

**PERIODIC REVIEW REPORT
FOR THE PROTECTION OF VISIBILITY**

November 2000

**Prepared by:
Oklahoma Department of Environmental Quality
Air Quality Division
707 N Robinson, P.O. Box 1677
Oklahoma City, OK 73101-1677**

TABLE OF CONTENTS

Introduction	3
Description of Protected Area	3
Evaluation of Visibility	3
New Source Review Process	3
Federal Land Manager	4
Airport Visibility Data	4
Emission Inventories and Permitted Sources in the Area	5
Assessment	5
Table 1: PM ₁₀ Monitoring Data from Lawton Monitoring Site	12
Table 2: 1997 County Emission Inventories within 100 km	18
Table 3: 1998 County Emission Inventories within 100 km	19
Figure 1: Mandatory Class I Area - Wichita Mountains Wilderness	7
Figure 2: % Yearly Readings \geq 7 miles (Ft. Sill Military Airport)	8
Figure 3: % Quarter Readings \geq 7 miles (Ft. Sill Military Airport)	9
Figure 4: % Yearly Readings \geq 7 miles (Lawton Municipal Airport)	10
Figure 5: % Quarter Readings \geq 7 miles (Lawton Municipal Airport)	11
Figure 6: PM ₁₀ Lawton Monitoring Data	13
Figure 7: Particulate Sources within 50 km	14
Figure 8: Particulate Sources in Lawton Area	15
Figure 9: Particulate Sources to the Southwest	16
Figure 10: 100 km radius	17
Appendix A: Oklahoma Visibility State Implementation Plan	20
Appendix B: Example of Visibility Impact Analysis from PSD Permit	21
Appendix C: Federal Land Manager Communications	22

INTRODUCTION

The Oklahoma Department of Environmental Quality (DEQ) has developed a long-term strategy to protect the visibility in the mandatory Class I Area, the Wichita Mountains Wilderness in Comanche County, from man-made pollution. The requirements for the periodic reports on visibility are contained in S169(A) of the Federal Clean Air Act, 40 CFR 51.306, and the Oklahoma Visibility State Implementation Plan (SIP). According to the Oklahoma Visibility SIP (Appendix A), a report will be filed with EPA every three years describing the condition of the visibility in the Wilderness Area. The report will assess the adequacy of preventing an impairment of visibility in the area. This periodic review report, assessing visibility beginning in 1986 and ending in 1999, is the third three-year periodic review report.

DESCRIPTION OF PROTECTED AREA

The mandatory Class I Area in Oklahoma, the Wichita Mountain Wilderness, is located in Comanche County near Ft. Sill Military Reservation (see Figure 1). This Class I Area consists of the Wichita Mountains National Wildlife Refuge, which is managed by the United States Fish and Wildlife Service. The area also consists of North Mountain and Charons Garden Wilderness Areas within the Refuge. The Ft. Sill Military Reservation, an army training base, is located southeast of the Refuge. The City of Lawton is the closest population center and is located 22 miles southeast of the Refuge.

EVALUATION OF VISIBILITY

The goals of the long-term strategy were to prevent future impairment of visibility since no impairment of visibility existed. Visibility for the Wilderness Area is evaluated through:

- 1) New Source Review process
- 2) Consultation with the Federal Land Manager
- 3) Review of local airport visibility data, PM₁₀ monitoring data, and meteorological data
- 4) Review of emission inventories and permits of nearby sources (i.e. less than 100 km distance).

NEW SOURCE REVIEW PROCESS

The New Source Review Program is considered by the DEQ to be the most cost effective and timely means of assuring good visibility in the Wilderness Area. Major sources within 100 km of the Wilderness Area must submit a visibility evaluation as part of their Prevention of Significant Deterioration (PSD) application, analyzing impairment of visibility that could result from construction and operation of the source in the vicinity.

Two PSD permit applications have been received from facilities lying within 100km of the Class I Areas, neither have been issued to date. Both applications are from Comanche County, one was received in November 1999 and the other in June 2000. All PSD permits include an analysis of impact on Class I Areas. An example of a visibility analysis is provided in Appendix B.

FEDERAL LAND MANAGER

The Federal Land Manager (FLM) is notified of any permit application received by DEQ for a source that may impact the area. The FLM also receives a copy of the complete application for a permit within 30 days of receipt and at least 60 days before holding any public hearing. The FLM and the public are given the opportunity to provide input in the New Source Review process. Sam Waldstein, FLM for the Wichita Mountain Wilderness Area, U.S. Department of the Interior, was consulted for any further information available regarding visibility in the area. The FLM stated there has been no noticeable change in visibility due to air pollution at the Refuge (Appendix C).

AIRPORT VISIBILITY DATA

Records for hourly visual range data were obtained for Lawton Municipal Airport located 22 miles southeast of the Wilderness Area, and the Ft. Sill Military Reservation located 19 miles southeast of the Wilderness Area. These data are representative of conditions in the Class I Area. Data was obtained from the Southern Regional Climatic Center, the Oklahoma Climatological Survey, and the National Climatic Data Center. Visibility readings were obtained hourly at both sites and the values recorded in miles. All available 12:00pm visibility readings were compiled separately for the two sites. Percentage of readings greater than or equal to seven miles was calculated for each quarter and for each year from 1986 through 1999. See Figures 2 through 5 for charts of these percentages. Visibility data for Lawton was collected using Automated Surface Observation System. This system uses two sensors that are three feet apart and a strobe light to calculate visibility. Fort Sill visibility data was collected manually using a marker/eye system. Since the two sites collect data differently, comparisons between the two can not be made.

For days where visibility was less than seven miles, meteorological and PM₁₀ monitoring data were evaluated to determine a cause for decreased visibility. The PM₁₀ monitoring data was collected for 1988-1998 from a monitoring site located in Lawton, 22 miles southeast of the Wilderness Area (Table 1 and Figure 6). PM₁₀ monitoring was discontinued in 1998 and collection of PM_{2.5} data began in March 1999. Excluding the dates in May of 1998 for which EPA allowed "Exceptional Event Status" for the Mexican Haze Event, instances of lowered visibility are contributed to high humidity and/or precipitation. Variation between the two sites is also an effect of high humidity and/or precipitation. For example, some of the data showed signs of precipitation during the 11am hour at Lawton, but for the noon reading the precipitation had moved from Lawton to Ft. Sill. This resulted in decreased visibility values for the Ft. Sill site but not for the

Lawton site. Even though the airports are in close proximity, meteorological events contributed to the variation between the two sites.

EMISSION INVENTORIES AND PERMITTED SOURCES IN THE AREA

Particulate sources located around the Wilderness Area were plotted on maps (Figures 7, 8, and 9). The emission inventories of sources in surrounding counties within 100 km (Figure 10) of the Class I Area were reviewed and the PM₁₀, SO_x, and NO_x emissions were evaluated (Tables 2 and 3).

ASSESSMENT

40 CFR 51.306 contains the requirements for the periodic review reports of the long-term strategy. They are as follows:

1. The progress achieved in remedying existing impairment of visibility in any mandatory Class I Federal area.

There is no existing visibility impairment in the Wilderness Area attributable to a source or group of sources. No visibility impairment has existed since the beginning of this program; thus, no corrective action has been required.

2. The ability of the long-term strategy to prevent future impairment of visibility in any mandatory Class I Federal area.

The New Source Review process requires that any new or modified major stationary source submit a visibility analysis and analysis of impacts on the Wilderness Area as part of their PSD application (example provided in Appendix B). This requirement has been in place since the beginning of the Oklahoma Visibility SIP in 1986, indicating that this strategy is effective in preventing attributable visibility impairment.

3. Any change in visibility since the last such report, or in the case of the first report, since plan approval.

There continues to be no change in visibility impairment attributable to a source or group of sources. The data does not appear to indicate any sort of trend. Variability from year to year is attributable to meteorological conditions.

4. Additional measures, including the need for SIP revisions that may be necessary to assure reasonable progress toward the national visibility goal.

The New Source Review process continues to be sufficient in protecting from attributable visibility impairment in the Wilderness Area at this time. No additional measures to assure progress toward the national visibility goal are necessary.

5. The progress achieved in implementing BART and meeting other schedules set forth in the long-term strategy.

The implementation of BART does not apply because no existing attributable visibility impairment in the Wilderness Area has been identified.

6. The impact of any exemption under Section 303 BART.

BART is not required as explained in the previous section; therefore, this issue is not applicable.

7. The need for BART to remedy existing visibility impairment of any integral vista listed in the plan since the last such report, or, in the case of the first report, since plan approval.

There are no integral vistas and no existing visibility impairment in the Wilderness Area; therefore, this issue is not applicable.

Figure 1
Class I Area
Wichita Mountains Wilderness

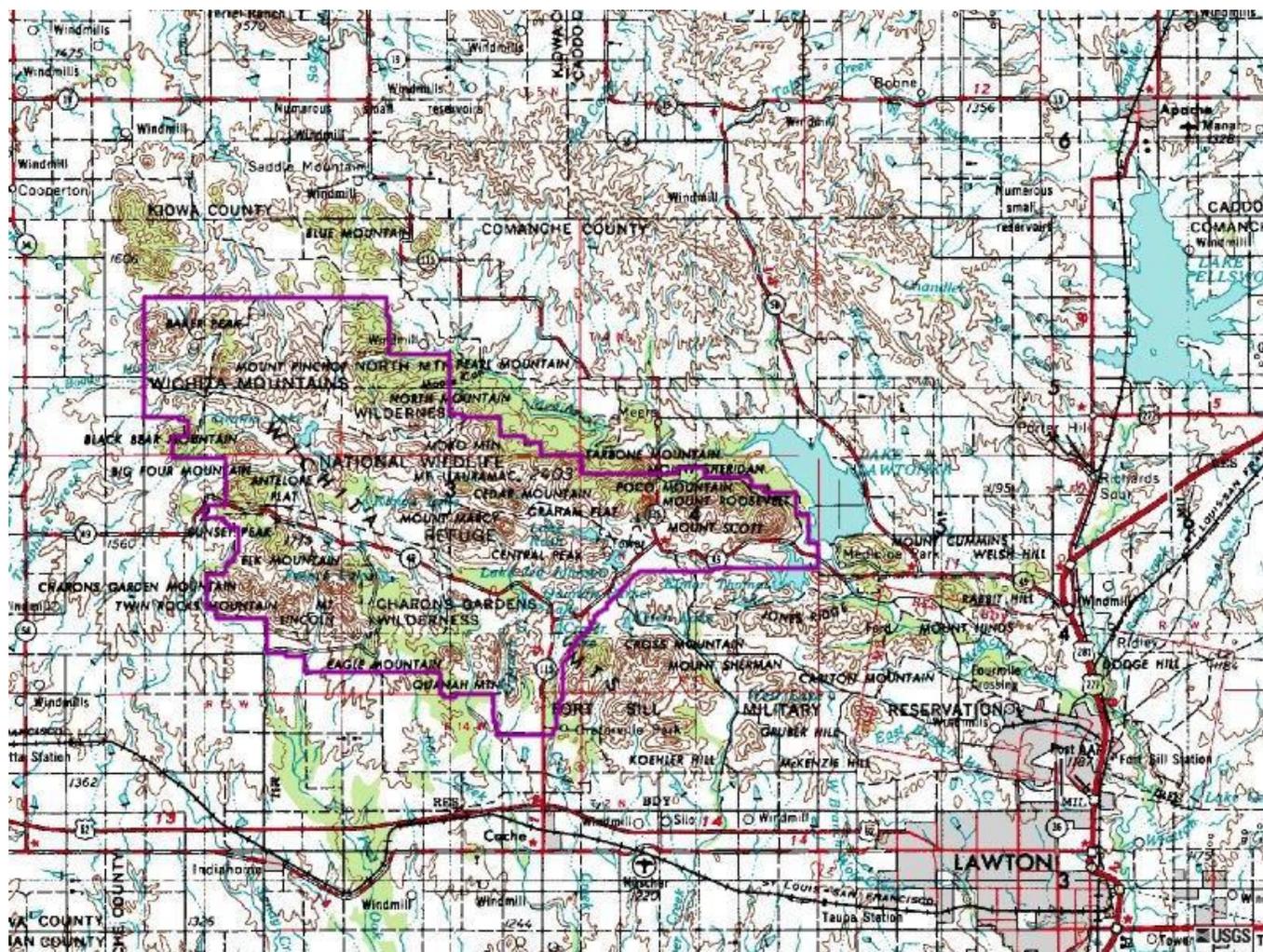


Figure 2
% Yearly Readings \geq 7 miles
Fort Sill AFB

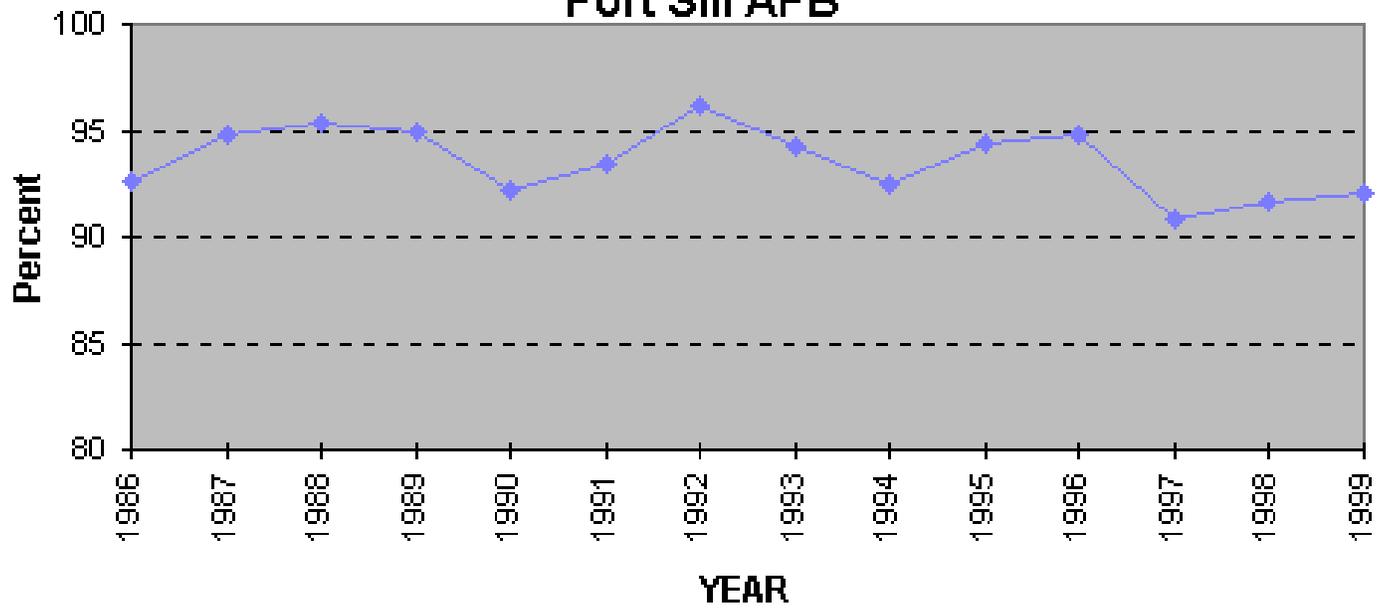


Figure 3
% Quarter Readings \geq 7 miles
Fort Sill AFB

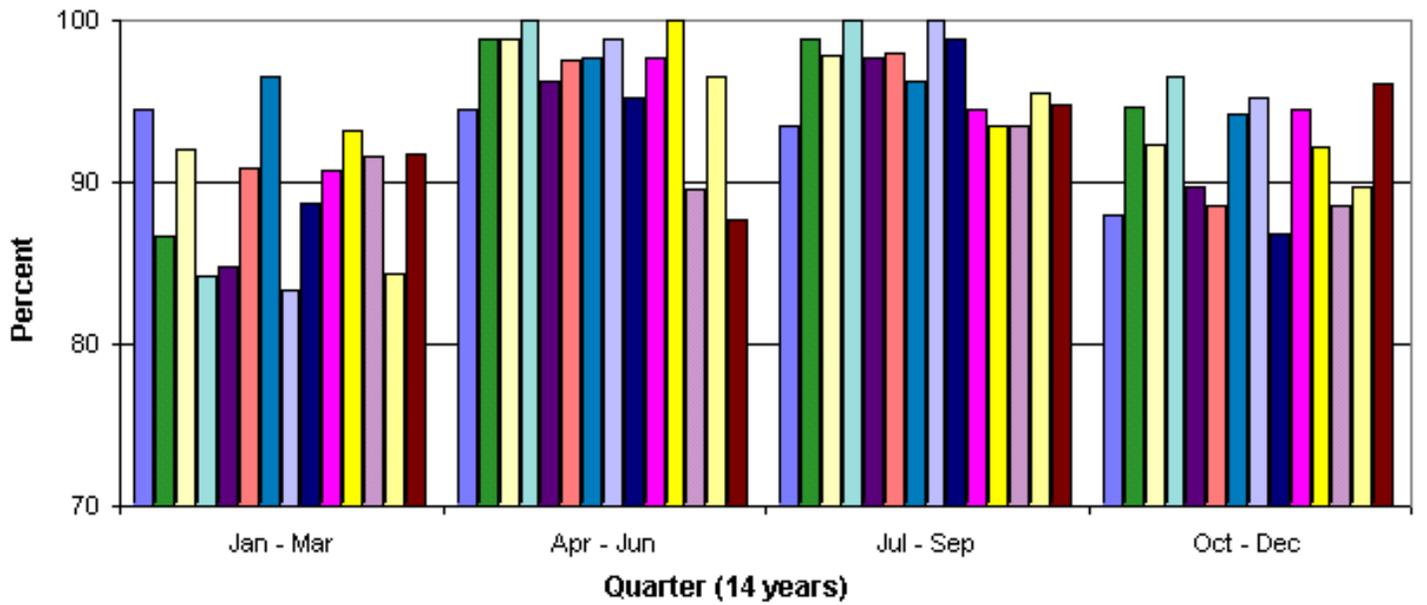


Figure 4
% Yearly Readings \geq 7 miles
Lawton Airport

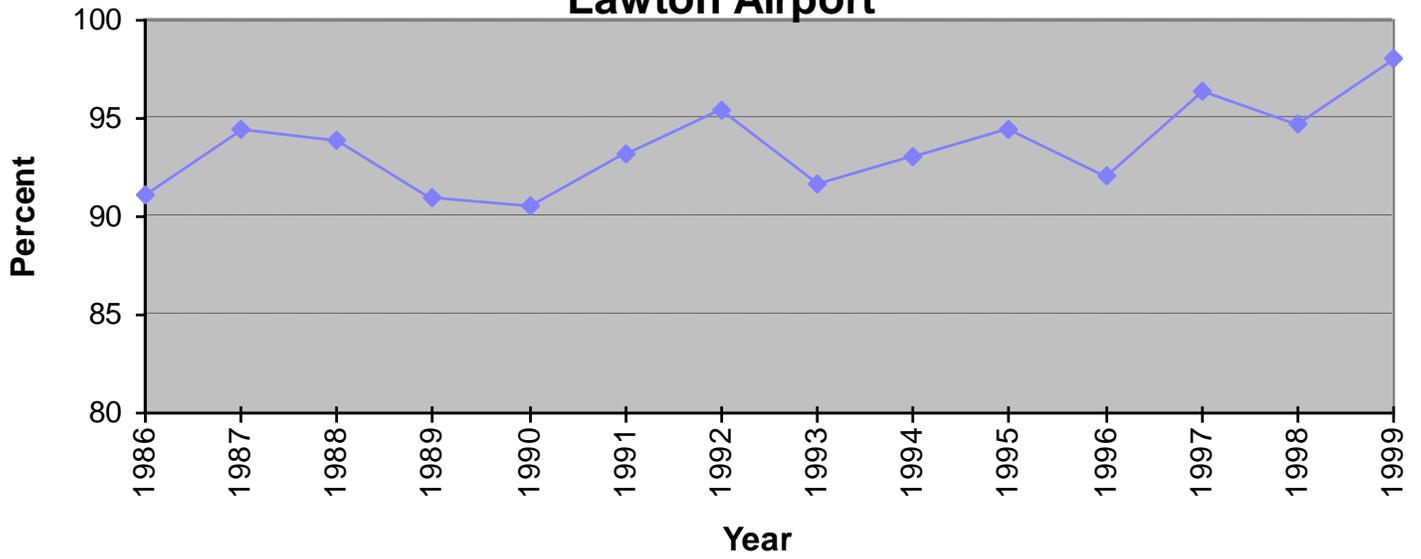


Figure 5
% Quarter Readings \geq 7 miles
Lawton Airport

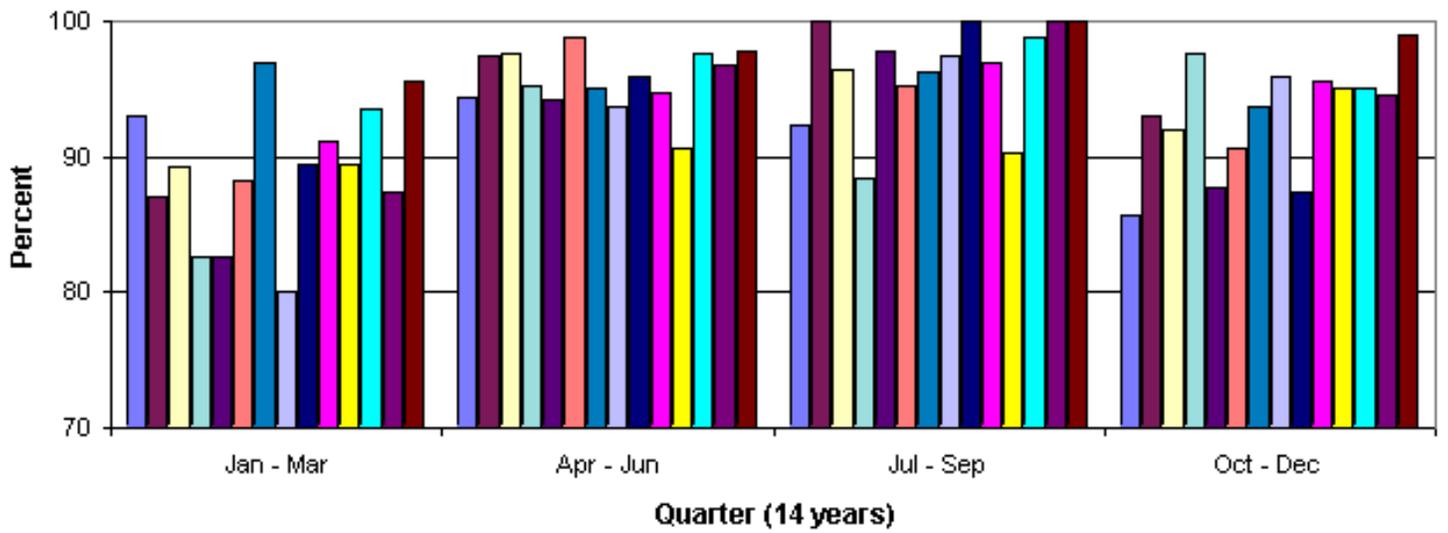


TABLE 1
PM₁₀ LAWTON MONITORING DATA

YEAR	Annual Average ug/m ³
1988	31
1989	31
1990	30
1991	27
1992	25
1993	28
1994	28
1995	25
1996	27
1997	26
*1998	28
**1999(PM2.5)	9.04(PM2.5)

*represents PM10 data from January through September only

**represents PM2.5 data from March through December

Figure 6
PM10 Lawton Monitoring Data

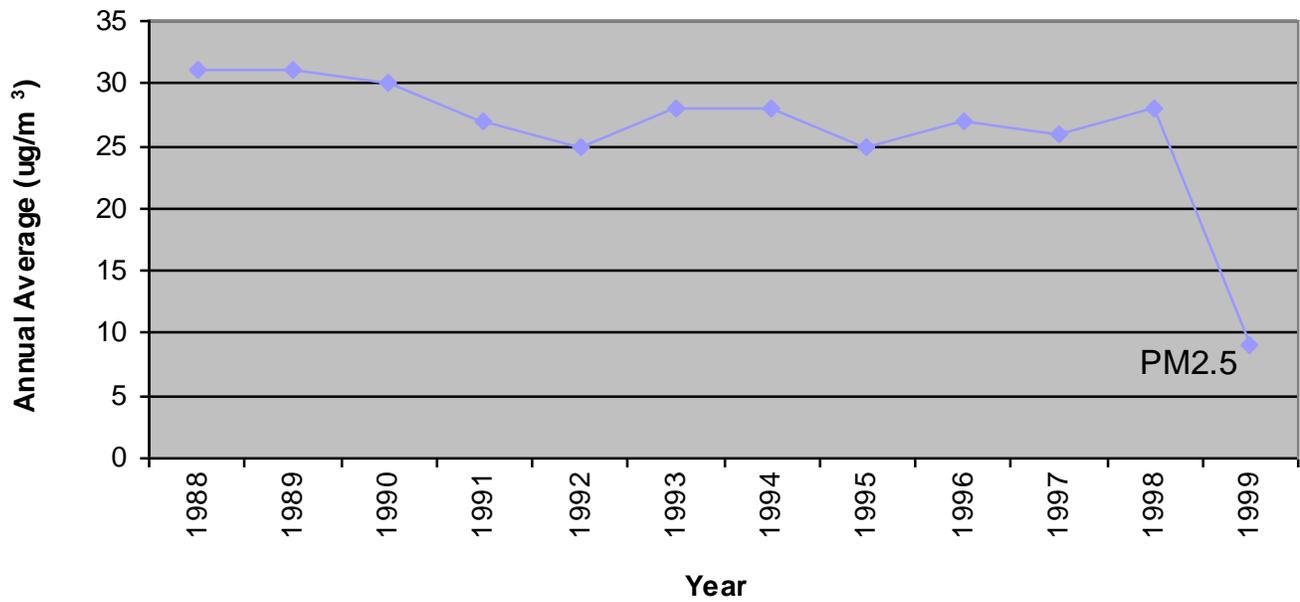


Figure 7
Particulate Sources
Within 50 km

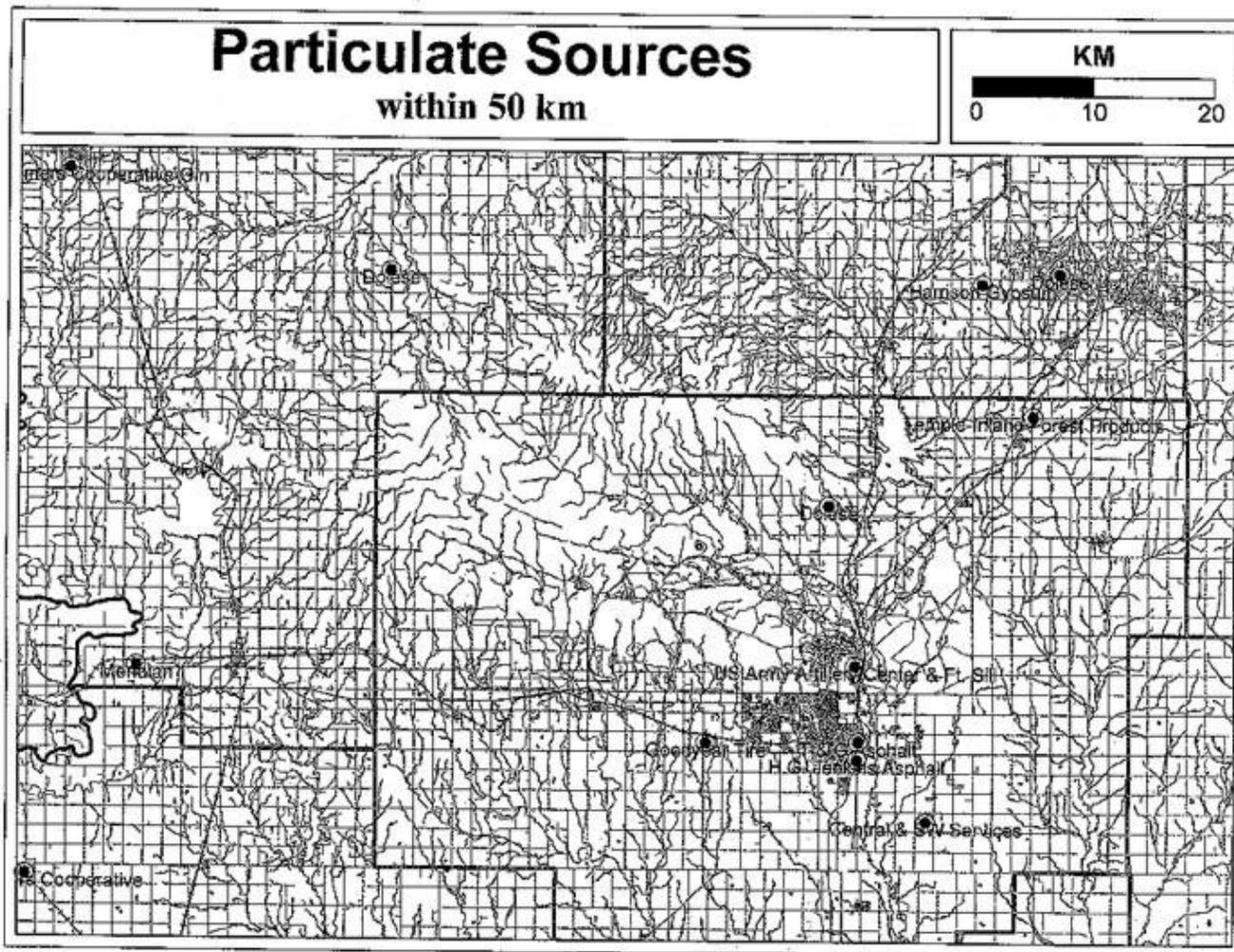


Figure 8
Particulate Sources
Lawton area

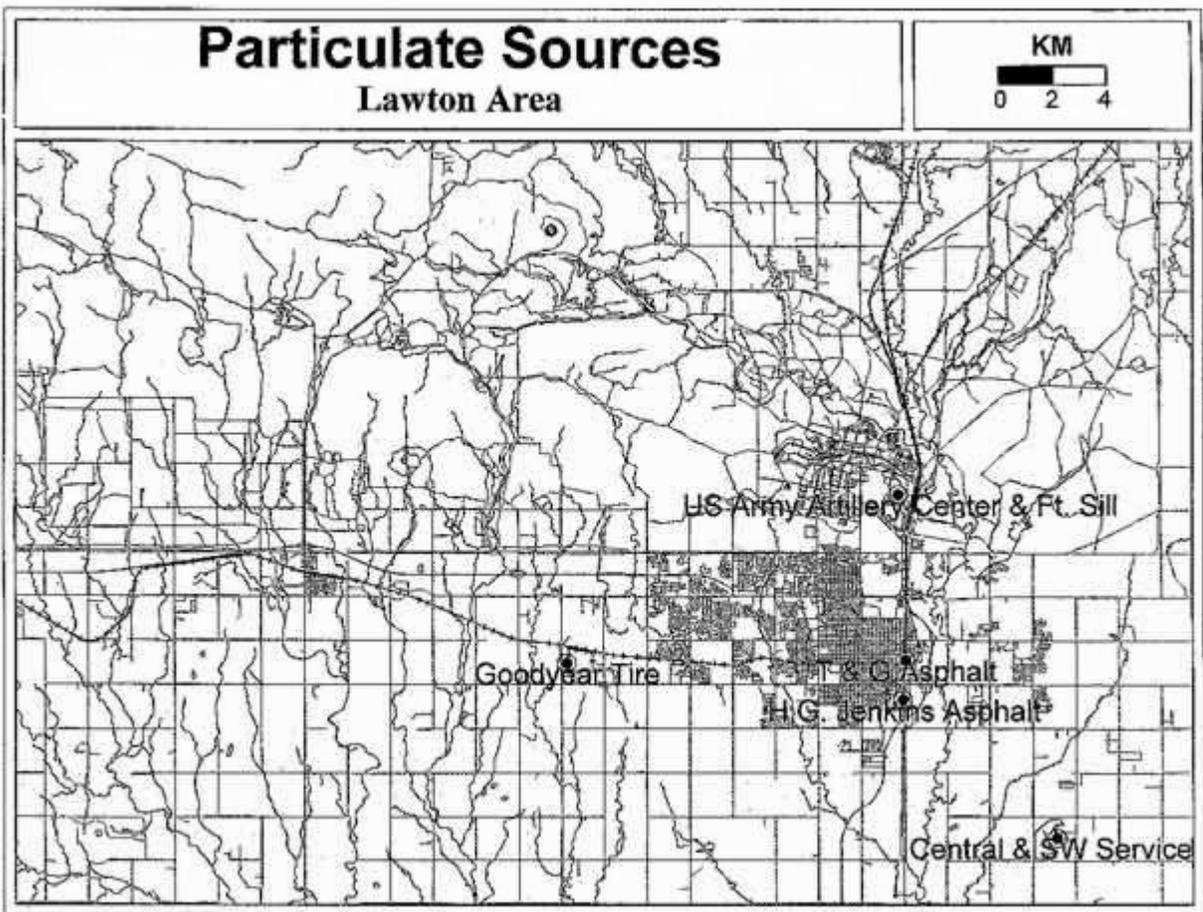


Figure 9
Particulate Sources
To the Southwest

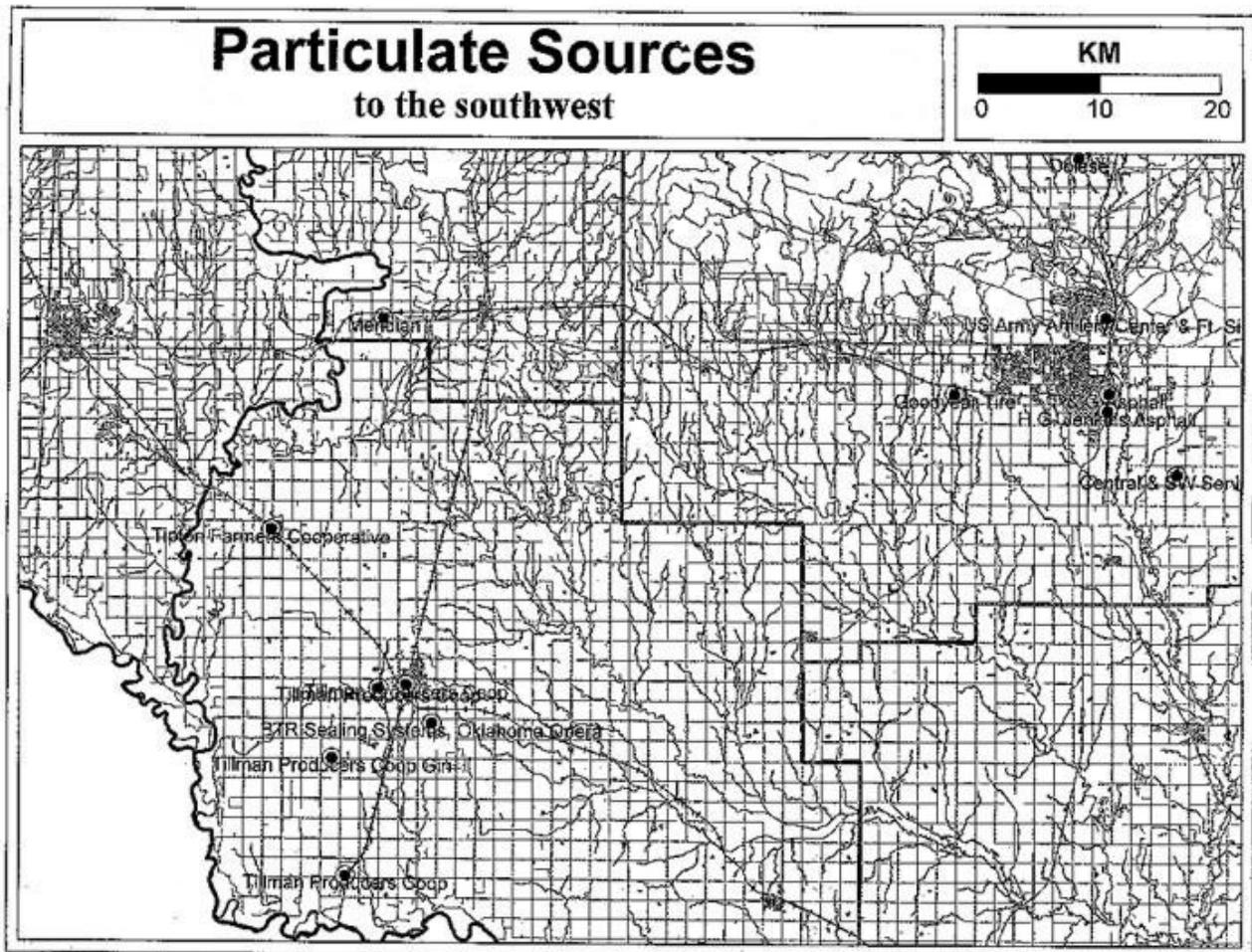


Figure 10
Class I Area
100 km radius

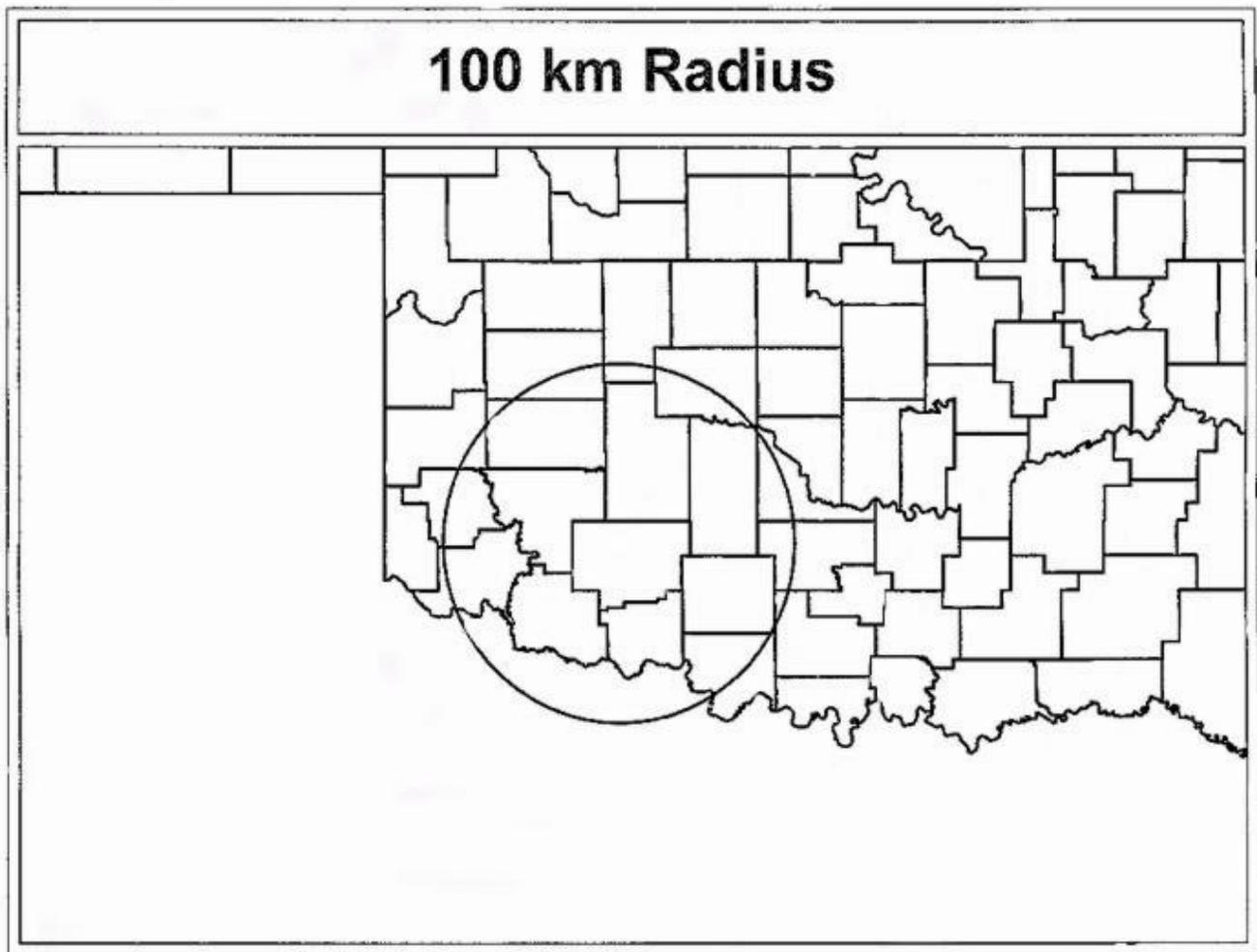


TABLE 2
EMISSION INVENTORIES FROM COUNTIES
WITHIN 100 KM OF WICHITA MOUNTAINS WILDERNESS
1997

COUNTY	TONS/YEAR OF PM₁₀	TONS/YEAR OF SO_x	TONS/YEAR OF NO_x
Beckham	19	546	797
Blaine	198	20	1433
Caddo	50	7	5009
Canadian	29	1	3351
Comanche	211	4	3748
Cotton	0	0	0
Custer	31	8	2335
Garvin	21	2534	5920
Grady	11	0	2372
Greer	4	12	5
Harmon	12	0	0
Jackson	19	8	101
Jefferson	4	1	29
Kiowa	21	3	69
McClain	3	0	1661
Stephens	2	604	4643
Tillman	17	0	14
Washita	11	0	446
TOTAL	663	3748	31933

TABLE 3
EMISSION INVENTORIES FROM COUNTIES
WITHIN 100 KM OF WICHITA MOUNTAINS WILDERNESS
1998

COUNTY	TONS/YEAR OF PM₁₀	TONS/YEAR OF SO_x	TONS/YEAR OF NO_x
Beckham	17	444	930
Blaine	138	11	1364
Caddo	141	8	7584
Canadian	39	3	3795
Comanche	334	4	4168
Cotton	0	0	0
Custer	38	8	2091
Garvin	120	2529	5124
Grady	12	15	2425
Greer	8	12	5
Harmon	12	0	0
Jackson	29	0	37
Jefferson	4	1	23
Kiowa	56	3	21
McClain	3	0	1452
Stephens	4	632	4217
Tillman	3	0	14
Washita	11	0	378
TOTAL	969	3670	33628

APPENDIX A
OKLAHOMA VISIBILITY
STATE IMPLEMENTATION PLAN

APPENDIX B
VISIBILITY IMPACT ANALYSIS
EXAMPLE PSD PERMIT

APPENDIX C
FEDERAL LAND MANAGER
COMMUNICATIONS