Missouri River at Hermann, Missouri

Flow-Normalized Nitrate Concentration and Flux

From 1980 through 2010, the largest percentage increase in FN nitrate concentration at any of the study sites occurred at Missouri River at Hermann, Missouri (MIZZ-HE) (79 percent; table 2). FN flux also increased substantially at this site over the same period (45 percent). FN nitrate concentration at this site in 1980 was approximately 1 mg/L, among the lowest of any site in this study. FN nitrate concentration and flux increased consistently from 1980 through 2010, though nitrate increased at a faster rate from the early 2000s onward (fig. 10).
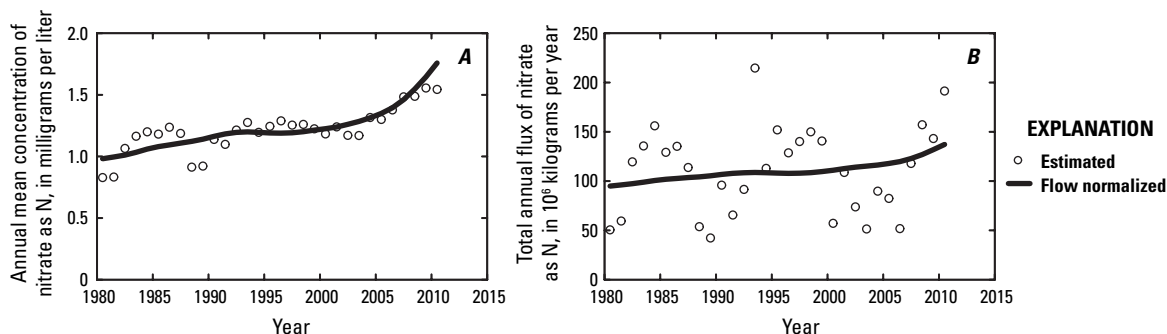

Figure 10. (*A*) Annual mean estimated concentration (circles) and flow-normalized concentration (solid line) and (*B*) total annual estimated flux (circles) and flow-normalized flux (solid line) from 1980 through 2010 for the Missouri River at Hermann, Missouri (MIZZ-HE).

Comparison of Nitrate Concentrations over Time and with Streamflow

Since 2000, nitrate concentration increased primarily during moderate and low streamflows at Missouri River at Hermann, Missouri (MIZZ-HE). This is particularly evident during spring and summer low streamflows (for example, at discharge values around 1,000 cubic meters per second [m^3/s]) when nitrate concentration increased from just under 2 mg/L in the early 2000s to greater than 3.5 mg/L in 2010 (fig. 11). These increases at low streamflows may be due to legacy nitrate from groundwater (Tesoriero and others, 2013) or could be related to increases from point source discharges in the basin. Slight increases in nitrate also occurred across all streamflows during the winter, though there was little change in the nitrate concentration at high discharges (about 5,000 m^3/s) during the rest of the year.

Figure 11. Expected nitrate concentrations at Missouri River at Hermann, Missouri (MIZZ-HE) from 2000 through 2010. Thin black lines show smoothed estimates of the 5th and 95th percentiles of streamflow. Vertical gray lines indicate January 1 of each year.

Link to water-quality data: http://infotrek.er.usgs.gov/nasqan_query