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ASSESSMENT OF THE IMPACT OF AIRBORNE POLLUTANTS ON THE RIO GRANDE BASIN WATERSHED

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Airborne pollutants, especially sulfate and nitrate, have been known to cause acid rain problems. These pollutants may be directly emitted from various emission sources or formed through chemical or physical processes in the atmosphere. The pollutants may be wash-out by falling rain droplets (wet deposition), or sediment out by their own vertical velocity (dry deposition). Both wet and dry deposition of these pollutants can significantly pollute the earth's valuable water resources.

This study was to assess the impact of long-range transport of airborne pollutants, especially sulfate and nitrate, on water sustainability in the Rio Grande Basin employing the most updated version of EPA's Model3/CMAQ (Community Multi-scale Air Quality) modeling system. The system is designed for air quality simulation of tropospheric ozone, acid deposition, visibility, and fine particulate matter involving three modeling components: meteorological, emission inventory and atmospheric chemical transport. In the study, the model was simulated for the period of February and September 2002 representing a typical month for winter and summer, respectively. The simulation results have indicated that deposition of pollutants, sulfate in particular, is a serious problem on water sustainability in the Rio Grande Basin. Both Texas and Mexico emission sources have been found to contribute significantly to the Basin's acid deposition problem. It is concluded that the model is capable of providing scientific insights into the atmospheric loading of pollutants on the aquatic environment in the Rio Grande Basin.

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