

**Table 6.** Estimated nitrogen and phosphorus fluxes to the Neuse River estuary from major sources, excluding oceanic exchange, for an average precipitation year (1.27 meters).

Source	Annual tonnes of nitrogen <sup>a-e</sup>	Percent of total	Annual tonnes of phosphorus <sup>f-j</sup>	Percent of total
Bottom-sediment flux	3,711 <sup>a</sup>	41	845 <sup>f</sup>	64
Ground-water flux	333 <sup>b</sup>	4	66 <sup>g</sup>	5
Surface-water flux from upstream of NRE	4,354 <sup>c</sup>	49	385 <sup>h</sup>	29
Precipitation flux to NRE	400 <sup>d</sup>	4	0 <sup>i</sup>	0
Surface-water flux from adjacent coastal tributaries	177 <sup>e</sup>	2	18 <sup>j</sup>	1
Total	8,975	100	1,314	100

<sup>a</sup>Nitrogen from bottom sediment flux—Average daily flux of NH<sub>4</sub> nitrogen flux from five studies (44.8 mg of nitrogen m<sup>-2</sup> d<sup>-1</sup>; table 1), assuming regeneration from half the area of the estuary. Source: Luettich et al. (2000).

<sup>b</sup>Daily flux of 94.5 mg m<sup>-2</sup> d<sup>-1</sup> applied to area of ground-water discharge (9.66 x 10<sup>6</sup> m<sup>2</sup>); Table 1. Source: This paper.

<sup>c</sup>Average total nitrogen load in surface water upstream from NRE for year having average rainfall. Source: North Carolina Department of Environment and Natural Resources (2001); Spruill et al. (2005).

<sup>d</sup>Dissolved nitrogen (from nitrate and ammonium) in rainfall falling on surface area of NRE (4.55 X 10<sup>8</sup> m<sup>2</sup>). Source: ~1 mg/L DIN (from National Atmospheric Deposition Program/National Trends Network 1997).

<sup>e</sup>Nitrogen flux computed by multiplying average total dissolved nitrogen concentration by 0.125 m of runoff (equal to 5 inches of surface runoff reported in Wilder et al. (1978)) over land area directly discharging to NRE (1.42 x 10<sup>9</sup> m<sup>2</sup>). Source: Assume 1 mg/N (dissolved total N) for Coastal Plain tributary streams based on average for Coastal Plain streams (Spruill et al. 1998).

<sup>f</sup>Phosphorus from bottom sediment flux—Average daily flux of orthophosphate-phosphorus (10.2 mg m<sup>-2</sup> d<sup>-1</sup>, assuming regeneration from half the area of the estuary (4.55 x 10<sup>6</sup> m<sup>2</sup>). Source: Fisher et al. (1982).

<sup>g</sup>Daily flux of 18.9 mg m<sup>-2</sup> d<sup>-1</sup> applied to area of ground-water discharge (9.66 x 10<sup>6</sup> m<sup>2</sup>); Table 1. Source: This paper.

<sup>h</sup>Average total phosphorus load from surface water upstream from NRE for year having average rainfall. Source: Spruill et al. (2005).

<sup>i</sup>Source: Assumed insignificant.

<sup>j</sup>Phosphorus flux computed by multiplying average total dissolved phosphorus concentration by 0.125 m of runoff (equal to 5 inches of surface runoff reported in Wilder et al. (1978)) over land area directly discharging to NRE (1.42 x 10<sup>9</sup> m<sup>2</sup>). Source: Assume 0.1 mg/L of dissolved total P for Coastal Plain tributary streams based on average for Coastal Plain streams (Spruill et al. (1998)).