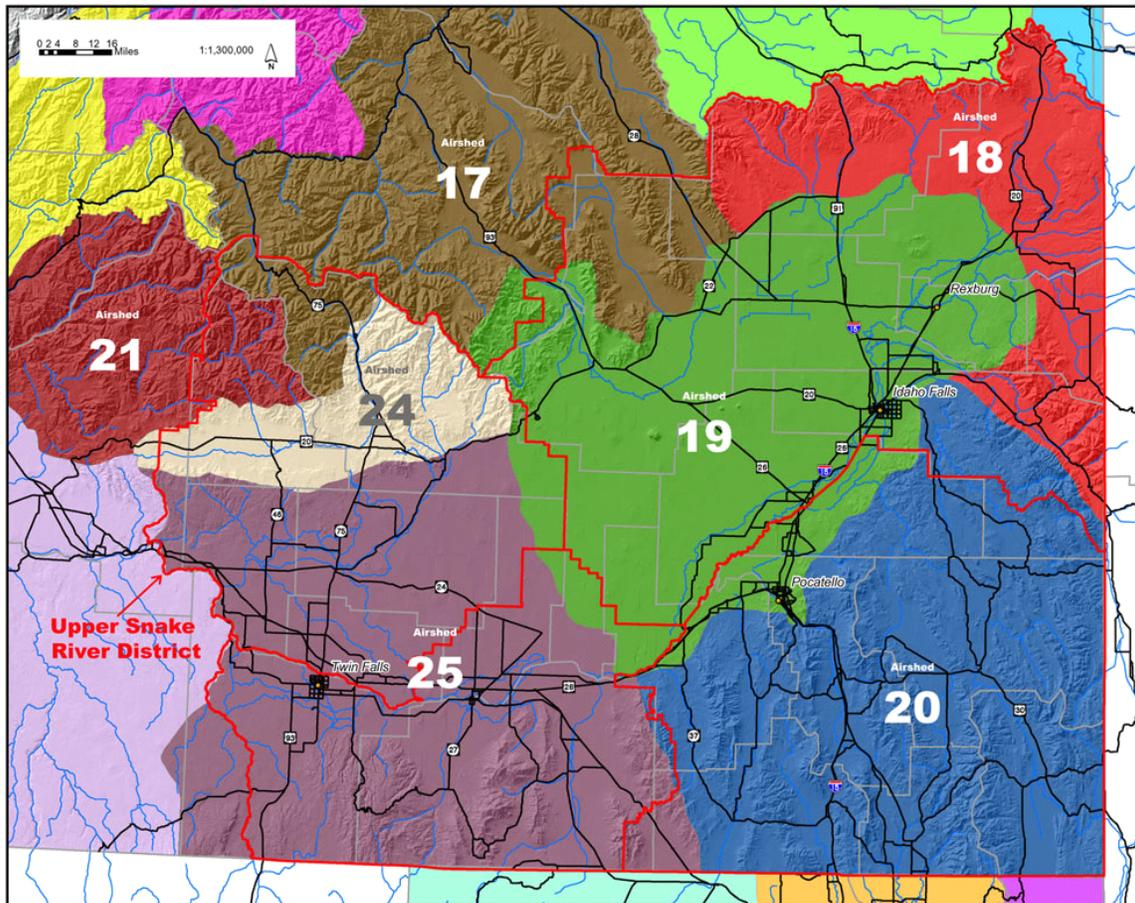


APPENDIX L - AIRSHED CHARACTERIZATION REPORT

L.1 INTRODUCTION

The state of Idaho has been divided into sixteen airsheds. The planning area is located within all or portions of seven airsheds including airsheds 17, 18, 19, 20, 21, 24, and 25. The majority of the Idaho Falls and Twin Falls Districts fall within airsheds 18, 19, 20, 24, and 25 with only minor portions falling within airsheds 17 and 21 (see Map L-1).



Map L-1. Planning Area Boundaries and Airshed Boundaries.

Impact zones are areas considered to be smoke sensitive by Idaho Department of Environmental Quality (IDEQ) and are given additional air quality protection as needed. There are ten impact zones identified in the state of Idaho, four of which fall within the planning area boundary. They include Idaho Falls, Sun Valley, Pocatello, and Twin Falls. Two other impact zones fall within a 100-kilometer radius of the Districts' boundary and include Boise and Salmon.

Within the planning area boundaries there are two PM₁₀ non-attainment areas including Portneuf Valley (Pocatello area) and Fort Hall Indian Reservation (a Tribal/Environmental Protection Agency [EPA] non-attainment area). Two other PM₁₀ non-attainment areas fall within a 100-kilometer radius of the planning area boundary and include Boise and Ogden, Utah.

L.2 AIRSHED 18

A. AIRSHED DESCRIPTION

Airshed 18 covers over 2,254,389 acres and is primarily federal land, with federal ownership occupying approximately 63% of the airshed. The ownership summary within the airshed is summarized in Table 1.

TABLE 1. AIRSHED 18 OWNERSHIP SUMMARY¹							
Size	BLM	NPS	Private	State	USFS	Water	Unknown
Total Acres	257,372	36,093	663,480	126,324	1,136,830	34,291	0.058
% of Airshed	11	2	29	6	50	2	< 1

¹ This table does not include the counties that make up 1% or less of the airshed.

Six USRD counties are in Airshed 18: Clark, Fremont, Madison, Bonneville, Jefferson, and Teton Counties. Table 2 summarizes the percentage of airshed area occupied by each county.

TABLE 2. AIRSHED 18 COUNTY SUMMARY						
Size	Clark	Fremont	Madison	Bonneville	Jefferson	Teton
Total Acres	792,695	843,808	23,921	298,032	3	266,310
% of Airshed	35	37	1	13	< 1	12

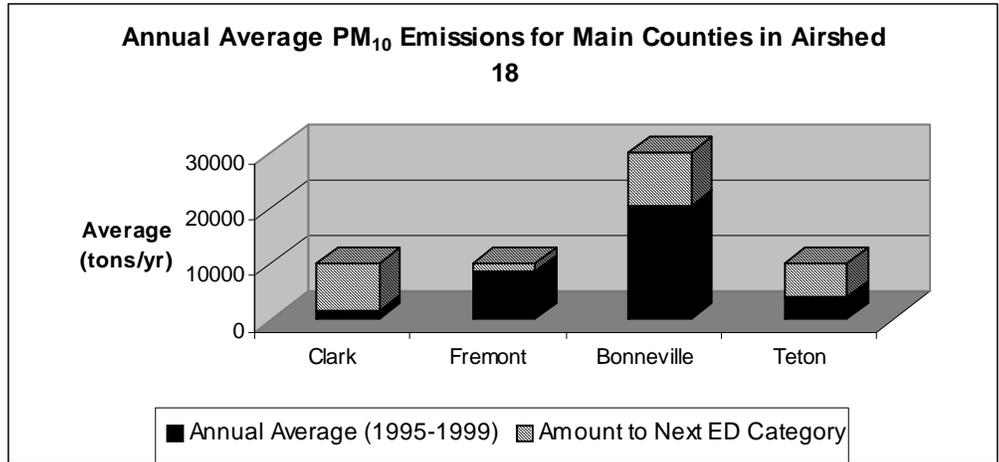
¹ This table does not include the counties that make up 1% or less of the airshed.

Particulate Emissions Summary

Annual (1995-1999) average emissions for PM₁₀ in these counties range between 1,442 tons/year (Clark County) to 20,355 tons/year (Bonneville County). Of the 22 counties evaluated in the Districts, Clark and Bonneville rank 22nd and 3rd, respectively (1st being the highest annual average PM₁₀ emissions). For PM_{2.5}, the 5-year average emissions range between 303 tons/year (Clark County) and 3,914 tons/year (Bonneville County). Of the 22 counties evaluated in the Districts, Clark and Bonneville rank 22nd and 4th for PM_{2.5}, respectively.

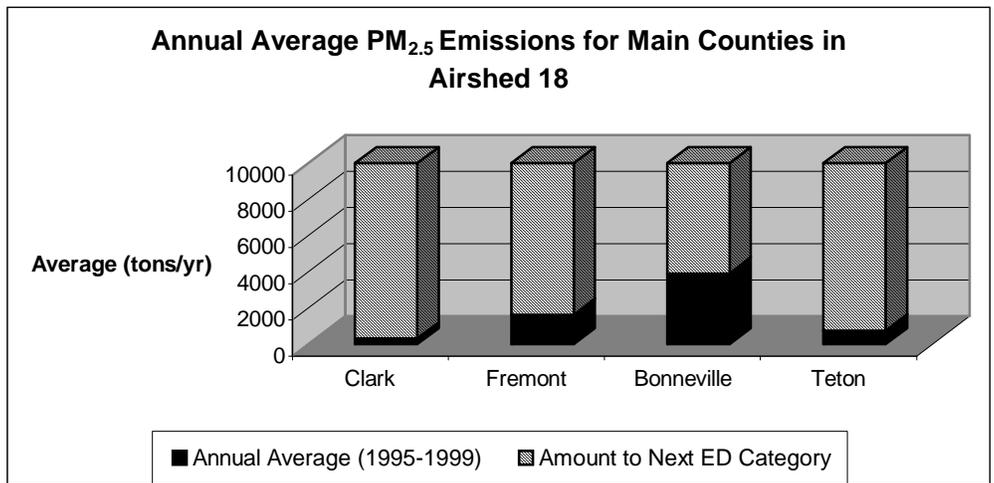
All the counties in Airshed 18 show an improving (decreasing annual emissions) trend in emissions over a 5-year period (1995-1999) for both PM₁₀ and PM_{2.5}. Figures 1 and 2 graphically present the PM₁₀ and PM_{2.5} emissions from each major county within the airshed. The "amount to next ED category" on the graphs indicates the remaining amount of emissions possible before the next emissions distribution (ED) category at 10,000 tons/year is reached. The 10,000

tons/year increment was chosen because all counties in Idaho with a PM₁₀ nonattainment area have at a minimum 10,000 tons/year of PM₁₀ emissions. It is not an official EPA or IDEQ threshold.



Note: This figure contains only the major counties within the airshed. The counties that consist of 1% or less of the airshed are not included.

Figure 1. Annual Average PM₁₀ Emissions for Main Counties in Airshed 18.



Note: This figure contains only the major counties within the airshed. The counties that consist of 1% or less of the airshed are not included.

Figure 2. Annual Average PM_{2.5} Emissions for Main Counties in Airshed 18.

In general, fugitive dust is the largest contributor of PM₁₀ and PM_{2.5} followed by the "Agriculture and Forestry" category. Tables 3 and 4 summarize the top three contributors of PM₁₀ and PM_{2.5} for each major county within Airshed 18. The counties that make up 1% or less of the airshed are not included since the majority of particulate emissions consist of the emissions from the main counties.

TABLE 3. MAJOR CONTRIBUTORS (%) OF PM₁₀ IN COUNTIES (1999) ¹

Source	Clark	Fremont	Bonneville	Teton
Fugitive Dust (% PM ₁₀ contribution)	57	74	78	73
Agriculture & Forestry (% PM ₁₀ contribution)	38	23	18	23
Other Major Contributor	2 (Combustion- Other)	2 (Residential Wood)	2 (Waste Open Burning)	1 (Residential Wood)

¹ This table does not include the counties that make up 1% or less of the airshed.

TABLE 4. MAJOR CONTRIBUTORS (%) OF PM_{2.5} IN COUNTIES (1999) ¹

Source	Clark	Fremont	Bonneville	Teton
Fugitive Dust (% PM _{2.5} contribution)	46	60	64	59
Agriculture & Forestry (% PM _{2.5} contribution)	33	23	17	23
Other Major Contributor	8 (Combustion- Other)	8 (Residential Wood)	8 (Waste Open Burning)	7 (Residential Wood)

¹ This table does not include the counties that make up 1% or less of the airshed.

Monitoring Network

Airshed 18 currently does not have a PM₁₀ ambient air quality monitor. There are no federal designated PM₁₀ non-attainment areas within this airshed.

B. SENSITIVE AREAS WITHIN AIRSHED

In addition to sensitive areas listed in Table 5, this airshed is within 100 kilometers of Grand Teton and Yellowstone National Parks, Craters of the Moon National Monument, and the Bridger Wilderness, all of which are federally mandated Class I visibility areas. There are no impact zones located within Airshed 18 (see Figure 3-9).

C. FIRE HISTORY

Since the 1990s, this airshed has not been affected by large wildfire events (>5,000 acres). There were a number of wildfires in the 1970s and 1980s. The history of wildfire and area burned for BLM lands is presented in Table 6.

TABLE 5. SUMMARY OF SENSITIVE AREAS WITHIN AIRSHED 18

Counties (% of County within Airshed)	Communities at Risk	Sensitive Populations (Medical facilities, etc.)	Transportation
Bonneville (25%)	Irwin and Swan Valley	N/A	Fanning Field
Clark (71%)	Dubois, Kilgore, and Spencer	N/A	I-15, US 22, Dubois Municipal Airport
Freemont (71%)	Ashton, Drummond, Henry's Lake, Island Park, Macks Inn, Marysville, and Warm River	N/A	I-15, US 20
Teton (95%)	Driggs, Felt, Teton, and Victor	Teton Valley Hospital and Surgicenter (13 beds)	I-15, US 20, US 26, Driggs Municipal Airport

TABLE 6. WILDFIRE AND AREA BURNED HISTORY OF BLM LAND

Decade	Acres Burned¹	Square Miles Burned	# of Years that Burned 10,000+ Acres	# of Years that Burned 5,000+ Acres	# of Years with No Fires > 300 Acres
2000-2001	107	0.2	0	0	2
1990-2000	75	0.1	0	0	10
1980-1989	16,649	26.0	1	1	7
1970-1979	12,589	19.7	0	1	4
32-year Airshed Total	29,420	46.0	1	2	23

¹ The acreage figures shown in this table represent total number of wildfire acres. Some areas may have burned more than once.

D. DISPERSION POTENTIAL

To accurately evaluate the dispersion potential of the particulate emissions generated within the airshed, a refined model such as CALPUF or CALMET is recommended. However, a more basic dispersion potential evaluation can be done by reviewing pertinent meteorological data. Wind speeds for the planning area tend to be highest in the summer and lowest in the fall. The corresponding wind direction in April and July (higher wind speeds) tends to be from the southwest to the northeast. During times of lower wind speeds (October), the wind predominantly blows from the northeast to the southwest.

When the wind in Airshed 18 blows from the southwest, typically in the spring and summer, it is possible that smoke may be carried towards Yellowstone National Park Class I visibility area. In the fall, when the wind tends to blow from the northeast, smoke could be carried into Airshed 19 and toward the major population centers of Idaho Falls and Rexburg, as well as towards the Craters of the Moon National Monument Class I visibility area.

An indicator for potential stagnate air is when mixing heights are at or below 1,640 feet (500 meters).¹ Early morning hours typically have lower mixing heights. For some of the lower elevation communities, trapping residual smoke could be of concern until afternoon heating increases mixing heights and/or an inversion breaks.

Afternoon mixing heights are generally best during the summer due to greater heating during the day, while the lowest mixing heights are expected during the fall. Burning near a community requires careful consideration of the amount of residual smoke that may be produced and trapped until dispersion can lift the smoke out of the area.

L.3 AIRSHED 19

A. AIRSHED DESCRIPTION

Airshed 19 covers over 4,889,268 acres. Federal ownership occupies approximately 54% of this airshed and 40% is privately owned (Table 7).

Twelve USRD counties fall within this airshed: Blaine, Power, Bannock, Bingham, Bonneville, Madison, Jefferson, Clark, Fremont, Teton, Minidoka, and Butte Counties (Table 8).

Particulate Emissions Summary

Annual (1995-1999) average emissions for PM₁₀ in these counties range between 1,442 tons/year (Clark County) and 25,610 tons/year (Bingham County). Of the 22 counties evaluated in the USRD, Clark and Bingham rank 22nd and 1st, respectively (1st being the highest annual average PM₁₀ emissions). For PM_{2.5}, the annual average emissions range between 303 tons/year (Clark County) and 4,568 (Bingham County). Of the 22 counties evaluated in the USRD, Clark and Bingham rank 22nd and 2nd, respectively.

All the counties in Airshed 19 show an improving (decreasing annual emissions) trend in emissions over a 5-year period (1995-1999) for both PM₁₀ and PM_{2.5}. Figures 3 and 4 graphically present the PM₁₀ and PM_{2.5} emissions from each major county within the airshed. The "amount to next ED category" on the graphs indicates the remaining amount of emissions possible before the next ED category at 10,000 tons/year is reached. The 10,000 tons/year increment was chosen because all counties in Idaho with a PM₁₀ nonattainment area have at a minimum 10,000 tons/year of PM₁₀ emissions. It is not an official EPA or IDEQ threshold.

In general, fugitive dust is the largest contributor of PM₁₀ and PM_{2.5} followed by the "Agriculture and Forestry" category. Tables 9 and 10 summarize the top three contributors of PM₁₀ and PM_{2.5} for each major county within Airshed 19. The counties that make up 1% or less of the airshed are not included since the majority of particulate emissions consist of the emissions from the main counties.

¹ Southern Forestry Smoke Management Guidebook, GTR SE-10, 1976.

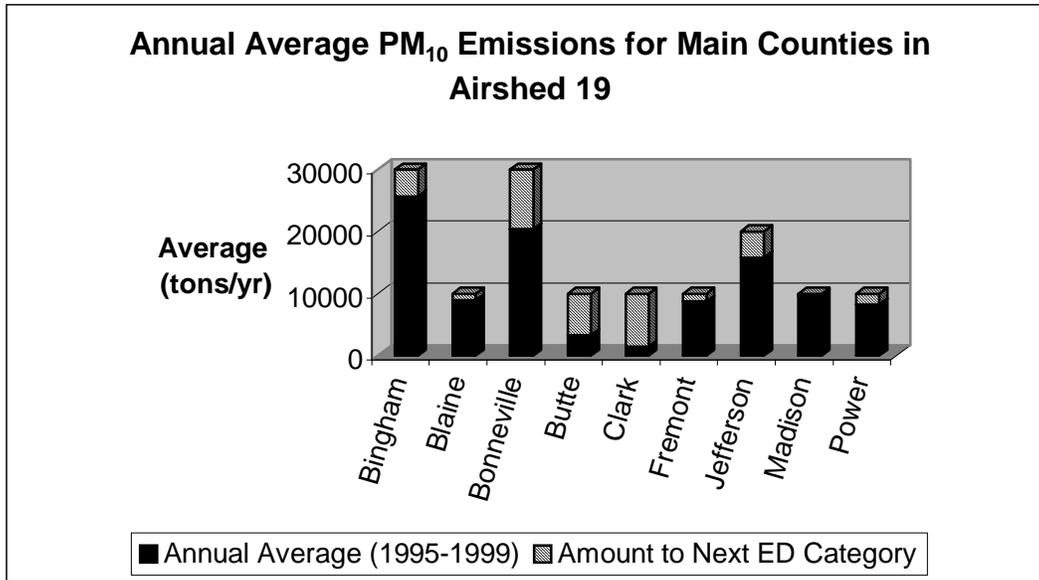
TABLE 7. AIRSHED 19 OWNERSHIP SUMMARY

Size	BLM	NPS	Private	State	USFS	USFWS	Water	BIA	DOI	MIL
Total Acres	1,738,773	53,188	1,944,659	214,297	81,097	11,589	71,063	205,052	568,466	1,083
% of Airshed	36	1	40	4	2	< 1	1	4	12	< 1

TABLE 8. AIRSHED 19 COUNTY SUMMARY

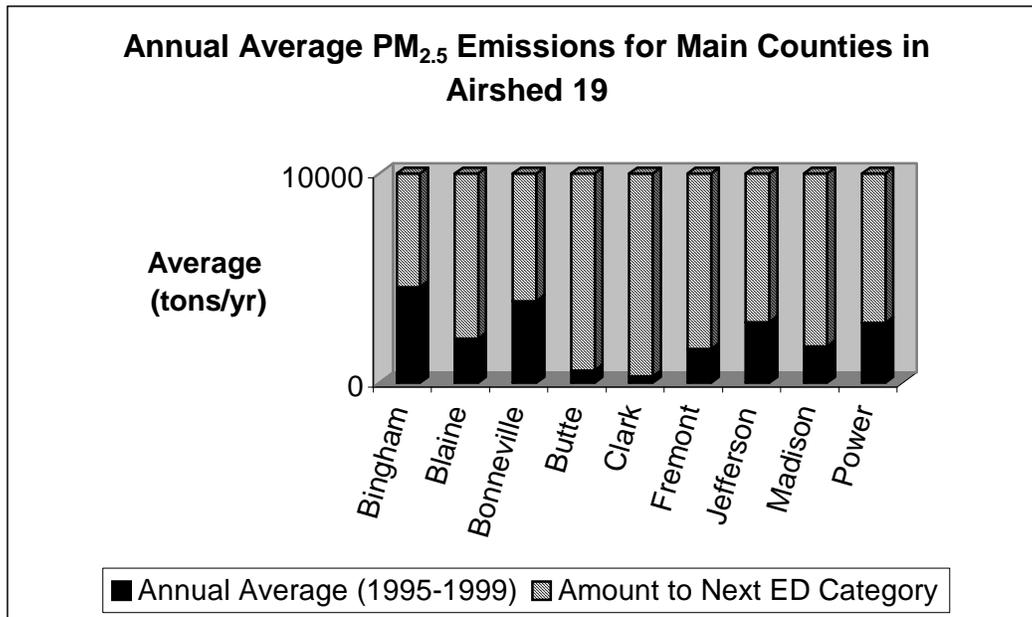
Size	Blaine	Power	Bingham	Bonneville	Madison	Jefferson	Fremont	Clark	Butte	Others ¹
Total Acres	397,082	374,277	993,248	325,515	280,762	710,356	341,599	204,283	980,732	207,275
% of Airshed	8	8	20	7	6	15	7	4	20	4

¹ Bannock, Teton, and Minidoka Counties



Note: This figure contains only the major counties within the airshed. The counties that consist of 1% or less of the airshed are not included.

Figure 3. Annual Average PM₁₀ Emissions for Main Counties in Airshed 19.



Note: This figure contains only the major counties within the airshed. The counties that consist of 1% or less of the airshed are not included.

Figure 4. Annual Average PM_{2.5} Emissions for Main Counties in Airshed 19.

TABLE 9. MAJOR CONTRIBUTORS (%) OF PM₁₀ IN COUNTIES (1999)¹								
Source	Blaine	Power	Bingham	Bonneville	Madison	Fremont	Clark	Butte
Fugitive Dust (% PM ₁₀ contribution)	81	32	73	78	81	74	57	76
Agriculture & Forestry (% PM ₁₀ contribution)	11	41	24	18	16	23	38	21
Other Major Contributors	5 (Combustion - Other)	21 (Mineral Product Processing)	1 (Commercial/ Institutional Coal Combust.)	2 (Waste Open Burning)	1 (Residential Wood)	2 (Residential Wood)	2 (Combustion - Other)	1 (Residential Wood)

¹ This table does not include the counties that make up less than 1% of the airshed.

TABLE 10. MAJOR CONTRIBUTORS (%) OF PM_{2.5} IN COUNTIES (1999)¹								
Source	Blaine	Power	Bingham	Bonneville	Madison	Fremont	Clark	Butte
Fugitive Dust (% PM _{2.5} contribution)	57	14	62	64	69	60	46	65
Agriculture & Forestry (% PM _{2.5} contribution)	9	22	25	17	16	23	33	21
Other Major Contributors	20 (Combustion- Other)	50 (Mineral Product Processing)	4 (Residential Wood)	8 (Waste Open Burning)	6 (Residential Wood)	8 (Residential Wood)	8 (Combustion- Other)	5 (Residential Wood)

¹ This table does not include the counties that make up less than 1% of the airshed.

Monitoring Network²

Airshed 19 has 15 PM₁₀ ambient air quality monitors (Table 11). The PM₁₀ monitors are located in Chubbuck (1), Pocatello (4), Idaho Falls (2), Rexburg (1), 2 miles east of Fort Hall (1), 4 miles northeast of Chubbuck (1), 8 miles west of Pocatello (1), and 4 miles west of Chubbuck (4). Generally, the 24-hour PM₁₀ average levels are below the 24-hour NAAQS (150 micrograms per cubic meter [µg/m³]) limit in this airshed. In 1999, however, the 24-hour PM₁₀ NAAQS limit was exceeded three times in Pocatello. Monitor 160050015-01, located in Pocatello, recorded a 1st highest 24-hour value of 183 µg/m³ in 1999. The Portneuf Valley and Fort Hall Reservation are federally designated non-attainment areas for PM₁₀ in this airshed.

Monitor ID	County	City
160050004 - 1	Bannock	Pocatello
160050005 - 1	Bannock	Pocatello
160050006 - 1	Bannock	Chubbuck
160050015 - 1	Bannock	Pocatello
160050015 - 2	Bannock	Pocatello
160050020 - 1	Bannock	4 miles NE of Chubbuck
160110002 - 1	Bingham	2 miles E of Fort Hall
160190006 - 1	Bonneville	Idaho Falls
160190010 - 1	Bonneville	Idaho Falls
160650001 - 1	Madison	Rexburg
160770008 - 1	Power	8 miles W of Pocatello
160770009 - 1	Power	4 miles W of Chubbuck
160770010 - 1	Power	4 miles W of Chubbuck
160770011 - 1	Power	4 miles W of Chubbuck
160770011 - 2	Power	4 miles W of Chubbuck

B. SENSITIVE AREAS WITHIN AIRSHED

In addition to sensitive areas listed in Table 12 this airshed is within 100 kilometers of the Sawtooth and Bridger Wilderness, Grand Teton and Yellowstone National Parks, and Craters of the Moon National Monument Class I visibility areas. Idaho Falls and Pocatello are impact zones within Airshed 19. Portneuf Valley and Fort Hall Reservation are non-attainment areas for PM₁₀ (see Figure 3-9).

² Idaho Air Quality Monitors for PM₁₀ obtained from <http://www.epa.gov/air/data/index.html>. In cases where the exact locations of monitors are unavailable, monitors may not be located in the airshed.

TABLE 12. SUMMARY OF SENSITIVE AREAS WITHIN AIRSHED 19			
Counties (% of County within Airshed)	Communities at Risk	Sensitive Populations (Medical facilities, etc.)	Transportation
Bannock (15%)	Chubbuck and Pocatello	Northwestern Band of Shoshone Health Center, Pocatello Regional Medical Center, Portneuf Medical Center (260 beds total)	I-15, I-86, US 30, US 91, Pocatello Regional Airport
Bingham (74%)	Aberdeen, Atomic City, Basalt, Blackfoot, Firth, Fort Hall, Moreland, Pingree, Riverside, Rockford, Shelley, Springfield, and Sterling	Bingham Memorial Hospital and State Hospital South (174 beds total) (2 hospitals, 317 beds in Shelley)	I-15, US 39, I-86, US 26, US 20, US 91, Aberdeen Municipal Airport, McCarley Field
Bonneville (27%)	Idaho Falls, Iona, Lincoln, and Ucon	Eastern Idaho Regional Medical Center (341 beds total)	I-15, US 20, US 26, US 91, Fanning Field
Butte (68%)	Arco, Butte City, Howe, and Moore	Lost Rivers District Hospital (17 beds)	I-15, I-86, US 20, US 26, US 93, Arco - Butte County Airport
Freemont (29%)	Chester, Newdale, Parker, St. Anthony, and Teton	N/A	US 20, Stanford Field Airport
Jefferson (100%)	Garfield, Hamer, Heise, Lewisville, Lorenzo, Montevue, Mud Lake, Rigby, Ririe, Roberts, and Terreton	N/A	I-15, US 20, US 26, Rigby-Jefferson County Airport
Madison (92%)	Rexburg, Sugar City, and Thornton	Madison Memorial Hospital (50 beds)	US 20, Rexburg-Madison County Airport
Power (41%)	American Falls	Harms Memorial Hospital (10 beds)	I-15, I-84, I-86, American Falls Airport, Pocatello Regional Airport

C. FIRE HISTORY

Airshed 19 has been affected by large wildfires in the past three decades. In 17 of the previous 32 years, more than 5,000 acres were burned by wildfires, and 10 of those years had more than 10,000 acres burned by wildfires. The history of wildfire and area burned for BLM land are presented in Table 13.

Decade	Acres Burned¹	Square Miles Burned	# of Years that burned 10,000+ Acres	# of Years that burned 5,000+ Acres	# of Years with No Fires > 300 Acres
2000-2001	143,804	224.7	1	1	0
1990-2000	515,762	805.9	6	7	1
1980-1989	93,599	146.2	1	4	0
1970-1979	142,262	222.3	2	5	1
32-year Airshed Total	895,427	1,399.1	10	17	2

¹ The acreage figures shown in this table represent total number of wildfire acres. Some areas may have burned more than once.

D. DISPERSION POTENTIAL

To accurately evaluate the dispersion potential of the particulate emissions generated within the airshed, a refined model such as CALPUF or CALMET is recommended. However, a more basic dispersion potential evaluation can be done by reviewing pertinent meteorological data. Wind speeds for the planning area tend to be highest in the summer and lowest in the fall. The corresponding wind direction in April and July (higher wind speeds) tends to be from the southwest to the northeast. During times of lower wind speeds (October), the wind predominantly blows from the northeast to the southwest.

Airshed 19 encompasses a portion of the low elevation Snake River Plain. The airshed is bounded by the low elevation, relatively flat Airshed 25 in the southwest, the mountainous Airshed 17 in the northwest, and the hilly Airshed 20 in the southeast. When the wind in Airshed 19 blows from the southwest, typically in the spring and summer, it is possible that smoke may be carried into Airshed 18 and towards Yellowstone and Grand Teton National Parks Class I visibility areas. In the fall, when the wind tends to blow from the northeast, smoke could be carried towards the Idaho Falls and Pocatello impact zones as well as towards Craters of the Moon National Monument class I visibility area.

An indicator for potential stagnate air is when mixing heights are at or below 1,640 feet (500 meters).³ Early morning hours typically have lower mixing heights. For some of the lower elevation communities, trapping residual smoke could be of concern until afternoon heating increased mixing heights and/or an inversion breaks.

Afternoon mixing heights are generally best during the summer due to greater heating during the day, while the lowest mixing heights are expected during the fall. Burning near a community requires careful consideration of the amount of residual smoke that may be produced and trapped until dispersion can lift the smoke out of the area.

³ Southern Forestry Smoke Management Guidebook, GTR SE-10, 1976.

L.4 AIRSHED 20

A. AIRSHED DESCRIPTION

Airshed 20 covers over 4,956,484 acres. Federal ownership occupies approximately 43% of this airshed and 49% is privately owned (Table 14).

Nine counties fall within this airshed: Bear Lake, Franklin, Oneida, Bannock, Power, Caribou, Bingham, Bonneville, and Cassia Counties (Table 15).

Particulate Emissions Summary

Annual (1995-1999) average emissions for PM₁₀ in these counties range between 4,523 tons/year (Oneida County) to 25,610 tons/year (Bingham County). Of the 22 counties evaluated in the USRD, Oneida and Bingham rank 18th and 1st, respectively (1st being the highest annual average PM₁₀ emissions). For PM_{2.5}, the annual average emissions range between 873 tons/year (Oneida County) to 4,568 tons/year (Bingham County). Of the 22 counties evaluated in the USRD, Oneida and Bingham rank 18th and 2nd, respectively.

All the counties in Airshed 20 show an improving (decreasing annual emissions) trend in emissions over a 5-year period (1995-1999) for both PM₁₀ and PM_{2.5}. Figures 5 and 6 graphically present the PM₁₀ and PM_{2.5} emissions from each major county within the airshed. The "amount to next ED category" on the graphs indicates the remaining amount of emissions possible before the next ED category at 10,000 tons/year is reached. The 10,000 tons/year increment was chosen because all counties in Idaho with a PM₁₀ nonattainment area have at a minimum 10,000 tons/year of PM₁₀ emissions. It is not an official EPA or IDEQ threshold.

In general, fugitive dust is the largest contributor of PM₁₀ and PM_{2.5} followed by the "Agriculture and Forestry" category. Tables 16 and 17 summarize the top three contributors of PM₁₀ and PM_{2.5} for each major county within Airshed 20. The county that makes up less than 1% of the airshed is not included since the majority of particulate emissions consist of the emissions from the main counties.

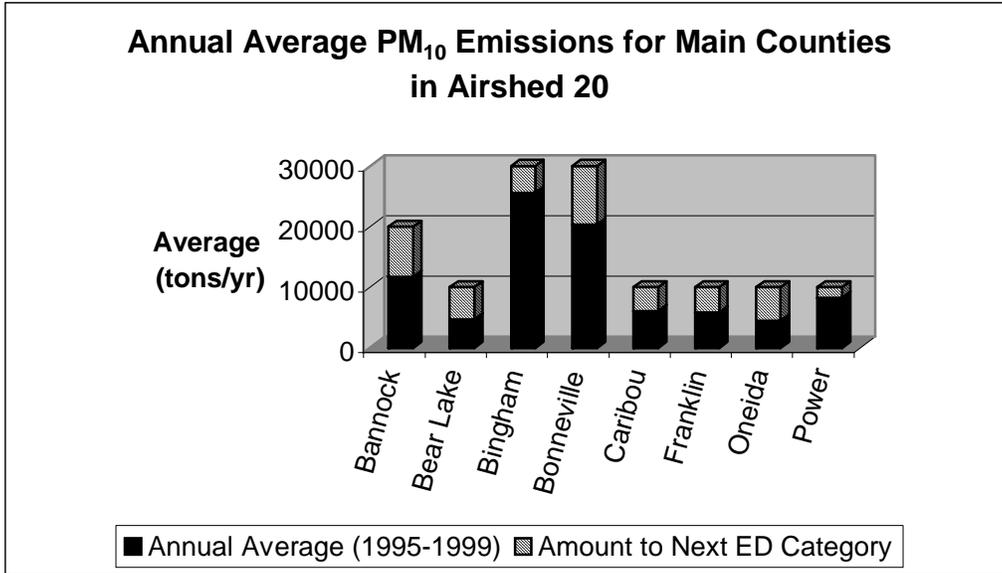
*Monitoring Network*⁴

Airshed 20 has three PM₁₀ ambient air quality monitors (Table 18). The PM₁₀ monitors are located in Inkom (1) and Soda Springs (2). Generally, the 24-hour PM₁₀ average levels are below the 24-hour NAAQS (150 µg/m³) limit in this airshed. In 2002, the 1st highest 24-hour PM₁₀ value recorded in Soda Springs was 45 µg/m³. The Portneuf Valley federally designated non-attainment areas for PM₁₀ in located within this airshed (see Figure 3-9).

⁴ Idaho Air Quality Monitors for PM₁₀ obtained from <http://www.epa.gov/air/data/index.html>. In cases where the exact locations of monitors are unavailable, monitors may not be located in the airshed.

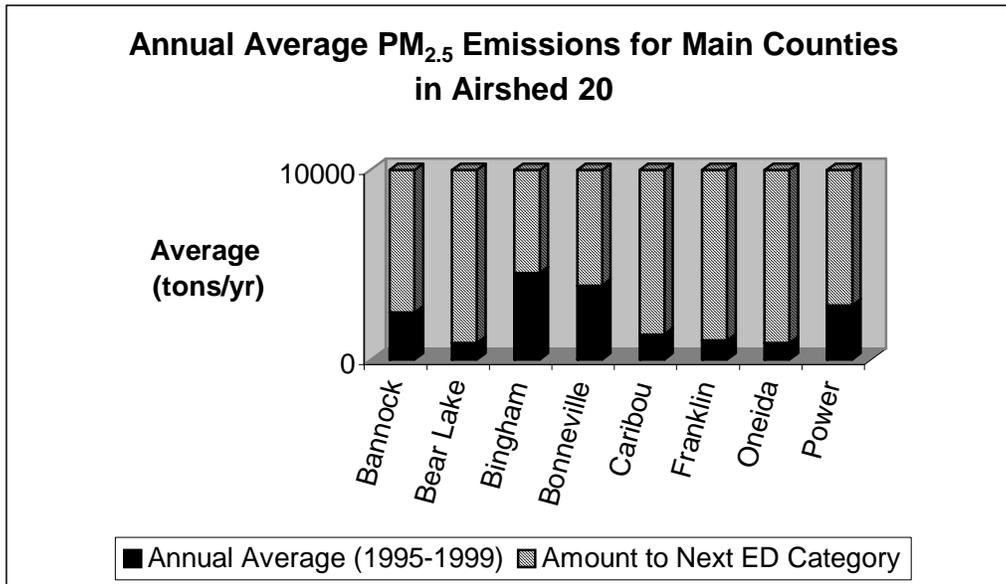
TABLE 14. AIRSHED 10 OWNERSHIP SUMMARY								
Size	BLM	Private	State	USFS	USFWS	Water	BIA	MIL
Total Acres	518,586	2,433,360	332,916	1,265,303	28,979	60,409	313,895	3,036
% of Airshed	10	49	7	26	1	1	6	< 1

TABLE 15. AIRSHED 20 COUNTY SUMMARY									
Size	Bear Lake	Franklin	Oneida	Bannock	Power	Caribou	Bingham	Bonneville	Cassia
Total Acres	667,929	417,415	652,597	621,634	522,654	1,139,100	346,386	569,546	14,282
% of Airshed	13	8	13	13	11	23	7	11	< 1



Note: This figure contains only the major counties within the airshed. The county that consists of <1% of the airshed is not included.

Figure 5. Annual Average PM₁₀ Emissions for Main Counties in Airshed 20.



Note: This figure contains only the major counties within the airshed. The county that consists of <1% of the airshed is not included.

Figure 6. Annual Average PM_{2.5} Emissions for Main Counties in Airshed 20.

TABLE 16. MAJOR CONTRIBUTORS (%) OF PM₁₀ IN COUNTIES (1999) ¹

Source	Bear Lake	Franklin	Oneida	Bannock	Power	Caribou	Bingham	Bonneville
Fugitive Dust (% PM ₁₀ contribution)	65	77	63	81	32	52	73	78
Agriculture & Forestry (% PM ₁₀ contribution)	31	21	33	11	41	36	24	18
Other Major Contributor	1 (Residential Wood)	1 (Waste Open Burning)	2 (Combustion-Other)	3 (Mineral Product Processing)	21 (Mineral Product Processing)	1 (Combustion-Other)	1 (Commercial/Institutional Coal Combust.)	2 (Waste Open Burning)

¹ This table does not include the county that makes up less than 1 % of the airshed.

TABLE 17. MAJOR CONTRIBUTORS (%) OF PM_{2.5} IN COUNTIES (1999) ¹

Source	Bear Lake	Franklin	Oneida	Bannock	Power*	Caribou	Bingham	Bonneville
Fugitive Dust (% PM _{2.5} contribution)	51	67	51	61	14	36	62	64
Agriculture & Forestry (% PM _{2.5} contribution)	29	23	32	10	22	30	25	17
Other Major Contributor	7 (Combustion-Other)	3 (Waste Open Burning)	9 (Combustion-Other)	9 (Mineral Product Processing)	50 (Mineral Product Processing)	19 (Inorganic Chemical Mfg)	4 (Residential Wood)	8 (Waste Open Burning)

¹ This table does not include the county that makes up less than 1% of the airshed.

Monitor ID	County	City
160050016 - 1	Bannock	Inkom
160290003 - 1	Caribou	Soda Springs
160290030 - 1	Caribou	Soda Springs

B. SENSITIVE AREAS WITHIN AIRSHED

In addition to sensitive areas listed in Table 19, this airshed is within 100 kilometers of Craters of the Moon National Monument, Grand Teton and Yellowstone National Parks, and Bridger Wilderness Class I visibility areas. The Pocatello area is an impact zone within Airshed 20. The Portneuf Valley PM₁₀ non-attainment area is partially within Airshed 20 as well (see Figure 3-9).

Counties (% of County within Airshed)	Communities at Risk	Sensitive Populations (Medical facilities, etc.)	Transportation
Bannock (85%)	Arimo, Downey, Inkom, Lava Hot, McCammon, Samaria, Swanlake, and Virginia	N/A	I-15, I-91, US 40, Hyde Memorial Airport
Bear Lake (100%)	Bear Lake, Bennington, Bern, Bloomington, Dingle, Fish Haven, Geneva, Georgetown, Montpelier, Ovid, Paris, and St. Charles	Bear Lake Regional Hospital (15 beds)	US 30, US 89, I-15, Bear Lake County Airport
Bonneville (48%)	Bone	N/A	
Caribou (100%)	Bancroft, Conda, Grace, Soda Springs, and Wayan	Caribou Memorial Hospital and Living Center (27 beds)	I-15, US 30, US 34, Allen H Tigert Airport, Bancroft Municipal Airport
Franklin (100%)	Banida, Clifton, Dayton, Franklin, Mink Creek, Oxford, Preston, Thatcher, and Weston	Franklin County Medical Center (21 beds)	I-15, I-84, I-80, US 91, Preston Airport
Oneida (85%)	Holbrook, Malad City, and Stone	Oneida County Hospital (11 beds)	I-15, Malad Airport
Power (57%)	Arbon, Pauline, and Rockland		

C. FIRE HISTORY

Airshed 20 has experienced several large wildfires in the past decades. In 7 of the previous 32 years, more than 5,000 acres were burned by wildfires, and 4 of those years had more than 10,000 acres burned by wildfires. The history of wildfire and area burned for BLM land is presented in Table 20.

Decade	Acres Burned¹	Square Miles Burned	# of Years that Burned 10,000+ Acres	# of Years that Burned 5,000+ Acres	# of Years with No Fires > 300 Acres
2000-2001	19,716	30.8	1	1	0
1990-2000	40,289	63.0	1	4	2
1980-1989	28,500	44.5	2	2	3
1970-1979	1,236	1.9	0	0	9
32-year Airshed Total	89,741	140.2	4	7	14

¹ The acreage figures shown in this table represent total number of wildfire acres. Some areas may have burned more than once.

D. DISPERSION POTENTIAL

To accurately evaluate the dispersion potential of the particulate emissions generated within the airshed, a refined model such as CALPUF or CALMET is recommended. However, a more basic dispersion potential evaluation can be done by reviewing pertinent meteorological data. Wind speeds for the planning area tend to be highest in the summer and lowest in the fall. The corresponding wind direction in April and July (higher wind speeds) tends to be from the southwest. During times of lower wind speeds (October), the wind predominantly blows from the northeast.

Airshed 20 encompasses a region with various elevations, marked by stream valleys oriented north-south that channel into the Snake River. When evaluating the impacts of prescribed fires, the stream valleys may play a role in redirecting wind patterns within the airshed. The down-valley wind may carry smoke toward major population centers in Airshed 19, such as Pocatello and Idaho Falls, when the wind blows from the south.

An indicator for potential stagnate air is when mixing heights are at or below 1,640 feet (500 meters).⁵ Early morning hours typically have lower mixing heights. For some of the lower elevation communities, trapping residual smoke could be of concern until afternoon heating increased mixing heights and/or an inversion broke.

Afternoon mixing heights are generally best during the summer due to greater heating during the day, while the lowest mixing heights are expected during the fall. Burning near a community

⁵ Southern Forestry Smoke Management Guidebook, GTR SE-10, 1976.

requires careful consideration of the amount of residual smoke that may be produced and trapped until dispersion can lift the smoke out of the area.

L.5 AIRSHED 24

A. AIRSHED DESCRIPTION

Airshed 24 covers over 1,062,872 acres. Federal ownership occupies approximately 52% of this airshed and 47% is privately owned (Table 21).

TABLE 21. AIRSHED 24 OWNERSHIP SUMMARY					
Size	BLM	Private	State	USFS	Water
Total Acres	344,347	496,919	65,987	148,489	7,132
% of Airshed	32	47	6	14	1

Five USRD counties fall within Airshed 24: Blaine, Butte, Gooding, Lincoln, and Camas Counties (Table 22).

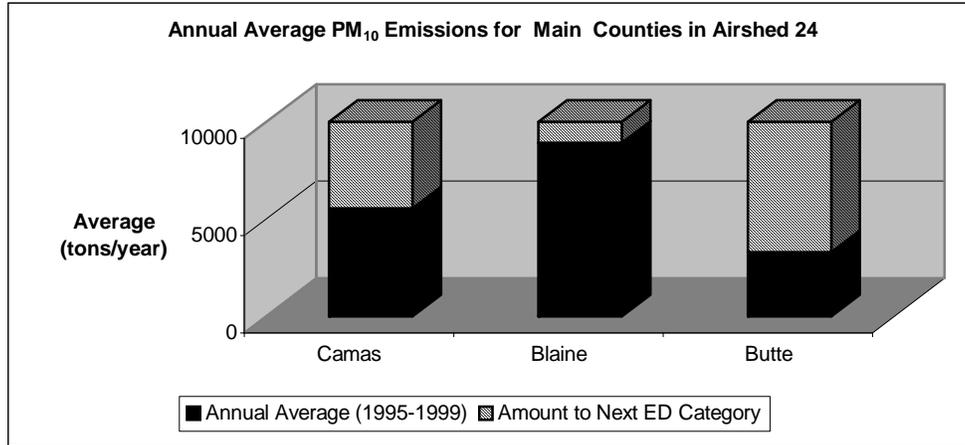
TABLE 22. AIRSHED 24 COUNTY SUMMARY					
Size	Blaine	Camas	Gooding	Lincoln	Butte
Total Acres	671,613	340,395	699	1,925	3,162
% of Airshed	63	32	< 1	< 1	< 1

Particulate Emissions Summary

Annual (1995-1999) average emissions for PM₁₀ in these counties range between 3,291 tons/year (Butte County) to 8,928 tons/year (Blaine County). Of the 22 counties evaluated in the USRD, Butte and Blaine rank 21st and 11th, respectively (1st being the highest annual average PM₁₀ emissions). For PM_{2.5}, annual average emissions range between 600 tons/year (Butte County) and 4,041 tons/year (Camas County). Of all the counties evaluated in the USRD, Butte and Camas Counties rank 21st and 3rd, respectively. Annual average PM₁₀ emissions for Gooding and Lincoln Counties were not considered in the ranking since Gooding and Lincoln Counties occupy less than 1 % of Airshed 24.

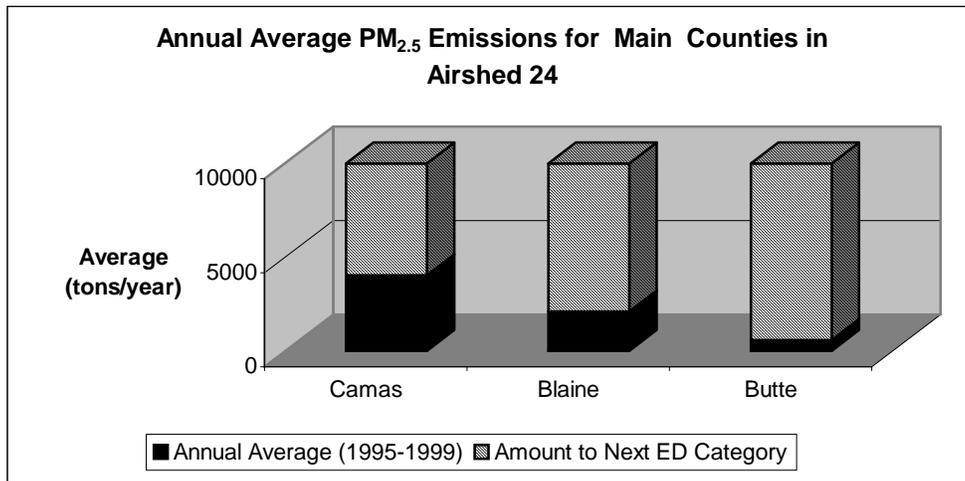
All the counties in Airshed 24 except Camas County show an improving (decreasing annual emissions) trend in emissions over a 5-year period (1995-1999) for both PM₁₀ and PM_{2.5}. There is a spike in emissions due to an increase in emissions from the "Combustion- Other" category in 1996. In 1997 emissions for both PM₁₀ and PM_{2.5} in Camas County dropped to 13.5% and 8%, respectively, in comparison to the 1996 levels, then showed a gentle increase between 1997 and 1999. Figures 7 and 8 graphically present the PM₁₀ and PM_{2.5} emissions from each major county within the airshed. The "amount to next ED category" on the graphs indicates the remaining amount of emissions possible before the next ED category at 10,000 tons/year is reached. The

10,000 tons/year increment was chosen because all counties in Idaho with a PM₁₀ nonattainment area have at a minimum 10,000 tons/year of PM₁₀ emissions. It is not an official EPA or IDEQ threshold.



Note: This figure contains only the major counties within the airshed. The counties that consist of <1% of the airshed are not included.

Figure 7. Annual Average PM₁₀ Emissions for Main Counties in Airshed 24.



Note: This figure contains only the major counties within the airshed. The counties that consist of <1% of the airshed are not included.

Figure 8. Annual Average PM_{2.5} Emissions for Main Counties in Airshed 24.

In general, fugitive dust is the largest contributor of PM₁₀ and PM_{2.5} followed by the "Agriculture and Forestry" category. Tables 23 and 24 summarize the top three contributors of PM₁₀ and PM_{2.5} for each major county within Airshed 24. The counties that make up less than 1% of the airshed are not included since the majority of particulate emissions consist of the emissions from the main counties.

TABLE 23. MAJOR CONTRIBUTORS (%) OF PM₁₀ IN COUNTIES (1999)¹			
Source	Blaine	Butte	Camas
Fugitive Dust (% PM ₁₀ contribution)	81	76	22
Agriculture & Forestry (% PM ₁₀ contribution)	11	21	7
Other Major Contributor	5 (Combustion- Other)	1 (Residential Wood)	70 (Combustion- Other)

¹ This table does not include counties that make up less than 1% of the airshed.

TABLE 24. MAJOR CONTRIBUTORS (%) OF PM_{2.5} IN COUNTIES (1999)¹			
Source	Blaine	Butte	Camas
Fugitive Dust (% PM _{2.5} contribution)	57	65	6
Agriculture & Forestry (% PM _{2.5} contribution)	9	21	2
Other Major Contributor	20 (Combustion- Other)	5 (Residential Wood)	91 (Combustion- Other)

¹This table does not include counties that make up less than 1% of the airshed.

Monitoring Network⁶

Airshed 24 has one PM₁₀ ambient air quality monitor. The PM₁₀ monitor is located in Ketchum. Generally, the 24-hour PM₁₀ average levels are below the 24-hour NAAQS (150 µg/m³) limit in this airshed. Between 1997 and 2002 the 24-hour PM₁₀ NAAQS limit was not exceeded in this airshed. There are no federal designated PM₁₀ non-attainment areas within this airshed. Sun Valley is the only impact zone within this airshed.

TABLE 25. MONITOR LOCATIONS IN AIRSHED 24		
Monitor ID	County	City
160130003 - 1	Blaine	Ketchum

B. SENSITIVE AREAS WITHIN AIRSHED

In addition to sensitive areas listed in Table 26, this airshed is within 100 kilometers of the Sawtooth Wilderness and Craters of the Moon National Monument Class I visibility areas. Sun Valley is the only impact zone within Airshed 24 (see Figure 3-9).

⁶ Idaho Air Quality Monitors for PM₁₀ obtained from <http://www.epa.gov/air/data/index.html>. In cases where the exact locations of monitors are unavailable, monitors may not be located in the airshed.

Counties (% of County within Airshed)	Communities at Risk	Sensitive Populations (Medical facilities, etc.)	Transportation
Blaine (39%)	Bellevue, Gannett, Hailey, Ketchum, Picabo, and Sun Valley	Wood River Medical Center (15 beds), Bellevue (1 hospital, 20 beds), Sun Valley (1 hospital, 27 beds)	I-84, US 20, Friedman Memorial Airport
Camas (50%)	Corral, Fairfield, and Hill City	N/A	I-84, US 20, US 93, Camas County Airport

C. FIRE HISTORY

Airshed 24 has experienced several large wildfires in the past decades. In 4 of the previous 32 years, more than 5,000 acres were burned by wildfires, and 2 of those years had more than 10,000 acres burned by wildfires. The history of wildfire and area burned for BLM land is presented in Table 27.

Decade	Acres Burned¹	Square Miles Burned	# of Years that Burned 10,000+ Acres	# of Years that Burned 5,000+ Acres	# of Years with No Fires > 300 Acres
2000-2001	7,825	12.2	0	1	1
1990-2000	55,960	87.4	2	3	4
1980-1989	12,068	18.9	0	0	4
1970-1979	3,098	4.8	0	0	6
32-year Airshed Total	78,951	123.4	2	4	15

¹ The acreage figures shown in this table represent total number of wildfire acres. Some areas may have burned more than once.

D. DISPERSION POTENTIAL

To accurately evaluate the dispersion potential of the particulate emissions generated within the airshed, a refined model such as CALPUF or CALMET is recommended. However, a more basic dispersion potential evaluation can be done by reviewing pertinent meteorological data. Wind speeds for the planning area tend to be highest in the summer and lowest in the fall. The corresponding wind direction in April and July (higher wind speeds) tends to be from the southwest to the northeast. During times of lower wind speeds (October), the wind predominantly blows from the northeast to the southwest.

When the wind in Airshed 24 blows from the southwest, typically in the spring and summer, it is possible that smoke may be carried into Airshed 19 and towards the Sun Valley impact zone and

Craters of the Moon National Monument Class I visibility area. Airshed 24 is bounded by hills in the south and mountains in the north. Since these terrain features limit dispersion in the horizontal direction, a mixing height above the terrain features is critical for smoke dispersion in this airshed.

An indicator for potential stagnate air is when mixing heights are at or below 1,640 feet (500 meters).⁷ Early morning hours typically have lower mixing heights. For some of the lower elevation communities, trapping residual smoke could be of concern until afternoon heating increased mixing heights and/or an inversion breaks.

Afternoon mixing heights are generally best during the summer due to greater heating during the day, while the lowest mixing heights are expected during the fall. Burning near a community requires careful consideration of the amount of residual smoke that may be produced and trapped until dispersion can lift the smoke out of the area.

L.6 AIRSHED 25

A. AIRSHED DESCRIPTION

Airshed 25 covers over 4,975,314 acres. Federal ownership occupies approximately 52% of this airshed and 47% is privately owned (Table 28).

Ten USRD counties fall within Airshed 25: Twin Falls, Cassia, Oneida, Power, Blaine, Minidoka, Jerome, Gooding, Camas, and Lincoln Counties (Table 29).

Particulate Emissions Summary

Annual (1995-1999) average emissions for PM₁₀ in these counties range between 3,667 tons/year (Lincoln County) and 25,564 tons/year (Twin Falls County). Of the 22 counties evaluated in the USRD, Lincoln and Twin Falls rank 20th and 2nd, respectively (1st being the highest annual average PM₁₀ emissions). For PM_{2.5}, annual average emissions range between 662 tons/year (Lincoln County) to 5,298 tons/year (Twin Falls County). Of all the counties evaluated in the USRD, Lincoln and Twin Falls rank 20th and 1st, respectively.

All the counties in Airshed 25 except Camas County show an improving (decreasing annual emissions) trend in emissions over a 5-year period (1995-1999) for both PM₁₀ and PM_{2.5}. There is a spike in emissions due to an increase in emissions from the "Combustion- Other" category in 1996. In 1997 emissions for both PM₁₀ and PM_{2.5} in Camas County dropped 13.5% and 8%, respectively, then showed a gentle increase between 1997 and 1999.

⁷ Southern Forestry Smoke Management Guidebook, GTR SE-10, 1976.

TABLE 28. AIRSHED 25 OWNERSHIP SUMMARY								
Size	BLM	Private	State	USFS	Mil	NPS	USFWS	Water
Total Acres	2,217,060	2,079,608	138,748	504,655	511	13	12,515	22,204
% of Airshed	45	42	3	10	< 1	< 1	< 1	< 1

TABLE 29. AIRSHED 25 COUNTY SUMMARY										
Size	Twin Falls	Cassia	Oneida	Power	Blaine	Minidoka	Jerome	Gooding	Camas	Lincoln
Total Acres	819,432	1,592,603	111,757	22,761	299,077	404,894	390,678	468,249	25,940	755,849
% of Airshed	16	32	2	< 1	6	8	8	9	1	15

Figures 9 and 10 graphically present the PM₁₀ and PM_{2.5} emissions from each major county within the airshed. Camas, Power, and Oneida Counties make up less than 2% of Airshed 25 and, therefore, are not included in the figures. The "amount to next ED category" on the graphs indicates the remaining amount of emissions possible before the next ED category at 10,000 tons/year is reached. The 10,000 tons/year increment was chosen because all counties in Idaho with a PM₁₀ nonattainment area have at a minimum 10,000 tons/year of PM₁₀ emissions. It is not an official EPA or IDEQ threshold.

In general, fugitive dust is the largest contributor of PM₁₀ and PM_{2.5} followed by the "Agriculture and Forestry" category. Tables 30 and 31 summarize the top three contributors of PM₁₀ and PM_{2.5} for each major county within Airshed 25. The counties that make up 2% or less of the airshed are not included since the majority of particulate emissions will consist of the emissions from the main counties.

Monitoring Network⁸

Airshed 25 has two PM₁₀ ambient air quality monitors. The PM₁₀ monitors are located in Rupert and Twin Falls (Table 32). Generally, the 24-hour PM₁₀ average levels are below the 24-hour NAAQS (150 µg/m³) limit in this airshed. In 2002, the 1st highest 24-hour PM₁₀ value recorded in Rupert and Twin Falls were 51 µg/m³ and 52 µg/m³, respectively. There are no federal designated PM₁₀ non-attainment areas within this airshed. Twin Falls is the only impact zone within this airshed.

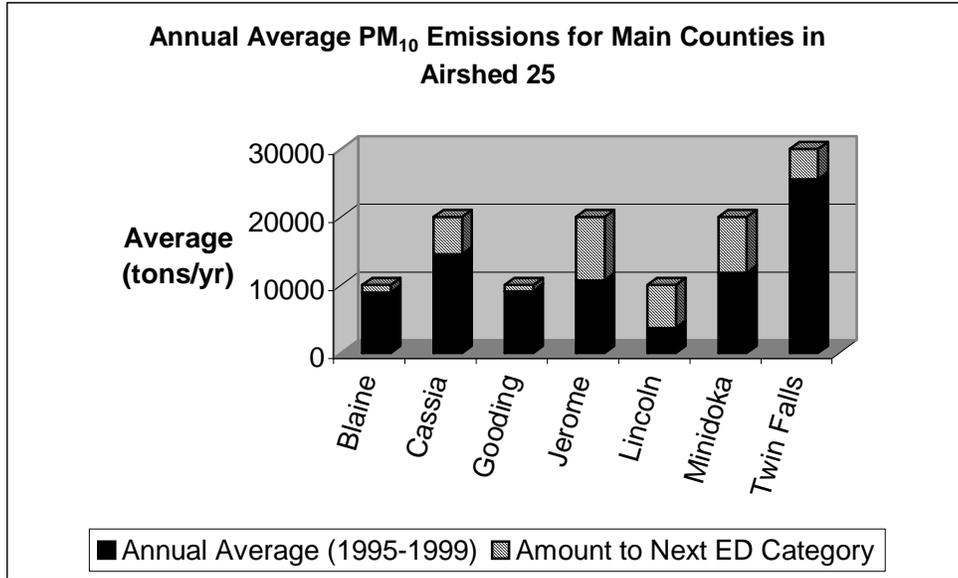
B. SENSITIVE AREAS WITHIN AIRSHED

In addition to sensitive areas listed in Table 33, this airshed is within 100 kilometers of the Sawtooth Wilderness and Craters of the Moon National Monument Class I visibility areas. Twin Falls is the only impact zone within Airshed 25 (see Figure 3-9).

C. FIRE HISTORY

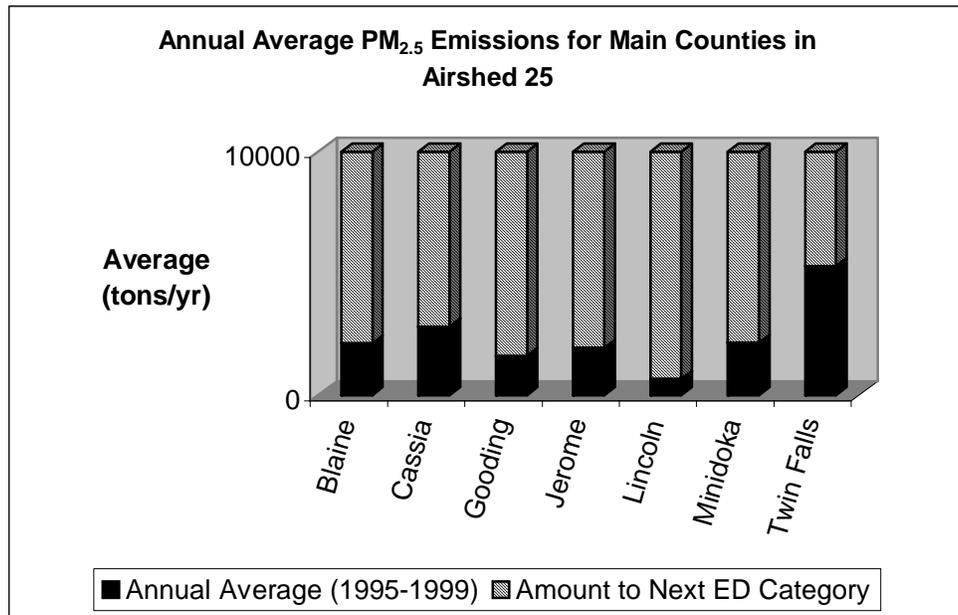
This airshed has been affected by many large wildfires in the past three decades. In 26 of the previous 32 years, more than 5,000 acres were burned by wildfires, and 21 of those years had more than 10,000 acres burned by wildfires. The history of wildfire and area burned for BLM land is presented in Table 34.

⁸ Idaho Air Quality Monitors for PM₁₀ obtained from <http://www.epa.gov/air/data/index.html>. In cases where the exact locations of monitors are unavailable, monitors may not be located in the airshed.



Note: This figure contains only the major counties within the airshed. The counties that consist of 2% or less of the airshed are not included.

Figure 9. Annual Average PM₁₀ Emissions for Main Counties in Airshed 25.



Note: This figure contains only the major counties within the airshed. The counties that consist of 2% or less of the airshed are not included.

Figure 10. Annual Average PM_{2.5} Emissions for Main Counties in Airshed 25.

TABLE 30. MAJOR CONTRIBUTORS (%) OF PM₁₀ IN COUNTIES (1999) ¹

Source	Twin Falls	Cassia	Blaine	Minidoka	Jerome	Gooding	Lincoln
Fugitive Dust (% PM ₁₀ contribution)	78	61	81	75	67	80	76
Agriculture & Forestry (% PM ₁₀ contribution)	16	35	11	17	30	18	21
Other Major Contributor	2 (Combustion-Other)	3 (Inorganic Chemical Product Mfg.)	5 (Combustion-Other)	6 (Industrial Fuel-Coal)	1 (Residential Wood)	1 (Combustion-Other)	1 (Residential Wood)

¹ This table does not include counties that make up 2% or less of the airshed.

TABLE 31. MAJOR CONTRIBUTORS (%) OF PM_{2.5} IN COUNTIES (1999) ¹

Source	Twin Falls	Cassia	Blaine	Minidoka	Jerome	Gooding	Lincoln
Fugitive Dust (% PM _{2.5} contribution)	61	48	57	75	58	69	65
Agriculture & Forestry (% PM _{2.5} contribution)	15	34	9	17	32	18	22
Other Major Contributor	10 (Combustion-Other)	10 (Combustion-Other)	20 (Combustion-Other)	2 (Residential Wood)	3 (Residential Wood)	3 (Residential Wood)	4 (Residential Wood)

¹ This table does not include counties that make up 2% or less of the airshed.

Monitor ID	County	City
160670001 - 1	Minidoka	Rupert
160830005 - 1	Twin Falls	Twin Falls

Counties (% of County within Airshed)	Communities at Risk	Sensitive Populations (Medical facilities, etc.)	Transportation
Blaine (18%)	Carey	N/A	Carey Airfield
Cassia (99%)	Albion, Almo, Burley, Conner, Declo, Elba, Malta, and Oakley	Cassia Regional Medical Center (40 beds)	I-84, I-86, US 30, Burley Municipal Airport, Oakley Municipal Airport
Gooding (100%)	Bliss, Gooding, Hagerman, and Wendell	Gooding County Memorial Hospital (26 beds), Hagerman (3 hospitals, 222 beds)	I-84, US 26, US 30, US 93, US 20, Gooding Municipal Airport
Jerome (100%)	Eden, Hazelton, and Jerome	St. Benedict's Family Medical Center (25 beds)	I-84, US 25, US 26, US 30, US 93 Hazelton Municipal, Jerome County Airport
Lincoln (99%)	Dietrich, Richfield, and Shoshone	N/A	US 24, US 26, US 95, US 93
Minidoka (83%)	Acequia, Heyburn, Hidden Valley, Minidoka, Norland, Paul, and Rupert	Rupert (1 hospital , 25 beds)	I-84, I-86, US 30
Twin Falls (99%)	Buhl, Caslteford, Filer, Hansen, Hollister, Kimberly, Murtaugh, Rock Creek, Rogerson, and Twin Falls	Magic Valley Regional Medical Center, Twin Falls Clinic and Hospital, Twin Falls (1 hospital) (233 beds total in sensitive areas)	I-84, US 30, US 74, US 93, Buhl Municipal, Joslin Field

Decade	Acres Burned¹	Square Miles Burned	# of Years that Burned 10,000+ Acres	# of Years that Burned 5,000+ Acres	# of Years with No Fires > 300 Acres
2000-2001	79,505	124.2	2	2	0
1990-2000	531,293	830.1	6	7	1
1980-1989	465,220	726.9	7	9	0
1970-1979	302,870	473.2	6	8	0
32-year Airshed Total	1,378,888	2,154.5	21	26	1

¹ The acreage figures shown in this table represent total number of wildfire acres. Some areas may have burned more than once.

D. DISPERSION POTENTIAL

To accurately evaluate the dispersion potential of the particulate emissions generated within the airshed, a refined model such as CALPUF or CALMET is recommended. However, a more basic dispersion potential evaluation can be done by reviewing pertinent meteorological data. Wind speeds for the planning area tend to be highest in the summer and lowest in the fall. The corresponding wind direction in April and July (higher wind speeds) tends to be from the southwest. During times of lower wind speeds (October), the wind predominantly blows from the northeast.

Airshed 25 consists of a portion of the lower elevation, relatively flat Snake River Plain. The airshed is bounded by the hilly Airshed 24 to the north and the hilly Airshed 20 to the east. When the wind in Airshed 25 blows from the south and west, typically in the spring and summer, it is possible that smoke may be carried into Airshed 19 towards Craters of the Moon National Monument Class I visibility area and/or the Pocatello impact zone. In the fall, when the wind tends to blow from the northeast, smoke could be carried towards population centers within the airshed including the Twin Falls impact zone.

An indicator for potential stagnate air is when mixing heights are at or below 1,640 feet (500 meters).⁹ Early morning hours typically have lower mixing heights. For some of the lower elevation communities, trapping residual smoke could be of concern until afternoon heating increased mixing heights and/or an inversion breaks.

Afternoon mixing heights are generally best during the summer due to greater heating during the day, while the lowest mixing heights are expected during the fall. Burning near a community requires careful consideration of the amount of residual smoke that may be produced and trapped until dispersion can lift the smoke out of the area.

⁹ Southern Forestry Smoke Management Guidebook, GTR SE-10, 1976.

THIS PAGE INTENTIONALLY LEFT BLANK