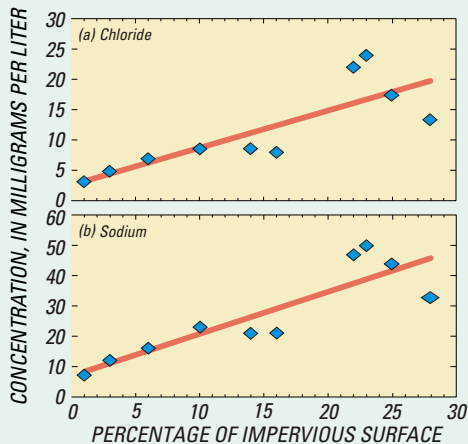


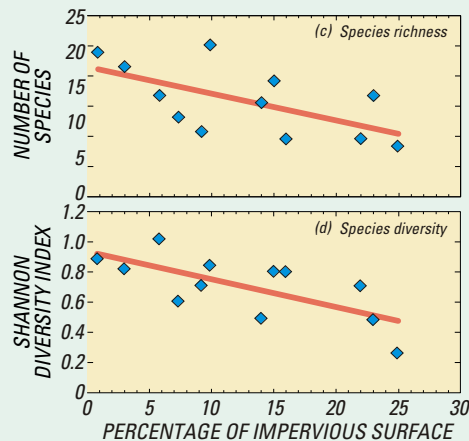
URBANIZATION AFFECTS FISH COMMUNITIES AND WATER QUALITY IN URBAN STREAMS OF THE STUDY UNIT

Water quality, instream habitat, and fish-community composition were characterized at urban streams of the Study Unit during low-flow conditions, September 1997. The amount of impervious cover (roads, parking lots, and rooftops) generally increases as population density increases and was used as a measure of urbanization. Nutrient and pesticide concentrations were generally low, rarely exceeding concentrations found in agricultural streams. Nutrient concentrations did not change with the percentage of impervious area. In contrast, chloride (fig. a) and sodium (fig. b) (used for road de-icing) concentrations were generally elevated in urban streams and increased as the percentage impervious area increased.

Fish communities within most urban streams were characterized by species that are tolerant to degraded physical and chemical conditions, such as the central mudminnow, fathead minnow, and black bullhead. There were, however, differences in the fish communities among streams. Two measures of community health--the species richness and species diversity--decreased as the percentage of impervious area increased (figs. c and d). Factors associated with impervious cover, such as reduced instream habitat, presence of contaminants in water and sediment, alterations to stream channels, and migration barriers, may directly affect fish-community composition.



Concentrations of chloride (a) and sodium (b) in relation to percentage of impervious surface in urban streams of the Study Unit, September 1997



Species richness (c) and species diversity (d) in relation to percentage of impervious surface in urban streams of the Study Unit, September 1997