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**CHANGES IN NITRATE IN THE MISSISSIPPI RIVER BASIN, 1980 TO 2008**

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**ABSTRACT:** Changes in nitrate concentration and flux between 1980 and 2008 at eight sites in the Mississippi River basin were determined using a new statistical method that accommodates evolving nitrate behavior over time and produces flow-normalized estimates of nitrate concentration and flux that are independent of random variations in streamflow. The results show that little consistent progress has been made in reducing riverine nitrate since 1980, and that conditions are worsening in some areas. Flow-normalized nitrate concentration and flux increased between 9 and 76% at four sites on the Mississippi River and a tributary site on the Missouri River, but changed very little at tributary sites on the Ohio, Iowa, and Illinois Rivers. Increases at the Mississippi River at Clinton and Missouri River at Hermann were more than three times larger than at any other site. At most sites, concentrations increased more at low and moderate streamflows than at high streamflows, suggesting that groundwater concentrations may be increasing and having an effect on river concentrations.

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