Wildfire Adapted Missoula Project
Air Quality Report
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LEGAL FRAMEWORK

Federal Law

Clean Air Act

The basic framework for controlling air pollution in the United States is the 1963 Clean Air Act (CAA), as amended in 1970, 1977, and 1990 (42 U.S.C. §7401 et seq.). In 1999 minor changes were made to the CAA for visibility in sections 7491 and 7492. These changes were published on July 1, 1999, as the Regional Haze Rules (64 FR 35714). The CAA was designed to protect and enhance the quality of the Nation's air resources. The Act encourages reasonable Federal, State and local government actions for pollution prevention. State Implementation Plans (SIPs) are developed by each state to implement the provisions of the Clean Air Act. The SIPs describe the actions the State will take to achieve and maintain the "national ambient air quality standards" (NAAQS).

National Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has established NAAQS for six criteria pollutants that have been determined to be harmful to public and the environment. The primary standard is intended to protect human health. Montana's largest air pollution problem is particulate matter (Hammer 2000). Particulate is a term used to describe dispersed airborne solid and liquid particles that will remain in atmospheric suspension from a few seconds to several months. Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), or less than 10 microns in diameter (PM_{10}) describes particles small enough to enter the human respiratory system. Combustion processes produce ultra-fine particles which are primarily $PM_{2.5}$. $PM_{2.5}$ is the principal cause of haze since it seldom settles and is usually removed from the air by rain. PM_{10} settles in hours and is often pollen and spores with some dust. Most geological dust is larger than PM_{10}. Federal and State Air Quality Standards are listed below in Table 1.

Table 1 Federal & State Air Quality Standards

FEDERAL & STATE AIR QUALITY STANDARDS				
Pollutant	**Time Period**	**Federal NAAQS**	**Montana (MAAQS)**	**Standard Type**
Carbon Monoxide	Hourly average	35 ppm[1]	23 ppm[b]	Primary
	8-hour average	9 ppm[1]	9 ppm[b]	Primary
Lead	90-day average	----	1.5 µg/m^{2}[c]	---
	Quarterly average	1.5 ppm[3d]	----	Prim. & Sec.
Nitrogen Dioxide	Hourly average	100 ppb[m]	0.30 ppm[b]	Primary
	Annual average	53 ppb[3d]	0.05 ppm[e]	Prim. & Sec.
Ozone	Hourly average	0.12 ppm[f]	0.10 ppm[b]	Prim. & Sec.
	Annual average	0.08 ppm[g]	----	Prim. & Sec.
PM-10	24-hour average	150 µg/m^{3}[k]	150 µg/m^{2}[k]	Prim. & Sec.

FEDERAL & STATE AIR QUALITY STANDARDS				
Pollutant	**Time Period**	**Federal NAAQS**	**Montana (MAAQS)**	**Standard Type**
PM-2.5	24-hour average	35 µg/m^{3m}	-----	Prim. & Sec.
	Annual average	12 µg/m^{3n}	-----	Primary
		15 µg/m^{3}	-----	Secondary
Settleable Particulate	30-day average	----	10 g/m^{2c}	---
Sulfur dioxide	Hourly average	0.75 ppm^{o}	0.50 ppm^{h}	----
	3-hour average	0.50 ppm^{a}	---	Secondary
	24-hour average	0.14 ppm^{a,i}	0.10 ppm^{b,j}	Primary
	Annual average	0.03 ppm^{d}	0.02 ppm^{e}	Primary
Visibility	Annual average	-----	3 x 10 $^{-5}$/m^{e}	----

Should an area not meet or "fail to attain" a particular NAAQS, then that area is designated nonattainment for that standard. The state must then demonstrate, in the form of a state implementation plan, how the area will meet the standard in the future.

For the Wildfire Adapted Missoula (WAM) project**,** the primary source of air emissions will be from prescribed fire smoke, thus the main NAAQS of concern will be particulate matter. The closest nonattainment/maintenance area for particulate matter is Missoula, MT, which is maintenance for PM_{10} and lies within the project boundary. Potential impacts to the Missoula maintenance area were considered in the development of this project. Figure 1 displays the annual average PM-2.5 data measured at the Missoula SLAMs monitor site located in Missoula, MT.

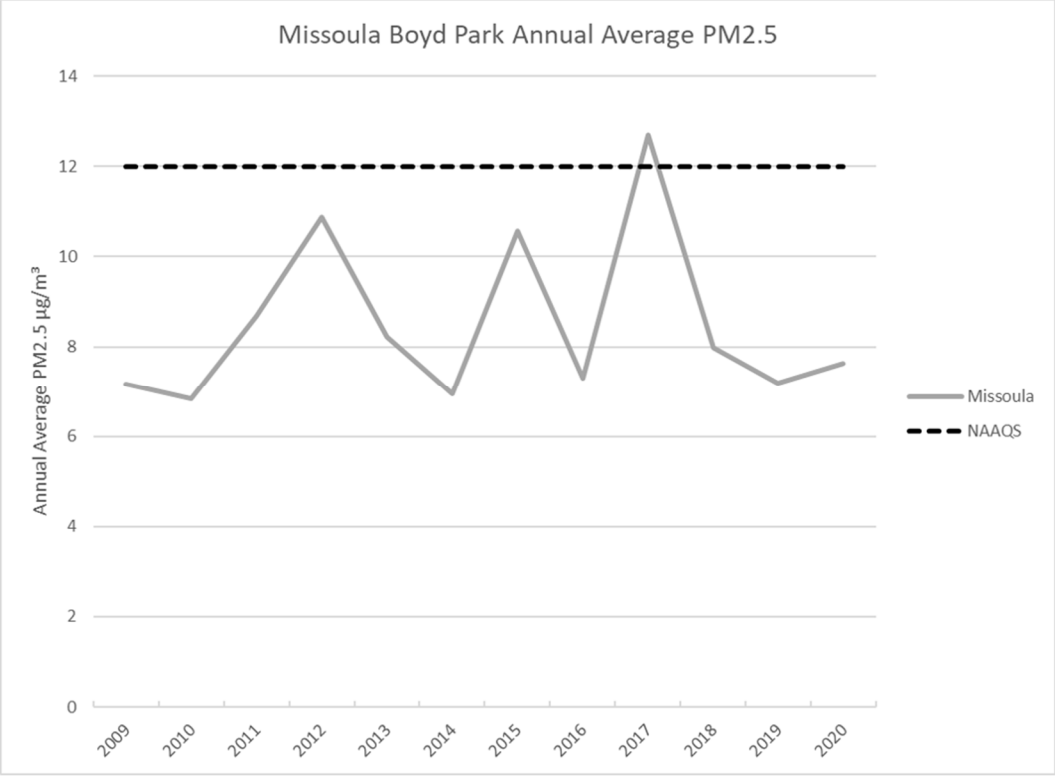

Figure 1 Missoula-Boyd Park Monitor Annual Average PM-2.5 2009-2020

Visibility Protection and Regional Haze

Within Class I areas, visibility is the air quality related value that is most affected by smoke from wildland fire. Particulates that remain suspended in the atmosphere are efficient light scatterers and therefore contribute to visibility impairment. Very small particles can travel great distances and contribute to regional haze problems. Cumulative particulate load may result from fire only or urban and industrial sources only, or it may be a combination of the two.

The closest Class I areas to the WAM project area are the Flathead Indian Reservation, with approximately 12,600 acres within the northern portion of the project area, and the Selway-Bitterroot Wilderness, which lies approximately one air mile to the south of the project. These areas were considered in the development of this project.

Conformity

The general conformity provisions of the CAA (Section 176 (c)), prohibit federal agencies from taking action within areas that are classified as non-attainment or maintenance that causes or contributes to a new violation of the standards, increases frequency or severity of an existing violation, or delays the timely attainment of a standard as defined in the area plan. The WAM project is not subject to a conformity analysis pursuant to 40 CFR § 93.153(c)(4), which states prescribed fire actions that comply with an approved land management plan and a certified state Smoke management Plan are presumed to comply.

Interim Air Quality Policy for Wildland and Prescribed Fire

EPA promulgated the Interim Air Quality Policy for Wildland and Prescribed Fire (the Policy) in 1998 in order to provide guidance to states and tribes on allowing prescribed fire as a land management tool while meeting air quality goals. The Policy offers incentives to states and tribes that develop a certified smoke management program should smoke from a prescribed fire cause an area to achieve non-attainment status.

In accordance with the Policy, the State of Montana has implemented a certified Smoke Management Program (SMP). This program includes regulations listed in Title 17, Chapter 8, Subchapter 6 of the Administrative Rules of Montana (ARM). In compliance with ARM 17.8.610, the Forest Service obtains a major open burning permit annually from the State and agrees to utilize Best Available Control Technology (BACT) (as defined in ARM 17.8.601(1)) and observe the provisions of the open burning permit. As part of the SMP, burns are coordinated through the MT/ID Airshed Group (www.smokemu.org). Member burners of the MT/ID Airshed Group submit burn requests to the Smoke Monitoring Unit which coordinates and approves prescribed burning activities in an agreement with Montana Department of Environmental Quality in a manner designed to meet ambient air quality standards and comply with BACT requirements.

As a member of the MT/ID Airshed Group, the Forest Service will submit all prescribed burn requests from the WAM project through the Smoke Monitoring Unit for approval in accordance with procedures outlined in the MT/ID Airshed Group Operating Guide. The Forest Service will operate underneath the permits defined by the Department of Environmental Quality and Missoula County Health Department, coordinate with Regional and Missoula County Smoke Coordinators, submit spot weather forecasts, and make appropriate public notifications.

STATE REGULATIONS

Prescribed burning activities are conducted in accordance with the open burning regulations as outlined in Title 17, Chapter 8, Subchapter 6 of the Administrative Rules of Montana (ARM). In compliance with

ARM 17.8.610, the Forest Service obtains a major open burning permit annually from the state and agrees to utilize Best Available Control Technology (as defined in ARM 17.8.601(1)) and observe the provisions of the open burning permit.

AFFECTED ENVIRONMENT

Table 2 displays the receptors identified within 65 miles of the center point of the WAM project. Beyond 50 miles, modeling tends to display good dispersion and minimal or no impacts to receptors.

Table 2 Sensititve Receptors and Direction from WAM project

City Name	County	Direction from Project
Missoula	*Missoula*	*Within project boundary*
Town Name	**County**	**Direction from Project Center**
Bearmouth	Granite	East
Drummond	Granite	East
Hall	Granite	East
Maxville	Granite	East
Philipsburg	Granite	East
Ravenna	Granite	East
Arlee	Lake	North
Charlo	Lake	North
Moiese	Lake	North
Pablo	Lake	North
Polson	Lake	North
Post Creek	Lake	North
Ravalli	Lake	North
Ronan	Lake	North
Saint Ignatius	Lake	North
Lincoln	Lewis and Clark	East
Alberton	Mineral	West
Lozeau	Mineral	West
Saint Regis	Mineral	West
Superior	Mineral	West
Tarkio	Mineral	West
Bonner	Missoula	East
Carlton	Missoula	South
Clinton	Missoula	East
Condon	Missoula	North
De Smet	Missoula	North
East Missoula	Missoula	East
Evaro	Missoula	North
Frenchtown	Missoula	West
Greenough	Missoula	East
Huson	Missoula	West
Lolo	Missoula	South
Lolo Hot Springs	Missoula	West

Piltzville	Missoula	East
Seeley Lake	Missoula	Northeast
Turah	Missoula	East
West Riverside	Missoula	East
Garrison	Powell	Southeast
Goldcreek	Powell	Southeast
Helmville	Powell	East
Ovando	Powell	East
Charlos Heights	Ravalli	South
Conner	Ravalli	South
Corvallis	Ravalli	South
Darby	Ravalli	South
Florence	Ravalli	South
Grantsdale	Ravalli	South
Hamilton	Ravalli	South
Pinesdale	Ravalli	South
Stevensville	Ravalli	South
Victor	Ravalli	South
Camas	Sanders	Northwest
Dixon	Sanders	Northwest
Hot Springs	Sanders	Northwest
Old Agency	Sanders	Northwest
Paradise	Sanders	Northwest
Perma	Sanders	Northwest
Plains	Sanders	Northwest

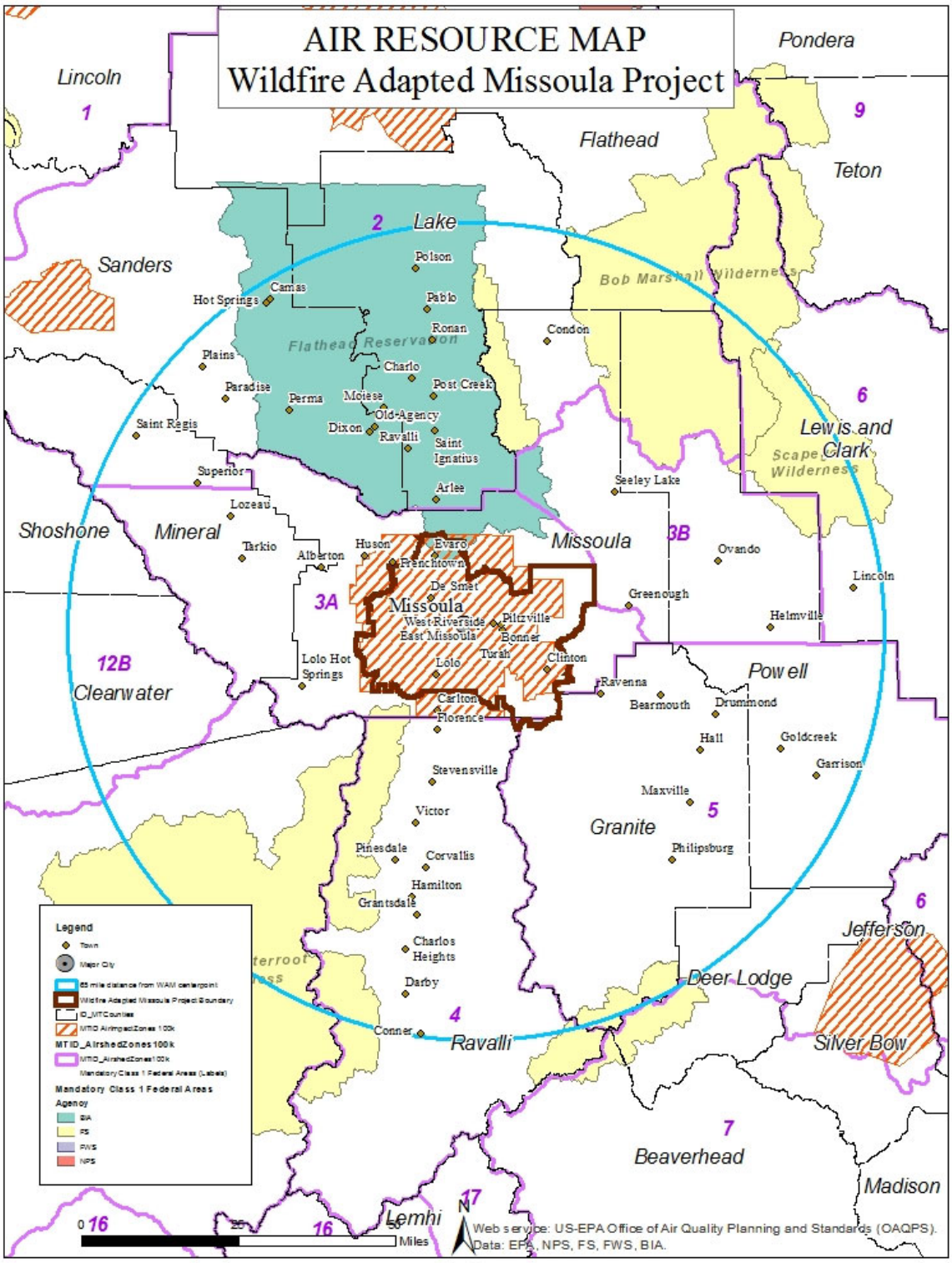

Figure 2 Air Resource Map for the WAM Project

DIRECT AND INDIRECT EFFECTS

The First Order Fire Effects Model (FOFEM) 6.7 models emission production, not visibility or dispersion. Categories of emissions estimated are PM2.5 (particulate matter less than 2.5 microns in diameter), PM10 (particulate matter less than 10 microns in diameter), and CO (carbon monoxide). The assumptions and methods used in FOFEM for modeling emissions were taken from Hardy and others (1996). Emissions production depends both on fuel consumption and on the combustion efficiency of the fire (Reinhardt et al. 2002). PM10 and PM2.5 production will be used as measures of impacts to air quality resources in the project area.

FOFEM was used to analyze wildfire smoke emissions in representative cover types under very dry summer conditions for current conditions, anticipated conditions with no treatments, and post-treatment conditions. This analysis assumes no treatment would be applied between the Alternative A current and anticipated condition. This analysis also assumes annual wildfire suppression would succeed in limiting fires' spread until a significant wildfire event. The current conditions reflect the following cover types: Interior Douglas-fir; grand fir, lodgepole pine and Interior ponderosa pine overstories with typical surface fuel loading. These cover type conditions reflect Douglas-fir, ponderosa pine and grand fir overstories with a high Douglas-fir/grand fir understory component. Lodgepole pine stand conditions would continue to see increased surface fuel loadings from past mountain pine beetle mortality. Treatments would remove much of the understory Douglas-fir and grand fir ladder fuel component. Post-prescribed fire conditions would include light litter and surface fuel loading along with reductions in Douglas-fir understory. FOFEM output values are not absolute but do indicate potential wildfire smoke emission trends between Alternative A (No Action) and Alternative B (Modified Proposed Action) (Table 3).

Table 3 FOFEM Outputs Wildfire Emissions

SAF Cover Type	Alternative					
	Alt. A Potential PM10 Emissions from Wildfire in Current Condition (lbs/acre)	**Alt. A Potential PM10 Emissions from Wildfire in Anticipated Condition No Treatment (lbs/acre)**	**Result of Alt. B Potential PM10 Emissions from Wildfire Post Treatment (lbs/acre)**	**Alt. A Potential PM2.5 Emissions from Wildfire in Current Condition (lbs/acre)**	**Alt. A Potential PM2.5 Emissions from Wildfire in Anticipated Condition No Treatment (lbs/acre)**	**Result of Alt. B Potential PM2.5 Emissions from Wildfire Post Treatment (lbs/acre)**
SAF 210 - Interior Douglas-fir	669	1,172	312	567	993	264
SAF 237 - Interior ponderosa pine	372	664	164	314	563	139
SAF 213 - grand fir	1,651	2,905	752	1,399	2,461	638
SAF 218 – lodgepole pine	1,140	2,166	491	966	1,835	417
Totals	3,832	6,907	1,719	3,246	5,852	1,458

Alternative A: No Action

Under the No Action Alternative there would be an increasing potential for wildfire emissions as the current condition progresses toward higher fuels loads. In the short term, the air quality impacts from the No Action Alternative would be less than Alternative B since the proposed prescribed burning would not occur. However, in the long term, the No Action Alternative would not allow for the opportunity to reduce the potential of wildfire ignition in the treatment areas. Wildfires have the potential to result in extensive smoke and air quality impacts from $PM_{2.5}$ and PM_{10} emissions. Alternative A would forgo the opportunity to reduce the likelihood of intensive short-term air quality impacts that result from a wildfire.

Alternative B: Modified Proposed Action

Direct effects from the proposed action include $PM_{2.5}$ and PM_{10} emissions from underburning and pile burning activities. Potential air quality impacts from the WAM were calculated for $PM_{2.5}$ and PM_{10} levels using FOFEM 6.7. The FOFEM model was used to analyze prescribed fire emissions in the same representative cover types under very dry spring conditions using a slash fuel bed to simulate the mid-

treatment activity surface fuels (Table 4). FOFEM output values are not absolute but do indicate potential smoke emission trends between Alternative A (No Action) and Alternative B (Modified Proposed Action).

Table 4 FOFEM outputs Prescribed Burning Emissions

	Alt. B Potential PM10 Emissions from Prescribed Burning (lbs/acre)	**Alt. B Potential PM2.5 Emissions from Prescribed Burning (lbs/acre)**
SAF 210 - Interior Douglas-fir	1,423	1,206
SAF 237 - Interior ponderosa pine	814	690
SAF 213 - grand fir	2,549	2,161
SAF 218 – lodgepole pine	1,826	1,548
Totals	6,612	5,605

Alternative B would reduce fuel continuity and arrangement over the area to a varying degree. FOFEM output values indicate a trend in reducing potential wildfire smoke emissions under post-treatment conditions for both $PM_{2.5}$ and PM_{10} emissions. Once all treatments are completed within the action alternative, emissions would be reduced in the event of a wildfire. Results suggest a 55 percent reduction in wildfire emissions under current conditions and a 75 percent reduction under no-treatment anticipated conditions across the SAF cover types. Under the same scenario PM_{10} emissions would be reduced similarly at approximately 55 percent and 75 percent (Table 3).

Model results (Table 3 and Table 4) reflect that emissions would be created during prescribed burning activities and wildfires. In the event of a wildfire, post-treatment, resultant stand conditions from Alternative B show that the level of $PM_{2.5}$ and PM_{10} emissions in lbs./acre are less than what is displayed from a severe wildfire event in Alternative A (No Action).

LITERATURE CITED

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