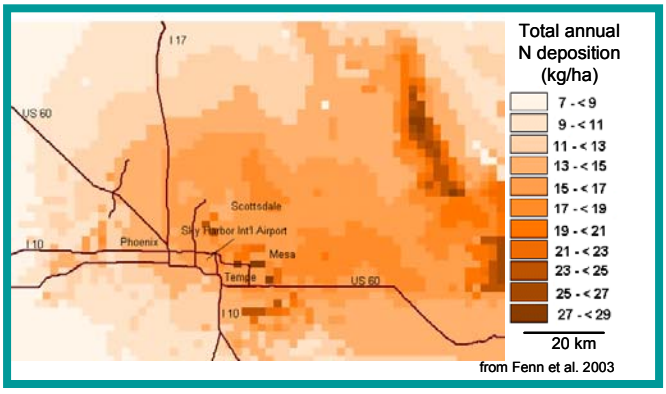
ECOSYSTEM RESPONSE TO MATERIAL DEPOSITION FROM THE URBAN ATMOSPHERE

CAP LTER
Central Arizona-Phoenix
Long-Term Ecological Research

Half the world's population will live in cities by 2007, and virtually all population growth in the next 30 years will occur in urban areas. Human activities affect the environment most intensely in cities, yet a basic mechanistic understanding of ecological response to human-wrought changes in urban ecosystems is still lacking.



from Fenn et al. 2003

This NSF-funded project studies the exchange of chemical elements between land and atmosphere and asks the fundamental question: are elemental cycles in urban ecosystems qualitatively different from those in non-urban ecosystems?

Ecosystem scientists, atmospheric chemists, and biogeochemists are testing the hypothesis that distinct biogeochemical pathways result from elevated inorganic nitrogen and organic carbon deposition from atmosphere to land. They will determine the potential for biological use of human-generated, atmospheric nitrogen and organic carbon compound and identify the pathways by which these compounds enter biological systems. Researchers will:

- examine ecosystem-level consequences of elevated deposition of the compounds
- test alternative hypotheses to explain ecosystem response

The project applies sophisticated methods from different scientific specialties to a common problem that is close to home—the urban environment in which most humans live. In addition to conducting research, scientists are working with local decision makers, including tribal leaders, to address worsening environmental quality on the borders of rapidly expanding cities. The project also provides training for graduate and undergraduate students participating in interdisciplinary field courses and independent research.

Do the biogeochemical pathways explored in Phoenix occur in other cities?

Urban growth in the next 50 years will concentrate in arid lands, especially in the developing world. Although we focus on the Phoenix area, we will collaborate with a regional/ international team of researchers who study aridland cities of the US Southwest and Mexico: Las Vegas, Albuquerque, Tucson, and Hermosillo, Mexico. This team will help test the generality of patterns we establish in urban deposition and ecosystem response for a large semiarid region of North America.

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