Geophysical Research Abstracts, Vol. 8, 10623, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10623

EVALUATING THE RISK OF NONPOINT SOURCE POLLUTION FROM BIOSOLIDS: INTEGRATED MODELLING OF NUTRIENT LOSSES AT FIELD AND CATCHMENT SCALES

P.G. Whitehead1, A.L. Heathwaite2, N.J. Flynn1, A. J. Wade1 and P.F. Quinn3

1Aquatic Environments Research Centre, Department of Geography, School of Human and Environmental Sciences, University of Reading, Reading, RG6 6AB, UK

2Centre for Sustainable Water Management, Lancaster University, Lancaster LA1 4YQ

3Department of Civil Engineering, University of Newcastle, Newcastle-upon Tyne, UK

Email for corresponding author; p.g.whitehead@reading.ac.uk)

The semi-distributed model INCA has been developed to determine the fate and distribution of nutrients in terrestrial and aquatic systems. The model simulates nitrogen and phosphorus processes in soils, groundwaters and river systems and can be applied in a semi-distributed manner at a range of scales. In this study, the model has been applied at field to sub-catchment to whole catchment scale to evaluate the behaviour of biosolid-derived losses of P in agricultural systems. It is shown that process based models such as INCA, applied at a wide range of scales, have been shown to reproduce field and catchment behaviour satisfactorily. The INCA model can also be used to generate generic information for risk assessment studies. By adjusting three key variables; biosolid application rates, the hydrological connectivity of the catchment and the initial P-status of the soils within the model, a matrix of P loss rates can be generated to evaluate the behaviour of the model and, hence, of the catchment system. The results, which indicate the sensitivity of the catchment to flow paths, to application rates and to initial soil conditions, have been incorporated into a Nutrient Export Risk Matrix (NERM).

KEY WORDS: modelling, water quality, biosolids, sludge, nitrogen, phosphorus, water quality, River Lee, River Thames, River Stort, nutrient risk model.