NITRATE NITROGEN FLUX FOLLOWING APPLICATION OF AMMONIUM NITRATE TO EASTERN KENTUCKY HARDWOODS

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ABSTRACT

Nitrate nitrogen concentrations in streamflow were monitored before, during, and after application of ammonium nitrate (NH_4NO_3) fertilizer to a 41 ha watershed in eastern Kentucky. The watershed, located in the Mountains and Eastern Coalfields physiographic region of the Cumberland Plateau, has a relatively undisturbed 50-60 year old stand of mixed hardwoods. Streamflow, both quality and quantity, has been measured on the watershed since 1971. The fertilizer was applied by helicopter at a prescribed rate of 504 kg/ha during late April, 1975. Because of the ruggedness of the terrain and the minimal amount of surface area occupied by streams no attempt was made to avoid application over the streams. Nitrate nitrogen concentrations in streamflow prior to treatment averaged 0.11 mg/1. During the fertilizer application nitrate nitrogen values measured on subdrainages within the watershed reached 640 mg/1, while at the weir the maximum was 123 mg/1. As a comparative index, the U.S. Public Health Service has established an upper limit on nitrate nitrogen concentration in drinking water at 10 mg/1. The concentration of nitrate nitrogen in streamflow after treatment steadily declined, after the initial peak values, during the summer of 1975. In early fall, with the advent of substantial rainfall, the values again increased, to near immediate post-treatment levels. Since the fall of 1975 there has been a consistant decline in concentrations. However, during March, 1978 the concentrations were still three times greater than pre-treatment values.