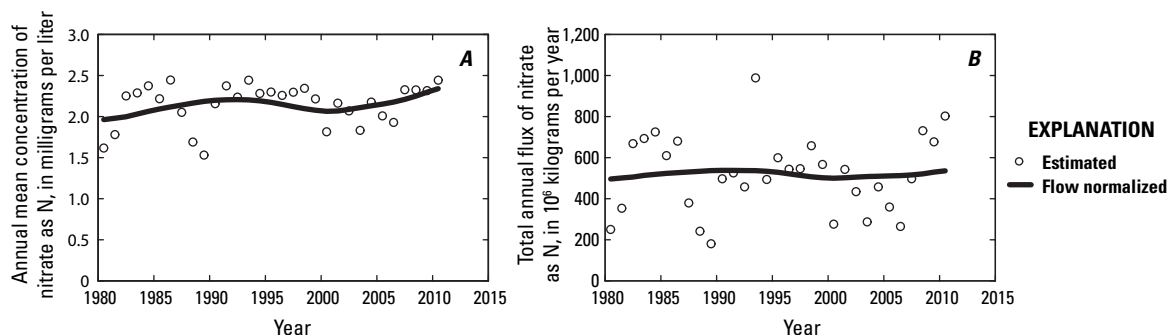


## Mississippi River at Thebes, Illinois

### Flow-Normalized Nitrate Concentration and Flux

From 1980 through 2010, FN nitrate concentration increased (19 percent), and FN flux experienced minimal change (8 percent) at Mississippi River at Thebes (MSSP-TH; table 2; fig. 12). Most of the increase in FN concentration occurred recently (2000–2010; 0.27 mg/L), as compared to the previous 20 years when concentration changed little (0.10 mg/L).



**Figure 12.** (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 Mississippi River at Thebes, Illinois (MSSP-TH).

### Comparison of Nitrate Concentrations over Time and with Streamflow

Nitrate concentration increased across most streamflows from 2000 through 2010 at Mississippi River at Thebes, Illinois (MSSP-TH). These increases are most prominent during low and moderate streamflows in the fall, winter, and spring (fig. 13) and may be related to changes in nitrate from groundwater or point sources. Some of these increases in nitrate are offset by slight decreases at moderate and high streamflows during the summer. These increases and decreases of nitrate concentration by season and streamflow at MSSP-TH reflect a mixture of the different trends observed at upstream sites, such as decreases in nitrate during high streamflows in the Mississippi River (MSSP-GR) and increases in nitrate during low streamflow in the Missouri River (MIZZ-HE) and MSSP-GR.

**Figure 13.** Expected nitrate concentrations at Mississippi River at Thebes, Illinois (MSSP-TH) 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.

