

INCORPORATING ECOSYSTEM SERVICES INTO ROADWAY PLANNING AND MITIGATION

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ABSTRACT

The web-based EnviroAtlas is an easy-to-use mapping and analysis tool built by the U.S. Environmental Protection Agency and its partners to provide information, data, and research on the relationships between ecosystems, built infrastructure, and societal well-being. EnviroAtlas features the distribution of ecosystem services—benefits provided by Nature—by 12-digit hydrologic unit code (HUC) and county across the contiguous 48 states. With this tool, the locations of continuous wildlife habitat, natural riparian buffers, and other valuable “green infrastructure” can be considered early in the transportation planning phase to avoid important large-scale environmental resources and identify where mitigation can elicit maximum benefits. Maps also summarize natural and anthropogenic environmental hazards, current and projected population, and the degree of societal benefits such as clean and plentiful drinking water, hazard mitigation, and spiritual and cultural environmental amenities. The high-resolution community component of EnviroAtlas features these ecosystem services, aspects of the built environment, and demographics at U.S. Census block-group scales for selected cities, towns, and Tribes. Map overlays reveal underserved neighborhoods where strategic investments in green and built infrastructure can serve the most people or the most vulnerable. A key cluster of transportation maps illustrates near-road pollutant exposure zones and the presence or absence of roadway tree buffers. The research underpinning these maps explored how tree buffers may result in decreased air pollutant concentrations downwind of major roadways. EnviroAtlas community maps identify segments of major roads with less than 10 meters of tree buffer, and vulnerable roadside populations that may benefit from mitigation. EnviroAtlas is designed to inform decision alternatives in management sectors including transportation, public health, water supply, recreation, and environmental conservation, as well as providing data, information, and analysis tools to scientists, students, and concerned citizens.

BIOGRAPHICAL SKETCH

Laura Jackson is a landscape ecologist with the U.S. EPA’s Office of Research and Development, in Research Triangle Park, North Carolina. She is a principal investigator in the Sustainable and Healthy Communities Research Program, leading the high-resolution component of the EnviroAtlas online national mapping tool. Her research has explored the links between ecosystem services and human well-being, the landscape ecology of urbanizing areas, and the effects of the built environment on ecological and public health. Current research includes exploring the effects of near-road and neighborhood tree cover on birth weight, associating Lyme disease with forest fragmentation metrics, and characterizing sprawl for EnviroAtlas. Previous research has addressed ecological indicator development, environmental monitoring and assessment, and landscape change analysis. Her record demonstrates a facility for cross-disciplinary synthesis; recent publications have appeared in ecology, epidemiology, and urban

planning journals, and medical and remote-sensing textbooks. Dr. Jackson has developed and led research, and performed research management and strategic planning for the U.S. EPA since 1990. She received her undergraduate degree from Bryn Mawr College, a Master of Environmental Management from Duke University's School of Forestry and Environmental Studies, and a Ph.D. in Ecology at the University of North Carolina-Chapel Hill.