



Catchment Statistics for Nutrient Pollution in Protected Areas

Protected areas with diffuse water pollution plans or
nutrient neutrality advice

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Executive summary

This document provides summary outputs from the Environment Agency's water quality modelling for protected area catchments where Diffuse Water Pollution Plans (DWPPs) are needed and where nutrient neutrality advice applies. We provide catchment-scale load source apportionment and comparison of diffuse sector concentrations with targets. Our outputs will help those working on DWPPs, designing or co-ordinating nutrient mitigation schemes, and working on site restoration. We aim to support a general understanding of the catchments rather than give the level of detail needed to inform specific on-the-ground measures. More detailed data and information, including maps, is available in the catchment specific modelling summaries alongside this report. This report and the associated catchment specific modelling summaries updates the data previously published in the Indicative Catchment Statistics for Nutrient Pollution report (Version 1.2) published in September 2024.

Alongside Simcat SAGIS models, we used the Farmscoper v5 decision support tool and applied the revised polluter pays principle methodology (v0.17) used during PR24 planning to define the sector share for the point and diffuse sectors.

Our outputs highlight the dominant nutrient sources under a range of scenarios, including future estimates based on planned water company investment and the wider implementation of rural land use measures. When total input loads to all catchments are considered, we estimate the average rural land use phosphate contribution to be 53%, rising to 65% after the implementation of the current (2025 to 2030) Water Industry National Environment Programme (WINEP). We estimate that diffuse sector phosphate concentrations need to reduce by 51% on average.

By 2030, we estimate the rural land use contribution to increase above 80% in the Axe, Clun, Lugg and Tweed (England) catchments. In these catchments, we estimate that diffuse sector phosphate concentrations need to reduce by 60% on average, and up to 90% in the Clun catchment.

After the implementation of the current WINEP, we estimate the protected site targets to be met in the River Derwent (Yorkshire) SAC, River Ehen Special Area of Conservation (SAC), Esthwaite Water Ramsar and at the Sites of Special Scientific Interest (SSSIs) in the Waveney valley. In the River Derwent (Yorkshire) SAC and River Ehen SAC catchments we estimate the diffuse sector share of the phosphate protected area targets to be met throughout the designated reaches. In Esthwaite Water Ramsar, the total phosphorus diffuse share is estimated to be met if uptake of agricultural regulatory measures were to reach 100%.

We have not incorporated additional nutrient contributions from any future development and growth including housing. Any additional future nutrient load will be assessed through the planning process led by the Local Planning Authority or through the Environment Agency's permitting process.

In almost all catchments, we estimate the reduction in nutrient losses achieved when applying catchment-wide rural land use measures to be insufficient to meet diffuse sector share. This is where additional and/or alternative measures would need to be explored to achieve the diffuse sector share of the target, for example through spatially targeted conversion of farmland to semi-natural habitat and woodland, habitat creation within and alongside farming, or innovation and technology to improve farm practices and manage flows of nutrients between sectors more efficiently.

Methodology

Catchments

The catchments in this report are protected areas, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSIs) or Ramsar, that are in unfavourable condition due to diffuse pollution. They include catchments where Diffuse Water Pollution Plans (DWPP) have been prepared, where Natural England nutrient neutrality advice applies and those designated as Sensitive Catchment Areas under the Water Industry Act 1991 (Table 1).

Table 1: Protected area catchments included in this report.

Protected Area Catchment	DWPP	NE NN Advice	Sensitive Catchment
River Avon (Hampshire) SAC	Yes	Yes	Yes
River Axe SAC	Yes	Yes	Yes
River Camel SAC	Yes	Yes ^l	Yes
River Clun SAC	Yes	Yes	
River Dee SAC	Yes		
River Derwent (Yorkshire) SAC	Yes		
River Derwent and Bassenthwaite Lake SAC	Yes	(part of)	(part of)
River Eden SAC	Yes	Yes ^l	Yes
River Ehen SAC	Yes		
River Itchen SAC	Yes	Yes	Yes
River Kent SAC	Yes	(part of)	(part of)
River Lambourn SAC	Yes	Yes	Yes
River Lugg SSSI	Yes	Yes	
River Mease SAC	Yes	Yes	Yes
River Test SSSI	Yes	Yes	
River Tweed (England) SAC	(part of)		
River Wensum SAC	Yes	Yes	Yes
River Wye SAC	Yes	(part of)	
Wye Valley (Peaks) SSSI*	Yes	Yes	
Ant Broads and Marshes SSSI[†]	Yes	Yes	Yes
Bure Broads and Marshes SSSI[†]	Yes	Yes	Yes
Yare Broads and Marshes SSSI[†]	Yes	Yes	Yes
Esthwaite Water Ramsar		Yes	
Lindisfarne SPA		Yes	
Ouse Washes SAC	Yes		
Poole Harbour SPA	Yes		Yes
Solent Marine Sites[‡]	Yes	Yes	Yes
Somerset Levels and Moors Ramsar		Yes	Yes
Stodmarsh SPA		Yes	Yes
Teesmouth and Cleveland Coast SPA		Yes	Yes
Waveney Wetland SSSIs[§]	Yes		

*Part of the Peak District Dales SAC. [†]Part of The Broads SAC. [‡]Comprises Solent Maritime SAC, Solent and Southampton Water SPA, Chichester and Langstone Harbours SPA and Portsmouth Harbour SPA. [§]Comprises Geldeston Meadows SSSI and Stanley and Alder Carr SSSI part of The Broads SAC. ^lDenotes change of nutrient neutrality boundary since previous version.

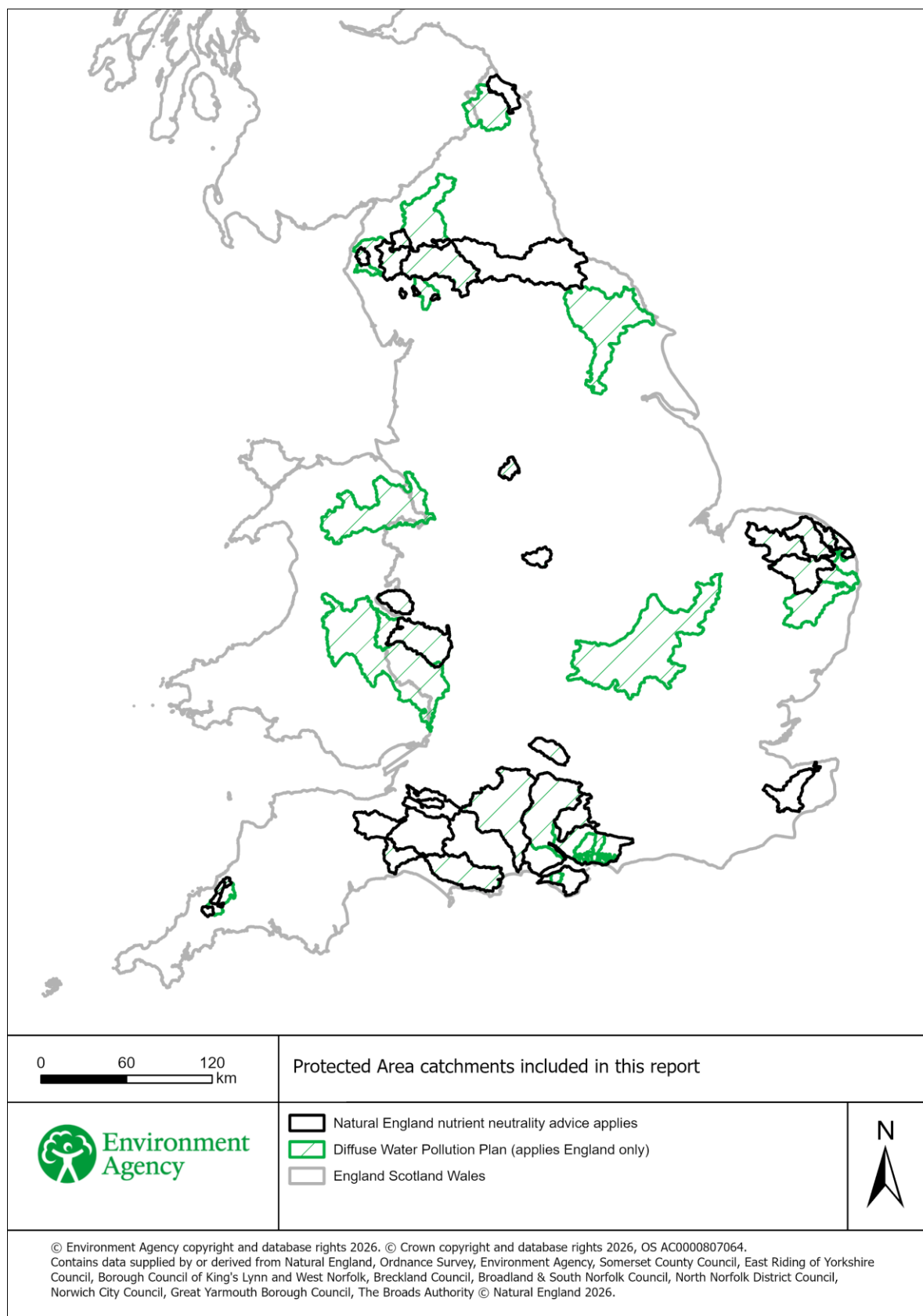


Figure 1: Map showing the extent of the 31 protected area catchments included in this report. The 26 Diffuse Water Pollution Plan catchments are highlighted alongside the 24 catchments where Natural England nutrient neutrality advice applies. Table 1 provides the detail for each catchment.

The Test River SSSI is an addition to this summary report. Modelling has not been updated since September 2024 for Poole Harbour SPA and Lindisfarne SPA, the data presented for these sites is the same as presented in the Indicative Catchment Statistics for Nutrient Pollution report (Version 1.2) published in September 2024. Data for Chesil and the Fleet SAC and Hornsea Mere SAC has been removed because detailed appraisal indicated Simcat SAGIS modelling to be inappropriate, information for these sites can be obtained from Area Environment Agency teams.

The following catchments are not included because they are not represented in Simcat SAGIS: Abbots Moss SSSI, Brown Moss SSSI, Dorset Heaths SAC, Leighton Moss SSSI, Marazion Marsh SPA, Oak Mere SAC, Roman Walls Loughs SAC, Rostherne Mere Ramsar and Wybunbury Moss SSSI.

Models used

We used the Price Review (PR) PR19 and the PR24 [Simcat SAGIS models](#) for this work alongside [Farmscoper v5](#). Simcat SAGIS (Source Apportionment Geographical Information System) integrates ArcGIS-based digital information management and visualisation with SIMCAT (Simulated Catchment), the Environment Agency's water quality model. Farmscoper is a decision support tool that can be used to assess diffuse agricultural pollutant loads and quantify the impacts of farm mitigation methods on these pollutants.

Simcat SAGIS models

The PR19 Simcat SAGIS models are calibrated to 2010 to 2012 data, following nationally agreed model build and calibration standards across UKWIR (UK Water Industry Research). Outputs from these models are used to establish the sector share under the revised polluter pays principle methodology (v0.17) used during PR24 planning. Similarly, the PR24 Simcat SAGIS models are calibrated to 2014 to 2020 data, following UKWIR agreed model build and calibration standards.

The calibration process optimises the agreement between measured and simulated values through reasonable and systematic adjustments to model parameters and input data. The process is, however, not intended to force-fit modelled and measured values and the level of agreement is in some instances imperfect. We adjust the inputs where there is least confidence, those representing diffuse sources of pollution. To assess confidence in the models, we compare the measured and simulated values. While Simcat SAGIS provides a robust framework for decision-making in wastewater investment, we have less certainty in the diffuse load estimates. As a result, we have lower confidence when using the models to assess the outcomes of measures that target diffuse sources, including those used here and in the DWPPs.

Since publication of the Indicative Catchment Statistics Report (Version 1.2, September 2024) we have recalibrated the models for the following sites to improve catchment

representation, the results presented in this report will therefore differ from those presented previously:

- River Clun SAC (phosphate and nitrate)
- River Dee SAC (phosphate)
- River Derwent and Tributaries and Bassenthwaite Lake SAC (phosphate)
- River Itchen SAC (phosphate and nitrate) (will influence Solent Marine Sites)
- River Test SSSI (phosphate and nitrate) (will influence Solent Marine Sites)
- River Tweed SAC (England) (phosphate)
- Esthwaite Ramsar (total phosphorus and total nitrogen)
- Teesmouth and Cleveland Coast SPA (nitrate)

PR19 Simcat SAGIS models

We used PR19 modelled datasets from the SAGIS models calibrated using SAGIS version SAGIS2015 and SIMCAT Version 14.8.

PR19 Data sources

Diffuse - UKWIR 2012 build. Arable and livestock information is from the ADAS PSYCHIC and NEAP-N models based on the 2010 (P) and 2015 (N) agricultural census data. The other diffuse sectors are based on bespoke methodologies developed within the UKWIR SAGIS project. The methodologies are based on small studies and national assumptions, and so the outputs for the intermittent and urban loads should be treated with caution.

Point sources - STW flows and quality 2010 to 2012 observed where available. We have used older observed data in preference to defaults if data for this period is not available.

River quality - 2010 to 2012 observed quality. We have used additional data from outside this time period to provide resolution in locations where there is no data available within this time period.

Flows - National RBD SIMCAT model diffuse flows (from Low Flows software) calibrated using 2010 to 2012 observed gauging data. We have excluded flows from the report due to third party license issues.

PR24 Simcat SAGIS models

We produced the PR24 modelled datasets from SAGIS models calibrated using SAGIS version 3 and SIMCAT Version 15.7.

PR24 Data sources

Diffuse - UKWIR 2021 build. Arable and livestock information is from the ADAS PSYCHIC and NEAP-N models based on the 2010 (P) and 2015 (N) agricultural census data. The other diffuse sectors are based on bespoke methodologies developed within the UKWIR

SAGIS project. The methodologies are based on small studies and national assumptions, subsequently the outputs for the intermittent and urban loads should be treated with caution and future model development will seek to improve the way these are represented. We are updating the models in 2026 to 2027 for PR29, including incorporating data from the 2023 June Agricultural Census.

Point sources – STW certified measured flows 2014 to 2018; quality 2014 to 2020 observed where available. If data is not available for this time period, we have used older observed data in preference to defaults.

River quality - April 2014 to March 2020 observed quality. If data for this time period is not available, we have used additional data to provide resolution in those locations where no data is available.

River Flows - National RBD SIMCAT model diffuse flows (from Low Flows software) calibrated using 2014 to 2018 observed gauging data. We have excluded flows from the report due to third party license issues.

Confidence in these and the other data sources in Simcat SAGIS are shown in Table 2:

Table 2: Data used in PR24 Simcat SAGIS

Data Set	Data used	Comments	Confidence in data set
River Flows	EA Flow Gauging Station data for period 2014 to 2018	Used to calibrate the flows in the models	High
River and Lake Quality (England)	2014 to 2020 EA monitoring data	Used to calibrate water quality in the rivers and lakes	High
Large Water Company Sewage Treatment Works (STW) Flows	Certified measured flows 2014 to 2018 and 2020 to 2023	Used to characterise the inputs	High
Small / Private STWs (package treatment plants) Flows	Permitted flow or estimated flow from population	Used to characterise the inputs	Medium
STW Quality	2014 to 2020 monitoring data. Where no monitoring data, defaults used.	Used to characterise the inputs	Medium – High High where monitoring data is used
Industrial discharges	2014 to 2020 monitoring data. Where no monitoring data, permit data used.	Used to characterise the inputs	High

Data Set	Data used	Comments	Confidence in data set
Storm Overflows	Annual loadings and spill durations derived using national datasets and assumptions	Used to characterise the inputs	Low-High High where updated using local data
Rural Land Run-off (for example, from farmland, forestry, grassland, moorland)	Annual 1 km loadings from the ADAS PSYCHIC (2010) and NEAP-N model (2015).	Diffuse inputs are included in the model at a waterbody scale with loadings spread evenly along each modelled reach	Medium
Septic Tanks	Estimated annual loadings from unsewered properties	Diffuse inputs are included in the model at a waterbody scale with loadings spread evenly along each modelled reach	Low-Medium
Urban Run-off (for example, contaminated surface water from towns and villages)	Estimated annual loadings from impermeable surfaces in urban areas	Diffuse inputs are included in the model at a waterbody scale with loadings spread evenly along each modelled reach	Low
Highways (run off from motorways and trunk roads only)	Outputs from the HAWRAT model	Diffuse inputs are included in the model at a waterbody scale with loadings spread evenly along each modelled reach	Low
Atmospheric Deposition (nitrate only)	Annual 1 km loadings from the ADAS NEAP-N (2015) models.	Diffuse inputs are included in the model at a waterbody scale with loadings spread evenly along each modelled reach	Medium

Farmscoper v5 Decision Support Tool

We used Farmscoper v5 to assess diffuse agricultural pollutant loads and to quantify the impacts of farm scale mitigation methods for a range of scenarios. This applies the agricultural planning assumptions for RBMP cycle 3 for land management measures (Environment Agency, 2022), as well as information from Defra project WT1594 (Defra, 2019a).

Farmscoper has been subject to external peer review through the publication of a description of Farmscoper and its application within a leading scientific journal (Gooday et al., 2014), and the majority of the component models and methods used within Farmscoper have been published in the external literature. Therefore, the assumptions and methods used within Farmscoper, and the conclusions derived from it and its component models are based on sound scientific principles. Farmscoper was developed as an advisory tool to aid policy makers, as it incorporates assumptions and data appropriate for broad-scale applications and comparisons between differing representative

systems and environments. However, it is now being used more extensively and for a wider range of purposes than it was originally intended for, therefore the consequences of assumptions and other uncertainties in Farmscoper outputs need to be considered in specific decision-making contexts. Any users of Farmscoper outputs need to understand the assumptions, uncertainty, and limitations at the relevant scale of interest.

Confidence in the Farmscoper outputs (Table 3) is based on the accuracy of the census and location data for the catchment:

- High: more than 100 farms
- Medium: 25 to 100 farms
- Low: less than 25 farms
- N/a: too small to be modelled

Table 3: Catchments modelled in Farmscoper V5.

Protected Area Catchment	Type	Confidence
River Avon (Hampshire) SAC	River	High
River Axe SAC	River	High
River Camel SAC	River	High
River Clun SAC	River	High
River Dee SAC	River	High
River Derwent (Yorkshire) SAC	River	High
River Derwent and Bassenthwaite Lake SAC	River	High
River Eden SAC	River	High
River Ehen SAC	River	Medium
River Itchen SAC	River	High
River Kent SAC	River	High
River Lambourn SAC	River	High
River Mease SAC	River	High
River Test SSSI	River	High
River Tweed (England) SAC	River	High
River Wensum SAC	River	High
River Wye SAC (inc. Lugg SSSI)	River	High
Wye Valley (Peaks) SSSI	River	High
Ant Broads and Marshes SSSI	Wetland	Medium
Bure Broads and Marshes SSSI	Wetland	High
Yare Broads and Marshes SSSI	Wetland	High
Esthwaite Water Ramsar	Lake	High
Ouse Washes SAC	Wetland	High
Solent Marine Sites	Estuary	High
Somerset Levels and Moors Ramsar	Wetland	High
Stodmarsh SPA	Wetland	High
Teesmouth and Cleveland Coast SPA	Estuary	High
Waveney Wetland SSSIs	Wetland	High

Scenarios

The modelling scenarios (Table 4) evaluate the effectiveness of nutrient reductions in point and diffuse sources to meet protected site targets and the diffuse sector share of those targets. In the 2030 Full Regulation and 2030 Theoretical Maximum scenario we have applied the Farmscoper v5 reductions (Tables 5 and 6) to the rural land use sector inputs. We have based the point sector measures on the AMP8 Water Industry National Environment Programme agreed in December 2024 ([PR24 WINEP](#)).

Table 4: Summary description of the point and diffuse measures represented in the Simcat SAGIS Scenarios modelled.

Scenario	Point Sector Measures	Diffuse Sector Measures	Model
Actual (2014 to 2020)*	Observed discharge flow and quality (2014 to 2019). Where not available, defaults used.	Current activities as represented post model calibration.	PR24 Calibration
2030 Optimistic	Water company AMP8 quality permit limits incorporated where applicable**	Current activities as represented post model calibration.	PR24 Calibration
2030 At Permit	All discharges represented at permitted flow and quality values up to and including AMP8**	Current activities as represented post model calibration.	PR24 At Permit
2030 Full Regulation	All discharges represented at permitted flow and quality values up to and including AMP8**	Rural land use inputs reduced by Full Regulation values from Farmscoper v5 (Table 6).	PR24 At Permit
2030 Theoretical Maximum	All discharges represented at permitted flow and quality values up to and including AMP8**	Rural land use inputs reduced by Theoretical Maximum values from Farmscoper v5 (Table 6).	PR24 At Permit

*Previously referred to as the 'recent' scenario. **Does not include any discharge flow increases that may be required to support growth.

The Farmscoper V5 scenarios used the agricultural planning assumptions for RBMP cycle 3 for land management measures ([Environment Agency, 2022](#)), as well as information from Defra project WT1594 ([Defra, 2019a](#)) to help inform the current and future agricultural scenarios.

We present outputs for two Farmscoper scenarios to provide estimates of the reduction in nutrient losses from 'full regulation' and 'theoretical maximum' uptake rates in agricultural mitigation measures (Tables 5 to 7). The full regulation scenario estimates full regulatory compliance by representing 100% uptake of regulatory measures, a 25% uptake of [Farming Rules for Water](#) 'reasonable' Regulatory measures, and current rates of uptake of all voluntary and other measures represented in Farmscoper V5. The theoretical maximum scenario estimates a theoretical maximum reduction in losses from agricultural land if there were to be 100% uptake of all measures in Farmscoper V5.

Table 5: Measure uptake rates for the Farmscoper v5 scenarios represented.

Scenario	Regulatory Measures	Farming Rules for Water 'reasonable' measures	Voluntary Measures	Other Measures
Full Regulatory	100%	25%	Current	Current
Theoretical Maximum	100%	100%	100%	100%

Table 6: Catchment specific Farmscoper v5 modelled reduction in rural land use phosphorus losses.

Protected Area Catchment	Full Regulatory	Theoretical Maximum
River Avon (Hampshire) SAC	12%	42%
River Axe SAC	20%	41%
River Camel SAC	14%	44%
River Clun SAC	14%	42%
River Dee SAC*	16%	28%
River Derwent (Yorkshire) SAC	12%	35%
River Derwent and Bassenthwaite Lake SAC	13%	23%
River Eden SAC	17%	29%
River Ehen SAC	9%	17%
River Itchen SAC	10%	43%
River Kent SAC	15%	30%
River Lambourn SAC	12%	41%
River Lugg SSSI*	14%	42%
River Mease SAC	12%	32%
River Test SSSI	10%	39%
River Tweed (England) SAC	10%	34%
River Wensum SAC	12%	37%
River Wye SAC (inc. Lugg SSSI)*	13%	34%
Wye Valley (Peaks) SSSI	13%	30%
Ant Broads and Marshes SSSI	9%	38%
Bure Broads and Marshes SSSI	10%	42%
Yare Broads and Marshes SSSI	11%	34%
Esthwaite Water Ramsar	16%	42%
Ouse Washes SAC	10%	31%
Poole Harbour SPA	15%	46%
Somerset Levels and Moors Ramsar	19%	39%
Stodmarsh SPA	11%	36%
Waveney Wetland SSIs	10%	29%

*Reduction in losses applied to English reaches only.

Table 7: Catchment specific Farmscoper v5 modelled reduction in diffuse nitrate losses.

Catchment	Full Regulatory	Theoretical Maximum
River Clun SAC	4%	13%
Ant Broads and Marshes SSSI	2%	15%
Bure Broads and Marshes SSSI	2%	14%
Yare Broads and Marshes SSSI	6%	18%
Esthwaite Water Ramsar	9%	22%
Poole Harbour SPA	3%	15%
Solent Marine Sites	4%	21%
Stodmarsh SPA	4%	17%
Teesmouth and Cleveland Coast SPA	7%	18%

Catchment average targets

We used the Common Standards Monitoring Guidance (CSMG) targets for phosphate, nitrate, and total nitrogen which are variable across the different catchments. Natural England and the Environment Agency agree these targets for water dependant protected areas and publish them on the [Catchment Data Explorer](#).

For each protected area catchment we used the applicable CSMG target(s) to calculate the catchment average site target. This catchment average approach is referred to in the revised polluter pays principle methodology v0.17. The catchment average target is based on the target values given to each modelled plotting point (spaced no more than 1km along all modelled reaches). In the designated reaches, we assign the modelled plotting points with the target value for the corresponding protected area unit. The modelled plotting points in the reaches upstream of the designated site are also assigned target values. This is because the upstream quality will need to improve in order for the water quality in the designated site to meet the target.

Source apportionment approach

We present source apportionment figures by input sector loads, estimated at the catchment end point for the river and estuary catchments and the modelled assessment point for the wetlands. These estimates represent the total inputs to a catchment after model calibration but before in-river processes have been simulated. For the wetlands, the values presented (Annex 1) do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS.

Apportioning the total input sector loads gives an indication of which sector is the dominant nutrient source. We have greatest confidence in the point sector loads where monitoring data is available. Confidence reduces where the quality and flow from the sector is based on estimates, such as the diffuse sectors (Table 8Table 8:).

The revised polluter pays principle relies on apportionment by catchment average concentration because water quality targets are expressed in concentrations. Apportionment by concentration and by load can be different because inputs from different

sources tend to occur under differing river flow conditions. Inputs from treatment works occur continuously whereas inputs from diffuse sources tend to occur under higher river flow conditions where there is a higher level of dilution available in the receiving water. This means that, on balance, a kilogram of phosphorus discharged from a treatment works will have a relatively greater impact on the in-river concentration than the equivalent input from diffuse sources.

Table 8: Point and diffuse sub-sectors with confidence in the sector data.

Sector	Sub-sector	Confidence in data
Point	Sewage Treatment Works	Medium to High
Point	Intermittent Discharges (Storm Overflows)	Low to High
Point	Industry	High
Diffuse	Rural Land Use	Medium
Diffuse	Urban Runoff	Low
Diffuse	Septic Tanks	Low to Medium
Diffuse	Highways	Low
Diffuse	Atmospheric deposition (nitrogen only).	Medium

Sector share and compliance approach

We followed the revised polluter pays principle methodology (v0.17) to estimate the sector share of the water quality targets as a catchment average. We estimated the baseline (2009) sector share of the targets using data from the PR19 models and the actual (2014 to 2020) sector concentrations from the PR24 calibration models. From these figures we have estimated the catchment average reduction required by the diffuse and point sectors. The catchment scale diffuse sector reduction applies equally to all diffuse sub-sectors.

As these figures are a catchment average reduction there will be locations in the catchment that will need to achieve a greater reduction, and some where a lesser reduction will be needed depending on the water quality at that location. Moreover, there may be locations in a catchment where the point sector investment alone delivers the overall site target and so reductions by the diffuse sector are not required, for example where the point sector discharges are subject to uniform emission standards.

The more detailed catchment modelling summaries provide the detailed CSMG target compliance and assessment with the diffuse sector share within the designated reaches of each protected area (links in Table 1).

Differences with previous modelling

Several protected area catchments have draft Diffuse Water Pollution Plans dating from circa 2014 to 2015, based on modelling using the PR19 models. There may be differences in the catchment scale source apportionment and the percentage sector reductions presented in these earlier Plans and the figures presented in this report and in the

associated catchment modelling summaries. These differences may be for several reasons, including:

- Modelling improvements between the PR19 and PR24 models
- Revisions to the polluter pays principle methodology (v0.17 used)
- Changes to site targets
- Improvements to sector inputs such as water company investment under AMP6

The modelling improvements that are most likely to have influenced the results are:

- Recalculation of headwater areas and flows using an improved methodology.
- Sector allocation of headwater input loads.
- Correlation of rural land use loads with river flows using power curves rather than non-parametric distribution files.
- Inclusion of storm overflows
- Revised calibration tools that calibrate against the whole of the water quality distribution curve, not just the mean.

River results

We present summary outputs for the riverine protected areas in figures below. The tables in Annex 1 provide the specific values used including the sector loads, source apportionment and catchment average concentrations. More detailed outputs, including maps, are available in the catchment modelling summaries published alongside this report (links in Table 1).

Source apportionment

We estimate the total input load phosphate source apportionment to all river catchments to be 29% point source and 71% diffuse source in the Actual (2014-20) scenario. Rural land use (63%) dominates the diffuse sector (Table 9). There are catchments where we estimate the rural land use proportion to be greater than 70%; the Axe, Clun, Ehen, Lugg and Tweed (England) (Figure 2 and Table 13).

There are four catchments where point sources dominate (over 50%) catchment loads; Camel, Derwent and Bassenthwaite Lake, Kent and Test catchments. And in the Hampshire Avon, Itchen, Mease and Test catchments we estimate notable contributions from 'urban' sources (over 20%) (Figure 2 and Table 13). Urban sources include estimates of inputs from impermeable surfaces (roads) and potentially misconnected drainage, which is to be expected in catchments where there are large conurbations.

When we model the water company investment up to 2030 (AMP8) in the calibration model (2030 Optimistic scenario), we estimate the phosphate source apportionment from rural land use sources to increase to 70% and for the proportion from point sources to fall to 20% (Table 9). The most notable change in catchment scale input load phosphate source apportionment is seen in the Camel and Test (Figure 3 and Table 14). There are five catchments where we estimate the point source phosphate catchment average contribution to fall below 10% after the 2030 (AMP8) investment; Axe, Clun, Lambourn, Lugg and Mease (Figure 3 and Table 14).

When the water company investment up to 2030 (AMP8) is modelled in the more precautionary At Permit model (2030 At Permit scenario), we estimate the phosphate source apportionment of total input loads to all river catchments to be 65% from rural land use sources and 26% from point sources (Table 9 and Figure 4). The source apportionment changes incrementally under the subsequent scenarios. When we apply the Full Regulation and Theoretical Maximum reductions to the rural land use sector (Table 6), the contribution from the rural land use sector falls from 65% in the 2030 At Permit scenario to 63% and 59% respectively (Table 9, Figure 5 and Figure 6).

We did not model the rural land use Farmscoper v5 reductions for the Derwent (Yorkshire) and Ehen catchments because these catchments were shown to meet both the overall protected site CSMG targets and the diffuse sector share of the targets under both the 2030 Optimistic and 2030 At Permit scenarios.

Table 9: Total estimated phosphate input load source apportionment from all modelled river catchments. See Table 18 for the sector load values.

Scenario	Point Sources	Rural Land Use	Urban	Septic Tanks	Other
Actual (2014 to 2020)	29%	63%	6%	2%	0%
2030 Optimistic	20%	70%	7%	2%	1%
2030 At Permit	26%	65%	7%	2%	1%
2030 Full Regulation	27%	63%	8%	2%	1%
2030 Theoretical Maximum	30%	59%	8%	2%	1%

The Clun SAC is the only river protected area with a nitrogen-related target. We estimate the proportion of nitrate coming from rural land use to be greater than 80% in all scenarios (Table 10 and Figure 1).

Table 10: Estimated nitrate input load source apportionment from the river Clun SAC catchment endpoint. See Table 19 for sector load values.

Scenario	Point Sources	Rural Land Use	Urban	Septic Tanks	Other
Actual (2014 to 2020)	2%	83%	0%	0%	14%
2030 Optimistic	2%	83%	0%	0%	14%
2030 At Permit	3%	82%	0%	0%	14%
2030 Full Regulation	3%	82%	0%	0%	15%
2030 Theoretical Maximum	3%	80%	0%	0%	16%

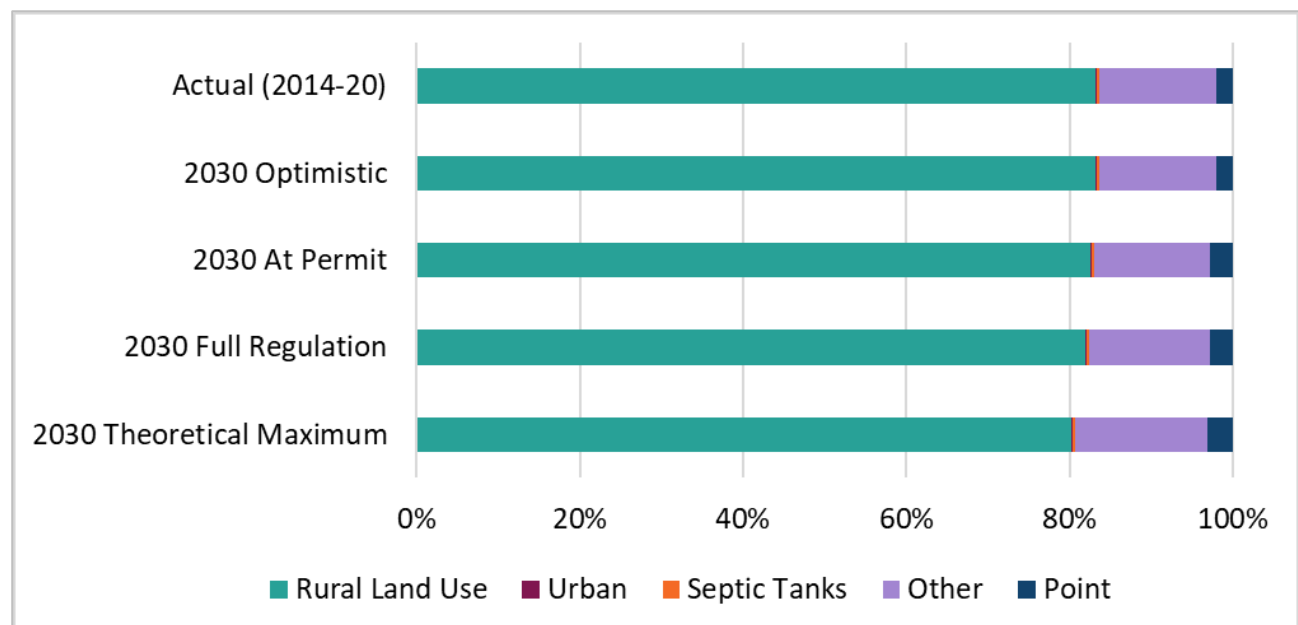


Figure 1: Estimated nitrate input load source apportionment for the river Clun SAC for all modelled scenarios. See Table 10 for data.

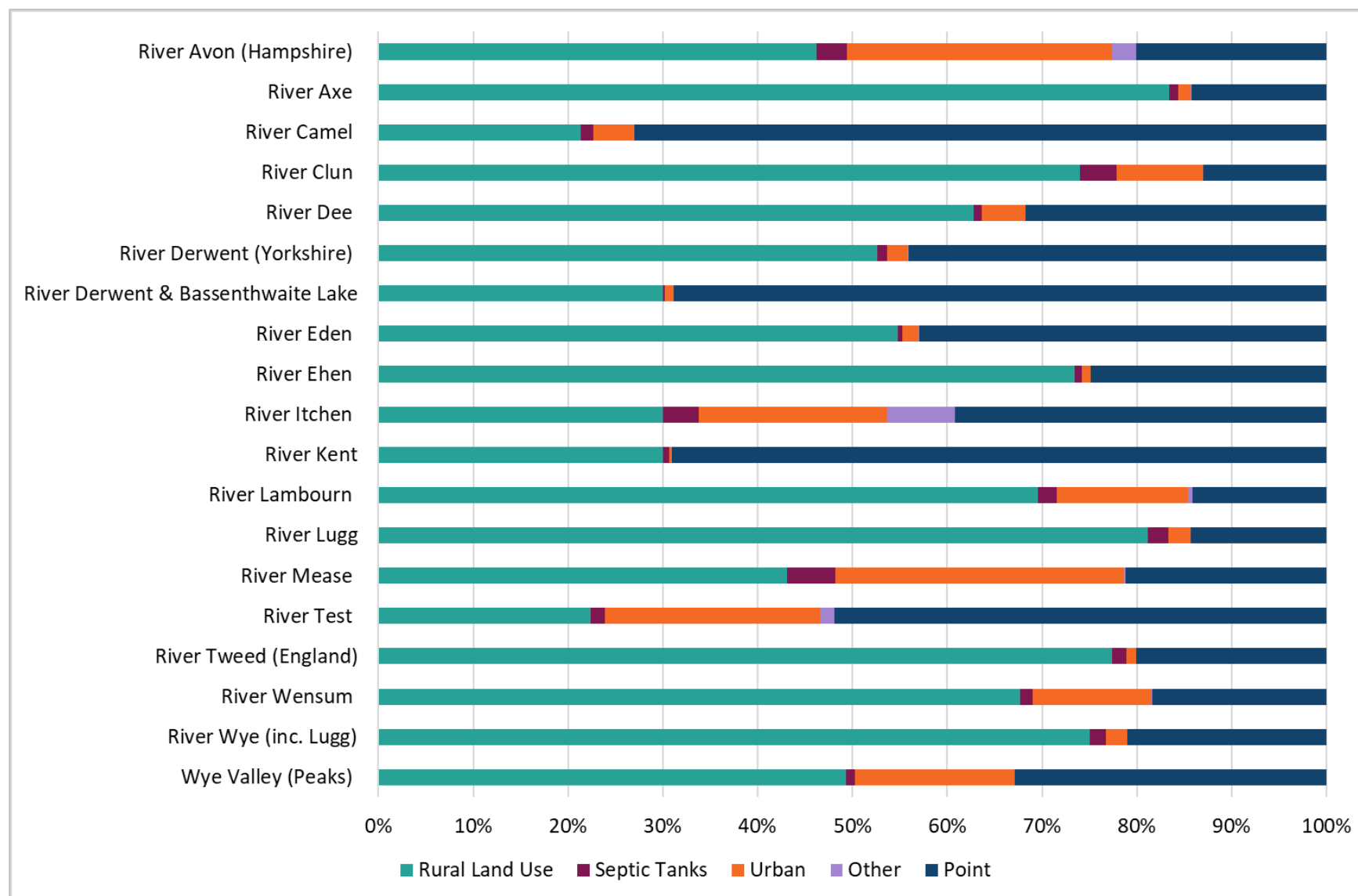


Figure 2: Estimated phosphate catchment input load source apportionment for the river catchments for the Actual (2014 to 2020) scenario. Phosphate source apportionment is dominated (more than 50%) by diffuse sources of nutrients. See Table 13 for data.

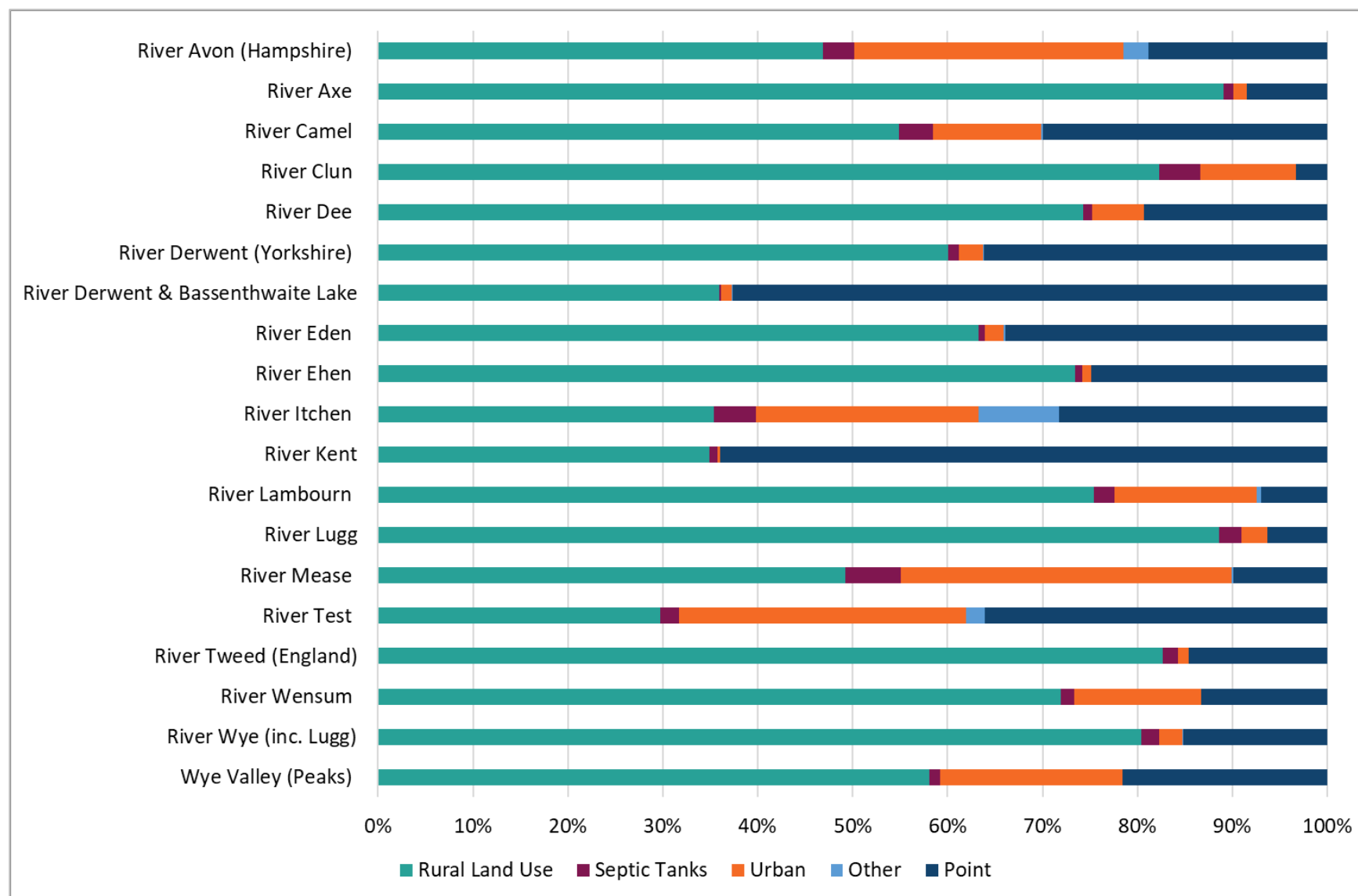


Figure 3: Estimated phosphate catchment input load source apportionment for the river catchments for the 2030 Optimistic scenario. Phosphate source apportionment is further dominated by diffuse sources of nutrients, particularly from rural land use. See Table 14 for data.

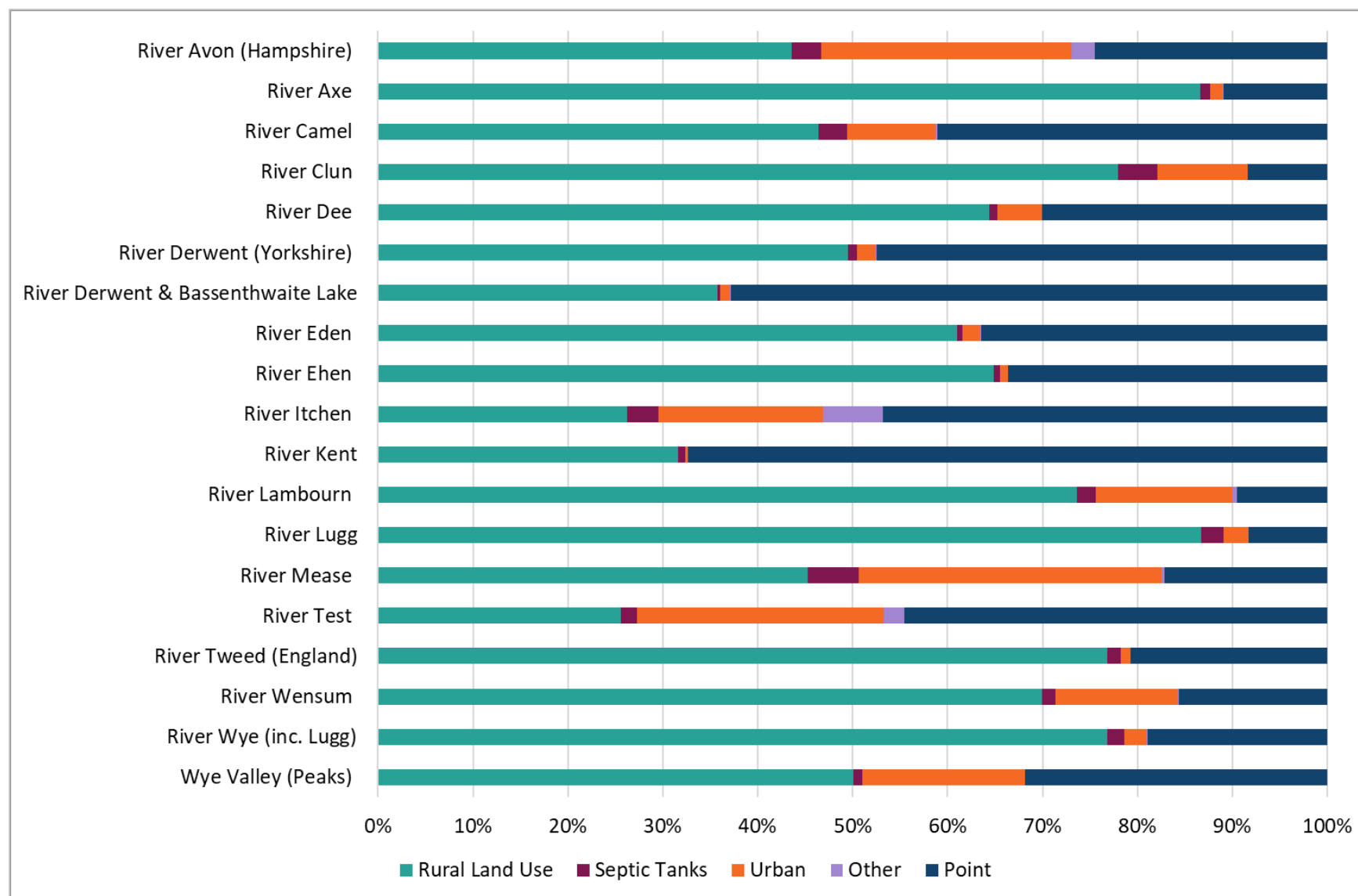


Figure 4: Estimated phosphate catchment input load source apportionment for the river catchments for the 2030 At Permit scenario. See Table 15 for data.

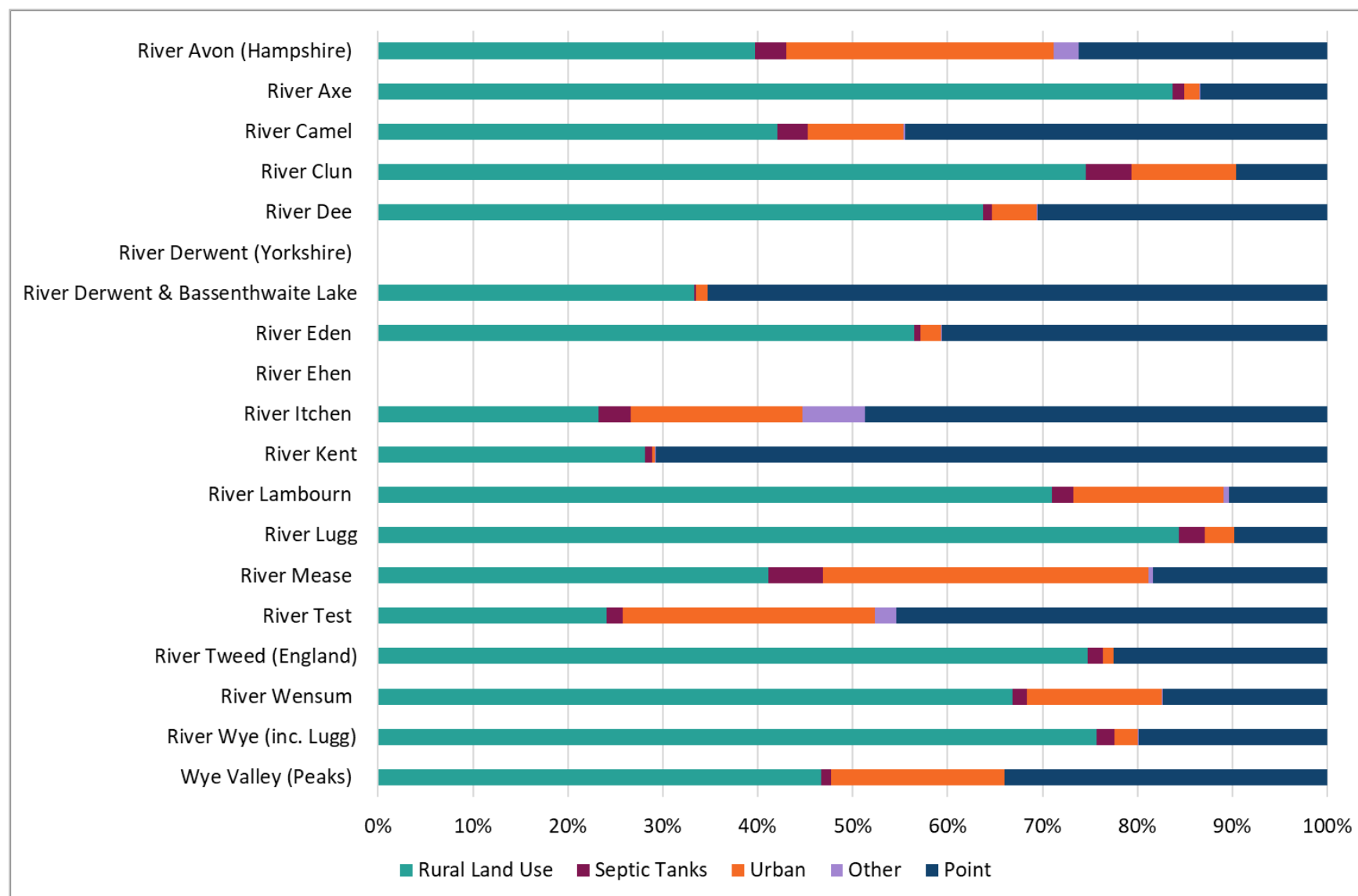


Figure 5: Estimated phosphate catchment input load source apportionment for the river catchments for the 2030 Full Regulation scenario. Derwent (Yorkshire) and Ehen diffuse sector share met and so this scenario is not necessary. See Table 16 for data.

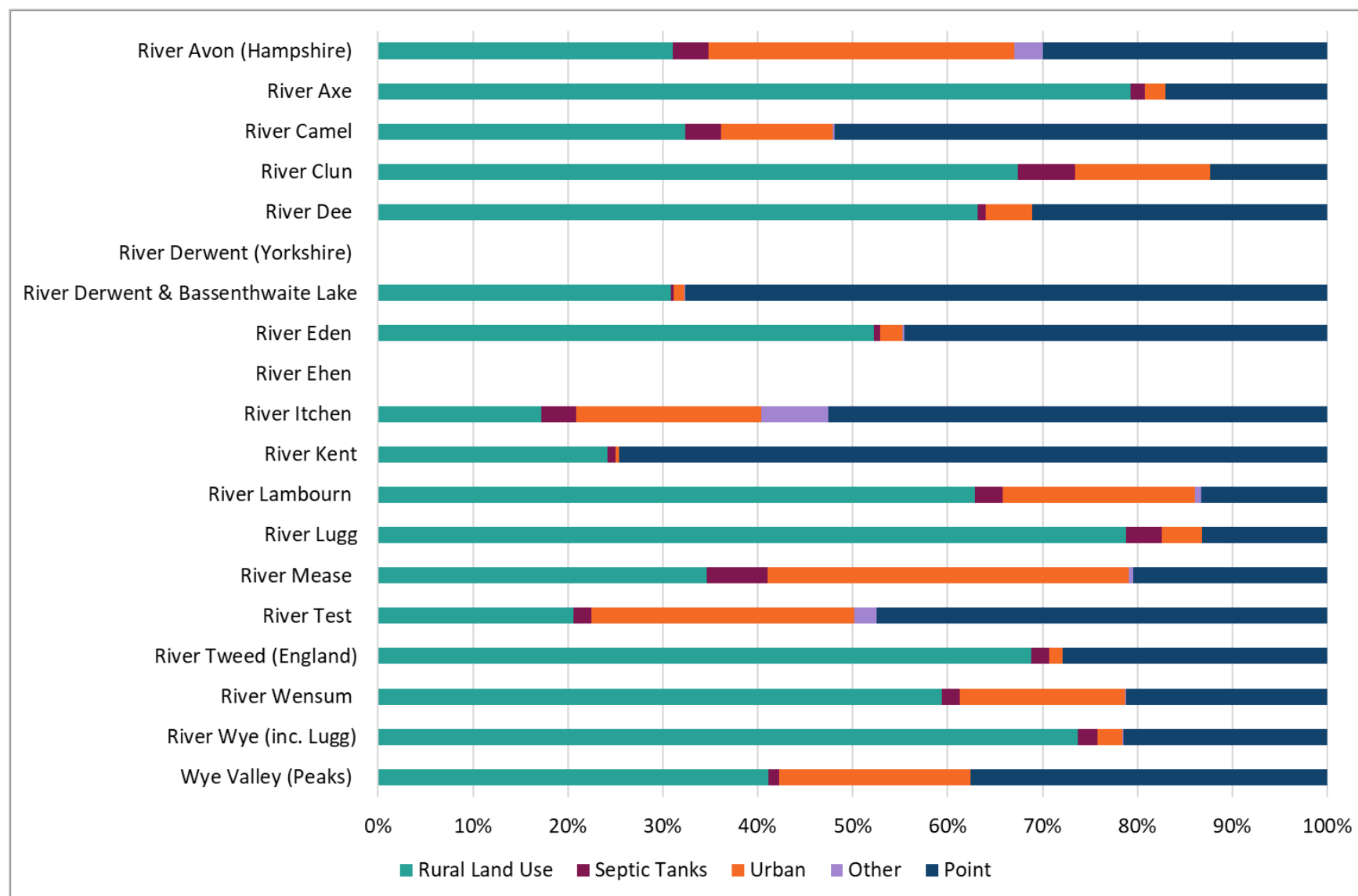


Figure 6: Estimated phosphate catchment input load source apportionment for the river catchments for the 2030 Theoretical Maximum scenario. Derwent (Yorkshire) and Ehen diffuse sector share met and so this scenario is not necessary. See Table 17 for data.

Catchment average statistics and reductions

In the detailed modelling summaries for each catchment (Table 1) we use maps to show the estimated concentration reductions needed for the protected area CSMG targets and the diffuse sector share of the targets to be met within the designated reaches of each protected area.

Compliance with riverine CSMG protected site targets

We present the catchment average phosphate protected site targets alongside the modelled total catchment average concentrations for each scenario (Figure 9 and Table 32 to Table 37). This shows how the catchment average concentrations reduce with the implementation of the AMP8 WINEP and with the Farmscoper v5 reductions applied to the rural land use loads.

In the majority of catchments, we estimate the catchment average phosphate concentrations to greatly exceed the catchment average protected site targets in the Actual (2014 to 2020) scenario (Figure 10). On average, we estimate total phosphate concentrations to need to reduce by 42% to meet the catchment average target. The highest estimated catchment average concentrations are in the Mease catchment (Figure 10), however the greatest reduction required is in the Clun catchment (over 80%) because the protected site target for the Clun (0.01mg/l) is tighter than that for the Mease (0.048mg/l) (Table 32).

There are four catchments where we estimate the protected site target to be met as a catchment average in the Actual (2014 to 2020) scenario; Camel, Ehen, Kent and Tweed (England) (Figure 9 and Table 32). However, there are locations within the Camel, Kent and Tweed (England) designated reaches where the protected site targets are not met. This detail is shown on the maps in the catchment modelling summaries (links in Table 1).

The 2030 Optimistic scenario estimates the concentrations after the implementation of AMP8 water company investment in the calibration model. The 2030 At Permit scenario estimates the concentrations after the implementation of AMP8 water company investment in the more precautionary At Permit model. There are five catchments where we estimate the protected site target to be met as a catchment average under both of these scenarios; Camel, Derwent and Bassenthwaite Lake, Ehen, Kent and Tweed (England) (Figure 9, Table 33 and Table 34). There are locations, however, within the Camel, Derwent and Bassenthwaite Lake, Kent and Tweed (England) designated reaches where the protected site targets are not met. This detail is shown on the maps in the catchment modelling summaries (links in Table 1). The protected site targets are estimated to be met in the Ehen SAC under all scenarios (Figure 9 and Table 32).

While we estimate the catchment average phosphate concentrations for the Derwent (Yorkshire) catchment to not meet the phosphate site targets as a catchment average, we estimate that the site targets are met in the designated reaches of the protected site. This

detail is shown on the maps in the Derwent (Yorkshire) SAC modelling summary (link in Table 1).

In the Clun catchment, we estimate the nitrate concentrations to be over twice the protected site target in all of the scenarios (Figure 7), and so estimated reductions needed are greater than 50% (Table 37).

Diffuse sector share of the riverine protected site targets

We also present the catchment average diffuse sector share of the target alongside the modelled diffuse sector concentrations in the Actual (2014 to 2020) scenario, the 2030 Full Regulation scenario and the 2030 Theoretical Maximum scenario. This shows how the catchment average diffuse sector concentrations reduce with the Farmscoper v5 reductions applied to the rural land use loads (Table 6).

In the majority of catchments, we estimate the catchment average diffuse phosphate concentrations to greatly exceed the catchment average diffuse sector share of the phosphate target in the Actual (2014 to 2020) scenario (Figure 10). On average, we estimate that diffuse phosphate concentrations in the river catchments need to reduce by 49% for the diffuse sector share of the target to be met. The highest catchment average diffuse sector concentrations are estimated to be in the Mease and Axe catchments (Figure 10). However, the greatest reduction required is in the Clun catchment (90%) because the diffuse sector share of the protected site target is tighter for the Clun (0.005mg/l) than for the Mease (0.024mg/l) (Table 32).

Under the 2030 Full Regulation and 2030 Theoretical Maximum scenarios, where the reduction in losses estimated by Farmscoper are applied to the rural land use sector (Table 6), we show that the diffuse catchment average concentrations reduce incrementally across all catchments, however the reductions are insufficient for the catchment average diffuse sector share to be met (Figure 10). This is particularly the case where urban diffuse sources of phosphate are notable (Figure 2).

There are five catchments where we estimate the diffuse sector share to be met in the Actual (2014 to 2020) scenario as a catchment average; Camel, Derwent and Bassenthwaite Lake, Kent, Tweed (England) and Ehen. With the exception of the Ehen however, there are locations in the designated reaches of these catchments where the diffuse sector share of the target is not met and where diffuse reductions are therefore needed. This detail is captured in the maps shown in the catchment specific modelling summaries (links in Table 1). In the Ehen, we estimate that the diffuse sector share of the target is met throughout the designated reaches of the protected area in the Actual (2014 to 2020) scenario.

Similarly, while we estimate the catchment average diffuse phosphate concentration in the Derwent (Yorkshire) catchment to exceed the diffuse sector share of the catchment average target (Figure 10), the diffuse share of the target is met throughout the designated

reaches of the protected area. This detail is captured in the maps provided in the Derwent (Yorkshire) modelling summary (link in Table 1).

In the Clun catchment, we estimate the catchment average diffuse nitrate concentrations to be over twice the diffuse sector share of the target in the Actual (2014 to 2020) scenario (Figure 8). When the full regulation and theoretical maximum reductions are applied to the rural land use sector inputs, further reductions of over 50% remain necessary (Table 37).

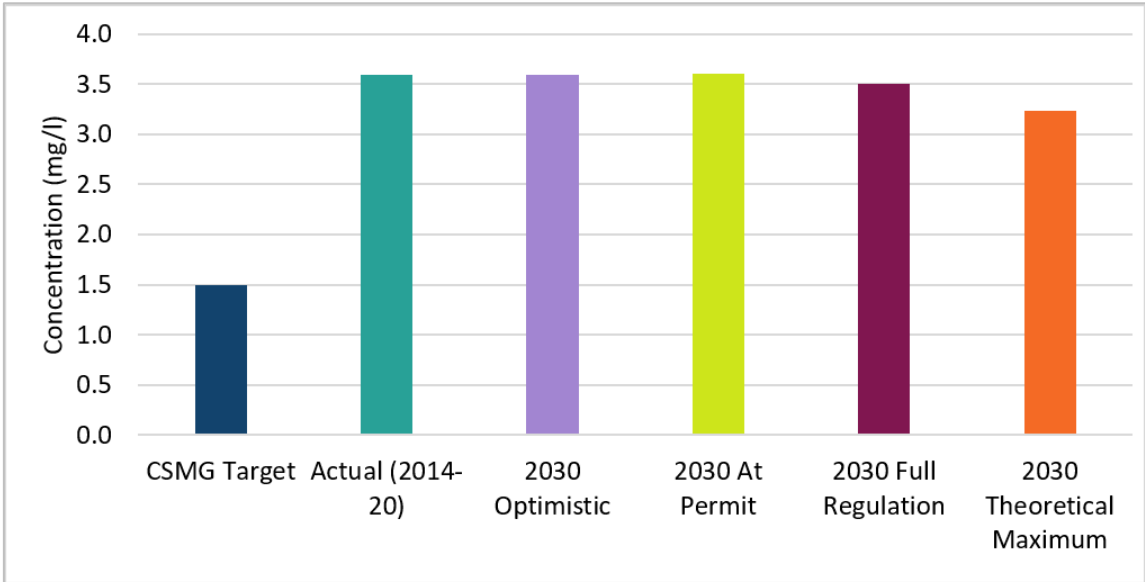


Figure 7: River Clun protected site nitrate target (mg/l) in dark blue alongside the catchment average concentration in the Actual (2014 to 2020) scenario (green), the 2030 Optimistic scenario (lavender), 2030 At Permit scenario (lime green) 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). See Table 37 for data.

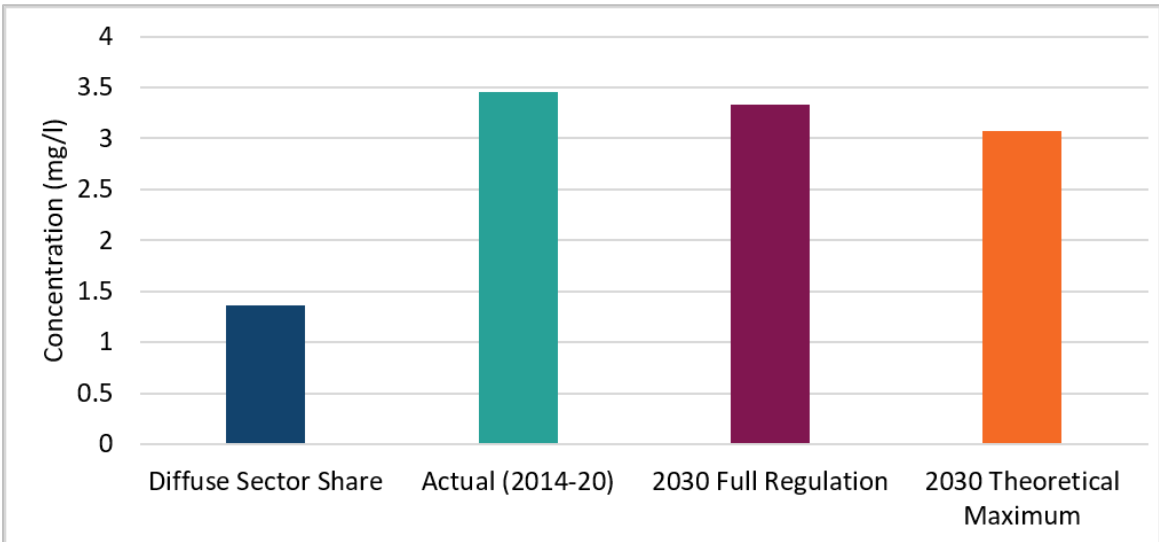


Figure 8: River Clun diffuse sector share of the protected area nitrate target (mg/l) in dark blue alongside the diffuse sector concentration in the Actual (2014 to 2020) scenario (green), the 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). See Table 37 for data.

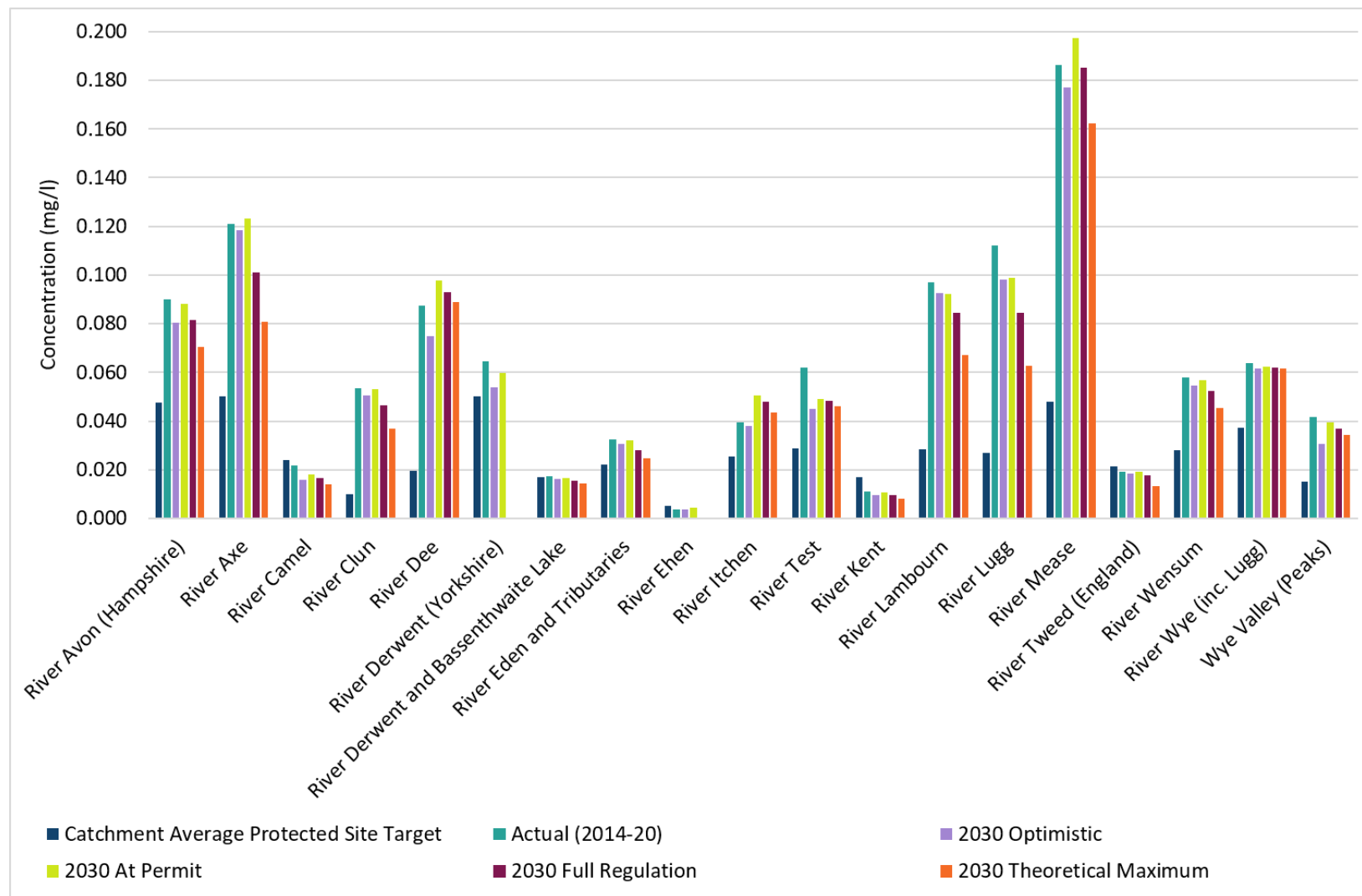


Figure 9: Estimated phosphate catchment average protected site target (mg/l) in dark blue alongside the catchment average concentration in the Actual (2014 to 2020) scenario (green), the 2030 Optimistic scenario (lavender), 2030 At Permit scenario (lime green) 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Derwent (Yorkshire) and Ehen diffuse sector share met and so the latter scenarios are not necessary. See Tables 32 to 36 for data.

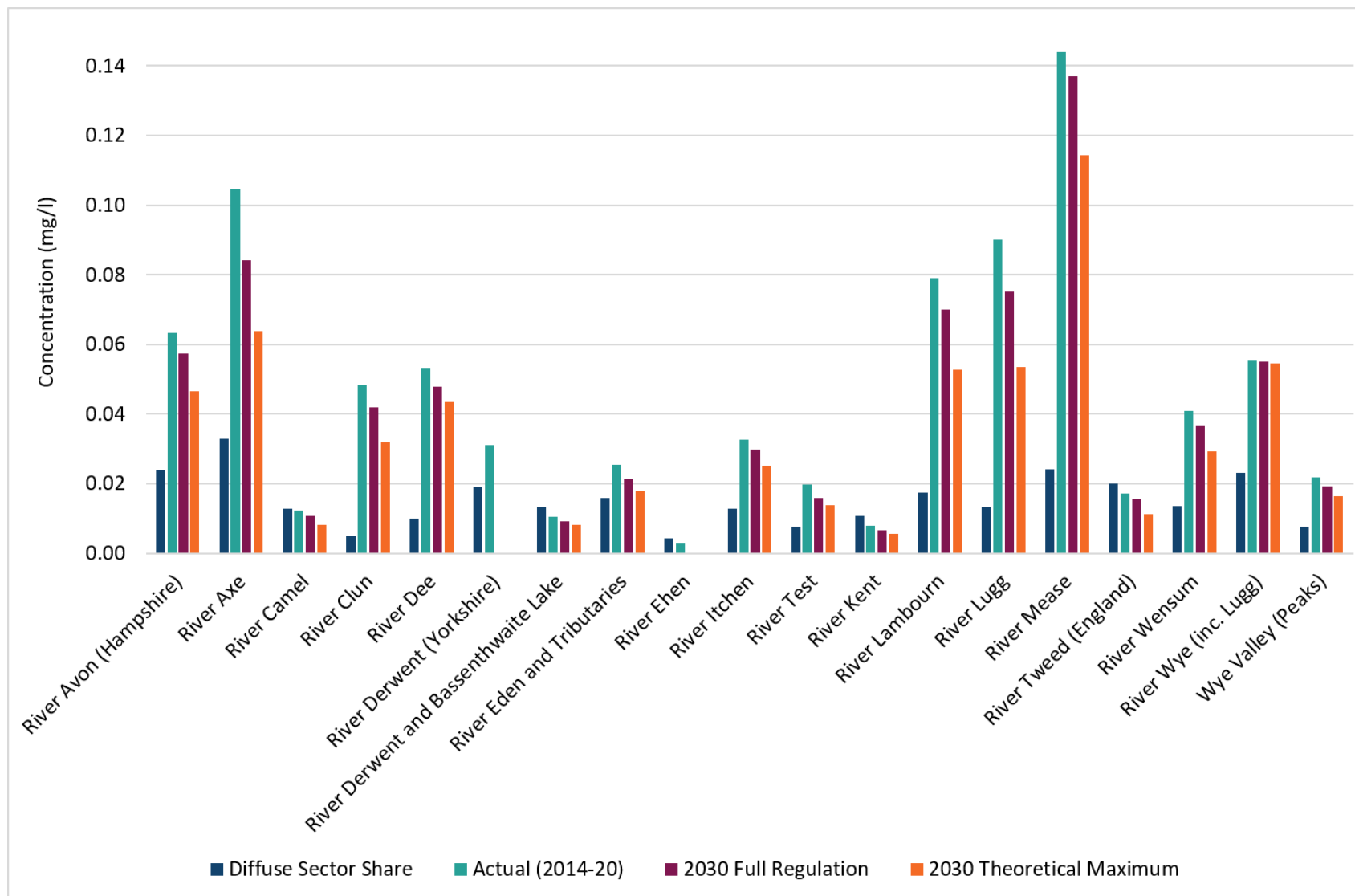


Figure 10: Estimated phosphate catchment average diffuse sector share of the target (mg/l) in dark blue alongside the diffuse sector concentration in the Actual (2014-20) scenario (green), the 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Derwent (Yorkshire) and Ehen diffuse sector share met and so the latter scenarios are not necessary. See Tables 32, 35 and 35 for data.

Wetland, lake and estuary results

We present summary outputs for each wetland, lake and estuary protected area in figures below. The tables in Annex 1 provide the specific values used including the sector loads, source apportionment and concentrations. More detailed outputs, including maps, are available in the individual catchment modelling summaries (links in Table 1).

Source apportionment

We estimate the total catchment input load phosphate and nitrate source apportionment to all wetland, lake and estuary catchments. For the wetlands, the values presented (Annex 1) do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. With the exception of Esthwaite Water, the values presented are based on the modelled phosphate or nitrate directly from Simcat SAGIS. We used the Simcat SAGIS lake model for Esthwaite Water, meaning total phosphorus and total nitrogen values are directly available from the model, without conversion. For the Solent Marine Sites, Stodmarsh and Teesmouth and Cleveland Coast, we have added load estimates from direct discharges to the protected sites to the modelled outputs.

Phosphate

Phosphate catchment input load source apportionment for the wetlands and lake in the Actual 2014 to 2020 scenario is mixed (Figure 11). We estimate the total catchment input load phosphate source apportionment to all wetland and lake catchments to be 49% point source and 51% diffuse source in the Actual (2014 to 2020) scenario (Table 11). Rural land use (39%) dominates the diffuse sector (Table 11).

We estimate rural land use sources to dominate (over 50%) in three catchments; Bure Broads and Marshes, Waveney at Geldeston Meadows and Somerset Levels and Moors. Urban diffuse sources are prominent in all catchments except the Waveney valley, Esthwaite Water and Poole Harbour (Figure 11 and Table 20)

When we model the water company investment up to 2030 (AMP8) in the calibration model (2030 Optimistic scenario), the proportion of phosphate coming from the point sector reduces to 22% and increases from the rural land use sector to 57% (Table 11 and Figure 12). This is with the notable exception of the Ant Broads and Marshes where the rural land use proportion is estimated to remain below 10% (Figure 12 and Table 21).

When the water company investment up to 2030 (AMP8) is modelled in the more precautionary At Permit model (2030 At Permit scenario), we estimate the phosphate source apportionment of total input loads to all wetland and lake catchments to be 56% from rural land use sources and 24% from point sources (Table 11 and Figure 13). The source apportionment changes incrementally under the subsequent scenarios. When we apply the Full Regulation and Theoretical Maximum reductions to the rural land use sector (Table 6),

the contribution from the rural land use sector falls from 56% in the 2030 At Permit scenario to 52% and 45% respectively (Table 11, Figure 14 and Figure 15).

Table 11: Total estimated phosphate input load source apportionment for all modelled wetland and lake catchments. See Table 25 for the sector load values. Values incorporated for Esthwaite Water and Poole Harbour are total phosphorus.

Scenario	Point Sources	Rural Land Use	Urban	Septic Tanks	Other
Actual (2014 to 2020) including values for Poole and Harbour	44.1% (49.7%)	40.7% (37.7%)	13.2% (10.9%)	1.9% (1.7%)	0.1% (0.0%)
2030 Optimistic	22%	57%	18%	3%	0%
2030 At Permit	24%	56%	17%	3%	0%
2030 Full Regulation	27%	52%	19%	3%	0%
2030 Theoretical Maximum	30%	45%	22%	3%	0%

Nitrate

For nitrate, we estimate the total catchment input load source apportionment to all wetland, lake and estuary catchments to be more prominently dominated by rural land use sources in all scenarios (over 60%) (Table 12).

However, for Esthwaite Water rural land use and 'other' loads are broadly equivalent, 'other' sources includes atmospheric deposition (Figure 16 and Table 26). Similarly, we estimate the Teesmouth and Cleveland Coast rural land use and point source loads to be broadly equivalent, this is because there are large industrial and wastewater treatment works discharging directly to the Teesmouth and Cleveland Coast in the Actual (2014 to 2020) scenario.

When we model the water company investment up to 2030 (AMP8) in the calibration model (2030 Optimistic scenario), the proportion of nitrate estimated to be from the point sector reduces to 15% and increases from the rural land use sector to 77% (Table 12 and Figure 17). The most notable increase in the rural land use nitrate load is estimated to be in the Stodmarsh and Teesmouth and Cleveland Coast catchments (Figure 17).

When the water company investment up to 2030 (AMP8) is modelled in the more precautionary At Permit model (2030 At Permit scenario), we estimate the nitrate source apportionment of total input loads to all wetland, lake estuary catchments to be 68% from rural land use sources and 25% from point sources (Table 12 and Figure 18). When we apply the Full Regulation and Theoretical Maximum reductions to the rural land use sector (Table 6), the contribution from the rural land use sector falls from 68% in the 2030 At Permit scenario to 67% and 63% respectively (Table 12, Figure 19 and Figure 20).

Table 12: Total estimated nitrate input load source apportionment for all modelled wetland and lake catchments. See Table 31 for the sector load values. Values incorporated for Esthwaite Water are total nitrogen.

Scenario	Point Sources	Rural Land Use	Urban	Septic Tanks	Other
Actual (2014 to 2020) including values for Lindisfarne and Poole Harbour	24.0% (23.6%)	68.8% (69.8%)	1.2% (1.0%)	0.1% (0.1%)	6.3% (5.7%)
2030 Optimistic	15%	77%	1%	0%	7%
2030 At Permit	25%	68%	1%	0%	6%
2030 Full Regulation	26%	67%	1%	0%	6%
2030 Theoretical Maximum	29%	63%	1%	0%	7%

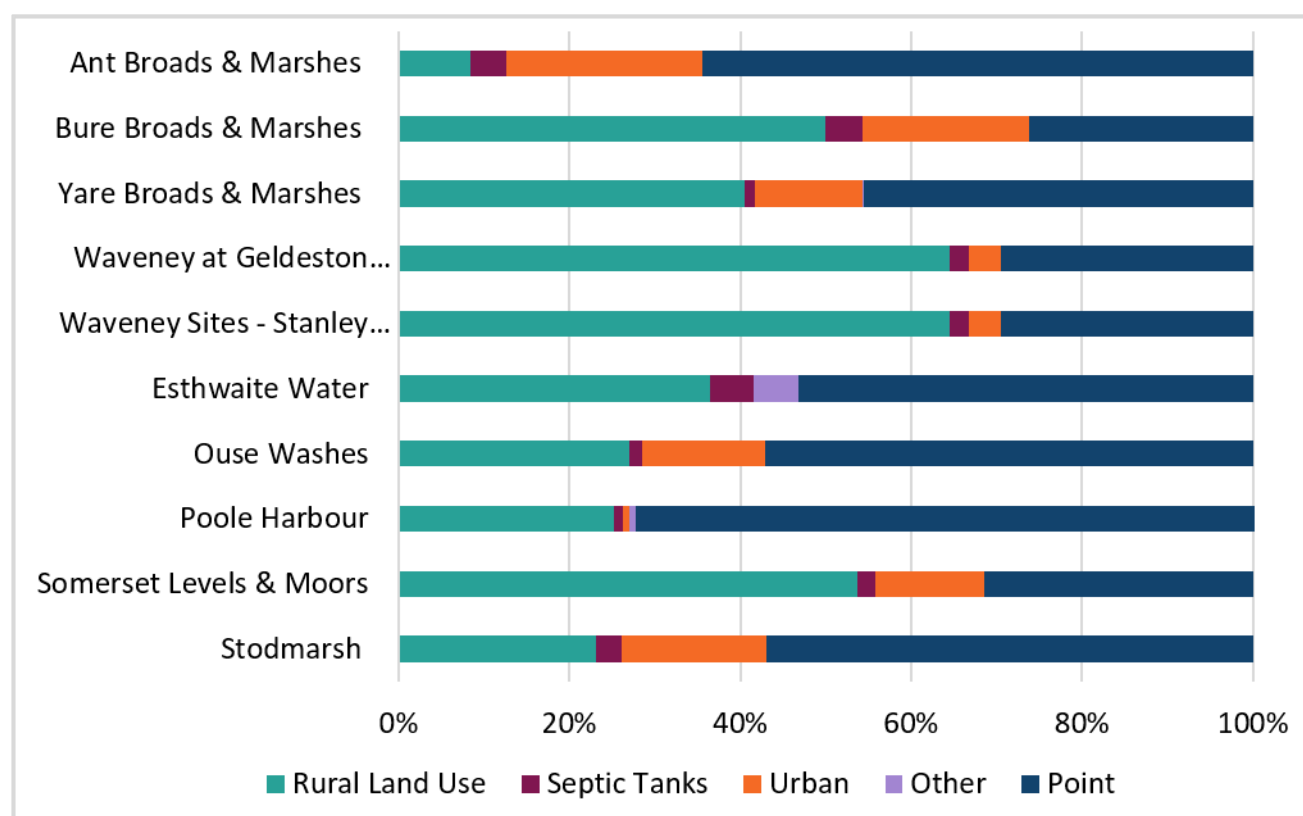


Figure 11: Estimated phosphate catchment input load source apportionment for the wetlands and lakes for the Actual (2014 to 2020) scenario. Total phosphorus for Esthwaite Water and Poole Harbour. See Table 20 for the data.

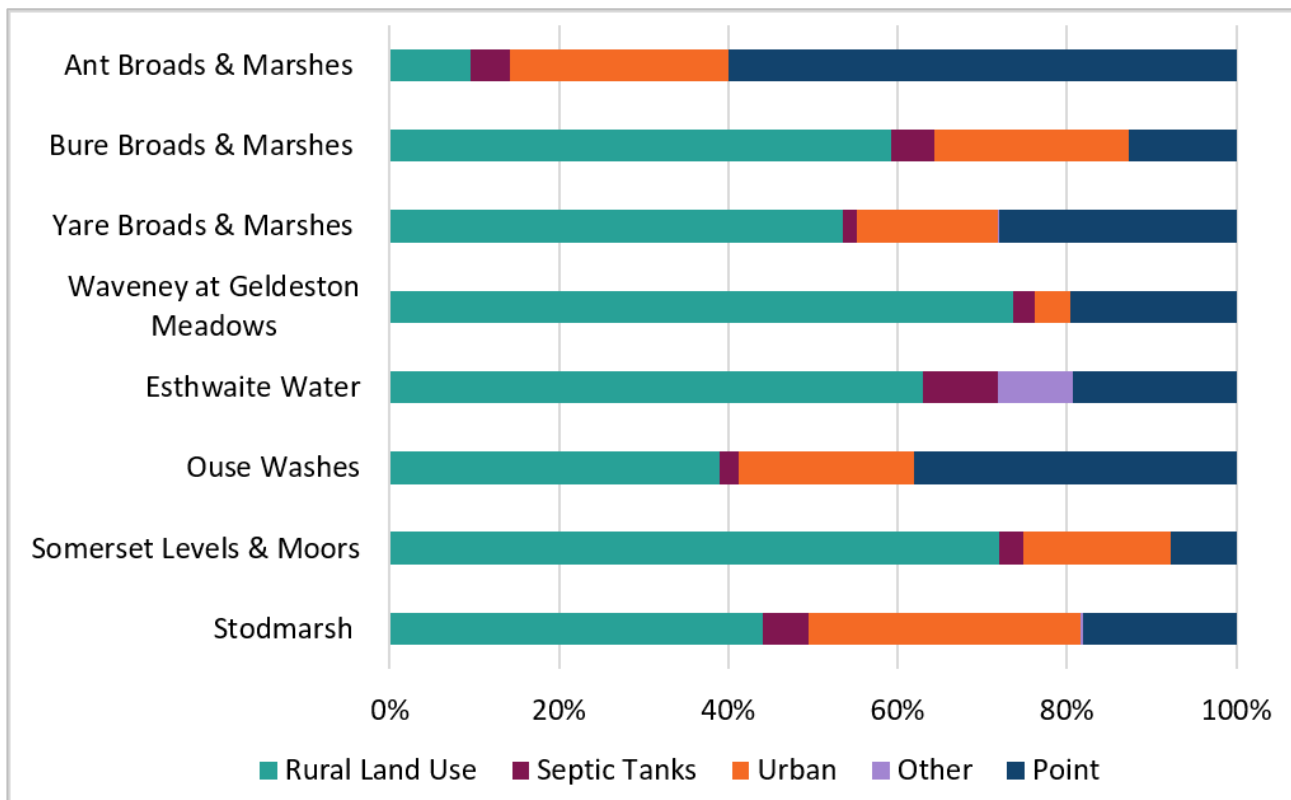


Figure 12: Estimated phosphate catchment input load source apportionment for the wetlands and lakes for the 2030 Optimistic scenario. Total phosphorus for Esthwaite Water. See Table 21 for the data.

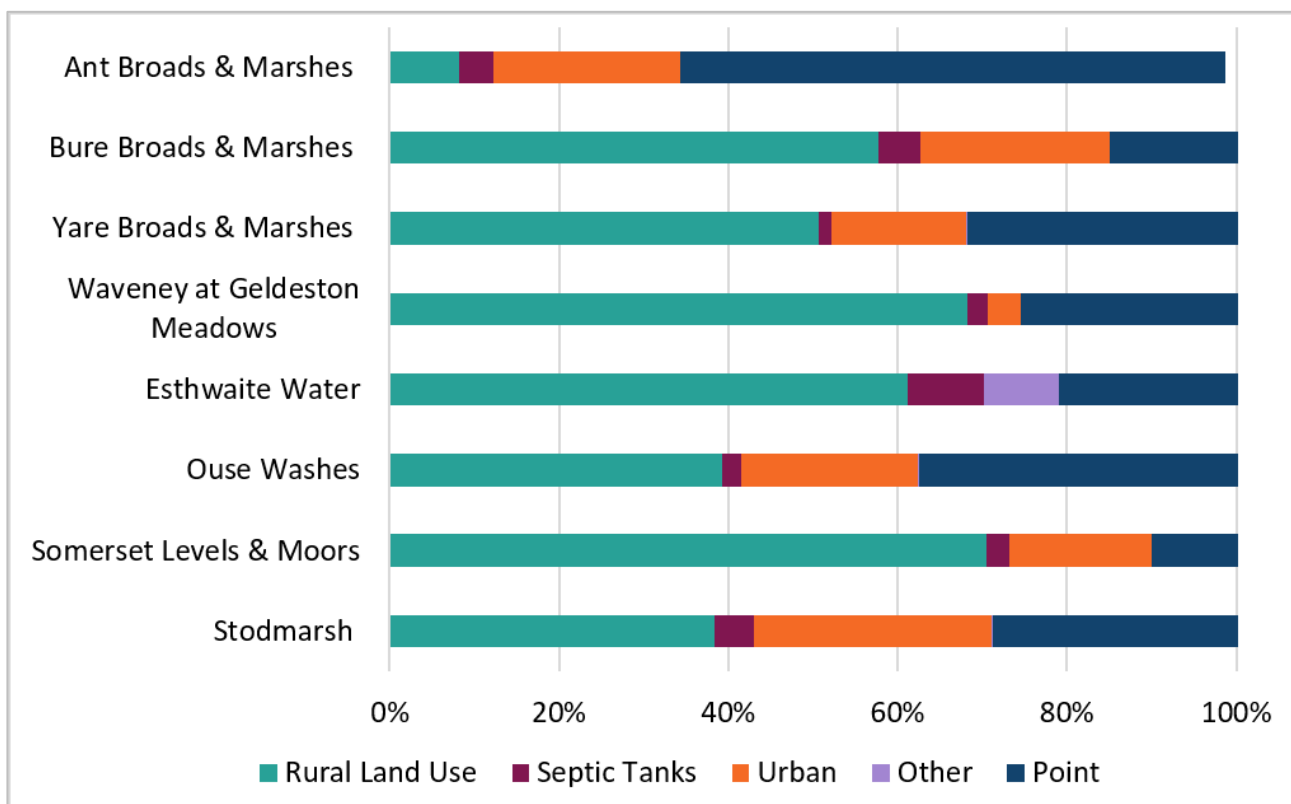


Figure 13: Estimated phosphate catchment input load source apportionment for the wetlands and lakes for the 2030 At Permit scenario. Total phosphorus for Esthwaite Water. See Table 22 for the data.

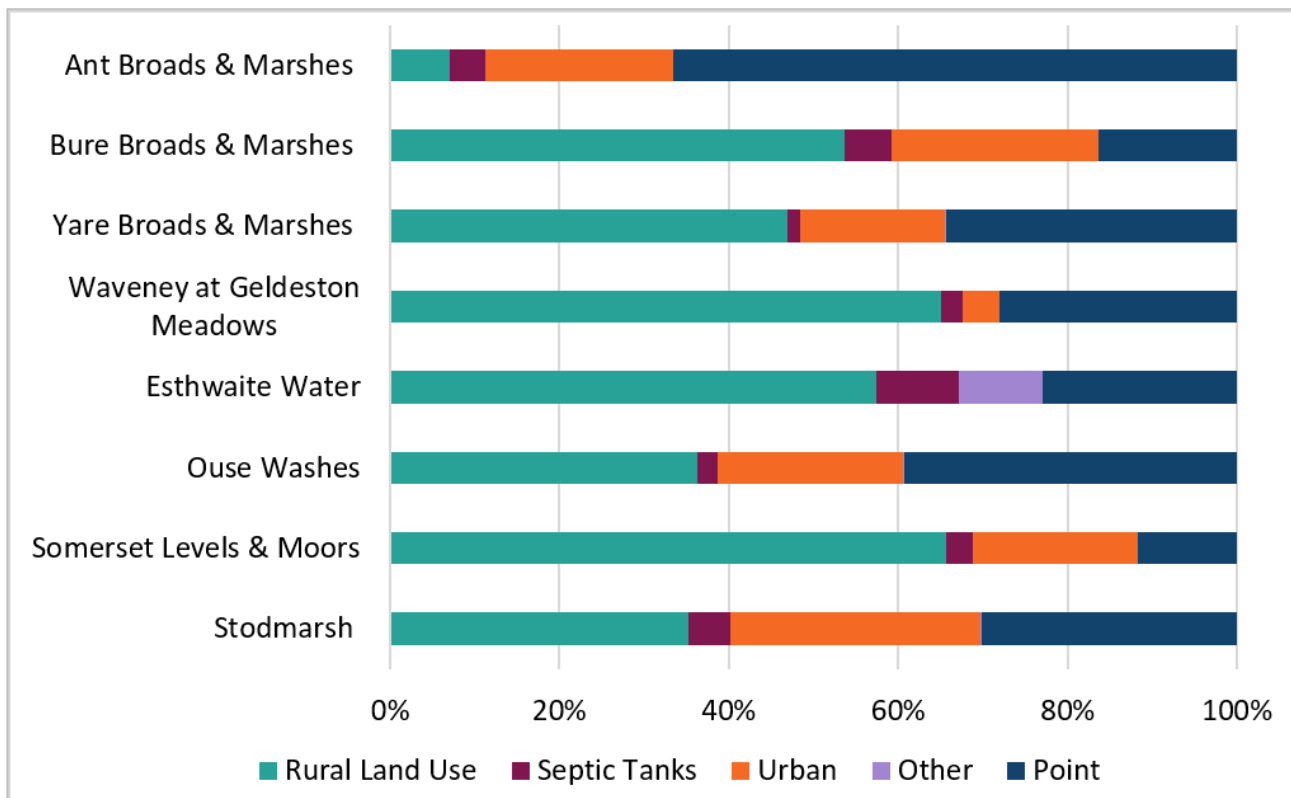


Figure 14: Estimated phosphate catchment input load source apportionment for the wetlands and lakes for the 2030 Full Regulation scenario. Total phosphorus for Esthwaite Water. See Table 23 for the data.

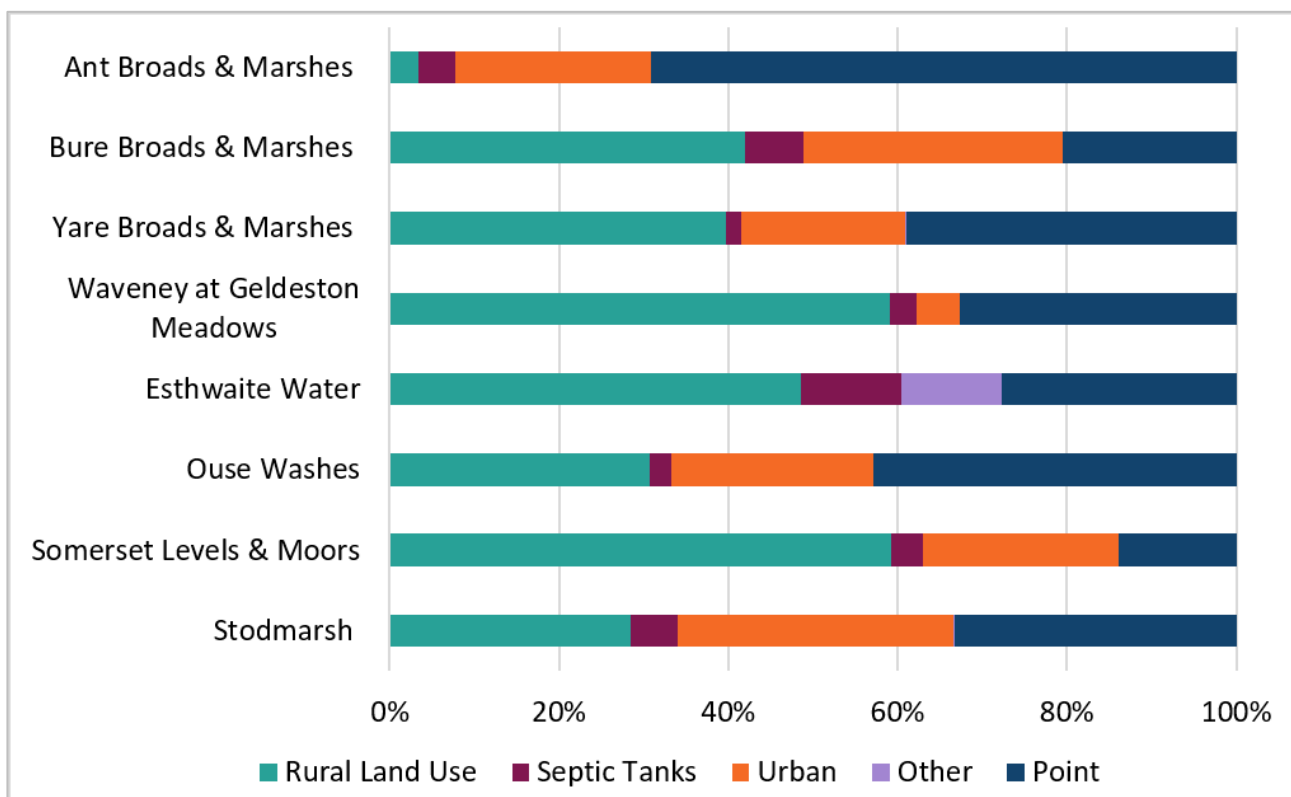


Figure 15: Estimated phosphate catchment input load source apportionment for the wetlands and lakes for the 2030 Theoretical Maximum scenario. Total phosphorus for Esthwaite Water. See Table 24 for the data.

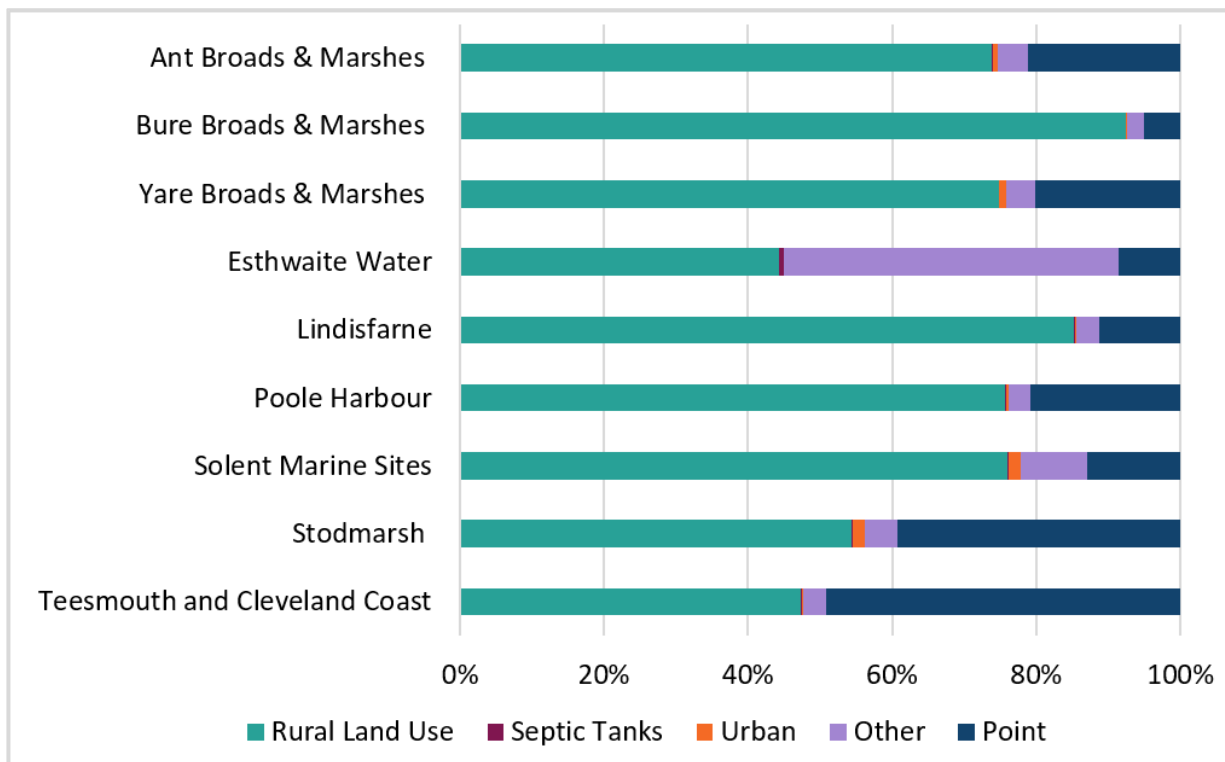


Figure 16: Estimated nitrate catchment input load source apportionment for the wetlands lake and estuaries for the Actual (2014 to 2020) scenario. Total nitrogen for Esthwaite Water. See Table 26 for the data.

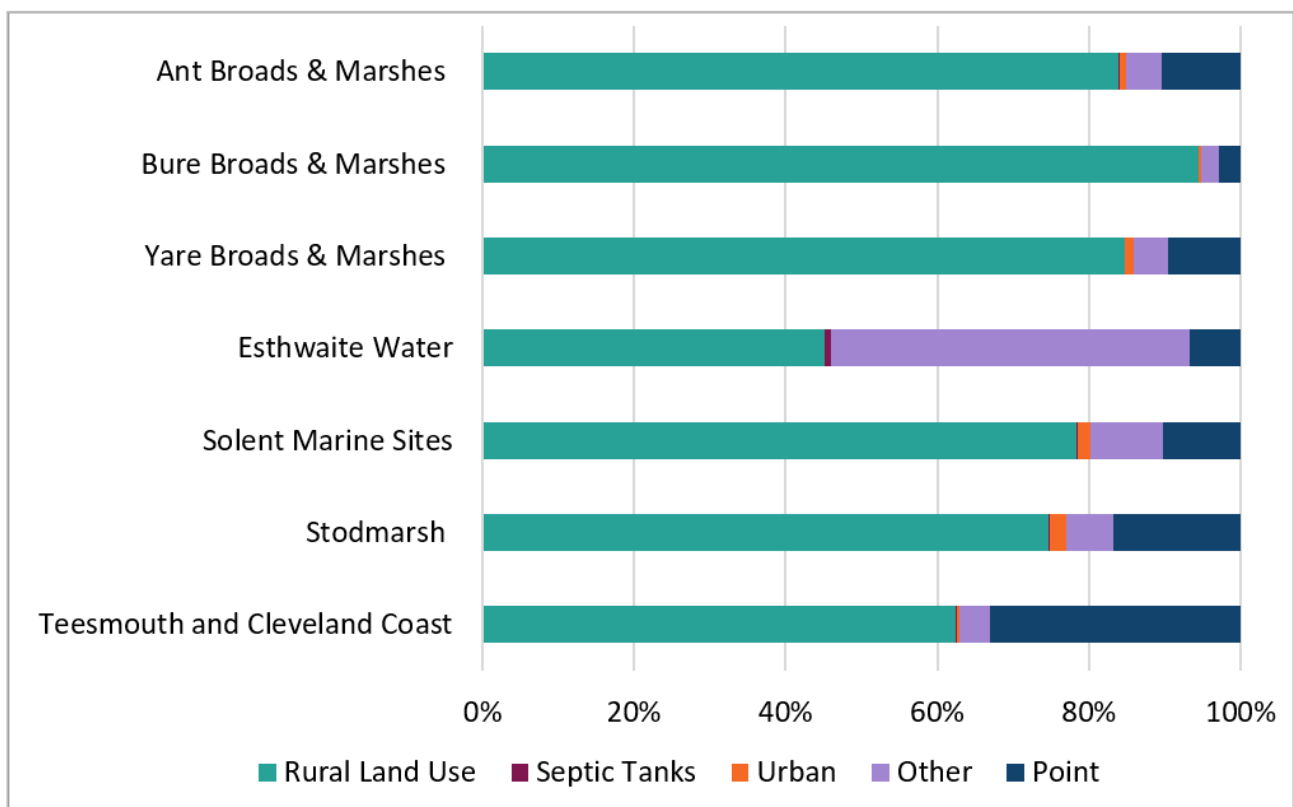


Figure 17: Estimated nitrate catchment input load source apportionment for the wetlands and lakes for the 2030 Optimistic scenario. Total nitrogen for Esthwaite Water. See Table 27 for the data.

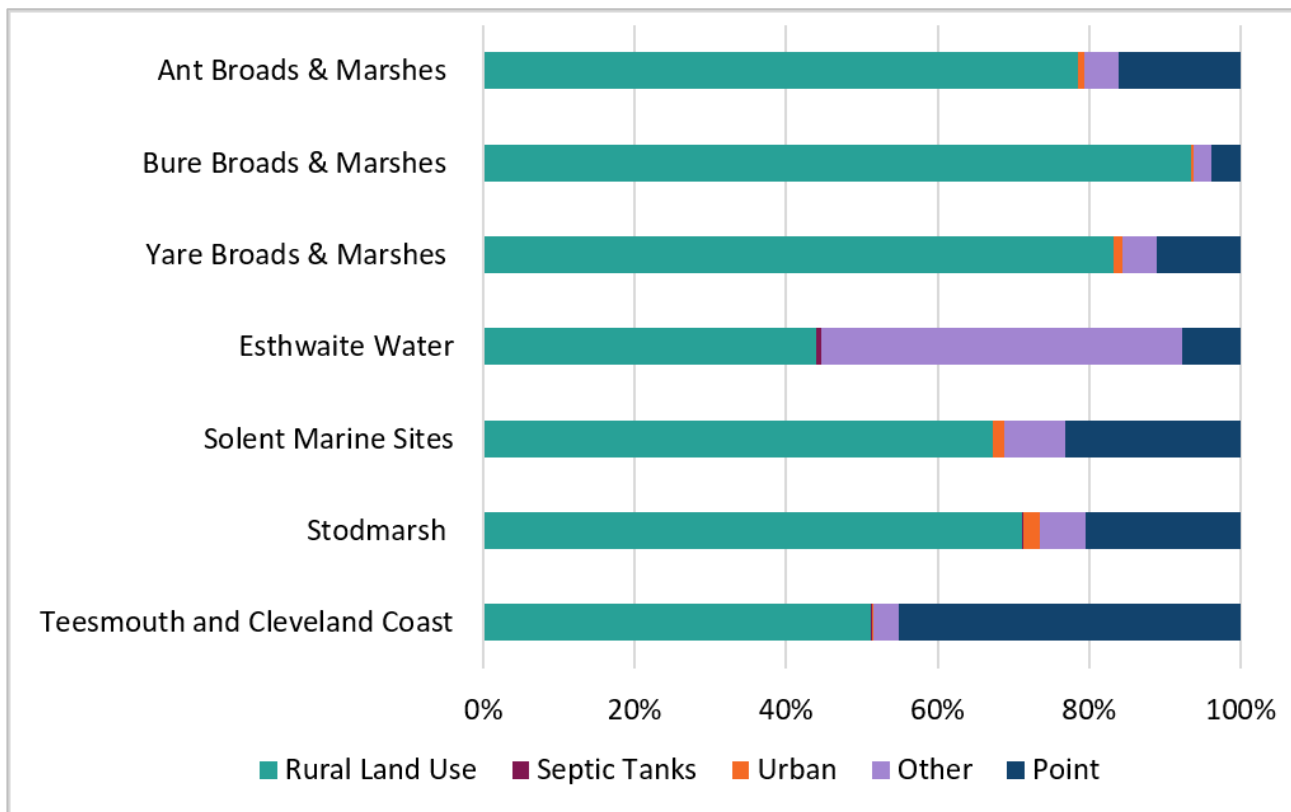


Figure 18: Estimated nitrate catchment input load source apportionment for the wetlands and lakes for the 2030 At Permit scenario. Total nitrogen for Esthwaite Water. See. Table 27 for the data.

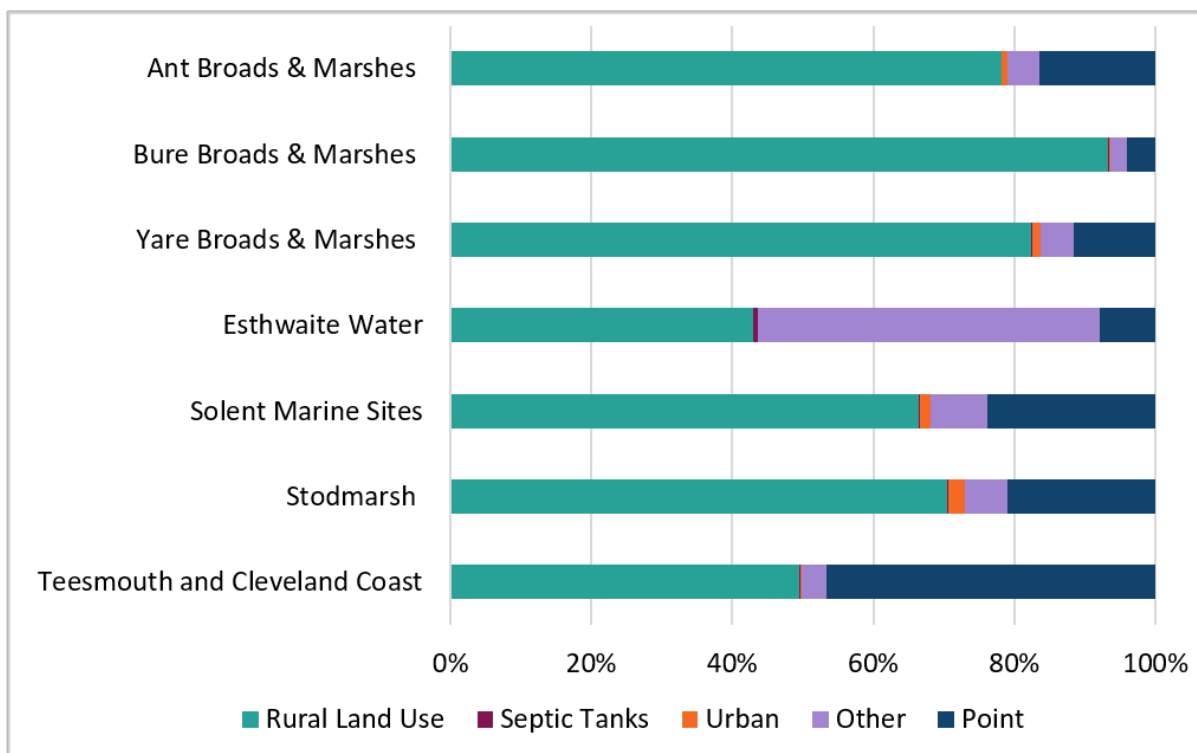


Figure 19: Estimated nitrate catchment input load source apportionment for the wetlands and lakes for the 2030 Full Regulation scenario. Total nitrogen for Esthwaite Water. See Table 29 for the data.

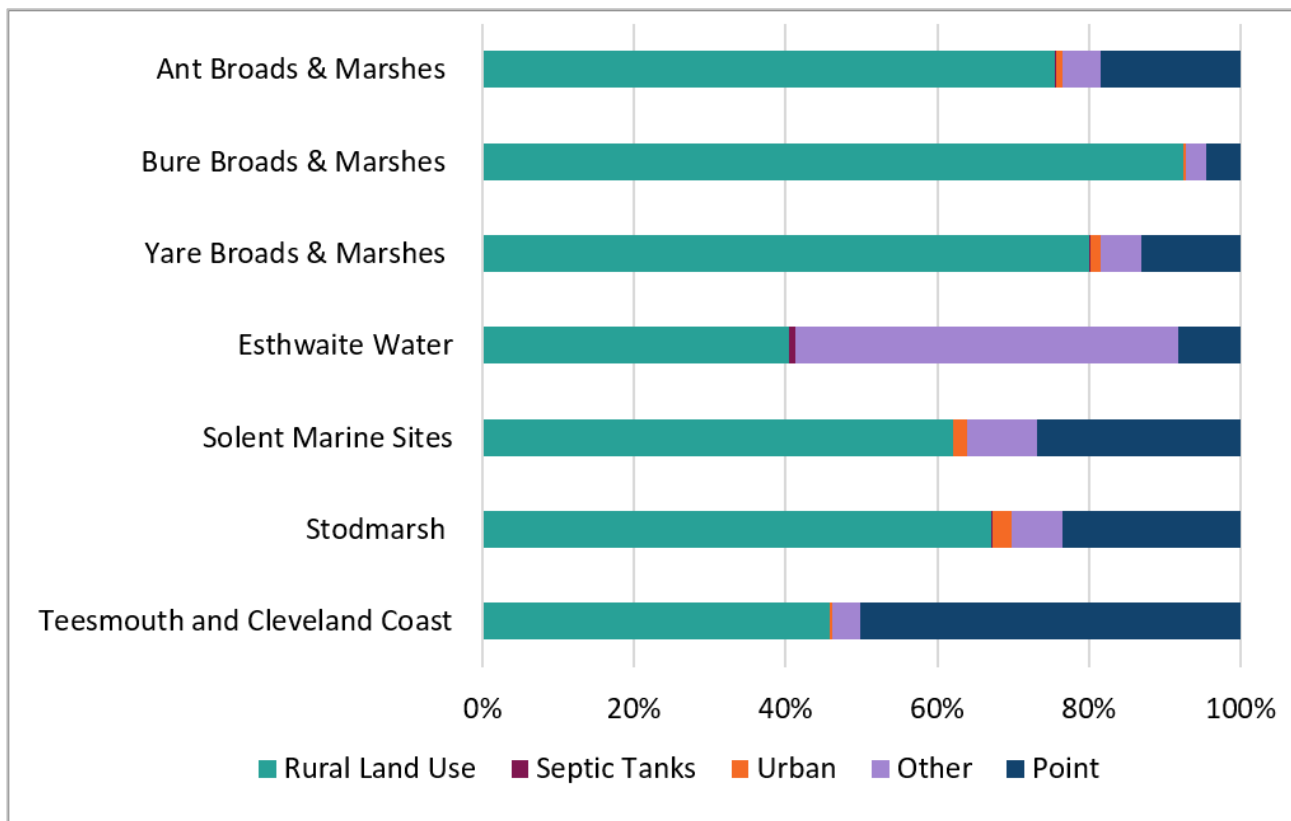


Figure 20: Estimated nitrate catchment input load source apportionment for the wetlands and lakes for the 2030 Theoretical Maximum scenario. Total nitrogen for Esthwaite Water. See Table 30 for the data.

Catchment statistics and reductions

In the detailed modelling summaries for each catchment (Table 1) we share the estimated concentration reductions needed for the protected area CSMG targets and the diffuse sector share of the targets to be met at each protected area.

For the sub-catchments of The Broads, the Ouse Washes and Stodmarsh we converted the total phosphorus CSMG targets to phosphate targets to enable comparison with the modelled phosphate concentrations at the assessment points. For all catchments, except Esthwaite Water, we compare the modelled nitrate concentrations to total nitrogen targets because there was insufficient data available to approximate a suitable conversion factor. The modelled values and targets for Esthwaite Water are for total phosphorus and total nitrogen respectively. The current agreed Somerset Levels and Moors phosphate target (0.1mg/l) is used here, the tables in Annex 1 also show the results against the newly proposed phosphate target (0.05mg/l). The Poole Harbour target is expressed as a load (Table 28). Nitrate or total nitrogen targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed.

For the Somerset Levels and Moors, Solent Marine Sites and Teesmouth and Cleveland Coast, the values presented here are an average of the in-river concentrations modelled at the point where the modelled reach is in connectivity with the protected area. The detailed modelling summary sets out the mean concentration modelled at each location (link in Table 1).

Compliance with wetland, lake and estuary CSMG protected site targets

We present the phosphate and nitrate protected site targets alongside the modelled concentrations for each scenario (Figure 21 and Figure 23). This shows how the concentrations reduce with the implementation of the AMP8 WINEP and with the Farmscoper v5 reductions applied to the rural land use loads.

Except for the Waveney, we estimate the phosphate concentrations to greatly exceed the protected site targets in all scenarios (Figure 21). On average, we estimate phosphate total concentrations to need to reduce by 58% to meet the protected site targets in the Actual (2014 to 2020) scenario. The highest estimated concentrations are in the Stodmarsh and Yare Broads and Marshes catchments (Figure 21). The estimated reductions to meet the protected site targets are over 80% in these catchments (Table 38).

The 2030 Optimistic scenario estimates the concentrations after the implementation of AMP8 water company investment in the calibration model. Under this scenario, we estimate the phosphate protected site target to be met in the Waveney catchment and at Esthwaite Water (Figure 21 and Table 39).

Similarly, except for Esthwaite Water, the nitrate concentrations greatly exceed the nitrate protected site targets in all scenarios at all sites (Figure 23 and Table 43 to Table 47). On average, we estimate nitrate concentrations to need to reduce by 77% to meet the

protected site targets in the Actual (2014 to 2020) scenario. The highest estimated concentrations are in the Stodmarsh and Yare Broads and Marshes catchments (Figure 23). The estimated reductions to meet the protected site targets are over 80% in these catchments (Table 43).

Diffuse sector share of the wetland, lake and estuary protected site targets

We also present the diffuse sector share of the phosphate and nitrate targets alongside the diffuse sector concentrations in the Actual (2014 to 2020) scenario, the 2030 Full Regulation scenario and the 2030 Theoretical Maximum scenario. This shows how the diffuse sector concentrations reduce with the Farmscoper v5 reductions applied to the rural land use loads for both phosphate and nitrate (Figure 22 and Figure 24).

Phosphate

In all catchments, except for Esthwaite Water, we estimate the diffuse phosphate concentration to greatly exceed the diffuse sector share of the phosphate target in the Actual (2014 to 2020) scenario (Figure 22). We estimate the sites with the greatest exceedances of the diffuse sector share to be the Somerset Levels and Moors, Stodmarsh and the Yare Broads and Marshes (Table 38). The average reduction in diffuse phosphate concentrations needed is estimated to be 54% but is over 70% for the Somerset Levels and Moors, Stodmarsh and the Yare Broads and Marshes.

Under the 2030 Full Regulation and 2030 Theoretical Maximum scenarios, we estimate diffuse phosphate concentrations to reduce incrementally across all catchments, but to remain high above the targets (Figure 22). Under the 2030 Full Regulation scenario, we predict the diffuse sector share of the phosphate target to be met in Esthwaite Water (Table 46).

Nitrate

Similarly, we estimate the diffuse nitrate concentrations to greatly exceed the diffuse sector share of the target in all catchments (Figure 24). The catchments with the greatest exceedances of the diffuse sector share are the Bure Broads and Marshes, Yare Broads and Marshes and Esthwaite, where we estimate concentrations to need to reduce by over 80% (Figure 24 and Table 43 to Table 47). While the concentrations reduce incrementally across all catchments under the 2030 Full Regulation and 2030 Theoretical Maximum scenarios, the concentrations remain high above the targets at all protected sites (Figure 24 and Table 43 to Table 47).

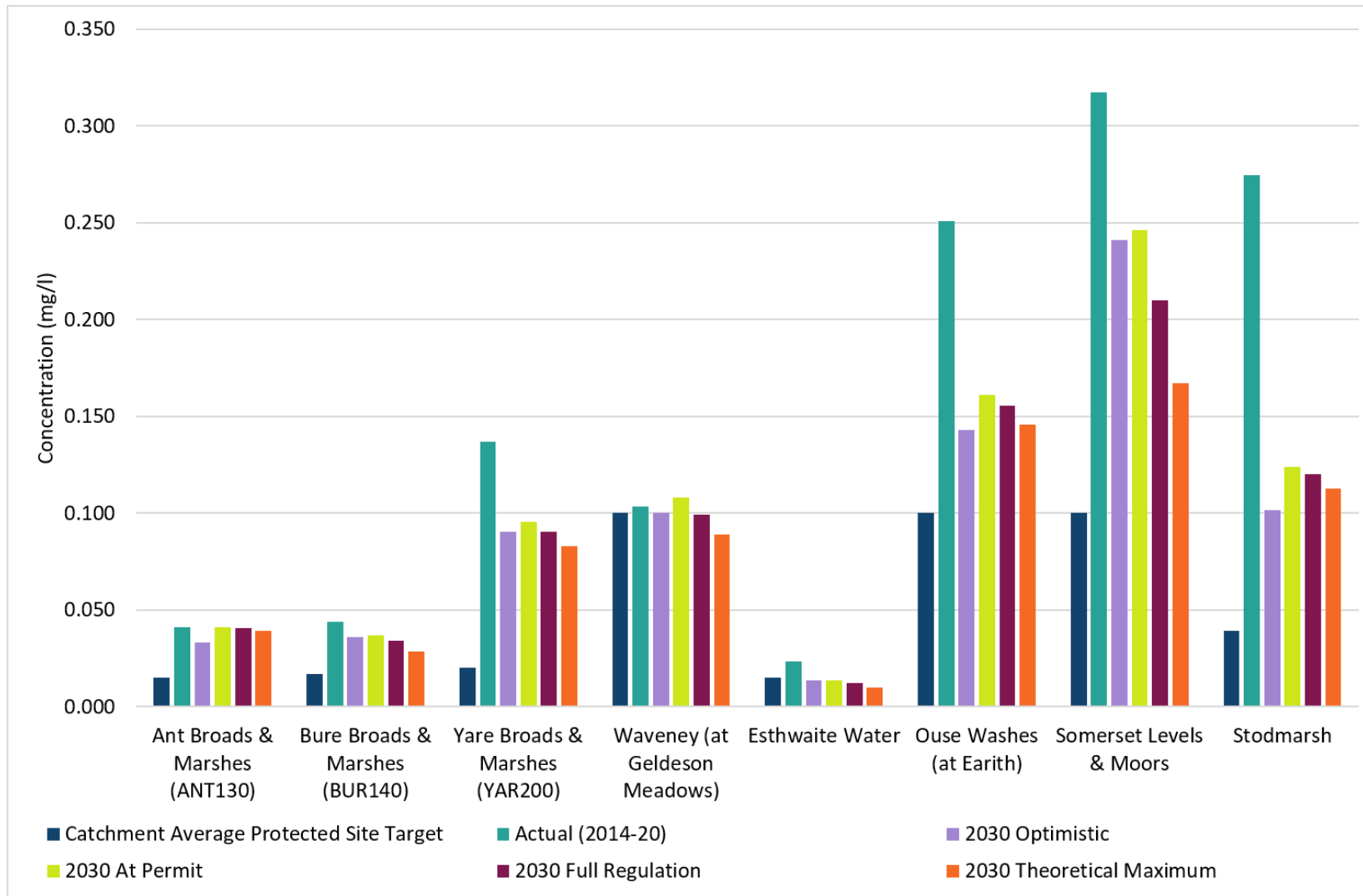


Figure 21: Phosphate protected site target (mg/l) in dark blue alongside estimated phosphate total concentrations in the Actual (2014 to 2020) scenario (green), 2030 Optimistic scenario (lavender), 2030 At Permit scenario (lime green) 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Somerset Levels and Moors figures are an average of all river Offtakes to the site. Total phosphorus values for Esthwaite Water. See Table 38 (inc. Poole Harbour) to Table 42 for data.

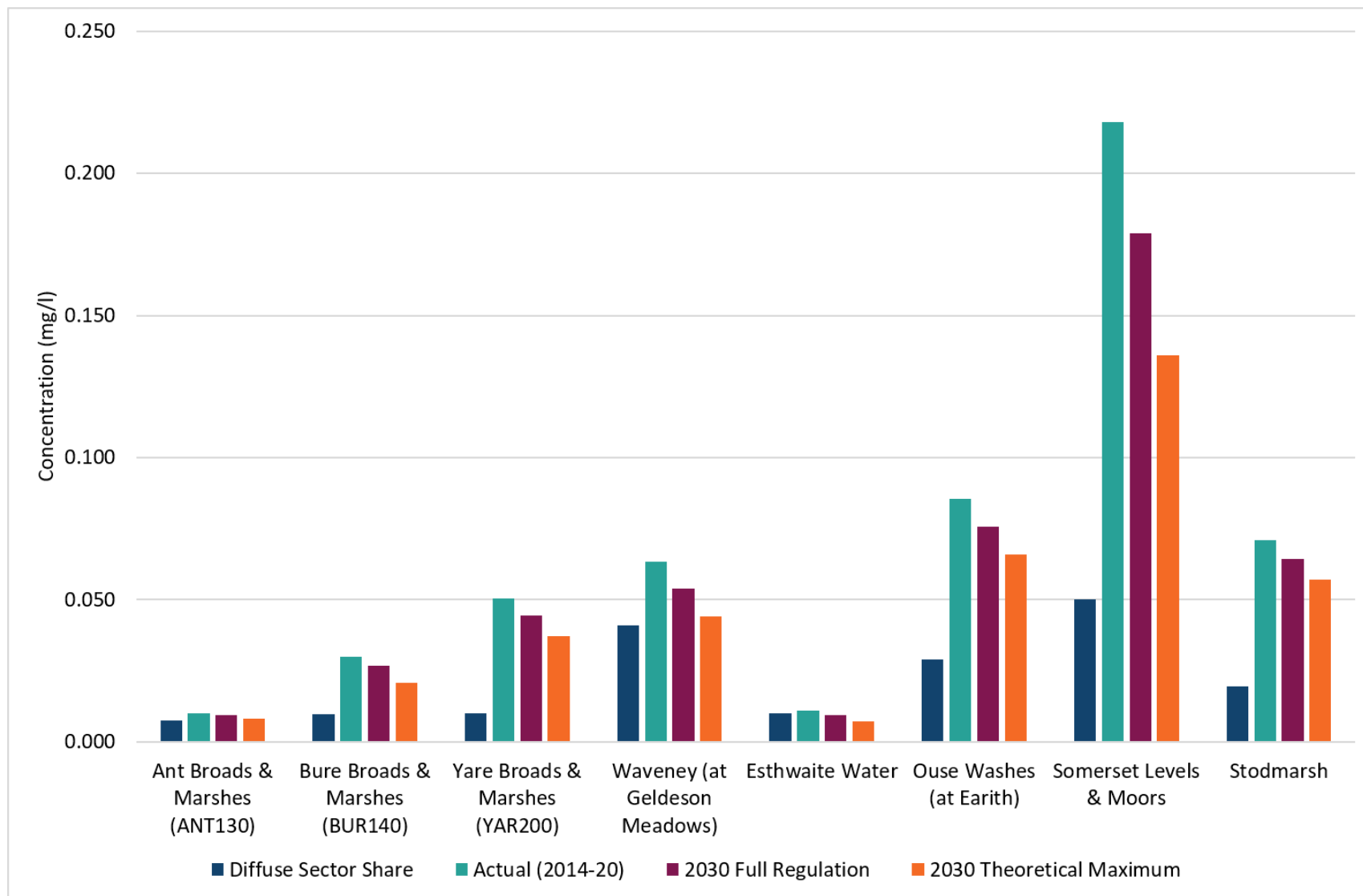


Figure 22: Diffuse sector share of the protected area phosphate target (mg/l) in dark blue alongside the diffuse sector concentration in the Actual (2014 to 2020) scenario (green), the 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Total phosphorus for Esthwaite Water. See Table 38 (inc. Poole Harbour) to Table 42 for data.

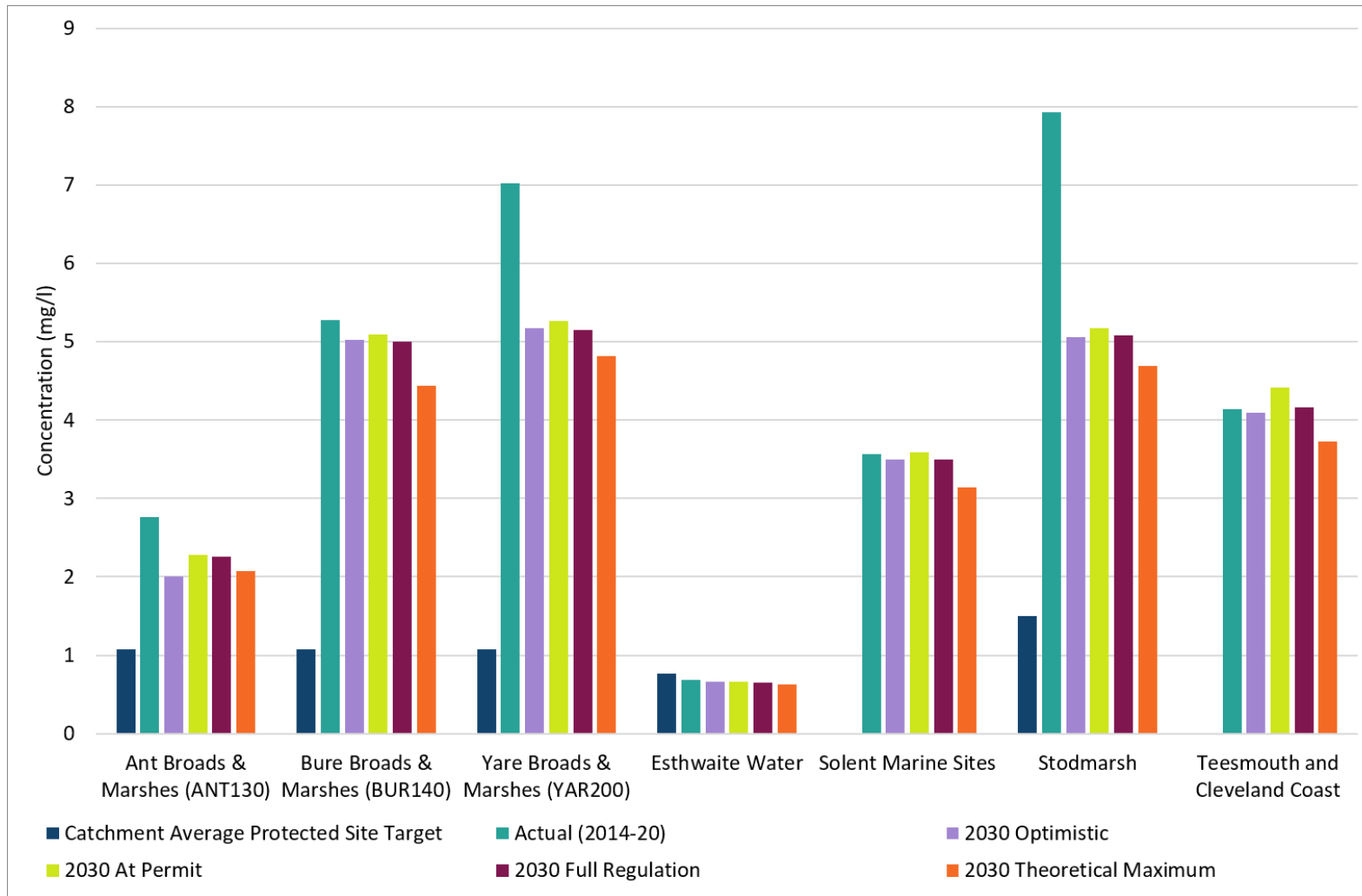


Figure 23: Nitrate protected site target (mg/l) in dark blue alongside estimated nitrate total concentrations in the Actual (2014 to 2020) scenario (green), 2030 Optimistic scenario (lavender), 2030 At Permit scenario (lime green) 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Somerset Levels and Moors figures are an average of all river Offtakes to the site. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed. See Table 43 (inc. Poole Harbour) to Table 47 for data.

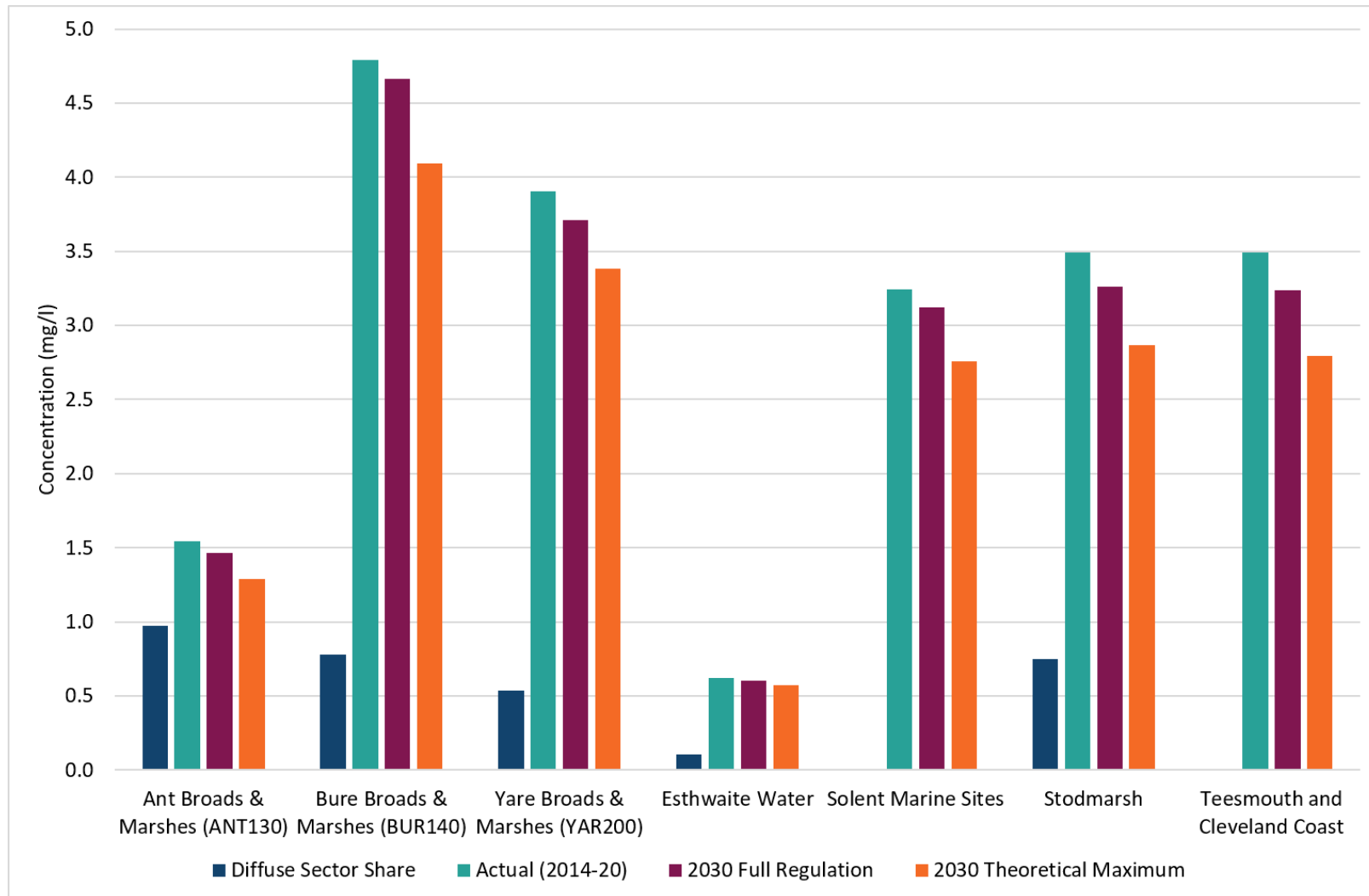


Figure 24: Diffuse sector share of the protected area nitrate target (mg/l) in dark blue alongside the diffuse sector concentration in the Actual (2014 to 2020) scenario (green), the 2030 Full Regulation scenario (dark red) and the 2030 Theoretical Maximum scenario (orange). Total nitrogen for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed. See Table 43 (inc. Poole Harbour) to Table 47 for data.

Annex 1: Data Tables

Table 13: Actual (2014 to 2020) scenario phosphate input loads (kg/d) and input load source apportionment. Estimates are from the downstream end of each protected area after calibration but before in-river processes have been simulated.

River Catchment	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
River Avon (Hampshire)	Phosphate	37.01	0.78	7.66	104.52	63.12	7.36	0.20	5.60	20.1%	46.2%	27.9%	3.3%	2.6%
River Axe	Phosphate	9.90	0.92	0.86	68.29	1.07	0.77	0.04		14.3%	83.4%	1.3%	0.9%	0.0%
River Camel	Phosphate	29.07	1.96		9.07	1.82	0.58	0.03		73.0%	21.3%	4.3%	1.4%	0.1%
River Clun	Phosphate	2.07	0.02		11.85	1.46	0.62			13.0%	74.0%	9.1%	3.9%	0.0%
River Dee	Phosphate	88.04	2.49	0.70	180.70	13.17	2.41	0.07		31.7%	62.8%	4.6%	0.8%	0.0%
River Derwent (Yorkshire)	Phosphate	53.76	0.70	3.62	69.31	2.84	1.29	0.10		44.1%	52.7%	2.2%	1.0%	0.1%
River Derwent and Bassenthwaite Lake	Phosphate	19.40	6.79	0.71	11.73	0.36	0.07	0.02		68.8%	30.0%	0.9%	0.2%	0.1%
River Eden	Phosphate	80.82	31.13	1.95	145.31	4.55	1.38	0.28		42.9%	54.7%	1.7%	0.5%	0.1%
River Ehen	Phosphate	0.22	0.40	0.02	1.92	0.03	0.02			24.9%	73.5%	1.0%	0.7%	0.0%
River Itchen	Phosphate	17.39	1.50	1.85	15.91	10.53	1.98	0.05	3.77	39.1%	30.0%	19.9%	3.7%	7.2%
River Kent	Phosphate	10.14	9.67	0.11	8.66	0.07	0.20	0.01		69.0%	30.0%	0.2%	0.7%	0.0%
River Lambourn	Phosphate	1.61	0.15	0.02	8.81	1.75	0.25	0.06		14.1%	69.6%	13.8%	2.0%	0.4%
River Lugg	Phosphate	29.76	0.44	0.00	171.73	5.03	4.49	0.04		14.3%	81.2%	2.4%	2.1%	0.0%
River Mease	Phosphate	3.45	0.32		7.67	5.42	0.90	0.04		21.2%	43.1%	30.4%	5.1%	0.2%
River Test	Phosphate	5.93	0.21	2.04	3.53	3.59	0.24	0.08	0.15	51.9%	22.4%	22.7%	1.5%	1.5%
River Tweed (England)	Phosphate	3.39	1.85	0.00	20.22	0.28	0.38	0.00		20.1%	77.4%	1.1%	1.4%	0.0%
River Wensum	Phosphate	6.67	0.16	1.36	30.10	5.56	0.59	0.03		18.4%	67.7%	12.5%	1.3%	0.1%
River Wye (inc. Lugg)	Phosphate	128.30	2.80	0.91	471.30	14.04	10.89	0.14		21.0%	75.0%	2.2%	1.7%	0.0%
Wye Valley (Peaks)	Phosphate	3.75	0.19		5.91	2.02	0.11			32.8%	49.3%	16.9%	0.9%	0.0%

Table 14: 2030 Optimistic scenario phosphate input loads (kg/d) and input load source apportionment. Estimates are from the downstream end of each protected area after calibration but before in-river processes have been simulated.

River Catchment	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
River Avon (Hampshire)	Phosphate	33.75	0.78	7.66	104.73	63.42	7.38	0.20	5.60	18.9%	46.9%	28.4%	3.3%	2.6%
River Axe	Phosphate	4.71	0.92	0.86	68.29	1.07	0.77	0.04		8.5%	89.1%	1.4%	1.0%	0.0%
River Camel	Phosphate	3.05	1.77	0.00	8.84	1.83	0.58	0.03		30.0%	54.9%	11.4%	3.6%	0.2%
River Clun	Phosphate	0.45	0.02		11.85	1.46	0.62			3.3%	82.3%	10.1%	4.3%	0.0%
River Dee	Phosphate	43.79	2.49	0.70	180.70	13.17	2.41	0.07		19.3%	74.3%	5.4%	1.0%	0.0%
River Derwent (Yorkshire)	Phosphate	36.30	0.71	3.64	67.39	2.83	1.29	0.10		36.2%	60.0%	2.5%	1.1%	0.1%
River Derwent and Bassenthwaite Lake	Phosphate	12.97	6.79	0.71	11.73	0.36	0.07	0.02		62.7%	35.9%	1.1%	0.2%	0.1%
River Eden	Phosphate	41.55	32.08	1.94	140.81	4.53	1.38	0.28		34.0%	63.3%	2.0%	0.6%	0.1%
River Ehen	Phosphate	0.22	0.40	0.02	1.92	0.03	0.02			24.9%	73.5%	1.0%	0.7%	0.0%
River Itchen	Phosphate	9.37	1.50	1.85	15.91	10.53	1.98	0.05	3.77	28.3%	35.4%	23.4%	4.4%	8.5%
River Kent	Phosphate	6.06	9.67	0.11	8.66	0.07	0.20	0.01		63.9%	34.9%	0.3%	0.8%	0.0%
River Lambourn	Phosphate	0.64	0.15	0.02	8.81	1.75	0.25	0.06		7.0%	75.4%	15.0%	2.1%	0.5%
River Lugg	Phosphate	11.16	0.54	0.00	164.48	5.01	4.49	0.04		6.3%	88.6%	2.7%	2.4%	0.0%
River Mease	Phosphate	1.22	0.32		7.67	5.42	0.90	0.04		9.9%	49.3%	34.8%	5.8%	0.2%
River Test	Phosphate	2.78	0.21	1.29	3.53	3.59	0.24	0.08	0.15	36.1%	29.7%	30.2%	2.0%	2.0%
River Tweed (England)	Phosphate	1.72	1.85		20.22	0.28	0.38			14.6%	82.7%	1.1%	1.5%	0.0%
River Wensum	Phosphate	4.02	0.16	1.36	30.10	5.56	0.59	0.03		13.2%	72.0%	13.3%	1.4%	0.1%
River Wye (inc. Lugg)	Phosphate	82.34	3.01	0.91	456.01	14.02	10.89	0.14		15.2%	80.4%	2.5%	1.9%	0.0%
Wye Valley (Peaks)	Phosphate	2.01	0.19		5.91	1.96	0.11			21.6%	58.1%	19.2%	1.1%	0.0%

Table 15: 2030 At Permit scenario phosphate input loads (kg/d) and input load source apportionment. Estimates are from the downstream end of each protected area after calibration but before in-river processes have been simulated.

River Catchment	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
River Avon (Hampshire)	Phosphate	39.97	0.78	18.20	104.73	63.42	7.38	0.20	5.60	24.5%	43.6%	26.4%	3.1%	2.4%
River Axe	Phosphate	6.87	0.92	0.86	68.29	1.07	0.77	0.04		11.0%	86.6%	1.4%	1.0%	0.0%
River Camel	Phosphate	6.07	1.96		9.07	1.82	0.58	0.03		41.1%	46.4%	9.3%	2.9%	0.2%
River Clun	Phosphate	1.25	0.02		11.85	1.46	0.62			8.3%	78.0%	9.6%	4.1%	0.0%
River Dee	Phosphate	81.04	2.49	0.70	180.70	13.17	2.41	0.07		30.0%	64.4%	4.7%	0.9%	0.0%
River Derwent (Yorkshire)	Phosphate	62.34	0.70	3.42	69.31	2.84	1.29	0.10		47.5%	49.5%	2.0%	0.9%	0.1%
River Derwent and Bassenthwaite Lake	Phosphate	12.86	7.00	0.71	11.72	0.36	0.07	0.02		62.8%	35.8%	1.1%	0.2%	0.1%
River Eden	Phosphate	53.76	31.13	1.95	145.31	4.55	1.38	0.28		36.4%	61.0%	1.9%	0.6%	0.1%
River Ehen	Phosphate	0.51	0.42	0.02	1.84	0.03	0.02			33.6%	64.9%	0.9%	0.6%	0.0%
River Itchen	Phosphate	14.37	1.50	12.48	15.91	10.53	1.98	0.05	3.77	46.8%	26.3%	17.4%	3.3%	6.3%
River Kent	Phosphate	7.42	10.20	0.11	8.31	0.07	0.20	0.01		67.4%	31.6%	0.3%	0.8%	0.0%
River Lambourn	Phosphate	0.99	0.14	0.02	8.81	1.75	0.25	0.06		9.5%	73.6%	14.4%	2.1%	0.5%
River Lugg	Phosphate	15.19	0.54	0.00	164.48	5.01	4.49	0.04		8.3%	86.7%	2.6%	2.4%	0.0%
River Mease	Phosphate	2.59	0.32		7.67	5.42	0.90	0.04		17.2%	45.3%	32.0%	5.3%	0.2%
River Test	Phosphate	4.44	0.21	1.49	3.53	3.59	0.24	0.08	0.23	44.5%	25.6%	26.0%	1.7%	2.2%
River Tweed (England)	Phosphate	3.60	1.85		20.22	0.28	0.38			20.7%	76.8%	1.1%	1.4%	0.0%
River Wensum	Phosphate	5.22	0.16	1.36	30.10	5.56	0.59	0.03		15.7%	70.0%	12.9%	1.4%	0.1%
River Wye (inc. Lugg)	Phosphate	108.60	3.01	0.91	456.01	14.02	10.89	0.14		19.0%	76.8%	2.4%	1.8%	0.0%
Wye Valley (Peaks)	Phosphate	3.57	0.19		5.91	2.02	0.11			31.8%	50.1%	17.1%	1.0%	0.0%

Table 16: 2030 Full Regulation scenario phosphate input loads (kg/d) and input load source apportionment. Estimates are from the downstream end of each protected area after calibration but before in-river processes have been simulated.

River Catchment	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
River Avon (Hampshire)	Phosphate	39.97	0.78	18.20	89.34	63.42	7.38	0.20	5.60	26.2%	39.7%	28.2%	3.3%	2.6%
River Axe	Phosphate	6.87	0.92	0.86	54.11	1.07	0.77	0.04		13.4%	83.7%	1.7%	1.2%	0.1%
River Camel	Phosphate	6.07	1.96		7.60	1.82	0.58	0.03		44.5%	42.1%	10.1%	3.2%	0.2%
River Clun	Phosphate	1.25	0.02		9.84	1.46	0.62			9.6%	74.6%	11.1%	4.7%	0.0%
River Dee	Phosphate	81.04	2.49	0.70	175.75	13.17	2.41	0.07		30.6%	63.8%	4.8%	0.9%	0.0%
River Derwent (Yorkshire)	Phosphate	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*
River Derwent and Bassenthwaite Lake	Phosphate	12.86	7.00	0.71	10.50	0.36	0.07	0.02		65.2%	33.3%	1.2%	0.2%	0.1%
River Eden	Phosphate	53.76	31.13	1.95	120.94	4.55	1.38	0.28		40.6%	56.5%	2.1%	0.6%	0.1%
River Ehen	Phosphate	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*
River Itchen	Phosphate	14.38	1.50	12.48	13.53	10.53	1.98	0.05	3.77	48.7%	23.2%	18.1%	3.4%	6.6%
River Kent	Phosphate	7.42	10.20	0.11	7.04	0.07	0.20	0.01		70.8%	28.1%	0.3%	0.8%	0.0%
River Lambourn	Phosphate	0.99	0.14	0.02	7.88	1.75	0.25	0.06		10.4%	71.0%	15.8%	2.3%	0.5%
River Lugg	Phosphate	15.19	0.54	0.00	136.07	5.01	4.49	0.04		9.7%	84.3%	3.1%	2.8%	0.0%
River Mease	Phosphate	2.59	0.32		6.50	5.42	0.90	0.07		18.4%	41.1%	34.3%	5.7%	0.4%
River Test	Phosphate	4.44	0.21	1.49	3.25	3.59	0.24	0.08	0.23	45.4%	24.0%	26.5%	1.8%	2.3%
River Tweed (England)	Phosphate	3.60	1.85		18.12	0.28	0.38			22.5%	74.8%	1.1%	1.6%	0.0%
River Wensum	Phosphate	5.22	0.16	1.36	26.02	5.56	0.59	0.03		17.3%	66.8%	14.3%	1.5%	0.1%
River Wye (inc. Lugg)	Phosphate	108.60	3.01	0.91	427.61	14.02	10.89	0.14		19.9%	75.7%	2.5%	1.9%	0.0%
Wye Valley (Peaks)	Phosphate	3.57	0.19		5.16	2.02	0.11			34.0%	46.7%	18.3%	1.0%	0.0%

*Scenario not modelled – diffuse sector share of the target met.

Table 17: 2030 Theoretical Maximum scenario phosphate input loads (kg/d) and input load source apportionment. Estimates are from the downstream end of each protected area after calibration but before in-river processes have been simulated.

River Catchment	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
River Avon (Hampshire)	Phosphate	39.97	0.78	18.20	61.09	63.42	7.38	0.20	5.60	30.0%	31.1%	32.3%	3.8%	2.9%
River Axe	Phosphate	6.87	0.92	0.86	40.30	1.07	0.77	0.04		17.0%	79.3%	2.1%	1.5%	0.1%
River Camel	Phosphate	6.07	1.96		5.01	1.82	0.58	0.03		51.9%	32.4%	11.8%	3.7%	0.2%
River Clun	Phosphate	1.25	0.02		6.92	1.46	0.62			12.3%	67.4%	14.2%	6.1%	0.0%
River Dee	Phosphate	81.04	2.49	0.70	171.10	13.17	2.41	0.07		31.1%	63.1%	4.9%	0.9%	0.0%
River Derwent (Yorkshire)	Phosphate	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*
River Derwent and Bassenthwaite Lake	Phosphate	12.86	7.00	0.71	9.39	0.36	0.07	0.02		67.6%	30.9%	1.2%	0.2%	0.1%
River Eden	Phosphate	53.76	31.13	1.95	101.73	4.55	1.38	0.28		44.6%	52.2%	2.3%	0.7%	0.1%
River Ehen	Phosphate	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*	Not modelled*
River Itchen	Phosphate	14.38	1.50	12.48	9.27	10.53	1.98	0.05	3.77	52.6%	17.2%	19.5%	3.7%	7.1%
River Kent	Phosphate	7.42	10.20	0.11	5.75	0.07	0.20	0.01		74.6%	24.2%	0.3%	0.8%	0.0%
River Lambourn	Phosphate	0.99	0.14	0.02	5.45	1.75	0.25	0.06		13.3%	62.9%	20.2%	2.9%	0.7%
River Lugg	Phosphate	15.19	0.54	0.00	93.99	5.01	4.49	0.04		13.2%	78.8%	4.2%	3.8%	0.0%
River Mease	Phosphate	2.59	0.32		4.93	5.42	0.90	0.07		20.4%	34.6%	38.1%	6.4%	0.5%
River Test	Phosphate	4.44	0.21	1.49	2.67	3.59	0.24	0.08	0.23	47.5%	20.6%	27.7%	1.9%	2.4%
River Tweed (England)	Phosphate	3.60	1.85		13.47	0.28	0.38			27.9%	68.8%	1.4%	1.9%	0.0%
River Wensum	Phosphate	5.22	0.16	1.36	18.93	5.56	0.59	0.03		21.2%	59.4%	17.5%	1.8%	0.1%
River Wye (inc. Lugg)	Phosphate	108.60	3.01	0.91	385.47	14.02	10.89	0.14		21.5%	73.7%	2.7%	2.1%	0.0%
Wye Valley (Peaks)	Phosphate	3.57	0.19		4.12	2.02	0.11			37.5%	41.1%	20.2%	1.1%	0.0%

*Scenario not modelled – diffuse sector share of the target met.

Table 18: Total estimated river catchment input loads (kg/d) and input load source apportionment. Estimates are totals from the downstream end of all protected area after calibration but before in-river processes have been simulated.

Scenario	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Actual (2014 to 2020)	Phosphate	530.68	62.48	21.82	1346.54	136.72	34.53	1.19	9.51	28.7%	62.8%	6.4%	1.6%	0.5%
2030 Optimistic	Phosphate	298.11	63.56	21.08	1317.56	136.90	34.55	1.19	9.51	20.3%	70.0%	7.3%	1.8%	0.6%
2030 At Permit	Phosphate	430.65	63.55	42.24	1323.78	136.98	34.55	1.19	9.59	26.3%	64.8%	6.7%	1.7%	0.5%
2030 Full Regulation	Phosphate	367.81	62.43	38.79	1119.27	134.11	33.24	1.12	9.59	26.6%	63.4%	7.6%	1.9%	0.6%
2030 Theoretical Maximum	Phosphate	367.81	62.43	38.79	939.59	134.11	33.24	1.12	9.59	29.6%	59.2%	8.5%	2.1%	0.7%

Table 19: River Clun nitrate input loads (kg/d) and input load source apportionment for all modelled scenarios. Estimates are from the downstream end of the protected area after calibration but before in-river processes have been simulated.

Scenario	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Actual	Nitrate	25.01	0.02	0.00	1012.50	2.49	3.55	0.00	174.60	2.1%	83.1%	0.2%	0.3%	14.3%
2030 Optimistic	Nitrate	25.01	0.02	0.00	1012.50	2.49	3.55	0.00	174.60	2.1%	83.1%	0.2%	0.3%	14.3%
2030 At Permit	Nitrate	34.23	0.02	0.00	1012.50	2.49	3.55	0.00	174.60	2.8%	82.5%	0.2%	0.3%	14.2%
2030 Full Regulation	Nitrate	34.23	0.02	0.00	972.00	2.49	3.55	0.00	174.60	2.9%	81.9%	0.2%	0.3%	14.7%
2030 Theo Max	Nitrate	34.23	0.02	0.00	868.60	2.49	3.55	0.00	174.60	3.2%	80.2%	0.2%	0.3%	16.1%

Table 20: Actual (2014 to 2020) scenario estimated phosphate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water and Poole Harbour are total phosphorus.

Wetland, Lake or Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Phosphate	1.86	0.05	0.00	0.25	0.68	0.13	0.00		64.4%	8.4%	22.9%	4.3%	0.0%
Bure Broads and Marshes	Phosphate	4.66	0.12	0.00	9.09	3.52	0.80	0.00		26.3%	50.0%	19.4%	4.4%	0.0%
Yare Broads and Marshes	Phosphate	66.53	0.90	1.40	61.25	19.20	1.75	0.14		45.5%	40.5%	12.7%	1.2%	0.1%
Waveney (at Geldeston Meadows SSSI)	Phosphate	25.70	0.28	0.28	57.43	3.31	2.04	0.00		29.5%	64.5%	3.7%	2.3%	0.0%
Esthwaite Water	Total Phosphorus	0.28	0.97	0.00	0.86	0.00	0.12	0.00	0.12	53.2%	36.5%	0.0%	5.2%	5.2%
Ouse Washes	Phosphate	399.60	11.95	8.78	198.75	105.50	11.56	0.54		57.1%	27.0%	14.3%	1.6%	0.1%
Poole Harbour	Total Phosphorus	217.72	4.59	101.35	111.54	3.44	4.65	0.00		73.0%	25.2%	0.8%	1.0%	0.8%
Somerset Levels and Moors	Phosphate	235.31	3.34	0.49	407.60	96.77	15.92	0.14		31.5%	53.7%	12.7%	2.1%	0.0%
Stodmarsh	Phosphate	61.81	1.22	0.00	25.68	18.78	3.18	0.10		56.9%	23.2%	17.0%	2.9%	0.1%

Table 21: 2030 Optimistic scenario estimated phosphate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total phosphorus.

Wetland or Lake	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Phosphate	1.53	0.05	0.00	0.25	0.68	0.13	0.00		60.0%	9.5%	25.7%	4.8%	0.0%
Bure Broads and Marshes	Phosphate	1.83	0.12	0.00	9.09	3.52	0.80	0.00		12.7%	59.2%	22.9%	5.2%	0.0%
Yare Broads and Marshes	Phosphate	29.71	0.90	1.40	61.25	19.20	1.75	0.14		28.0%	53.6%	16.8%	1.5%	0.1%
Waveney (at Geldeston Meadows SSSI)	Phosphate	14.70	0.28	0.28	57.43	3.31	2.04	0.00		19.6%	73.6%	4.2%	2.6%	0.0%
Esthwaite Water	Total Phosphorus	0.11	0.15	0.00	0.87	0.00	0.12	0.00	0.12	19.3%	63.0%	0.0%	8.9%	8.9%
Ouse Washes	Phosphate	173.30	11.95	8.78	198.75	105.50	11.56	0.54		38.0%	38.9%	20.7%	2.3%	0.1%

Wetland or Lake	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Somerset Levels and Moors	Phosphate	39.56	3.35	0.30	402.12	97.05	16.06	0.14		7.7%	72.0%	17.4%	2.9%	0.0%
Stodmarsh	Phosphate	9.40	1.22	0.00	25.68	18.78	3.18	0.10		18.2%	44.0%	32.2%	5.4%	0.2%

Table 22: 2030 At Permit scenario estimated phosphate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total phosphorus.

Wetland or Lake	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Phosphate	1.97	0.05	0.00	0.25	0.68	0.13	0.00		65.7%	8.1%	22.0%	4.1%	0.0%
Bure Broads and Marshes	Phosphate	2.24	0.12	0.00	9.09	3.52	0.80	0.00		14.9%	57.7%	22.3%	5.1%	0.0%
Yare Broads and Marshes	Phosphate	36.09	0.90	1.40	61.25	19.20	1.75	0.14		31.8%	50.7%	15.9%	1.5%	0.1%
Waveney (at Geldeston Meadows SSSI)	Phosphate	20.83	0.28	0.28	57.43	3.31	2.04	0.00		25.4%	68.2%	3.9%	2.4%	0.0%
Esthwaite Water	Total Phosphorus	0.13	0.15	0.00	0.84	0.00	0.12	0.00	0.12	20.9%	61.2%	0.0%	9.0%	9.0%
Ouse Washes	Phosphate	169.40	11.95	8.78	198.75	105.50	11.56	0.54		37.5%	39.2%	20.8%	2.3%	0.1%
Somerset Levels and Moors	Phosphate	54.32	3.34	0.49	407.60	96.77	15.92	0.14		10.1%	70.4%	16.7%	2.8%	0.0%
Stodmarsh	Phosphate	18.04	1.22	0.00	25.68	18.78	3.18	0.10		28.7%	38.3%	28.0%	4.7%	0.2%

Table 23: 2030 Full Regulation scenario estimated phosphate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total phosphorus.

Wetland or Lake	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Phosphate	1.97	0.05	0.00	0.21	0.68	0.13	0.68		66.5%	7.0%	22.3%	4.1%	0.0%
Bure Broads and Marshes	Phosphate	2.24	0.12	0.00	7.75	3.52	0.80	0.00		16.3%	53.7%	24.4%	5.5%	0.0%
Yare Broads and Marshes	Phosphate	36.09	0.90	1.40	52.45	19.20	1.75	0.14		34.3%	46.9%	17.2%	1.6%	0.1%
Waveney (at Geldeston Meadows SSSI)	Phosphate	20.83	0.28	0.28	49.61	3.31	2.04	0.00		28.0%	65.0%	4.3%	2.7%	0.0%
Esthwaite Water	Total Phosphorus	0.13	0.15	0.00	0.71	0.00	0.12	0.00	0.12	23.0%	57.4%	0.0%	9.8%	9.8%
Ouse Washes	Phosphate	169.40	11.95	8.78	175.54	105.50	11.56	0.54		39.3%	36.3%	21.8%	2.4%	0.1%
Somerset Levels and Moors	Phosphate	54.32	3.34	0.49	326.62	96.77	15.92	0.14		11.7%	65.6%	19.4%	3.2%	0.0%
Stodmarsh	Phosphate	18.04	1.22	0.00	22.51	18.78	3.18	0.10		30.2%	35.3%	29.4%	5.0%	0.2%

Table 24: 2030 Theoretical Maximum scenario estimated phosphate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total phosphorus.

Wetland or Lake	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Other (anglers and background) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Phosphate	1.97	0.05	0.00	0.10	0.68	0.13	0.00		69.1%	3.4%	23.2%	4.3%	0.0%
Bure Broads and Marshes	Phosphate	2.24	0.12	0.00	4.82	3.52	0.80	0.00		20.5%	41.9%	30.6%	6.9%	0.0%
Yare Broads and Marshes	Phosphate	36.09	0.90	1.40	39.13	19.20	1.75	0.14		38.9%	39.7%	19.5%	1.8%	0.1%
Waveney (at Geldeston Meadows SSSI)	Phosphate	20.83	0.28	0.28	38.63	3.31	2.04	0.00		32.7%	59.1%	5.1%	3.1%	0.0%
Esthwaite Water	Total Phosphorus	0.13	0.15	0.00	0.50	0.00	0.12	0.00	0.12	27.7%	48.5%	0.0%	11.9%	11.9%
Ouse Washes	Phosphate	169.40	11.95	8.78	136.31	105.50	11.56	0.54		42.8%	30.7%	23.8%	2.6%	0.1%
Somerset Levels and Moors	Phosphate	54.32	3.34	0.49	248.06	96.77	15.92	0.14		13.9%	59.2%	23.1%	3.8%	0.0%
Stodmarsh	Phosphate	18.04	1.22	0.00	16.48	18.78	3.18	0.10		33.3%	28.5%	32.5%	5.5%	0.2%

Table 25: Total estimated phosphate catchment input load (kg/d) and input load source apportionment for the wetland and lake catchments. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water and Poole Harbour are total phosphorus.

Scenario	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Background (arising from cress/ fish farms abstractions) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Actual (2014 to 2020) including values for Poole Harbour	Phosphate/ Total phosphorus	795.74 (1013.46)	18.83 (23.43)	10.95 (112.30)	760.90 (872.44)	247.75 (251.19)	35.49 (40.15)	0.94 (0.94)	0.12 (0.12)	44.1% (49.7%)	40.7% (37.7%)	13.2% (10.9%)	1.9% (1.7%)	0.1% (0.0%)
2030 Optimistic	Phosphate/ Total phosphorus	270.14	18.02	10.76	755.43	248.03	35.63	0.94	0.12	22.3%	56.4%	18.5%	2.7%	0.1%
2030 At Permit	Phosphate/ Total phosphorus	303.02	18.01	10.95	760.88	247.75	35.49	0.94	0.12	24.1%	55.3%	18.0%	2.6%	0.1%
2030 Full Regulation	Phosphate/ Total phosphorus	303.02	18.01	10.95	635.40	247.75	35.49	1.62	0.12	26.5%	50.7%	19.8%	2.8%	0.1%
2030 Theoretical Maximum	Phosphate/ Total phosphorus	303.02	18.01	10.95	484.03	247.75	35.49	0.94	0.12	30.2%	44.0%	22.5%	3.2%	0.1%

Table 26: Actual (2014 to 2020) scenario estimated nitrate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Wetland, Lake, Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Nitrate	58.34	0.30	0.00	205.05	1.85	0.33	0.00	11.880		21.1%	73.8%	0.7%	0.1%	4.3%
Bure Broads and Marshes	Nitrate	137.60	0.20	0.00	2519.20	7.98	0.91	0.00	62.13		5.1%	92.3%	0.3%	0.0%	2.3%
Yare Broads and Marshes	Nitrate	2123.00	0.90	1.72	7891.00	110.00	6.04	0.37	425.70		20.1%	74.7%	1.0%	0.1%	4.0%
Esthwaite Water	Total Nitrogen	1.70	0.68	0.00	12.18	0.00	0.20	0.00	12.53	0.25	8.7%	44.2%	0.0%	0.7%	46.4%
Lindisfarne	Nitrate	100.57	1.42	0.00	762.28	1.28	1.14	0.11	28.38		11.3%	85.3%	0.1%	0.1%	3.2%
Poole Harbour	Nitrate	2270.07	11.63	248.46	8276.42	47.98	8.75	0.14	333.48		20.8%	75.7%	0.4%	0.1%	3.1%
Solent Marine Sites	Nitrate	3215.58	10.69	426.60	21335.52	470.90	26.54	0.94	1670.8	921.5	13.0%	76.0%	1.7%	0.1%	9.2%
Stodmarsh	Nitrate	1719.54	1.72	0.00	2376.20	73.66	5.97	0.27	197.40		39.3%	54.3%	1.7%	0.1%	4.5%
Teesmouth and Cleveland Coast	Nitrate	4644.67	7.69	1461.80	5882.67	22.67	13.71	0.58	382.6		49.2%	47.4%	0.2%	0.1%	3.1%

Table 27: 2030 Optimistic scenario estimated nitrate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Wetland, Lake, Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Nitrate	24.98	0.30	0.00	205.05	1.85	0.33	0.00	11.880		10.3%	83.9%	0.8%	0.1%	4.9%
Bure Broads and Marshes	Nitrate	76.15	0.20	0.00	2519.20	7.98	0.91	0.00	62.13		2.9%	94.5%	0.3%	0.0%	2.3%
Yare Broads and Marshes	Nitrate	888.20	0.90	1.72	7891.00	110.00	6.04	0.37	425.70		9.6%	84.6%	1.2%	0.1%	4.6%
Esthwaite Water	Total Nitrogen	1.70	0.10	0.00	12.18	0.00	0.20	0.00	12.53	0.25	6.7%	45.2%	0.0%	0.7%	47.4%
Solent Marine Sites	Nitrate	2382.56	10.69	394.11	21335.52	470.90	26.54	0.94	1670.8	921.5	10.2%	78.4%	1.7%	0.1%	9.5%
Stodmarsh	Nitrate	531.11	1.72	0.00	2376.20	73.66	5.97	0.27	197.40		16.7%	74.6%	2.3%	0.2%	6.2%
Teesmouth and Cleveland Coast	Nitrate	1650.31	7.65	1461.80	5882.67	22.67	13.71	0.58	382.6		33.1%	62.4%	0.2%	0.1%	4.1%

Table 28: 2030 At Permit scenario estimated nitrate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Wetland, Lake, Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Nitrate	42.02	0.30	0.00	205.05	1.85	0.33	0.00	11.880		16.2%	78.4%	0.7%	0.1%	4.5%
Bure Broads and Marshes	Nitrate	105.10	0.20	0.00	2519.20	7.98	0.91	0.00	62.13		3.9%	93.5%	0.3%	0.0%	2.3%
Yare Broads and Marshes	Nitrate	1050.00	0.90	1.72	7891.00	110.00	6.04	0.37	425.70		11.1%	83.2%	1.2%	0.1%	4.5%
Esthwaite Water	Total Nitrogen	1.97	0.11	0.00	11.80	0.00	0.20	0.00	12.55	0.25	7.8%	43.9%	0.0%	0.7%	47.6%
Solent Marine Sites	Nitrate	6926.63	10.69	432.80	21335.52	470.90	26.54	0.94	1670.8	868.6	23.2%	67.2%	1.5%	0.1%	8.0%
Stodmarsh	Nitrate	684.71	1.72	0.00	2376.20	73.66	5.97	0.27	197.40		20.6%	71.1%	2.2%	0.2%	5.9%
Teesmouth and Cleveland Coast	Nitrate	2174.42	7.65	3007.83	5882.67	22.67	13.71	0.58	382.6		45.2%	51.2%	0.2%	0.1%	3.3%

Table 29: 2030 Full Regulation scenario estimated nitrate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Wetland, Lake, Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Nitrate	42.02	0.30	0.00	201.20	1.85	0.33	0.00	11.880		16.4%	78.1%	0.7%	0.1%	4.6%
Bure Broads and Marshes	Nitrate	105.10	0.20	0.00	2469.60	7.98	0.91	0.00	62.13		4.0%	93.3%	0.3%	0.0%	2.3%
Yare Broads and Marshes	Nitrate	1050.00	0.90	1.72	7479.00	110.00	6.04	0.37	425.70		11.6%	82.4%	1.2%	0.1%	4.7%
Esthwaite Water	Total Nitrogen	1.97	0.11	0.00	11.35	0.00	0.20	0.00	12.55	0.25	7.9%	42.9%	0.0%	0.7%	48.4%
Solent Marine Sites	Nitrate	6926.63	10.69	432.80	20600.36	470.90	26.54	0.94	1670.8	868.6	23.8%	66.4%	1.5%	0.1%	8.2%
Stodmarsh	Nitrate	684.71	1.72	0.00	2297.50	73.66	5.97	0.27	197.40		21.0%	70.4%	2.3%	0.2%	6.1%
Teesmouth and Cleveland Coast	Nitrate	2174.42	7.65	3007.83	5495.76	22.67	13.71	0.58	382.6		46.7%	49.5%	0.2%	0.1%	3.5%

Table 30: 2030 Theoretical Maximum scenario estimated nitrate catchment input loads (kg/d) and load source apportionment. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Wetland, Lake, Estuary	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Ant Broads and Marshes	Nitrate	42.02	0.30	0.00	173.41	1.85	0.33	0.00	11.880		18.4%	75.5%	0.8%	0.1%	5.2%
Bure Broads and Marshes	Nitrate	105.10	0.20	0.00	2153.20	7.98	0.91	0.00	62.13		4.5%	92.4%	0.3%	0.0%	2.7%
Yare Broads and Marshes	Nitrate	1050.00	0.90	1.72	6409.00	110.00	6.04	0.37	425.70		13.2%	80.1%	1.4%	0.1%	5.3%
Esthwaite Water	Total Nitrogen	1.97	0.11	0.00	10.24	0.00	0.20	0.00	12.54	0.25	8.2%	40.5%	0.0%	0.8%	50.5%
Solent Marine Sites	Nitrate	6926.63	10.69	432.80	17007.11	470.90	26.54	0.94	1670.8	868.6	26.9%	62.0%	1.7%	0.1%	9.3%
Stodmarsh	Nitrate	684.71	1.72	0.00	1963.90	73.66	5.97	0.27	197.40		23.4%	67.1%	2.5%	0.2%	6.8%
Teesmouth and Cleveland Coast	Nitrate	2174.42	7.65	3007.83	4726.84	22.67	13.71	0.58	382.6		50.2%	45.7%	0.2%	0.1%	3.7%

Table 31: Total estimated catchment nitrate input load (kg/d) and input load source apportionment for the wetland, lake and estuary catchments. Estimates are from modelled points in connectivity with the protected area after calibration but before in-river processes have been simulated. For the wetlands, these values do not represent the total loads entering the protected sites because loads enter these sites under high river flow or pumped conditions that are not represented by Simcat SAGIS. Values incorporated for Esthwaite Water are total nitrogen.

Scenario	Determinand	STW (kg/d)	Intermittents (kg/d)	Industrial (kg/d)	Rural Land Use (kg/d)	Urban (kg/d)	Septic Tanks (kg/d)	Highways (kg/d)	Atmospheric Deposition (kg/d)	Other (anglers and backgroun d) (kg/d)	Point (%)	Rural Land Use (%)	Urban (%)	Septic Tanks (%)	Other (%)
Actual (2014 to 2020) including values for Lindisfarne and Poole Harbour	Nitrate/ Total nitrogen	11900.43 (14271.08)	22.19 (35.24)	1890.12 (2138.58)	40221.82 (49260.52)	687.07 (736.32)	53.69 (63.58)	2.17 (2.41)	2763.04 (3124.90)	921.75 (921.75)	24.0% (23.6%)	68.8% (69.8%)	1.2% (1.0%)	0.1% (0.1%)	6.3% (5.7%)
2030 Optimistic	Nitrate/ Total nitrogen	5555.02	21.57	1857.63	40221.82	687.07	53.69	2.17	2763.04	921.75	14.5%	77.2%	1.3%	0.1%	7.1%
2030 At Permit	Nitrate/ Total nitrogen	10984.86	21.58	3442.35	40221.45	687.07	53.69	2.17	2763.06	868.87	24.8%	68.1%	1.2%	0.1%	6.2%
2030 Full Regulation	Nitrate/ Total nitrogen	10984.86	21.58	3442.35	38554.76	687.07	53.69	2.17	2763.06	868.87	25.6%	67.2%	1.2%	0.1%	6.3%
2030 Theoretical Maximum	Nitrate/ Total nitrogen	10984.86	21.58	3442.35	32443.70	687.07	53.69	2.17	2763.06	868.87	28.7%	63.3%	1.3%	0.1%	7.1%

Table 32: Actual (2014 to 2020) scenario catchment average phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions.

Catchment	Determinand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Catchment Average Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
River Avon (Hampshire)	Phosphate	50%	50%	0.048	0.024	0.024	0.063	0.027	0.090	62%	11%	47%
River Axe	Phosphate	66%	34%	0.050	0.033	0.017	0.105	0.016	0.121	69%	0%	59%
River Camel	Phosphate	52%	48%	0.024	0.013	0.011	0.012	0.010	0.022	0%	0%	0%
River Clun	Phosphate	50%	50%	0.010	0.005	0.005	0.048	0.005	0.053	90%	1%	81%
River Dee - England Only Diffuse Reductions	Phosphate	50%	50%	0.020	0.010	0.010	0.053	0.034	0.088	82%	71%	78%
River Derwent (Yorkshire)	Phosphate	38%	62%	0.050	0.019	0.031	0.031	0.033	0.064	39%	7%	22%
River Derwent and Bassenthwaite Lake	Phosphate	76%	24%	0.017	0.013	0.004	0.010	0.007	0.017	0%	39%	1%
River Eden and Tributaries	Phosphate	72%	28%	0.022	0.016	0.006	0.025	0.007	0.033	38%	16%	33%
River Ehen	Phosphate	83%	17%	0.005	0.004	0.001	0.003	0.001	0.004	0%	0%	0%
River Itchen	Phosphate	50%	50%	0.025	0.013	0.013	0.033	0.007	0.039	61%	0%	35%
River Test	Phosphate	27%	73%	0.029	0.008	0.021	0.020	0.042	0.062	61%	50%	54%
River Kent	Phosphate	62%	38%	0.017	0.011	0.007	0.008	0.003	0.011	0%	0%	0%
River Lambourn	Phosphate	61%	39%	0.028	0.017	0.011	0.079	0.018	0.097	78%	38%	71%
River Lugg	Phosphate	50%	50%	0.027	0.013	0.013	0.090	0.022	0.112	85%	39%	76%
River Mease	Phosphate	50%	50%	0.048	0.024	0.024	0.144	0.042	0.186	83%	43%	74%
River Tweed (England)	Phosphate	94%	6%	0.021	0.020	0.001	0.017	0.002	0.019	0%	31%	0%
River Wensum	Phosphate	48%	52%	0.028	0.013	0.015	0.041	0.017	0.058	67%	15%	52%
River Wye (inc. Lugg)	Phosphate	62%	38%	0.037	0.023	0.014	0.055	0.009	0.064	58%	0%	42%
Wye Valley (Peaks)	Phosphate	50%	50%	0.015	0.008	0.008	0.022	0.020	0.042	65%	63%	64%

Table 33: 2030 Optimistic scenario catchment average phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions.

Catchment	Determinand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Catchment Average Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
River Avon (Hampshire)	Phosphate	50%	50%	0.048	0.024	0.024	0.063	0.017	0.080	62%	0%	41%
River Axe	Phosphate	66%	34%	0.050	0.033	0.017	0.105	0.014	0.118	69%	0%	58%
River Camel	Phosphate	52%	48%	0.024	0.013	0.011	0.012	0.004	0.016	0%	0%	0%
River Clun	Phosphate	50%	50%	0.010	0.005	0.005	0.049	0.002	0.050	90%	0%	80%
River Dee - England Only Diffuse Reductions	Phosphate	50%	50%	0.020	0.010	0.010	0.053	0.022	0.075	82%	55%	74%
River Derwent (Yorkshire)	Phosphate	38%	62%	0.050	0.019	0.031	0.031	0.023	0.054	38%	0%	7%
River Derwent and Bassenthwaite Lake	Phosphate	76%	24%	0.017	0.013	0.004	0.010	0.006	0.016	0%	31%	0%
River Eden and Tributaries	Phosphate	72%	28%	0.022	0.016	0.006	0.025	0.005	0.031	38%	0%	29%
River Ehen	Phosphate	83%	17%	0.005	0.004	0.001	0.003	0.001	0.004	0%	0%	0%
River Itchen	Phosphate	50%	50%	0.025	0.013	0.013	0.033	0.005	0.038	61%	0%	33%
River Test	Phosphate	27%	73%	0.029	0.008	0.021	0.020	0.025	0.045	61%	17%	36%
River Kent	Phosphate	62%	38%	0.017	0.011	0.007	0.008	0.002	0.010	0%	0%	0%
River Lambourn	Phosphate	61%	39%	0.028	0.017	0.011	0.079	0.013	0.093	78%	17%	69%
River Lugg	Phosphate	50%	50%	0.027	0.013	0.013	0.090	0.008	0.098	85%	0%	73%
River Mease	Phosphate	50%	50%	0.048	0.024	0.024	0.156	0.021	0.177	85%	0%	73%
River Tweed (England)	Phosphate	94%	6%	0.021	0.020	0.001	0.017	0.001	0.019	0%	8%	0%
River Wensum	Phosphate	48%	52%	0.028	0.013	0.015	0.041	0.014	0.055	67%	0%	49%
River Wye (inc. Lugg)	Phosphate	62%	38%	0.037	0.023	0.014	0.055	0.006	0.062	58%	0%	39%
Wye Valley (Peaks)	Phosphate	50%	50%	0.015	0.008	0.008	0.022	0.009	0.031	65%	15%	51%

Table 34: 2030 At Permit scenario catchment average phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions.

Catchment	Determinand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Catchment Average Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
River Avon (Hampshire)	Phosphate	50%	50%	0.048	0.024	0.024	0.063	0.024	0.088	62%	0%	46%
River Axe	Phosphate	66%	34%	0.050	0.033	0.017	0.106	0.017	0.123	69%	0%	59%
River Camel	Phosphate	52%	48%	0.024	0.013	0.011	0.012	0.006	0.018	0%	0%	0%
River Clun	Phosphate	50%	50%	0.010	0.005	0.005	0.048	0.005	0.053	90%	0%	81%
River Dee - England Only Diffuse Reductions	Phosphate	50%	50%	0.020	0.010	0.010	0.052	0.045	0.098	81%	78%	80%
River Derwent (Yorkshire)	Phosphate	38%	62%	0.050	0.019	0.031	0.031	0.029	0.060	38%	0%	16%
River Derwent and Bassenthwaite Lake	Phosphate	76%	24%	0.017	0.013	0.004	0.010	0.006	0.017	0%	34%	0%
River Eden and Tributaries	Phosphate	72%	28%	0.022	0.016	0.006	0.025	0.007	0.032	38%	8%	32%
River Ehen	Phosphate	83%	17%	0.005	0.004	0.001	0.003	0.001	0.004	0%	30%	0%
River Itchen	Phosphate	50%	50%	0.025	0.013	0.013	0.032	0.018	0.051	61%	30%	50%
River Test	Phosphate	27%	73%	0.029	0.008	0.021	0.017	0.032	0.059	55%	35%	42%
River Kent	Phosphate	62%	38%	0.017	0.011	0.007	0.008	0.003	0.011	0%	0%	0%
River Lambourn	Phosphate	61%	39%	0.028	0.017	0.011	0.078	0.014	0.092	78%	24%	69%
River Lugg	Phosphate	50%	50%	0.027	0.013	0.013	0.090	0.009	0.099	85%	0%	73%
River Mease	Phosphate	50%	50%	0.048	0.024	0.024	0.151	0.046	0.197	84%	48%	76%
River Tweed (England)	Phosphate	94%	6%	0.021	0.020	0.001	0.017	0.002	0.019	0%	40%	0%
River Wensum	Phosphate	48%	52%	0.028	0.013	0.015	0.041	0.016	0.057	67%	8%	51%
River Wye (inc. Lugg)	Phosphate	62%	38%	0.037	0.023	0.014	0.055	0.007	0.062	58%	0%	40%
Wye Valley (Peaks)	Phosphate	50%	50%	0.015	0.008	0.008	0.021	0.018	0.040	65%	59%	62%

Table 35: 2030 Full Regulation scenario catchment average phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions.

Catchment	Determinand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Catchment Average Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
River Avon (Hampshire)	Phosphate	50%	50%	0.048	0.024	0.024	0.057	0.024	0.081	59%	0%	42%
River Axe	Phosphate	66%	34%	0.050	0.033	0.017	0.084	0.017	0.101	61%	0%	50%
River Camel	Phosphate	52%	48%	0.024	0.013	0.011	0.011	0.006	0.017	0%	0%	0%
River Clun	Phosphate	50%	50%	0.010	0.005	0.005	0.042	0.005	0.047	88%	0%	79%
River Dee - England Only Diffuse Reductions	Phosphate	50%	50%	0.020	0.010	0.010	0.048	0.045	0.093	79%	78%	79%
River Derwent (Yorkshire)	Phosphate	38%	62%	0.050	0.019	0.031	n/a	n/a	n/a	n/a	n/a	n/a
River Derwent and Bassenthwaite Lake	Phosphate	76%	24%	0.017	0.013	0.004	0.009	0.006	0.015	0%	34%	0%
River Eden and Tributaries	Phosphate	72%	28%	0.022	0.016	0.006	0.021	0.007	0.028	26%	8%	21%
River Ehen	Phosphate	83%	17%	0.005	0.004	0.001	n/a	n/a	n/a	n/a	n/a	n/a
River Itchen	Phosphate	50%	50%	0.025	0.013	0.013	0.030	0.018	0.048	57%	30%	47%
River Test	Phosphate	27%	73%	0.029	0.008	0.021	0.016	0.032	0.048	52%	35%	41%
River Kent	Phosphate	62%	38%	0.017	0.011	0.007	0.007	0.003	0.009	0%	0%	0%
River Lambourn	Phosphate	61%	39%	0.028	0.017	0.011	0.070	0.014	0.085	75%	24%	66%
River Lugg	Phosphate	50%	50%	0.027	0.013	0.013	0.075	0.009	0.084	82%	0%	68%
River Mease	Phosphate	50%	50%	0.048	0.024	0.024	0.137	0.048	0.185	82%	50%	74%
River Tweed (England)	Phosphate	94%	6%	0.021	0.020	0.001	0.016	0.002	0.018	0%	40%	0%
River Wensum	Phosphate	48%	52%	0.028	0.013	0.015	0.037	0.016	0.053	63%	8%	47%
River Wye (inc. Lugg)	Phosphate	62%	38%	0.037	0.023	0.014	0.055	0.007	0.062	58%	0%	40%
Wye Valley (Peaks)	Phosphate	50%	50%	0.015	0.008	0.008	0.019	0.018	0.037	61%	58%	60%

Table 36: 2030 Theoretical Maximum scenario catchment average phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Catchment Average Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
River Avon (Hampshire)	Phosphate	50%	50%	0.048	0.024	0.024	0.047	0.024	0.071	49%	0%	33%
River Axe	Phosphate	66%	34%	0.050	0.033	0.017	0.064	0.017	0.081	49%	0%	38%
River Camel	Phosphate	52%	48%	0.024	0.013	0.011	0.008	0.006	0.014	0%	0%	0%
River Clun	Phosphate	50%	50%	0.010	0.005	0.005	0.032	0.005	0.037	84%	0%	73%
River Dee - England Only Diffuse Reductions	Phosphate	50%	50%	0.020	0.010	0.010	0.044	0.045	0.089	77%	78%	78%
River Derwent (Yorkshire)	Phosphate	38%	62%	0.050	0.019	0.031	n/a	n/a	n/a	n/a	n/a	n/a
River Derwent and Bassenthwaite Lake	Phosphate	76%	24%	0.017	0.013	0.004	0.008	0.006	0.014	0%	34%	0%
River Eden and Tributaries	Phosphate	72%	28%	0.022	0.016	0.006	0.018	0.007	0.025	12%	8%	11%
River Ehen	Phosphate	83%	17%	0.005	0.004	0.001	n/a	n/a	n/a	n/a	n/a	n/a
River Itchen	Phosphate	50%	50%	0.025	0.013	0.013	0.025	0.018	0.043	50%	30%	41%
River Test	Phosphate	27%	73%	0.029	0.008	0.021	0.014	0.032	0.046	44%	35%	38%
River Kent	Phosphate	62%	38%	0.017	0.011	0.007	0.005	0.003	0.008	0%	0%	0%
River Lambourn	Phosphate	61%	39%	0.028	0.017	0.011	0.053	0.014	0.067	67%	24%	58%
River Lugg	Phosphate	50%	50%	0.027	0.013	0.013	0.053	0.009	0.063	75%	0%	57%
River Mease	Phosphate	50%	50%	0.048	0.024	0.024	0.114	0.048	0.162	79%	50%	70%
River Tweed (England)	Phosphate	94%	6%	0.021	0.020	0.001	0.011	0.002	0.013	0%	40%	0%
River Wensum	Phosphate	48%	52%	0.028	0.013	0.015	0.029	0.016	0.045	54%	8%	38%
River Wye (inc. Lugg)	Phosphate	62%	38%	0.037	0.023	0.014	0.054	0.007	0.061	57%	0%	39%
Wye Valley (Peaks)	Phosphate	50%	50%	0.015	0.008	0.008	0.016	0.018	0.034	54%	58%	56%

Table 37: River Clun nitrate baseline (2009) sector share, target (Total Oxidised Nitrogen, TON), modelled concentrations (mg/l) and estimated percentage reductions.

Scenario	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	TON Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Actual (2014 to 2020)	Nitrate	91%	9%	1.500	1.365	0.135	3.459	0.130	3.589	61%	0%	58%
2030 Optimistic	Nitrate	91%	9%	1.500	1.365	0.135	3.459	0.130	3.589	61%	0%	58%
2030 At Permit	Nitrate	91%	9%	1.500	1.365	0.135	3.439	0.166	3.605	60%	19%	58%
2030 Full Regulation	Nitrate	91%	9%	1.500	1.365	0.135	3.333	0.166	3.499	59%	19%	57%
2030 Theoretical Maximum	Nitrate	91%	9%	1.500	1.365	0.135	3.070	0.166	3.236	56%	19%	54%

Table 38: Actual (2014 to 2020) scenario phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Values for Poole Harbour expressed as tonnes per year to reflect the load target for Poole Harbour (Environment Agency and Natural England, 2021). For the Somerset Levels and Moors, the proposed target values are presented in brackets alongside the current target values.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Phosphate	50%	50%	0.015	0.008	0.008	0.010	0.031	0.041	26%	76%	64%
Bure Broads and Marshes (BUR140)	Phosphate	57%	43%	0.017	0.010	0.007	0.030	0.014	0.044	68%	48%	61%
Yare Broads and Marshes (YAR200)	Phosphate	50%	50%	0.020	0.010	0.010	0.051	0.086	0.137	80%	88%	85%
Waveney (at Geldeson Meadows)	Phosphate	41%	59%	0.100	0.041	0.059	0.063	0.040	0.104	35%	0%	3%
Esthwaite Water	Total phosphorus	68%	32%	0.015	0.010	0.005	0.011	0.012	0.023	6%	61%	36%
Ouse Washes (at Earith)	Phosphate	29%	71%	0.100	0.029	0.071	0.086	0.165	0.251	66%	57%	60%
Poole Harbour	Total phosphorus	28%	72%	22T/yr	6T/yr	16T/yr	12T/yr	52T/yr		49%	70%	
Somerset Levels and Moors (proposed target values)	Phosphate	50%	50%	0.1 (0.05)	0.05 (0.025)	0.05 (0.025)	0.218	0.100	0.317	77% (89%)	50% (75%)	68% (84%)
Stodmarsh	Phosphate	50%	50%	0.039	0.020	0.020	0.071	0.204	0.275	73%	90%	86%

Table 39: 2030 Optimistic scenario phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. For the Somerset Levels and Moors, the proposed target values are presented in brackets alongside the current target values.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Phosphate	50%	50%	0.015	0.008	0.008	0.010	0.023	0.033	26%	67%	55%
Bure Broads and Marshes (BUR140)	Phosphate	57%	43%	0.017	0.010	0.007	0.030	0.006	0.036	67%	0%	53%
Yare Broads and Marshes (YAR200)	Phosphate	50%	50%	0.020	0.010	0.010	0.051	0.040	0.090	80%	75%	78%
Waveney (at Geldeson Meadows)	Phosphate	41%	59%	0.100	0.041	0.059	0.063	0.037	0.100	35%	0%	0%
Esthwaite Water	Total phosphorus	68%	32%	0.015	0.010	0.005	0.011	0.003	0.014	6%	0%	0%
Ouse Washes (at Earith)	Phosphate	29%	71%	0.100	0.029	0.071	0.086	0.057	0.143	66%	0%	30%
Somerset Levels and Moors (proposed target values)	Phosphate	50%	50%	0.1 (0.05)	0.05 (0.025)	0.05 (0.025)	0.216	0.025	0.241	77% (88%)	0% (0%)	59% (79%)
Stodmarsh	Phosphate	50%	50%	0.039	0.020	0.020	0.071	0.031	0.102	73%	36%	62%

Table 40: 2030 At Permit scenario phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. For the Somerset Levels and Moors, the proposed target values are presented in brackets alongside the current target values.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Phosphate	50%	50%	0.015	0.008	0.008	0.010	0.031	0.041	25%	76%	63%
Bure Broads and Marshes (BUR140)	Phosphate	57%	43%	0.017	0.010	0.007	0.029	0.008	0.037	67%	4%	54%
Yare Broads and Marshes (YAR200)	Phosphate	50%	50%	0.020	0.010	0.010	0.050	0.046	0.095	80%	78%	79%
Waveney (at Geldeson Meadows)	Phosphate	41%	59%	0.100	0.041	0.059	0.063	0.045	0.108	35%	0%	7%
Esthwaite Water	Total phosphorus	68%	32%	0.015	0.010	0.005	0.011	0.003	0.013	4%	0%	0%
Ouse Washes (at Earith)	Phosphate	29%	71%	0.100	0.029	0.071	0.081	0.080	0.161	64%	11%	38%
Somerset Levels and Moors (proposed target values)	Phosphate	50%	50%	0.1 (0.05)	0.05 (0.025)	0.05 (0.025)	0.215	0.031	0.246	77% (88%)	0% (19%)	59% (80%)
Stodmarsh	Phosphate	50%	50%	0.039	0.020	0.020	0.068	0.056	0.124	71%	65%	69%

Table 41: 2030 Full Regulation scenario phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. For the Somerset Levels and Moors, the proposed target values are presented in brackets alongside the current target values.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Phosphate	50%	50%	0.015	0.008	0.008	0.009	0.031	0.040	20%	76%	63%
Bure Broads and Marshes (BUR140)	Phosphate	57%	43%	0.017	0.010	0.007	0.027	0.008	0.034	64%	4%	50%
Yare Broads and Marshes (YAR200)	Phosphate	50%	50%	0.020	0.010	0.010	0.045	0.046	0.090	78%	78%	78%
Waveney (at Geldeson Meadows)	Phosphate	41%	59%	0.100	0.041	0.059	0.054	0.045	0.099	24%	0%	0%
Esthwaite Water	Total phosphorus	68%	32%	0.015	0.010	0.005	0.009	0.003	0.012	0%	0%	0%
Ouse Washes (at Earith)	Phosphate	29%	71%	0.100	0.029	0.071	0.076	0.080	0.156	62%	11%	36%
Somerset Levels and Moors (proposed target values)	Phosphate	50%	50%	0.1 (0.05)	0.05 (0.025)	0.05 (0.025)	0.179	0.031	0.210	72% (86%)	0% (19%)	52% (76%)
Stodmarsh	Phosphate	50%	50%	0.039	0.020	0.020	0.064	0.056	0.120	70%	65%	68%

Table 42: 2030 Theoretical Maximum scenario phosphate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. For the Somerset Levels and Moors, the proposed target values are presented in brackets alongside the current target values.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Phosphate	50%	50%	0.015	0.008	0.008	0.008	0.031	0.039	8%	76%	62%
Bure Broads and Marshes (BUR140)	Phosphate	57%	43%	0.017	0.010	0.007	0.021	0.008	0.028	53%	4%	40%
Yare Broads and Marshes (YAR200)	Phosphate	50%	50%	0.020	0.010	0.010	0.037	0.046	0.083	73%	78%	76%
Waveney (at Geldeson Meadows)	Phosphate	41%	59%	0.100	0.041	0.059	0.044	0.045	0.089	7%	0%	0%
Esthwaite Water	Total phosphorus	68%	32%	0.015	0.010	0.005	0.007	0.003	0.010	0%	0%	0%
Ouse Washes (at Earith)	Phosphate	29%	71%	0.100	0.029	0.071	0.066	0.080	0.146	56%	11%	31%
Somerset Levels and Moors (proposed target values)	Phosphate	50%	50%	0.1 (0.05)	0.05 (0.025)	0.05 (0.025)	0.136	0.031	0.167	63% (82%)	0% (19%)	40% (70%)
Stodmarsh	Phosphate	50%	50%	0.039	0.020	0.020	0.057	0.056	0.113	66%	65%	65%

Table 43: Actual (2014 to 2020) scenario nitrate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed. Values for Poole Harbour expressed as tonnes per year to reflect the load target for Poole Harbour (Enivornment Agency and Natural England, 2021).

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Nitrate	91%	9%	1.07	0.096	0.974	1.546	1.216	2.762	37%	92%	61%
Bure Broads and Marshes (BUR140)	Nitrate	73%	27%	1.07	0.289	0.781	4.793	0.479	5.272	84%	40%	80%
Yare Broads and Marshes (YAR200)	Nitrate	50%	50%	1.07	0.535	0.535	3.904	3.122	7.026	86%	83%	85%
Esthwaite Water	Total Nitrogen	14%	86%	0.770	0.108	0.662	0.621	0.059	0.680	83%	0%	0%
Poole Harbour	Total Nitrogen	80%	20%	1500T/yr	1200T/yr	300T/yr	2298T/yr	533T/yr		48%	44%	
Solent Marine Sites	Nitrate	n/a	n/a	n/a	n/a	n/a	3.246	0.32	3.566	n/a	n/a	n/a
Stodmarsh	Total Nitrogen	50%	50%	1.500	0.750	0.750	3.494	4.437	7.931	79%	83%	81%
Teesmouth and Cleveland Coast	Nitrate	n/a	n/a	n/a	n/a	n/a	3.489	0.646	4.136	n/a	n/a	n/a

Table 44: 2030 Optimistic scenario nitrate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Nitrate	91%	9%	1.07	0.096	0.974	1.544	0.459	2.003	37%	79%	47%
Bure Broads and Marshes (BUR140)	Nitrate	73%	27%	1.07	0.289	0.781	4.791	0.238	5.030	84%	0%	79%
Yare Broads and Marshes (YAR200)	Nitrate	50%	50%	1.07	0.535	0.535	3.903	1.268	5.170	86%	58%	79%
Esthwaite Water	Total Nitrogen	14%	86%	0.770	0.108	0.662	0.621	0.045	0.665	83%	0%	0%
Solent Marine Sites	Nitrate	n/a	n/a	n/a	n/a	n/a	3.248	0.249	3.497	n/a	n/a	n/a
Stodmarsh	Total Nitrogen	50%	50%	1.500	0.750	0.750	3.494	1.563	5.057	79%	52%	70%
Teesmouth and Cleveland Coast	Nitrate	n/a	n/a	n/a	n/a	n/a	3.525	0.573	4.098	n/a	n/a	n/a

Table 45: 2030 At Permit scenario nitrate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Nitrate	91%	9%	1.07	0.096	0.974	1.489	0.793	2.282	35%	88%	53%
Bure Broads and Marshes (BUR140)	Nitrate	73%	27%	1.07	0.289	0.781	4.755	0.340	5.095	84%	15%	79%
Yare Broads and Marshes (YAR200)	Nitrate	50%	50%	1.07	0.535	0.535	3.828	1.437	5.265	86%	63%	80%
Esthwaite Water	Total Nitrogen	14%	86%	0.770	0.108	0.662	0.612	0.051	0.663	82%	0%	0%
Solent Marine Sites	Nitrate	n/a	n/a	n/a	n/a	n/a	3.214	0.380	3.594	n/a	n/a	n/a
Stodmarsh	Total Nitrogen	50%	50%	1.500	0.750	0.750	3.357	1.819	5.176	78%	59%	71%
Teesmouth and Cleveland Coast	Nitrate	n/a	n/a	n/a	n/a	n/a	3.483	0.930	4.413	n/a	n/a	n/a

Table 46: 2030 Full Regulation scenario nitrate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broads and Marshes (ANT130)	Nitrate	91%	9%	1.07	0.096	0.974	1.465	0.793	2.258	34%	88%	53%
Bure Broads and Marshes (BUR140)	Nitrate	73%	27%	1.07	0.289	0.781	4.664	0.340	5.004	83%	15%	79%
Yare Broads and Marshes (YAR200)	Nitrate	50%	50%	1.07	0.535	0.535	3.708	1.437	5.145	86%	63%	79%
Esthwaite Water	Total Nitrogen	14%	86%	0.770	0.108	0.662	0.601	0.051	0.652	82%	0%	0%
Solent Marine Sites	Nitrate	n/a	n/a	n/a	n/a	n/a	3.121	0.380	3.501	n/a	n/a	n/a
Stodmarsh	Total Nitrogen	50%	50%	1.500	0.750	0.750	3.263	1.819	5.082	77%	59%	70%
Teesmouth and Cleveland Coast	Nitrate	n/a	n/a	n/a	n/a	n/a	3.237	0.930	4.167	n/a	n/a	n/a

Table 47: 2030 Theoretical Maximum scenario nitrate baseline (2009) sector share, targets, modelled concentrations (mg/l) and estimated percentage reductions at the modelled assessment points. Total nitrogen values for Esthwaite Water. Nitrate targets for the Solent Marine Sites and Teesmouth and Cleveland Coast are yet to be agreed.

Catchment	Determindand	Baseline (2009) Diffuse Sector Share	Baseline (2009) Point Sector Share	Target (mg/l)	Diffuse Sector Share (mg/l)	Point Sector Share (mg/l)	Diffuse Concentration (mg/l)	Point Concentration (mg/l)	Total Concentration (mg/l)	Diffuse % Reduction Needed	Point % Reduction Needed	Total % Reduction Needed
Ant Broad and Marshes (ANT130)	Nitrate	91%	9%	1.07	0.096	0.974	1.287	0.793	2.079	24%	88%	49%
Bure Broad and Marshes (BUR140)	Nitrate	73%	27%	1.07	0.289	0.781	4.094	0.340	4.434	81%	15%	76%
Yare Broad and Marshes (YAR200)	Nitrate	50%	50%	1.07	0.535	0.535	3.382	1.437	4.819	84%	63%	78%
Esthwaite Water	Total Nitrogen	14%	86%	0.770	0.108	0.662	0.574	0.051	0.625	81%	0%	0%
Solent Marine Sites	Nitrate	n/a	n/a	n/a	n/a	n/a	2.757	0.380	3.137	n/a	n/a	n/a
Stodmarsh	Total Nitrogen	50%	50%	1.500	0.750	0.750	2.867	1.819	4.686	74%	59%	68%
Teesmouth and Cleveland Coast	Nitrate	n/a	n/a	n/a	n/a	n/a	2.794	0.93	3.725	n/a	n/a	n/a

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List of abbreviations

ADAS – UK-based independent agricultural and environmental consultancy, previously National Agricultural Advisory Service (NAAS).

AMP8 WINEP – Asset Management Plan 8 (2025 – 2030) Water Industry National Environment Programme - [Water industry national environment programme \(WINEP\) methodology - GOV.UK](#)

CSMG – Common Standards Monitoring Guidance – includes guidance on the appropriate standards and targets for designated sites [Common Standards Monitoring Guidance for Freshwater Habitats | JNCC Resource Hub](#)

DWPP – Diffuse Water Pollution Plan.

NEAP-N – ADAS model providing annual 1 km grid loadings of nitrate.

PR – [Price Review](#)

PSYCHIC – ADAS model providing annual 1 km grid loadings of Phosphate.

SAC – Special Area of Conservation

SAGIS – Source Apportionment Geographical Information System

SPA – Special Protection Area

SSSI – Site of Special Scientific Interest

TON – Total Oxidised Nitrogen

UKWIR – United Kingdom Water Industry Research

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