A. Great Basin Valleys Air Basin (Great Basin Unified APCD)

The Great Basin Valleys Air Basin is comprised of a single air district, the Great Basin Unified APCD, and consists of Alpine, Mono, and Inyo Counties. The entire air basin currently exceeds both the State 24-hour and annual average PM10 standards. The air basin is designated as unclassified for the State annual PM2.5 standard – available data are insufficient to support designation as attainment or nonattainment. Four distinct areas in the air basin are currently designated as nonattainment for the national PM10 standards: the Mono Basin (Mono Lake monitoring sites), Owens Lake (Lone Pine, Keeler, Shell Cut, Dirty Sox, and Olancha monitoring sites), and Searles Valley (Coso Junction monitoring site) rural areas and the city of Mammoth Lakes. However, although the Mammoth Lakes nonattainment area has not been officially redesignated, it has not exceeded the national PM10 standards for many years.

Figure A-1 shows the location of PM10 (a) and PM2.5 (b) monitoring sites throughout the Great Basin Valleys Air Basin. As described above, the air basin is primarily rural, with only the monitor at Mammoth Lakes reflecting a more urban influence.

Figure A-1. PM10 and PM2.5 Monitoring Sites throughout the Air Basin.

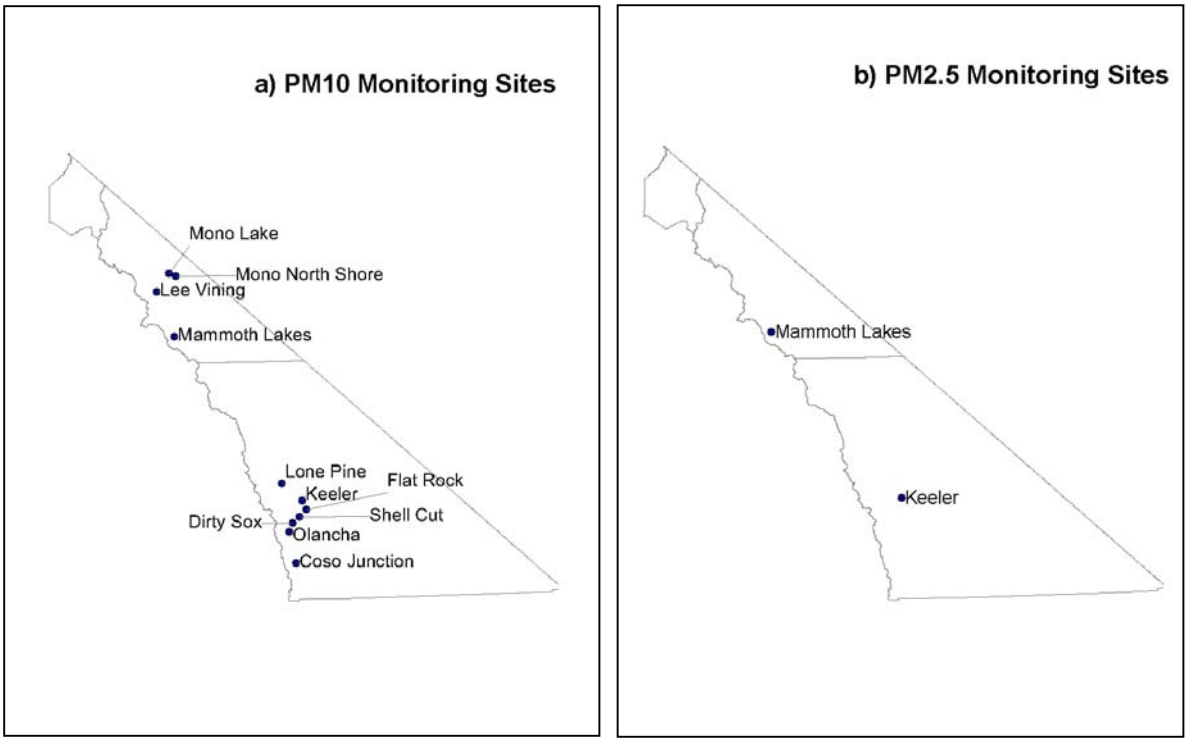


Table A-1 provides information on yearly variations in the highest PM10 and PM2.5 concentrations recorded across the District in 2001 through 2003. During this period, particulate levels are estimated to have exceeded the 24-hour State PM10 standard 178 times. While particulate levels are often low, on a short term, episodic basis, the Great Basin Unified APCD can record some of the highest PM10 monitored levels in the State. During windy conditions, dust from the Mono and Owens lakebeds produce extremely high concentrations of particulate matter in the air, reaching 15,641 ug/m^3 in 2003. Frequent high concentrations measured during windy days result in high annual average PM10 estimates.

Table A-1. PM10 and PM2.5 Air Quality in the Great Basin Unified APCD.

Year	PM10 (ug/m^3)			PM2.5 (ug/m^3)	
	Calculated Days over State Std.	Max 24-hour (Std.=50)	Max Annual Average (Std.=20)	Max 24-hour*	Max Annual Average (Std.=12)
2001	41	3,643	63	76	6
2002	93	7,401**	159	68	Incomplete Data
2003	44	15,641**	130	44	Incomplete Data

* The maximum 24-hour PM2.5 values are provided for information only.
** These values were excluded for determining attainment status. See text.

Table A-2 provides the 24-hour and annual designation values for the State standards for the 2001-2003 period. Designation values represent the highest 24-hour PM10 concentration measured during the three year period, after concentrations measured during highly irregular and infrequent events have been excluded, and the highest estimated PM10 and PM2.5 annual average in the same period. For example, the maximum 24-hour PM10 concentrations in 2002 and 2003 shown in Table A-1 were identified as extreme concentration events and were excluded in determining the designation values shown in Table A-2. The designation values are determined for each site, and the highest site is used for determining an area's designation. Based on these data, the Great Basins Unified APCD currently is nonattainment for both the State 24-hour and annual average PM10 standards. The District is designated as unclassified for the State annual PM2.5 standard – available data are insufficient to support designation as attainment or nonattainment.

Table A-2. Air District Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

	PM10 (ug/m^3)		PM2.5 (ug/m^3)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Designation Value	5,291	159	Incomplete Data

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Table A-3 provides designation values for each monitoring site in the air district to provide further information on the geographic distribution of concentrations. PM10 concentrations exceeding the annual average standard occur mostly in the rural areas, such as the Mono Lake and Owens Lake monitoring sites (Mono North Shore, Shell Cut, Olancha, Keeler, Flat Rock, and Dirty Sox). While exceedances of the 24-hour PM10 standard prevail throughout the district, the highest concentrations occur at the Dirty Sox and Mono North Shore monitoring sites. PM2.5 data are only collected at the Keeler and Mammoth Lakes monitoring sites. Although the data are not yet complete for all sites, annual average PM2.5 concentrations at Keeler are low.

Table A-3. Monitoring Site Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

Site	PM10 (ug/m^3)		PM2.5 (ug/m^3)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Coso Junction	111	18	No monitor
Dirty Sox	3,457	159	No monitor
Flat Rock	291	25	No monitor
Keeler	505	63	6
Lone Pine	222	Incomplete Data	No monitor
Olancha	1,121	34	No monitor
Shell Cut	996	69	No monitor
Lee Vining	60	14	No monitor
Mammoth Lakes	111	Incomplete Data	Incomplete Data
Mono Lake	64	Incomplete Data	No monitor
Mono North Shore	5,291	62	No monitor

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Figures A-2 (a) and (b) illustrate the variation in PM10 and PM2.5 levels throughout the year at Keeler (2002) and Mammoth Lakes (2003), respectively. The total height of the bars represents PM10 concentrations, while the height of the black portion of the bars represents the PM2.5 fraction. Keeler is located near the Owens dry lakebed. At Keeler, high concentrations can occur at any time of the year. During 2002, the high PM episodes dominated by the coarse fraction (particles between PM2.5 and PM10 in size) were due to high wind events. During the summer of 2002, high PM concentrations dominated by PM2.5 may have originated from wildfires. In contrast, in the town of Mammoth Lakes, high PM concentrations in 2003 occurred during November and December and reflect a larger contribution from PM2.5. During the fall and winter, approximately 40 percent of ambient PM10 consists of PM2.5. The colder, more stagnant conditions during this time of the year are conducive to the buildup of PM, as well as increased activity from residential wood combustion.

On an annual average, based on 2000-2003 monitoring data, we estimate that PM2.5 comprises 16 percent of the PM10 ambient levels in rural areas such as Owens Lake. While in urban areas such as Mammoth Lakes, PM2.5 comprises 39 percent of the PM10 concentrations.

Figure A-2. Seasonal Variation in PM10 and PM2.5 Concentrations.

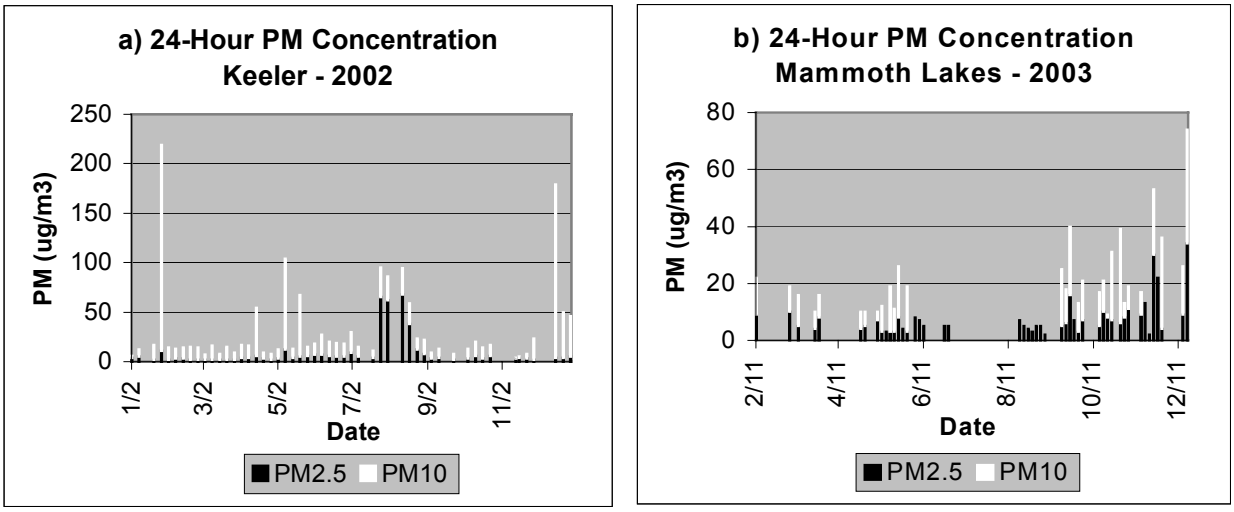
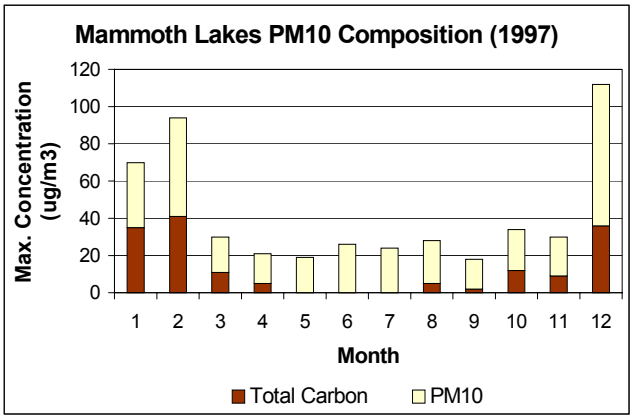


Figure A-3. Carbon Component of PM10.



Only limited data on chemical composition are available. Figure A-3 illustrates seasonal variations in total carbon at Mammoth Lakes. The highest PM10 concentrations in the town of Mammoth Lakes occurred during the late fall and winter months (December – February). During these months, total carbon comprises 30 percent to 50 percent of the measured PM10. The majority of carbon is expected to be due to directly emitted carbon from combustion sources. Key sources include residential wood combustion, agricultural and prescribed burning, motor vehicles, and stationary combustion sources. However, a fraction may be due to secondary organic aerosol formation from anthropogenic and biogenic VOC emissions.

Data on PM2.5 chemical composition are also available from a site operated at Olancha during the California Regional PM10/PM2.5 Air Quality Study in 2000. Based on these data, total carbon comprised approximately 20 percent of the PM2.5 mass on an annual average, while the fraction of PM2.5 that is comprised of secondary ammonium nitrate and sulfate was approximately 30 percent.