



The fluvial flux of phosphorus from the UK 1974 – 2012: where has all the phosphorus gone?

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As part of the Harmonised Monitoring Scheme, the UK has been monitoring total phosphorus (TP) and total reactive phosphorus (TRP) concentration at the tidal limit of all major UK rivers since 1974. Over the study period there were over 40,000 measurements of TP from 230 catchments and 160,000 measurements of TRP from 270 catchments. Concentrations of TRP and TP in UK rivers have decreased significantly since 1989, with values now less than 50% of their 1974 values. During this time, the ratio of TRP to TP has increased slightly with TRP now representing 73% of TP. The UK riverine flux of TRP peaked at 70.9 ktonnes P/yr (0.29 tonnes P/km²/yr) in 2000 and reached a minimum in 2011 of 9.3 ktonnes P/yr (0.04 tonnes P/km²/yr). Similarly, for TP, the peak flux occurred in 2001 at 95 ktonnes P/yr, with a minimum in 2011 of 15.8 ktonnes P/yr. A comparison of patterns in P fluxes with catchment land-use, soil types and hydroclimatic factors shows that the fluxes of both TP and TRP are dominantly linked to urban land cover, which we consider to be proxy for sewage inputs. The fluvial fluxes of TRP and TP will be discussed in the light of declining P fertiliser inputs; decreased direct sewage outputs of P; increased transfers of P via food and feed imports; and an increasing UK population.