

The 30-year (1980–2010) annual and spring trends in flow-normalized nitrate concentration and flux at eight sites in the Mississippi River Basin.

[conc, nitrate concentration; FN, flow normalized; mg/L, milligrams per liter; kg/yr, kilograms per year; kg/km²/yr, kilogram per square kilometer per year; Increasing and decreasing trends are greater than or equal to ± 10 percent, respectively, strongly increasing trends are greater 40 percent, and trends with minimal change are within ± 10 percent. Spring trends and values consider a 91-day period from April through June]

Site	30-year annual trends (1980–2010)						
	in 1980			FN concentration		FN flux	
	FN annual mean conc (mg/L)	FN annual flux (10 ⁶ kg/yr)	FN annual yield (kg/km ² /yr)	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)
MSSP-CL	1.19	71	321	0.84	Strongly increasing (70)	39	Strongly increasing (55)
IOWA-WAP	5.28	63	1,955	−0.60	Decreasing (−11)	−9	Decreasing (−15)
ILLI-VC	3.85	102	1,478	−0.55	Decreasing (−14)	−15	Decreasing (−14)
MSSP-GR	2.59	342	771	0.45	Increasing (17)	39	Increasing (11)
MIZZ-HE	0.98	95	70	0.78	Strongly increasing (79)	42	Strongly increasing (45)
MSSP-TH	1.96	496	269	0.38	Increasing (19)	40	Minimal change (8)
OHIO-GRCH	0.99	310	589	−0.02	Minimal change (−2)	−16	Minimal change (−5)
MSSP-OUT	1.26	819	281	0.22	Increasing (17)	119	Increasing (14)

Site	30-year spring trends (1980–2010)					
	in 1980		FN concentration		FN flux	
	FN spring mean conc (mg/L)	FN spring flux (10 ⁶ kg/yr)	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)
MSSP-CL	1.25	30	0.96	Strongly increasing (76)	17	Strongly increasing (56)
IOWA-WAP	6.00	27	0.43	Minimal change (7)	−0.3	Minimal change (−1)
ILLI-VC	4.89	44	−0.75	Decreasing (−15)	−7	Decreasing (−15)
MSSP-GR	3.19	146	0.72	Increasing (23)	27	Increasing (18)
MIZZ-HE	1.32	41	0.78	Strongly increasing (59)	14	Increasing (33)
MSSP-TH	2.54	221	0.43	Increasing (17)	12	Minimal change (6)
OHIO-GRCH	1.12	94	0.07	Minimal change (6)	0.7	Minimal change (1)
MSSP-OUT	1.54	325	0.38	Increasing (25)	54	Increasing (17)

The 20-year (1980–2000) and 10-year (2000–2010) annual trends in flow-normalized nitrate concentration and flux at eight sites in the Mississippi River Basin.

[mg/L, milligrams per liter; kg/yr, kilograms per year; Increasing and decreasing trends are greater than or equal to ± 10 percent, respectively, strongly increasing trends are greater than 40 percent, and trends with minimal change are within ± 10 percent]

Site	20-Year annual trends (1980–2000)				10-Year annual trends (2000–2010)			
	FN concentration		FN flux		FN concentration		FN flux	
	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)
MSSP-CL	0.38	Increasing (32)	17	Increasing (23)	0.46	Increasing (29)	23	Increasing (26)
IOWA-WAP	–0.06	Minimal change (–1)	–1	Minimal change (–2)	–0.54	Decreasing (–10)	–8	Decreasing (–13)
ILLI-VC	0.34	Minimal change (9)	14	Increasing (14)	–0.90	Decreasing (–21)	–29	Decreasing (–25)
MSSP-GR	0.27	Increasing (10)	36	Increasing (11)	0.18	Minimal change (6)	3	Minimal change (1)
MIZZ-HE	0.24	Increasing (25)	16	Increasing (17)	0.53	Strongly increasing (43)	26	Increasing (23)
MSSP-TH	0.10	Minimal change (5)	4	Minimal change (1)	0.27	Increasing (13)	36	Minimal change (7)
OHIO-GRCH	0.05	Minimal change (5)	4	Minimal change (1)	–0.07	Minimal change (–6)	–20	Minimal change (–6)
MSSP-OUT	0.05	Minimal change (4)	34	Minimal change (4)	0.16	Increasing (12)	85	Increasing (10)

The 20-year (1980–2000) and 10-year (2000–2010) spring trends in flow-normalized nitrate concentration and flux at eight sites in the Mississippi River Basin.

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Site	20-Year spring trends (1980–2000)				10-Year spring trends (2000–2010)			
	FN concentration		FN flux		FN concentration		FN flux	
	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)	Change (mg/L)	Trend (percent change)	Change (10 ⁶ kg/yr)	Trend (percent change)
MSSP-CL	0.38	Increasing (31)	5	Increasing (16)	0.57	Increasing (35)	12	Increasing (34)
IOWA-WAP	0.67	Increasing (11)	3	Increasing (10)	–0.24	Minimal change (–4)	–3	Decreasing (–10)
ILLI-VC	0.41	Minimal change (8)	5	Increasing (10)	–1.17	Decreasing (–22)	–11	Decreasing (–23)
MSSP-GR	0.47	Increasing (15)	23	Increasing (16)	0.25	Minimal change (7)	4	Minimal change (2)
MIZZ-HE	0.35	Increasing (26)	8	Increasing (19)	0.43	Increasing (26)	6	Increasing (12)
MSSP-TH	0.14	Minimal change (6)	–2	Minimal change (–1)	0.28	Increasing (11)	14	Minimal change (6)
OHIO-GRCH	0.18	Increasing (16)	10	Increasing (11)	–0.12	Minimal change (–9)	–9	Minimal change (–9)
MSSP-OUT	0.15	Increasing (10)	24	Minimal change (7)	0.23	Increasing (14)	30	Minimal change (9)

See Murphy, J.C., Hirsch, R.M., and Sprague, L.A., 2013, Nitrate in the Mississippi River and its tributaries, 1980–2010—An update: U.S. Geological Survey Scientific Investigations Report 2013–5169, 31 p. for discussion of the above tables.