ISSUE 24: AIR QUALITY

Changes from the Draft to the Final EIS

There were no substantive changes to this section between the Draft and Final EIS. Several changes were made in response to EPA comments. These include an updated description of NAAQS (air quality standards) and addition of ozone. The description for issue #24 was expanded to include a more complete description of potential adverse health effects of snowmobile emissions to individuals who have less physical ability to deal with snowmobile emissions. More recent particulate (PM10 to 2005) data from air monitoring stations in Bozeman and Belgrade from 1999 through June of 2005 was added as well PM10 data from the Firehole station in West Yellowstone and PM2.5 data from stations at Bozeman and the West Entrance of Yellowstone National Park.

Introduction

Concern was raised over the potential effects of the proposed Travel Plan alternatives (particularly motorized uses) on air quality. This issue has been determined to be non-significant to the decision among Travel Plan alternatives. The issue was raised in public comments as an undesirable effect of encountering motorized use emissions on Forest roads and trails. The Forest Service acknowledges that odor generated by combustion engines, particularly two-cycle engines, can diminish a non-motorized users experience of Forest trails. However, this is a recreation (user satisfaction) issue rather than a general air quality issue. Air quality is not significantly affected by potential motorized use of Forest roads and trails under any of the seven alternatives.

Discussion

Location and Description

Air quality within the Gallatin National Forest area is generally excellent, with limited local emission sources and consistent wind dispersion. An air quality assessment for the Eastside National Forests (USFS 2000) describes air quality conditions on the Gallatin National Forest in detail. Local air pollution sources on the Forest include construction equipment, vehicle emissions, road dust, residential wood burning, wood fires and smoke from logging slash disposal. Emissions on the Forest are very limited, with temporary local sources of impairment. Wind dispersion throughout mid to upper slopes on the Forest is robust, with no visible inversions or localized concentrations of emissions. Down-valley drainage is frequently robust during nighttime and early morning hours.

General Effects

The DEQ has estimated that for southwest Montana, including the Absaroka Range, a PM_{10} background of 5 ug/m3 (micrograms per cubic meter) (annual average) is appropriate. No other sources of industrial emissions occur in the analysis area.

The major source of emissions on the Gallatin Forest is the cities of Bozeman, Belgrade, Livingston, Big Timber, Gardiner and West Yellowstone, although no PSD-permitted sources occur in or around these cities. Primary sources in these communities include vehicle exhaust, wood burning smoke, road dust and spillage of solvents, although all of the communities are in compliance with National Ambient Air Quality Standards (NAAQS). The community emissions do not visibly impact the Forest. Winter inversions over Bozeman tend to drift down the Gallatin River valley and can impact Belgrade. Emissions in the Yellowstone River and Boulder River valleys and are strongly dispersed by predominant and robust south and southwest wind direction with at times very strong wind gradients. The largest concentrations of air pollution on the Forest occur from wildfires, which until the last 20 years had low occurrence. Regional wildfire smoke accumulated within the area during periods of extensive wildfire activity in 1988, 1994, 2000 and 2003. The prime source of wildfire emissions is from central and southern Idaho, and southwest Montana. Smoke from wildfires in Yellowstone National Park can also impact the Boulder Canyon area, as occurred in 1988.

The Montana DEQ has estimated that for southwest Montana a PM_{10} background of 5 ug/m3 (annual average) is appropriate. The Environmental Protection Agency (EPA) AIRS database, at, http://www.epa.gov/air/data/reports.html includes PM_{10} data for Bozeman and West Yellowstone. Average PM_{10} values in Bozeman were 19 ug/m3 in 1998, 21 ug/m3 in 1999, 20 ug/m3 in 2000, 18 ug/m3 in 2001, 19 ug/m3 in 2002, 17 ug/m3 in 2003, 15 ug/m3 in 2004, and 16 ug/m3 in 2005. Maximum measured PM_{10} at Bozeman was 51-89 ug/m3, with no excedances of the PM_{10} 150 ug/m3 hourly standard. The highest PM_{10} values for Bozeman occurred in the widespread wildfire years of 2000 and 2001. Average PM_{10} values in West Yellowstone were 18 ug/m3 in 2000, 22 ug/m3 in 2001, 15 ug/m3 in 2002 with a maximum PM_{10} value of 78 ug/m3 in 2000. $PM_{2.5}$ values for West Yellowstone for include 2.5 ug/m3 in 2003 (maximum of 5 ug/m3), 7.3 ug/m3 in 2004 (maximum of 30 ug/m3), and 3.8 ug/m3 in 2005 (maximum of 73) ug/m3.

Generally, the Gallatin Forest does not develop temperature inversions that trap smoke and reduce smoke dispersal. Dispersion of emissions within the Forest is very high, due to the mountainous terrain and high wind activity. The Wind Energy Resource Atlas of the U.S. (Elliott et al. 1986) shows the Gallatin Forest as an area of high wind energy. Up-valley winds during daytime and down-valley winds (cold air drainage) at night can dominate valley winds more than overall prevailing wind direction on ridge tops. Localized inversions can occur around Big Sky, which the Montana DEQ has designed as an Impact Zone (http://www.smokemu.org).

Vehicle emissions on the Forest are most concentrated along the Interstate-90 corridor east of Bozeman, Highway 191 through the Gallatin Canyon, the Bridger Bowl ski area parking lot (automobiles and trucks) and the West Entrance to Yellowstone National Park (snowmobile emissions). The Forest does not have jurisdiction on vehicle use levels or emission in any of these concentrated motorize use areas. Recreation motorized use and emissions on the Forest is more localized to roads and motorized trails, with generally sufficient wind dispersion to avoid air quality concerns The EPA has estimated that off-highway recreational vehicles, which include gasoline-powered motorcycles, ATVs and snowmobiles, contribute about 5% of hydrocarbon emissions and 2% of carbon monoxide from mobile sources nationwide (EPA 2003). The EPA has adopted emission standards (EPA 2002) for new recreational vehicles that will be phased-in starting in 2006. These new standards will reduce hydrocarbon emissions from these vehicles by 67% and carbon monoxide

emissions by 28%. Manufacturers are likely to used advanced two-stroke and increased use of four-stroke technology to meet these standards (EPA 2003).

Direct and indirect effects of vehicle emissions on air quality do not result in much variation among alternatives, since emissions from recreational vehicles (cars, trucks, ATVs, snowmobiles, motorbikes etc.) are spread over much of the Forest with generally good emission dispersion. Overall contribution of recreational vehicles on the Forest to emission levels from local and regional sources mentioned in the beginning of this discussion is small. The most concentrated areas of emissions occur at trailheads and parking lots, particularly during evening and early morning hours when dispersion is the least. Total recreational vehicle emissions are greatest with Alternative 1, and become progressively less from Alternative 2, Alternative 3, Alternative 4, Alternative 7-M, Alternative 5 and Alternative 6.

The areas of most concentrated recreation vehicle emissions occur near the Forest, at the Bridger Bowl parking lot and at the West Entrance of Yellowstone National Park. Bridger Bowl parking lot emissions (which are on private land) were estimated in the Bridger Bowl FEIS (USFS 2005) for Alternative 1 (no action) and Alternative 2 (maximum expansion). Increased vehicle traffic would occur at Bridger Bowl with associated increases in tailpipe emissions, primarily hydrocarbon and nitrogen oxides. Peak weekend one-hour vehicle emissions in the Bridger Bowl base area in 2010 were estimated using AP-42 (EPA 1996) emission factors for light duty gasoline-powered vehicles (autos, pickups and vans). As shown in Table 4.24. 1, the Alternative 1 peak weekend hour would increase to an estimated 1,277 vehicles/hour in Alternative 2. Hydrocarbon emissions during the 2010 peak weekend hour would increase from an estimated 345 grams/hour (g/hr) in Alternative 1, to 804 g/hr in Alternatives 2. Carbon monoxide would increase from an estimated 5,080 grams/hour in Alternative 1 to 11,900 g/hr in Alternatives 2. Nitrogen oxides would increase from an estimated 476 g/hr in Alternative 1 to 1,117 g/hr in Alternative 2.

Table 4.24. 1 Bridger Bowl peak weekend hour vehicle emissions.

Parameter	Alt. 1	Alt. 2
Vehicles per hour	545	1,277
Hydrocarbons (g/hr)	345	804
Carbon Monoxide (g/hr)	5,080	11,900
Nitrogen Dioxide (g/hr)	476	1,117

Emissions were estimated by assuming weekend peak hour emissions would occur for an eight-hour day (which is an overestimation) during a 120-day ski season. Total Bridger Bowl emissions would be 0.85 tons of hydrocarbons, 12.6 tons of carbon monoxide and 5.4 tons of nitrous dioxides. This, if combined into a stationary source of 18.9 tons/year would be too low to require an air quality permit from the Montana DEQ (ARM 16.8.1102). Since these numbers meet the MAAQS and NAAQS, no significant impacts to air quality would be expected from current or potential vehicular traffic due the dispersion effects of drainage winds on the local airflow.

The West Entrance of Yellowstone National Park has been an area of considerable discussion relative to air quality effects of snowmobiles. The National Park Service (USDI 2000) provides information that indicates snowmobiles have a much higher per vehicle emission rate than autos and trucks. Monitoring in 1999 documented carbon monoxide (CO) and particulate matter concentrations at the West Entrance, which were very close to violation of the CO one-hour and

eight-hour NAAQS. Measured concentrations were less at Madison and Old Faithful. Engineering, Science and Technology (2002) in modeling various alternatives of winter use at the West Entrance, found that none of the alternatives for winter use management in Yellowstone Park would exceed one-hour average CO concentrations for NAAQS or Montana Air Quality Standards, although CO concentrations would be elevated considerably above background levels.

The above examples include emission concentration levels in locations near the Forest, which have much higher concentrations than any of the dispersed motorized recreation areas on the Forest. No direct excedances of NAAQS or Montana Air Quality standards from motorized use on the Gallatin would be expected. However, localized and transient concentrations of nuisance emissions, particularly from two-cycle snowmobiles, ATVs and motorcycles at trailheads and in some trail corridors will occur in all alternatives. While pollutants emitted from snowmobile exhaust may not exceed NAAQS, there can be adverse effects to those who breathe the emissions. For individuals with asthma, pulmonary illness, comprised immune systems, pregnant women and the elderly, exposure to these pollutants can be problematic, especially for those coming from lower altitudes and are being physically active. These nuisance emissions are objectionable to some non-motorized users when encountering motorized recreationists, and would occur most frequently in Alternative 1 and decreasing sequentially through Alternative 6. The new EPA (2002) emission standards for new off-highway recreational vehicles (motorcycles, ATVs and snowmobiles) will gradually reduce per average vehicle emissions after 2006, as newer recreational vehicles become available.

Cumulative effects of motorized travel on Gallatin Forest air resources are unique in that the past impacts to air quality are not usually evident. The emissions associated with motorized recreation on the Gallatin Forest would be cumulative only with the local emission sources described in the affected environment. These include construction equipment, vehicle emissions, road dust, residential wood burning, wood fires and smoke from logging slash disposal, cities of Bozeman, Belgrade, Livingston, Big Timber, Gardiner, and West Yellowstone, stationary industrial sources, prescribed burning and wildfire. Since motorized recreation emission sources on the Forest are localized and transient, actual cumulative combinations of emissions are minor and do not result in significant effects.

Consistency with Laws, Regulations, Policy, and Federal, Regional, State and Local Land Use Plans (including the Forest Plan)

Congress passed the Clean Air Act in 1963, and amended it in 1972, 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 Act established National Ambient Air Quality Standards (NAAQS), which must be met by state and federal agencies and private industry. States are given primary responsibility for air quality management. Section 110 of the Clean Air Act requires states to develop State Implementation Plans (SIPs) that identify how the state will attain and maintain NAAQS, which are identical to the Montana standards for PM10 (particulate mater with less than 10 microns). The PM2.5 standard requires concentrations of PM2.5 not to exceed a 24-hour average of 65 ug/m3 (micrograms per cubic meter). Average annual arithmetic PM2.5 concentrations are not to exceed 15 ug/m3. The SIP is promulgated through the Montana Clean Air Act and implementing regulations. The regulations provide specific guidance on maintenance of air quality, including

restrictions on open burning (ARM 16.8.1300). The act created the Montana Air Quality Bureau (now under DEQ) and the regulatory authority to implement and enforce the codified regulations.

The NAAQS have been established for carbon monoxide, nitrogen oxide, and sulfur dioxide, lead, ozone, and particulate matter. There are numerous types of pollutants that could be controlled, but particulate matter is the primary pollutant of concern since particles less than 2.5 microns can be inhaled deeply into human lungs causing respiratory problems. The August 1977 amendments designated areas of the nation into PSD (Prevention of Signification Deterioration) classes. Class 1 airsheds are given the most protection from human-caused air pollution in order to protect their pristine character. Class II airsheds allow for a greater amount of human-caused pollution. The EPA has not yet identified any Class III airsheds.

The Montana DEQ is currently cooperating with the Western Regional Air Partnership to establish visibility goals, monitoring plans and control measures to comply with regional haze visibility standards in all Montana Class I areas, including Yellowstone Park.

The Montana DEQ does not directly manage mobile sources of air pollution, such as occurs from vehicles, except that all areas within Montana must meet Montana and National Ambient Air Quality Standards. Due to the generally excellent air quality on the Gallatin Forest, and limited emissions from motorized recreation, all alternatives are anticipated to fully comply with Montana and National Ambient Air Quality Standards.