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Nutrient water quality of the Wye catchment, UK: exploring patterns and fluxes using the Environment Agency data archives

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Abstract. Water quality data, collected by the Environment Agency in England and Wales over 10 years (1991 – 2000) were used to examine the spatial distribution of nutrient pollution risk and for assessing broad-scale spatial and temporal variability in nutrient fluxes across the Wye catchment. Nutrient water quality across the upper and middle Wye catchment, and along the main River Wye, is generally very good. However, the main areas of concern lie in the small tributaries in the south and east of the catchment, which have lower dilution capacity and high agricultural and effluent inputs, and where mean Total Reactive Phosphorus (TRP) in some cases exceed 1 mg-P l^{-1} . Indeed, mass load calculations have demonstrated that the lowland south and east portion of the catchment contributes more than 85% of the whole-catchment TRP and more than 78% of nitrate (NO_3^-) loads. Ratios of $\text{NO}_3^-:\text{Ca}$ were used to fingerprint different water-types across the catchment, linked to weathering and agricultural activity. The Wye catchment has been subject to two major sets of perturbations during the study period: (i) climatic fluctuations, with a drought during 1995-6, followed by a subsequent drought-break in 1997/8, and extreme high river flows in the autumn/winter of 2000/2001, and (ii) introduction of tertiary P-treatment at major sewage treatment works in the catchment. The implications of these perturbations for the nutrient water quality of the Wye catchment are discussed. Recommendations are made for more targeted monitoring to directly assess diffuse source nutrient contributions.

Keywords: nutrients, phosphate, phosphorus, nitrate, nitrogen, river, Wye, PSYCHIC, Defra

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