

Squillace, P.J., Thurman, E.M., and Furlong, E.T., 1993, Groundwater as a nonpoint source of atrazine and deethylatrazine in a river during base flow conditions: *Water Resources Research*, vol. 29, no. 6, pp. 1719-1729.

Alluvial groundwater adjacent to the main stem river is the principal nonpoint source of atrazine and deethylatrazine in the Cedar River of Iowa after the river has been in base flow conditions for 5 days. Between two sites along a 116-km reach of the Cedar River, tributaries contributed about 25% of the increase in the atrazine and deethylatrazine load, whereas groundwater from the alluvial aquifer contributed at least 75% of the increase in load. Within the study area, tributaries aggregate almost all of the discharge from tile drains, and yet the tributaries still only contribute 25% of the increase in loads in the main stem river. At an unfarmed study site adjacent to the Cedar River, the sources of atrazine and deethylatrazine in the alluvial groundwater are bank storage of river water and groundwater recharge from areas distant from the river. Atrazine and deethylatrazine associated with bank storage water will provide larger concentrations to the river during early base flow conditions. After the depletion of bank storage, stable and smaller concentrations of atrazine and deethylatrazine, originating from groundwater recharge, continue to be discharged from the alluvial aquifer to the river; thus these results indicate that alluvial aquifers are an important nonpoint source of atrazine and deethylatrazine in rivers during base flow.