildfires would increase as a consequence of taking no action as contrasted with action Alternatives B and C.

## Alternatives B and C
## Direct and Indirect Effects

For the purpose of analysis, it was assumed that all of the acres proposed for treatment followed by underburning prescribed burning, are burned by intense, stand replacing wildland fire. Stand-replacement fire would produce the highest volume of particulates; therefore, it is used here as a worst case scenario. In doing this, a basis for comparing the potential air quality impacts of wildland fire to the potential impacts of management activities is determined. Table 3-26 displays these estimates.

**TABLE 3-26**
**PARTICULATE AMOUNTS PRODUCED BY WILDLAND FIRE**

| Alternatives | PM 10 total tons produced | PM 2.5 total tons produced |
|---|---|---|
| A | 4,720 | 2,820 |
| B and C | 2,145 | 1,971 |

The comparison of relative impacts of implementing an action alternative versus a stand replacement wildland fire indicates that, on an acre-to-acre basis, an action alternative would produce from 50-60 percent of the smoke impacts of an intense wildland fire affecting the same area.

The indirect effect of wildland fire smoke on air quality, resulting from implementing the action alternatives would be that, over time, as vegetation recovers in response to both the burning and the increase in available sunlight, the fire potential on treated areas would increase from the immediate post-burn level, but would be less than the current existing condition. Over time, with regrowth of shrubs and trees after treatment, the potential for spread of fire would increase compared to the immediate post treatment conditions, but the intensity, and smoke production, would generally decrease from the current situation.

## Alternatives B and C
## Cumulative Effects

The cumulative effects of wildland fire smoke on air quality, for the alternatives, would include all pollution sources contributing particulates to the air mass in addition to the smoke produced by wildland fires within the analysis area. The greatest cumulative effect would occur when wildland fires are burning outside and upwind of the analysis area and wildland fires within the analysis area burn at the same time. The cumulative effect of these sources could result in extended periods of poor air quality. The potential amount of smoke produced would vary by alternative and would be proportionate to the amount of fuel hazard reduction resulting from each alternative.

Certain wilderness areas and National Parks established before August of 1977 were designated as Class I areas. A Class I designation allows only very small increments of new pollution above already existing air pollution levels. The CAA Amendments of 1977 included a program for prevention of significant deterioration of air quality, generally referred to as the PSD program. This program is to prevent areas currently having clean air from becoming more polluted (A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas, General Technical Report RM-168). The Bob Marshall Wilderness, Glacier National Park are Class I areas.

### Effects Analysis of Potential Impacts To Class 1 Airsheds

As discussed earlier, the Bob Marshall Wilderness, Glacier National Park are Class I Airsheds.

Naturally occurring visual range in the East (United States) may be between 105 to 190 kilometers (65 to 118 miles), while natural visual range in the West is between 190 to 270 kilometers (118 to 167 miles) (Interim Air Quality Policy on Wildland and Prescribed Fires, EPA, 1998). The existing condition of the representative standard visual range for the Class I Airsheds of concern for this project is as follows:

**TABLE 3-27**
**STANDARD VISUAL RANGE FOR THE BOB MARSHALL WILDERNESS AND GLACIER NATIONAL PARK**

| 10th percentile | 50th percentile | 90th percentile |
|---|---|---|
| 97 kilometers (60 miles) | 178 kilometers (110 miles) | 249 kilometers (154 miles) |

The analysis shown in the table above indicates the probability that transport winds from a direction that would carry smoke toward the Bob Marshall Wilderness Area and Glacier National Park, would occur on about 20 percent of days. If burning occurs on one of these days, smoke could impact visual quality and could also deliver air borne pollutants to these Class I Airsheds. Smoke dilution would greatly reduce the level of pollutants reaching these points of interest. The effects of visual impairment would be less noticed during spring weather because wilderness use is very limited due to deep snow. The probability of impacting the Bob Marshal Wilderness and Glacier National Park, due to smoke generated from either action alternative is considered to be quite low. This is because of the distance to these areas, coupled with the mitigating atmospheric conditions required for smoke dispersal required under airshed management standards.

## Regulatory Framework and Consistency

By participating in the Montana and Idaho Interstate Airshed Group, complying with the MOU with the Montana Air Quality Bureau, and meeting the requirements of the SIP and Smoke Management Plan, the proposed activities would comply with the forest Plan and the CAA.