3.5. AIR QUALITY

SCOPE OF THE ANALYSIS

The area potentially affected by smoke emissions includes the project area and the airsheds that immediately surround it. The project area is located in Idaho Airshed No. 13. Refer to map below for location of Airshed.

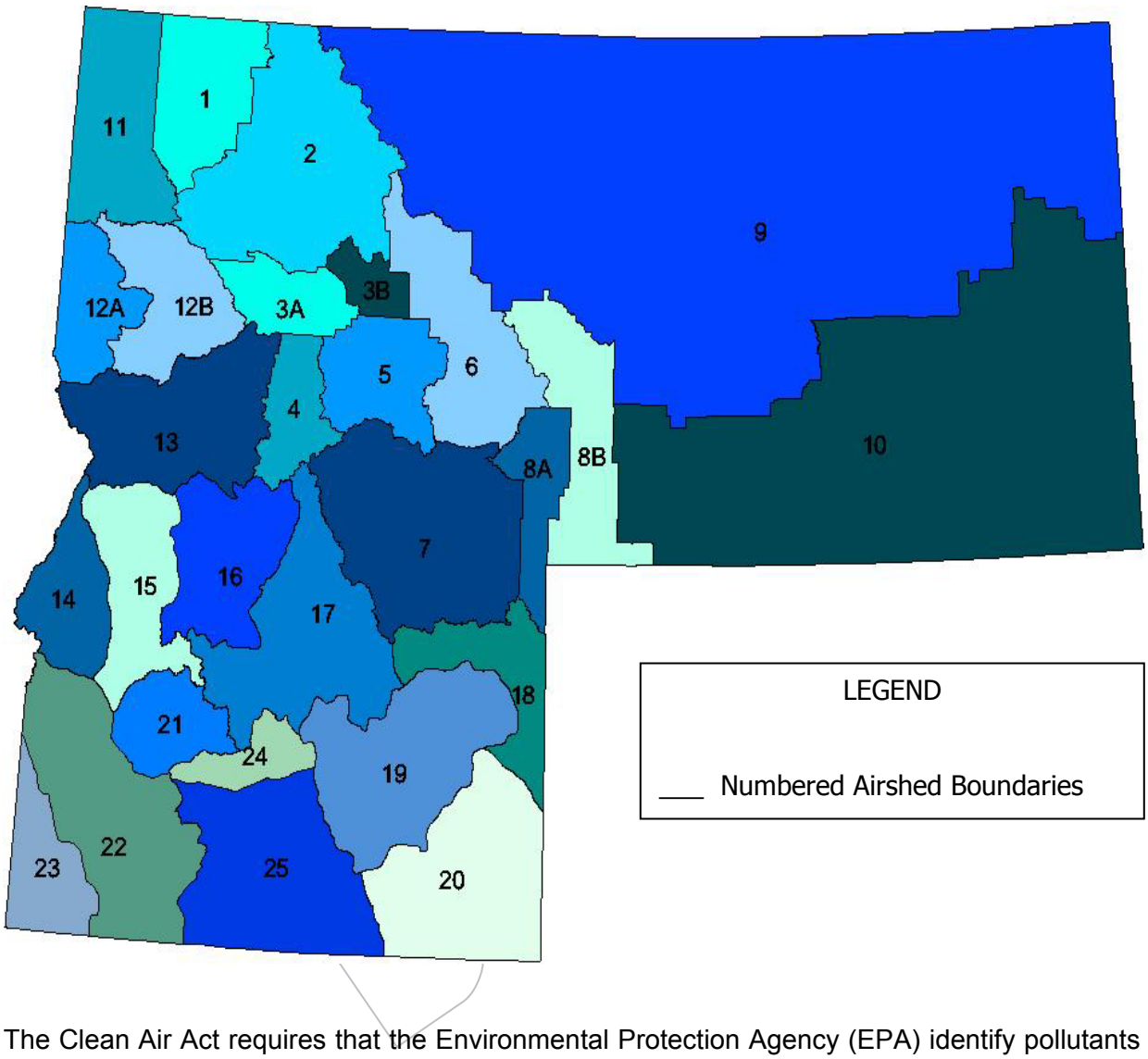
The analysis of air quality includes identifying the adjacent and down wind airsheds of concern (Class I and non-attainment areas) and comparing the amounts of smoke and particulate matter to be produced as a result of the fuels treatment activities associated with each alternative. The analysis includes discussion of the consequences of wildfire in regards to air quality.

REGULATORY FRAMEWORK

The Clean Air Act, passed in 1963 by the US Congress and amended several times, is the primary legal instrument for air resource management. The Clean Air Act amendments of 1977 set up a process that included designation of Class I and II areas for air quality management. The primary differences between Class I and II areas are in the protection and processes provided in the 1977 amendments. Class I areas receive the highest levels of protection under the Prevention of Significant Deterioration (PSD) program. This program regulates air quality in these areas through application of numerical criteria for specific pollutants and use of the Best Available Control Technology (BACT).

IDAHO-MONTANA AIRSHEDS

Taken from Idaho-Montana Airshed Group



The Clean Air Act requires that the Environmental Protection Agency (EPA) identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. Each state is also required to develop an implementation plan to maintain air quality. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead and particulate matter 10 microns in diameter or smaller (PM 10) and 2.5 microns and smaller (PM 2.5).

Idaho has similar standards for these pollutants. In general, concentrations of PM 10 greater than 150 micrograms per cubic meter for longer than 24 hours, or greater than 50 micrograms per cubic meter as an annual arithmetic mean, is considered a hazard to public health and welfare. Similarly, concentrations of PM 2.5 greater than 65 micrograms per cubic meter for longer than 24 hours, or greater than 15 micrograms per cubic meter as an annual arithmetic mean, is considered a hazard to public health and welfare.

The Nez Perce National Forest Plan direction for air quality is to cooperate with the Idaho Department of Health and Welfare in the State Implementation Plan (SIP) and to meet the requirements of the SIP and State Smoke Management Plan (NPFP, Chapter II, Page 23).

The Nez Perce National Forest is a party to the North Idaho Smoke Management Memorandum of Agreement (MOA), which establishes procedures to regulate the amount of smoke produced by prescribed fire. This MOA is intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed fire to avoid adverse effects on air quality. This MOA can be found in the project file.

ANALYSIS METHODS

Particulate emissions production was calculated using the First Order Fire Effects Model (FOFEM). FOFEM predicts the quantity of natural or activity fuel consumed by prescribed fire and the resultant emissions. Fuel loadings are derived from forest cover type classifications as represented in the analysis area.

One major assumption made in FOFEM is that the entire area of concern experiences fire. For discontinuous burns, the results should be weighted by the percent of the area burned. For the purposes of this analysis, it is assumed that 60 percent of the acres to be treated mechanically or by fire would actually produce particulate emissions.

The assumptions and methods used in FOFEM for modeling emissions were taken from Hardy, et al. (1996). Emissions production depends both on fuel consumption and on the combustion efficiency of the fire. Therefore, it is important to note that emissions quantities are derived from tons of fuel consumed and not tons of fuel treated. FOFEM models emissions production, not visibility or dispersion. Categories of emissions estimated are PM 2.5 and PM 10. About 70 to 80 percent of PM 10 is actually in the PM 2.5 category. Idaho and Montana monitor for both categories, therefore the amount of both are modeled in this analysis.

A “Decision Analysis for Smoke Modeling” (Atcheson et al., pg. 19, 20) was used to select the level of modeling for this analysis. A threshold in this decision analysis for PM emissions is established at 100 tons/year. This threshold is based on the minimum increase required to establish the existence of a major source for non-compliance in PSD for downwind Class I areas or to exceed the NAAQS standards. Since none of the alternatives in the analysis area approaches or exceeds 100 tons/year based on 10 year implementation, no further analysis is required.

THE MODEL INPUT PARAMETERS AND THE OUTPUT VALUES AS WELL AS THE EMISSIONS WORKSHEETS CAN BE FOUND IN THE PROJECT FILE.

EXISTING CONDITION

PARTICULATE MATTER AND VISIBILITY

Air quality associated with the American and Crooked River Project analysis area is generally considered good to excellent most of the year. Local adverse effects result from dust from native-surfaced roads and smoke from prescribed burning, agricultural burning, and wildfires.

Climatic conditions in this central Idaho area are governed by a combination of large-scale and small-scale factors. Among the large-scale factors are latitude, prevailing hemispheric wind patterns, and extensive mountain barriers to the east and west. Small-scale or local factors include the topographic setting and position (canyon, slope or ridge location), as well as vegetation cover (Oke 1978; Schroeder and Buck 1970). The average large-scale airflow is generally from a westerly direction throughout the year.

The pre-settlement natural range of variability for smoke probably ranged from very clear and clean in the non-fire months (November to May) to hazy and smoky for extended periods during the fire months (June to October). Current air quality during non-fire months is probably close to the natural range of variability, while during fire months it is probably outside the natural range (i.e. cleaner) because most wildfires in the area are suppressed, thus the amount of smoke has been reduced from historical averages.

The American and Crooked River Project analysis area is non-classified, but is considered to be in compliance with the NAAQS. The closest non-attainment areas include portions of Missoula County, Montana (approximately 100 air miles to the northeast), and Boise and Sandpoint, Idaho (approximately 200 air miles to the southwest and northwest, respectively).

The Selway-Bitterroot Wilderness, 8 air miles to the northeast, and the Hells Canyon National Recreation Area, 44 air miles to the southwest, are the closest Class I areas to the American and Crooked River Project analysis area. All other areas on the Nez Perce National Forest, including the American and Crooked River Project analysis area, are designated Class II areas.

ENVIRONMENTAL EFFECTS

PARTICULATE MATTER AND VISIBILITY

All action alternatives would require prescribed burning to reduce fuel loadings to an acceptable level. The resulting smoke would affect air quality. Fugitive dust generated from road related activities and increased vehicle traffic from logging operations would also temporarily affect air quality.

Three methods of prescribed burning would be used to accomplish fuel load reduction:

- Broadcast burning is usually used in clearcuts. Because combustion is efficient, a convection column forms which lifts most of the smoke above the mixing air layer.
- Underburning would be used for both natural and activity created fuels. The objective is to reduce fuel loading while protecting the residual overstory trees from damage due to heat and flames. Since the burning is deliberately cool and slow, combustion is likely to be inefficient. More particulate matter per acre of fire is often produced with this method of burning than with other methods.
- Machine pile burning would be used for activity created fuels. This type of burning concentrates slash in specific locations to eliminate the need to broadcast or underburn. Slash is gathered and piled mechanically throughout the unit or at the landing. Piles are burned after a season of curing when the fuel moistures are low resulting in efficient combustion, thus lessened particulate matter. This type of burning has less effect on air quality compared to underburning.

Particulate matter released into the air as a result of prescribed burning can have adverse effects on visibility and public health. The emission of particulate matter is related to the method of burning conducted, as shown above, and how much burning of each method is conducted. The concentrations of particulates at locations in the airshed is influenced by what other activities are going on in the airshed, and by current or changing climatic conditions. Potential concentrations in the airshed at any one time are regulated through compliance with the procedures of the North Idaho Smoke Management MOA as previously described.

The following discussion compares the direct and indirect effects of all the alternatives. A table displaying the PM 10 and PM 2.5 emissions expressed in tons/year by alternative is included at the end of the discussion.

ALTERNATIVE A – NO ACTION ALTERNATIVE

There would be no direct effects on the existing condition of air quality from this alternative because no prescribed burning would occur. No particulate matter would be produced and visibility would not be impaired due to prescribed burning.

Indirect effects would be that fuel loadings continue to increase and wildfires would continue to occur. Wildfire occurrence without previous fuel reduction is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley et al., 1997).

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

Direct effects associated with any of the action alternatives would be an increase in short-term particulate matter emissions and temporary impairment of visibility. Alternatives B, C, D, and E would produce particulate matter as a result of burning harvest generated fuels.

The alternatives differ only in the amount of particulate matter produced (Table 3.39). Fugitive dust generated from road activities and increased vehicle traffic would also temporarily affect air quality by implementing any of the action alternatives.

Indirect effects would be a long-term decrease in fuel loading following implementation of prescribed burning. Therefore, there would be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur.

Table 3.39: Approximate Annual Emissions by Alternative, Based On 10 Year Implementation

Emissions (tons/year)	Alternative				
	A	B	C	D	E
PM 10		40.3	44.4	56.8	31.2
PM 2.5		34.2	37.6	48.2	26.5

FULL SUMMARY OF CUMULATIVE EFFECTS FOR AIR QUALITY

Alternative D has the greatest chance of causing adverse impacts because it treats the most acres of fuel and produces the greatest total quantity of particulate emissions. Alternative C has the second highest acres and second greatest total quantity of particulate emissions followed by Alternative B. Alternative E would have the least effect on air quality because it has the least total acres to be treated and produces the least total quantity of particulate emissions.

CONCLUSIONS

EXISTING CONDITION

- Air quality in the American and Crooked River Project analysis area is good to excellent.
- Local and regional climatic conditions, as well as topography, influence smoke concentrations and dispersal.
- Air quality is probably outside its natural range of variability during normal wildfire months.
- There are no non-attainment areas for National Ambient Air Quality Standards (NAAQS) in close proximity to the analysis area.
- The Selway-Bitterroot Wilderness is the only Class I airsheds in close proximity to the analysis area.

ENVIRONMENTAL CONSEQUENCES

- There would be no direct effects on air quality by implementing Alternative A.
- There would be the likelihood of increased particulate emissions from wildfires by implementing Alternative A.
- Implementation of any of the action alternatives would directly affect air quality.
- Implementation of any of the action alternatives would decrease particulate matter emissions from wildfires.
- Alternative D would produce the greatest amount of particulate matter emissions, followed by alternatives C, B, and E.
- Competition in the airshed is regulated to avoid exceeding the NAAQS.
- Impacts to air quality(visability) in the Selway-Bitterroot Wilderness by implementing alternative B, C, D, or E would be short in duration and impacts would be minimal due to the relatively small burn unit size

IRREVERSIBLE OR IRRETRIEVABLE EFFECTS

Impacts from smoke to the air resource are temporary; therefore there are no irreversible or irretrievable effects on the air resource under any of the alternatives.

CUMULATIVE EFFECTS

Consideration of cumulative effects for air quality takes a different approach than for other resource areas. Past activities in the analysis area don't necessarily enter consideration, except in the sense that use of existing roads and facilities may contribute to fugitive dust levels as described above. Present use of and activities in the analysis area are continuing with a current assessment of good to excellent air quality.

All the action alternatives would affect air quality. Locally adverse and cumulative impacts to air quality could be expected if extensive prescribed burning occurred under any of the action alternatives, particularly if that burning occurred in conjunction with on-going wildfires or other prescribed burning activities in and adjacent to the airshed. Other potential prescribed burning projects that could have an impact are the listed in the table at the beginning of this chapter(description of the past, present and foreseeable future actions). However, mitigation measures and procedures outlined in the North Idaho Smoke Management Memorandum of Agreement are intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed burning to avoid adverse cumulative effects.

CONSISTENCY WITH THE FOREST PLAN AND ENVIRONMENTAL LAW

Prescribed burning under the action alternatives would comply with the requirements of the Clean Air Act. Both PM 10 and PM 2.5 emissions are quantified and modeled for their effects on adjacent and downwind airsheds, particularly non-attainment and Class I areas.

The action alternatives are consistent with Forest Plan standards and guides in that implementation would be in cooperation with Idaho Department of Health and Welfare by complying with the procedures outlined in the North Idaho Smoke Management Memorandum of Agreement.