Broadaxe Air Quality Specialist Report

REGULATORY REQUIREMENTS

Current direction to protect and improve air quality on National Forests is provided by: 1) the Forest and Rangeland Renewable Resources Act of 1974 (16 U.S.C. 1601), as amended by the National Forest Management Act (16 U.S.C. 1602); 2) the Federal Land Management Policy Act of 1976 (43 U.S.C. 1701); and 3) the Clean Air Act amendments of 1977, 1990, 1999 (42 U.S.C. 7401-7626). The Clean Air Act (Section 110) requires states to develop State Implementation Plans (SIPS), which identifies how states will attain and maintain air quality standards.

The Clean Air Act amendment of 1977 sets up a process that includes designation of Class I, II, and III areas for air quality management (see project file for Idaho and Montana web page address to view designation map). Airshed designations are defined in Table 1.

The Clean Air Act requires the Environmental Protection Agency (EPA) to identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, and particulate matter less than or equal to 10 microns (PM 10). Idaho and Washington also have standards for these pollutants. Particulate standards were originally defined in terms or Total Suspended Particulate (TSP). In recent years the EPA has changed the particulate standard to apply to small particulates less than 10 microns in diameter (PM 10) and less than 2.5 microns in diameter (PM 2.5). This change was made because PM 10 and PM 2.5 are too small to be effectively filtered by the human respiratory system and much of it penetrates deep into the lungs. These particulates can cause respiratory problems, especially in smoke sensitive portions of the population such as the young, elderly, or those predisposed to respiratory ailments. The Act defines NAAQS as levels of pollutant above which detrimental effects on human health and welfare could occur. An area that is in violation of NAAQS standards is called a “non-attainment area”. Pollution sources in these areas are subject to tighter restrictions. Spokane, Washington; Libby, Montana; and Sandpoint, Idaho are federally designated non-attainment areas, because of an excess of PM 10. A portion of Kootenai County, Idaho (Coeur d’Alene) is a proposed non-attainment area for PM 10.

Airshed groups are assembled in North Idaho and Montana to work cooperatively to “minimize or prevent” accumulation of smoke in Idaho and Montana to such a degree as necessary to meet state and federal ambient air quality standards when prescribed burning is necessary to conduct accepted forestry practices, i.e. hazard reduction, site preparation, and wildlife habitat improvement (MOA, 1090). As monitoring units, the airshed groups may limit burning, cease burning in specific areas, or cease entirely when meteorological or existing air quality conditions so warrant. Forest management burning is thereby regulated during the months of September through November (North Idaho Cooperative Smoke Management Plan). The Idaho Panhandle National Forests, including the St. Joe Ranger District, is a member of the North Idaho Memorandum of Agreement and adhere to the North Idaho Smoke Management Plan.

Table 1 – Airshed Classification Definitions

Airshed Classifications
Class I – These area include all international areas and National Parks greater than 6000 acres, and national wildernesses greater than 5000 acres, that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional man-made air pollution, which can be added to these areas. The nearest federally designated Class 1 area are the Cabinet Wilderness (located near the Idaho-Montana border just south of the Canadian-USA boarder), the Selway-Bitteroot Wilderness. (approximately 70 miles south of the St. Joe Ranger District), and the Flathead Tribal Reservation (60 miles northeast) The intrusion of smoke into Class I airsheds from prescribed burning operations in the Quartz Gold Project area would be minimal due to distance, the smoke dispersion, and the prevailing southwest to northeast air flow.
Class II – These areas include all other areas of the country. These areas may be upgraded to Class I, pending further legislation. A greater amount of additional man-made air pollution may be added to these areas, as opposed to Class I airsheds. All Forest Service lands that are not designated Class I are Class II airsheds. All of the lands in the Quartz Gold Project Area are designated Class II.
Class III – These areas have the least amount of regulatory protection from added air pollution. To date, no Class III areas have been designated in the country.

AFFECTED ENVIRONMENT

The Broadaxe Project Area is within North Idaho Airshed 12B. The boundaries of 12B encompass the area from Dworshak Reservoir east to the Montana state line (roughly 60 miles wide east to west) and from the St. Joe/Coeur d'Alene Divide south to the Clearwater/Nez Perce Forest Boundary (55 miles long north to south). The Broadaxe project is also situated on the boundary of Airshed 2, which includes the down-wind communities of St. Regis and Superior, Montana.

The Clean Air Act designates Class I, II, and III areas for air quality management. There are no Class I areas within the IPNF, and all areas are designated as Class II. Class II areas can be described as having good air quality with no additional air quality restrictions other than NAAQS. Class I areas are the most pristine areas which receive special visibility protection. The Cabinet Wilderness and the Flathead Indian Reservation are designated Class I areas and lie approximately 48 miles northeast and 60 miles to the northeast respectively.

The EPA designates air quality-sensitive sites as "non-attainment areas" because of violations of a NAAQS. Airshed 12B has no non-attainment areas within its boundaries. The nearest non-attainment areas are Thompson Falls, Montana (20 miles to the north); Pinehurst, Idaho (30 miles to the northwest); and Missoula, Montana (65 miles southeast). These areas are in violation of the PM_{10} standard during periods of winter inversions.

The air quality of the Broadaxe Project Area is generally good throughout the year due to good air dispersion. Human-caused and natural events inside and outside the project area do occasionally affect air quality. Human influences such as stationary industrial pollution sources, campfires, vehicle exhaust and road dust are very minimal. Regional haze, however, occasionally occurs due to agricultural dust, agricultural field burning, and private land forest slash burning. Natural events such as dust storms and wildland fires contribute to reduced air

quality at times.

The wind direction in northern Idaho is generally from the southwest to west. Smoke dispersion is to the east and northeast. Long-duration, low-intensity frontal systems commonly occur in the fall and spring, aiding atmospheric mixing and improving air quality.

The effects of smoke within this project area and surrounding areas are dependant upon a number of factors such as season, topography, atmospheric conditions and time of day of the burning.

Spring and early summer seasons have the best dispersion and mixing atmospheric conditions. Daytime heating lifts smoke high into the atmosphere and seasonal instability disperses smoke down wind. Daytime heating lifts smoke out of valley inversions, but can be difficult under stable high pressure systems. Inversions in the fall can potentially create the worst smoke problems of prescribed burning. Spring and fall are the seasons monitored and regulated by the North Idaho Airshed Group. Cold winter months, however, are when the air quality can be poorest. The EPA specified non-attainment areas have the poorest air quality in winter due to local smoke and dust trapped in valley locations. Prescribed burning rarely occurs at all during this season and, as always, is regulated by the state.

The topographic location of a prescribed fire will either aid smoke dispersion if high on the ridge and exposed to free air wind or conversely increase the potential of smoke impacts if down in a valley bottom. Smoke produced low on the slope and not lifted up an out of the valley can become subject to nighttime down-slope winds and then be trapped by nighttime inversions and contribute to valley smoke pooling until the next daytime heating.

ENVIRONMENTAL EFFECTS

No Action

This alternative would have no immediate adverse effect on air quality, except in the event of a wildfire. Current management activities in the project area contribute little additional pollutants to the local airsheds. The primary source of pollution would be from vehicular exhaust, occasional campfires, and dust from motor traffic in the area. Air quality would remain good until the occurrence of a major wildfire event near or down-wind of the area, after which a return to pre-existing conditions could be expected within a matter of days.

A wildfire scenario would not be regulated and could result in significant particulate production per acre and more severe concentrations without fuel reduction through timber harvest and prescribed fire. Historically, this area was characterized by very large stand-replacing fires every 100-200 years on average.

The potential for air quality degradation and reduced visibility within the analysis area may increase with no action due to the unabated potential for a severe wildfire. Existing and increased mortality in the analysis area would contribute to increased intensities and severities if a wildland fire were to occur. Consumption of live and dead fuel loads in the aerial and surface fuel layers during an intense and uncontrolled wildfire would generate smoke emissions well beyond acceptable regulatory levels. These emissions may remain in the local and surrounding airsheds for a period of a few days to several weeks depending on the fire's size and intensity. Smoke from wildfires from outside the project area may also decrease the air quality during

summer fire seasons.

Wildfire smoke has naturally been a part of the analysis area ecosystem. The amount of smoke generated from forest fires has decreased since the 1930s and the advent of effective fire suppression. Prior to this time the northern Rocky Mountains probably had 1,500-2,000 fires burning annually. Before modern fire suppression these fires burned until they naturally went out and many burned for prolonged periods of 60-120 days. Journals from early day explorers and newspaper articles from the late nineteenth century often mention the smoky conditions in western Montana and northern Idaho.

Prescribed fire from outside the project area has generated smoke during the spring and fall months. Agricultural burning restrictions on the Palouse has reduced levels of seasonal regional haze.

Noxious weed spraying would have a short term localized affect in the area of spraying. Noxious weeds inside the project area may be sprayed as planned in the St. Joe Noxious Weed Control Environmental Impact Statement. The impact from spraying would be very minimal to the air quality in the project area. The proposed weed treatment would have short-term, localized impact on air quality because of the drift of spray particles. Generally the greatest part of this drift would settle within 25 feet of the site, although small amounts could carry greater distances (USDA Forest Service, 1993). The smell of herbicides may also persist at a spray site for several days following spraying.

Human inhalation environmental exposures to herbicide spray would be less than occupational exposures since spray operators, involved with activities on the spray units, are more likely to be subject to spray mist than is a casual visitor. Thus a casual forest visitor should be expected to receive an inhalation exposure orders of magnitude less than that of a backpack sprayer (USDA Forest Service, 1984).

Proposed Action

Direct Effects

The objective of the proposed prescribed burning is to reduce a portion of the surface fuel profile while minimizing consumption of duff, course woody debris, and above ground foliage. Conditions that limit fuel consumption would also reduce smoke emissions. Utilizing aerial ignitions can also reduce smoke impacts on an airshed by reducing ignition time, which in turn reduces the amount of time of smoldering combustion in favor of flaming combustion. This constrains smoke production to a shorter time period than hand ignition may be capable of, reduces total emissions, and improves smoke dispersal by generating greater convective lifting within the smoke column (Hardy et al., 2001).

The smoke emissions from prescribed burning activities could adversely affect air quality on a temporary basis, if predictive weather conditions within planned burning parameters and ideal weather fail to materialize after ignition has taken place. The greater probability of this occurring would be during fall conditions, when forecasted up-slope, optimum ventilation winds may turn down slope, down –canyon after night fall, or due to a stable air mass moving into the area.

The amount of smoke generated from prescribed fire will be reduced through the current scheduling of slash burning when atmospheric conditions are favorable for dispersion as

compared to burning during poor air quality and atmospheric conditions.

All the proposed prescribed burning would occur over a period of one to three years and would be conducted only when atmospheric conditions are judged favorable. The proposed burns would result in less smoke produced per acre than high intensity wildfire because less fuel would be available for consumption and subsequent smoke production. When possible scheduling prescribed fires for spring like conditions reduces emissions by as much as 54%, and where possible burn slash in clean piles rather than broadcast burns reduces emissions by 25-50% (Radke and Ward 1991).

Emissions can be scheduled to not violate ambient air standards and not create air quality problems through the regulatory processes previously described. Because of the transient nature of smoke emissions from forestry burning direct effects would be limited within the project area. Smoke produced would be dispersed generally to the northwest by prevailing winds over unpopulated forest lands.

Proposed activities could temporary affect air quality at St. Regis (10 miles to the northeast) the nearest residential area. This affect will be from the down canyon winds at night, bringing smoke into the area until day time heating lifts air currents. These areas are generally down canyon of the project area. Forest visitors use the developed and undeveloped campgrounds along the St. Joe River corridor down Gold Creek from the project area. Diurnal temperature inversions within the canyon may allow pooling of smoke to affect these sites.

Indirect Effects

Smoke produced from prescribed fire would be dispersed generally to the northeast by prevailing winds over unpopulated forest lands. The smoke that would reach populated areas to the northeast would be lifted above the 6,000-foot elevation state line divide and would not likely be in any harmful concentrations except to contribute to general haze.

Dust may increase from road construction and maintenance as well as project-associated vehicular traffic. Road dust is primarily a minor and temporary local nuisance settling near the source. Dust is also generated at differing times than prescribed fire activity and is not considered to be a significant cumulative impact.

Cumulative Effects

Monitoring of air pollutants during prescribed burning seasons is used to regulate burning during times when such activities would result in violations of the state standards, including unacceptable impacts to non-attainment areas. The Forest Service voluntarily ceases burning operations to avoid violations of State standards. Burning of activity-created fuels would occur primarily in early spring when demand for airspace has been historically low. Smoke and particulate matter flows to the northeast and dissipates rapidly during good to excellent dispersion days.

Prescribed fire from outside the analysis area has generated smoke during the spring and fall months. Agricultural burning restrictions on the Palouse have reduced regional haze levels. Other prescribed burning on federal, state and private lands within the affected airshed that may occur at the same time are monitored cumulatively on a daily basis and contribute to the local Smoke Management Unit’s decision to approve a prescribed burn request on a given day. Wildfires occurring outside or inside the analysis area would generate smoke during the summer months which may affect air quality during that time period.

Noxious weed spraying would have a short-term localized effect in the area of spraying. The impact from spraying would be very minimal to the air quality in the project area. Weed treatment would have short-term, localized impact on air quality because of the drift of spray particles. Generally the greatest part of this drift would settle within 25 feet of the site, although small amounts could carry greater distances (USDA Forest Service, 1993). The smell of herbicides may also persist at a spray site for several days following spraying. Human inhalation environmental exposures would be less than occupational exposures since spray operators, involved with activities on the spray units, are more likely to be subject to spray mist than is a casual visitor. Thus a casual forest visitor should be expected to receive an inhalation exposure that would be orders of magnitude less than that of a backpack sprayer (USDA Forest Service, 1984).

COMPLIANCE WITH REGULATIONS

The Proposed Action would be monitored and controlled by airshed regulations to avoid violation of air quality standards. Prescribed burning on the IPNF is regulated by the North Idaho Smoke Management Memorandum of Agreement (1990). Under the Clean Air Act, states have the primary responsibility for maintaining air quality standards. All Forest Service prescribed burning is monitored and controlled through this process. All other burning is regulated directly by the state. Burning is allowed only when current and predicted air quality will allow new ignitions for the next day based on acres to burn and predicted meteorological conditions. Restrictions can be issued to curtail all burning or to reduce burning acres or restrict burning to specified elevations. This regulation process as well as the temporary nature of smoke accumulation should prevent violations of ambient air standards except possibly temporarily at the fire sites directly next to active burning. Fire management personnel have safety guidelines and procedures to avoid excessive smoke inhalation.

Jason Jerman_____ Date_____

Prescribed Fire/Fuels Specialist