AIR QUALITY

Introduction

This section discusses the current condition and proposed project's effects on air quality. Air quality is affected by smoke, dust, industrial sources, and motor vehicle exhaust. Forest Service activities generate smoke from occasional wildland fires and prescribed fires.

Information Sources

Smoke Impact Spreadsheet (SIS) was used to model smoke dispersion and the Consume Model was used to model on site ground level concentrations for each alternative. Each ignited landing pile's predicted ground level concentrations of both PM-10 and PM-2.5 emissions dispersed almost completely 2 hours after ignition. The smoke dispersion modeling assumed one ninth of the landing piles are collocated and ignited at 10 minute intervals, with winds from the east to northeast directing emissions to Kalispell or Columbia Falls. This represents the most potential impactive scenario for the closest non attainment areas. Areas greater than 1.5 miles from concentrated landing pile ignitions would have no risk of exceeding the 24 hour average PM2.5 and PM10 ambient air quality standards. The SIS and Consume Model runs and input data for all action alternatives are in Project File Exhibit J-1

Analysis Area

The primary analysis area used for assessing the influence of project activities on air quality is Airshed 2 as defined by the Montana/Idaho Airshed Group. Airshed 2 comprises Flathead, Lake, Sanders and the northern portions of Missoula and Powell counties. Airshed 2 is the geographic range any activities undertaken in the project area might influence in terms of air quality.

Smoke contains pollutants including tiny particles called particulate matter (PM). Particulate matter can cause significant health problems, especially for people with respiratory illness. Smoke in the air also affects visibility. The Environmental Protection Agency (EPA) sets standards for air quality to provide both health and visibility protection, as directed by the Clean Air Act of 1970, with amendments. The state of Montana has also set standards to help protect air quality.

The primary air quality concerns associated with forest management activities include road dust, and smoke from wildfires and prescribed burning. Wood smoke produces particles too small to be seen by the human eye, measuring 10 microns (one micron equals a millionth of a meter) and smaller. Larger particles tend to settle out of the air quickly, and are less likely to affect public health. Particles 10 microns and smaller may be inhaled deep in the lungs.

Particulates 2.5 microns and smaller are the greatest public health concern. Standards prescribe concentrations of these particle sizes that cannot be exceeded in a 24-hour period.

Affected Environment

Airshed Characteristics

The air quality of the Flathead River Valleys is considered to be good to excellent throughout most of the year and meets Montana air quality laws and the Clean Air Act.

Air quality may be affected and various amounts of pollutants may occur from:

- Prescribed burning in the spring and fall by the Flathead National Forest, Montana Department of Natural Resources, Corporate Timber Companies and land development companies.
- Prescribed burning to the west and south done by other National Forests, other agencies and private companies or citizens.
- Wildland fire use for resource benefit occurring in the summer months in the Bob Marshall Wilderness, Great Bear Wilderness, and Glacier National Park.
- Wildland fires burning upwind to a distance of two hundred miles depending on the size of the fire.
- Agriculture field burning both the Flathead Valley and in Idaho.
- Weather patterns affect the air quality, causing degradation when low pressure systems over Idaho pull suspended pollutants from large metropolitan airsheds and from farms (dust and smoke) in Oregon, Washington and Idaho.

Prescribed burning requires a permit from the State of Montana/ Idaho Airshed Group and the burn must be implemented within the regulatory framework.

Although historical reports indicate that smoke was common and often thick in western Montana prior to the advent of fire suppression, most people in the valley are now accustomed to good air quality and are less likely to tolerate poor air quality.

Fire has historically been a part of the vegetative dynamics in the Northern Rockies as evidenced by the burn mosaics of the surrounding forested lands. It has been estimated that 768,000 acres burned in the Lewis and Clark Reserve in 1889 alone (Losensky 1990). Models suggest that about 200,000 acres would burn on average every 10 years under a natural fire regime in forest types similar to those in the study area.

The Flathead Valley airshed receives increasing emissions from a growing population's combustion of heating fuels in residences and businesses, especially wood stoves, as well as fuel combustion emissions from increasing numbers of vehicles. Dust from winter road sanding and summer use of unpaved roads contributes to the airborne particulate matter.

The air quality sampling data indicates that air quality in the project area is good to excellent most of the year. Wildland fire is a part of the natural forest ecosystem and produces local short-term impairment of air quality. The impairment of air quality during the 2001 and 2003 fire seasons are extreme examples of the wildland fire smoke effects on air quality.

Meteorology

Dispersion, the dilution of smoke, is primarily determined by transport winds and mixing height. Transport winds determine the direction of a smoke plume and the speed at which it travels, while mixing height controls the ability of smoke to mix into an air mass.

In the spring and summer, solar heating of the earth surface is much more intense, increasing the amount of warm air contributing to an unstable atmospheric condition. The more unstable the atmosphere is, the higher the mixing height would be. During the fall and winter, stable atmospheric conditions prevail as cooler air pools in the valley bottoms. Solar heating is not enough to heat this pooled air, so the stable conditions remain until a frontal passage "scours" out the valley air. Smoke management meteorology is discussed in depth in *NWCG Smoke Management Guide for Prescribed and Wildland Fire, Chapter 7 – 2001 Edition.*

Sensitive Areas

This prescribed burning smoke from this project may have the potential to affect Airshed 2 and Airshed 9. The small size of the project treatment areas and burning under good smoke dispersion conditions should alleviate any adverse air quality effects.

Communities that do not meet or "attain" air quality standards over a period of time are designated by the EPA as non-attainment areas. States are then required to develop a plan to control source emissions and ensure future attainment of the standards. Three cities in the Flathead Valley are considered sensitive areas, because they are non-attainment areas for PM-10; Kalispell, Columbia Falls, and Whitefish. Kalispell is considered an area of concern, though not legally a non-attainment area for carbon monoxide.

The Clean Air Act further provides for additional measures "to preserve, protect, and enhance the air quality" in larger national parks, wilderness areas and other areas of special national significance. These areas are designated Class I airsheds. Of particular concern under this requirement is visibility or haze. There are several Class I airsheds in the vicinity, but Glacier National Park and the Great Bear / Bob Marshall Wilderness Complex are the ones that could be most affected by this project since prevailing winds often blow from west / southwest to east northeast. Glacier National Park is located approximately 12 air miles east-northeast of the project area and the Great Bear / Bob Marshall Wilderness Complex is located approximately 4 to 6 air miles east of the project area.

Environmental Consequences

No significant issues related to air quality were identified (refer to Chapter 2). The following Effects Indicator was used to focus the air quality analysis and disclose relevant environmental effects:

- Particulate Matter (PM10) Generated by Alternative

Direct and Indirect Effects

Effects Common to All Alternatives

Wildland Fires

In the absence of fuel reduction, and in the event of future wildland fire occurring, varying levels of smoke could persist in the Flathead Valley for several weeks, depending on local climatic conditions, level of dispersion (poor, good, etc.) and amount of smoke/emissions produced. This could increase emissions raising health concerns for the segments of the population and adversely affect visibility. Alternative A does not propose to conduct any harvest activities or associated fuel reduction treatments to mitigate current and future heavy fuel loadings. Therefore, it is the least effective in reducing potential smoke emissions and associated pollutants from future wildland fires. Alternative A does not propose to conduct any prescribed fire, therefore in the short-term no smoke would occur from this activity. Alternatives E, D, and B in that order would be the most effective, followed by Alternative C, in reducing potential smoke emissions and associated pollutants in the long term. Alternatives B, C, D, and E all propose to conduct prescribed fire (pile burning) and would produce varying levels of smoke in the short term. Smoke from wildland fires would occur with all alternatives, the amount dependent upon climate. Wildland fires locally, or anywhere in the Pacific Northwest and Western Canada can affect regional haze in the Flathead Valley. Frequently, wildland fires upwind are carried by winds into the Flathead area affecting visibility, but rarely exceeding PM-10. Natural phenomena such as volcanic eruptions and windstorms over deserts also produce particulate matter. Dust from as far away as China in 1998 and 2001 as well as ash from the 1980 eruption of Mount Saint Helens has impacted the Flathead Valley. Metropolitan areas upwind like Seattle and Portland can affect particulate matter. Wind on wheat fields of southern Alberta and Saskatchewan, Canada, as well as eastern Montana, has affected particulate matter in the Flathead Valley. Wildland fires would continue to produce smoke, primarily during the summer months. All alternatives have wildland fire smoke potential.

The indicator used to evaluate the effects of the alternatives on smoke production is particulate matter. Each of the action alternatives would produce particulate matter at various levels. Table 3-37 contains the acres of treatment by alternative and type, an estimate of the total particulate matter (PM), the annual PM and the maximum predicted 24 hour PM measured in microns.

Table 3-37: Particulate Matter (PM10 and PM 2.5) Generated by Alternative.

Alternative	[1]Salvage Units- Pile Burning Rx Fire Treatment (Acres)	Rx Fire Landing Pile Total (Acres)/ Estimated Number of (Landing Piles)	Total Pm-10 Emissions Estimate (Tons)	Total Pm-2.5 Emissions Estimate (Tons)	Total Pm-10/ 2.5 Emissions Annual Est. (Tons)*	Maximum Predicted 24 Hour PM-10/PM-2.5 For Kalispell	Maximum Predicted 24 Hour PM-10/PM-2.5 For Columbia Falls
A	0	0	0	0	0	0	0
B	4921	14.4/173	175	152	58/51	7.6/6.6	13.9/12.1
C	3949	11.5/139	141	122	47/41	7.6/6.6	13.9/12.1
D	5300	15.5/187	189	164	63/55	7.6/6.6	13.9/12.1
E	5338	15.6/188	190	165	63/55	7.6/6.6	13.9/12.1

***** Calculated for a 3 year implementation schedule

According to the Environmental Protection Agency's Airdata , Air Quality Index Report the maximum 24 hour PM10 measurement at the Columbia Falls receptor site was 158 microns during the active fire season of 2003. This is approximately 11 to 21 times the PM10 daily worst case scenario for post salvage harvest slash burning that may affect non attainment areas in the Flathead Valley.

Common to All Action Alternatives – Alternatives B, C, D and E

Prescribed burning, road dust, vehicle emissions and wildfire could cause a temporary adverse affect on air quality in the analysis area and surrounding area. The South Fork of the Flathead River Valley could be inconvenienced by smoky conditions for short periods during prescribed burning operations or during the summer wildland fire season. Road dust due to log hauling and normal public traffic would be common to these alternatives. Dust abatement would be used on haul roads, including the Westside Hungry Horse Road (Rd.895) to minimize the effects of road dust.

Pile burning would be used in all the action alternatives to treat the fuel accumulations in salvage units. The pile burning will consist of primarily landing piles. All burning would occur under conditions designed to ensure good smoke dispersal. The cumulative impact of all private and agency burning is assessed daily during the burning season by coordinating with the Montana/Idaho Airshed Group. This prescribed burning will require monitoring of smoke transport and dispersion conditions to minimize effects to the airsheds air quality.

Fuel wood availability due to fire mortality is not expected to noticeably affect the availability of wood or air quality, because the West Side Fire area would be closed to fire wood gathering until the completion of the post-fire salvage project. The amount of fuel wood burned in the valley would not increase as a result of any action alternative. Air quality in the

[1] Treatment of logging slash (i.e. piling and burning, or jackpot burning) would be limited to only those units where fuel loadings pose other resource concerns (such as regeneration potential or fire risk).

Flathead Valley during the winter months would not change as a result of the availability of fuel wood in the project area.

Air quality in the Flathead Valley would not adversely be affected by the prescribed burning proposed in this project. Weather and smoke dispersion conditions outlined in the prescribed burn plan should alleviate any adverse smoke effects.

Alternative A (no action)

No prescribed burning related to the West Side Fires would occur in this alternative, therefore no prescribed burning smoke emissions would be produced by this project. As described above, the risk of large wildfire within the West Side Fire project area would increase over time as vegetation continues to fill in the burned area. The risk of large wildfire outside the West Side Fire project area would remain high based on the prevalence of the lethal fire regime with a 200+ year fire return interval. Smoke produced by a large wildland fire could have an adverse affect on the air quality of the Flathead Valley.

Alternative B, D and E

These alternatives involve the largest acres of management activity including fuel reduction, and thus would produce the most direct smoke emissions of any of the action alternatives. Pile burning would be conducted over the course of 1-2 years after salvage activities, so impact would not be concentrated. Areas where fuels have been treated under conditions selected to minimize effects on air quality should be less vulnerable to future intense wildfires where smoke effects are unpredictable. The risk of large wildfire within the West Side Fire project area would increase over time as vegetation continues to fill in the burned area.

Also, salvage harvest would generate landing piles under all these alternatives. Piles concentrate fuels in a specific area they can usually be burned in the late fall under ideal smoke dispersion conditions and when the risk of fire spread or escape is much less.

Alternative C

Prescribed pile burning in this alternative would produce the least amount of emissions of all the action alternatives. Potentially, prescribed burning would be conducted over the course of 1-2 years after salvage activities, so impact would not be concentrated. The risk of large wildfire within the West Side project area would increase over time as vegetation continues to fill in the burned area.

Also, salvage harvest would generate landing piles under this alternative. Piles concentrate fuels in a specific area they can usually be burned in the late fall under ideal smoke dispersion conditions and when the risk of fire spread or escape is much less.

Cumulative Effects

Smoke emissions produced by the implementation of an action alternative, road dust, and vehicle emissions could combine with air pollutants from other projects in the area such as other prescribed burning and particulates produced west of the project area. Action alternative effects would contribute to the cumulative impact of air pollutants within the South Fork of the Flathead valley. Prescribed burning would be implemented during good smoke transport and dispersion conditions and would be accomplished over time, which should minimize any adverse effects from prescribed burning smoke emissions.

If no fuel treatment is accomplished in this project area, the potential for smoke from a large wildland fire is increased. The 2003 fire season displayed the adverse effects large wildfires can have on air quality. The size, duration, timing and air quality conditions of wildland fires cannot be predicted.

Since 1990, new air quality rules have been issued related to fine particulates (PM-2.5), and visibility (regional haze). Additionally, EPA has issued the Interim Air Quality Policy on Wildland Fire and Prescribed Fire. The Interim Policy is meant to encourage states to develop and certify to EPA smoke management programs to address emissions from prescribed fire and prescribed natural fire. The operations of the Montana/Idaho State Airshed Group are critical to minimize cumulative air quality impacts within Idaho and Montana. The daily operation of the Airshed Group considers and tries to minimize impacts from prescribed fire, wildland fire, and wildland fire use.

REGULATORY FRAMEWORK AND CONSISTENCY

As designated by law, State Air Quality Rules, and the Flathead Forest Plan, the Forest cooperates with the State Air Quality Bureau and through the U.S. Forest Service is a member of the Montana/ Idaho State Airshed Group. This coordination ensures that during project implementation, burning only occurs under conditions, which would protect air quality and meet state and national standards.

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