AIR QUALITY

Public comment focused on one issue in regard to the potential effects of travel management on air quality.

EFFECTS ON AIR QUALITY DUE TO MOTORIZED OHV TRAVEL.

There are concerns that motorcycles, ATVs and snowmobiles are negatively impacting the air quality of adjacent Class 1 airsheds: Bob Marshall Wilderness, Scapegoat Wilderness and Glacier National Park.

1. EXISTING CONDITION

a. Background and Legal Requirements

The basic framework addressing air pollutants is mandated by the 1970 Clean Air Act (CAA), as amended in 1990 and 1999 (Story 2000) The CAA was developed to "protect and enhance" air quality. Section 160 of the CAA requires measures "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores and other areas of special national or regional natural, recreation, scenic, or historic value." Class I areas include Forest Service and Fish and Wildlife Service wilderness areas over 5,000 acres that were in existence before August 1977, and National Parks in excess of 6,000 acres as of August 1977. Designation as a Class I area allows only very small increments of new pollution above already existing air pollution levels.

The Bob Marshall, Gates-of-the-Mountains and Scapegoat Wildernesses are within a Class I airshed. The Rocky Mountain Division of the Forest adjoins Glacier National Park (also a Class I airshed). The Bob Marshall Wilderness addition (Great Bear Wilderness) was established in 1978 and is a Class II airshed as is the remainder of the Rocky Mountain Division.

The primary means through which the CAA is accomplished is with National Ambient Air Quality Standards (NAAQS). The following table lists the NAAQS for pollutants important to human health. Montana has adopted some more stringent standards on certain pollutants (Story 2000).

Table III-1.
National and State Ambient Air Quality Standards

Pollutant	Time Period	Federal (NAAQS)	Standard Type	Montana (MAAQS)
Carbon Monoxide	Hourly Average 8-Hour Average	35 ppm 9 ppm	Primary Primary	23 ppm 9 ppm
Fluoride in Forage	Monthly Average Grazing Season	- - - - - -	- - - - - -	50 ug/g 35 ug/g
Hydrogen Sulfide	Hourly Average	- - -	- - -	0.05 ppm
Lead	90-Day Average Quarterly Average	- - - 1.5 ug/m	- - - Prim. & Sec.	1.5 ug/m - - -
Nitrogen Dioxide	Hourly Average Annual Average	- - - 0.053 ppm	- - - Prim. & Sec.	0.30 ppm 0.05 ppm
Ozone	Hourly Average 8-Hour Average	0.12 ppm 0.08 ppm	Prim. & Sec. Prim. & Sec.	0.10 ppm - - -

Pollutant	Time Period	Federal (NAAQS)	Standard Type	Montana (MAAQS)
PM - 10	24-Hour Average Annual Average	150 ug/m 50 ug/m	Prim. & Sec. Prim. & Sec.	150 ug/m 50 ug/m
PM – 2.5	24-Hour Average Annual Average	65 ug/m 15 ug/m	Prim. & Sec. Prim. & Sec.	- - - - - -
Settleable Particulate	30-Day Average	- - -	- - -	10 g/m
Sulphur Dioxide	Hourly Average 3-Hour Average 24-Hour Average Annual Average	- - - 0.50 ppm 0.14 ppm 0.03 ppm	- - - Secondary Primary Primary	0.50 ppm - - - 0.10 ppm 0.02 ppm
Visibility	Annual Average	- - -	- - -	3 x 10(-5)/m

b. Natural Characteristics and Past Events and Conditions

Finklin (1986) indicates normal airflow patterns in Glacier National Park and along the front of the Rocky Mountain Division are generally from west to southwest. The mountainous area along the Rocky Mountain Division has maximum wind speeds in winter/early spring, and minimum in summer. Winds on peaks and higher elevations average nearly 20 mph during November-February. Finklin (1986) also notes that the eastside of Glacier National Park and Rocky Mountain Division has consistent and exceptionally strong warm chinook winds during winter. Cold front passage during the summer/fall will also produce exceptionally strong winds.

c. Human Influences

Limited specific information is available concerning existing air quality within RMF Travel Planning analysis area. No air quality monitoring data is collected by the Lewis and Clark NF in the analysis area. Stationary sources (greater than 100 tons/yr emissions) from the Montana Air Quality Division inventory within 100 km of the Rocky Mountain Division Forest boundaries are listed below (Montana Department of Environmental Quality 2004):

Table III-2.
2003 Stationary Sources of Emissions

Facility	City	CO t/yr	NO2 t/yr	Lead t/yr	PM10 t/yr	SO2 t/yr
Montana Refining	Great Falls	41	153	0	14	517
Montana Tunnels Mine	Clancy	333	543	0	819	59
Ash Grove Cement	Clancy	24	1831	2	198	236
Stimson Lumber	Bonner	238	166	0	127	9
Flynn Lane	Missoula	5	11	0	288	231
Roseburg Forest Products	Missoula	94	523	0	218	8
Stone Container	Missoula	3239	1496	0	352	206

The Great Falls and Clancy sources primarily disperse toward the east with prevailing westerly winds. The Bonner and Missoula sources are moved west or northwest in the winter or south during the remainder of the year based on prevailing winds (Western Regional Climate Center 2004).

Scattered oil and gas well drilling has occurred in the Rocky Mountain Division (Story 2000). Except for the gas production at Blackleaf Field, most have been dry holes. There have been thousands of wells drilled since the early 1900's on the Sweetgrass arch which stretches from the Canadian border through Shelby and Conrad. The western most production from the fields associated with the arch is approximately 24 to 30 miles east of the Rocky Mountain Ranger District.

Emissions from fire, both wildland and prescribed, are an important episodic contributor to visibility-impairing aerosols, including organic carbon, elemental carbon and particulate matter (PM2.5) (Story 2000; Lewis and Clark National Forest 2000). Agricultural burning emissions east of the analysis area and their effects may be a concern but these impacts have not been quantified.

US Highway 2 and the Burlington Northern and Santa Fe Railway (BNSF) between East Glacier and Essex separate the north end of the project area from Glacier National Park. Between 1992 and 2003 the daily average number of vehicles per day on Highway 2 passing through the automatic recorder located 10 miles northeast of East Glacier ranged from 1818 to 2238 (State of Montana 2004). In 2003 the peak number of vehicles per day occurred on the weekends of July with over 3000 vehicles counted. Not all of these vehicles would travel southwest of the analysis area but much of the summer traffic does. The BNSF route is a major transcontinental rail freight trunk route with annual freight traffic of between 52 and 67 million gross tons (State of Montana 2000). This BNSF route also serves AMTRAC. The diesel engines of these trains emit organic compounds, sulfur compounds, carbon monoxide, carbon dioxide, water vapor, and trace metals that may be carcinogenic by inhalation (EPA 2000a). The upwind emissions from US Highway 2 traffic and BNSF railway have not been quantified but are potentially important with respect to the northern end of the analysis area.

Dust emitted into the air by vehicles and livestock traveling on unpaved roads and trails contribute to reduced visibility and to suspended airborne particulates that can cause health concerns. Airborne particles less than 2 microns have been found to contribute to human health problems especially in young children, older people and people with lung problems such as asthma and emphysema (Gucinski et al, 2001). Dust from road and trail traffic can also settle on nearby plants blocking respiration, photosynthesis and transpiration (Trombulak and Frissell 2000). Use levels on unpaved roads and trails in the analysis area are not known.

Two-stroke engines used in many off-highway motorcycles (approximately 63 percent), some ATVs (approximately 15 percent) and most snowmobiles generally use a fuel and oil mixture to both produce power while lubricating the engine (EPA 2000a). As much as 30 percent of the intake charge passes through the engine unburned and exhausts to the atmosphere. Fine particulate matter and unburned hydrocarbons emissions from these engines can be much higher than 4-stroke engines of similar size and power. Significant quantities of both carbon monoxide and oxides of nitrogen are also emitted by both 2-stroke and 4-stroke engines of recreational vehicles. Again, use levels of off-highway motorcycles, ATVs and snowmobiles in the analysis area are not known.

Monitoring data near the analysis area comes from several sources. First, the National Atmospheric Deposition Program (NADP) was initiated in 1978 to monitor geographic and temporal trends in the chemical composition of rain and snow, with the primary purpose of acid rain benchmark monitoring (Story 2000). Of the 200 NADP sites 2 are near the project area. The table below lists average (1990-1998) wet deposition chemistry of the NADP stations in 9 year averages.

Table III-3. 1990-1998 Wet Deposition Chemistry of NADP Sites Near the Rocky Mountain Division Travel Plan Analysis Area

Site/Management Agency	pH	SO4 (Sulfate)	NO3 (Nitrate)	NH4 (Ammonium)	SO4	NO3	Pcp	Elev
		Concentrations (mg/L=ppm)			Annual Loading (kg/Ha)		cm	meters
MT05-Glacier NP, West Glacier	5.12	.32	.39	.07	2.8	3.3	86	968
MT07-Clancy	5.0	.9	.9	.32	2.7	2.7	31	806

In the absence of any man caused air pollution the pH would average around 5.65 due to the solubility of CO2 in carbonic acid in water vapor. Concentrations (mg/L) and deposition (kg/Ha) of the primary acid deposition anions are relatively low. The relatively elevated levels of SO4 and NO3 (concentrations) at the Clancy site may be influenced by Helena area emissions.

Water quality in lakes can be a good indicator of air quality changes since lake water chemistry can be highly influenced by atmospheric deposition. Sampling has occurred in 13 lakes in the Bob Marshall and Scapegoat Wilderness areas (Story 2000). Unfortunately all 13 lakes have watersheds dominated by Paleozoic and Mesozoic limestone/sandstone/shale geologies with high acid neutralizing capacity. These lakes are not vulnerable to acid deposition under any reasonable acid deposition scenario.

The chemical composition of annual snowpack has been shown to be a composite record of atmospheric deposition of airborne pollutants throughout winter and has also been used to identify nearby emission sources (Story 2000). The US Geological Survey has been sampling seasonal snowpacks at 52 sampling sites in a network from New Mexico to Montana since 1993. A summary of the first five years data is provided by Ingersoll et al (2001). A relation between chemical concentrations of ammonium and sulfate in seasonal snowpacks and the level of snowmobile use in Yellowstone National Park has been established. Snow chemistry at sampling sites *in snowpacked roadways* along high-traffic snowmobile routes showed consistently higher concentrations of ammonium and sulfate than snow samples collected at sites 30 meters or more away. Because snowmobile emissions tend to be limited in dispersion and confined to specific corridors in heavy-use areas, snow sampling sites 30 meters away from the local effect are *representative of regional snow chemistry*. Although local effects, such as snowmobile emissions, are detectable in popular snowmobiling areas, the contribution to regional atmospheric deposition is likely minimal. (Preliminary analyses of snowmelt-runoff chemistry from a small number of samples (5) indicated that elevated emission levels in snow along highway corridors in Yellowstone National Park are dispersed into surrounding watersheds at concentrations below levels likely to threaten human or ecosystem health (Ingersoll 1999). The three USGS sites closest to the Rocky Mountain Ranger District Travel Plan analysis area are west of the Continental Divide and upwind. Five-year average values (1993-1997) are shown in Table III-4 below.

Table III-4. 1993-1997 US Geological Survey Snow Sampling

Site Name	pH	NH4	SO4	NO3
		microequivalents/l		
Big Mountain	5.11	2.9	4.1	4.7
Noisy Basin	5.15	3.9	4.4	4.9
Snow Bowl	5.21	2.9	4.0	4.0

These values are all below the means for the 52 sites.

d. Desired Condition

The Lewis and Clark NF air resource management responsibilities derive from the Clean Air Act and amendments, National Forest Management Act (NFMA), Wilderness Act, and National Environmental Policy Act (NEPA) (Story 2000). Primary responsibilities include:

1. Protect NFS lands from adverse air pollution impacts.
2. Manage NFS emissions in accordance with national and local air quality standards.
3. Protect AQRVs (associated air quality values), including visibility, in Class I areas.

The Lewis and Clark NF air quality responsibilities derive from protective requirements of Class I areas and AQRVs. The Forest Service multiple use output mandates and targets, however, result in several sources of emissions such as prescribed fire, road dust, vehicle exhaust and engine emissions from permitted activities. Air quality management on the Lewis and Clark NF requires a balance of sustaining resource productivity while conserving ecosystems and protecting Wilderness areas.

Lewis and Clark NF Forest Plan standards (F-3, page 2-52 of Forest Plan):

> 14) Comply with Federal and State standards and the Montana airshed group's Memorandum of Understanding on any management activity that may effect air quality.
>
> 15) Protect air quality by cooperating with Montana Air Quality Bureau in the Prevention of Significant Deterioration program and State Implementation Plan.

Effects of the No Action and Action Alternatives are discussed below. A summary will show that the current levels of use of all kinds, winter and summer, on roads and trials in the Rocky Mountain R.D. Travel Plan analysis area are not well known. Additionally, air quality monitoring of current levels of use on roads and trails in the analysis area would be difficult to obtain and are not available now. Given the lack of data specific statements about impacts of current levels of use of the road and trail system in the analysis area on the air quality of the analysis area and adjacent Class 1 airsheds are not possible. Considering the normal airflow patterns, the emissions from vehicles on Highway 2, the emissions from trains on the BNSR freight trunk line, and potential affects of wildfires the impacts of current uses of analysis area roads and trails on the analysis area airshed and adjacent Class 1 airsheds are likely small enough to not be measurable. The Action Alternatives propose fewer miles of motorized trails compared to Alternative 1, the No Action Alternative for lower total miles of roads and trails open to motorized vehicles (517, 392, 88.1, 239 and 171.1 respectively for Alternatives 1-5). For these reasons, all alternatives are thought to meet Lewis and Clark Forest Plan Standards.

2. ENVIRONMENTAL CONSEQUENCES

Natural disturbance events (wildfire) and the normal airflow patterns are the factors that most influence the air quality of the Rocky Mountain Ranger District Travel Plan analysis area. Exhaust emissions from upwind sources, prescribed fire and emissions from users on the road and trail system of the analysis area are lesser contributing influences.

a. Alternative 1 – No Action Alternative

Air quality monitoring data for the Rocky Mountain Ranger District Travel Plan analysis area are not available, nor are use levels known on roads and trails within the analysis area by vehicles, motorcycles, ATVs, snowmobiles, hikers or horses and packstock. For these reasons only general statements about air quality can be made.

1. Direct and Indirect Effects

Natural disturbance events will continue to influence the air quality of the Rocky Mountain Ranger District Travel Plan analysis area. Given the current vegetative conditions, prolonged drought and associated fuel accumulations there is potential for large wildfires within and adjacent to the analysis area. Extended periods (several months) of elevated levels of emissions such as organic carbon, elemental carbon and particulate matter are possible.

The normal airflow patterns from the west or southwest will continue with strong winds possible from cold front passage and warm Chinook winds during winter.

Upwind exhaust emissions (organic compounds, sulfur compounds, carbon monoxide, carbon dioxide and others) from cars, pickups, self-contained campers, buses and tractor-trailer rigs along US Highway 2 and diesel powered trains along the BNSF transcontinental rail freight trunk route are likely to continue at current levels or possibly increase. These emissions have the potential to impact the northern end of the analysis area.

Prescribed fire such as the South Fork Sun River Prescribed Burn will have limited, short term impacts similar to wildfire on the analysis area.

Dust from vehicles and stock use of unpaved roads and trails and emissions from recreational vehicles powered by 2-stroke and 4-stroke engines (unburned hydrocarbons, carbon monoxide, oxides of nitrogen and others) generally increase with increasing numbers of vehicles or increased use.

The current levels of use of all kinds, winter and summer, on roads and trials in the Rocky Mountain R.D. Travel Plan analysis area are not well known. Additionally, air quality monitoring of current levels of use on roads and trails in the analysis area would be difficult to obtain and are not available now. Given the lack of specific data and the factors above, specific statements about impacts of current levels of use of the road and trail system in the analysis area on the air quality of the analysis area and adjacent Class 1 airsheds are not possible. Considering the normal airflow patterns, the emissions from vehicles on Highway 2, the emissions from trains on the BNSR freight trunk line, and potential affects of wildfires the impacts of current uses of analysis area roads and trails on the analysis area airshed and adjacent Class 1 airsheds are likely small enough to not be measurable.

2. Cumulative Effects

The following apply from the list of Cumulative Effects for the project.

Normal airflow patterns from the west and southwest will continue to dominate the analysis area. Occasional strong winds from passage of cold fronts and winter Chinooks are expected.

Emissions from wildfire and prescribed fire within the project area will continue to be episodic contributors of organic carbon, elemental carbon and particulate matter. Some wildfire incidents may last for several months.

Exhaust emissions from vehicles on US Highway 2 and the BNSF railway west of the Forest and along the north boundary will continue at current levels or possibly increase.

At some level, dust and exhaust emissions from motorized vehicle travel on Forest roads and trails will continue. Under certain dry conditions, stock use of Forest roads and trails may also contribute dust to the air.

Dust and exhaust emissions from construction equipment, drilling equipment and motorized vehicle travel will increase at some level if the Fina/Longwell oil and gas proposal (Section 26, T30N, R 13W) and Chevron/Devon energy drilling proposal (Section 35, T29N, R12W) are approved and initiated. If the proposals result in producing wells the dust and exhaust emissions will continue for some time. The dust and exhaust emissions will be short lived if the proposals do not result in producing wells.

b. Action Alternatives 2-5

Once again, air quality monitoring data for the Rocky Mountain R.D. Travel Plan analysis area are not available, nor are use levels known on roads and trails within the analysis area by full size vehicles, motorcycles, ATVs, snowmobiles, hikers or horses and packstock. However, the Action Alternatives can be evaluated in relative terms given the assumption that motorized use creates more exhaust emissions and dust than stock or foot travel. In a general way, the Action Alternatives can be compared according to the miles of roads and trails open to motorized use.

Table III-5. Miles of Motorized Roads and Trails

Alternative	Miles of Open Roads	Miles of Motorized Trails	Total
1	118	399	517
2	101	291	392
3	87	1.1	88.1
4	109	130	239
5	98	73.1	171.1

All Action Alternatives have fewer motorized miles of roads and trails than the Existing Condition, Alternative 1. Alternative 3 has he smallest total of motorized roads and trails followed by Alternatives 5, 4 and 2. With Alternative 3 having the fewest miles where motorized vehicles could produce exhaust emissions and dust, this alternative would also have the least impact on the air quality of the analysis area and adjacent areas.

2. Cumulative Effects

Cumulative effects for the Action Alternatives are very similar to Alternative 1, the No Action Alternative.

c. Effects Common to All Alternatives

Finklin (1986) indicates normal airflow patterns in Glacier National Park and the Rocky Mountain Division are generally from west to southwest. The mountainous area along the Rocky Mountain Division has maximum wind speeds in winter/early spring, and minimum in summer. Winds on peaks and higher elevations average nearly 20 mph during November-February. Finklin (1986) also notes that the eastside of Glacier National Park and the Rocky Mountain Division has consistent and exceptionally strong warm chinook winds during winter. Cold front passage during the summer/fall will also produce exceptionally strong winds.

Emissions from fire, both wildland and prescribed, are an important episodic contributor to visibility-impairing aerosols, including organic carbon, elemental carbon and particulate matter (PM2.5) (Story 2000; Lewis and Clark National Forest 2000). Agricultural burning emissions east of the analysis area and their effects may be a concern but these impacts have not been quantified.

US Highway 2 and the Burlington Northern and Santa Fe Railway (BNSF) between East Glacier and Essex separate the north end of the project area from Glacier National Park. Between 1992 and 2003 the daily average number of vehicles per day on Highway 2 passing through the automatic recorder located 10 miles northeast of East Glacier ranged from 1818 to 2238 (State of Montana 2004). In 2003 the peak number of vehicles per day occurred on the weekends of July with over 3000 vehicles counted. Not all of these vehicles would travel southwest of the analysis area but much of the summer traffic does. The BNSF route is a major transcontinental rail freight trunk route with annual freight traffic of between 52 and 67 million gross tons (State of Montana 2000). This BNSF route also serves AMTRAC. The diesel engines of these trains emit organic compounds, sulfur compounds, carbon monoxide, carbon dioxide, water vapor, and trace metals that may be carcinogenic by inhalation (EPA 2000a). The upwind emissions from US Highway 2 traffic and BNSF railway have not been quantified but are potentially important with respect to the northern end of the analysis area.

Dust from vehicles and stock use of unpaved roads and trails and emissions from recreational vehicles powered by 2-stroke and 4-stroke engines (unburned hydrocarbons, carbon monoxide, oxides of nitrogen and others) generally increase with increasing numbers of vehicles or increased use.

The current levels of use of all kinds, winter and summer, on roads and trails in the Rocky Mountain R.D. Travel Plan analysis area are not well known. Additionally, air quality monitoring of current levels of use on roads and trails in the analysis area would be difficult to obtain and are not available now. Given the lack of data and the factors above, specific statements about impacts of current levels of use of the road and trail system in the analysis area on the air quality of the analysis area and adjacent Class 1 airsheds are not possible. Considering the normal airflow patterns, the emissions from vehicles on Highway 2, the emissions from trains on the BNSR freight trunk line, and potential affects of wildfires the impacts of current uses of analysis area roads and trails on the analysis area airshed and adjacent Class 1 airsheds are likely small enough to not be measurable.

The Cumulative Effects as described above for the No Action and Action Alternatives are very similar. Potential impacts from upwind sources, emissions from wildfire or prescribed fire, existing impacts from vehicles on US Highway 2 and the BNSF railway and potential impacts from oil and gas development are described above.

d. Effects Common to All Action Alternatives

The effects common to all Action Alternatives include the effects common to all Alternatives above with an important exception.

Air quality monitoring data for the Rocky Mountain R.D. Travel Plan analysis area are not available, nor are use levels known on roads and trails within the analysis area by full size vehicles, motorcycles, ATVs, snowmobiles, hikers or horses and packstock. However, the Action Alternatives can be evaluated in relative terms given the assumption that motorized use creates more exhaust emissions and dust than stock or foot travel. In a general way, the Action Alternatives can be compared according to the miles of roads and trails open to motorized use.

All Action Alternatives have fewer motorized miles of roads and trails than the Existing Condition, Alternative 1 (517, 392, 88, 239 and 171 respectively for Alternatives 1-5). Alternative 3 has he smallest total of motorized roads and trails followed by Alternatives 5, 4 and 2. With Alternative 3 having the fewest miles where motorized vehicles could produce exhaust emissions and dust, this alternative would also have the least impact on the air quality of the analysis area and adjacent areas.