Water Quality and Climate Fluctuations in the Neuse River Basin, NC

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Water and nitrogen flux in the Neuse River Basin has been monitored by the RiverNet program for the past 6 years. There are large inter-annual and intra-annual variations in nitrate and water flux. The inter-annual variations are related to the El-Nino index modulated by the North Atlantic Oscillation. 2003 and 2006 were high flux years and were associated with a positive JMA (Japanese Meteorological Association) ENSO index. River discharge and nitrogen flux increased during the positive JMA index periods only when the North Atlantic Oscillation (NAO) index increased. These periods of increased nitrate flux were associated with fish kills in the Neuse River Estuary. After 2000, the NAO increases were antithetic with the JMA. During the 1990's the JMA and NAO were synchronous and larger fish kills were observed in the estuary. Interaction of the climate variation with water quality is cyclical and occurs on a 3-7 year time frame. Water quality and water availability is affected by these climate oscillations, and should be taken into account by water managers and public utilities during periods of drought.