Spatial patterns of phosphorus in the Ribble and Wyre catchments, a source to sea approach

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The Ribble and Wyre flow westward to the Irish Sea and their basins drain upland areas of outstanding natural beauty (part of the Yorkshire Dales and the trough of Bowland). The Ribble includes part of the urban/industrial heartlands of Lancashire while the Wyre is much more rural in nature. Across the Ribble and Wyre basins, 26 sites were monitored.

Water quality measurements included major ions, nutrients, trace elements, pH, alkalinity and conductivity. Water samples were filtered in the field through either 0.45 µm cellulose nitrate filters for metals and glass fibre (GFC) filters for anions, nutrients and dissolved organic carbon (DOC). For the wide array of water quality determinands, electrometric, colorimetric, ion chromatography and inductively coupled optical-emission and mass spectrometry was used. These measurements were collected over the period Winter 2007 to Summer 2010, with a 2 weekly sampling interval. Phosphorus (SRP, PO4-, TP, and TPP) measurements were assessed in relation to land use, climate, anthropogenic inputs and associative relationships. The dominant sources of phosphorus are sewage treatment point sources, however background diffuse sources dominate. Boron measurements were also made which is a markeer for septic tanks.. Flow weighted mean concentrations of phosphorus ranged from 0.01 to 1.03 mg l^{-1}. These relationships are discussed in relation to the hydrology (15 min resolution) collected for all 26 sites. Estimates of nutrient fluxes from all catchments to an assesment of the total estuarine flux are also presented.

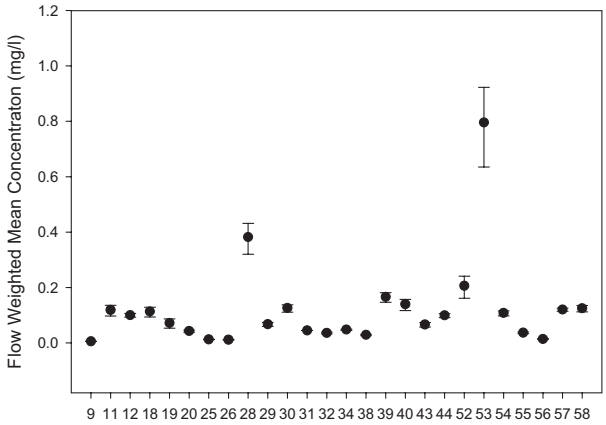

Figure 1 Flow weighted mean concentrations of PO4 in relation to the 26 catchments. Values are 8 year means (2003-2010).