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Land use patterns may affect diversity and abundance of stream fishes by greatly altering water chemistry in streams. Previous research in the Enoree and Saluda Rivers of the upstate of South Carolina has suggested that the absence of some species from certain stream sections may be related to the presence of elevated nitrate and sulfate levels at those locations. This study examined the effect of a range of nitrate and sulfate levels on two species of fish, *Nocomis leptocephalus* and *Etheostoma thalassinum*. *Nocomis leptocephalus* are widespread throughout the upstate of South Carolina, and thought to be tolerant to elevated nitrate and sulfate levels. In contrast, *Etheostoma thalassinum* are found only in stream reaches with low levels of these two chemicals, so are assumed to be highly sensitive to high concentrations of nitrates and sulfates. Fish and stream water were collected from pristine sites (low levels of nitrates and sulfates) in the Saluda River Basin, and concentrations used (concentrations ranged from 0.5 mg/L to 50.0 mg/L) were based on current environmental levels in this watershed. Fish mortality was observed for 8-10 days, with low mortality rates in the first four days and high rates of mortality on days 5-10. Overall, the findings indicated that environmental concentrations are not high enough to be immediately lethal to these species of fish, but may have long-term effects.