United States
Environmental Protection
Agency

Region 8
1860 Lincoln Street
Denver, Colorado 80295

EPA-908/2-80-002
October, 1980

Surveillance and Analysis Division, Data Analysis Branch

Air Quality Trends in Region VIII

1979 Data

EPA - 908/2-80-002 U.S. Environmental Protection Agency

AIR QUALITY TRENDS

IN REGION VIII

(1979 DATA)

Data Analysis Branch
Surveillance and Analysis Division
Denver, Colorado
September 1980

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ABSTRACT

Air quality trends and status for the calendar year 1979 were determined for the six states in Region VIII. These states include Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Data resident in the SAROAD national data bank was analyzed.

Statistical tests which detect significant differences between two populations were utilized to identify trends. The status and severity of air pollutants was reported as a direct measure of air quality standard and alert level exceedences. The report includes a summary of air quality in each nonattainment area.

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SECTION I

Introduction

Air quality monitoring activities have increased substantially in Region VIII over the past few years both in scope and frequency. These increases are due to public demand for accurate information about harmful pollutants in the environment and to the passage of Federal Legislation, namely, The Clean Air Act Amendments. To fulfill the requirements of these legislative mandates State agencies have planned and developed extensive monitoring networks which have generated a mass of air quality data. This report presents a portrayal of current ambient air quality status and trends in the six states comprising EPA's Region VIII. Trend analyses performed on the 1977, 1978, and 1979 air quality data available in the SAROAD System indicate that 42 of the 252 counties, where sufficient data were available, experienced statistically significant changes for at least one pollutant group. Air quality was found to be deteriorating in 26 counties and improving in 19 counties. Table 1 summarizes these trends.

The severity analyses of 1979 air data reveals that total suspended particulates continue to present the most wide-spread pollutant problem in the region where 19 of the 30 counties which exceeded the primary standard also exceeded alert levels. TSP was sampled in 118 counties. These values represent an increase over those for 1978 when 130 counties sampled TSP and 11 of the 27 counties with violations of the primary Health Standard also exceeded the alert level.

During 1979 18 counties monitored for carbon monoxide. Of the 12 counties where violations of the primary standard occurred, 7 were found which also violated alert levels. In 1978 there were 13 counties with primary CO violations, including 3 which also had alert violations.

No appreciable trend was observed between standards violations occurring in 1978 and 1979 for sulphur dioxide, nitrogen dioxide or ozone.

Lead, newly designated as a criteria pollutant, was sampled in 19 counties with only one county experiencing violations of the primary standard. The majority of sites sampling for lead are located in rural rather than in urban settings and it is difficult to draw any meaningful results from the lead data, either in terms of health affects or in terms of trends in concentrations due to vehicular emissions. Probably with the increased use of unleaded gas in motor vehicles and with old vehicle attrition, lead pollution will cease to present any major pollution problem.

The comparisons of single year observations of pollutant concentrations is generally considered inadequate for accurately measuring and describing trends. Meteorological considerations such as precipitation, solar intensity, wind speed and direction have a major effect on year-to-year short-term changes in pollutants and should not be neglected. However, due to the lack of long-term monitoring data and missing periods in the data at most sites, short-term trends must be calculated. Current trends referenced in this report are approximated from the 1977, 1978, and 1979 data bases.

The map in Figure 1 gives a county-by-county picture of Regional air quality status during 1979. In constructing this map, the air quality of an entire county is determined by that site in the county exhibiting the most severe pollutant violations. Counties colored blue are those which sampled at least one of the criteria pollutants for 75 percent of the total possible sampling time and did not violate the health standard. Yellow indicates that at least one of the sampled sites in the county violated primary air quality standards. Red indicates that at least one of the sampled sites in the county exceeded the alert level. Counties without current monitoring data or with less than 75 percent of the total possible sample are colored green.

TABLE 1

Air Quality Monitoring

Summary of Air Monitoring in
Region VIII in 1979

	TSP	SO^2	NO^2	CO	OZONE	LEAD	TOTAL
Total sites	227	54	49	23	22	37	412
Counties with data	118	39	41	18	18	19	252
Counties exceeding primary standard	30	3	0	12	5	1	51
Counties exceeding alert level	19	0	0	7	0	0	26
Counties with deteriorating air quality	12	1	4	5	4	0	26
Counties with improving air quality	4	3	5	4	3	0	19
Counties with insufficient data or no discernible trend	105	34	32	9	11	19	210

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1 U.S. EPA. "Guideline for Public Reporting of Daily Air Quality -- Pollutant Standards Index (PSI)," EPA 450/2-76-013, August 1976.

2 Instrumentation measures ozone which is the primary constituent of oxidants.

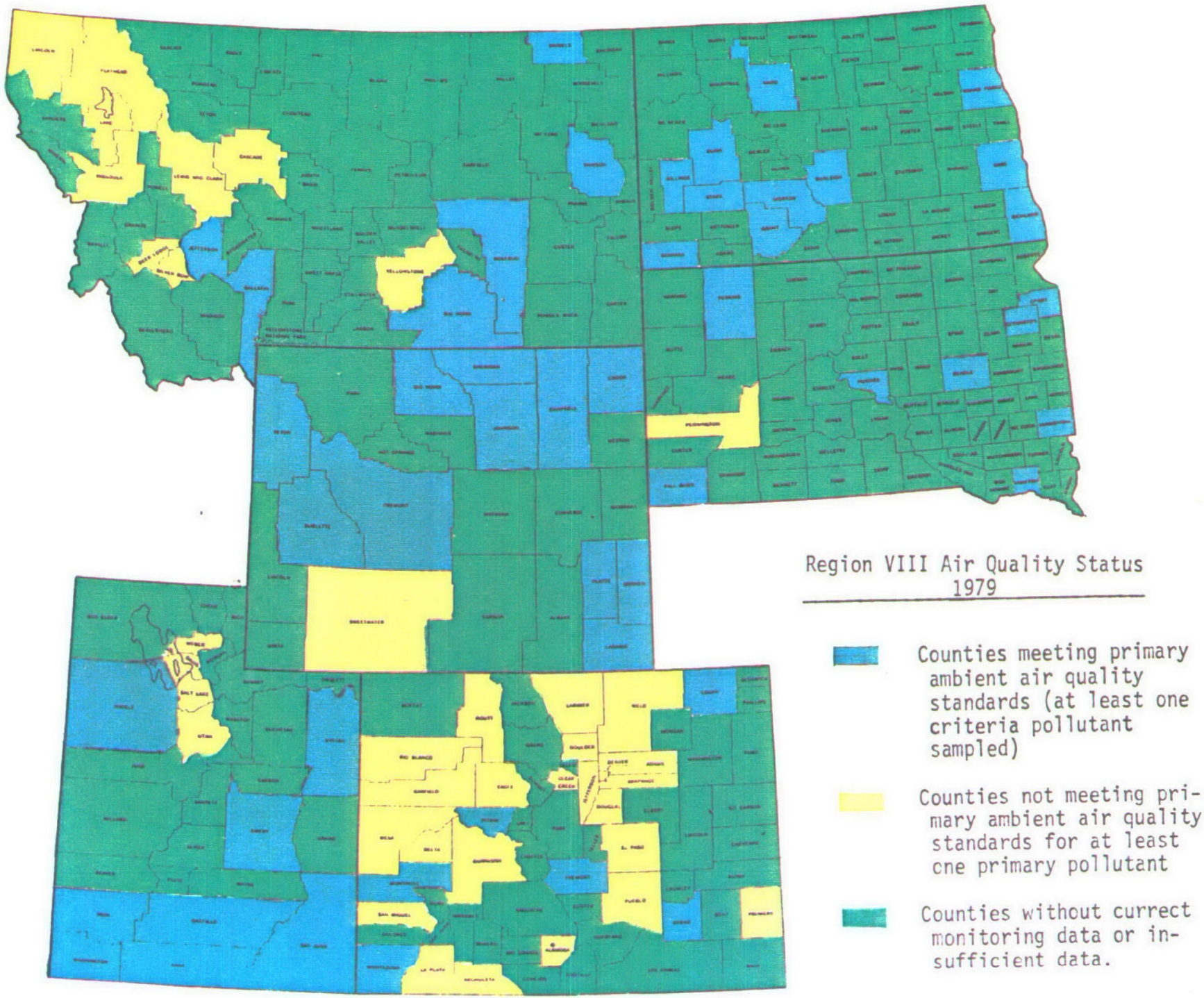

Region VIII Air Quality Status
1979
Counties meeting primary ambient air quality standards (at least one criteria pollutant sampled)
Counties not meeting primary ambient air quality standards for at least one primary pollutant
Counties without currect monitoring data or insufficient data.

Figure 1

TABLE 2

Air Quality Pollutants and Health Effects

Pollutant	Physical Description	Health Effect at Concentrations above the Primary Standard
Total Suspended Particulates (TSP)	TSP is a measurement of particles in the air (such as soot, mist, and sprays) and includes non-toxic materials (dust and dirt) as well as toxic materials (lead, asbestos, sulfates). Natural and man-made sources contribute to TSP which affects the respiratory system in varying degrees depending on particle size and chemical composition. Particle sizes up to 15 micron size can be inhaled into the lungs and particles smaller than 2.5 can become lodged deeply in the lungs. Normally the size of major concern is from .1 to 3 microns.	Aggravation of asthma and chronic lung diseases, increased cough, chest discomfort, restricted activity, aggravation of heart and lung disease symptoms in the elderly, increased death rate; long term exposure to TSP levels from 100-300 Mg/m^3 may cause multiple lung function changes.
Sulfur Dioxide (SO_2)	SO_2 is a colorless gas with a "rotten egg smell that is detectable by most people at concentrations greater than .3 to 1 part per million. When combined with water it forms sulfuric acid. When in the air in sufficient quantity it can combine with rain to form "acid rain." This is a problem whose frequency is just being recognized. The most common form of SO_2 in the atmosphere, results from combustion of coal and gas or as a by-product in mineral smelting operations. SO_2 reacts readily with other atmospheric pollutants to form sulfates, a group of compounds responsible for aggravation of respiratory ailments.	Aggravation of asthma, aggravation of heart and lung disease symptoms in the elderly, increased lung illness, increased death rate; long term exposure to SO_2 levels from 05-1ppm may cause multiple lung function changes

Carbon Monoxide (CO)	CO is a colorless, odorless, tasteless gas--a toxic product of combustion. The automobile engine represents the major single source of this pollutant.	Interference with mental and physical activity, reduced capacity in persons suffering from heart and other circulatory disorders; decreases visual perception and general alertness.
Ozone (O_3)	Ozone and other photochemical oxidant compounds are formed by a complex series of chemical reactions occurring when hydrocarbons and nitrogen oxides from motor vehicles or other emission sources are exposed to sunlight. Ozone, the critical constituent in oxidants, is a severe irritant to human tissue.	Aggravation of asthma and chronic lung disease, irritation of the eye and of the respiratory tract, decreased vision, reduced heart and lung capacity.
Nitrogen Dioxide (NO_2)	NO_2 is a reddish-brown gas with a pungent odor. It is corrosive and is an oxidizing agent which reacts with hydrocarbon in sunlight to form photochemical oxidants (ozone primarily). NO_2 is formed during high temperature combustion (motor vehicle engines and powerplant boilers).	Increased chronic bronchitis, reduced resistance to disease, aggravation of chronic lung disease.
Lead (Pb)	Lead is a gray-white metal with a high luster and low melting point. It is produced in a much larger quantity than any other toxic metal. The major use of lead is as a knock retardant (tetraethyl lead) in gasoline. More than half the lead in the country goes into gasoline to produce almost 90% of the total lead in the atmosphere, a large majority of which is in particualte form (usually less than 2 microns).	Impairs hemoglobin production, causes anemia, often fatal to infants.

Air Quality Standards

The Environmental Protection Agency has been given the authority to establish ambient air quality standards which specify, for the principal and most widespread classes of air pollutants, limitations necessary to protect the public health and welfare. These pollutants currently are total suspended particulate matter, sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide. Standards for lead have recently been proposed.

Two types of standards were established. Primary standards are set at levels to protect human health. Secondary standards are set at levels to protect against other forms of damage to such things as vegetation and materials. The numerical value for each standard is listed in Appendix A.

Air Quality Nonattainment Areas

The Clean Air Act Amendments of 1977 placed additional requirements on the States and EPA. Section 107(d) directed each State to submit a list of the NAAQS attainment status for all areas within the State. These designations were to be based on air quality levels that existed at the time the Amendments were enacted. States were required by EPA guidance to consider the most recent four quarters of monitored ambient air quality data available. If these data showed no standards violations, then the previous four quarters of monitoring data were to be examined to assure that the current indication of attainment was not the result of a single year's data reflecting

unrepresentative meteorological conditions. In the absence of sufficient monitored air quality data, other evaluation methods were used, including air quality disperson modeling. The Act specified that the designated areas could be based on air quality control regions (AQCRs) or any subportions of these areas. EPA advised States they could divide (AQCRs) into various nonattainment, attainment, or unclassified portions, i.e., county, subcounty, or other geographic areas as long as the area could be clearly defined in a written narrative. Additionally, a different geographic area could be used in designating the status for each pollutant. The section 107(d) designations were meant to provide a starting point for States in their effort to correct existing air quality problems and to implement programs under the 1977 CAA Amendments. But the designation of an area as nonattainment or attainment must be considered only a point of departure and not a final, inflexible end in itself. Table 2 indicates, on a State-by-State, pollutant-by-pollutant basis, the attainment status of every area as submitted by the appropriate State agency and approved, or as designated by the Environmental Protection Agency. No distinctions have been made as to the severity of the violations recorded in the areas designated by nonattainment in this table. Each area was designated nonattainment for primary or secondary standard violations. A "P" indicates "does not meet primary standards" and "S" indicates "does not meet secondary standards". 1979 status and trends for each nonattainment area in Region VIII are described in the appropriate state summary.

TABLE 3

EPA NONATTAINMENT AREAS IN REGION VIII
FEDERAL REGISTER - MARCH 3, 1978

		TSP	SO_2	NO_2	CO	O_x
Montana	Colstrip Area	P				
	City of Columbia Falls	P				
	City of Missoula	P				
	Missoula Area	S				
	Billings Area	S				
	Great Falls Area	S				
	Butte Area	S				
	East Helena Area	S	PS			
	Laurel Area		P			
	Anaconda Area		PS			
	City of Billings				P	
	Yellowstone County					P
	Rosebud County					P
So. Dak.	Rapid City Area	P				
Utah	Davis County	S				P
	Salt Lake County	P	PS		P	P
	Utah County	P				P
	Weber County	P				P
	City of Price	P				
	Cedar City	S	PS			
	Tooele County		PS			
	Uintah County					P
	City of Bountiful				P	
	City of Ogden				P	
	City of Provo				P	
Wyoming	Trona Industrial Area Sweetwater County	P				
Colo.	Larimer-Weld designated area	P				P
	Denver Designated Area	P		P	P	P
	Colo. Springs 3-C	P			P	
	Pueblo 3-C	P				
	Mesa Designated Area	P				
	El Paso County					P
	Ft. Collins-Greeley				P	

P - Does not meet primary standard
S - Does not meet secondary standard

TABLE 4

EPA NONATTAINMENT AREAS IN REGION VIII
1979

		TSP	SO2	NO2	CO	O
Colo.	Denver Designated Area	P		P	P	P
	Colo. Springs 3-C	P			P	
	Pueblo 3-C	P				
	Mesa Designated Area	P				
	Ft. Collins-Greeley	S			P	
Montana	Colstrip Area	P				
	City of Columbia Falls	P				
	City of Missoula	P			P	
	Missoula Area	S				
	City of Billings	S			P	
	Great Falls Area	S				
	Butte Area	P				
	East Helena Area	S	PS			
	Laurel Area		P			
	Anaconda Area		PS			
So. Dak.	Rapid City Area	P				
Utah	Davis County	S				P
	Salt Lake County	P	PS			P
	Utah County	P				P
	Weber County	P				P
	Cedar City		PS			
	Tooele County		PS			
	City of Bountiful				P	
	City of Ogden				P	
	City of Provo				P	
	Salt Lake City				P	
Wyoming	Trona Industrial Area	P				

P - Does not meet primary standard
S - Does not meet secondary standard

Analytical Procedures - Air Quality

Status and Severity Analysis

Status and severity of air quality are determined by comparing measurements made at monitoring stations to air pollution standards. The indicator used to characterize air quality status in this manner was the number of days in which measurements exceed the primary standards at the worst site in each county. The indicator may not actually represent air quality for the entire county, however the worst site is always selected in an area where measured concentrations are affecting some segment of the population. Complete procedures for determining status are documentated in Appendix C.

Another indicator is used to demonstrate the severity of the problem. Each pollutant has been assigned an alert level, the concentration at which the public must be notified of possible adverse health affects. These values shown in Appendix B are significantly higher than the standards and are not frequently encountered.

These two indicators correspond to break points in the Pollutant Standards Index (PSI) which is becoming the nationwide index for reporting air quality levels to the public. In the PSI the worst site pollutant concentration in each metropolitan are is chosen, and the index is calculated from the concentration at the site referenced to primary standards and alert levels. PSI breakpoints are detailed by pollutant in Appendix B.

Trend Analysis

For a long while it has been felt by many researchers in the field that air pollutant concentration probability distributions were not known at all or at the very best only poorly approximated. This is true for the types of distributional forms previously studied, namely the log normal and distributions similar to the log normal (e.g., SB, gamma, etc). All of these fall short in providing a usable model for the data. As a result, nonparametric techniques, which are inherently less powerful than parametric techniques, have been advised for trending purposes. Recent statistical research in the Data Analysis Branch has brought to our attention a type of truncated normal distribution which has proven quite effective in modeling air data. Our trending techniques have been based upon this distribution and are totally parametric and extremely powerful. Although based upon complicated formulae, the trending technique is intuitively appealing. Utilizing the new distributional form, a 95 percent confidence interval is constructed for the true concentration mean for each year under study. This mean is not the same as a simple arithmetic mean or a geometric mean. The more proper term for the type of mean used here is the "expected value," with the definition of this term being described as it ususally is in mathematics and statistics. The "expected value" is the single best measure of the central tendency of a data set. Each time interval is inspected for any overlap or commonly included parts with other intervals. If no overlap occurs, we can safely assume that there has been a significant shift in mean concentrations, i.e., a trend is present. The specific type of trend, whether increasing or decreasing, is defined by the relative position of the interval along the

concentration real number line. For example, if the lower bound of the 95 percent confidence interval for 1978 is greater than the upper bound of the 95 percent confidence interval for 1977, the 1978 mean value has significantly shifted upward from the 1977 mean value.

SECTION II

STATE AIR QUALITY SUMMARIES

The following graphics and charts appear as a part of each state summary:

1. A map showing the location of all active air quality monitoring sites in the state. Stations with more than 75 percent of all possible data are represented by squares. Circles identify stations where less than 75 percent of the data was collected.

2. A table specifying stations and pollutants used for trends and/or status in each county. Stations with less than three years of data are not used for trending. They are, however, used to determine current status. Each station used for either status or trends is required to have 75 percent of the maximum possible data.

3. A table showing the number of violation days for the years 1977, 1978, and 1979 for each pollutant at sites within designated nonattainment areas. Both alert level and primary level violation days are noted along with a count of sampling days.

4. A bar chart showing total days sampled and alert and primary violation days in 1979 by county and specific site. Each site with a violation of criteria pollutants is displayed.

5. A chart showing current status and trends by county and pollutant. If there were no data or insufficent data in the county, arrows are not shown. Status was determined by comparing the 1977, 1978, and 1979 data. Ozone status is based on a three year average of 1-hour primary level violations.

Colorado Air Quality

The Denver metropolitan area and the Fort Collins/Greeley areas still are the major air pollution problem areas in Colorado. Denver still has high TSP violation rates at the 21st and Broadway site. However, TSP violations were noted at sites in 16 other Colorado Counties. Nearly 1/2 of all instances in which the TSP health standard was exceeded involved concentrations at or above the alert level, not only in heavily populated Denver county, but also throughout most of the state. Carbon monoxide violations tend to be confined to the metropolitan areas of Denver, Colorado Springs, and Greeley. Denver has by far the most numerous CO violations with a generally increasing trend. Twenty-one percent of the total CO exceedences of the primary health standard involved concentrations above the alert level. Ozone violations were limited to the Denver Metro area. They also showed an increasing trend.

Status of Nonattainment Areas in Colorado

Larimer-Weld Designated Area - Colorado initiated a change to drop the primary nonattainment status for TSP on November 6, 1979. The designation for TSP was changed to a secondary standard for only Fort Collins and Greeley. In 1978 daily primary and alert level violations occurred at the Loveland, Johnstown, Platteville, Fort Collins, Greeley and La Salle stations. Yearly geometric mean primary violations occurred at the Loveland, Johnstown and La Salle stations. The year 1979 still showed annual geometric mean primary violations at the Loveland and Johnstown sites located in the Larimer-Weld County area.

On November 26, 1979, the area was changed to unclassified for ozone. The only station sampling ozone for Larimer-Weld Counties was at Greeley. This showed one violation in 1978 and one in 1979.

El Paso County - This area was changed to unclassified for ozone on November 25, 1979. No violations were observed at the Colorado Springs station for 1976 to 1979.

Denver Designated Area - The nitrogen dioxide nonattainment area generally represented by the Denver Metro area is shown on the map in Appendix . The carbon monoxide and ozone nonattainment areas consist of Adams, Arapahoe, Boulder, Denver, Douglas and Jefferson Counties. Automobile emissions and meteorological phenomenon common to the Rocky Mountains are the main causes of NO_2, CO and O_3 pollutant problems. There were 2 stations monitoring NO_2 during 1979, 3 in 1978 and 5 in 1977. No violations were noted in 1978 and 1979.

Nine stations were used to monitor CO with no discernible trend in violation rate for the three year period. Of the 365 days sampled in 1979, 160 days showed primary or alert level violations. Seven ozone stations operating in 1978 and 1979 (5 in 1977) showed no specific trend during this period. There were 12 primary violations in 1979.

Total suspended particulates were sampled in an area shown by the map in Appendix . (Generally, the Denver metro area). A traditional cause of violations is the Cherokee Power Plant while nontraditional causes include street cleaning, winter sanding, unpaved roads, construction work, demolition activities, unpaved alleyways and parking areas.

The number of sampling stations remained about the same, i.e., 25 in 1977, 22 in 1978 and 23 in 1979, but the sampling days increased from 91 in 1977 to 144 in 1978 and 177 in 1979. Primary to alert level violation ratios remained about the same for 1977 and 1978 but increased substantially in 1979. Increased downtown construction appears to be one of the causes of the increase in TSP violation levels.

Colorado Springs 3C Area - The area of El Paso County in and around Colorado Springs comprises this area. CO problems are primarily caused by automobiles and the meteorology and topography of the area. Two stations reported CO samples for 365 days each of the last two years. The last three years have shown a primary violation day increase from 0 in 1977 to 4 in 1978 and 11 violations in 1979.

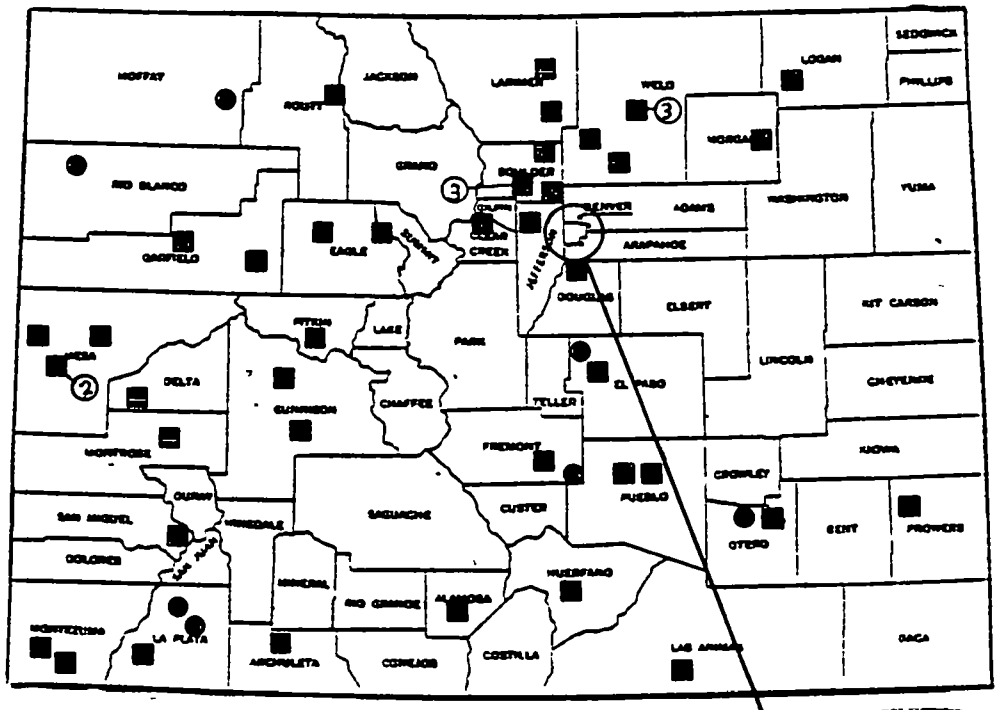
Along with the semi-arid climate which promotes the potential for air borne dust, winter sanding, grading and construction activities contribute to TSP problems. The one station which sampled this area for an average of 78 days per year showed no primary violations during 1977, 1978 or 1979.

Pueblo 3C Area - The map in Appendix D shows the area of nonattainment for TSP which consists of the City of Pueblo and its immediate outskirts. The CF&I Steel Company is one of the major contributors to TSP along with the standard nontraditional sources. Two stations sampled an average of 88 days. During 1977 six primary violation days were observed. There was one violation in 1978 and two in 1979.

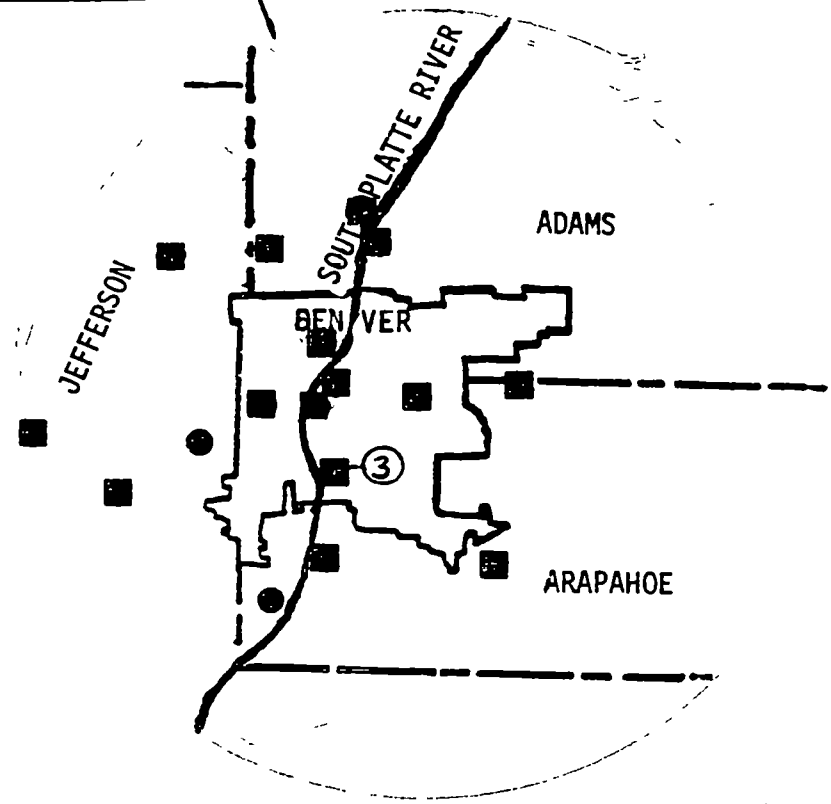
Mesa Designated Area - This area is in and around Grand Junction. Three stations were sampled in 1977 and 1978 with four stations used in 1979. No violations for TSP were noted in any of the three years which were sampled an average of 85 days per year.

Fort Collins - Greeley Area - The City limits of Fort Collins and Greeley constitute the limits of this area. Motor vehicles cause the vast majority of CO emissions in these two cities with the meteorology and topography of the area being of some consideration in pollution dispersion. The two stations (one in Greeley and one in Fort Collins) sampled daily and showed a marked increase in carbon monoxide primary standard violations with 10 in 1977, 6 in 1978 and 31 in 1979.

The TSP sampling done at three stations showed no apparent increase in primary violation levels between 1977, 1978 and 1979 (1 to 2 to 2). The average number of sampling days was 83 per year.



COLORADO MONITORING SITES



■ Stations with greater than 75% of maximum possible data

● Stations with less than 75% of maximum possible data

COLORADO

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	SO_2	NO_2	CO	O_x	LEAD
Adams	Adams	060020001F01	X					
	Aurora	060140001F01	X					
	Brighton	060240001F01	X					
	Welby	062210001F01		X	X	X	X	
	Westminister	062240002F01	X					
Alamosa	Alamosa	060040001F01	X					
Arapahoe	Cherry Creek Dam	060080001F01	X					
	Englewood	060780001F01	X					
	S. Univ. Blvd	060080002F01				X	X	
Archuletta	Pagosa Springs	060100001F01	X					
Boulder	Boulder	060200001F01	X					
	Boulder	060200008G01				X*		
	Boulder	060200006G05					X*	
	Longmont	061460001F01	X					
Clear Creek	Idaho Springs	060360001F01	X					
Delta	Delta	060540001F01	X					
Denver	Denver-Annex	060580001F01	X					
	Denver 21st & Bdwy	060580002F01	X	X	X			
	Denver Health Dept	060580007F01	X					
	Denver Colo Blvd	060580010F01				X		
	Denver-Marion	060580012F01	X					
	Denver-Julian	060580009F01	X				X	
Douglas	Castle Rock	060660001F01	X					
Eagle	Vail	060700001F01	X*					
El Paso	Colorado Springs	060380004F01	X		X	X	X	
Fremont	Canon City	060300001F01	X					
Garfield	Glenwood Springs	060920001F01	X*					
	Rifle	060880001F01	X					
Gunnison	Crested Butte	061020001F01	X*					
	Crested Butte	061040002F01	X					

*Status Only

COLORADO

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	SO_2	NO_2	CO	O_3	LEAD
Jefferson	Arvada	060120002F01				X	X	
	Arvada	060120003F01	X					
	Golden	060940001F01	X*					
	Lakewood	061260001F01	X					
La Plata	Durango	060680003F01	X					
	Red Mesa	061300083K03						X
Larimer	Fort Collins	060820001F01	X			X		
	Loveland	061480002F01	X					
Las Animas	Trinidad	062160002F01	X					
Mesa	Fruita	061520001F01	X					
	Grand Junction	060980010F01	X					
	Palisade	061520002F01	X					
Moffat	Craig	060480001F01	X*					
Montezuma	Mesa Verde	061530003F03	X					
	Towaoc	061600004K03						X
Montrose	Montrose	061620001F01	X					
Otero	La Junta	061220001F01	X					
Pitkin	Aspen	061780001F01	X					
Prowers	Lamar	061280001F01	X					
Pueblo	Pueblo Fire Sta.	061820003F01	X					
	Pueblo Health Dept	061820007F01	X	X				
Rio Blanco	Rangely	061860002F01	X*					
Routt	Steamboat Springs	061920003F01	X*					
San Miguel	Telluride	062000001F01	X*					
Weld	Greeley	061000005F01				X	X	
	Greeley	061000006F01	X					
	Johnstown	062220003F01	X					
	Platteville	062720005F01	X					

*Status Only

COLORADO

STATIONS NOT USED FOR TRENDS AND/OR STATUS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	TSP	Ox	LEAD
Boulder	Broomfield	060260001F01	X		
	Boulder	060200008G01		X	
Denver	Denver-Gates Rubber	060580003F01	X		
	Denver-1010 S. Broadway	060580003F02	X		
Eagle	Eagle Courthouse	060700004F01	X		
El Paso	Manitou Springs	061500001F01	X		
Fremont	Florence	060800001F01	X		
Jefferson	Edgewater	060720001F01	X		
	Rocky Flats	061140001F02	X		
La Plata	Ignacio	061300003K03			X
Logan	Sterling	062080001F01	X		
Mesa	Grand Junction	060980011F01	X		
Morgan	Brush	060280001F01	X		
Otero	Rocky Ford	061900001F01	X		
Weld	Greeley	061000003F01	X		

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

COLORADO

NONATTAINMENT AREAS

		Total Suspended Particulates			Nitrogen Dioxide			Carbon Monoxide		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations	Average Percent Obs./Sta.	Stations W/Yearly Average Violations	Number of Stations	Days Sampled	Violation Days	Number of Stations
Denver Designated Area	1977	91	A-4/P-17	25	86%	P-2	5	365	A-18/P-145	9
	1978	144	A-8/P-26	22	72%	P-0	3	365	A-34/P-184	9
	1979	177	A-27/P-52	23	91%	P-0	2	365	A-34/P-160	9
Colorado Springs 3C	1977	80	P-0	1				350	P-0	2
	1978	71	P-0	1				365	A-1/P-4	2
	1979	82	P-0	1				365	A-1/P-11	2
Pueblo 3C	1977	90	A-1/P-6	2						
	1978	79	P-1	2						
	1979	96	A-1/P-2	2						
Mesa Designated Area	1977	91	P-0	3						
	1978	77	P-0	3						
	1979	86	P-0	4						
Fort Collins-Greeley	1977	81	P-1	3						
	1978	81	P-2	3						
	1979	87	A-1/P-2	3						

A - Alert Violation Days
P - Primary Standard Violation Days

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

COLORADO

NONATTAINMENT AREAS

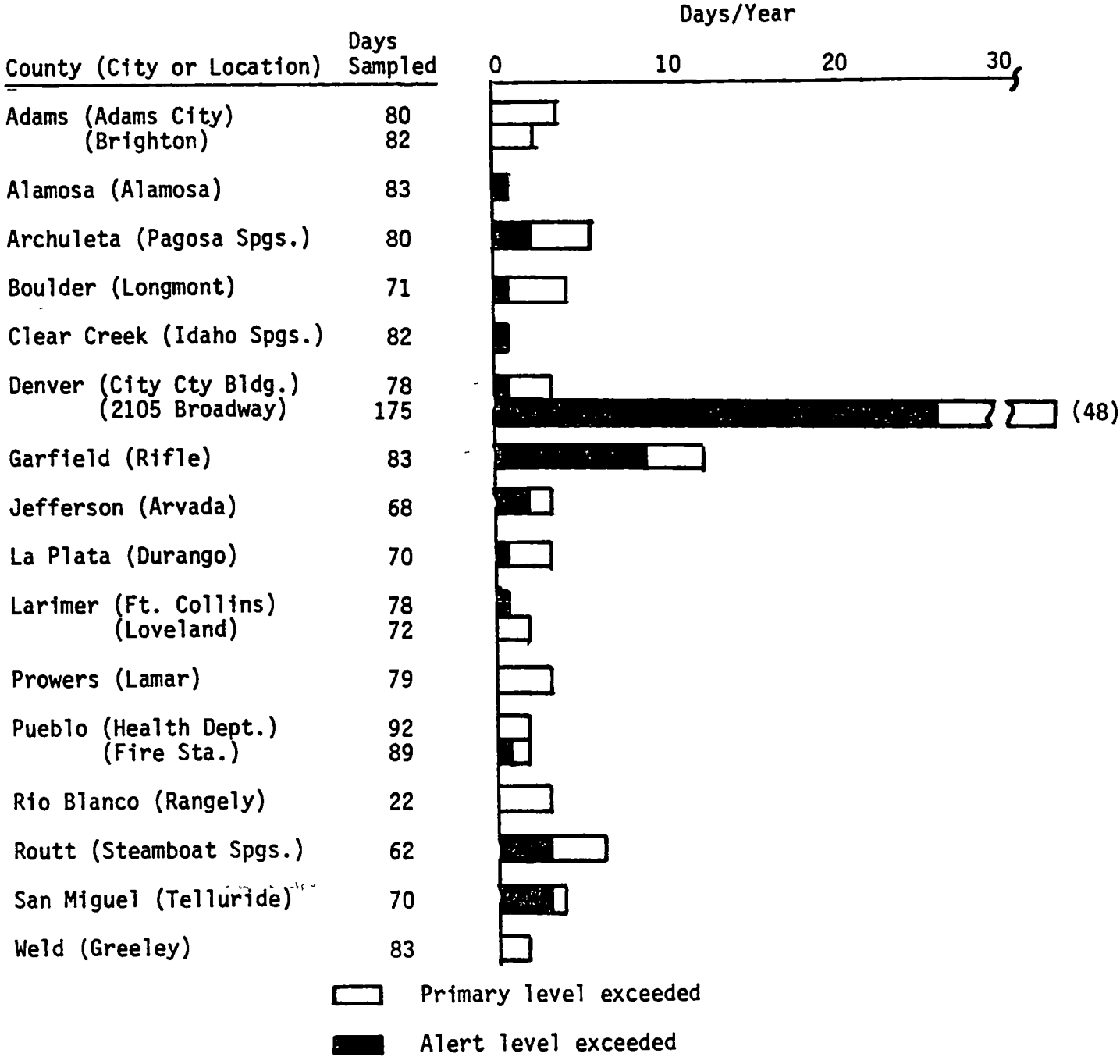
		Ozone		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations
Denver Designated Area	1977	363	P-15	5
	1978	356	A-1/P-5	7
	1979	365	P-12	7

A - Alert Violations Days
P - Primary Standard Violation Days

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

COLORADO

TOTAL SUSPENDED PARTICULATES

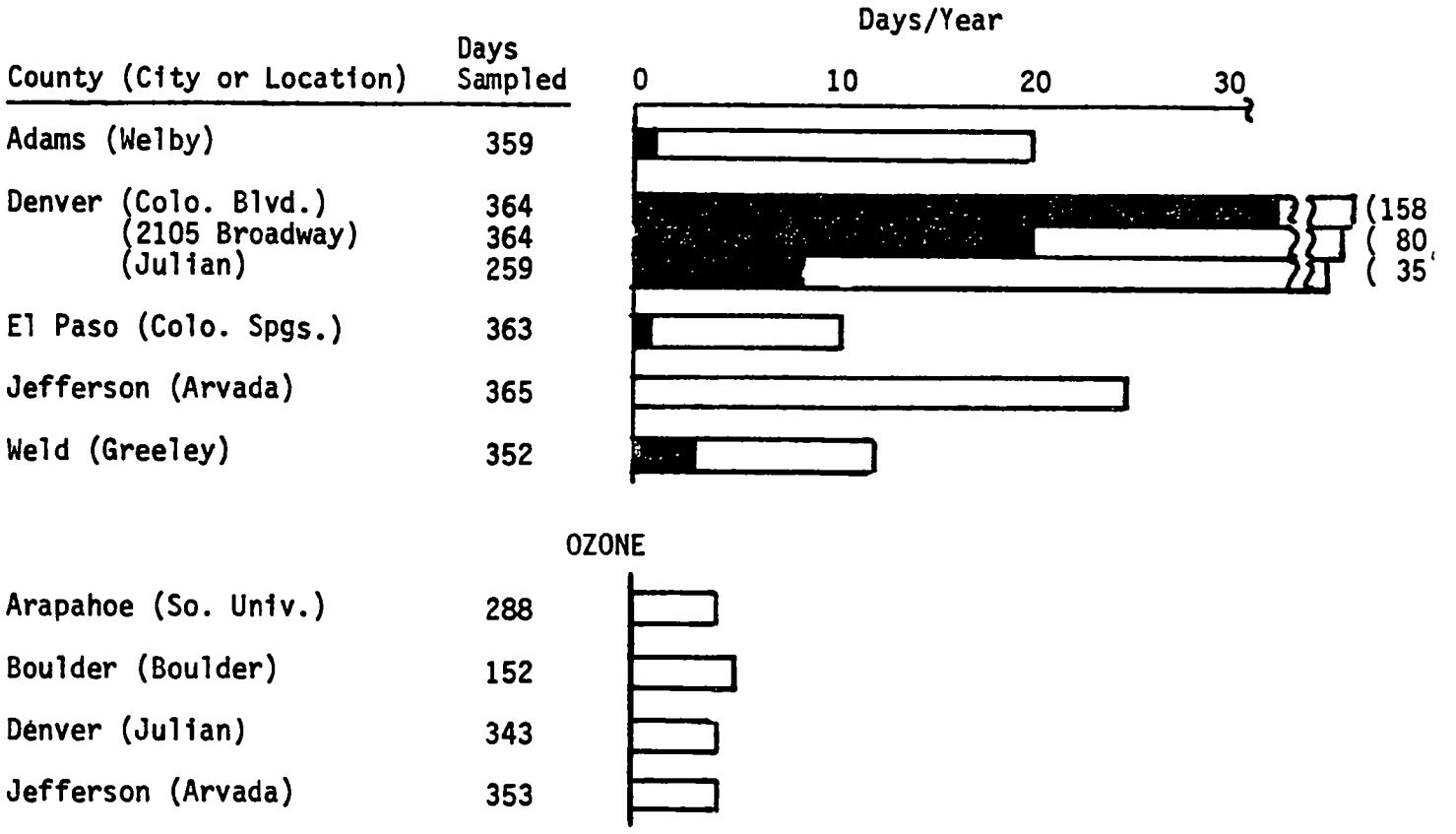


County (City or Location)	Days Sampled
Adams (Adams City)	80
(Brighton)	82
Alamosa (Alamosa)	83
Archuleta (Pagosa Spgs.)	80
Boulder (Longmont)	71
Clear Creek (Idaho Spgs.)	82
Denver (City Cty Bldg.)	78
(2105 Broadway)	175
Garfield (Rifle)	83
Jefferson (Arvada)	68
La Plata (Durango)	70
Larimer (Ft. Collins)	78
(Loveland)	72
Prowers (Lamar)	79
Pueblo (Health Dept.)	92
(Fire Sta.)	89
Rio Blanco (Rangely)	22
Routt (Steamboat Spgs.)	62
San Miguel (Telluride)	70
Weld (Greeley)	83

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

COLORADO

CARBON MONOXIDE

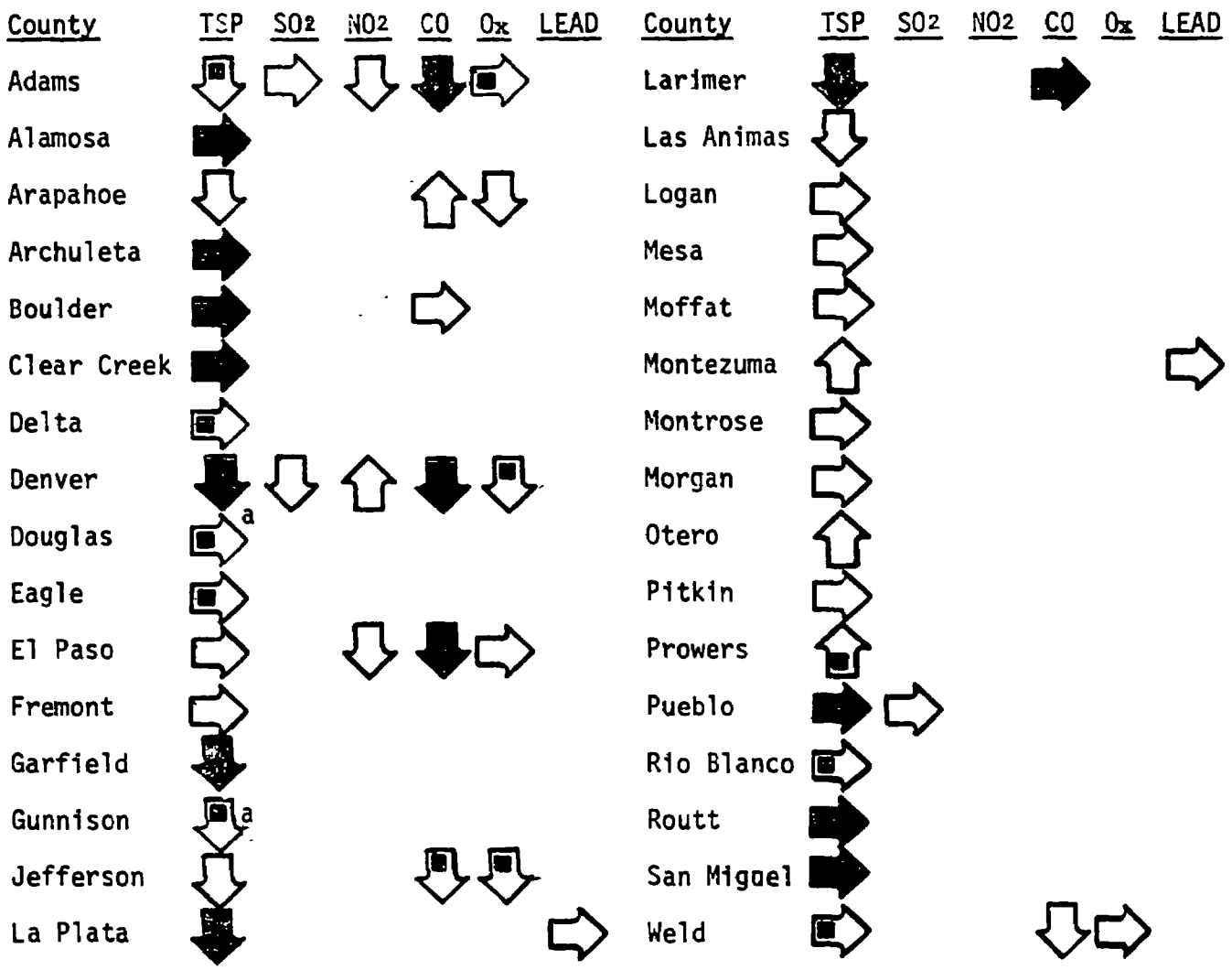


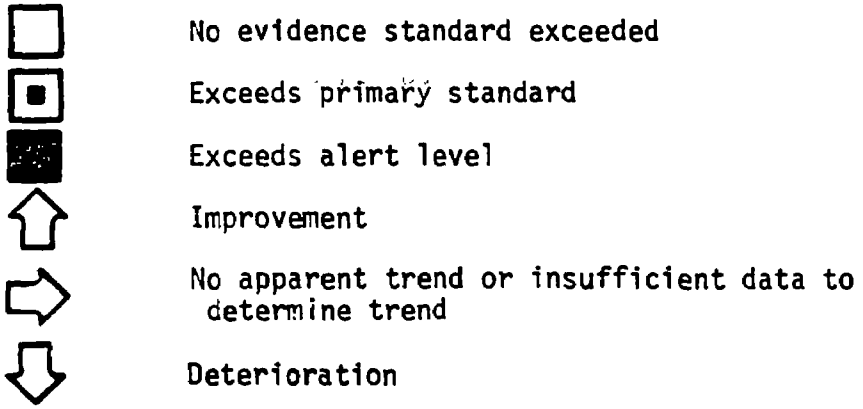
Primary level exceeded

Alert level exceeded

STATUS AND TRENDS IN AIR QUALITY

COLORADO





a/ Status Based on Annual Mean Only

Montana Air Quality

There have been few pollution problems in Montana that have shown either an improvement or deterioration. Two of the major improvements have occurred in the city of Missoula and the Anaconda area. Carbon monoxide violations in Missoula dropped drastically during the trend period. Missoula, located in a valley, is particularly susceptible to pollution because of it's topography. Sulfur dioxide violations in the Anaconda area decreased substantially although there were 3 alert and 18 primary SO_2 violations in 1979. Lead violations for all 3 quarters of the 3 quarters sampled were observed in Helena.

Status of Nonattainment Areas in Montana

Rosebud County - This area was changed from nonattainment to unclassified for ozone. No ozone sampling was done in Montana during 1976, 1978 or 1979. Rosebud showed no ozone violations for 290 sampling days in 1977.

Colstrip Area - The Rosebud County area is a square approximately 11 miles on a side centered at Colstrip, Montana. This area had been designated nonattainment for TSP for both 24 hour and annual primary standards. Five sampling sites in the area had no primary violations and only two secondary violations during the 32 days of sampling in 1979. The Ashland site, (the only site sampled in prior years) showed no violation in 1976, 1977 and 1978.

City of Columbia Falls - The city limits of Columbia Falls constitute this TSP nonattainment area located in Flathead County. This area was designated nonattainment for the primary standard. Fugitive dust from Highway 40 and Nucleus Avenue is the major TSP contributor. These streets will be rebuilt and maintained by the city to alleviate this problem. Even though no daily violations were observed for the 27 samples taken in 1977, there were 5 violations observed in 1978 and in 1979. The total of samples taken was 55 in 1978 and 8 in 1979.

City of Missoula - The city limits of Missoula make up the area which is a primary standard nonattainment area for TSP and CO. A broader area around Missoula has a secondary standard nonattainment designation. The TSP problem can be attributed primarily to dust from unpaved roads. A primary standard violation rate of 7 days in 1977, 16 days in 1978 and 10 days in 1979 was observed during the trend period.

Carbon monoxide due primarily to motor vehicles and the air stagnation producing topography of this area (a valley) cause the continuing CO alert and primary standard violation occurrences. Most of the data for 1977 and 1978 was accumulated from the station at Brooks and South Avenue. This station location was moved for part of 1978 and 1979 to a location at Bancroft and Kent. The number of daily violations diminished but there was still one alert and 9 primary violation days for the 136 days sampled at the Bancroft and Kent site.

Billings Area - The area bounded by 6th Avenue N on the north, 2nd Avenue S on the south, 25th Street on the east and 33rd Street on the west comprise the nonattainment area designated because of secondary TSP violations. Reentrained dust from paved roads is a major problem. A planned pilot sweeping and flushing program will be started to alleviate the TSP problem. Five stations showed a total of three primary standard violation days in 1979. However, the Central Park site had 36 secondary violation days of the 299 days sampled. No primary violations were noted in 1977 or 1978.

Great Falls Area - This area is bounded by 2nd Avenue N on the north, 2nd Avenue S on the south, 10th Street on the east and the Missouri River on the south. It is designated nonattainment for secondary violations of TSP. Windblown particulate matter from street sanding is a major problem. No primary violations were noted in 1978 and 1979 for four stations that sampled 93 and 126 days respectively.

Great Falls has recently been made a primary level violation nonattainment area for carbon monoxide. One station was used for sampling CO and this showed four primary level violations out of 94 sampling days in 1979. The years 1977 and 1978 also showed 4 and 10 primary level violations respectively.

Butte Area - The northeast section of Butte is currently designated nonattainment for primary TSP violations. Fugitive dust emission violations caused by the open pit mine owned by Anaconda Copper Company and unpaved roads increased dramatically in 1979. Five primary violations days were noted out of 240 days sampled at six stations in 1979. Only two primary standard violations were noted in 1977 and no violations occurred in 1978. These stations were sampled for 44 days in 1977 and 181 days in 1978.

East Helena Area - The designation of nonattainment for primary level SO_2 violations covers an area of .67km radius around the ASARCO smelter. A 1400 foot square area in the northeast corner of the SO_2 area has been designated a nonattainment TSP area because of secondary standard violations. The ASARCO lead smelter causes the majority of the TSP emission problems. No TSP sampling sites are located in this area but two sampling sites are located in Helena. These sites showed no primary level violations in 1977 thru 1979 but do show a total of seven secondary violations for the 59 days sampled in 1979.

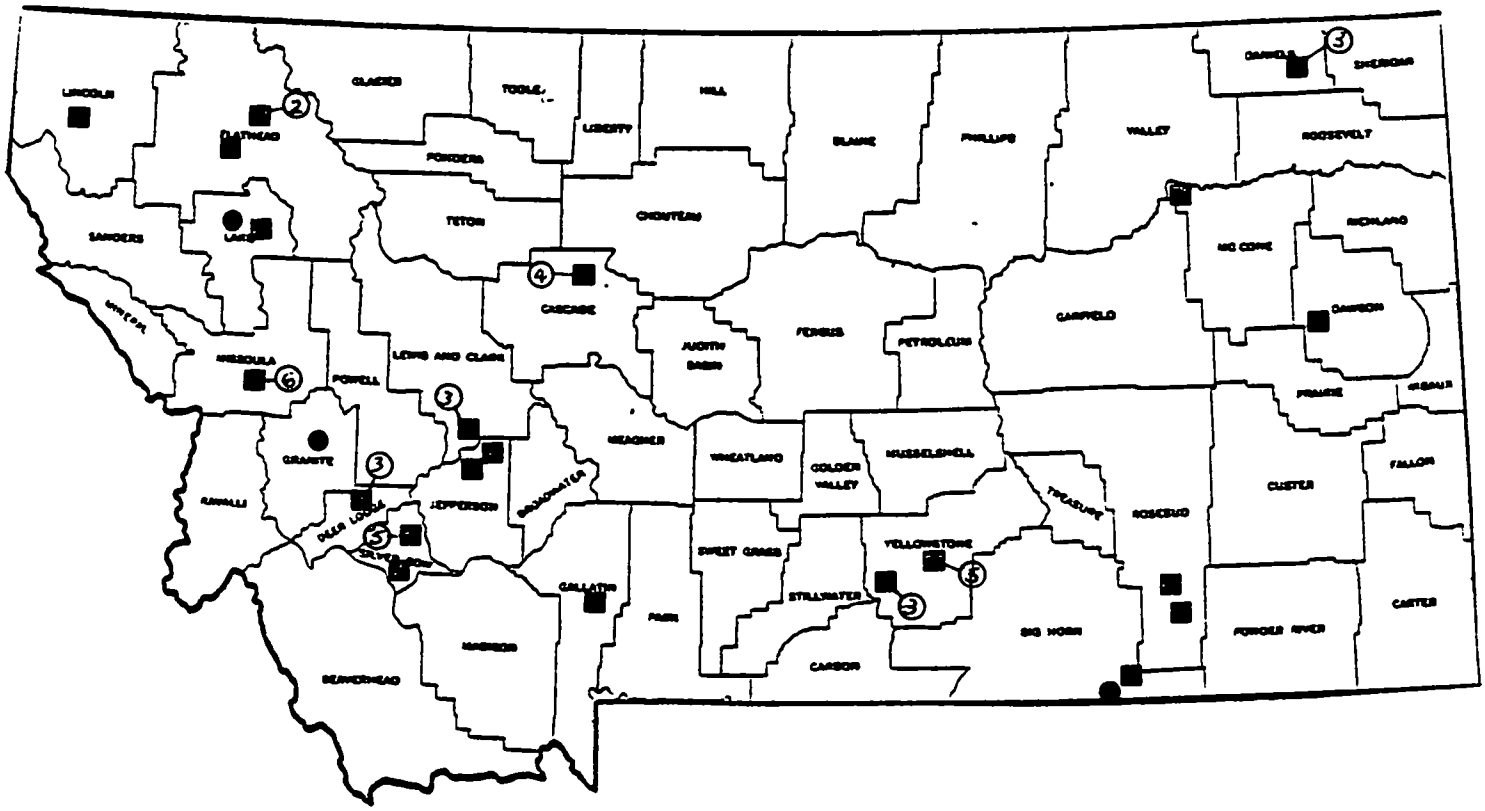
A station is set up in Montana City four miles SSE of the ASARCO plant to monitor SO_2. No violations of the primary standard were shown at this site for 1977 thru 1979 even though there were 290, 183 and 133 days of sampling respectively. Eighty percent of the emissions are from 400 foot stacks, while the remaining 20 percent of the emissions are from 110 foot stacks and subject to down wash. Taller stacks (375 feet) have been suggested as a replacement to the 110 foot stacks to solve down wash problems.

Laurel Area - An area of 2 km radius around the Cenex Refinery is the area designated nonattainment for primary SO_2 standard violations. The one site used for monitoring showed 10 primary violation days in both 1978 and 1979 down from 33 in 1977. The number of days sampled has decreased over the trend period.

Anaconda Area - A 6 mile square area centered at the Anaconda Copper smelter constitutes the nonattainment area designated because of SO_2 violations. Violations occur because of excessive emissions from the main stack in the elevated terrain southwest of the plant. Excessive fugitive emissions also occur close to the smelter. Only one site currently has data in the EPA data system for 1979, and shows 18 primary violation days for 335 days sampled by comparison 1978 showed 136 primary violation days at the 10 sampling sites

City of Billings - The area bounded by 6th Avenue N on the north, the Burlington Northern tracks on the south, U.S. 87 on the east and Division Street on the west has been designated as nonattainment for carbon monoxide violations. Motor vehicle emissions cause almost all the CO problems. No data was collected in 1979 at any site in Billings. Only one station was used for 1977 and 1978. This showed three daily violations of 276 samples taken in 1977 and no violations for 82 samples taken in 1978. Three major intersections need modifications to help alleviate this problem area.

Billings was changed from nonattainment to unclassified for ozone. No ozone data was collected in 1978 or 1979.



MONTANA

MONITORING SITES

■ Stations with 75% or more of maximum possible data

● Stations with less than 75% of maximum possible data

MONTANA

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	SO_2	CO	LEAD
Big Horn	N.E. of Decker	270060009F03	X			
Cascade	Great Falls	270660015F01			X*	
	Great Falls	270660009G01	X			
	Great Falls	270660026F01	X			
Daniels	Scobey	270340001F03	X			
	Scobey	270340003F03	X			
	Scobey	270340003F03	X			
Dawson	Lindsay	270360004F03	X*			
Deer Lodge	Anaconda-Lincoln	270020007F01	X*	X*		X*
	Highway Jct	270400004F02		X		X*
	Mill Cr Crossing	270400012F02		X		
Flathead	Columbia Falls	270270005F01	X			
	Columbia Falls	270480029F02	X*			
Gallatin	Kalispell	270800014F01	X*			
	Bozeman	270120001F01	X*			
Jefferson	Montana City	270760904F02		X		
	Microwave	270760903F02				X
Lake	Ronan	270820011F05	X*			
Lewis & Clark	Helena	270720001F01	X*			
	Helena	270860002F02	X			X
	Helena	270720001F07	X*			
Lincoln	Libby	270900010F01	X			
Missoula	Missoula-Lions Pk	271100019F01	X		X*	X*
	Missoula	271100020G01	X			
	Missoula	271100001G01	X			X*
	Missoula	271100015G02	X			
	Missoula	271100016G02	X			
Rosebud	BN Site	271360027F02	X*			

*Status Only

MONTANA

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	SO_2	CO	LEAD
Silverbow	Butte	270160005F01	X			X*
	Fisher Butte	271360003F03	X			
	Tierney	271480015F02	X			
	Butte	270160020F01				X*
	Butte	270160017F01	X*			
	Butte	270160018F01	X*			X*
	Butte	270160019F01	X*			X*
Yellowstone	Billings	270080059F01				X*
	Billings	270080007G01	X			
	Billings	270080008G01	X			
	Billings	270080009G01	X			
	Laurel	270840001G02	X	X		
	Laurel	270840009F01		X		
	Laurel	270840009F05		X		

*Status Only

MONTANA

STATIONS NOT USED FOR TRENDS AND/OR STATUS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	TSP
Big Horn	Decker-Warren Ranch	270060009F03	X
Lake	Polson	270820010F05	X
McCone	Fort Peck	270980001F03	X
Yellowstone	Billings	270080006F05	X

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

MONTANA

NONATTAINMENT AREAS

		Total Suspended Particulates			Carbon Monoxide		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations	Days Sampled	Violation Days	Number of Stations
Colstrip Area	1977	27	P-0	1			
	1978	13	P-0	1			
	1979	32	P-0	5			
City of Columbia Falls	1977	27	P-0	1			
	1978	55	A-3/P-5	2			
	1979	60	A-2/P-8	1			
City of Missoula	1977	365	P-7	8	290	A-12/P-133	1
	1978	360	A-6/P-16	9	150	A-21/P-66	2
	1979	365	A-1/P-10	6	136	A-1/P-9	1
Missoula Area	1977	365	P-7	8			
	1978	360	A-6/P-16	9			
	1979	365	A-1/P-10	6			
Billings Area	1977	60	P-0	4			
	1978	138	P-0	7			
	1979	303	P-3	5			
Great Falls Area	1977	99	A-1/P-1	2	161	P-4	1
	1978	93	P-0	4	57	P-10	1
	1979	126	P-0	4	94	P-4	1
Butte Area	1977	44	P-2	5			
	1978	131	P-0	8			
	1979	240	P-5	6			

A - Alert Violation Days
P - Primary Standard Violation Days

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

MONTANA

NONATTAINMENT AREAS

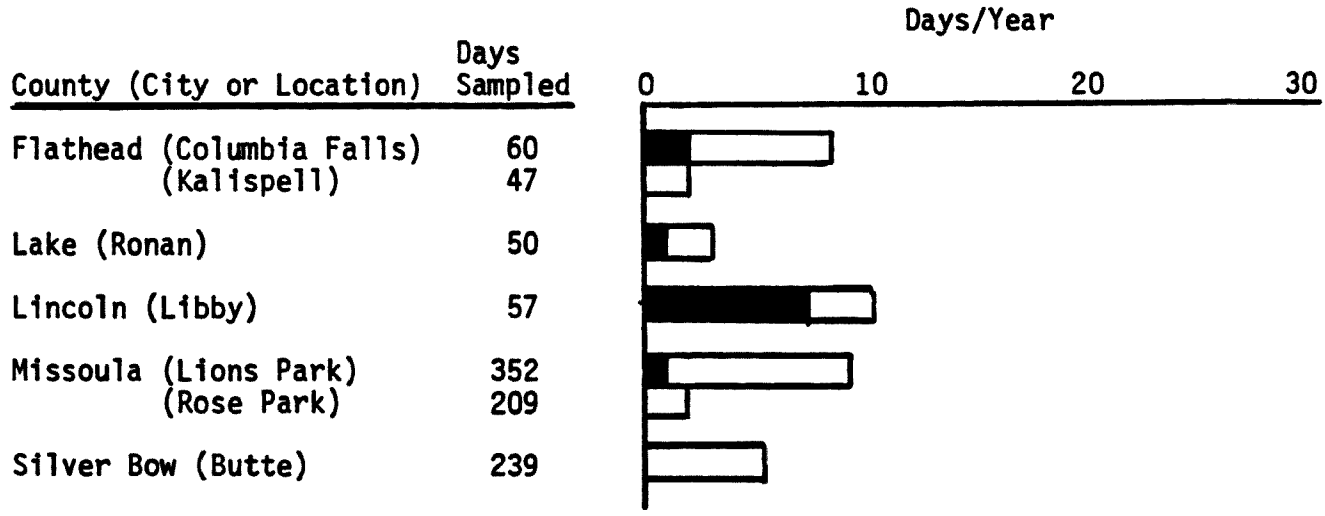
		Total Suspended Particulates			Sulfur Dioxide			Carbon Monoxide		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations	Days Sampled	Violation Days	Number of Stations	Days Sampled	Violation Days	Number of Stations
East Helena Area	1977	49	P-0	2	290	P-0	1			
	1978	68	P-0	3	183	P-0	1			
	1979	59	P-0	2	133	P-0	1			
Laurel Area	1977				191	P-33	2			
	1978				75	A-2/P-14	2			
	1979				172	P-10	2			
Anaconda Area	1977				365	A-8/P-28	1			
	1978				363	A-48/P-136	10			
	1979				335	A-3/P-18	1			
City of Billings	1977							226	P-3	1
	1978							82	P-0	1
	1979							0	---	0

A - Alert Violation Days
P - Primary Standard Violation Days

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

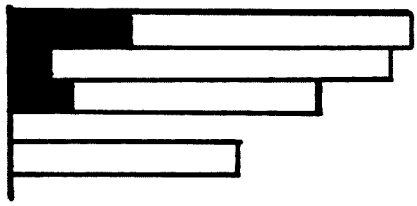
MONTANA

TOTAL SUSPENDED PARTICULATES



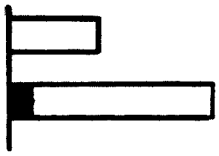
County (City or Location)	Days Sampled
Flathead (Columbia Falls)	60
(Kalispell)	47
Lake (Ronan)	50
Lincoln (Libby)	57
Missoula (Lions Park)	352
(Rose Park)	209
Silver Bow (Butte)	239

SULFUR DIOXIDE



Deer Lodge (Highway Jct.)	175
(Anaconda)	322
(Mill Cr. Cross)	186
Yellowstone (Laurel)	157

CARBON MONOXIDE



Cascade (Great Falls)	82
Missoula (Lions Park)	132

LEAD - VIOLATIONS-QUARTERLY AVERAGE

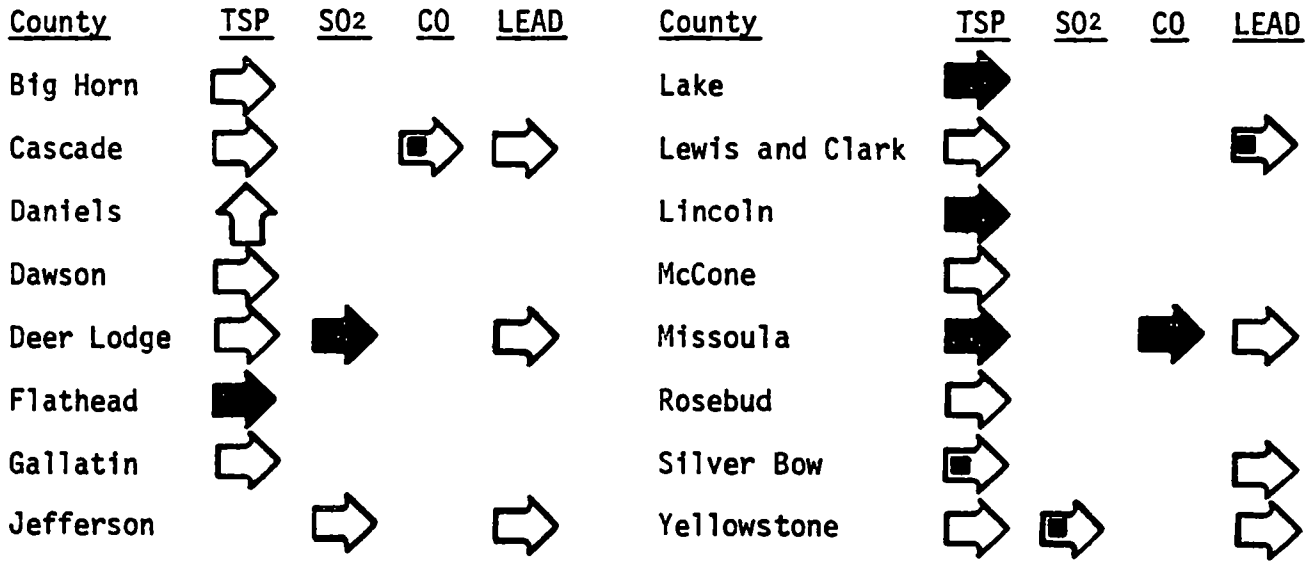
	Quarters Sampled
Lewis & Clark (Helena)	3

Primary level exceeded

Alert level exceeded

STATUS AND TRENDS IN AIR QUALITY

MONTANA



No evidence standard exceeded

Exceeds primary standard

Exceeds alert level

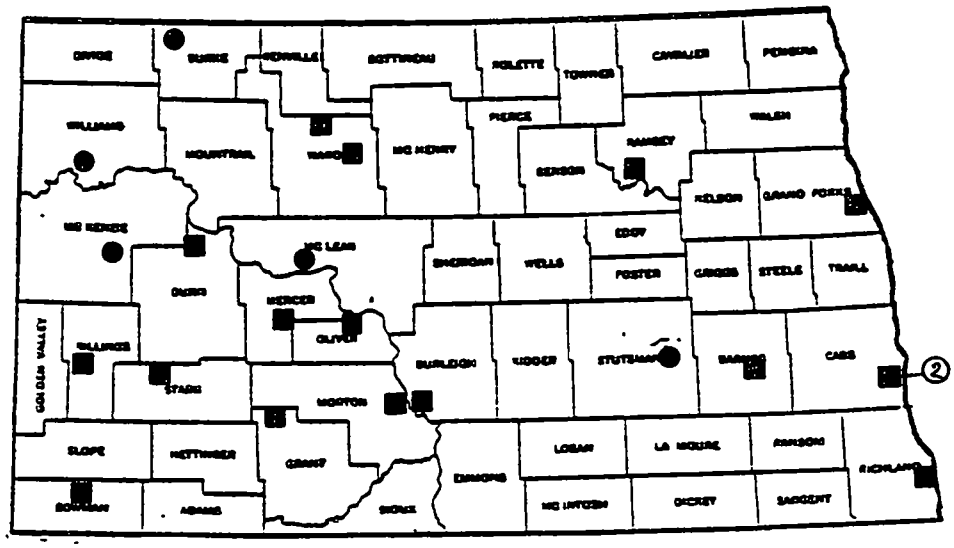
Improvement

No apparent trend or insufficient data to determine trend

Deterioration

North Dakota Air Quality

Total suspended particulates were sampled in 13 counties with no primary ambient air quality standard violations in 1979. Only one station sampled NO_2 and Ozone (Stanton). This site also showed no violations for these pollutants. There are no designated non-attainment areas in the state.



NORTH DAKOTA

MONITORING SITES

■ Stations with 75% or more of maximum possible data

● Stations with less than 75% of maximum possible data

NORTH DAKOTA

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	NO^2	O_x
Barnes	Valley City	351240001F01	X		
Billings	Medora	350080001F03	X		
Bowman	Bowman	350160001F01	X		
Burleigh	Bismarck	350100001F01	X		
Cass	Fargo	350400001F01	X		
Dunn	Mandaree	350340001F03	X*		
Grand Forks	Grand Forks	350480001F01	X*		
Grant	Glen Ullin	350520001F03	X		
Morton	Mandan	350740001F01	X		
Oliver	Stanton	350860001F03		X	X
Richland	Wahpeton	351260001F01	X*		
Stark	Dickinson	350300001F01	X*		
Ward	Minot	350780001F01	X*		
	Lake Darling	351300001F03	X		

*Status Only

NORTH DAKOTA

STATIONS NOT USED FOR TRENDS AND/OR STATUS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	TSP
Cass	Fargo	350220001F03	X
McKenzie	Roosevelt Natl Park	350700002F03	X
Mercer	Beulah	350760001F01	X
Ramsey	Devils Lake	350260001F01	X
Stutsman	Jamestown	350580001F01	X
Williams	Williston	351360001F01	X

STATUS AND TRENDS IN AIR QUALITY

NORTH DAKOTA

County	TSP	NO2	Ox
Barnes	⇨		
Billings	⇨		
Bowman	⇨		
Burleigh	⇨		
Cass	⇨		
Dunn	⇨		
Grand Forks	⇨		
Grant	⇨		
McKenzie	⇨		
McLean	⇨		
Mercer	⇨		
Morton	⇨		
Ramsey	⇨		
Richard	⇨		
Oliver		⇩	⇩
Stark	⇨		
Stutsman	⇨		
Ward	⇨		
Williams	⇨		

No evidence standard exceeded

Exceeds primary standard

Exceeds alert level

Improvement

No apparent trend or insufficient data to determine trend

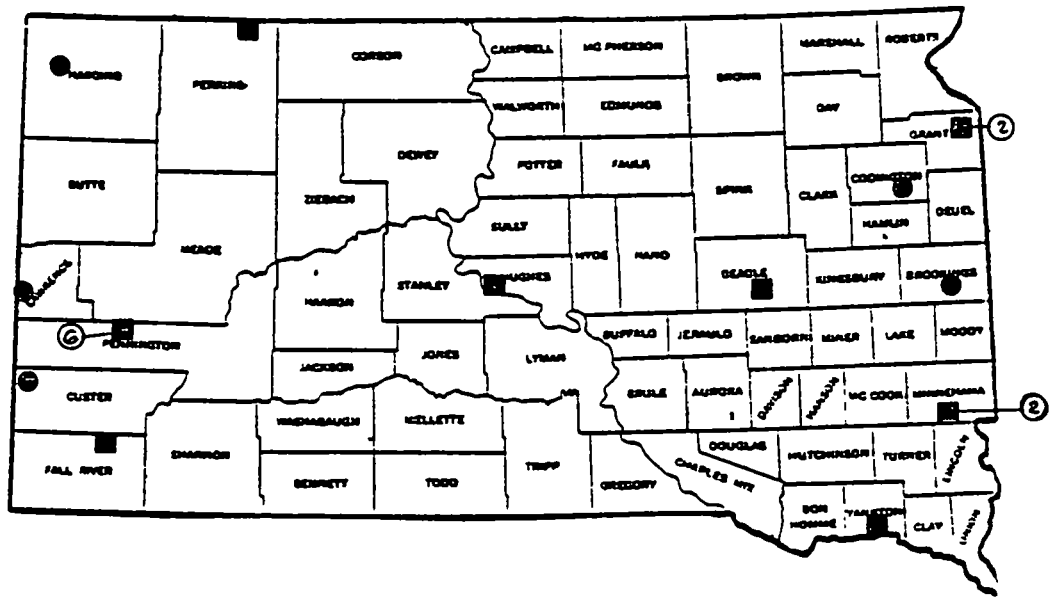
Deterioration

South Dakota Air Quality

Total suspended particulate (TSP) is the only air pollutant monitored in South Dakota. Seven stations located in the Rapid City area showed 2 alert level and 3 primary level violation days. This is a deterioration from the 1977 and 1978 levels.

Status of Nonattainment Areas in South Dakota

Rapid City Area - The nonattainment area designated for TSP primary violations is a 10 mile (north-south) by 11 mile (east-west) rectangular area centered at Rapid City. Most of the violations have been caused by fugitive emissions from quarry operations. Requirements have been adopted for fugitive dust emission controls which should result in attainment by 1982. Seven stations measured three primary and two alert level violation days for 62 days sampled in 1979. This is higher than in the past. There were three primary violation days in 1977 and one in 1978.



SOUTH DAKOTA

MONITORING SITES

■ Stations with 75% or more of maximum possible data

● Stations with less than 75% of maximum possible data

SOUTH DAKOTA

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP
Beadle	Huron	430820001F01	X*
Fall River	Hot Springs	430780001F03	X*
Grant	N.E. Big Stone Plant	430640002F02	X*
	S.E. Big Stone Plant	430640001F02	X*
Hughes	Pierre	431340001F01	X
Minnehaha	Sioux Falls	431480004F01	X
Pennington	Rapid City	431380001F01	X
	Rapid City	431380007F01	X*
	Rapid City	431380002F01	X*
	Rapid City	431380005F01	X
	Rapid City	431380006F01	X
Perkins	Lemmon	431320001F03	X
Yankton	Yankton	431800001F03	X

*Status Only

SOUTH DAKOTA

STATIONS NOT USED FOR TRENDS AND/OR STATUS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	TSP
Brookings	Brookings	430140001F01	X
Codington	Watertown	431760001F01	X
Pennington	Rapid City	431380009F01	X

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

SOUTH DAKOTA

NONATTAINMENT AREAS

		Total Suspended Particulates		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations
Rapid City Area	1977	53	P-3	4
	1978	56	P-1	4
	1979	62	A-2/P-3	7

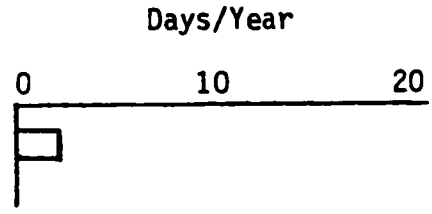
A - Alert Violation Days
P - Primary Standard Violation Days

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

SOUTH DAKOTA

TOTAL SUSPENDED PARTICULATES

County (City or Location)	Days Sampled
Pennington (Rapid City)	55



Primary level exceeded

Alert level exceeded

STATUS AND TRENDS IN AIR QUALITY

SOUTH DAKOTA

County	TSP
Beadle	
Brookings	
Codington	
Custer	
Fall River	
Grant	
Hughes	
Minnehaha	
Pennington	
Perkins	
Yankton	

No evidence standard exceeded

Exceeds primary standard

Exceeds alert level

Improvement

No apparent trend or insufficient data to determine trend

Deterioration

Utah Air Quality

Total suspended particulate violations occurred in 1979 at approximately the same frequency as in 1978 for the counties of Salt Lake, Weber and Utah. Even though the TSP emitted by Kennecott Copper has diminished, U.S. Steel in Orem continues to be the major contributor to TSP pollution in the Wasatch Front Counties. Most of the cities in the Wasatch Front Counties (Davis, Salt Lake, Utah and Weber) still have violations for ozone and carbon monoxide. In most areas no trend was noted for O and CO pollution. Both industrial and motor vehicle pollution prevail in this area.

Status of Nonattainment Areas in Utah

Changes in nonattainment status - The City of Price in Carbon County was changed from a nonattainment area with primary violation status in TSP to an unclassified area. No samples were taken in 1979 but 1978 data showed that the site had not exceeded the primary standard. The nonattainment status of Cedar City in Iron County was changed to unclassified designation. No ozone data from Uintah County was found in the EPA data system for 1977, 1978, or 1979.

A nonattainment designation for total suspended particulates has been given to four Utah Counties, Davis, Salt Lake, Utah and Weber Counties. Fugitive dust from unpaved roads and industrial emission sources are the main causes of TSP problems.

Davis County City of Bountiful Areas - The only TSP data taken for 1978 and 1979 was at the Bountiful site. Davis County was designated nonattainment for secondary TSP violations. The years 1978 and 1979 showed no primary level TSP violation but each year showed 6 and 18 secondary level violation days respectively for 333 and 334 days sampled. In 1977 one alert level and two primary level violations were noted. Davis County is also a nonattainment area for ozone because of primary level violations. Refineries in the area and motor vehicle emissions are the main causes. The meteorology and topography of the area inhibit dispersion. Mountains are on both sides of this area. The inspection and maintenance program should help reduce both the ozone and carbon monoxide problems in the county. The ozone violation day level has remained relatively constant in the last three years. There have been primary violations of 8, 8 and 10 in 1977 thru 1979 respectively. The City of Bountiful was designated nonattainment for primary level carbon monoxide violations. Again motor vehicles appear to be the primary cause of the CO violations. The three year average of primary violation days is currently slightly less than 4 per year for 1977 thru 1979. This is in comparison with 20 and 23 violation days in 1975 and 1976 at the same site.

Salt Lake County - Salt Lake City Areas - The TSP primary and alert level violations that occurred in Salt Lake County were caused by the previously mentioned common regional sources with additional pollution caused by the smelters at the Kennecott Copper Company The number of primary violations have remained the same for 1978 and 1979 (9 violation days each year). This is down considerably from 33 violation days in 1977.

Ambient air quality violation of the sulfur dioxide standard have diminished considerably since the construction of the stack at the Kennecott Copper Company smelter near Magna. This was the main cause of the SO_2 violations in Salt Lake County. The primary violation days have decreased in the last four years. They were 120, 30, 17 and four days for 1976 thru 1979 respectively.

Salt Lake County ozone problems caused primarily by motor vehicles should be reduced with the implementation of the inspection and maintenance program. The Salt Lake Health Department monitoring site showed three and four primary level violations exceedences in 1978 and 1979.

Carbon monoxide violation days for the City of Salt Lake still remain high. They have declined from 54 violation days in 1976 to 16 in 1979. However, there were still two alert level days in 1979.

Utah County - Provo Areas - One of the main causes of TSP violations in this area is the U.S. Steel plant west of Orem. Of the three TSP measuring sites located in Utah County, only two primary daily TSP violations were noted. However, all three sites showed violations of the primary annual geometric mean level violations for TSP.

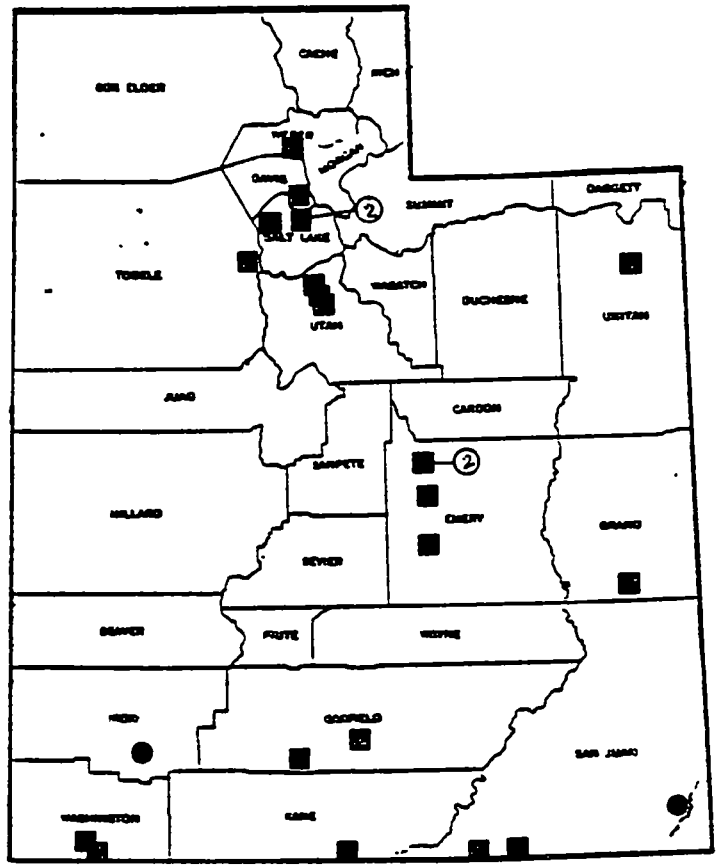
The CO site at Provo showed four primary violations in 1979 versus 51, 23 and 7 in 1976, 1977 and 1978 respectively. There has been only one primary ozone violation day in three years at the Provo site under the revised ozone standard. The State of Utah will soon be redesignating Utah County to an unclassified area.

Weber County - Ogden Areas - The station at Ogden is the only station used to monitor TSP for Weber County. Primary level daily violations have remained approximately the same for 1977 thru 1979 with three primary and one alert level violation day being noted in 1979. The annual geometric mean has been at the primary violation level for the last four years 1976-1979.

There have been no ozone violations noted for Weber County at the Ogden site for 1977 thru 1979 using the revised ozone standards. The State of Utah will be redesignating these areas to unclassified. Motor vehicle emissions still are a major problem in Ogden. Primary daily ozone violations numbered 12 and 14 in 1978 and 1979. This is down from 75 and 36 ozone violation days in 1976 and 1977.

Cedar City Area - Cedar City in Iron County was designated a nonattainment area for SO_2. The cause was a building burning high sulfur oil for heating. No primary violations occurred in 1979 because of a change to low sulfur fuel in that building. The state implementation plan for this city was approved by EPA.

Tooele County Area - The East Tooele monitoring site showed no primary level TSP violations in 1978 or 1979. The original cause of violations was the emissions from the copper smelter owned by Kennecott Copper Company. The design change taken by Kennecott has caused this decrease in primary violations.



UTAH

MONITORING SITES

■ Stations with 75% or more of maximum possible data

● Stations with less than 75% of maximum possible data

UTAH

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP	SO_2	NO_2	CO	O_x	LEAD
Davis	Bountiful	460060001F01	X	X	X	X	X	
Emery	Castledale	460280004F02	X*	X*				
	Green River	460280005F02	X*					
	Huntington Canyon	460280001K03						X
	Huntington #2	460280003K03						X
Garfield	Escalante	460300002K03						X
	Henrieville	460300003K03						X
Grand	Moab	460580002F01	X*					
Iron	Cedar City	460160002F01		X*				
Kane	Glen Canyon	460400003K03						X
Salt Lake	Airport (SLC)	460920004F02	X					
	Health Dept (SLC)	460920001F01	X	X	X	X	X	
	Magna	460520001F02	X	X				
San Juan	Navajo Mt	460960001K03						X
	Olsato	460960002K03						X
Tooele	East Tooele	461160001F01	X	X				
Uintah	East Vernal	461200001F01	X*	X*	X			
Utah	Lindon	461120001F01	X					
	Pleasant Grove	460760001F01	X					
	Provo	460800001F01	X		X	X*	X	
Washington	Bloomington	461280001K03						X
	George	461280002K03						X
Weber	Ogden	460680001F01	X		X	X	X*	

*Status Only

UTAH

STATIONS NOT USED FOR TRENDS AND/OR STATUS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	LEAD
San Juan	Aneth	460960003K03	X

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

UTAH

NONATTAINMENT AREAS

		Total Suspended Particulates			Sulfur Dioxide			Ozone		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations	Days Sampled	Violation Days	Number of Stations	Days Sampled	Violation Days	Number of Stations
Davis County	1977	334	P-2	1				364	P-8	1
	1978	333	P-0	1				364	A-1/P-8	1
	1979	334	P-0	1				358	P-10	1
Salt Lake County	1977	365	A-3/P-33	8	361	A-4/P-119	1	355	P-0	1
	1978	363	A-4/P-9	4	261	A-2/P-151	3	179	P-3	1
	1979	364	A-2/P-9	3	263	P-4	2	362	P-4	1
Utah County	1977	365	A-4/P-19	6				365	P-0	2
	1978	356	P-0	3				352	P-1	2
	1979	356	P-2	2				363	P-0	1
Weber County	1977	350	A-1/P-3	2				203	P-0	1
	1978	301	P-1	2				72	P-0	1
	1979	350	A-1/P-3	1				341	P-0	1
Cedar City	1977				272	P-11	1			
	1978				334	P-7	2			
	1979				334	P-0	1			
Tooele County	1977				306	P-7	1			
	1978				305	P-0	1			
	1979				231	P-0	1			

A - Alert Violation Days
P - Primary Standard Violation Days

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

UTAH

NONATTAINMENT AREAS

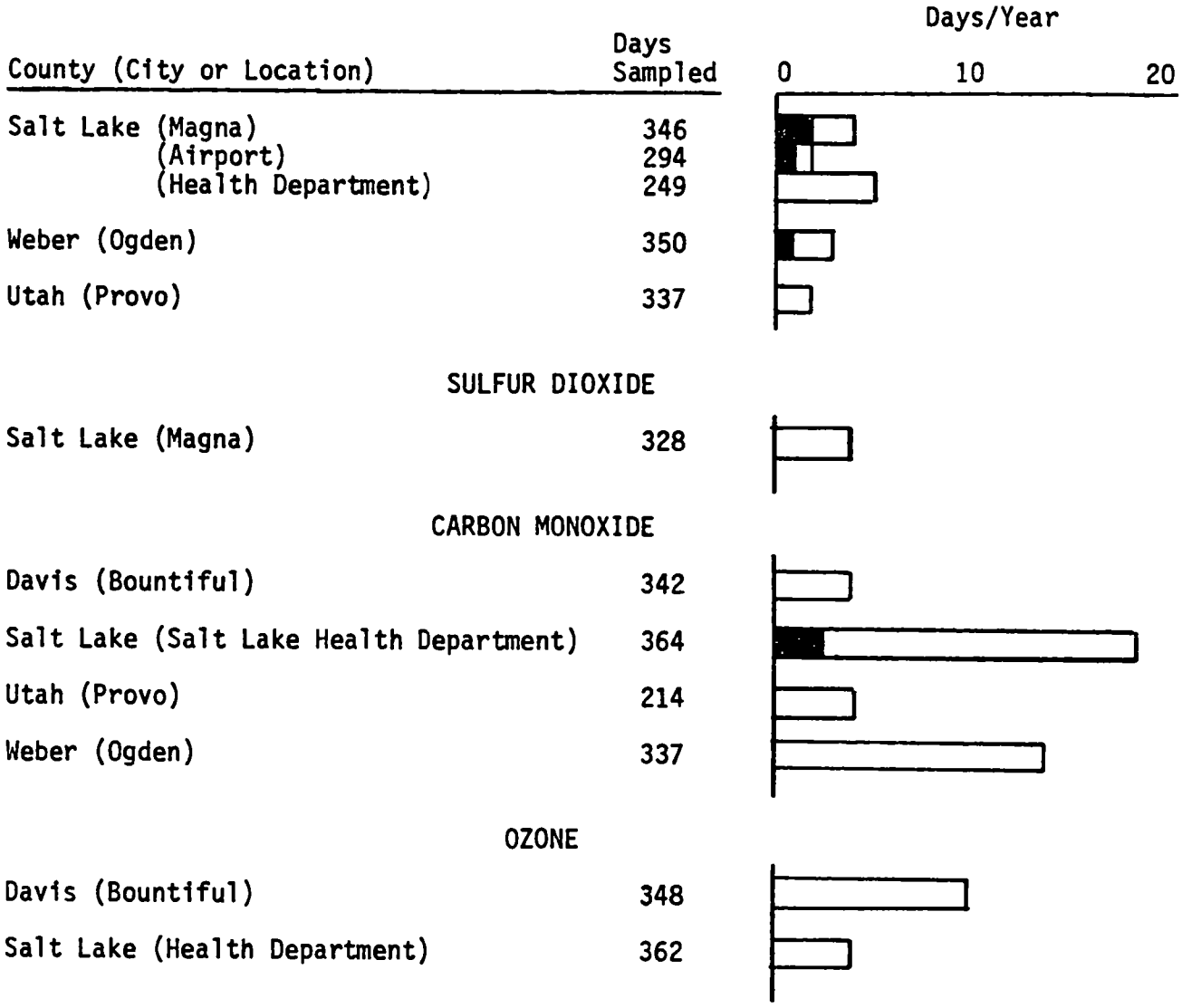
		Carbon Monoxide		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations
City of Bountiful	1977	228	P-7	1
	1978	334	P-0	1
	1979	334	P-4	1
City of Ogden	1977	341	A-3/P-36	1
	1978	349	P-12	1
	1979	337	P-14	1
City of Provo	1977	365	P-23	1
	1978	277	P-7	1
	1979	212	P-4	1
Salt Lake City	1977	359	A-3/P-40	1
	1978	352	P-18	1
	1979	364	A-3/P-18	1

A - Alert Violation Days
P - Primary Standard Violation Days

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

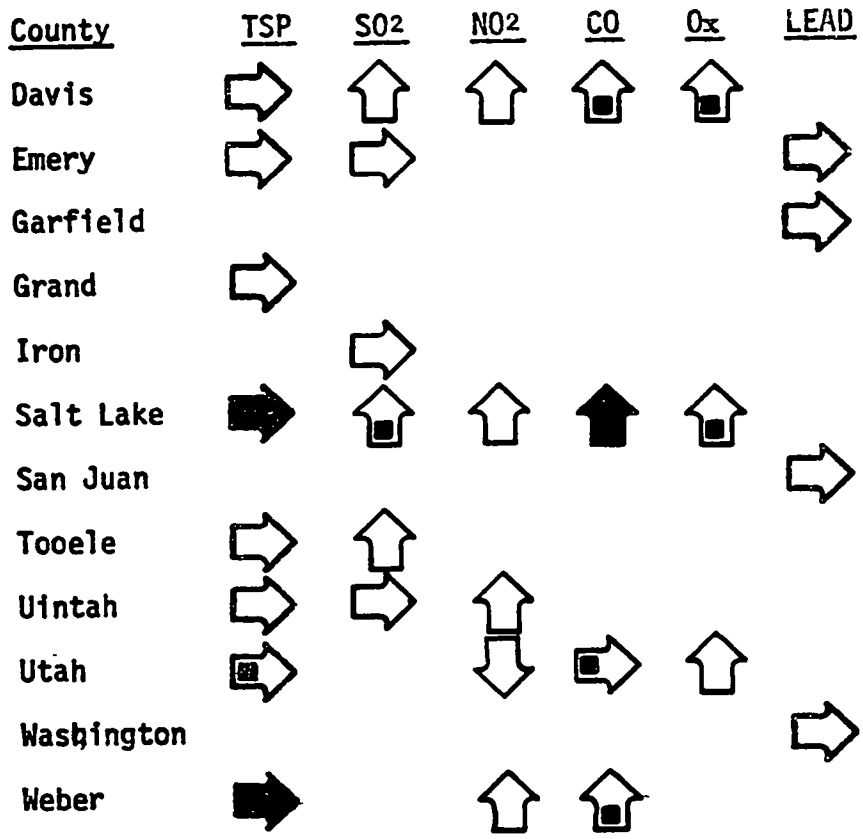
UTAH

TOTAL SUSPENDED PARTICULATES



STATUS AND TRENDS IN AIR QUALITY

UTAH



No evidence standard exceeded

Exceeds primary standard

Exceeds alert level

Improvement

No apparent trend or insufficient data to determine trend

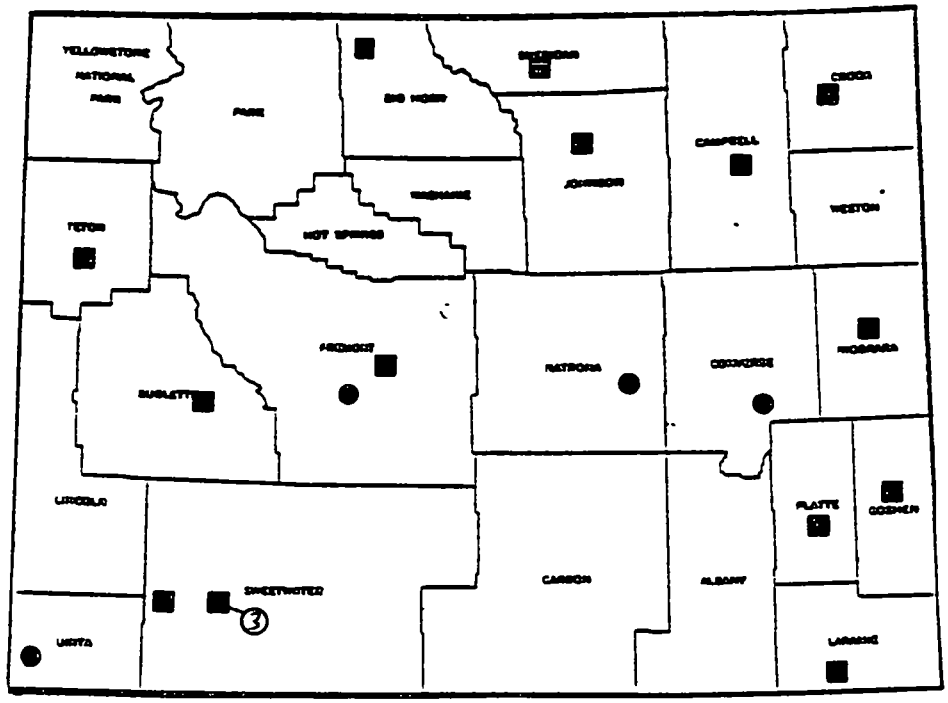
Deterioration

Wyoming Air Quality

The only air pollution monitoring in Wyoming is for total suspended particulates. The nonattainment area for TSP in the Trona industrial area showed no primary level violations. Rock Springs, located 28 miles ENE of this area, did show 2 primary level violations for TSP. No other TSP primary violations were noted in Wyoming since there were only 8 secondary level TSP violations in all of Wyoming for 1979.

Status of Nonattainment Areas in Wyoming

Trona Industrial Area - A nonattainment area for primary TSP violations was designated for an area 10 miles by 10 miles square centered approximately 28 miles WSW of Rock Springs. No primary level violations were shown for 1977 thru 1979 at the Granger station. An average of 56 days were sampled during each of these three years.



WYOMING

MONITORING SITES

■ Stations with 75% or more of maximum possible data

● Stations with less than 75% of maximum possible data

WYOMING

STATIONS USED FOR TRENDS AND/OR STATUS

County	City or Location	Station Number	TSP
Big Horn	Lovell	520040001F01	X
Campbell	Gillette	520280002F01	X*
Crook	Devils Tower	520200002F03	X
Fremont	Riverton	520600001F01	X*
Goshen	Lingle	520300003F03	X
Johnson	Southwest of Buffalo	520360001F03	X
Laramie	Cheyenne	520140001F01	X
Platte	Wheatland	520830001F01	X
Sheridan	Sheridan	520660002F03	X
Sublette	Boulder	520680001F03	X*
Sweetwater	Rock Springs	520620001F01	X
	Rock Springs	520620003F01	X
	Granger	520680001F03	X
Teton	Kelly	520720001F03	X

*Status Only

WYOMING

STATIONS NOT USED FOR STATUS AND/OR TRENDS - LESS THAN 75% OF MAXIMUM DAYS

County	City or Location	Station Number	TSP
Albany	Laramie	520400005F03	X
Converse	Douglas	520220002F03	X
Fremont	Lander	520380001F01	X
Natrona	Casper	520120001F01	X
Sweetwater	Rock Springs	520620001F01	X
Uinta	Evanston	520240001F01	X

AIR QUALITY TRENDS
BASED ON STANDARD VIOLATIONS

WYOMING

NONATTAINMENT AREAS

		Total Suspended Particulates		
Nonattainment Area	Year	Days Sampled	Violation Days	Number of Stations
Trona Industrial Area	1977	58	P-0	1
	1978	55	P-0	1
	1979	55	P-0	1

A - Alert Violation Days
P - Primary Standard Violation Days

NUMBER OF DAYS THAT PRIMARY STANDARD OR ALERT LEVEL WAS EXCEEDED IN 1979

WYOMING

TOTAL SUSPENDED PARTICULATES

County (City or Location)	Days Sampled	Days/Year 0 10 20
Sweetwater (Rock Springs)	38	

Primary level exceeded

Alert level exceeded

STATUS AND TRENDS IN AIR QUALITY

WYOMING

County	TSP
Albany	
Big Horn	
Campbell	
Converse	
Crook	
Fremont	
Goshen	
Johnson	

County	TSP
Laramie	
Natrona	
Platte	
Sheridan	
Sublette	
Sweetwater	
Teton	
Uinta	

No evidence standard exceeded

Exceeds primary standard

Exceeds alert level

Improvement

No apparent trend or insufficient data to determine trend

Deterioration

APPENDIX A

National Ambient Air Quality Standards

NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Time period/standard	Maximum permissible concentration
Suspended particulate matter	Annual, secondary	60 $\mu g/m^3$
(Total suspended particulates)	Annual, primary[a]	75 $\mu g/m^3$
(TSP)	24-hour, secondary[b]	150 $\mu g/m^3$[c]
	24-hour, primary	260 $\mu g/m^3$[c]
Sulfur dioxide	Annual, primary	80 $\mu g/m^3$
(SO_2)	24-hour, primary	365 $\mu g/m^3$[c]
	3-hr, secondary	1300 $\mu g/m^3$[c]
Carbon monoxide	1-hr, primary	40 mg/m^3[c]
(CO)	8-hr, primary	10 mg/m^3[c]
Oxidants/ozone	1-hr, primary	235 $\mu g/m^3$[c]
(O_x + O_z or O_3)		
Nitrogen dioxide	Annual, primary	100 $\mu g/m^3$
(NO_2)		
Lead	Quarterly, primary	1.5 $\mu g/m^3$

[a]Primary: to protect public health.

[b]Secondary: to protect public welfare.

[c]These values are not to be exceeded more than once per year.

APPENDIX B

Breakpoints For Pollutant Standards Index (Includes Alert Level For Each Pollutant)

Breakpoints for PSI (ψ) in Metric Units

Breakpoints	PSI Value (ψ)	TSP $\mu g/m^3$ 24-hr.	SO_2 $\mu g/m^3$ 24-hr.	TSP x SO_2 $(\mu g/m^3)^2$	CO mg/m^3 8 hours	O_3 $\mu g/m^3$ 1-hr.	NO_2 $\mu g/m^3$ 1-hr.
50% of primary short-term NAAQS	50	75[a]	80[a]	b	5.0	118	b
Primary short-term NAAQS	100	260	365	b	10.0	235	b
Alert Level	200	375	800	65×10^3	17.0	400	1130
Warning Level	300	625	1600	261×10^3	34.0	800	2260
Emergency Level	400	875	2100	393×10^3	46.0	1000	3000
Significant Harm Level	500	1000	2620	490×10^3	57.5	1200	3750

[a]Annual primary NAAQS.

[b]No index value reported at concentration levels below those specified by the Alert level criteria.

APPENDIX C

Procedures Used To Determine Status

PROCEDURES USED TO DETERMINE STATUS

TOTAL SUSPENDED PARTICULATES

County Status

1. Select worst site in each county based on
   - o Number of days per year greater than 260 $\mu g/m^3$
   - o Data available in 1979 (must have greater than 75% of maximum possible data)
   - o Population exposure of site. Should be representative of populated area

2. For the selected site the number of days with a value greater than 260 $\mu g/m^3$ for 1979

3. For same site, number of days with at least one value greater than 375 $\mu g/m^3$

Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any sites with a daily value of greater than 260 $\mu g/m^3$ in the county
   - o Any sites with a daily value of greater than 375 $\mu g/m^3$ in the county
   - o Compare violation days at all sites to total days sampled at all sites for the year

NITROGEN DIOXIDE

County Status

1. Select worst site in each county based on
   - o Highest annual average
   - o Data available in 1979

2. Determine whether annual average is greater than 100 $\mu g/m^3$
   - o Actual data are used
   - o Years without valid annual average are disregarded

Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any site with an average of greater than 100 $\mu g/m^3$

2. Compare the sites with yearly average values of 100 $\mu g/m^3$ to the total number of sites sampled for the year.

County Status

1. Select site in each county based on
   - o Population exposure. Must be in area where people are present
   - o Representativeness within county
   - o Number of days for 1979 greater than 24-hour average of 365 $\mu g/m^3$
   - o Data available in 1979

2. For the selected site, number of days in 1979 greater than primary 24-hour standard for the year
   - o Actual data used
   - o Continuous data preferred over noncontinuous

3. For same site count number of days per year with at least one value greater than 730 $\mu g/m^3$
   - o Actual data used

Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any sites with a 24-hour concentration of greater than 365 $\mu g/m^3$ in the county
   - o Any sites with a 24-hour concentration of greater than 730 $\mu g/m^3$ in the county

2. Compare violation days at all sites to the total days sampled at all sites for the year

County Status

1. Select worst site in county based on
   - o Number of days greater than 235 $\mu g/m^3$
   - o Data available for at least one year (1977-1979) during the months April through September

2. For selected site, count the number of days per year 1977-1979, with at least one hourly value greater than 235 $\mu g/m^3$
   - o For periods with no data, estimate by examining data from nearby sites and for the same site during same period of other years
   - o Data are insufficient if unavailable during the peak ozone season (April-September)

3. For same site, count number of days with at least one value greater than 400 $\mu g/m^3$
   - o Actual number is always used

Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any sites with a day having a 1-hour concentration of greater than 235 $\mu g/m^3$
   - o Any sites with a day having 1-hour concentration of greater than 400 $\mu g/m^3$

2. Compare violation days at all sites to total days sampled at all sites for the year

County Status

1. Select worst site in each county based on
   - o Number of days greater than 10 mg/m^3 8-hour average
   - o Data available for 1979

2. For selected site, count the number of days in 1979 with at least one 8-hour average greater than 10 mg/m^3
   - o For periods with no data estimate by examining data for same site for same period of other years and by looking at data for other nearby sites.

3. For same site count number of days with at least one value greater than 17 mg/m^3
   - o Actual number always used

Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any sites with a day having an 8-hour concentration of greater than 10 mg/m^3
   - o Any sites with a day having an 8-hour concentration of greater than 17 mg/m^3

2. Compare violation days at all sites to total days sampled at all sites for the year

LEAD

County Status

1. Select the worst site in each county based on
   - o Quarterly average periods greater than 1.5 $\mu g/m^3$
   - o Data available in 1979

2. For selected site, count number of quarters in 1973 with quarterly value of greater than 1.5 $\mu g/m^3$

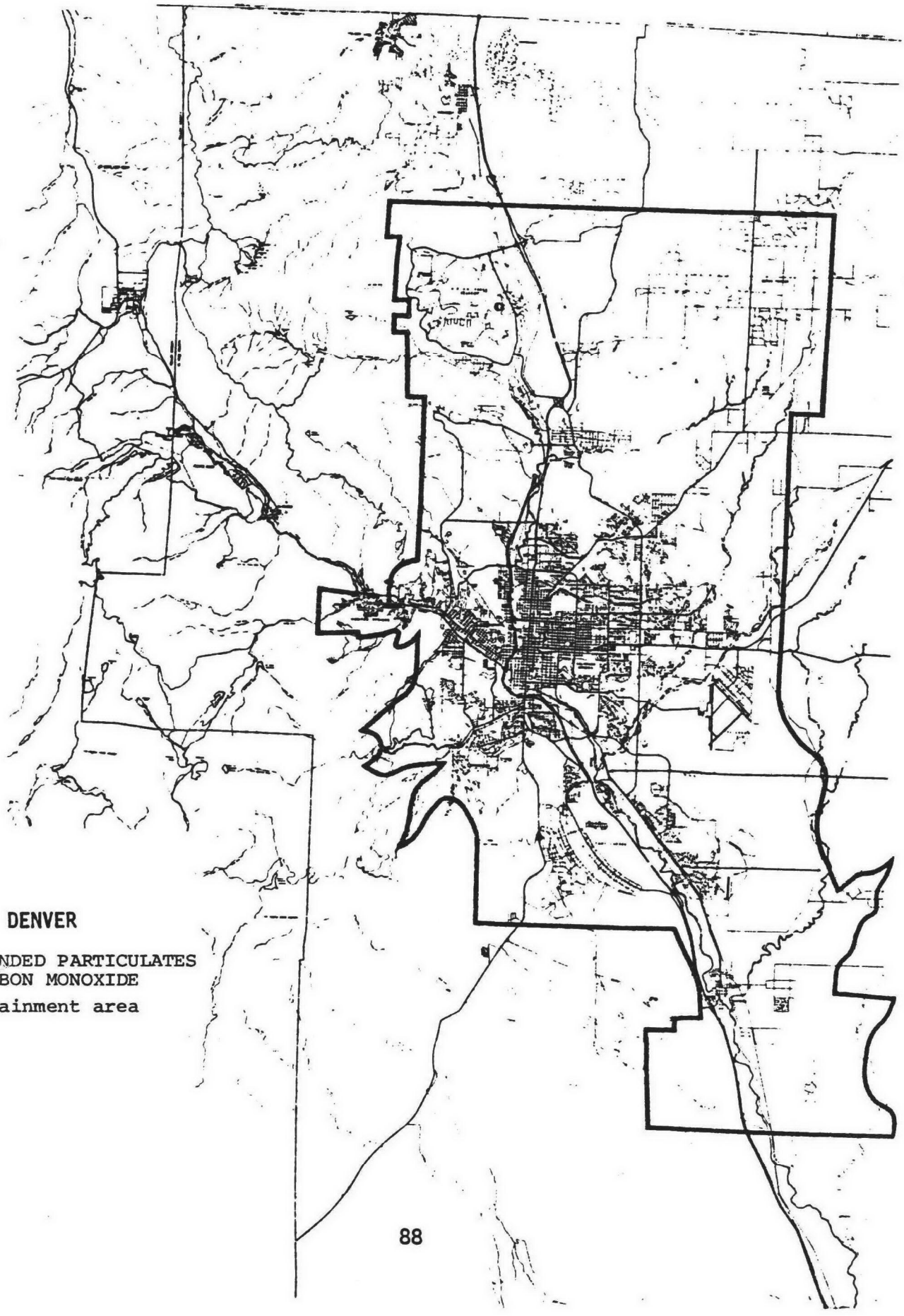
Nonattainment Area Status

1. Select all the sites in each nonattainment area based on
   - o Any sites with a quarterly average greater than 1.5 $\mu g/m^3$

2. Compare violation quarters at all sites to total quarters sampled at all sites for the year

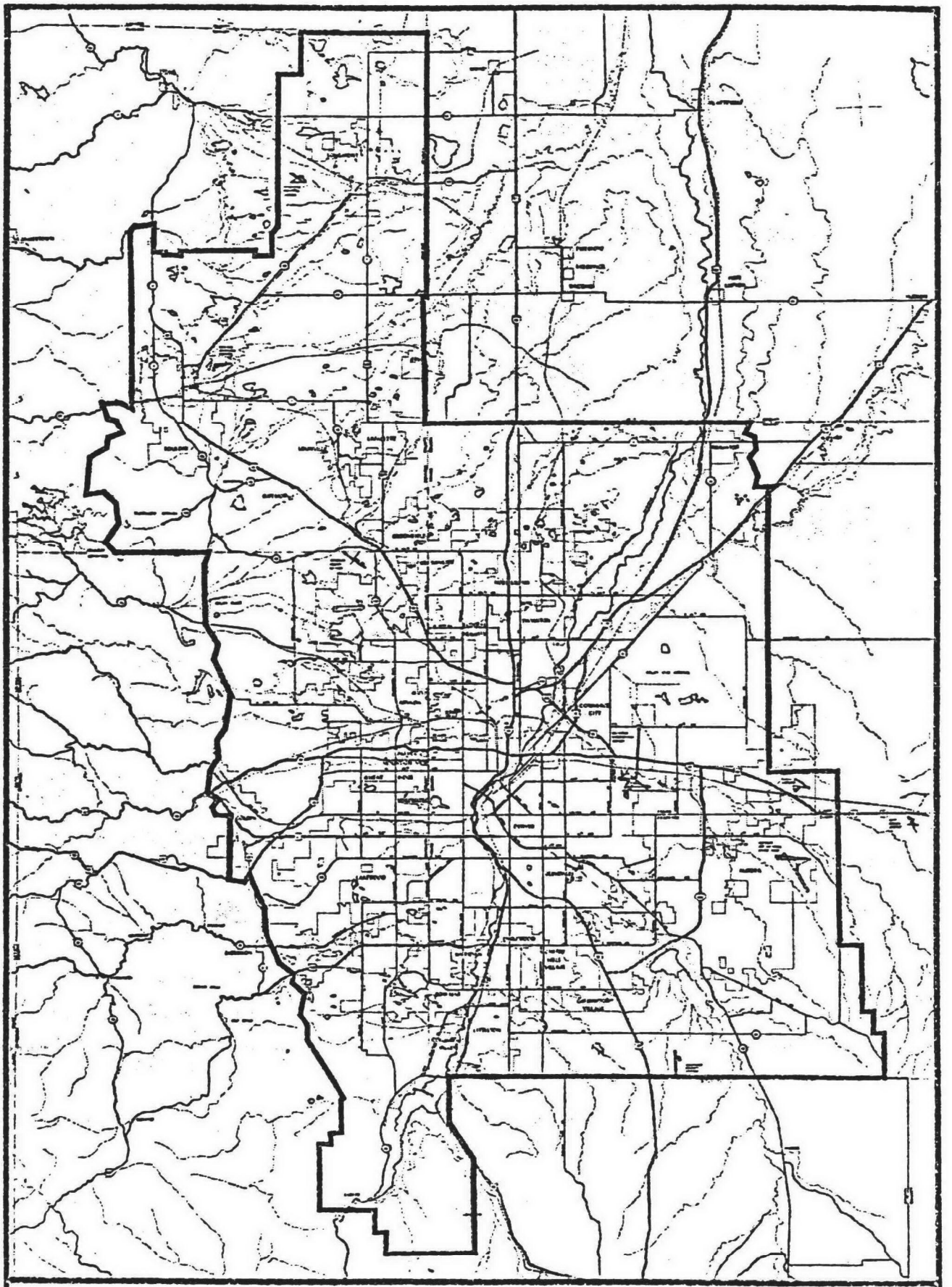
APPENDIX D

Nonattainment Area Maps



DENVER

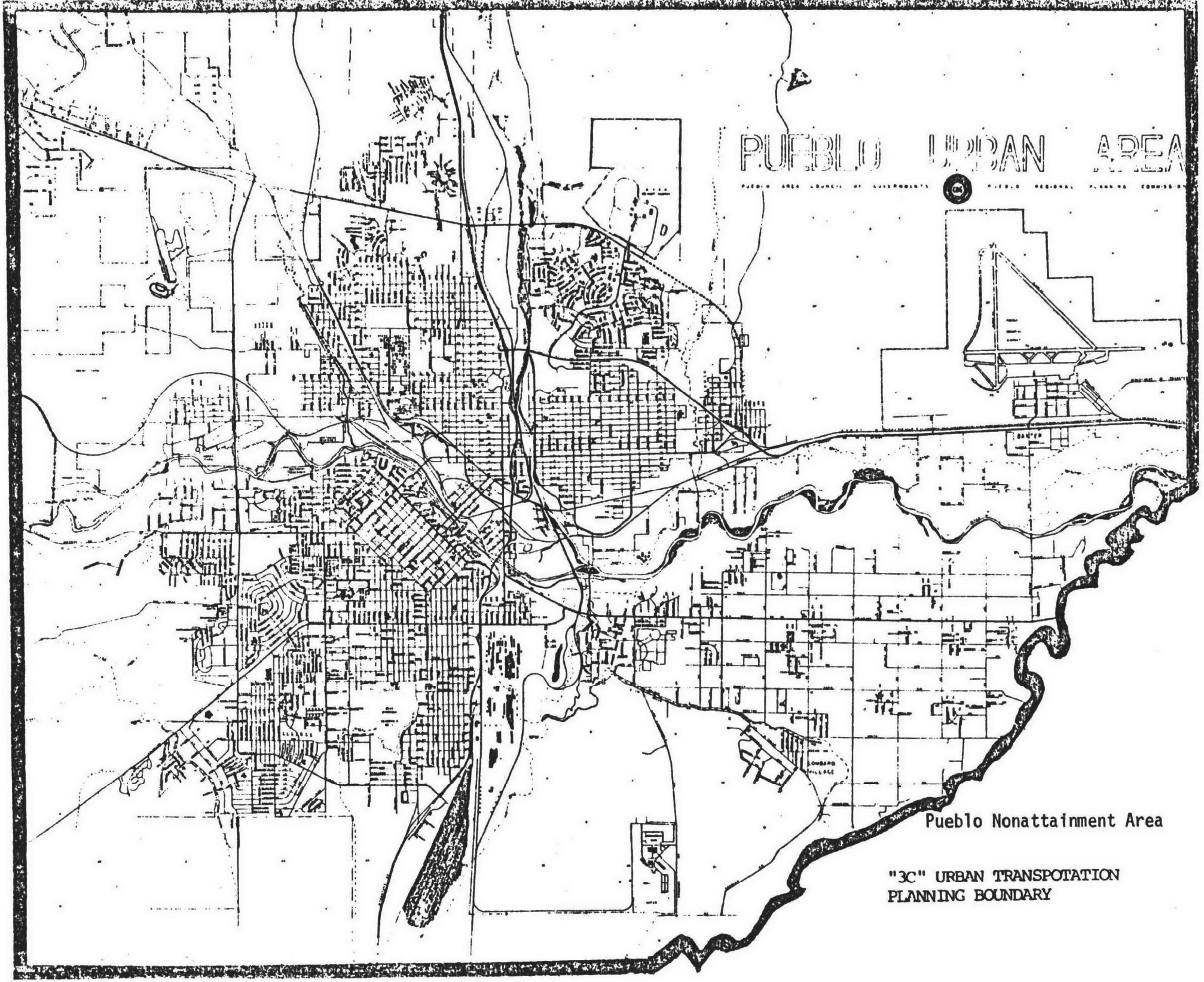
TOTAL SUSPENDED PARTICULATES
AND CARBON MONOXIDE
non-attainment area



DENVER

THREE C, YEAR 2000, PLANNING AREA MAP

DENVER / BOULDER / LONGMONT (DBL) AREA


PUEBLO URBAN AREA
Pueblo Nonattainment Area
"3C" URBAN TRANSPOTATION
PLANNING BOUNDARY

LARIMER/WELD

STATE OF COLORADO DEPARTMENT OF PUBLIC HEALTH

4210 EAST 11TH AVENUE · DENVER, COLORADO 80220 · PHONE 388-6111

R. L. CLEERE, M.D., M.P.H., DIRECTOR

N O T I C E

In compliance with the provisions of the "Air Pollution Control Act", Section 8 (1) (C), Session Laws of Colorado, Second Regular Session 1966, NOTICE is hereby given Department of Public Health has designated the following legally described area in Larimer and Weld Counties, State of Colorado, in which the ambient air standards set forth in Section 4 of the above cited Act are not being met, and in which the emission standards set forth in Section 5 and the penalties prescribed in Section 15 of said Act, as amended by Senate Bill No. 380, 46th General Assembly (1967), shall be in effect as provided therein, to wit:

> Commencing at the Northwest corner of Section 6, Township 9 North, Range 70 West; thence East along the section lines approximately 18 miles to the Northeast corner of Section 1, Township 9 North, Range 68 West; thence South along the section lines approximately 6 miles to the Southeast corner of Section 36, Township 9 North, Range 68 West; thence East along the section lines approximately 24 miles to the Northeast corner of Section 1, Township 8 North, Range 64 West; thence South along the section lines approximately 48 miles to the Southeast corner of Section 36, Township 1 North, Range 64 West; thence West along the section lines approximately 30 miles to the Southwest corner of Section 31, Township 1 North, Range 68 West; thence North along the section lines approximately 18 miles to the Northwest corner of Section 6, Township 3 North, Range 68 West; thence West along the section lines approximately 12 miles to the Southwest corner of Section 31, Township 4 North, Range 70 West; thence North along the section lines approximately 36 miles to the point of beginning;

Roy L. Cleere, M.D., M.P.H.
Director
Colorado State Department of
Public Health

George J. Dwire, D.D.S.
Chairman
Air Pollution Variance
Board

Dated August 4, 1967

MESA

STATE OF COLORADO DEPARTMENT OF PUBLIC HEALTH

4210 EAST 11TH AVENUE • DENVER, COLORADO 80220 • PHONE 388-5601

R. L. CLEERE, M.D., M.P.H., DIRECTOR

NOTICE

In compliance with the provisions of Section 8 (1) (c) of the "Air Pollution Control Act" (Ch. 45, Pg. 210, Colorado Session Laws 1966) NOTICE is hereby given that the Division of Administration of the Colorado State Department of Public Health has enlarged the area comprising the air pollution basin in Mesa County to include additional territory and has designated the following legally described area of Mesa County, Colorado in which the ambient air standards set forth in Section 4 of the above cited Act are not being met, and in which the emission standards set forth in Section 5 of said Act, shall be in effect as provided therein, to wit:

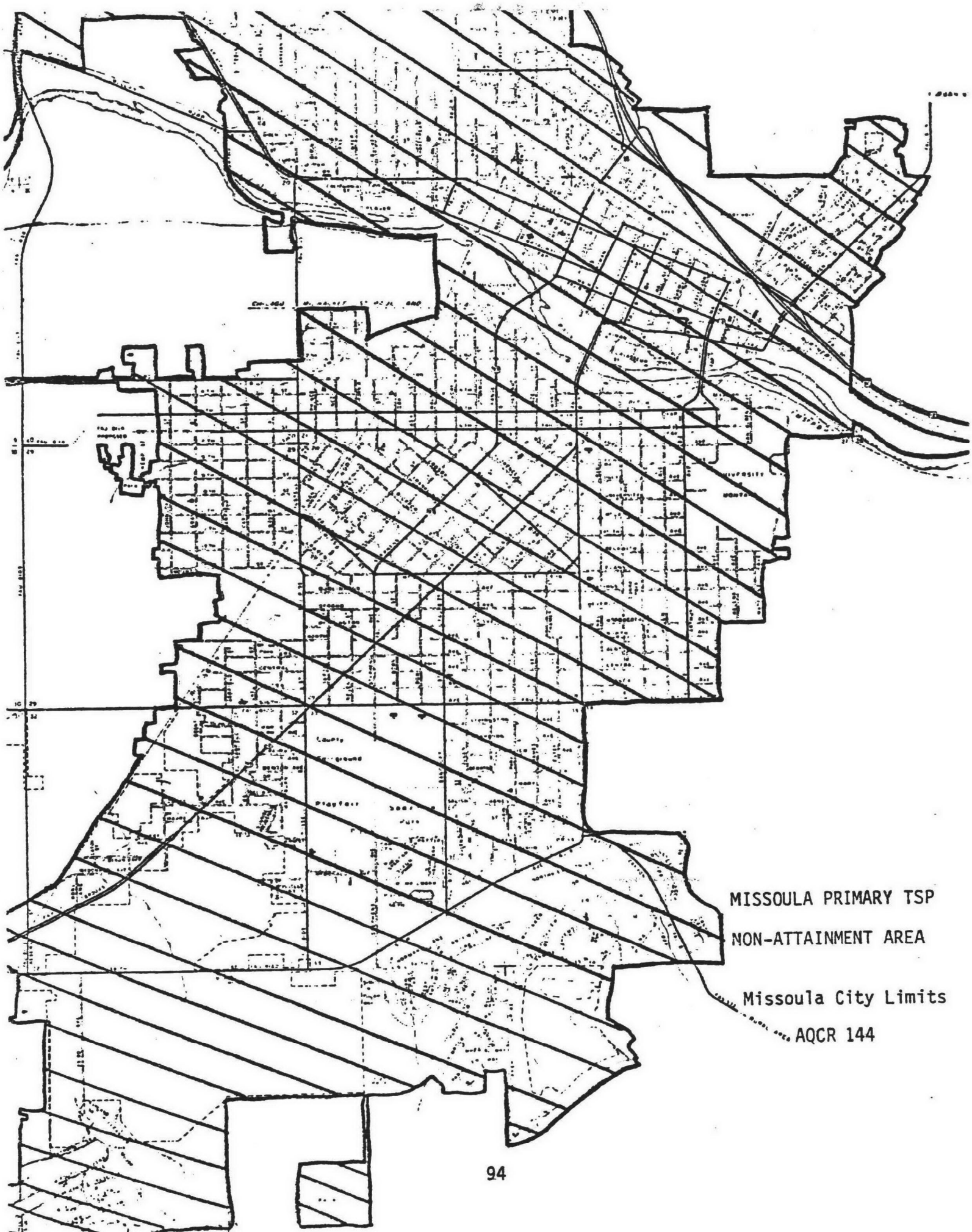
Commencing at the Northeast Corner of Section 34, Township 10 South, Range 98 West; thence South along the section line approximately 1 mile to the Southeast Corner of Section 34, Township 10 South, Range 98 West; thence East along the section line approximately 400 feet to the Northeast Corner of Section 2, Township 11 South, Range 98 West; thence South along the section lines approximately 2.4 miles to the Southeast Corner of Section 11, Township 11 South, Range 98 West; thence West along the section line approximately 2000 feet to a point where such line intersects the Eastern boundary of Section 1, Township 1 South, Range 2 East; thence South along the section lines approximately 6 miles and 3800 feet to the Southeast Corner of Section 1, Township 2 South, Range 2 East; thence West along the section lines approximately 11 miles to the Southwest Corner of Section 5, Township 2 South, Range 1 East; thence North along the section line approximately 1 mile to the Northwest Corner of Section 5, Township 2 South, Range 1 East; thence West along the section lines approximately 5 and 3/4 miles to the point where said line intersects the East boundary of the Colorado National Monument Park; thence in a Northwesterly direction along the boundary line of said Park to the Northwest Corner of Section 31, Township 1 North, Range 2 West; thence North

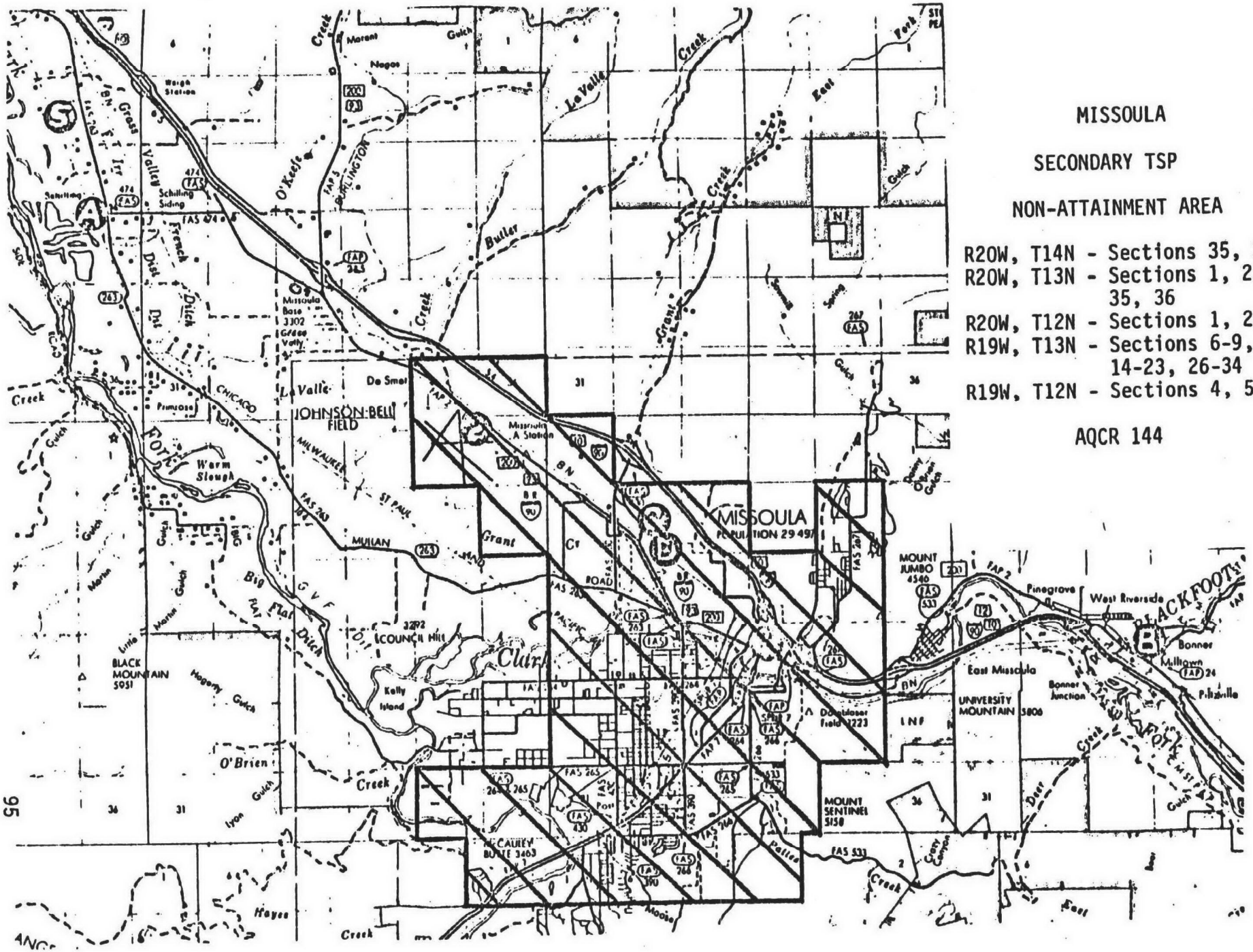
along the section line approximately 1 mile to the Southwest Corner of Section 19, Township 1 North, Range 2 West; thence West along the section line approximately 1 mile to the Southwest Corner of Section 24, Township 1 North, Range 3 West; thence North along the section line approximately 1 mile to the Southwest Corner of Section 13, Township 1 North, Range 3 West; thence West along the section lines approximately 2 miles to the Southwest Corner of Section 15, Township 1 North, Range 3 West; thence North along the section lines approximately 3 miles to the Northwest Corner of Section 3, Township 1 North, Range 3 West; thence East along the section lines approximately 11 miles to the Northeast Corner of Section 5, Township 1 North, Range 1 West; thence South along the section lines approximately 2 miles to the Northeast Corner of Section 17, Township 1 North, Range 1 West; thence East along the section line approximately 1 mile to the Northeast Corner of Section 16, Township 1 North, Range 1 West; thence South along the section line approximately 1 mile to the Southeast Corner of Section 16, Township 1 North, Range 1 West; thence East along the section lines approximately 15 miles to the point of beginning, all in Mesa County, Colorado.

Roy L. Cleere, M.D., M.P.H.
Director
Colorado State Department of
Public Health

George S. Dwire, D.D.S.
Chairman
Air Pollution Variance
Board

Dated June 9, 1966


MISSOULA PRIMARY TSP
NON-ATTAINMENT AREA
Missoula City Limits
AQCR 144



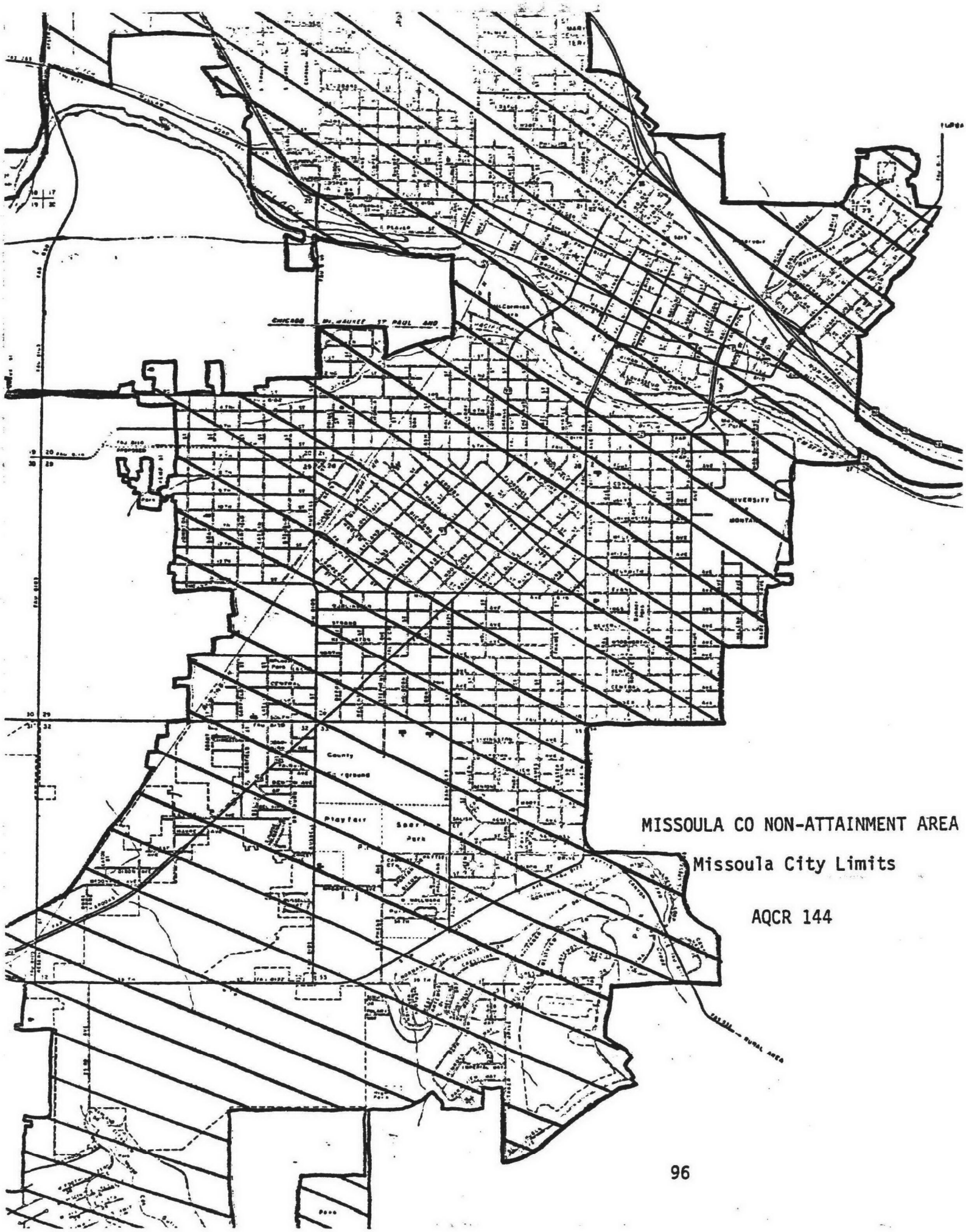
MISSOULA

SECONDARY TSP

NON-ATTAINMENT AREA

R20W, T14N - Sections 35, 36
R20W, T13N - Sections 1, 2, 12, 35, 36
R20W, T12N - Sections 1, 2
R19W, T13N - Sections 6-9, 11, 14-23, 26-34
R19W, T12N - Sections 4, 5, 6

AQCR 144

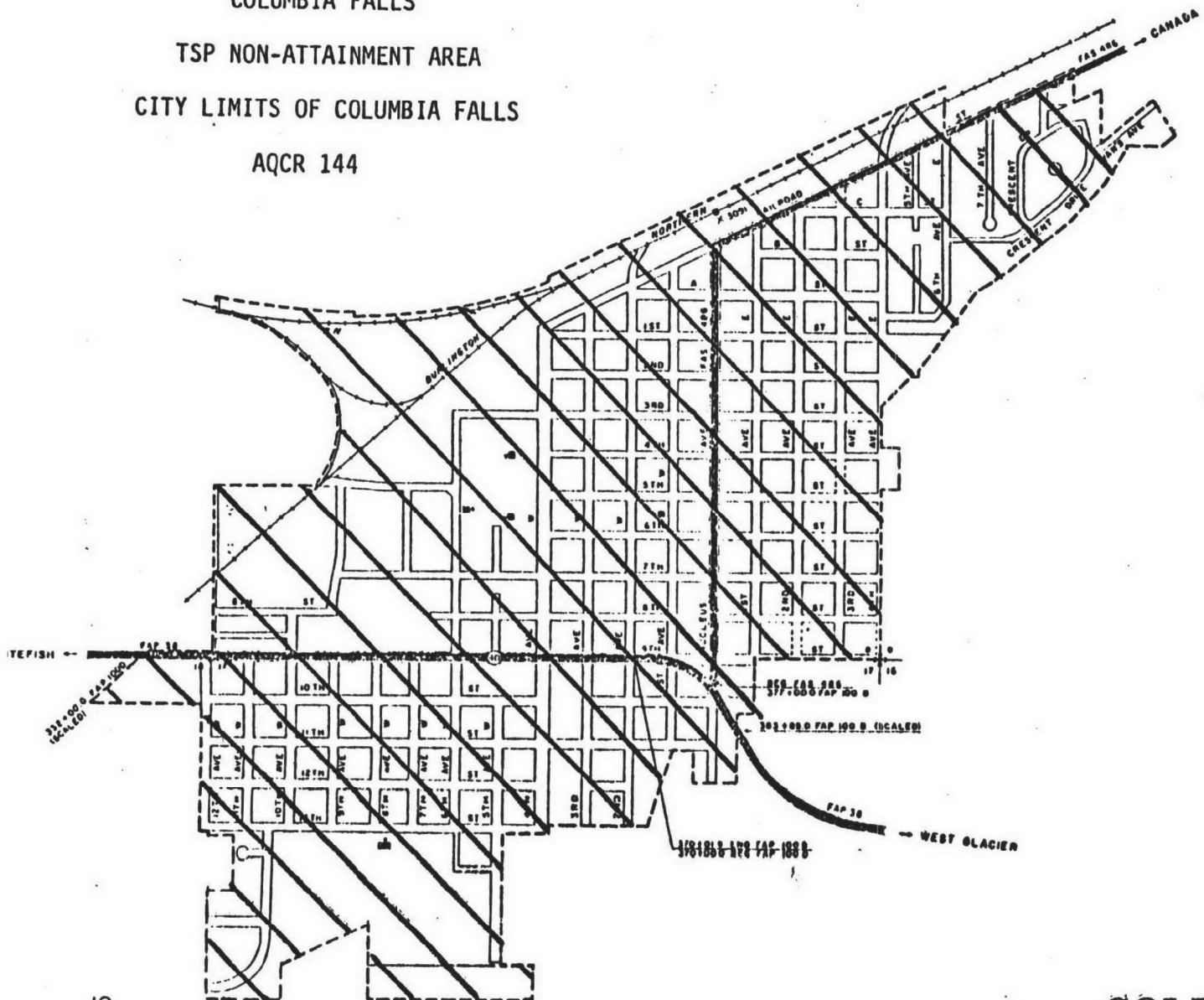

MISSOULA CO NON-ATTAINMENT AREA
Missoula City Limits
AQCR 144

COLUMBIA FALLS

TSP NON-ATTAINMENT AREA

CITY LIMITS OF COLUMBIA FALLS

AQCR 144



LEGEND

- PROPOSED ROAD
- GRADED AND DRAINED ROAD
- GRAVEL OR STONE ROAD
- LOW TYPE BITUMINOUS ROAD
- PAVED ROAD
- DIVIDED ROAD - TRAFFIC FLOW
- FAI FEDERAL AID INTERSTATE SYSTEM
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- FAS FEDERAL AID SECONDARY SYSTEM
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- NON-EXISTENT DEDICATED STREET
- CBD CENTRAL BUSINESS DISTRICT
- URBAN EXTENSION BOUNDARY
- RAILROAD AND STATION
- POST OFFICE
- COURT HOUSE
- ELEMENTARY SCHOOL
- HIGH SCHOOL
- HOSPITAL
- X 0000 ELEVATION

N

T 30 N R 20 W

CITY PLAT

COLUMBIA FALLS

FLATHEAD COUNTY

MONTANA

1970 CENSUS 2,652

SCALE IN FEET

600 0 600 1200

REVISED DEC 31, 1971

97

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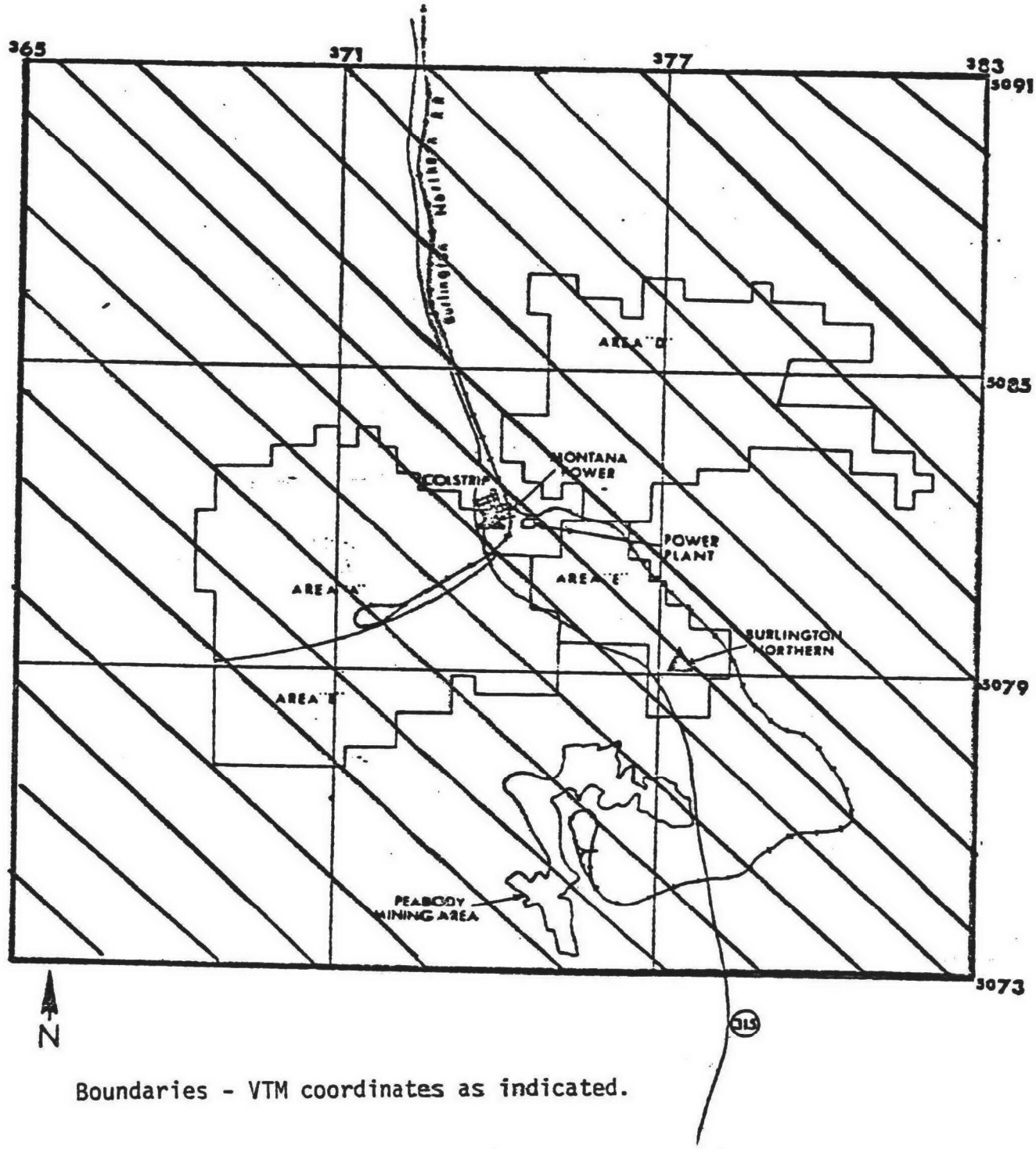
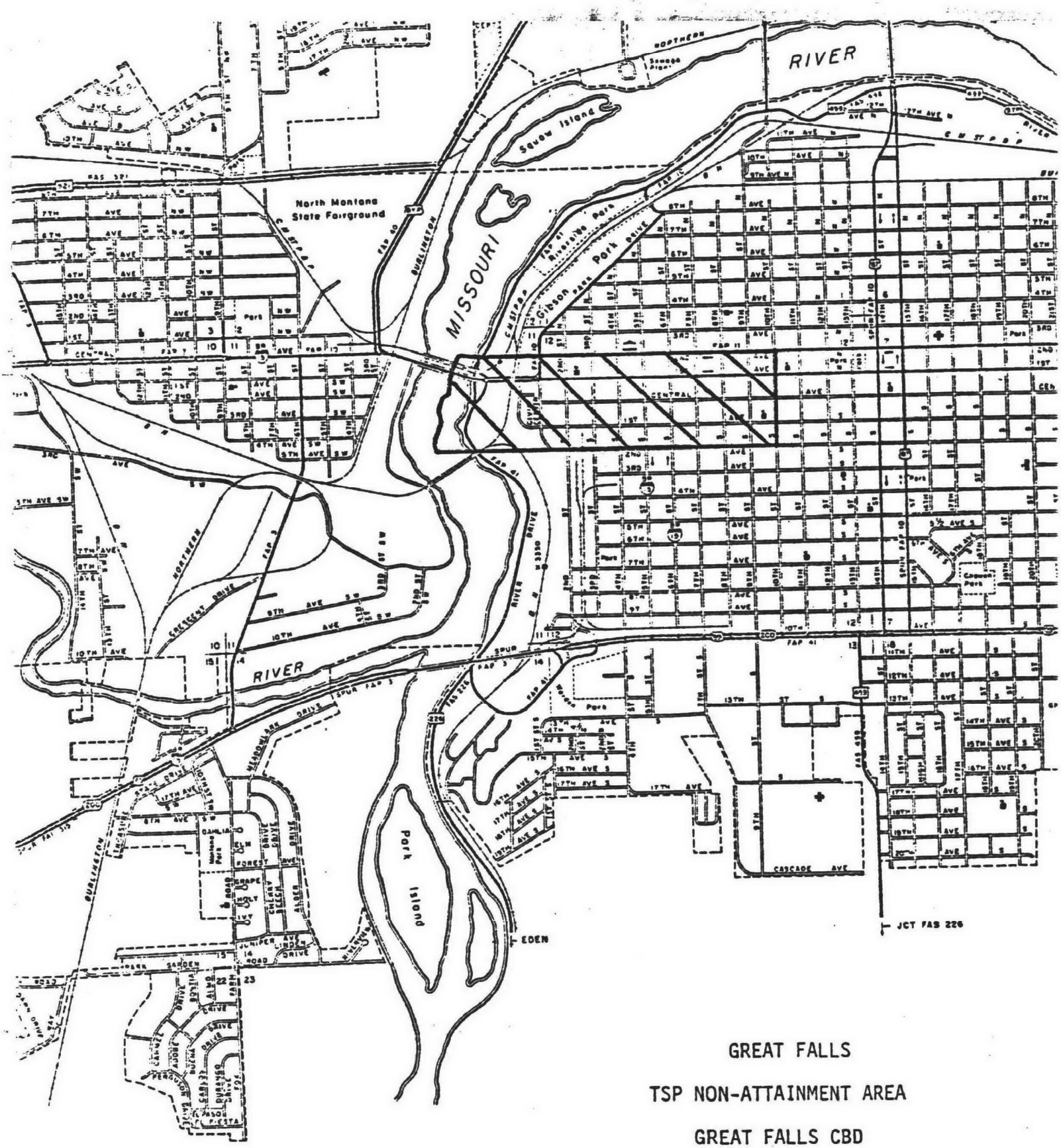
COLSTRIP

TSP NON-ATTAINMENT AREA

AQCR 143



Boundaries - VTM coordinates as indicated.



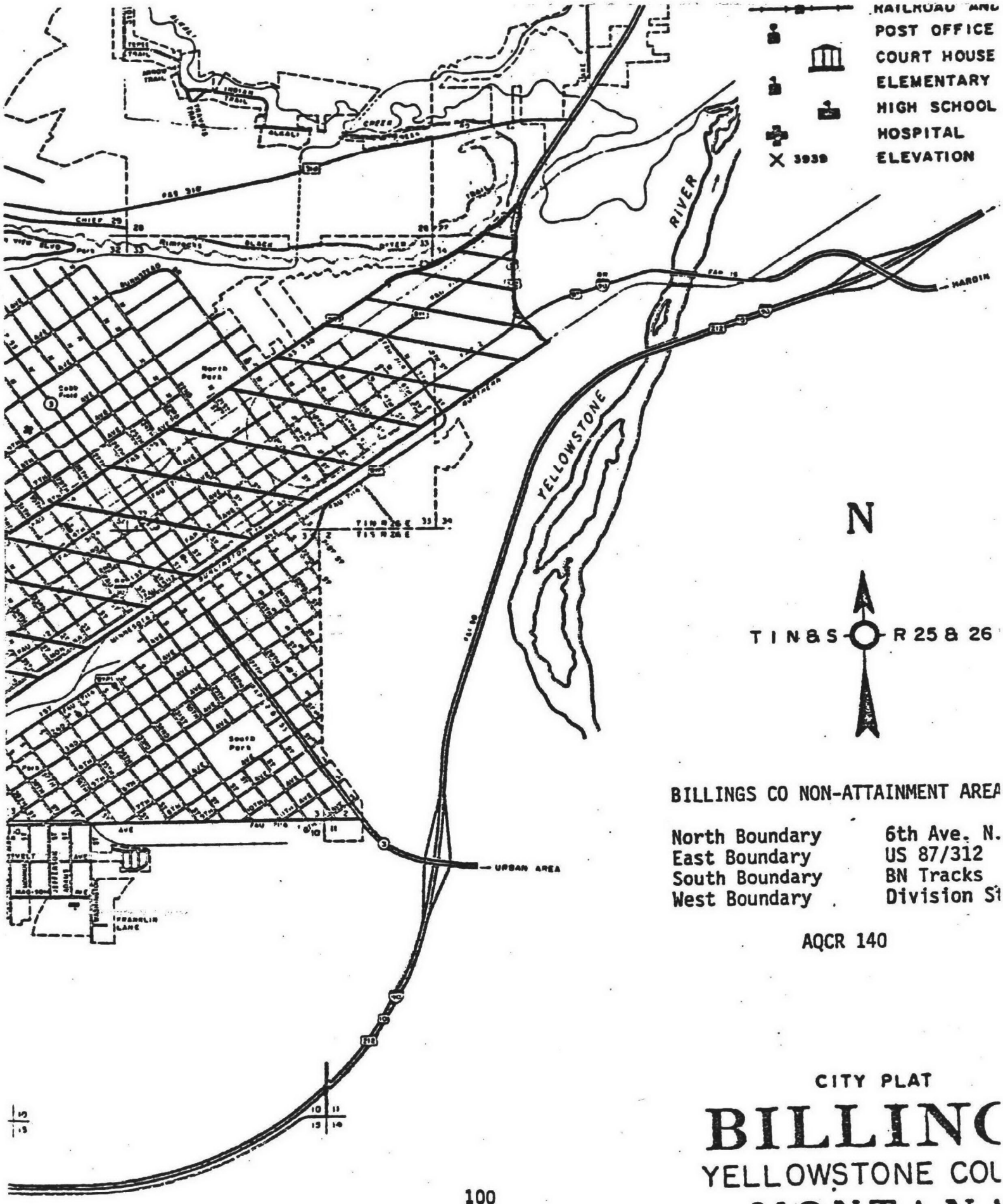
GREAT FALLS

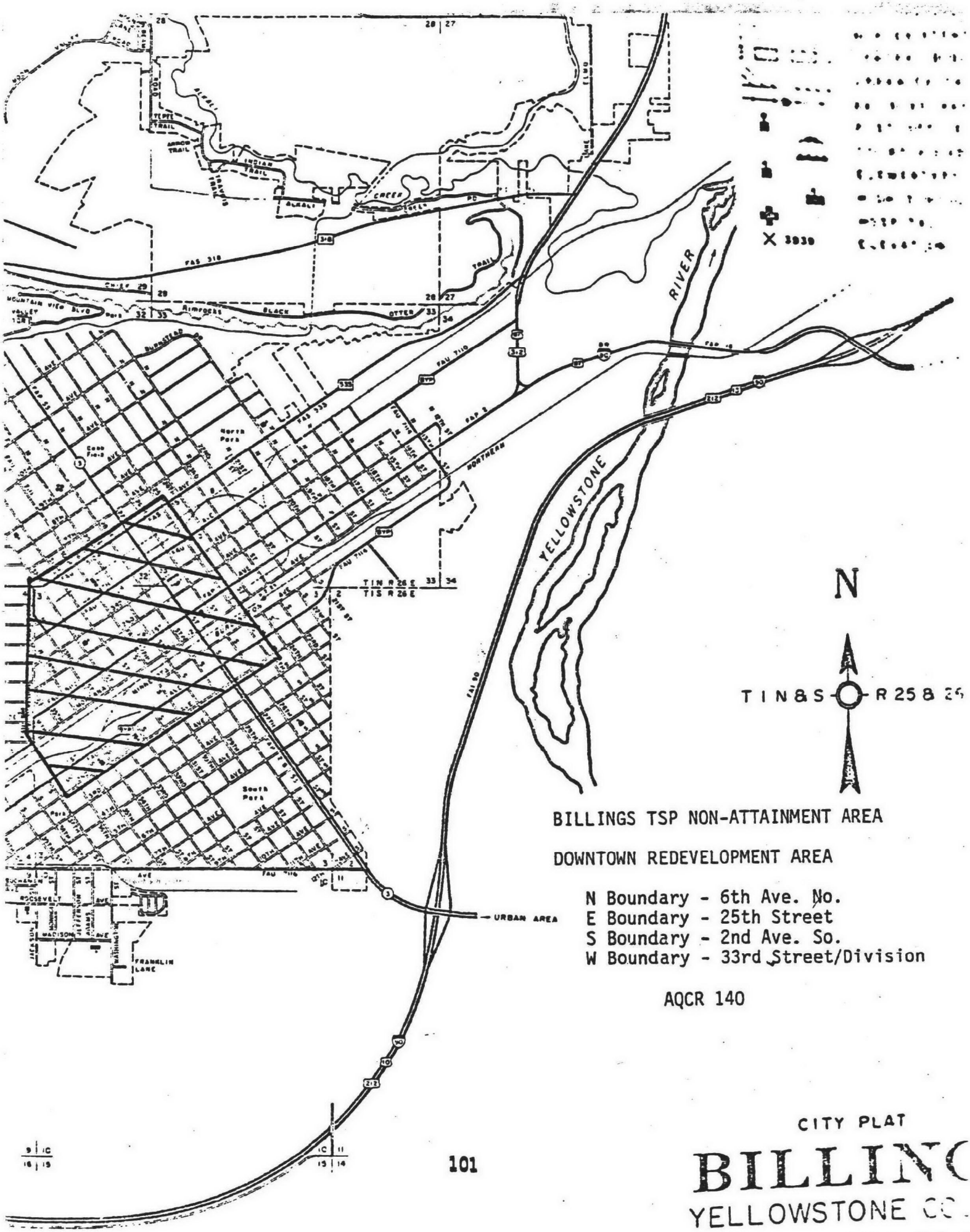
TSP NON-ATTAINMENT AREA

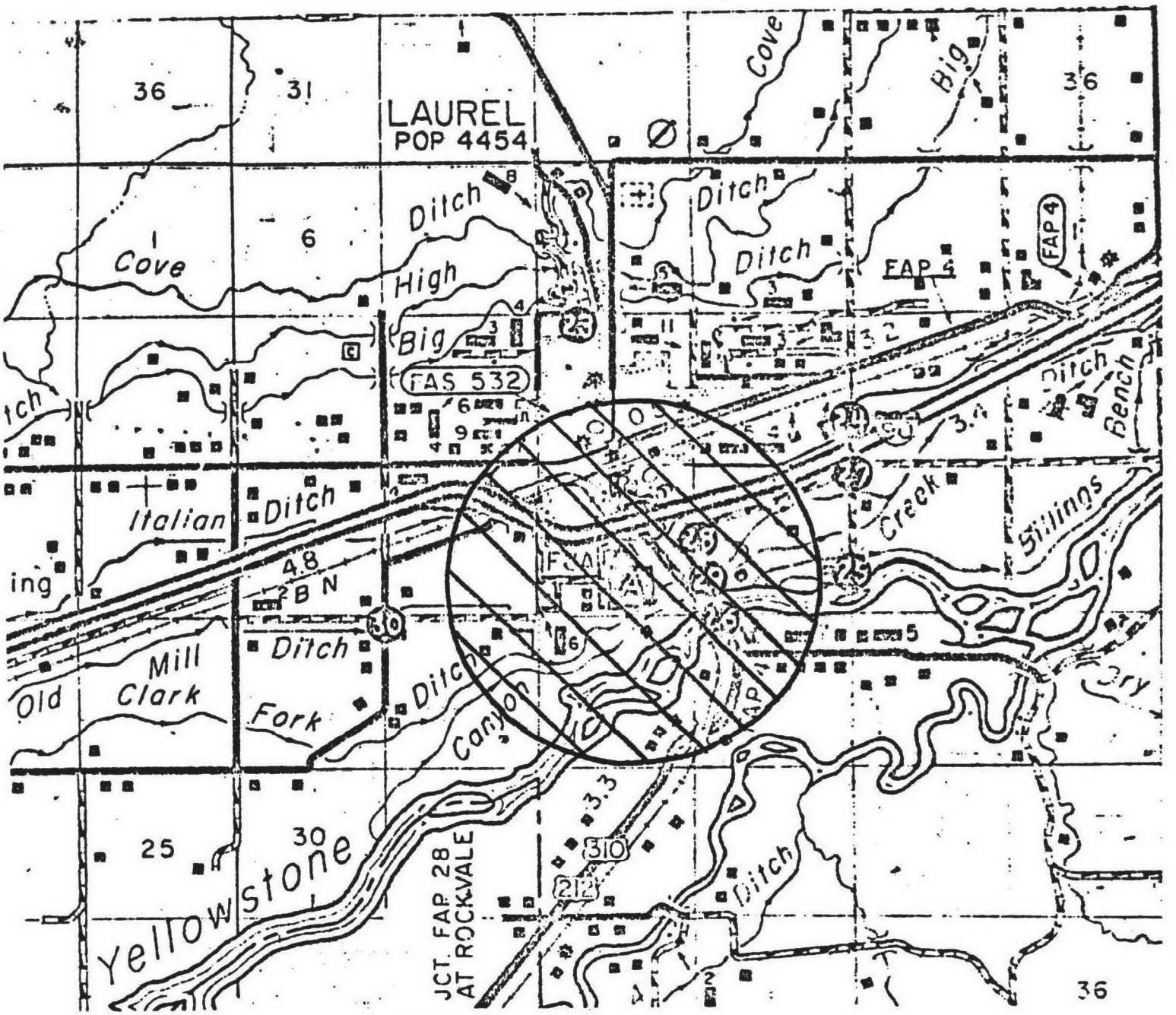
GREAT FALLS CBD

North Boundary	2nd Ave. N.
East Boundary	10th Street
South Boundary	2nd Ave. S.
West Boundary	Missouri River

AQCR 141


RAILROAD AND
POST OFFICE
COURT HOUSE
ELEMENTARY
HIGH SCHOOL
HOSPITAL
3939 ELEVATION
RIVER
YELLOWSTONE
HARDIN
URBAN AREA
N
T 1 N & S — R 25 & 26
BILLINGS CO NON-ATTAINMENT AREA
North Boundary 6th Ave. N.
East Boundary US 87/312
South Boundary BN Tracks
West Boundary Division St
AQCR 140
CITY PLAT
BILLING
YELLOWSTONE COU
MONTANA


RIVER
YELLOWSTONE
N
T 1 N & S - R 25 & 26 E
BILLINGS TSP NON-ATTAINMENT AREA
DOWNTOWN REDEVELOPMENT AREA
N Boundary - 6th Ave. No.
E Boundary - 25th Street
S Boundary - 2nd Ave. So.
W Boundary - 33rd Street/Division
AQCR 140
URBAN AREA
CITY PLAT
BILLIN
YELLOWSTONE CO

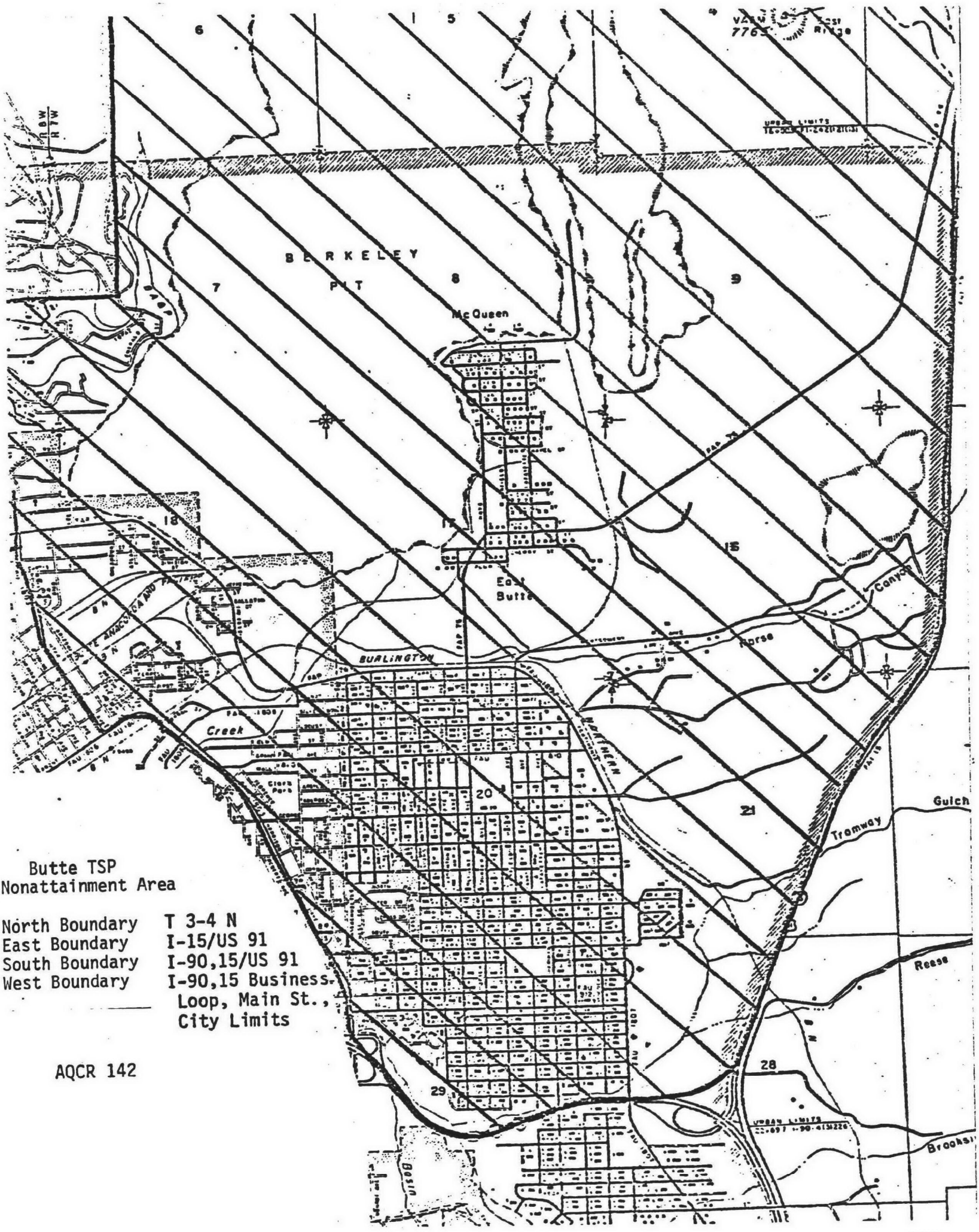


LAUREL

SO_2 NON-ATTAINMENT AREA

2.0 km Radium Around
Cenex Refinery (Point A)

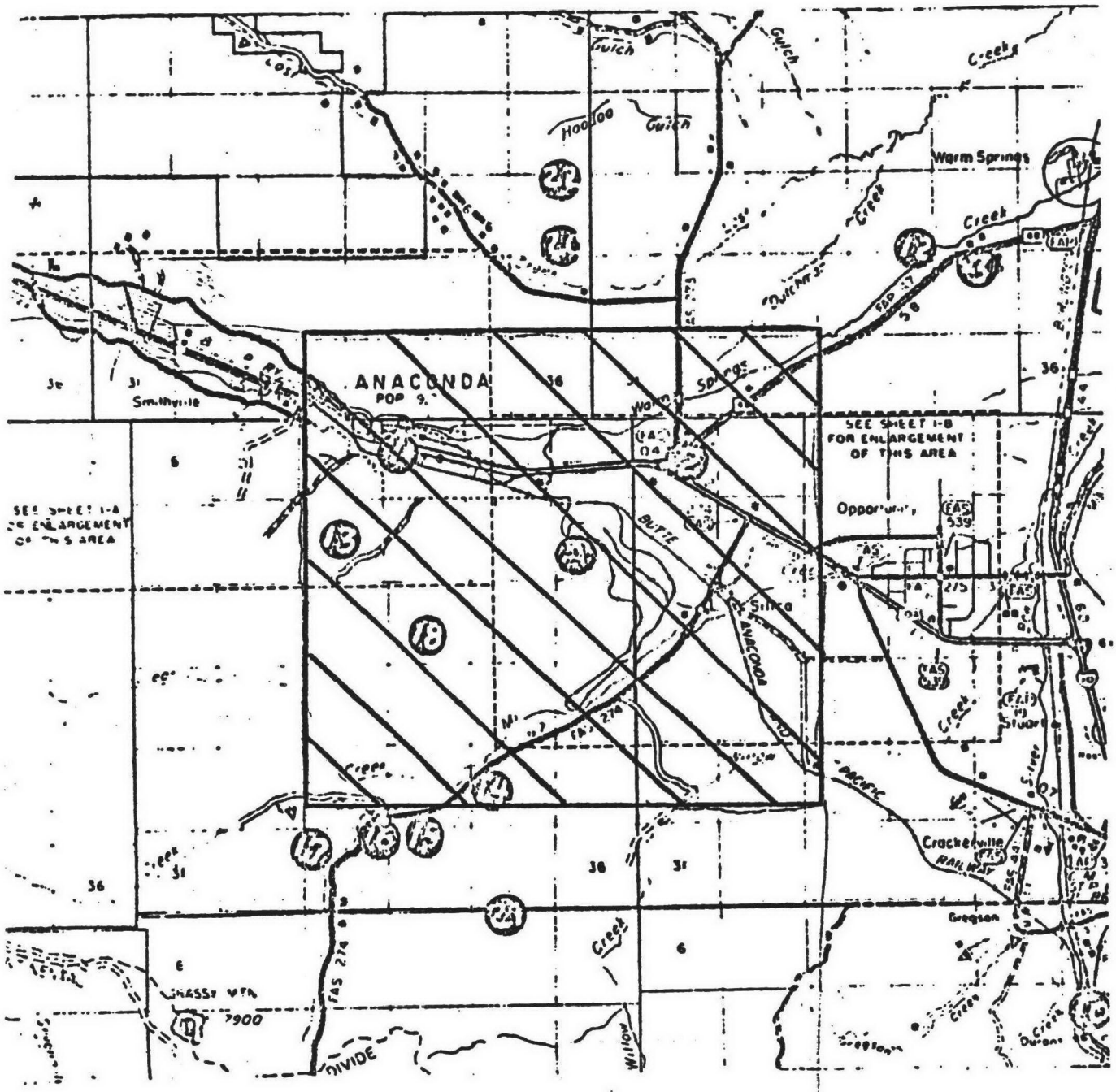
AQCR 140



Butte TSP
Nonattainment Area

North Boundary	T 3-4 N
East Boundary	I-15/US 91
South Boundary	I-90,15/US 91
West Boundary	I-90,15 Business Loop, Main St., City Limits

AQCR 142



ANACONDA

SO_2 NON-ATTAINMENT AREA

ANACONDA SMELTER - POINT A

AQCR 142

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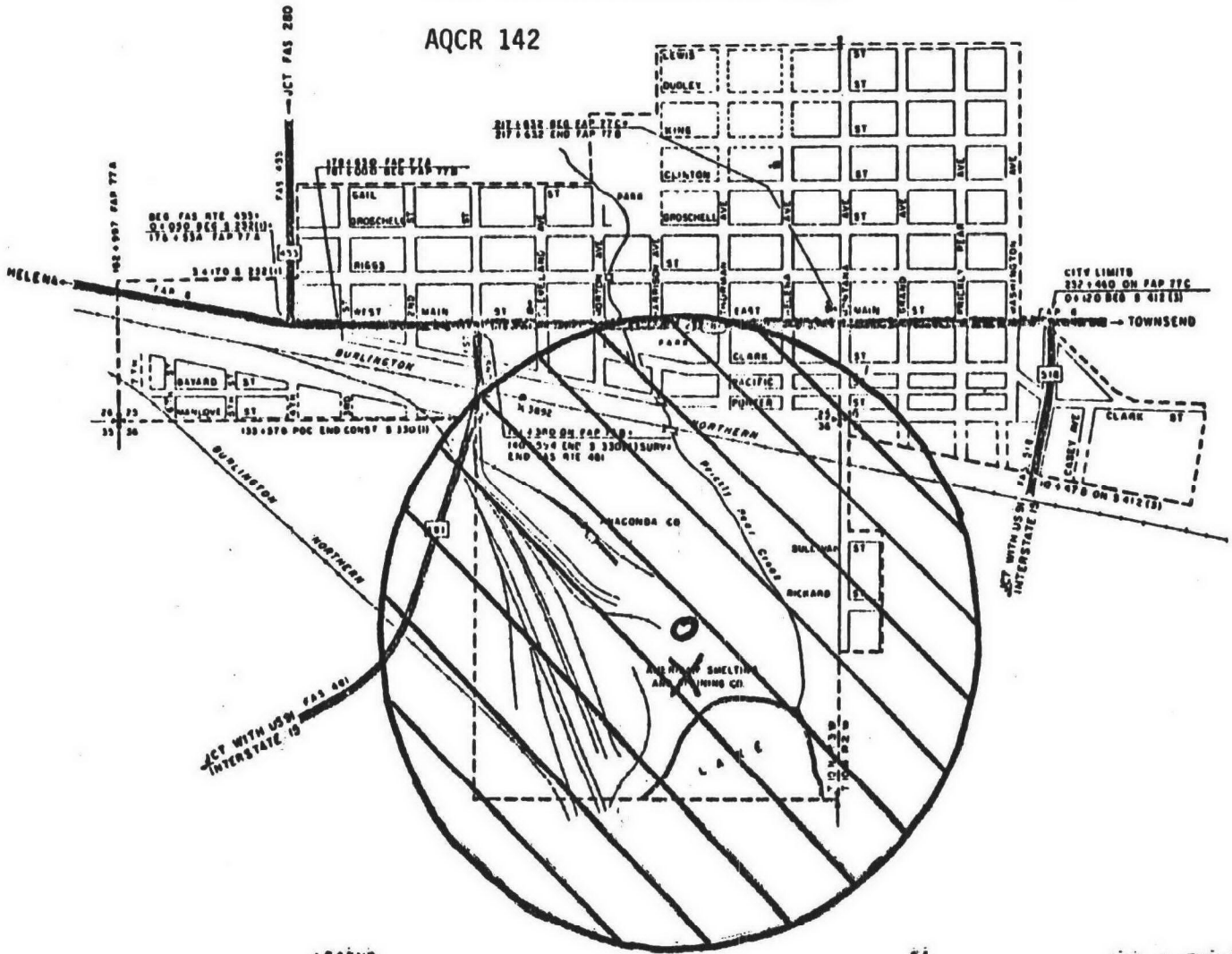
EAST HELENA

SO_2 NON-ATTAINMENT AREA

0.67 Km Radius Around Smelter

AQCR 142



105

LEGEND

- PROPOSED ROAD
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- HIGH SCHOOL
- HOSPITAL
- ELEVATION

N

T 10N R 2 & 3 W

CITY PLAT

EAST HELENA

LEWIS & CLARK COUNTY

MONTANA

1970 CENSUS 1,651

SCALE IN FEET

600 0 600 1200

REVISED DEC. 31, 1971

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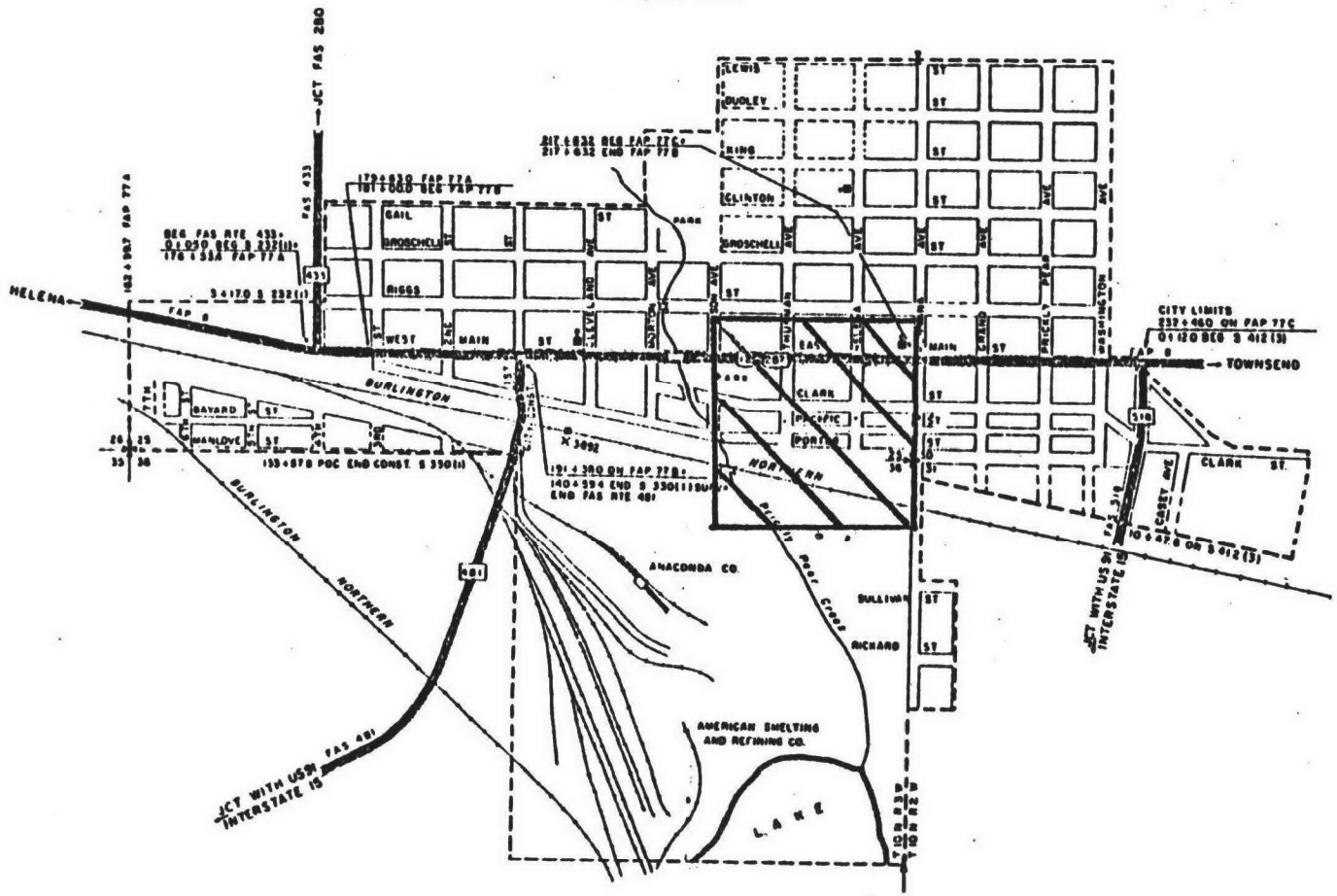
EAST HELENA

TSP NON-ATTAINMENT AREA

AQCR 142



LEGEND

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- HOSPITAL
- X 0000 — ELEVATION

N

T 10N — R 2 & 3 W

CITY PLAT

EAST HELENA

LEWIS & CLARK COUNTY

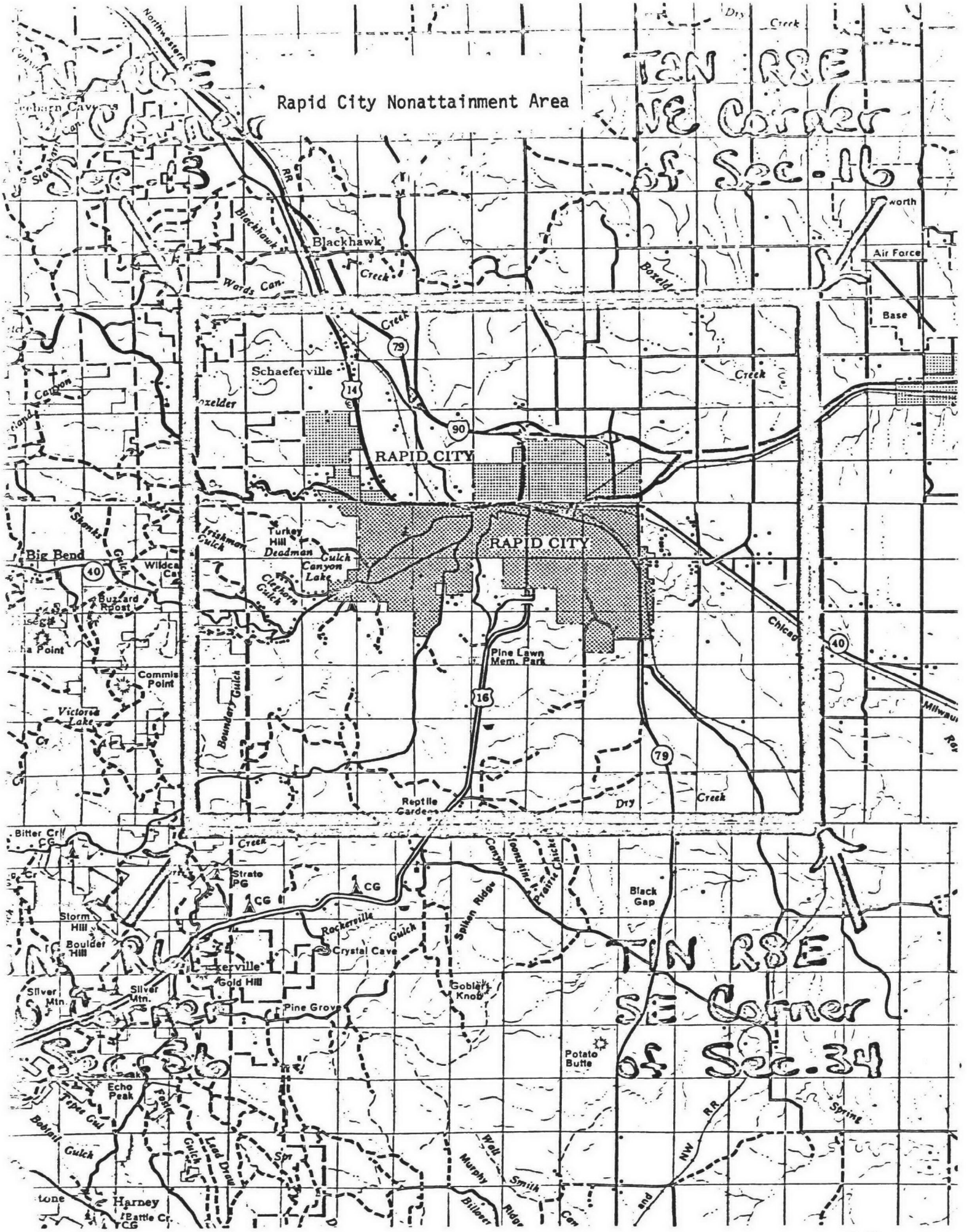
MONTANA

1970 CENSUS 1,651

SCALE IN FEET

600 0 600 1200

REVISED DEC 31 1971


Rapid City Nonattainment Area
T2N R8E
NE Corner
of Sec. 16
T1N R8E
SE Corner
of Sec. 34
RAPID CITY
RAPID CITY
Schaeferville
Blackhawk
Creek
Air Force
Base
Big Bend
Buzzard Roost
Commis Point
Victoria Lake
Pine Lawn Mem. Park
Reptile Gardens
Dry Creek
Chicago
Black Gap
Rockerville
Crystal Cave
Gold Hill
Silver Mtn.
Pine Grove
Goblin Knob
Potato Butte
Echo Peak
Harney
Boulder Hill
Storm Hill
Spokan Ridge
Prairie Chicken
Canyon
Turkey Hill
Deadman Gulch
Canyon Lake
Irishman Gulch
Boulder Gulch
Bobtail Gulch
Lead Draw
Murphy
Smith
Billoer Ridge
Spring
Strato PG
CG
Bitter Cr
Harney Peak
Tepee Gul
Wards Can.
Stanley
Carbon
Wildcat
Clethorn Gulch
Well
NW
RR
Dry Creek
Boxelder
Boxelder Creek
Blackhawk Creek
Northwestern
Chicago
Milwaukee
Rapid
Ellsworth
Stagebarn Cavern
Jewel Cave
Wind Cave
Custer
Hot Springs
Edgemont
Oelrichs
Pine Ridge
Rapid City
Spearfish
Sturgis
Belle Fourche
Newell
Lead
Deadwood
Whitewood
Nisland
Piedmont
Summerset
Box Elder
Ellsworth AFB
Rapid City Regional Airport
Black Hills National Forest
Custer State Park
Mount Rushmore National Memorial
Badlands National Park
Wall
Interior
Kadoka
Philip
Midland
Hayes
Cottonwood
Scenic
Wasta
Quinn
Creston
Rockerville
Hisega
Keystone
Hill City
Custer
Pringle
Fairburn
Oral
Smithwick
Rochford
Deerfield
Nemo
Roubaix
Sheridan Lake
Pactola Reservoir
Pactola
Rapid Valley
Box Elder
Ellsworth AFB
Black Hills National Forest
Custer State Park
Mount Rushmore National Memorial
Badlands National Park
Wall
Interior
Kadoka
Philip
Midland
Hayes
Cottonwood
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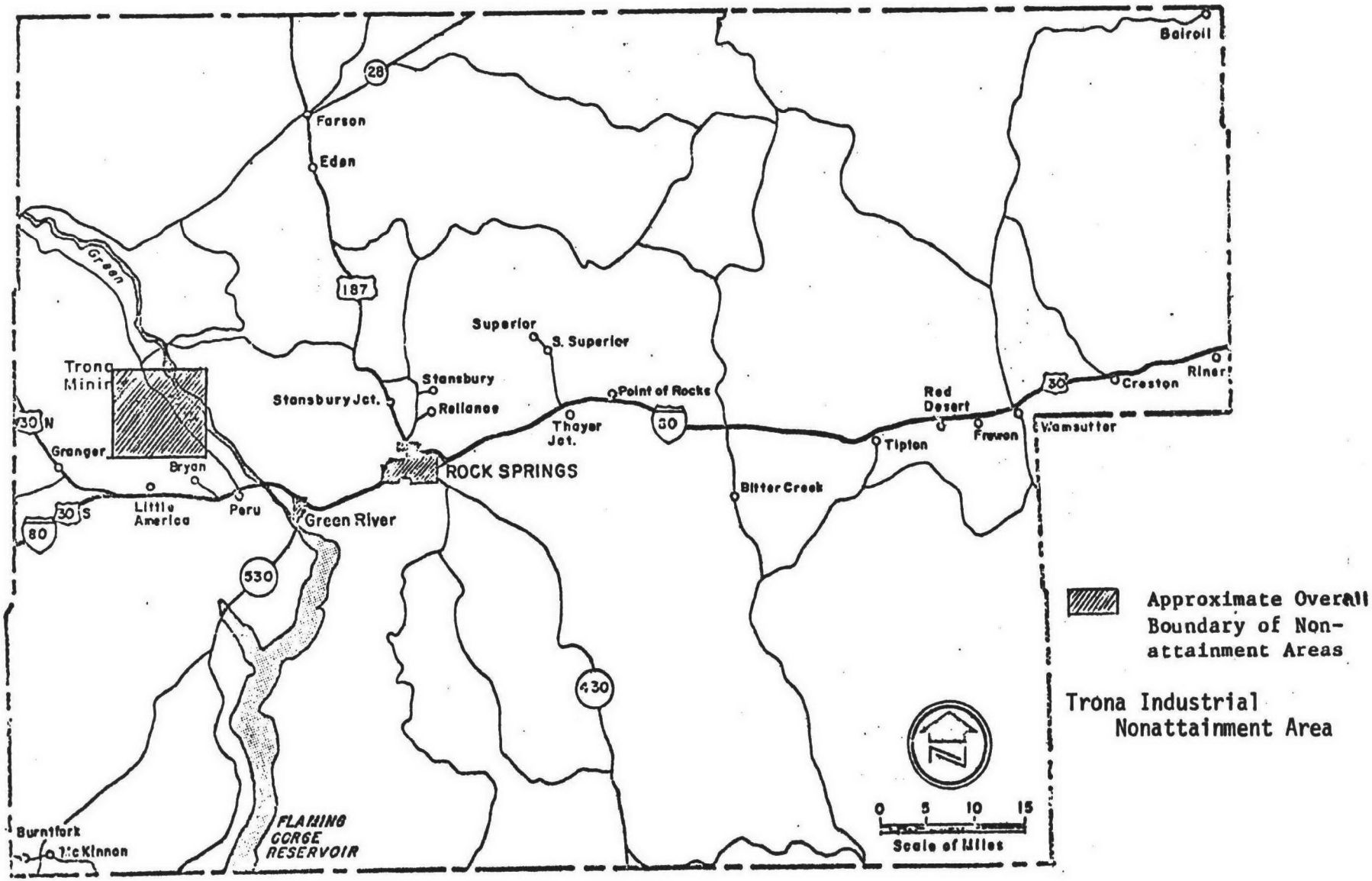
Wasta
Quinn
Creston
Rockerville
Hisega
Keystone
Hill City
Custer
Pringle
Fairburn
Oral
Smithwick
Rochford
Deerfield
Nemo
Roubaix
Sheridan Lake
Pactola Reservoir
Pactola
Rapid Valley



SWEETWATER COUNTY

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1 REPORT NO	2	3 RECIPIENT'S ACCESSION NO
EPA - 908/2-80-002		

4 TITLE AND SUBTITLE	5 REPORT DATE
AIR QUALITY TRENDS in REGION VIII (1979 Data) U.S. Environmental Protection Agency	September 1980
	6. PERFORMING ORGANIZATION CODE

7 AUTHOR(S)	8 PERFORMING ORGANIZATION REPORT NO
William H. Tabor, Thomas A. Entzminger, Stephen C. Bell	

9 PERFORMING ORGANIZATION NAME AND ADDRESS	10 PROGRAM ELEMENT NO
U.S. Environmental Protection Agency Surveillance and Analysis Division 1860 Lincoln St. Denver, Colorado 80295	11 CONTRACT/GRANT NO

12. SPONSORING AGENCY NAME AND ADDRESS	13 TYPE OF REPORT AND PERIOD COVERED
	Final
	14 SPONSORING AGENCY CODE

15 SUPPLEMENTARY NOTES

16 ABSTRACT

Air quality trends and status for the calendar year 1979 were determined for the six states in Region VIII. These states include Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Data resident in the SAROAD national data bank was analyzed.

Statistical test which detect significant differences between two populations were utilized to identify trends. The status and severity of air pollutants was reported as a direct measure of air quality standard and alert level exceedences. The report includes a summary of air quality in each nonattainment area.

17 KEY WORDS AND DOCUMENT ANALYSIS

a DESCRIPTORS	b IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Trends Air Quality Nonattainment Areas	Colorado SAROAD Montana North Dakota South Dakota Utah Wyoming	

18 DISTRIBUTION STATEMENT	19 SECURITY CLASS *(This Report)*	21 NO OF PAGES
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