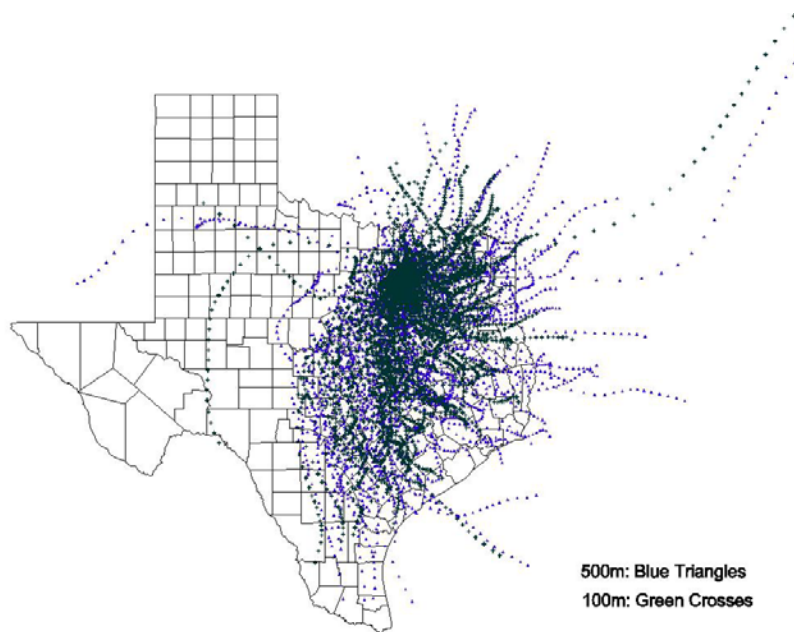


Regional Transport of Ozone in eastern Texas: State of the Science



Prepared by

**David Allen
University of Texas**

for the

Texas Environmental Research Consortium

August, 2003

SUMMARY

Air quality monitoring and modeling indicate that regional ozone concentrations will play a major role in determining whether the state's urban areas meet the new National Ambient Air Quality Standard (NAAQS) for ozone (with concentrations averaged over 8-hours). The sources of emissions leading to elevated regional ozone concentrations include the state's urban areas, rural emission sources and sources outside of the state. Preliminary analyses indicate that all of these sources are significant and none can be ignored in developing a strategy for reducing regional ozone concentrations.

Therefore, in designing strategies to meet the new NAAQS for ozone (with concentrations averaged over 8-hours), the State of Texas should develop an integrated and comprehensive approach for reducing regional ozone concentrations. The development of this strategy will require information, that is not currently available, about the relative importance of emissions in urban areas, emissions in rural areas and emissions outside of the state in creating elevated regional concentrations of ozone.

The following analysis and data collection activities should be performed.

Recommendation 1: Conduct ozone season modeling that examines the relative importance of in-state urban, in-state rural, and out-of-state emission sources in determining seasonal ozone concentrations. All of the modeling results reported in this assessment document have been based on relatively short ozone episodes. These short (3 to 10 day) episodes typically include a single type of meteorological cycle; these single 8/24/2003 15 cycle modeling episodes have been the types of modeling tools that have been used in developing strategies for meeting the NAAQS based on 1-hour averaged ozone concentrations. However, the NAAQS based on 1-hour averaged ozone concentrations is based more on extreme and localized events than the new NAAQS based on 8-hour ozone concentrations. To understand the effect of emission control strategies on the critical parameters in the new NAAQS (the 4th highest maximum daily eight hour averaged ozone concentration over an ozone season) it will be necessary to perform modeling on all of the multiple types of meteorological cycles that are experienced over an entire ozone season.

Recommendation 2: Conduct field studies that improve our understanding of the meteorological and chemical processes that dominate regional ozone production and transport. Seasonal or multi-episode modeling of regional ozone formation will provide insights into the chemical and physical processes that dominate the formation and transport of ozone at regional scales. Among the processes that are likely to be important are night-time chemistry, the chemistry that occurs when ground-level and aloft air masses mix, mixing height evolution in coastal and rural areas, and the interaction of urban and isolated rural plumes with rural biogenic emissions. Relatively little is known about many of these processes, so as an understanding of the processes critical to regional ozone formation emerges through modeling efforts, field studies should be planned to reduce modeling uncertainties. These field programs should be integrated into the plans for a major air quality study, to be conducted in Texas during 2005 and 2006.

Recommendation 3: Establish a regional ozone assessment work group to coordinate the activities of the multiple jurisdictions that will be involved in designing integrated and comprehensive strategies for reducing regional ozone concentrations. Air quality management plans (referred to as State Implementation Plans or SIPs) are developed by individual metropolitan statistical areas (MSAs), in coordination with the State of Texas. Because regulatory timetables for MSAs vary within the state, and from state to state, most SIP development is done without a thorough analysis of the potential synergies that could be achieved through integrated planning across multiple MSAs. The first step in developing integrated planning would be to convene a working group of the air quality management teams for each of the MSAs in eastern Texas. The initial goals of the working group would be to facilitate the exchange of technical data (for example, detailed local emission inventories and growth projections) and to establish joint priorities for improving modeling and data collection.