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Urban influences on river chemistry and biology in the upper piedmont of South Carolina

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Presently, some of the most rapid rates of urban expansion in the United States occur in the upper piedmont of South Carolina. Over the past five years, we have examined influences of urban areas on streams and rivers in that region. In general, streams in watersheds with a high proportion of urban land cover have higher concentrations of nitrates, sulfates, and other solutes than do streams in watersheds with a high proportion of forest cover. However, the influence of urban areas extends beyond the boundaries of urban land cover because wastewater treatment effluent may be released downstream of urban areas. Our study of a tributary of the Saluda River which flows from an urban area (City of Easley) through a rural area suggests that both point source and nonpoint sources of nutrients are important; however, the largest consistent change in river chemistry was associated with the release of wastewater treatment effluent. The abundance of suspended coliform bacteria was often higher in urban stream reaches than in rural reaches. In addition, the abundances of suspended coliform bacteria are sometimes elevated downstream of wastewater treatment plants in the piedmont, but this pattern appears to vary among locations and with river discharge. Species richness and diversity of fishes typically is lower in urban streams than streams in mainly forested areas, although abundance of some species can be relatively high in some urban streams.