Jocko Lakes Fire Salvage Project

Air Quality Report

Prepared by:
Randy Hall
Fire/Fuels Specialist

for:
Seeley Lake Ranger District
Lolo National Forest

July 28, 2008

Table of Contents

List of Tables

Introduction

The smoke from fire contains a number of pollutants, including tiny particles called "particulate matter" (PM). Exposure to PM can cause significant health problems, especially for people suffering from respiratory illnesses. Smoke also adversely affects the clarity of the air, or visibility. Based on recent health research, Environmental Protection Agency (EPA) revised the air quality standards to provide improved health and visibility protection. With the new standards in place, land managers must consider using techniques that minimize prescribed fire emissions and the adverse impacts of smoke on public health and the environment. Careful planning and cooperation among land managers, air quality regulators, and local communities ensures that prescribed fire, clean air and public health goals can be met.

The main air quality concern associated with this project is the quantity, concentration and duration of PM 2.5 produced by proposed prescribed pile burning. Up to 70% of smoke particulate is PM 2.5 or smaller. Particulate matter is comprised of a mixture of solid particles and liquid droplets. Particle size is measured in microns (one micron equals one millionth of a meter). Particles can be up to 50 microns or larger. Fine particles, 2.5 microns and smaller (PM-2.5), are of the highest concern because the may be inhaled deep into the lungs and they pose a greater threat to public health and visibility. PM 2.5 are generally emitted from activities such as industrial and residential combustion, wildland fire, agricultural burning, and vehicle exhaust.

This analysis describes the desired and existing condition of the air quality resource within the project area and evaluates the potential effects of the Proposed Action and No Action Alternatives for consideration in determining whether or not to prepare an Environmental Impact Statement.

Overview of Issues Addressed

There is a concern that the proposed project will negatively affect air quality. The measurement indicator for this issue will be the predicted smoke emissions (PM2.5) on sensitive receptors and how that compares to regulatory standards and requirements

Affected Environment

Analysis Area

The project area lies within Montana/Idaho Airshed 3B which includes Missoula County (Appendix A). Airsheds are defined and managed by Montana Department of Environmental Quality (DEQ). The Montana/Idaho Airshed Group (Airshed Group) as authorized by the Montana Department of Environmental Quality (MDEQ) implements the Smoke Management Program in Montana and Idaho by making recommendations as to whether or not a burn can occur, given forecasted meteorological conditions, burn type, burn location and other surrounding proposed burns. The burner uses the recommendations of the Airshed Group, "Best Available Control Technology (BACT)", and site specific conditions to determine whether to burn on a particular day or not.

Existing emission sources in the project area include vehicles, road dust, residential wood burning, wood fires, the Pyramid lumber mill and smoke from forest fires. Emissions are limited with no local visible sources of impairment. Wind dispersion throughout the project area is robust, with usually no visible inversions or localized concentrations of emissions. The entire project area is considered to be in attainment (meeting the standards for emissions) by the MDEQ. The nearest non-attainment area is Missoula (25 miles to the southwest).

The nearest Class I areas are the Flathead Reservation less than a mile to the west, the Bob Marshall Wilderness 15 miles northeast, Mission Mountain Wilderness 15 miles northwest, and the Scapegoat Wilderness 25 miles northeast.

Missoula is both a non-attainment area for PM10 and an impact zone.

Smoke produced within the analysis area would most likely be carried in north, northwest or northeast direction (Appendix B)

Existing Condition

Air Quality

Air Quality within the project area is generally excellent with limited local emission sources and consistent wind dispersion during much of the year. Existing sources of emissions include residential wood burning, debris burning, road dust, light industry, vehicles, construction equipment and wildland fire. Emissions are limited much of the year with winter being the period with the greatest emission production due to residential wood burning for heat. Wildland fires can produce substantial emissions in the summer and fall for short to moderate durations. Occasional inversions develop in the winter during winter burning periods with stable atmospheres. The area allows for good dispersal the majority of the time, with typical south, southwest and southeast patterns. Generally, the project area does not develop temperature inversions, which trap smoke and reduce smoke dispersal. Dispersion of emissions within the project area is very high due to the mountainous terrain and high wind activity. Up valley winds during daytime and down valley wind (cold air drainage) at night can dominate winds more than overall prevailing wind direction on ridge tops.

The EPA's air quality index (AQI) rates air quality in the vicinity of the project area as "good" most of time for both counties. The AQI is a system for measuring and rating pollution levels for five of the six "criteria" pollutants regulated under the Clean Air Act. Tables 1 and 2 show air quality index for Missoula and Powel Counties for the past 11 and 6 years respectively.

Table 1. Air quality index (AQI) for Missoula County

Missoula County Air Data Monitor-AQI Report					
	Days Monitored	**Good Days**	**Moderate Days**	**Unhealthy Days for Sensitive Groups**	**Unhealthy Days**
2007	365	321	40	3	1
2006	359	319	37	1	2
2005	342	310	27	4	1
2004	251	228	20	2	1
2003	364	323	32	5	4
2002	365	343	22	0	0
2001	365	331	30	4	0
2000	366	329	39	5	2
1999	337	319	17	0	1
1998	331	317	14	0	0
1997	365	342	23	0	0

Located on the web at http://www.epa.gov/air/data/index.html

Table 2. Air quality index (AQI) for Powell County

Powell County Air Data Monitor-AQI Report					
	Days Monitored	Good Days	Moderate Days	Unhealthy Days for Sensitive Groups	Unhealthy Days
2005	120	118	2	0	0
2004	114	114	0	0	0
2003	107	106	1	0	0
2002	114	114	0	0	0
2001	112	112	0	0	0
2000	61	59	2	0	0

Located on the web at http://www.epa.gov/air/data/index.html

The Class 1 Airsheds within 50 miles radius of the project area are the Bob Marshall, Scapegoat, Mission Mountain, Selway Bitterroot Wilderness areas and the Flathead Reservation that could be affected by the proposed project during periods of atmospheric stability. A requirement of Prevention of Significant Deterioration (PSD) in Class I areas is that new stationary sources must have a PSD permit. A stationary source is a source of pollution that is well-defined, such as a smokestack. The Jocko Lake Fire Salvage project is not considered a major stationary source and therefore is not subject to the PSD permitting requirement.

Visibility at Class I Areas

The Clean Air Act establishes as a national goal "the prevention of any future, and the remedying of any existing impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution" (42 U.S.C. §7491 et seq.).

Visibility impairment is a basic indicator of air pollution. The EPA has determined that regional variation in visibility needs to be addressed. As a result, the EPA promulgated Regional Haze Regulations for Protection of Visibility in National Parks and Wilderness Areas in 1997. These regulations are intended to improve visibility, or visual air quality, in more than 150 Class I Areas across the country. The Regional Haze regulations apply to all States, including those States that do not have any Class I areas. Pollution that occurs in those states may or may not contribute to impairment in other states or Class I areas, but must be accounted for.

The Regional Haze regulations propose "presumptive reasonable progress targets" for improving visibility in each Class I area. The progress targets are described in terms of deciviews, a measure for describing perceived changes in visibility. For example, a deciview of zero represents pristine conditions. For most views in Class I areas the average person considers a change of one deciview perceptible.

Montana will consider emissions from prescribed fire and wildland fire use as they evaluate progress toward the national visibility goal.

Nonattainment Areas

If a community does not "attain" the NAAQS for one or more pollutants, the EPA will designate it a "non-attainment area." States must demonstrate to the public and the EPA how a non-attainment area will meet the NAAQS, based upon the control of emission sources. Such demonstrations employ control plans that are part of each State Implementation Plan (SIP), including emissions from prescribed fire. The project lies in the northern part of Missoula County

and adjacent to Powell County. Portions of Missoula County are designated as non-attainment for PM 10. (U.S. EPA: Criteria Pollutant Area Summary Report (Green Book). On line at http://www.epa.gov/air/data/index.html).

Smoke-sensitive Areas

Table 3 displays a general list of sensitive receptors that could be impacted by smoke out to 50 miles of the project area. A mapped overview of the potential impact area and dominate wind direction during burning months can also be viewed in Appendix B.

Table 3. Summary of sensitive receptors adjacent to or near the project area

Sensitive Receptors	Direction to Location of Potential Receptor	Approximate Distance (miles) From Project Area to Potential Receptor
Seeley Lake Community	NE	<5 miles
Ovando Community	E	23 miles
Arlee Community	W	25 miles
Missoula City/Community	SW	25 miles
French Town Community	W	25 miles
Saint Lgnatius Community	NW	28 miles
Condon Community	NW	30 miles
Charlo Community	NW	35 miles
Lolo Community	SW	35 miles
Huson Community	W	35 miles
Alberton Community	W	38 miles
Ronan Community	NW	38 miles
Dixon Community	NW	38 miles
Drummond Community	SE	38 miles
Florence Community	SW	40 miles
Pablo Community	NW	42 miles
Lincoln Community	E	45 miles
Polson Community	NW	48 miles
Stevensville Community	SW	48 miles
Missoula Impact Zone	SW	10 miles
Flathead Reservation (Class-1)	W	<1 mile
Bob Marshall Wilderness (Class 1)	N	15 miles
Scape Goat Wilderness (Class 1)	NE	25 miles
Mission Mountain Wilderness (Class 1)	NW	15 miles
Selway Bitterroot Wilderness (Class 1)	SW	40 miles
Rattlesnake Wilderness (Class 2)	SW	8 miles
Welcome Creek Wilderness (Class 2)	S	33 miles
State Highway 83	E	8 miles
State Highway 200	S	15 miles
US Highway 93	W	22 miles
Interstate Highway 90	S	22 miles

Monitoring

The majority of the legal entities in Montana and Idaho (including the Forest Service) which create particulates as a result of their burning activities have formed the Montana/Idaho State Airshed Group. Through a Memorandum of Understanding, this group has established a smoke coordination system that provides air quality predictions /restrictions to its members. In Montana, the MTDEQ issues an annual burn permit to the Forest Service. Issuance of this permit is based on participation and compliance with burning restrictions set by the Montana/Idaho Airshed Group.

All prescribed burning implemented within the analysis area will comply with the State Requirements of the State Implementation Plan and the Smoke Management Plan (USFS 1987a, p. II-26). Prescribed burning is reported to the Airshed Coordinator on a daily basis. If ventilation problems are forecast by the monitoring unit, prescribed burning is either restricted by elevation or curtailed until good ventilation exists (Dzomba 2005)

Fugitive Dust from Vehicle Traffic on Unpaved Roads

There are several forest system dirt roads within the project area. Fugitive road dust is a result of motorized vehicle use when road surfaces are dry. When a motorized vehicle travels on an unpaved road, the force of the wheels moving across the road surface causes pulverization of surface material. Dust is lofted by the rolling wheels as well as by the turbulence caused by the vehicle itself. This air turbulence can persist for a period of time after the vehicle passes. The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. Variables that influence the amount of dust produced include the average vehicle speed, the average vehicle weight, the average number of wheels per vehicle, the road surface texture, the fraction of road surface material which is classified as silt and the moisture content of the road surface. The moisture content of the road surface has the greatest influence on the amount of fugitive dust produced. Within the project area, unpaved roads are generally closed during the winter months from snow or for wildlife habitat security. July, August and September are generally dry so most dust production would occur during this period. Precipitation during these months is usually limited, so it would only reduce dust production for short periods.

Wildfire

Wildfires in the project area have occurred over the past century. Fire has been more frequent during the past 10 years with 4 major fires occurring, one of which stared in the Flathead and moved on to the Lolo. The Jocko Lakes Fire in 2007 generated considerable smoke. Regional wildfire smoke has accumulated within the area during periods of extensive wildfire activity in 1988, 1994, and 2000 and 2007. The prime source of wildfire emissions is from central and northern Idaho, and western Montana.

Pollutants

Airsheds can include both attainment and non-attainment areas, designations EPA uses to describe the air quality in a given area for any of six common pollutants known as criteria pollutants. The six pollutants are ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide and lead.

The main pollutants monitored for prescribed fire emissions are particulate matter. Fine particles are those less than 2.5 micrometers in diameter and are also referred to as PM2.5 (Environmental

Protection Agency Website; www.epa.gov/pmdesignations). Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs (Environmental Protection Agency Website; www.epa.gov/pmdesignations)

.The fine particles have been associated with premature mortality and other serious health effects. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes.

Particles less than 10 micrometers in diameter (PM10) pose a health concern because they can be inhaled and accumulate in the respiratory system. Particles with diameters between 2.5 and 10 micrometers are referred to as "coarse." Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Other particles may be formed in the air from the chemical change of gases. They are indirectly formed when gases from burning fuels react with sunlight and water vapor. These can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes. (Environmental Protection Agency Website; www.epa.gov/pmdesignations)

PM 2.5 is the particulate level that will have the most significant impact on the area and people surrounding the project area and is the focus of the assessment.

Desired Condition

Regulatory Frame Work

Federal Clean Air Act

Congress passed the Clean Air Act (CAA) in 1963, and amended it in 1970, 1977, and 1990. The purpose of the act is to protect and enhance air quality while ensuring the protection of public health and welfare. The 1970 amendments established National Ambient Air Quality Standards (NAAQS), which must be met by most state and federal agencies, including the Forest Service.

States are given the primary responsibility for air quality management. The Clean Air Act requires States to develop State Implementation Plans (SIP) that identify how the State will attain and maintain NAAQS. The Montana Clean Air Act promulgates the SIP and created the Montana Air Quality Bureau (now under the Department of Environmental Quality). The Clean Air Act also allows States, and some counties, to adopt unique permitting procedures and to apply more stringent standards. Montana MDEQ are advisors to the Idaho/Montana Airshed Group (which is comprised of the State and Federal resource management agencies and private companies with a history of prescribed fire use) to regulate smoke emissions through a burn approval process and monitoring program. MTDEQ retains the authority to recommend go/no go decisions for burning in the Fall. In the Spring, this is done by the Airshed Group Smoke Coordinator. The Clean Air Act requires that Forest Service actions have “no adverse effect” on air resources by meeting the NAAQS and non-degradation standards for Class I Areas. Managers are further directed to improve substandard existing conditions and reverse negative trends where practicable (e.g. Missoula is a “non-attainment” zone in need of improvement). All Prescribed Fire Burn plans will address mitigation measures to minimize smoke impacts and comply with the Clean Air Act. Table 4 shows the NAAQ standards for particle pollution set by the Clean Air Act for PM10 and PM2.5.

Table 4. NAAQS standards for particle pollution set by the Clean Air Act

National Ambient Air Quality Standards for Particle Pollution			
Pollutant	Primary Standards	Averaging Times	Secondary Standards
Particulate Matter (PM10)	150 µg/m3	24-hour[a]	
Particulate Matter (PM2.5)	15.0 µg/m3	Annual[b] (Arith. Mean)	Same as Primary
	35 µg/m3	24-hour[c]	

See the complete table of National Ambient Air Quality Standards at http://www.epa.gov/air/criteria.html)
Units of measure for the standards are micrograms per cubic meter of air (µg/m3).
Footnotes:
a - Not to be exceeded more than once per year on average over 3 years.
b - To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
c- To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

The Jocko Lake Fire Salvage project is designed to meet the goals, objectives and standards set forth by this law and the following local regulatory framework.

Regional Haze Rule (1990 Clean Air Act Amendments), 40 CFR Part 5)

In 1999, EPA promulgated the Regional Haze Rule (40 CFR 51.308-309), which calls for states to establish goals for improving visibility in mandatory class I areas and to develop long-term strategies for reducing the emissions of air pollutants that cause visibility impairment. The Regional Haze Rule also requires states to address visibility impairment in mandatory class I areas due to emissions from fire activities. The Preamble to the Rule emphasizes the "implementation of smoke management programs to minimize effects of all fire activities on visibility." The Rule requires states to address visibility effects from all fire sources contributing to visibility impairment in mandatory class I areas (Dzomba 2005). Montana is developing their Regional Haze State Implementation Plan; the Forest Service will help with the fire emissions portion.

Visibility impairment is a basic indicator of air pollution concentrations and was recognized as a major air quality concern in the Clean Air Act Amendments of 1977. Visibility variation occurs as a result of the scattering and absorption of light by particles and gases in the atmosphere.

EPA's 1980 visibility rules (40 CFR 51.301-307) were developed to protect mandatory Class I areas from human-caused impairments reasonably attributable to a single or small group of sources. In 1999, EPA promulgated the Regional Haze Rule (40 CFR 51.308-309), which calls for states to establish goals for improving visibility in mandatory Class I areas and to develop long-term strategies for reducing the emissions of air pollutants that cause visibility impairment.

EPA is developing a Federal Implementation Plan for the State of Montana.

Interim Air Quality Policy on Wildland and Prescribed Fires

The Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998). The Interim Policy suggests that air quality and visibility impact evaluations of fire activities on Federal lands should consider several different items during planning (EPA 1998). In a project level NEPA document, it is appropriate to consider and address to the extent practical, a description of applicable regulations, plans, or policies, identification of sensitive areas (receptors), and the potential for smoke intrusions in those sensitive areas. Other important disclosure items include applicable smoke management techniques, participation in a basic smoke management program, and potential for emission reductions. Typically ambient air quality, visibility monitoring, and

cumulative impacts of fires on regional and subregional air quality are not explained to the same level of detail. Ambient air quality and visibility monitoring (for class I areas) are typically done collaboratively with the states. Impacts to regional and subregional air are addressed operationally through a coordinated smoke management program. The EPA urges states to develop, implement, and certify smoke management programs that meet the recommended requirements of the Interim Policy. If a "certified" program is in place and smoke exceeds the particulate standard, it may not be considered a violation by EPA (Dzomba 2005). This project meets the intent of the Interim Policy through the NEPA analysis process and the practices of the Montana / Idaho Airshed Group.

The State of Montana has an EPA-certified state smoke management program.

General Conformity Rule

General Conformity Rule (1990 Clean Air Act Amendments) (Section 176 (c) of the Clean Air Act (part 51, subpart W, and part 93, subpart B.)

The General Conformity Rule implements the Clean Air Act (CAA) conformity provision, which mandates that the federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved CAA implementation plan. This project conforms to the CAA.

State Guidance

The MDEQ oversees the airshed programs that are implemented by the Montana and Idaho Airshed Group. All prescribed fire proposed in Montana is reviewed and coordinated through the Airshed Group which accepts or rejects prescribed fires based on numbers of proposed prescribed fires and local predicted weather forecasts. Burners implement Best Available Control Technologies (BACT) on each prescribed fire as required in the annual smoke permit from MDEQ. BACT means those techniques and methods of controlling emission of pollutants from an existing or proposed open burning source to limit emissions to the maximum degree that MDEQ determines, on a case-by-case basis, is achievable for that source, MDEQ takes into account impacts on energy use, the environment, and the economy, and any other costs, including the cost to the source.

Such techniques and methods may include the following:

a) Scheduling of burning during periods and seasons of good ventilation;

b) Applying dispersion forecasts;

c) Utilizing predictive modeling results performed by and available from MDEQ to minimize smoke impacts;

d) Limiting the amount of burning to be performed during any one time:

e) Using ignition and burning techniques which minimize smoke production;

f) Selecting fuel preparation methods that will minimize dirt and moisture content;

g) Promoting fuel configurations which create adequate air-to-fuel ratio;

h) Prioritizing burns as to air quality impact and assigning control techniques accordingly;

i) Promoting alternative treatments and uses of materials to be burned; and.

j) Selecting sites that will minimize smoke impacts.

Guidance can be found on line at:
http://www.fs.fed.us/r1/fire/nrcc/smoke_web_pages/OpGuide.pdf

Forest Plan

Forest Wide Management Direction (Lolo Forest Plan p II-17)

- Air quality will be maintained at a level that is adequate for the protection and use of National Forest System Lands and that meets or exceeds Federal and State standards. Prescribed fire objectives for smoke management will be met within the constraints established by Montana State Airshed Group's Memorandum of Understanding.

Management Area Direction (Lolo Forest Plan p III-48)

MA-12 Bob Marshall/Great Bear/Scapegoate Wilderness Complex

- Manage the airshed in the Bob Marshall and Scapegoat to meet Class I Air Quality Standard and Class II in the Great Bear and the Bob Marshall addition in the Lewis and Clark National Forest.
- Where manageable or negotiable, identify and mitigate outside influences. The air quality related values will be identified when a PSD (Prevention of Significant Deterioration) action that may impact the wilderness is received.

Environmental Consequences

Methodology

Measurement indicators are estimations for 24-hour maximum downwind smoke emissions measured in PM 2.5 (ug/m^3).

- Effect on the Class 1 Airshed as measured in upwind concentrations of PM 2.5 (ug/m^3).

Smoke Impact Spreadsheet (SIS)

The Smoke Impact Spreadsheet (SIS) is a planning model for estimating potential particulate matter (PM) emissions and concentrations down wind of wildland fires (Air Sciences 2003). SIS conservatively predicts (that is, estimates higher than actual) downwind PM concentrations for comparison with appropriate Federal or State air quality standards. Embedded in SIS is an emissions module that calculates emissions for broadcast burns and wildfires using the First Order Fire Effects Model (FOFEM 5.0, Reinhardt et al. 1997), and for pile burns using the CONSUME 2.1 (Prichard et al. no date) pile wizard. Also, a dispersion module is incorporated into the spreadsheet that calculates down wind concentrations using the CALPUFF dispersion model.

Primary Use in Analysis

SIS was used to assess the longevity of exposure to PM 2.5 concentrations over time for pile burning activities and to determine the potential to exceed Environmental Protection Agency and the Montana Department of Environmental Quality PM 2.5 standards set by the Clean Air Act and NAAQS.

Inputs for the SIS model were identified and sorted by NFDRS fuel model, forest cover types, and treatment types. There was one run performed for the largest acreage in each group, accounting for the largest potential smoke output for each modeling group. The modeling inputs (e.g. time of year, time between pile ignitions).

Core Assumptions

The process used to determine the burn input spread sheet was:

- Primary species contained within piles to be burned: Estimate Douglas fir 70% and Lodgepole Pine 30%.
- Assume about 10 landing piles or 37 corridor piles would be burned in any one day.

The SIS model predicts 1-hour and 24-hour average PM 2.5 concentrations, models impacts for daytime and night time meteorological conditions, and incorporates a simplified terrain profile.

Known Limitations

SIS is not an operational tool for making go / no-go decisions for prescribed burns. It was developed to assist land managers to make informed planning using the best available science. SIS was developed as a simple model for fire and air practitioners and does not consider use of actual weather records or three-dimensional terrain data. SIS inputs include:

- For pile burns – pile shape, dimensions, packing ratio, fuel type for pile burns, and number of piles per burning period.

- For meteorology – burn date, latitude, 10-meter wind speed (mph), wind direction offset (degrees), maximum temperature, Pasquill-Gifford stability class.

- For terrain – maximum distance, average elevation of burn, terrain profile.

Anticipated Consequences of Limitations

The intended use of the SIS model in this project analysis is to provide worst case scenarios of smoke impacts based upon the most likely time of year for treatments to occur. Because model inputs are constants and there is no avenue to incorporate variability due to landscape, weather, or human factors, and the model will not precisely determine the exact amount of smoke release from a burned unit. The possibility of increased smoke production, duration of smoke release, or smoke retention from a burned unit exists due to potential for multiple day burns; warmer, drier, or windier conditions than expected; unpredicted stable air masses settling over the burn area; or the potential for escaped fires.

Spatial and Temporal Context for Effects Analysis

The effects area for the air quality analysis has varying scales. When looking at the smoke sensitive areas for effects, a maximum perimeter distance of 50 miles was considered. This boundary was chosen, because the smoke sensitive sites that we are concerned about can be some distance from the burn area. The time span of 1-2 days was chosen because unlike most industrial and urban sources, smoke from prescribed burning or wildland fire is usually transitory in nature, lasting only one or two days at a single location.

Dust can also travel great distances. The risk to health and safety is concentrated along the road where it is being produced. Applying mitigation measures to reduce dust will make the potential to exceed Federal Ambient Air Quality Standards negligible for this project

Alternative 5 – No Action

Direct and Indirect Effects

No prescribed burning would occur under Alternative 5. Fuels from fire-killed trees would fall over time and remain on site until natural decomposition takes place or another wildfire occurs in the project area. Impacts from dust, vehicle emissions, and other sources would not change from current conditions.

This alternative would have no immediate direct adverse effects on air quality. If a wildfire were to occur, the potential indirect effects include degraded air quality and reduced visibility. Existing and continued mortality and fuel accumulations would contribute to increased fire intensities and severities. Consumption of the increased fuel loads and understory biomass would increase the amount of smoke emissions. In fact, emissions from wildfire are typically twice those of a prescribed fire on the same acreage due to greater emission factor (Ottmar 2001), fuel consumption, and fire intensity. These emissions would also occur over a period of a few days to several weeks as opposed to intermittent days over several years for a prescribed fire project

Cumulative Effects

There would be no cumulative effects to air quality caused by management activities under Alternative 5 since no new burning activities would be proposed and effects to air quality are usually episodic and of short duration. A large wildfire in the area can not be predicted so it

would not be reasonably foreseeable. Fire suppression will continue to occur under both alternatives.

If a wildfire occurred, there is a potential for the NAAQS to be exceeded depending on the size and duration of the wildfire. If a large wildfire were to occur, the Forest Service and the State of Montana Air Quality Bureau could, depending on the specific situation, restrict all regulated burning. However, effects of smoke from a large wildfire could become cumulative with present and foreseeable activities or combined with unregulated pollutants in the area, such as dust from roads.

Alternative 3 – Modified Proposed Action

Under this alternative, two categories of activities may contribute to air quality impacts if implemented. Both categories of activities would result in temporary, transient impacts to local, and possibly regional, air quality. The first involves dust from ground disturbances that may be associated with thinning, chipping and removal activities. The second activity is from prescribed pile burning. The only burning proposed under this Alternative is to burn residual slash piles at landing sites and slash piles generated at the head of skyline corridors. It is estimated that there will be approximately 100 landing piles and approximately 37 corridor slash piles.

Burning of landings and piles will occur during late fall or early winter[1] after a unit has been salvaged. Pile burning (particularly landing pile burning) typically occurs after an area has received significant rain or snow to prevent the pile from spreading and reduce the risk of escape. Burning will occur over the life cycle of the project estimated at 5-10 years and as units are completed. Mitigations will include limiting the number of piles ignited per day to 10 for landings and 37 for corridor slash piles to assure air quality standards are met; and halting all pile burning if, through cumulative effects of other contributors, air quality standards are exceeded.

Direct and Indirect Effects

Alternative 3 would have a direct, short-term impact on air quality in the project area. Management activities under this Alternative would likely cause direct short-term impacts from dust. Specifically these activities involve chipping, chewing and grinding of dead vegetation, loading and processing activities at landing sites and truck transportation of material. These activities are not anticipated to result in significant impacts to regional air quality because of the transitory nature of fugitive dust and because mitigation measures such as road watering would be applied during hauling activities.

Table 5 depicts the modeled maximum PM 2.5 concentrations emitted from prescribed pile burning in the project area. Results indicate the 24-hour maximum PM 2.5 value will be below the federal 35 μg/m3 threshold within 0.1 mile downwind of the project area. Modeling indicates the PM 2.5 concentrations drop off significantly after 0.1 mile and do not exceed the threshold in any case. When these units are burned, Best Available Control Technologies (BACT) will be used by the burner to mitigate potential smoke impacts to the airshed as described above. Generally, impacts will be minimal and will be confined to the project area

The east boundary of the Flathead reservation is located within one tenth mile of the proposed burning activities. Modeling shows there would be no significant impacts to this or any other Class 1 airshed resulting from this project and will be confined to the project area.

[1] Special permission is needed from Montana DEQ if any burning is to occur between December 1 and March 1. This time period is not coordinated through the MT/ID Airshed Group.

Table 5. Modeled pm 2.5 concentrations from proposed burning

Burn Type	Modeled Unit Acres	Cover Type	Considerations	24-hr max PM 2.5 (µg/m3) 0.1 mi downwind from unit (with mitigations)
Landing Piles	100 piles	Doug Fir/ Lodge Pole Pine	Assume maximum ignition of 10 Landings per day	32.8
Corridor Piles	37 piles	Doug Fir/ Lodge Pole Pine	Assume maximum ignition of 37 piles per day	32.8

Typical late fall early winter conditions are represented by November 15, 10 mph 20-foot wind speed, maximum temperature of 50 degrees F, 30% moisture content for 1000-hour fuels, and 75% moisture content for duff.

The action alternatives could produce some smoky days in the local area. Some smoke would be expected to settle into the lower draws and drainages during the evening hours following ignition. The dominate winds, when burning is planned, are generally from the south, southwest and southeast and therefore some possibility of transitory smoke in those directions is expected (Appendix B). This may also result in the form of nuisance smoke, smell or haze under the worst-case scenario.

Cumulative Effects

Cumulative effects on air quality of smoke from burning piles, produced as a result of the implementation of Alternative 2, would result in an incremental decrease in air quality as PM2.5 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. It is not possible to predict the amount of particulates contributed by these other sources.

There may be days when regional air quality does not meet the established standards but, because of the Montana/Idaho Smoke Monitoring Units effectiveness at limiting the amount of burning in any given day, there is reduced likelihood that any source associated with this project or any other present or reasonably foreseeable future burning project, would be a significant contributor. If these safeguards failed, and air quality does not meet the established standards the mitigations measures call for the secessions of all pile burning, so the duration of exceeding would be minimal. This would not be the case in a wildfire situation.

The cumulative effect on Class 1 Airsheds from the implementation of the proposed action and other present and reasonably foreseeable future actions is not known at this time. The production of air pollutants associated with the implementation of this project would vary over time and would not be continuous. Impacts would be intermittent in nature and the potential for occurrence would end when the implementation of this project is completed.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All prescribed burning would be implemented in full compliance with MDEQ air program with coordination through the Montana/Idaho Airshed Group. All action alternatives would meet

Forest Plan Standards for air quality by following coordination requirements. The project complies with the Federal Clean Air Act.

References

Clean Air Act, as amended in 1977 and 1990 CAA, as amended 1977 and 1990: http://www.epa.gov/

Dzomba, Thomas; Story, Mark. 2005. Smoke NEPA Guidance: Air Resource Smoke Impacts from Prescribed Fire on National Forests & Grasslands of Montana, Idaho, North Dakota, & South Dakota in Regions 1 & 4. November.

Environmental Protection Agency, Aerometric Information Retrieval System Data, Air Pollution Maps, Ready To View Maps, (Accessed June 15, 2007); http://www.epa.gov/air/data/geosel.html

Environmental Protection Agency, Transportation and Air Quality (Accessed May 9, 2008) http://www.epa.gov/otaq/ap42.htm#highway

Montana Department Of Environmental Quality (MDEQ) http://www.deq.mt.gov/AirQuality/AQinfo.asp

Ottmar, R.D. 2001. Smoke source characteristics. In: Hardy, C.C., R.D. Ottmar, J.L. Peterson, J.E. Core, P. Seamon, eds/comps. Smoke management guide for prescribed and wildland fire 2001 edition. National Wildfire Coordination Group; PMS 420-2, NFES 1279. December 2001. Chapter 5, pp 89-106. Available online at http://www.nwcg.gov/pms/pubs/SMG/SMG-72.pdf.

Ottmar, Roger D.; Alvarado, Ernesto; Hessburg Paul F. 1996. "Linking Recent Historical and Current Forest Vegetation Patterns to Smoke and Crown Fire in the Interior Columbia River Basin," Proceedings of 13th Conference on Fire and Forest Meteorology, Lorne, Australia, p 523-532.

Reinhardt, E.D., R.E. Keane, J.K. Brown, 1997. First order fire effects model, FOFEM Users guide. IMT-GTR-344. USFS Intermountain Station, Missoula, MT

Reinhardt et al. 2000, Smoke exposures among firefighters at prescribed burns in the Pacific Northwest Research Report PNW-RP-525. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.

Sandberg, David V.; Ottmar, Roger D; Peterson, Janice L.; Core, John. 2002. Wildland Fire On Ecosystems: Effects of Fire on Air. Gen. Tech. Rep. RMRS-GTR-42-vol. 5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 79 p.

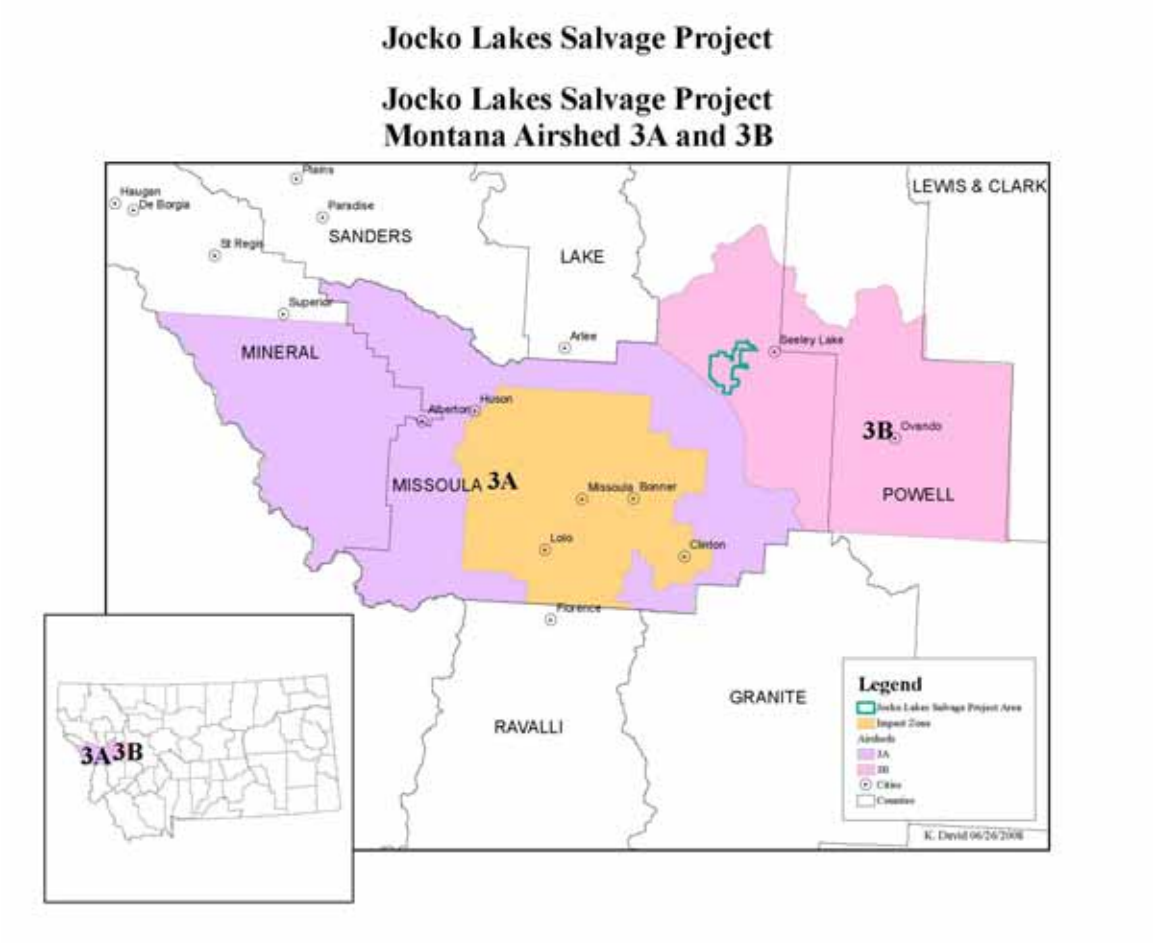
Schaaf, M., K. Norville, 2002. Users Guide Smoke Impact Spreadsheet (SIS). Air Sciences, Inc. Portland, OR.. http://frames.nbii.gov/metadata/tools/SIS.html

U.S. Environmental Protection Agency. 2004. AIR Data. http://www.epa.gov/air/data/geosel.html

U.S. Environmental Protection Agency (EPA). 1998. Interim air quality policy on wildfire and prescribed fires. Final report. U.S. Environmental Policy Agency.

U.S. Environmental Protection Agency. 1999. Regional Haze Regulations, Final Rule, 40 CFR Part 51.

Appendix A: Montana Airshed Map



Appendix B Smoke Vector and Receptor Map