Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Physico-chemical factors controlling the speciation of phosphorus in English and Welsh rivers

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Contents

Plates

Electronic Supporting Information

S1 Abbreviations used within the paper

Abbreviation	Definition
EU	European Union
WFD	Water Framework Directive
GES	Good Ecological Status
RP	Reactive phosphorus
P	Phosphorus
FRP	Filtrable Reactive phosphorus
DRP	Dissolved reactive phosphorus
MRP	Molybdate reactive phosphorus
TRP	Total reactive phosphorus
PP	Particulate phosphorus
Fe	Iron
Al	Aluminium
WwTW	Waste water treatment works
Ca	Calcium
SS	Suspended solids
DWF	Dry weather flow
TSP	Total soluble phosphorus
HCl	Hydrochloric acid
S.g	Specific gravity
CRM	Certified Reference Material

ICP-MS	Inductively Coupled Plasma Mass Spectrometer
SUP	Soluble unreactive phosphorus
MLR	Multiple linear regression
EPC_0	Equilibrium phosphorus concentration

S2 Calculation of the EQS

Calculation of the EQS for each class (High/Good, Good/Moderate. Moderate/Poor and Poor/Bad) is made using the following equations and expressed as µg /L reactive phosphorus:

a) *High/Good Standard = 10^((1.0497 x log_{10} (0.702)+1.066) x (log_{10} (reference Phosphorus)- log_{10}(3,500)) + log_{10}(3,500))*

b) *Good/Moderate Standard = 10^((1.0497 x log_{10} (0.532)+1.066) x (log_{10} (reference Phosphorus)- log_{10}(3,500)) + log_{10}(3,500))*

c) *Moderate/Poor Standard = 10^((1.0497 x log_{10} (0.356)+1.066) x (log_{10} (reference Phosphorus)- log_{10}(3,500)) + log_{10}(3,500))*

d) Poor/Bad Standard = 10^((1.0497 x log_{10} (0.166)+1.066) x (log_{10} (reference Phosphorus)- log_{10}(3,500)) + log_{10}(3,500))

where the value for reference phosphorus is calculated by the equation:

Reference phosphorus = 10^(0.454 (log_{10}alk) – 0.0018 (altitude) + 0.476)

S3 Molybdenum blue analysis for SRP and TRP

The following reagents were made up for the molybdenum blue analysis.

1) 25% Sulphuric acid: 250 ml of concentrated sulphuric acid added to 750 ml of high purity water, allowed to cool then made up to 1 litre with further high purity water.

2) Ascorbic acid: 2.5 g of ascorbic acid, $C_6H_8O_6$, dissolved in 12.5 ml of high purity water. 12.5 ml of diluted sulphuric acid (25%) solution (reagent 1) added and mixed well. This solution was made up before each analysis or stored in an amber lab glass bottle in a refrigerator, to be used within a week of preparation.

3) Mixed Reagent: 12.5 g of ammonium heptamolybdate tetrahydrate, $(NH_4)_6Mo_7O_{24}.4H_2O$ in 125 ml dissolved high purity water. 0.5 g of potassium antimony tartrate, $K(SbO)C_4H_4O_6$ (with/without ½ H_2O) dissolved in 20 ml high purity water. Molybdate solution added to 350 ml of dilute sulphuric acid solution (reagent 1) and stirred continuously. Tartrate solution added and mixed well. The reagent was stored in a lab glass bottle and was stable for several months.

Method:

I. Add 0.25 ml of ascorbic acid to a 12.5 ml sample.
II. Add 0.25 ml of the mixed reagent to the solution.
III. Mix and leave for 10 minutes.
IV. Measure within 30 minutes by pouring the sample into 4 cm cuvette and placing in Cecil CE1010 colorimeter at 710 nm.

S4 Methodology for TP and TSP analysis

A standard solution of phosphorus, PlasmaCAL P standard of 10040+/-50 µg P mL^{-1}, lot S170220019 (= 10,000 mg P L^{-1}) together with a multi element standard solution by Labkings (LK) of 100 mg L^{-1} were used to make standards for calibration.

100 mg P L^{-1} stock solution was produced by taking 0.25 ml of P standard (10,000 mg P L^{-1}) and made up to 25 ml with 10% $HN0_3$. From this and the LK multi-element 100 mg L^{-1} stock, a 1 mg P L^{-1} and LK stock made. These two stocks were used to produce the following concentration standards: Standard 1: 10 µg L^{-1}, Standard 2: 40 µg L^{-1}, Standard 3: 100 µg L^{-1}, Standard 4: 200 µg L^{-1}, Standard 5: 300 µg L^{-1}.

Samples were spiked with 100 µl of Iridium and Indium for use as an internal standard to give a final concentration of 10 µg Ir / Id L^{-1}. ESH certified reference material was measured.

Each 25 ml volumetric flask of standard was spiked with 250 µl of 1 mg Ir/Id L^{-1} Iridium/Indium internal standard to give a final internal standard concentration in standards and samples of 10 µg Ir/Id L^{-1}.

S5 Descriptive catchment details

S5.1 Erewash

The Erewash is a WwTW effluent dominated catchment (Fig S2.1) with an estimated 64% effluent under average flow conditions. The 8 main WwTW discharging to the river with a total population served of almost 250,000 are all dosing for P removal to 2 mg P L^{-1}. CIP catchment data confirms this with mean TP concentrations of between 670 and 1640 µg P L^{-1}.

Proportions of SRP to TP range from means of 60 to 85%, which are at the higher end of the SRP:TP ratio for WwTw dosing for P removal. Given the altitude and alkalinity of the Erewash, good status under the WFD is calculated to vary between 55 µg P L^{-1} at the headwaters up to 81 µg P L^{-1} near its confluence with the Trent.

Under high flow conditions as sampled in November 2016, concentrations were lower reflecting greater dilution of the effluent with runoff from the catchment. River levels at the gauging station were over two times higher than during the summer sampling survey. It had rained heavily the night before and although flows had peaked, there was still obvious signs of significantly higher flows than in the summer. Phosphate speciation varied from the summer sampling with a lower proportion of SRP of TRP averaging 71% across the catchment, compared with 95% in the summer. There is also a steady increase in TP and SRP (with proportions of SRP remaining relatively constant) down the catchment (unlike the similar levels throughout in summer) as the effluent from the larger WwTW discharges becomes more influential. Higher proportions of particulate phosphorus and soluble unreactive phosphorus suggest inputs to the river associated with the higher suspended solids concentration of typically up to 20 mg L^{-1} across the catchment.

During the summer low flow (close to baseflow according to gauging station data), no sites were classed as good. Near the source was classified as moderate, then after the first WwTw effluent discharge at Kirky in Ashfield, concentrations rose to greater than 1400 µg P L^{-1} (bad quality) then decreased back to around 800 µg P L^{-1} (poor) to its confluence with the Trent. The P speciation is dominated by SRP suggesting that other inputs other than wastewater (typically 60 to 85% SRP according to CIP2 data) are likely to comprise SRP. The residual P was particulate P associated with the small amount of suspended solids present in the river.

These concentrations represent a worst case P picture as river levels were low and WwTW effluent discharge is relatively consistent with measured concentrations in the range of 600 to 800 µg P L^{-1}, closely aligned with approximate dilution of over 64% effluent containing ~1 mg P L^{-1}.

S5.2 River Mease

In terms of available dilution, the Mease sits at the other end of the spectrum to the less populated wetter catchments in the west of England (Fig S2.2) and Wales; overall it has only 3.7 L s^{-1} flow for every km^2 of the catchment (compared with 18.2 for the Teifi), consequently the average proportion of effluent contribution to river flow is 21%, but will be much higher during summer low flows in the river. The Mease is characterised as a lowland clay river flowing east to west from just east of Measham to the Trent at Croxall All significant WwTW within the catchment dose for P reduction. Other pressures on the water quality are agriculture which appears quite mixed, with horticulture, intensive farming of livestock and arable cereal farming prevalent.

The catchment was sampled twice in the summer (July and August) at very similar low flow conditions. The lowland, high alkalinity typology means that WFD good status for P ranges between a narrow range of 60 to 79 µg P L^{-1}. Lowest concentrations were observed near its source (Site 1) and Hooborough Brook downstream of Donisthorpe WwTW (Site 6) which were all at 64 µg P L^{-1} or less for SRP, equating to good status on both sampling occasions for site 6 and high and moderate for site 1, although the moderate status was only 4 µg-P/l above the good boundary. The rest of the main river channel (Sites 1, 2, 3, 4, 5, 7, 11) were all of moderate status with the exception of Site 3 which was poor on both occasions and was close to the source on one of the feeder streams of very low flow within an area of intensive agriculture and downstream of Norton Juxta Twycross WwTW (albeit dosing for P reduction to 2 mg /L TP). Sites 8, 9 and 10 were upstream, effluent from Chilcote rotating biological contactor and downstream on a small tributary of the Mease around mid catchment. The RBC effluent contained very high concentrations of SRP (10 and 5 mg P L^{-1}) on the two occasions, which obviously influenced downstream concentrations.

Phosphorus speciation in the catchment was unsurprisingly very similar on both occasions, dominated by SRP, nearing 100% of the contribution on many occasions. Concentrations of dissolved iron were generally low throughout the catchment with means of 32 and 60 µg P L^{-1} for the two occasions.

S5.3 River Ouzel

The Ouzel is a small river rising in the Chilterns (Fig S2.3) and flowing 20 miles north to the Ouse at Newport Pagnell. The river Ouzel, has similar typology to the Mease, with only slightly higher flow per km^2 (4.2 compared with 3.7 L s $km^{2\ -1}$) reflecting lower rainfall in the east of England. Again, effluent contributions to river flow was higher owing to less available dilution (27%) with a number of moderately sized WwTW including Leighton Buzzard and Dunstable, both dosing for P reduction.

The lowland topography and high alkalinity mean the good/moderate boundary under the WFD ranges from 63 to 76 µg P L^{-1}.

Site 1 close to the source was categorised as high status on both occasions, but the river then flows immediately into an area of intensive agriculture and centres of population. Highest concentrations of were observed on both sampling occasions at site 3, downstream of Dunstable WwTW over 1 mg P L^{-1} P reflecting very low dilution of an effluent discharge near the headwaters of a river. The river stays at poor status all the way down to site 9 as concentrations slowly decrease as a result of increasing dilution before concentrations drop to below 337 µg P L^{-1} (moderate status) near to the confluence with the Ouse.

Phosphorus speciation is dominated by SRP with a small percentage of particulate P probably associated with the suspended solids present (up to 13 mg P L^{-1}). Dissolved Fe concentrations were generally low (means of 37 and 49 µg L^{-1} Fe) and appeared not to overly influence the proportion of SRP present.

S5.4 River Arun/Rother

The Rother and Arun catchments (Fig S2.4) cover a significant area of Sussex north of the South Downs. The catchment is relatively low lying, hard water typology dominated by a combination of arable and livestock farming with significant fertiliser use and small market towns interspersed down the entire catchment including Petersfield, Horsham, Midhurst, Pulborough, Petworth and Arundel. Approximately 80% of the population's wastewater is treated for P removal, with Horsham (on the Arun) comprising 46% of the catchment's population dosing to 1000 µg P L^{-1}. A total of 37 significant WwTW discharge to the river, with the largest works (10 WwTW) dosing for P removal to either 1000 or 2000 µg P L^{-1} as TP.

The water quality rarely meets good status using the reived EQS for P under the WFD (63 to 82 µg P L^{-1} between top and bottom of catchment). Immediately from near the source the water quality is under pressure from agricultural runoff from extensive horticulture (orchards) in the upper Rother catchment and this is reflected in the elevated TP levels in the first sample. The next 3 sites downstream in summer were of good status after what appears to be dilution by cleaner tributaries entering upstream and downstream of Petersfield with site 3 below Petersfield (2nd largest town in the catchment ~19K PE and dosing to meet 2000 µg P L^{-1} permit) still retaining good status. Further down the catchment towards the confluence with the Arun at Pulborough water quality deteriorates to only moderate status with TP almost 100 µg P L^{-1}. The Arun is dominated by inputs from Horsham WwTW (dosing to meet a 1000 µg P L^{-1} P permit). The upper catchment is flat with the river exhibiting low, sluggish flows in summer. The two samples taken downstream of Horsham WwTW (site 6) and before the confluence with the Rother (site 7) and WwTW were of poor status with TP levels rising to 220 µg P L^{-1}. Sites 8, 9 and 10 downstream on the Arun/Rother confluence stabilised and began to drop probably owing to dilution by drainage from wetlands along the tidally influenced part of the river. P speciation showed an interesting pattern with a significant fraction of particulate and soluble unreactive P present, attributed to high iron concentrations associated with a greensand belt in the South Downs chalk geology. This was evident in one sample (Site 4X, Plate S1) taken from a small ochreous discharge into the Rother at site 4. The particulate P was therefore likely to be non-filterable iron phosphate colloidal material of particle sizes > 0.4 µm.

The soluble unreactive P would represent the likely presence of organo-P or polymeric phosphate complexes not reactive to the molybdenum tests.

The winter samples taken in November were under relatively low flow conditions, and showed some contrasting results. Again the Rother was contaminated at source, but TP concentrations decreased downstream and remained at good status to the Arun confluence. The Arun was again significantly more contaminated and additional samples were taken at close to Horsham WwTW and at Billingshurst to better characterise the river. In all cases TP > 200 µg P L^{-1} rising to 500 µg P L^{-1} at the Rother confluence. The almost doubling in concentrations possibly reflects the low flows and variations in inputs from the agricultural sources present. As with the summer sampling campaign, a significant proportion of the TP present was not soluble, with up to 75% of the P present in the particulate and soluble unreactive phases, particularly in the Rother where iron concentrations were at their highest. The Arun, recorded some particulate P, albeit generally less than the Rother with highest concentrations downstream of Horsham WwTW (site 10) possibly related to the dosing occurring at the works generating and discharging colloidal P, which is both diluted and precipitated from solution further downstream. Iron concentrations at site 10 were also highest for the Arun samples supporting this hypothesis. Soluble unreactive P is still present at all but site 1, although at slightly lower concentrations than observed in summer. For the winter sampling site '3x' was a tributary of the Rother adjacent to site 3 which was included as an additional sample owing to it looking 'cleaner'; conductivity and suspended solids were lower but the TP concentration and speciation was similar to the main channel. There was no ochreous discharge from near site 4, which may have reflected the low flows at the time, but cannot be readily explained.

S5.5 River Cefni

The Cefni is a small low lying relatively soft water river on Anglesey (Fig S2.5). With the exception of the WwTW at Llangefni, it is a relatively rural catchment, with rough pasture and small scale arable crops being grown. There appeared to be little evidence of widespread fertiliser use or intensive agriculture.

Samples were taken in a one-off sampling survey in July 2016, under low flow conditions with suspended solids less than 10 mg L^{-1} at all sites. All samples exhibited very low levels of SRP, being classified as either high or good status. The effluent from the BNR was measured at only 17 µg P L^{-1} as SRP (105 µg P L^{-1} as TP). The BNR, although a significant flow into what is a small river, has no impact on the overall concentration or speciation. In fact, concentrations in the effluent are of a similar magnitude to upstream concentration.

The phosphorus speciation, however, revealed a different pattern with significant soluble unreactive P present as well as some particulate, or at least, non filterable (>0.4 µm) P. SRP across the catchment contributed between approximately 10% and 50% of the total P concentration. The low suspended solids suggested that there may be other physico-chemical factors influencing the P speciation such as dissolved Fe which again was measureable at between 90 and 438 µg Fe L^{-1} across the catchment.

The relatively high alkalinity and low altitude means that good status for reactive P ranges from 63 to 85 µg P L^{-1}. The catchment was chosen in part owing to the presence of the Biological Nutrient Removal WwTW at Llangefni at the lower end of the catchment.

S5.6 River Teifi

The Teifi catchment (Fig S2.6) was one of the largest sampled and is located in the west of Wales stretching from the Cambrian mountains of mid Wales 73 miles to the sea at Cardigan. It is a soft water, upland catchment (the source is at 455 m) with little population and rural low intensity, hill farming of sheep. As a result P sources are limited and only at the bottom of the catchment in towns such as Lampeter, Newcastle Emlyn, Llandysul and Llanybydder are there any significant wastewater discharges, although it should be noted that these WwTW are also dosing for P removal. The catchment is also subject to significant rainfall and so exhibits the highest flow per unit area of any of the catchments sampled. Overall, these factors contribute to ensure P levels are low in the catchment.

Sampling was undertaken in the summer and although dry on the day, it had been raining for two days previously and river levels were elevated above typical summer values.

There was obvious colouration in the water from runoff from peaty land, which was accounted for as part of the colorimetric P determinations. Suspended solids slowly increased down the catchment from 7 to 17 mg L^{-1}. The upland, low alkalinity water means that the standards for good quality for reactive P are very low, ranging from 13 to 42 µg P L^{-1} from the top to the bottom of the catchment. Concentrations of SRP at very low at the top of the catchment <10 µg P L^{-1} (high quality) and slowly increase down river and population centres are encountered. However, good status is maintained for all bar one site (site 9) where it 'fails' good status by only 2 µg P L^{-1}. The catchment therefore exhibits good water quality with only minimal anthropogenic pressures.

The P speciation again shows some interesting trends, with SRP being only between <1% and 38% of the TP concentration which ranges from 50 to 100 µg P L^{-1} between the top and bottom of the catchment. Similar to the Cefni and other catchments with significant Fe concentrations measured in the water, there are significant amounts of soluble unreactive P present and a small proportion of particulate P. Concentrations of dissolved Fe are elevated with levels reaching the highest observed for the 12 different catchments sampled, ranging from 250 to 650 µg Fe L^{-1} mid catchment, reflecting a low point in % SRP of TP ratios.

S 5.7 River Wylye

The river Wylye is located within the Hampshire Avon catchment (Fig S2.7) and is a high alkalinity, low land chalk stream rising on White Sheet Downs before flowing into the Nadder at Wilton, then the Avon just downstream in Salisbury. The catchment is generally rural with significant arable cereal crops being grown as well as water cress in the upper catchment. Warminster WwTW is the only significant source of effluent, with the works dosing to an average of less than 1000 µg P L^{-1}. Warminster barracks just downstream also contributes a certain load of P, but is not controlled by any permits.

Although the high alkalinity, lowland waters mean that the EQS for good status is relatively high (between 66 and 80 µg P L^{-1}), the river stills fails to meet this target from the top to the bottom of the catchment, with levels of SRP increasing to almost 200 µg P L^{-1} mid catchment, downstream of Warminster, just falling into poor status from moderate. It should be noted that upstream concentrations are failing the EQS on account of agricultural inputs and possibly contributions from septic tanks; and also that sampling occurred during a summer dry spell, with flows matching typical long term low flows, as a result the dilution available for the effluent within the river were at their lowest.

P speciation is dominated by SRP, with only small quantities of particulate P present in the samples. Warminster WwTW effluent P concentrations reflected the degree of dosing and filtration with levels post second dosing of Fe into the trickling filter works effluent after sand filtration having only 200 µg P L^{-1} TP. The filtration of particulate material also means that the observed concentrations within the catchment of between 100 and 200 µg P L^{-1} TP, dominated by SRP are very similar to those reported for another UKWIR project during 2010 and 2011. This suggests that the catchment conditions have changed little in the intervening period. Dissolved concentrations of Fe are very low (10 to 50 µg Fe L^{-1}) which might reflect the predominance of SRP in the catchment.

S.5.8 River Kennet

The river Kennet, like the Wylye is a lowland chalk stream, within the Thames catchment rising in Wilshire near Silbury hill and joining the Thames in Reading (Fig S2.8). The upper catchment is rural arable land dominated by cereal crops, with increasing populations down the catchment at towns such as Marlborough, Hungerford, Newbury and Reading. The high population of Reading (>250,000) discharging into the Kennet less than 1 km from its confluence with the Thames, means that the calculated percentage effluent of average flow within the catchment is slightly misleading. All of the main WwTW within the catchment are dosing for P removal to 1000 or 2000 µg P L^{-1}.

The river level on the day of sampling was only marginally above typical summer low flows. Consequently WwTW contributions would be at their highest. Suspended solids were very low (<8 mg L^{-1}) and concentrations of SRP did not quite meet good status (65 to 85 µg P L^{-1}) at the top of the catchment influenced by farming and where there was very little flow, and then again within the urban environment at the bottom of the catchment below Reading WwTW.

Similar to the Wylye the P speciation was dominated by SRP, with dissolved Fe very low, ranging from 8 to 30 µg Fe L^{-1}.

S 5.9 River Taw

The Taw catchment (Fig S2.9) extends from Dartmoor to Barnstaple in N Devon. It is a large, mostly rural catchment, with a notable industrial discharge in the mid to upper catchment at North Tawton where a dairy discharges its effluent into the river just upstream of N. Tawton WwTW. The Taw catchment has the 3rd highest flow to unit area of the 12 catchments sampled and has only a mean contribution of WwTW effluent of 2%.

The lower alkalinity and upland area means good status for P ranges from only 17 µg P L^{-1} near the source to 56 µg P L^{-1} mid catchment. Owing to the size of the catchment, only the top half of the catchment was sampled. Site 1 was classified as high status for both the summer and winter sampling which is not surprising as it was located near to the source, right on the edge of Dartmoor above any influences from either agriculture of WwTW inputs. For the summer sampling campaign during typically low flows and low suspended solids conditions (<7 mg L^{-1} throughout the catchment), water quality deteriorated immediately the river encounters a combination of increasing human population and agriculture (a combination of arable and livestock). Sites 2 and 3 upstream of N Tawton were considered moderate status, but downstream of the dairy and WwTW water quality was only categorised at poor, before recovering to moderate at Taw Bridge (Site 7). Site 8 on the Yeo, just upstream of the confluence with the Taw exhibited higher P levels and influenced the final Taw sample at Chenson, pushing it back down into ‘poor’ status.

The winter samples were collected after a significant rain event, categorised as typically high flows; as a consequence, inputs of P appear to be diluted and as a result SRP concentrations are lower. SRP levels only reach a maximum of 58 µg P L^{-1} at Chenson, downstream of the Yeo confluence where levels were higher at 75 µg P L^{-1}. The river water quality was therefore considered as high or good above and below North Tawton until the confluence with the Yeo.

Phosphorus speciation was also markedly different. The summer samples were dominated by low suspended solids and high proportions of SRP. The winter samples contained much higher proportions of soluble unreactive P in particular and some particulate P, with SRP never contributing more than 50% of the total P concentration. Because of the higher flows, suspended solid concentrations were significantly higher (up to 24 mg L^{-1}) suggesting possible washout of complex phosphates and particle associated P. Iron concentrations may have also influenced the P speciation because concentrations in the summer samples were much lower (28 to 194, with a mean of 82 µg Fe L^{-1}) compared with the winter samples (56 to 215 with a mean of 159 µg Fe L^{-1}).

S5.10 East Looe

The East Looe catchment (Fig S2.10) was the smallest of all the catchments sampled (one 20^{th} the size of the Kennet). Its location in Cornwall in the west of England, subject to higher rainfall, meant it had the highest flow to unit are ratio of all the English catchments sampled and was second only to the Teifi. There is only one significant WwTW discharge from Lodge Hill, which serves Liskeard and doses aluminium for P reduction. There is little intensive agriculture and the catchment is predominantly rural, with unimproved upland pastures and a small amount of arable farming. From Sites 8 to 10, there was some evidence of forestry and recent logging operations.

The higher altitude and lower alkalinity meant good status for P ranged from 21 to 59 µg P L^{-1}. The upper catchment receives inputs from four small feeder streams, which were barely a trickle during the summer survey.

The winter samples were taken after significant rain and flows were therefore noticeably higher. Site 1 had an obvious ochreous input leaching into the stream denoting the presence of iron. Although there are no obvious signs of mines in the area, that part of Cornwall is generally a metalliferous region.

For the summer samples, of the four feeder streams one (Site 4) was classified as high status, sites 2 and 3 moderate and site 1 good. The site upstream of Liskeard WwTW was categorised as good, as was the downstream site. The use of aluminium dosing for P removal appears to be highly efficient and SRP in the effluent was only ~100 µg P L^{-1} (approximately half that of TP). The rest of the sites downstream including a small stream draining from Liskeard town (Site 11) were all at good status.

For the winter sampling campaign although flows were higher, this was not reflected in any significant increase in suspended solids <5 mg L^{-1}) possibly reflecting the lack of intensive farming in the catchment. Consequently concentrations of SRP and the WFD status was almost identical (only Site 2 had changed from moderate to good and site 7 from good to moderate (although in actuality concentrations for summer vs winter went from 48 to 52 µg P L^{-1}, set against good status of 50 µg P L^{-1}).

The P speciation for both sampling occasions were also very similar, with SRP comprising 20% to 71% in the summer and 22% to 47% in the winter. As for other catchments where the proportions of SRP were low, dissolved Fe concentrations were slightly elevated (10 to 90, with a mean of 41 µg Fe L^{-1} in the summer and 20 to 84, with a mean of 53 µg Fe L^{-1} in the winter)

S5.11 River Inny

The Inny is a small head water of the river Tamar (Fig S2.11), entering the Tamar around 45 km from the source. Its location on the edge of Bodmin moor, Cornwall in the west of England, makes it subject to higher rainfall, so like East Looe river, it had a high flow to unit area ratio. There is only one significant WwTW in the catchment which discharges from a creamery at Davidstow. There is little intensive agriculture and the catchment is predominantly rural, with unimproved upland pastures and a small amount of arable farming.

Summer samples were in the range 17 µg P L^{-1} as SRP at the Trib 1 to 174 µg P L^{-1} as SRP downstream of the creamery WwTW outfall. Suspended solids measured 0 – 9 mg L^{-1} across the sample sites.

Winter samples were in the range 6 µg P L^{-1} as SRP at Trib 1 to 53 µg P L^{-1} immediately downstream of the creamery WwTW outfall. Proportions of SRP were higher in the summer samples than the winter samples. The summer saw very low flows and much lower proportion of SUP than during winter.

S5.12 River Blackwater

The river Blackwater (Fig S2.12) is an urbanised river, rising in near Aldershot in Hampshire and flowing through a number of Surrey towns (Tongham, Ash, Farnborough, Camberley etc, before joining the Loddon, a tributary of the Thames, at Swallowfield. High population density means there is significant wastewater treatment works effluent discharged along its length. Ten sites along the river were sampled across seasons. Only the sample taken near the source to the first of the urbanised areas (samples 1 to 4) were relatively uncontaminated. Sites 5 to 10 were heavily influenced by wastewater discharges and were invariably above the threshold of good status, whether determined as SRP or TRP. Summer concentrations were consistent and significantly higher than winter levels owing to low flows in the summer leading to SRP being calculated as at least good (sites 1 to 4) and moderate at best (sites 5 to 10). In the summer TRP was at best moderate from sites 1 to 4 and poor for sites 5 to10. Increased dilution from rainwater in the winter served to reduce phosphate levels and so TRP was at least good in the upper catchment (sites 1 to 4) and moderates for sites 5 to 10. Commensurately, for SRP at least good status was achieved for all sites, with all but 2 being classified as high status.

S5.13 Sedgemoor catchment

The West Sedgemoor (Fig S2.13) catchment is located within south Somerset, in the southwest of England. It is a rural agricultural catchment of flood plain grazing with ownership spread between local farmers, Natural England and the Royal Society for the Protection of Birds (RSPB). The site is a designated site of special scientific interest (SSSI) owing to its diverse flora and rich invertebrate species and forms part of Somerset Levels and Moors Ramsar site number 914.

Average rainfall is around 833 mm (2000 – 2008 annual mean) and the site receives run off from a small catchment of around 41 km^2. Further water inputs are derived from managed rhynes bringing in water from the river Parrett to control local water levels and introduce water to enhance the area for overwintering wildfowl.

The West Sedgemoor Main Drain and feed waters from the river Parrett are classified as having poor status for orthophosphate as P under the Water Framework Directive (2000/60/EC) (2).

16 routine monitoring sites were selected, in agreement with Natural England, and the local Internal Drainage Board ecologist and sampled fortnightly between August 2015 and June 2016.

SRP concentrations ranged 45 to 292 µg P L^{-1}, whilst RP (unfiltered) ranged 40 to 330 µg P L^{-1}. Data from this catchment was used for objective 2.

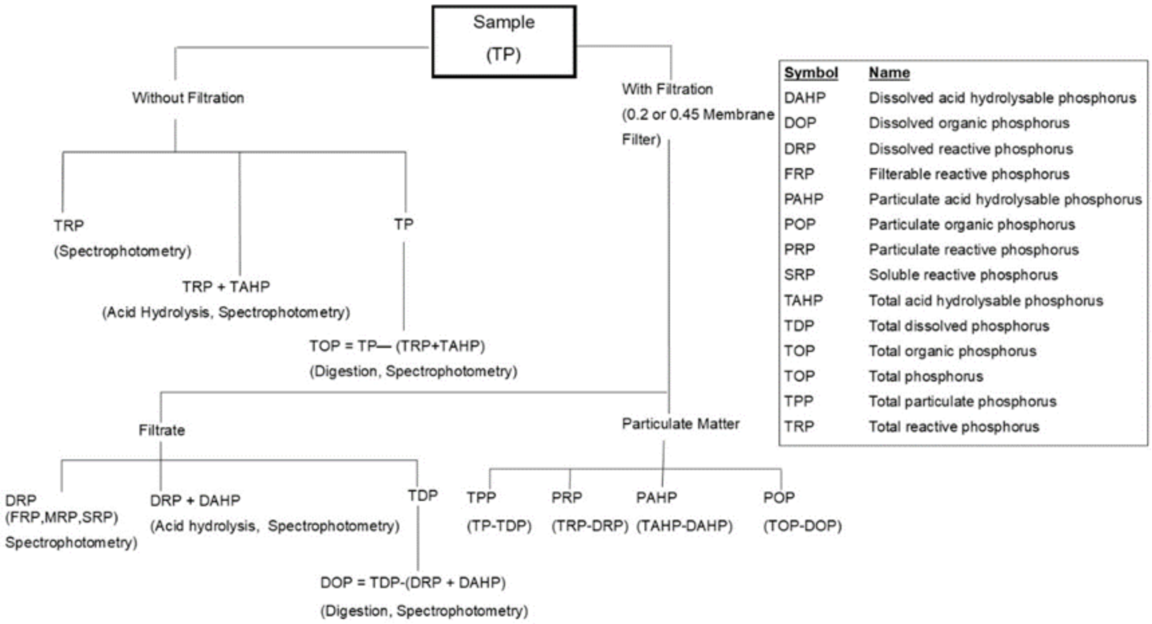

Fig S1: Operationally defined aquatic P fractions (1)

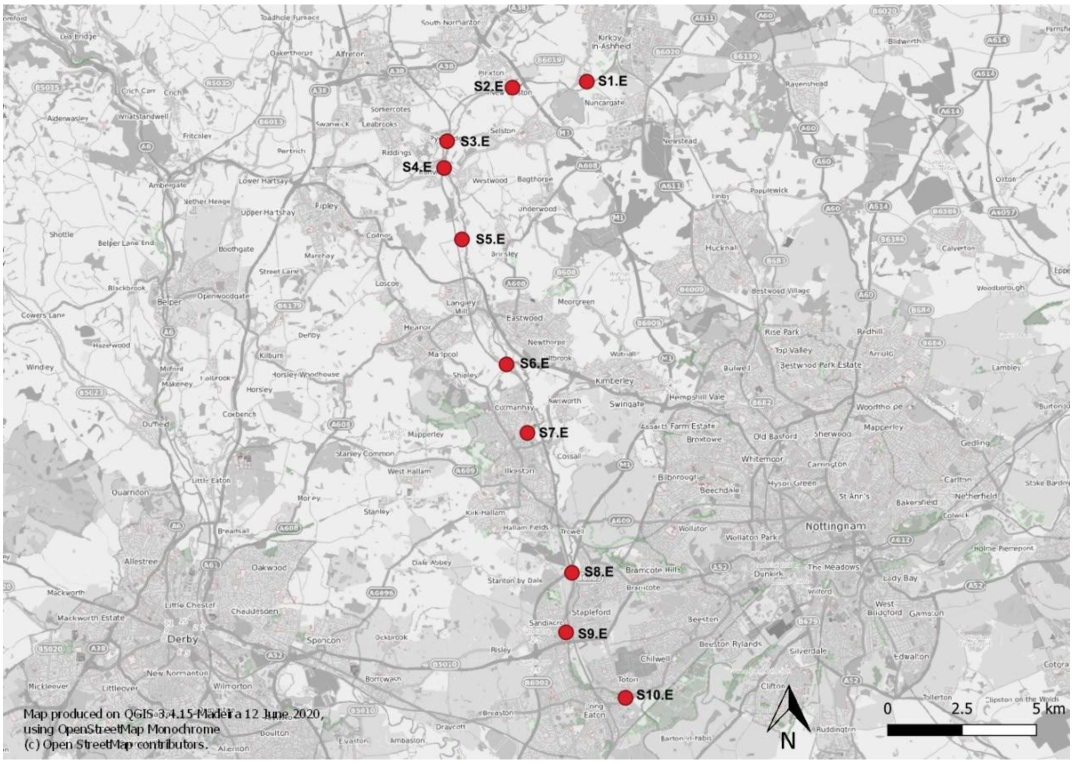

Fig S2.1 River Erewash map of catchment and sampling points.

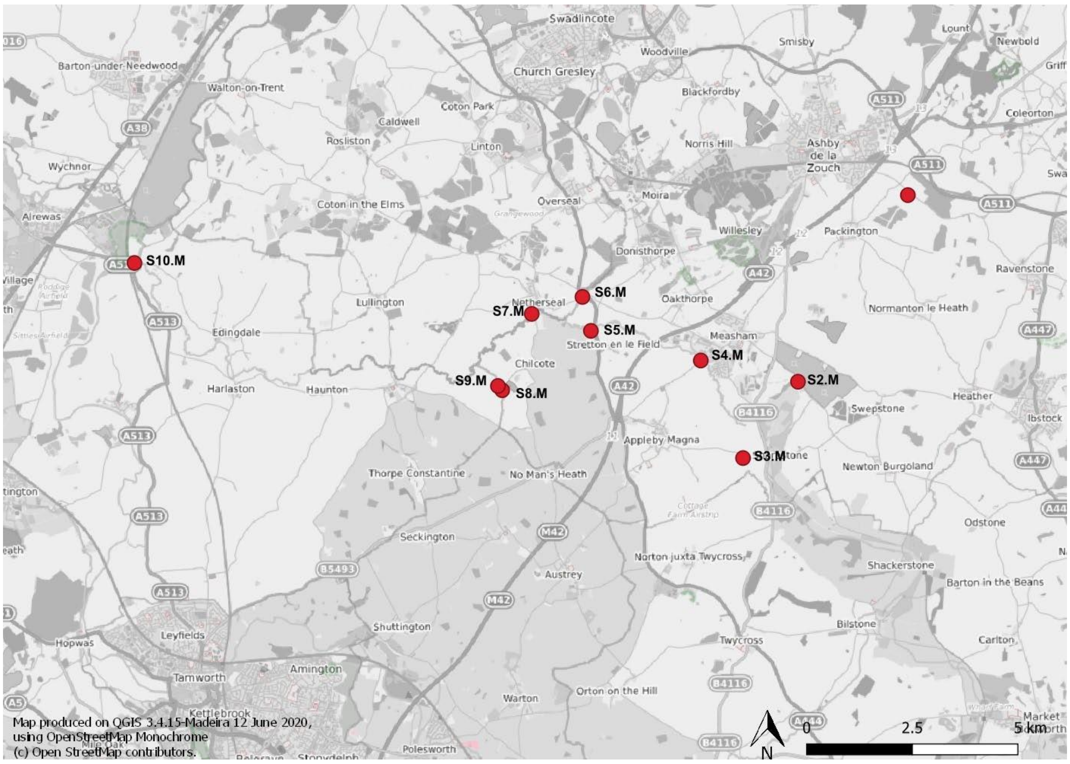

Fig S2.2 River Mease map of catchment and sampling points.

Fig S2.3 River Ouzel map of catchment and sampling points.

Fig S2.4 River Arun/Rother map of catchment and sampling points.

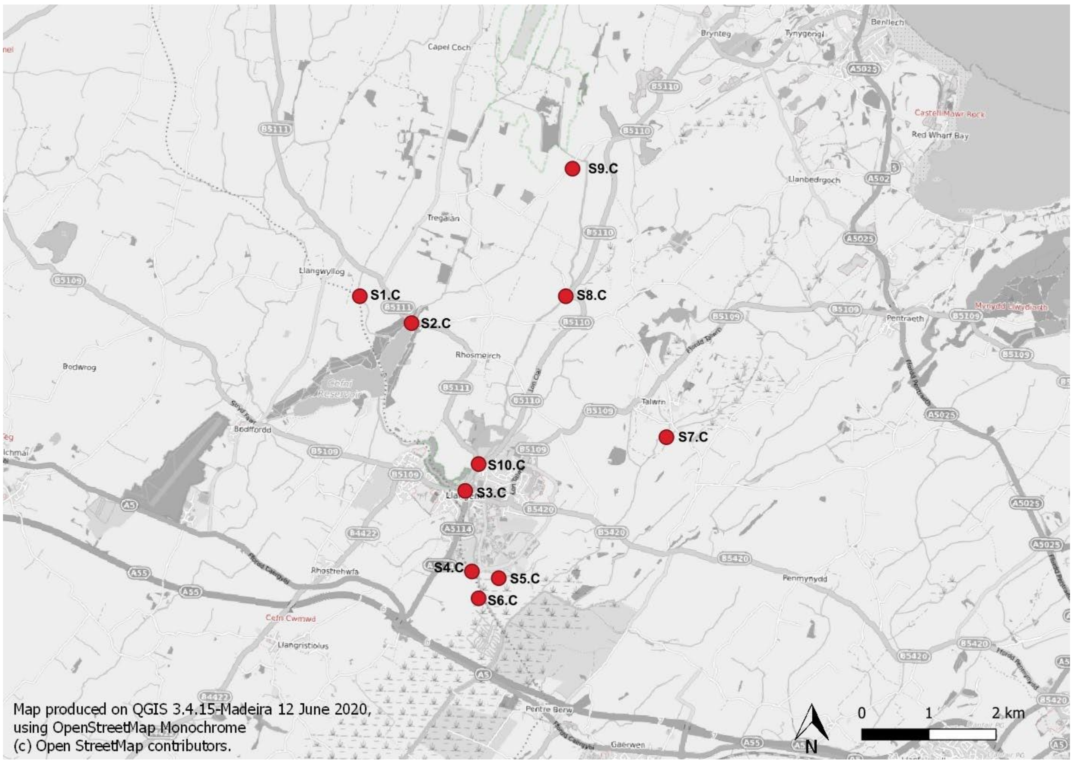

Fig S2.5 River Cefni map of catchment and sampling points.

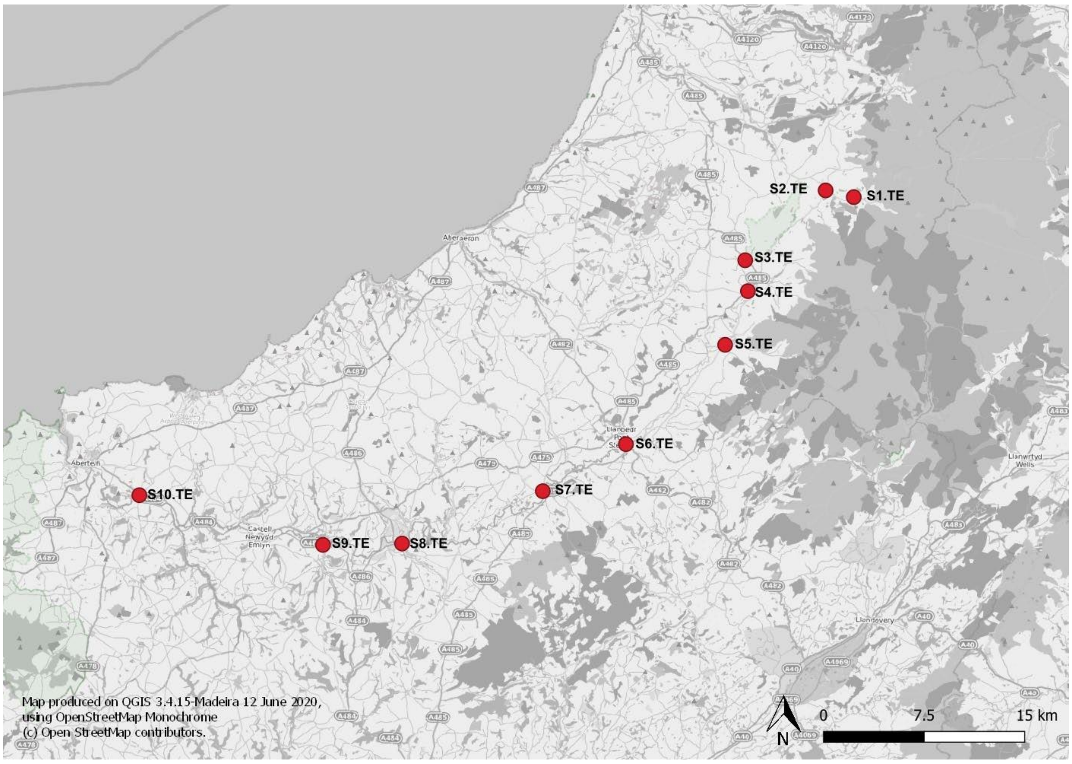

Fig S2.6 River Teifi map of catchment and sampling points.

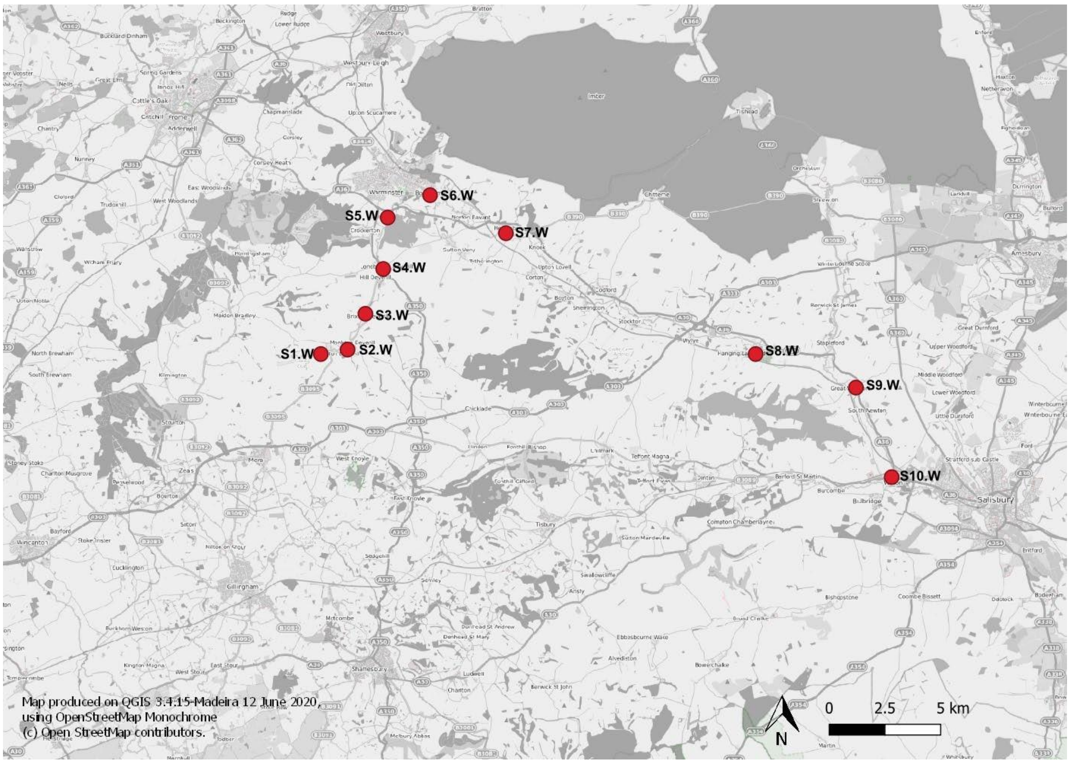

Fig S2.7 River Wylye map of catchment and sampling points.

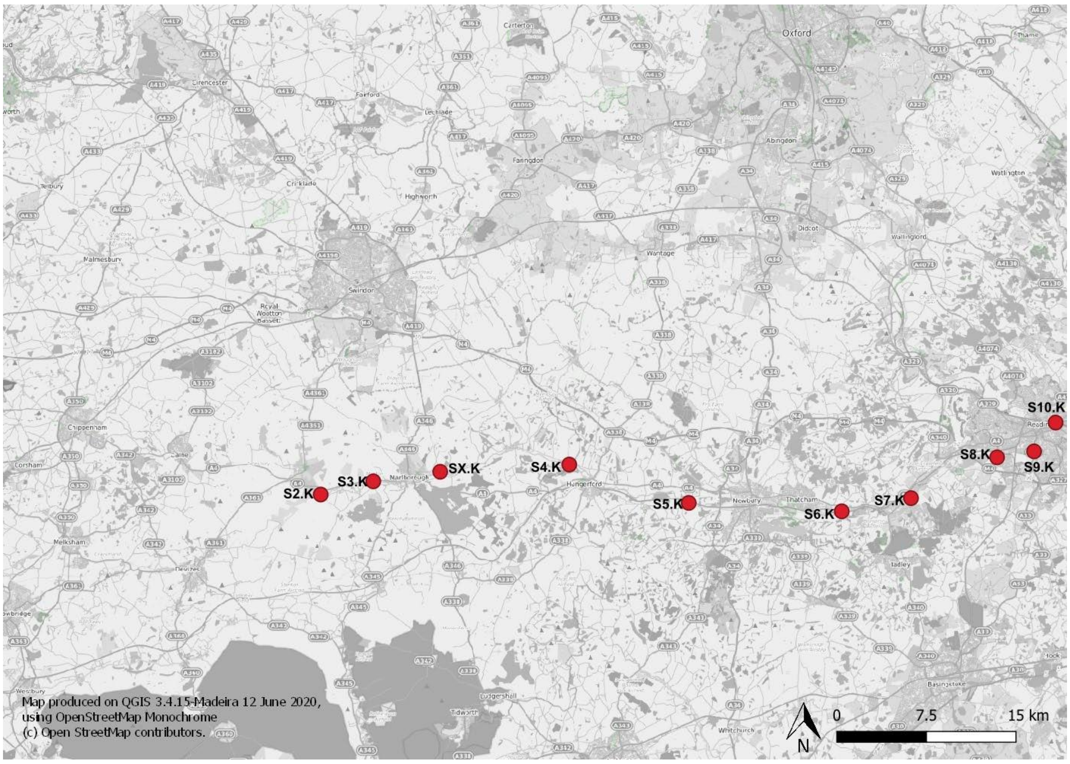

Fig S2.8 River Kennet map of catchment and sampling points.

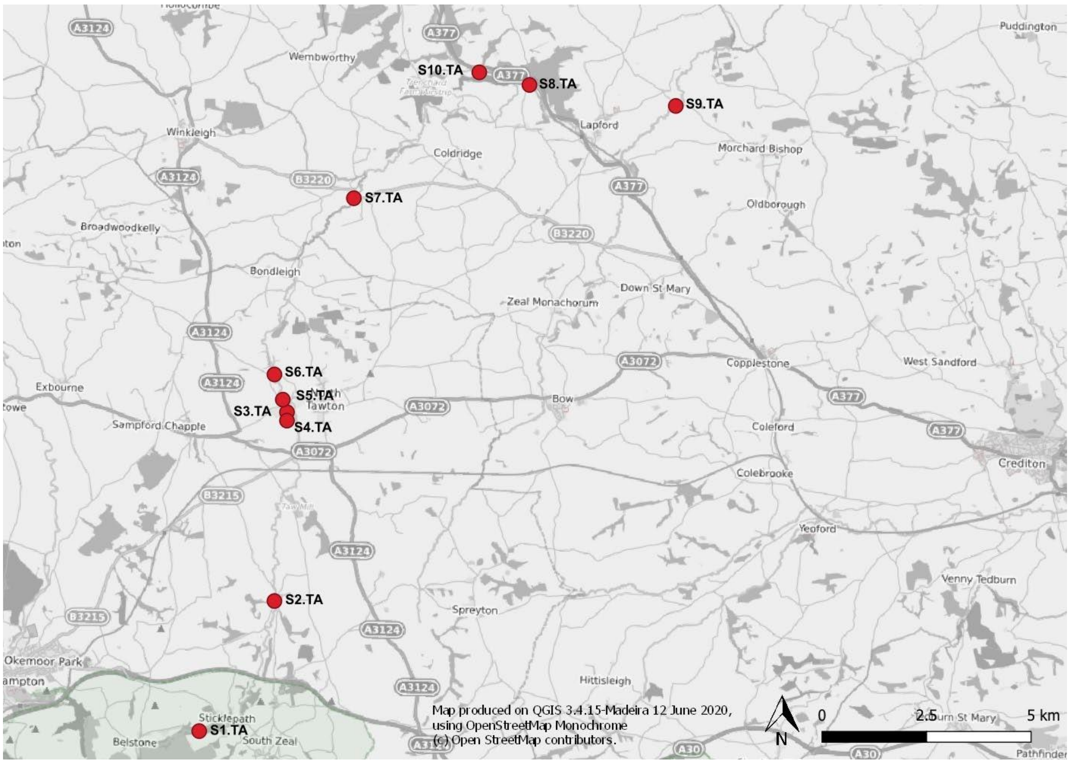

Fig S2.9a River Taw map of catchment and sampling points.

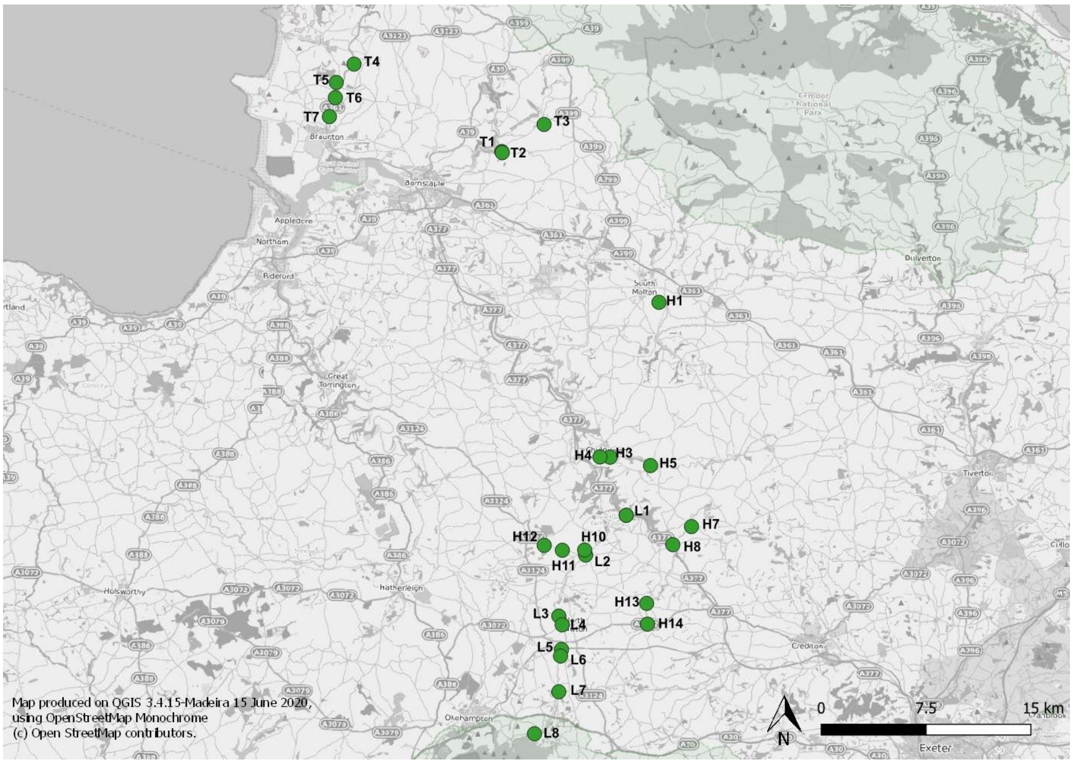

Fig S2.9b River Taw map of catchment and sampling points used in objective 2 study.

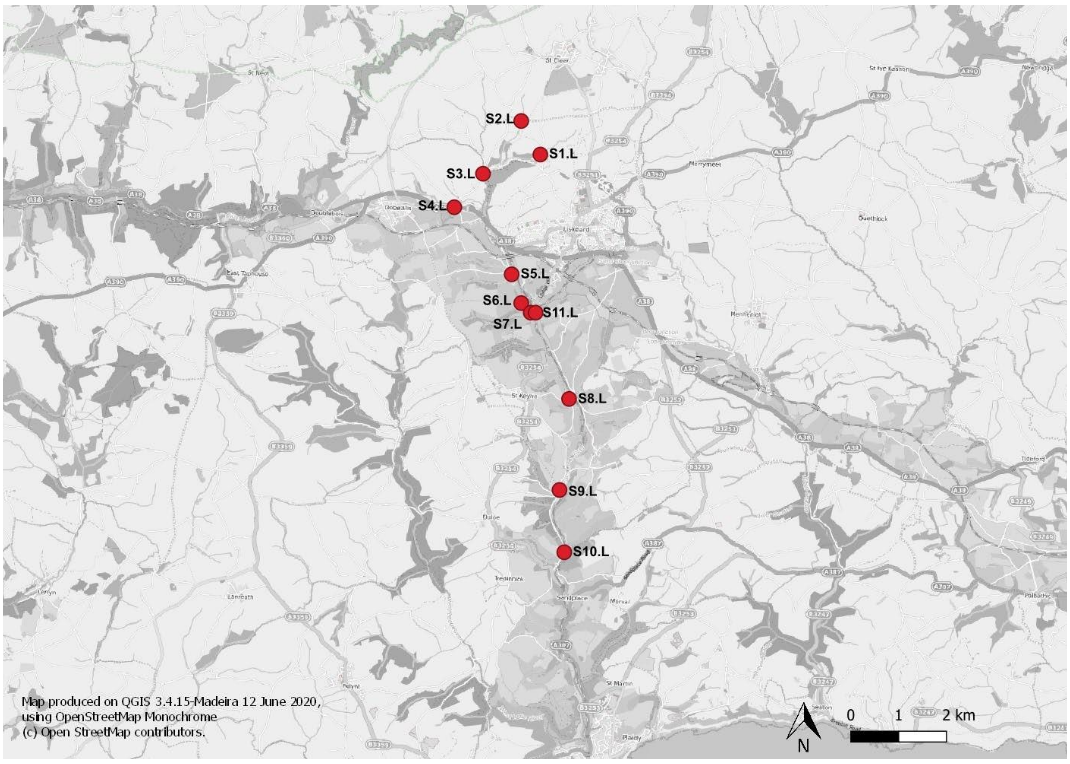

Fig S2.10 Map of East Looe catchment and sampling points.

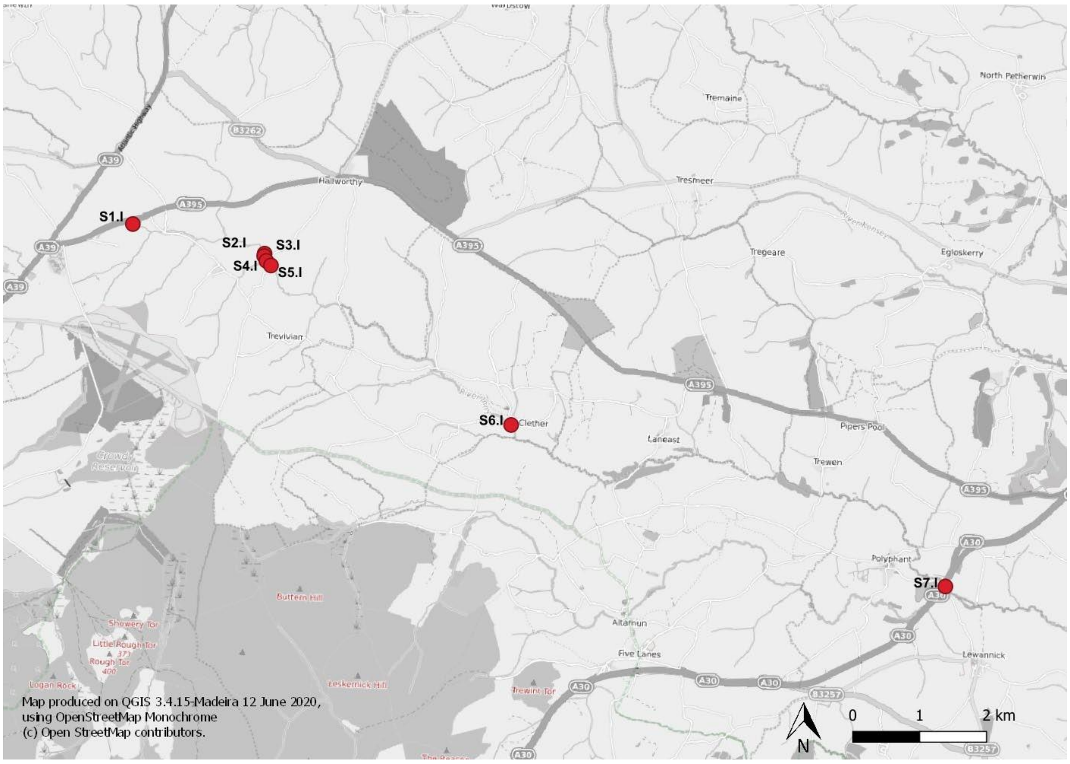

Fig S2.11 River Inny map of catchment and sampling points.

Fig S2.12 River Blackwater map of catchment and sampling points.

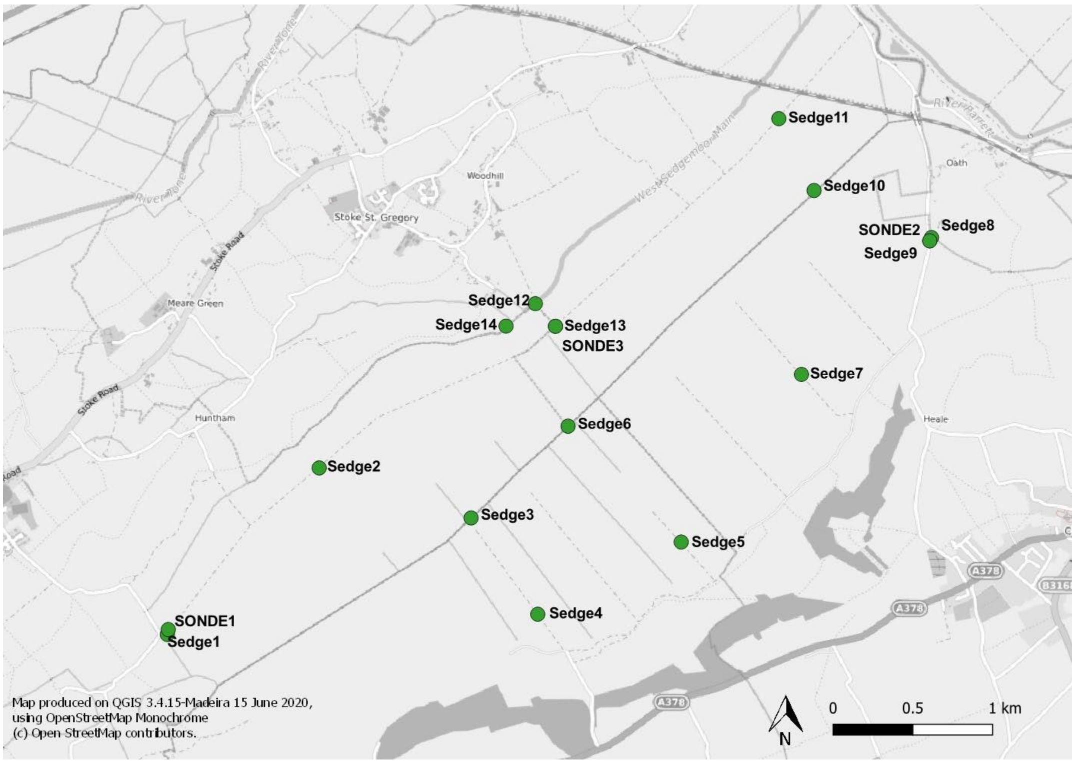

Fig S2.13 Sedgemoor catchment with sampling points.

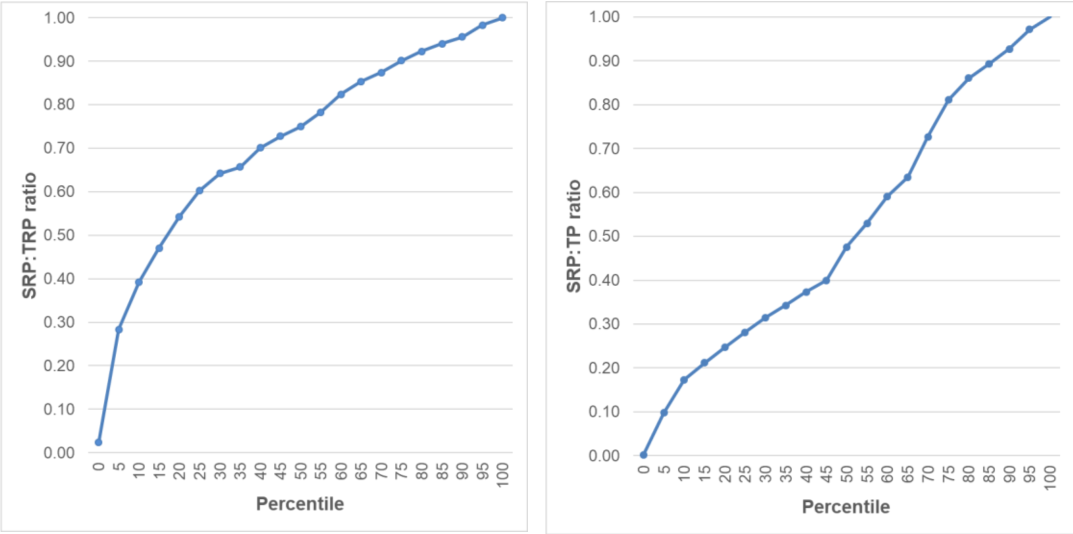

Fig S3 Cumulative frequency chart for soluble reactive phosphorus: total reactive phosphorus and soluble reactive phosphorus: total phosphorus ratios based on samples collected from sites in England and Wales (2016-2018).

Table S1. Phosphorus, iron and suspended solids data for twelve of the catchments studied.

Sample	Catchment	SRP (µg P L^{-1})	TSP (µg P L^{-1})	TRP (µg P L^{-1})	TP (µg P L^{-1})	PP (µg P L^{-1})
S1.A2.SRP1	Arun	112	117	124	112	<1
S2.A.SRP1	Arun	61	87	143	143	56
S2.A2.SRP1	Arun	36	62	100	108	46
S3.A.SRP1	Arun	67	75	126	123	48
S3.A2.SRP1	Arun	36	52	83	112	60
S3.X.SRP1	Arun	36	65	83	110	45
S4.A.SRP1	Arun	55	71	96	97	26
S4.A2.SRP1	Arun	30	57	59	81	24
S4.X.SRP1	Arun	67	84	126	128	44
S5.A.SRP1	Arun	96	96	131	127	31
S5.A2.SRP1	Arun	71	86	106	112	26
S6.A.SRP1	Arun	173	169	208	193	24
S6.A2.SRP1	Arun	448	428	459	465	37
S7.A.SRP1	Arun	220	205	273	222	17
S8.A.SRP1	Arun	173	156	243	205	49
S8.A2.SRP1	Arun	253	227	312	275	48
S9.A.SRP1	Arun	137	125	267	223	97
S10.A.SRP1	Arun	114	120	208	170	49
S10.A2.SRP1	Arun	200	287	259	335	47
BL1S	Blackwater	16	5	63	34	29
BL1W	Blackwater	8	5	17	9	4
BL2S	Blackwater	51	59	180	273	213
BL2W	Blackwater	10	7	21	47	40
BL3S	Blackwater	51	83	129	230	147
BL3W	Blackwater	38	56	45	101	45
BL4S	Blackwater	51	90	133	171	81
BL4W	Blackwater	24	32	35	88	56
BL5S	Blackwater	114	157	209	332	176
BL5W	Blackwater	48	77	158	202	125
BL6S	Blackwater	99	147	251	336	189
BL6W	Blackwater	21	42	114	142	100
BL7S	Blackwater	203	309	313	615	306
BL7W	Blackwater	12	23	109	116	92
BL8S	Blackwater	120	185	267	453	268
BL8W	Blackwater	14	27	119	145	118
BL9S	Blackwater	135	225	318	525	300
BL9W	Blackwater	26	44	118	167	123
BL10S	Blackwater	89	178	322	365	186
BL10W	Blackwater	35	56	77	145	88
S1.C.SRP1	Cefni	32	94	61	124	30
S2.C.SRP1	Cefni	43	96	67	112	16
S3.C.SRP1	Cefni	32	87	43	101	14
S4.C.SRP1	Cefni	35	81	49	105	24
S6.C.SRP1	Cefni	37	67	73	132	65
S7.C.SRP1	Cefni	79	95	90	170	75
S8.C.SRP1	Cefni	37	108	67	124	16
S9.C.SRP1	Cefni	8	92	26	105	13
S1.C.SRP2	Cefni	35	93	55	131	37
S1.E.SRP1	Erewash	74	97	86	98	1
S1.E.SRP2	Erewash	51	121	78	127	<1
S2.E.SRP1	Erewash	1458	1381	1546	1606	225
S2.E.SRP2	Erewash	134	181	178	217	<1
S3.E.SRP2	Erewash	139	189	195	251	<1
S4.E.SRP2	Erewash	139	192	212	267	<1
S5.E.SRP2	Erewash	123	189	195	239	<1
S6.E.SRP2	Erewash	295	295	378	363	<1
S7.E.SRP2	Erewash	256	305	373	390	<1
S8.E.SRP2	Erewash	273	283	317	340	<1
S9.E.SRP2	Erewash	212	287	323	351	<1
S10.E.SRP2	Erewash	256	326	362	398	<1
7TP	Inny	27	72	42	107	35
12TP	Inny	15	21	21	29	8
7T2	Inny	27	107	31	44	<1
12T2	Inny	16	49	26	65	16
7US	Inny	44	193	53	158	<1
12US	Inny	12	44	21	67	23
7DS	Inny	174	244	202	297	53
12DS	Inny	53	179	68	189	10
7T1	Inny	17	174	18	87	<1
12T1	Inny	6	34	10	35	1
7TB	Inny	173	192	188	220	28
12TB	Inny	48	117	55	134	17
7StC	Inny	49	33	55	44	11
12StC	Inny	27	18	37	11	<1
72BI	Inny	47	33	50	44	11
122BI	Inny	19	18	30	11	<1

Sample	Catchment	SRP (µg P L^{-1})	TSP (µg P L^{-1})	TRP (µg P L^{-1})	TP (µg P L^{-1})	PP (µg P L^{-1})
SX.K.SRP1	Kennet	76	76	77	78	2
S4.K.SRP1	Kennet	64	74	67	78	4
S5.K.SRP1	Kennet	60	64	63	82	18
S6.K.SRP1	Kennet	67	76	68	82	6
S7.K.SRP1	Kennet	81	81	82	94	13
S8.K.SRP1	Kennet	86	82	86	95	13
S9.K.SRP1	Kennet	123	117	134	130	13
S10.K.SRP1	Kennet	134	127	140	144	17
S1.L1.SRP1	Looe	26	58	41	76	18
S1.L2.SRP1	Looe	29	98	35	94	18
S2.L1.SRP1	Looe	28	57	29	58	1
S2.L2.SRP1	Looe	18	87	25	85	1
S3.L1.SRP1	Looe	36	67	39	70	3
S3.L2.SRP1	Looe	48	104	74	127	3
S4.L1.SRP1	Looe	10	49	13	51	2
S4.L2.SRP1	Looe	10	77	15	90	2
S5.L1.SRP1	Looe	24	57	27	62	5
S5.L2.SRP1	Looe	28	90	41	98	5
S7.L1.SRP1	Looe	48	76	53	84	9
S7.L2.SRP1	Looe	52	102	85	127	9
S8.L1.SRP1	Looe	39	68	45	70	2
S8.L2.SRP1	Looe	48	107	83	130	2
S9.L1.SRP1	Looe	45	73	47	73	<1
S9.L2.SRP1	Looe	54	111	68	115	<1
S10.L1.SRP1	Looe	47	69	48	75	5
S10.L2.SRP1	Looe	48	101	65	130	5
S11.L1.SRP1	Looe	52	78	53	73	<1
S11.L2.SRP1	Looe	46	107	48	113	<1
S1.M.SRP1	Mease	30	71	112	81	10
S1.M.SRP2	Mease	64	109	88	135	26
S2.M.SRP1	Mease	106	109	118	113	4
S2.M.SRP2	Mease	117	129	129	157	28
S4.M.SRP1	Mease	141	133	159	149	16
S4.M.SRP2	Mease	164	160	182	186	26
S5.M.SRP2	Mease	164	177	176	186	9
S6.M.SRP1	Mease	47	70	53	73	2
S6.M.SRP2	Mease	64	97	76	123	26
S7.M.SRP1	Mease	153	141	165	154	13
S7.M.SRP2	Mease	176	187	188	208	21
S11.M.SRP2	Mease	193	217	205	208	<1
S1.O.SRP1	Ouzel	9	53	15	56	3
S1.O.SRP2	Ouzel	31	56	43	55	<1
S2.O.SRP1	Ouzel	41	68	51	88	19
S2.O.SRP2	Ouzel	108	111	126	125	13
S4.O.SRP2	Ouzel	892	864	951	904	40
S5.O.SRP2	Ouzel	716	678	804	720	41
S6.O.SRP1	Ouzel	250	228	357	305	76
S6.O.SRP2	Ouzel	598	512	657	606	94
S7.O.SRP1	Ouzel	209	194	267	238	44
S8.O.SRP1	Ouzel	188	191	236	218	27
S9.O.SRP1	Ouzel	162	161	199	181	20
S10.O.SRP1	Ouzel	157	159	188	180	21
S1.TA.SRP1	Taw	3	46	9	50	4
S1.TA.SRP2	Taw	5	79	5	91	<1
S2.TA.SRP1	Taw	68	96	74	99	3
S2.TA.SRP2	Taw	8	97	11	100	<1
S3.TA.SRP1	Taw	74	93	80	104	11
S3.TA.SRP2	Taw	11	104	17	109	<1
S4.TA.SRP2	Taw	280	343	280	346	<1
S5.TA.SRP1	Taw	97	114	103	117	3
S5.TA.SRP2	Taw	22	99	22	106	<1
S6.TA.SRP1	Taw	127	131	133	140	9
S6.TA.SRP2	Taw	22	116	28	121	<1
S7.TA.SRP1	Taw	133	130	145	146	16
S7.TA.SRP2	Taw	28	115	34	130	0
S8.TA.SRP2	Taw	75	163	111	196	0
S9.TA.SRP1	Taw	127	140	150	158	18
S9.TA.SRP2	Taw	75	148	105	181	<1
S10.TA.SRP1	Taw	174	161	186	186	24
S10.TA.SRP2	Taw	58	157	93	181	<1
S1.TE.SRP1	Teifi	0	44	3	48	5
S2.TE.SRP1	Teifi	4	48	7	55	7
S3.TE.SRP1	Teifi	13	65	19	67	2
S4.TE.SRP1	Teifi	17	65	24	82	17
S5.TE.SRP1	Teifi	9	56	10	63	7
S6.TE.SRP1	Teifi	2	62	6	68	6
S7.TE.SRP1	Teifi	26	80	34	91	11
S8.TE.SRP1	Teifi	32	82	43	94	13
S9.TE.SRP1	Teifi	37	81	48	103	21
S10.TE.SRP1	Teifi	39	80	65	102	22
S4.W.SRP1	Wylye	98	93	102	106	13
S9.W.SRP1	Wylye	82	85	83	83	<1
S10.W.SRP1	Wylye	83	82	84	85	3

Sample	Catchment	Fe tot (µg P L^{-1})	Fe diss (µg P L^{-1})	TSS (mg L^{-1})	SRP:TP	SRP:TP	SRP:TRP	SRP:TRP
S1.A2.SRP1	Arun	105	53	10	1.00	100%	0.91	91%
S2.A.SRP1	Arun	1634	452	7	0.43	43%	0.42	42%
S2.A2.SRP1	Arun	1264	321	10	0.33	33%	0.36	36%
S3.A.SRP1	Arun	709	125	6	0.54	54%	0.53	53%
S3.A2.SRP1	Arun	833	225	4	0.32	32%	0.43	43%
S3.X.SRP1	Arun	824	194	5	0.32	32%	0.43	43%
S4.A.SRP1	Arun	520	118	5	0.56	56%	0.57	57%
S4.A2.SRP1	Arun	518	221	6	0.37	37%	0.50	50%
S4.X.SRP1	Arun	1193	585	15	0.52	52%	0.53	53%
S5.A.SRP1	Arun	493	108	7	0.76	76%	0.73	73%
S5.A2.SRP1	Arun	447	161	4	0.63	63%	0.67	67%
S6.A.SRP1	Arun	101	174	7	0.89	89%	0.83	83%
S6.A2.SRP1	Arun	139	100	10	0.96	96%	0.97	97%
S7.A.SRP1	Arun	210	154	7	0.99	99%	0.81	81%
S8.A.SRP1	Arun	133	61	10	0.84	84%	0.71	71%
S8.A2.SRP1	Arun	491	114	8	0.92	92%	0.81	81%
S9.A.SRP1	Arun	249	31	22	0.62	62%	0.51	51%
S10.A.SRP1	Arun	171	32	17	0.67	67%	0.55	55%
S10.A2.SRP1	Arun	604	387	3	0.60	60%	0.77	77%
BL1S	Blackwater	#na	71	9	0.48	48%	0.26	26%
BL1W	Blackwater	#na	71	3	0.88	88%	0.47	47%
BL2S	Blackwater	#na	30	28	0.19	19%	0.28	28%
BL2W	Blackwater	#na	12	8	0.21	21%	0.47	47%
BL3S	Blackwater	#na	20	18	0.22	22%	0.39	39%
BL3W	Blackwater	#na	14	11	0.37	37%	0.85	85%
BL4S	Blackwater	#na	41	19	0.30	30%	0.38	38%
BL4W	Blackwater	#na	28	8	0.27	27%	0.68	68%
BL5S	Blackwater	#na	29	17	0.34	34%	0.54	54%
BL5W	Blackwater	#na	72	6	0.24	24%	0.31	31%
BL6S	Blackwater	#na	60	12	0.29	29%	0.39	39%
BL6W	Blackwater	#na	84	6	0.15	15%	0.19	19%
BL7S	Blackwater	#na	30	11	0.33	33%	0.65	65%
BL7W	Blackwater	#na	57	10	0.11	11%	0.11	11%
BL8S	Blackwater	#na	39	13	0.26	26%	0.45	45%
BL8W	Blackwater	#na	53	9	0.10	10%	0.12	12%
BL9S	Blackwater	#na	52	10	0.26	26%	0.42	42%
BL9W	Blackwater	#na	65	6	0.16	16%	0.22	22%
BL10S	Blackwater	#na	41	21	0.24	24%	0.28	28%
BL10W	Blackwater	#na	60	8	0.24	24%	0.46	46%
S1.C.SRP1	Cefni	824	438	6	0.25	25%	0.52	52%
S2.C.SRP1	Cefni	449	361	6	0.39	39%	0.65	65%
S3.C.SRP1	Cefni	229	119	10	0.31	31%	0.73	73%
S4.C.SRP1	Cefni	173	158	5	0.33	33%	0.70	70%
S6.C.SRP1	Cefni	146	144	7	0.28	28%	0.51	51%
S7.C.SRP1	Cefni	181	86	2	0.46	46%	0.87	87%
S8.C.SRP1	Cefni	356	141	9	0.30	30%	0.56	56%
S9.C.SRP1	Cefni	268	92	5	0.08	8%	0.31	31%
S1.C.SRP2	Cefni	85	<1	6	0.27	27%	0.64	64%
S1.E.SRP1	Erewash	171	20	5	0.76	76%	0.86	86%
S1.E.SRP2	Erewash	299	23	4	0.40	40%	0.65	65%
S2.E.SRP1	Erewash	401	114	6	0.91	91%	0.94	94%
S2.E.SRP2	Erewash	458	103	9	0.62	62%	0.75	75%
S3.E.SRP2	Erewash	512	85	11	0.56	56%	0.72	72%
S4.E.SRP2	Erewash	540	99	10	0.52	52%	0.66	66%
S5.E.SRP2	Erewash	778	124	16	0.51	51%	0.63	63%
S6.E.SRP2	Erewash	618	168	15	0.81	81%	0.78	78%
S7.E.SRP2	Erewash	750	145	17	0.66	66%	0.69	69%
S8.E.SRP2	Erewash	759	155	22	0.80	80%	0.86	86%
S9.E.SRP2	Erewash	793	157	19	0.60	60%	0.66	66%
S10.E.SRP2	Erewash	808	153	21	0.64	64%	0.71	71%
7TP	Inny	608	29	52	0.25	25%	0.64	64%
12TP	Inny	151	15	<1	0.53	53%	0.75	75%
7T2	Inny	197	72	7	0.61	61%	0.87	87%
12T2	Inny	284	122	3	0.25	25%	0.61	61%
7US	Inny	326	143	5	0.28	28%	0.83	83%
12US	Inny	230	57	<1	0.18	18%	0.59	59%
7DS	Inny	331	81	4	0.59	59%	0.86	86%
12DS	Inny	345	70	4	0.28	28%	0.78	78%
7T1	Inny	202	82	30	0.20	20%	0.94	94%
12T1	Inny	187	42	7	0.16	16%	0.54	54%
7TB	Inny	216	64	2	0.79	79%	0.92	92%
12TB	Inny	263	52	3	0.36	36%	0.86	86%
7StC	Inny	111	38	6	#na	#na	0.89	89%
12StC	Inny	448	48	4	#na	#na	0.72	72%
72BI	Inny	166	57	6	#na	#na	0.94	94%
122BI	Inny	394	45	5	#na	#na	0.64	64%

Sample	Catchment	Fe tot (µg P L^{-1})	Fe diss (µg P L^{-1})	TSS (mg L^{-1})	SRP:TP	SRP:TP	SRP:TRP	SRP:TRP
SX.K.SRP1	Kennet	15	8	5	0.97	97%	0.98	98%
S4.K.SRP1	Kennet	22	14	3	0.82	82%	0.95	95%
S5.K.SRP1	Kennet	56	20	8	0.73	73%	0.96	96%
S6.K.SRP1	Kennet	78	22	7	0.82	82%	0.98	98%
S7.K.SRP1	Kennet	92	28	8	0.86	86%	0.99	99%
S8.K.SRP1	Kennet	103	26	7	0.91	91%	1.00	100%
S9.K.SRP1	Kennet	96	30	6	0.94	94%	0.91	91%
S10.K.SRP1	Kennet	94	29	5	0.93	93%	0.96	96%
S1.L1.SRP1	Looe	125	36	2	0.34	34%	0.64	64%
S1.L2.SRP1	Looe	210	84	1	0.31	31%	0.83	83%
S2.L1.SRP1	Looe	22	10	3	0.48	48%	0.96	96%
S2.L2.SRP1	Looe	125	20	1	0.22	22%	0.75	75%
S3.L1.SRP1	Looe	156	37	2	0.51	51%	0.93	93%
S3.L2.SRP1	Looe	378	62	5	0.37	37%	0.65	65%
S4.L1.SRP1	Looe	151	89	<1	0.20	20%	0.75	75%
S4.L2.SRP1	Looe	178	72	<1	0.11	11%	0.65	65%
S5.L1.SRP1	Looe	115	64	1	0.39	39%	0.90	90%
S5.L2.SRP1	Looe	312	62	4	0.28	28%	0.68	68%
S7.L1.SRP1	Looe	87	46	<1	0.57	57%	0.90	90%
S7.L2.SRP1	Looe	263	53	<1	0.41	41%	0.61	61%
S8.L1.SRP1	Looe	87	40	1	0.56	56%	0.88	88%
S8.L2.SRP1	Looe	366	54	2	0.37	37%	0.58	58%
S9.L1.SRP1	Looe	84	37	1	0.62	62%	0.95	95%
S9.L2.SRP1	Looe	259	52	1	0.47	47%	0.79	79%
S10.L1.SRP1	Looe	61	39	<1	0.63	63%	0.97	97%
S10.L2.SRP1	Looe	250	51	1	0.37	37%	0.73	73%
S11.L1.SRP1	Looe	62	11	2	0.71	71%	0.98	98%
S11.L2.SRP1	Looe	89	17	1	0.41	41%	0.95	95%
S1.M.SRP1	Mease	436	33	24	0.37	37%	0.26	26%
S1.M.SRP2	Mease	898	66	26	0.48	48%	0.73	73%
S2.M.SRP1	Mease	105	40	5	0.94	94%	0.90	90%
S2.M.SRP2	Mease	211	82	3	0.74	74%	0.91	91%
S4.M.SRP1	Mease	93	31	5	0.95	95%	0.89	89%
S4.M.SRP2	Mease	171	43	8	0.88	88%	0.90	90%
S5.M.SRP2	Mease	159	64	7	0.88	88%	0.93	93%
S6.M.SRP1	Mease	84	34	2	0.65	65%	0.89	89%
S6.M.SRP2	Mease	244	59	6	0.52	52%	0.84	84%
S7.M.SRP1	Mease	23	39	2	0.99	99%	0.93	93%
S7.M.SRP2	Mease	165	79	7	0.85	85%	0.94	94%
S11.M.SRP2	Mease	221	46	4	0.93	93%	0.94	94%
S1.O.SRP1	Ouzel	35	7	2	0.17	17%	0.64	64%
S1.O.SRP2	Ouzel	79	14	12	0.57	57%	0.73	73%
S2.O.SRP1	Ouzel	109	11	2	0.47	47%	0.80	80%
S2.O.SRP2	Ouzel	71	15	9	0.87	87%	0.86	86%
S4.O.SRP2	Ouzel	133	68	10	0.99	99%	0.94	94%
S5.O.SRP2	Ouzel	139	41	13	0.99	99%	0.89	89%
S6.O.SRP1	Ouzel	379	29	3	0.82	82%	0.70	70%
S6.O.SRP2	Ouzel	511	100	12	0.99	99%	0.91	91%
S7.O.SRP1	Ouzel	68	20	7	0.88	88%	0.78	78%
S8.O.SRP1	Ouzel	59	47	6	0.86	86%	0.80	80%
S9.O.SRP1	Ouzel	198	33	7	0.89	89%	0.81	81%
S10.O.SRP1	Ouzel	187	37	4	0.87	87%	0.83	83%
S1.TA.SRP1	Taw	61	47	2	0.07	7%	0.36	36%
S1.TA.SRP2	Taw	158	109	<1	0.05	5%	1.00	100%
S2.TA.SRP1	Taw	75	61	2	0.69	69%	0.92	92%
S2.TA.SRP2	Taw	117	191	3	0.08	8%	0.73	73%
S3.TA.SRP1	Taw	94	67	2	0.71	71%	0.93	93%
S3.TA.SRP2	Taw	291	161	8	0.10	10%	0.65	65%
S4.TA.SRP2	Taw	132	56	5	0.81	81%	1.00	100%
S5.TA.SRP1	Taw	101	66	3	0.83	83%	0.94	94%
S5.TA.SRP2	Taw	269	171	8	0.21	21%	1.00	100%
S6.TA.SRP1	Taw	110	75	3	0.91	91%	0.96	96%
S6.TA.SRP2	Taw	257	148	5	0.19	19%	0.79	79%
S7.TA.SRP1	Taw	140	71	5	0.91	91%	0.92	92%
S7.TA.SRP2	Taw	371	147	8	0.22	22%	0.83	83%
S8.TA.SRP2	Taw	894	206	24	0.38	38%	0.68	68%
S9.TA.SRP1	Taw	194	194	7	0.80	80%	0.84	84%
S9.TA.SRP2	Taw	698	215	18	0.42	42%	0.72	72%
S10.TA.SRP1	Taw	165	86	6	0.94	94%	0.94	94%
S10.TA.SRP2	Taw	721	184	22	0.32	32%	0.62	62%
S1.TE.SRP1	Teifi	353	259	7	0.00	0%	0.02	2%
S2.TE.SRP1	Teifi	501	270	6	0.08	8%	0.60	60%
S3.TE.SRP1	Teifi	916	646	8	0.19	19%	0.69	69%
S4.TE.SRP1	Teifi	907	604	9	0.21	21%	0.73	73%
S5.TE.SRP1	Teifi	729	604	11	0.14	14%	0.86	86%
S6.TE.SRP1	Teifi	836	498	12	0.03	3%	0.32	32%
S7.TE.SRP1	Teifi	683	501	14	0.28	28%	0.77	77%
S8.TE.SRP1	Teifi	952	482	14	0.34	34%	0.75	75%
S9.TE.SRP1	Teifi	450	444	17	0.36	36%	0.76	76%
S10.TE.SRP1	Teifi	926	352	15	0.38	38%	0.60	60%
S4.W.SRP1	Wylye	27	14	4	0.92	92%	0.96	96%
S9.W.SRP1	Wylye	21	15	5	0.99	99%	0.99	99%
S10.W.SRP1	Wylye	26	14	3	0.98	98%	0.99	99%

Plates

Plate S1 Ochreous discharge into river Rother.

References

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2. Natural England. Somerset Levels and Moors SSSIs Diffuse Water Pollution plan. 2015.