# Indicative Catchment Statistics for Nutrient Pollution

## Protected areas with diffuse water pollution plans or nutrient neutrality advice

Date: September 2024

Version: 1.2

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## Contents

# Executive summary

We have provided indicative, catchment-scale source apportionment and estimated diffuse sector reductions required to meet protected area water quality targets. This is to support a general understanding of catchments and is not intended to give the level of detail needed to inform specific on-the-ground measures. This will help those designing or co-ordinating nutrient mitigation schemes, working on Diffuse Water Pollution Plans (DWPPs) and working on site restoration.

We have highlighted the dominant sources of nutrients under the ‘recent’ scenario, to closely represent what is currently happening in catchments. The results should be regarded as indicative. They will be superseded by further modelling work for DWPPs where indicated, which will also incorporate the ‘at permit’ scenario simulations of the point sector fully utilising all permit headroom and the benefits of water industry investment to reduce point source pollution since 2020 (AMP7) and in the future (PR24).

We used Simcat SAGIS models calibrated using monitoring data up to 2020. We applied the revised ‘polluter pays principle’ methodology to define the ‘fair share’ percentage reduction required by each broad sector. We compared the diffuse sector figures to outputs from Farmscoper, which show what may be achieved by improvements to land management.

We have also presented the reduction required by the point sector for each catchment. However, this report does not set out the reductions that have been achieved by the AMP7 water company investment measures nor future PR24 schemes, including the proposed improvements to wastewater treatment works to comply with the Levelling up and Regeneration Act. The work for the DWPPs will consider these further.

We have not quantified the 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 our permitting process.

The results show that rural land use sources of nutrients dominate most catchments, particularly the rivers. A small number of catchments have diffuse urban sources indicated and point sources are important in most catchments.

In almost all catchments, we estimate the ‘fair share’ reduction required by the diffuse sector to be several times greater than the estimated reduction in losses achieved when applying catchment-wide rural land management measures. This is where additional and/or alternative measures would need to be explored to achieve the diffuse sector share of the target.

# Methodology

## Catchments

The catchments included in this report are protected areas in unfavourable condition due to diffuse pollution and where an Environment Agency led, or joint Environment Agency-Natural England Diffuse Water Pollution Plan (DWPP) is being prepared. Several of these catchments are where Natural England nutrient neutrality advice applies for overnight accommodation and were also designated in 2023 as Sensitive Catchment Areas under the Water Industry Act 1991 (Table 1).

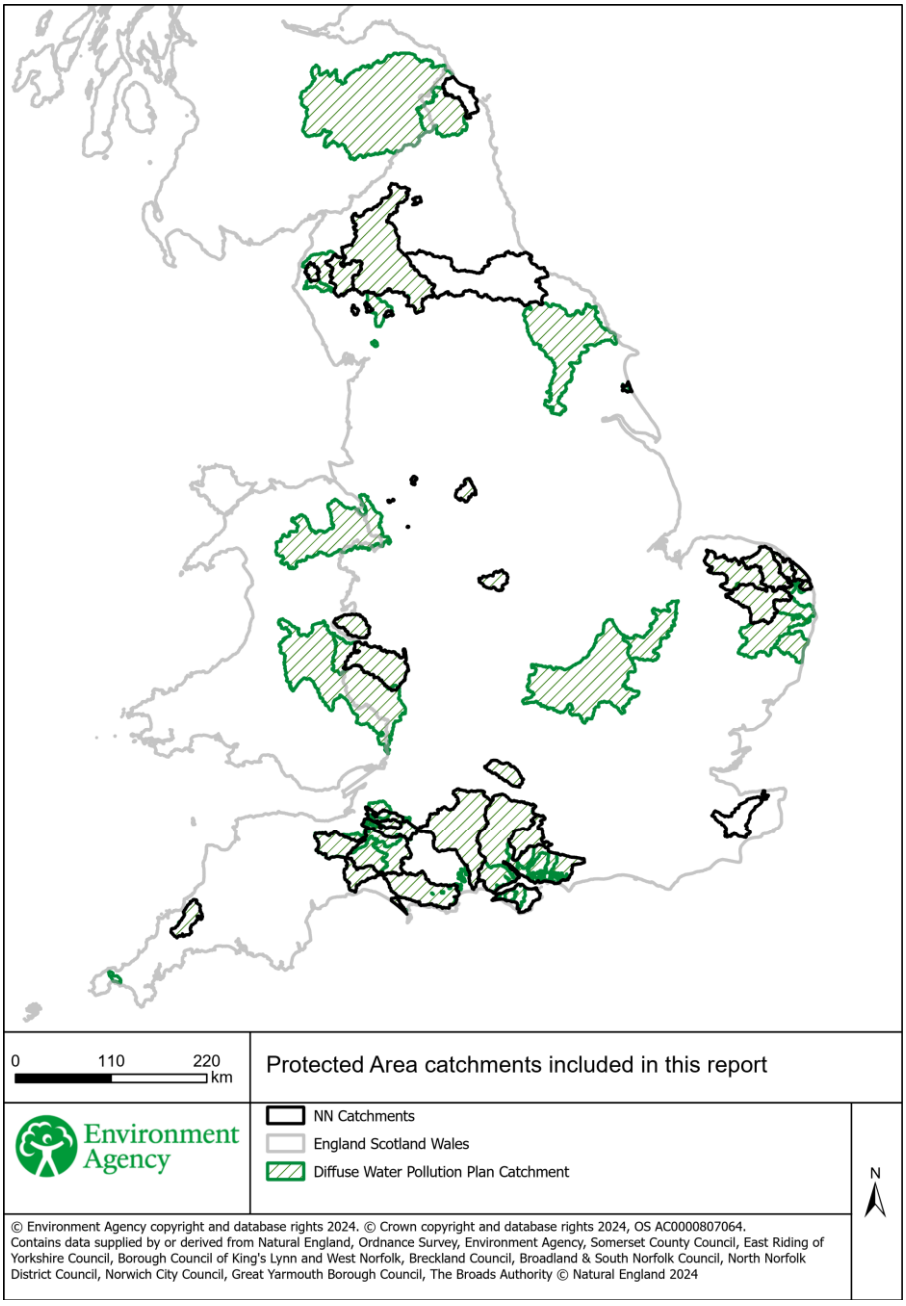


**Figure 1: Protected Area Catchments included in this report.**

**Table 1: Protected area catchments included in this report.**

| Protected Area | EA Led/ Joint DWPP | NE NN Advice Applies | Sensitive Catchment (WRA 1991) | Further modelling expected 24/5 |
|---|---|---|---|---|
| River Avon (Hampshire) | Yes | Yes | Yes | |
| River Axe | Yes | Yes | Yes | |
| River Camel | Yes | Yes | Yes | Yes |
| River Clun | Yes | Yes | | Yes |
| River Dee | Yes | | | Yes |
| River Derwent (Yorkshire) | Yes | | | Yes |
| River Derwent & Bassenthwaite Lake | Yes | (part of) | (part of) | Yes |
| River Eden | Yes | Yes | Yes | |
| River Ehen | Yes | | | Yes |
| River Itchen | Yes | Yes | Yes | Yes |
| River Kent | Yes | (part of) | (part of) | |
| River Lambourn | Yes | Yes | Yes | |
| River Mease | Yes | Yes | Yes | Yes |
| River Tweed (England) | (part of) | | | |
| River Wensum | Yes | Yes | Yes | |
| River Wye | Yes | (part of) | | |
| Wye Valley (Peaks) | Yes | Yes | | |
| The Broads | | Yes | Yes | |
| Ant Broads & Marshes | Yes | Yes | Yes | |
| Bure Broads & Marshes | Yes | Yes | Yes | |
| Yare Broads & Marshes | Yes | Yes | Yes | |
| Chesil & The Fleet | Yes | Yes | | Yes |
| Esthwaite | | Yes | | Yes |
| Hornsea Mere | Yes | Yes | | |
| Lindisfarne | | Yes | | |
| Ouse Washes | Yes | | | Yes |
| Poole Harbour | Yes | Yes | Yes | |
| Solent (Freshwater inputs) | Yes | Yes | Yes | Yes |
| Somerset Levels & Moors | | Yes | Yes | |
| Stodmarsh | | Yes | Yes | |
| Teesmouth & Cleveland Coast | | Yes | Yes | |
| Waveney (several SSSIs) | Yes | | | Yes |

We have not included the following DWPP catchments in this report because they are not represented in Simcat SAGIS: Abbotts Moss, Brown Moss, Dorset Heaths, Leighton Moss, Marazion Marsh, Oak Mere and Wybunbury Moss. The completion of these DWPPs is led by Natural England. Similarly, we have not included Roman Walls Loughs and Rostherne Mere, which are subject to nutrient neutrality advice, for the same reason.

## Simcat SAGIS Modelling

We have used the PR19 and the PR24 Simcat SAGIS models for this work. Through 2024 we will further validate the models for the catchments where DWPPs are yet to be completed. The figures presented here should be regarded as provisional and may be superseded following more detailed modelling work.

We calibrated the models following nationally agreed model build and model calibration standards. The calibration process optimises the level of agreement between measured and simulated values through reasonable and systematic adjustments to model parameters and data. We do this by adjusting the model inputs in which we have least confidence, those representing diffuse source of pollution. To assess confidence in the models, we compare the level of agreement between measured and simulated values. While Simcat SAGIS modelling has provided a robust framework for use in decision-making for wastewater investment planning for several Price Review cycles, there is less certainty in the estimates of loadings from diffuse sources. Hence, there is less confidence in using the models to assess the outcomes of measures that target diffuse sources, as we have done here and for the DWPPs.

For this work, we have used the Simcat SAGIS models to produce results for a single scenario, the 2020 calibrated baseline period using 2014 – 2018 flow data and water and discharge quality data up to 2020. This ‘recent scenario’ is the closest approximation we have of the current situation for the diffuse sector inputs and concentrations. While the benefits of any late delivery AMP6 schemes on overall in-river concentrations may not be represented by this work, this will have minimal influence on the diffuse sector concentrations, diffuse sector share and the diffuse sector reductions estimated.

The more detailed DWPP modelling through 2024, where undertaken, will incorporate assessing the benefits from AMP7 investment measures, proposed PR24 measures and potential reductions in diffuse inputs as estimated using Farmscoper V5 for a range of measure uptake scenarios. This future work will set out the specific diffuse sector reductions required to achieve target compliance along designated reaches in the protected sites alongside the catchment averages presented here.

## Data used in Simcat SAGIS models

We have updated the SAGIS models with Environment Agency and Water Company data and calibrated them using the latest UKWIR flow and water quality calibration tools. The calibration process has optimised the level of agreement between measured and simulated values through reasonable and systematic adjustments to model parameters and data. The process is, however, not intended to force-fit modelled and measured values and the level of agreement is in some instances imperfect. For the Diffuse Water Pollution Plan catchments, we are reviewing the model calibration to understand model performance, which is central to interpreting the results. Any steps taken to improve the model calibration will be detailed in the catchment-specific report(s). A catchment

approach, such as that applied in this report, will minimise uncertainties at individual locations in a model.

Sensitivity analysis can be used to quantify model uncertainties and to understand the significance of the uncertainties to decision making. This will be progressed as necessary in the DWPP-specific modelling.

**PR19 Modelling**

We have produced the PR19 modelled datasets from a SAGIS model that we have calibrated using:

- SAGIS version SAGIS2015
- 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, 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.

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 time 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 Modelling**

We have produced the PR24 modelled datasets from a SAGIS model that we have calibrated using:

- SAGIS version 3
- 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.

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 on 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 the data set |
|---|---|---|---|
| River Flows | EA Flow Gauging Station data for period 2014-2018 | Used to calibrate the flows in the models | High |
| River and Lake Quality (England) | 2014-2020 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 2014-2018 & 2020 -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 |

| Data Set | Data used | Comments | Confidence in the data set |
|---|---|---|---|
| STW Quality | 2014-2020 monitoring data. Where no monitoring data, defaults used. | Used to characterise the inputs | Medium – High<br><br>High where monitoring data is used |
| Industrial discharges | 2014-2020 monitoring data. Where no monitoring data, permit data used. | Used to characterise the inputs | High |
| Storm Overflows | Annual loadings and spill durations derived using national datasets and assumptions | Used to characterise the inputs | Low-High<br><br>High where updated using local data |
| Rural Land Run-off (e.g. 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 (e.g. 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 |

| Data Set | Data used | Comments | Confidence in the data set |
|---|---|---|---|
| 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 Modelling

We have used Farmscoper v5 to assess diffuse agricultural pollutant loads and quantify the impacts of farm mitigation methods across ten scenarios. Outputs from this work are being used by those working on the Diffuse Water Pollution Plans.

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.

We have presented outputs for four of the scenarios in this report to give a ‘best’ and ‘worst case’ estimation of the reduction in nutrient losses from different rates of agricultural mitigation measure uptake (Table 3).

Scenario 3 estimates high regulatory compliance (85% uptake of regulatory measures), a 25% uptake of Farming Rules for Water (FRfW) ‘reasonable’ Regulatory measures, and current rates of uptake of all voluntary and other measures represented in Farmscoper V5.

Scenario 4 estimates full regulatory compliance (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.

Scenario 8 estimates an optimistic view with a high (85%) uptake of regulatory measures, a 25% uptake of Farming Rules for Water 'reasonable' Regulatory measures, and 70% uptake of voluntary measures represented in Farmscoper V5.

Scenario 10 estimates a theoretical maximum reduction in losses from agricultural land if there were to be 100% uptake of all measures in Farmscoper.

**Table 3: Measure uptake rates from the Farmscoper V5 scenarios represented.**

| Scenario | Regulatory Measures | Farming Rules for Water 'reasonable' measures | Voluntary Measures | Other Measures |
|---|---|---|---|---|
| Scenario 3 – High Regulatory | 85% | 25% | Current | Current |
| Scenario 4 – Full Regulatory | 100% | 25% | Current | Current |
| Scenario 8 – Optimistic | 85% | 25% | 70% | Current |
| Scenario 10 – Theoretical Maximum | 100% | 100% | 100% | 100% |

Confidence in the Farmscoper outputs (Table 4) is based on the accuracy of the census and location data for the catchment:

- High: >100 farms
- Medium: 25 – 100 farms
- Low: < 25 farms
- N/a: too small to be modelled

**Table 4: Catchments modelled in Farmscoper V5.**

| Catchments | Type | Confidence |
|---|---|---|
| River Avon (Hampshire) | River | High |
| River Axe | River | High |
| River Camel | River | High |

| Catchments | Type | Confidence |
|---|---|---|
| River Clun | River | High |
| River Dee | River | High |
| River Derwent (Yorkshire) | River | High |
| River Derwent & Bassenthwaite Lake | River | High |
| River Eden | River | High |
| River Ehen | River | Medium |
| River Itchen | River | High |
| River Kent | River | High |
| River Lambourn | River | High |
| River Mease | River | High |
| River Tweed | River | High |
| River Wensum | River | High |
| River Wye | River | High |
| Wye Valley (Peaks) | River | High |
| The Broads | Estuaries, Wetlands and Lakes | High |
| Ant Broads & Marshes SSSI | Estuaries, Wetlands and Lakes | Medium |
| Bure Broads & Marshes SSSI | Estuaries, Wetlands and Lakes | High |
| Yare Broads & Marshes SSSI | Estuaries, Wetlands and Lakes | High |
| Chesil & The Fleet | Estuaries, Wetlands and Lakes | Low |
| Hornsea Mere | Estuaries, Wetlands and Lakes | Low |
| Ouse Washes | Estuaries, Wetlands and Lakes | High |
| Poole Harbour | Estuaries, Wetlands and Lakes | High |
| Solent (Freshwater inputs) | Estuaries, Wetlands and Lakes | High |
| Somerset Levels & Moors | Estuaries, Wetlands and Lakes | High |
| Stodmarsh | Estuaries, Wetlands and Lakes | High |
| Teesmouth | Estuaries, Wetlands and Lakes | High |
| Waveney (several SSSIs) | Estuaries, Wetlands and Lakes | High |

## Source Apportionment

We have presented source apportionment figures by input sector loads. 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 5). Apportioning the input loads gives an indication of which sector is the dominant nutrient source.

The in-river modelled concentrations arise from the input loads, after the influence of river dilution and natural decay processes in the river, and after calibration factors have been applied to optimise the level of agreement between measured and simulated values. We have presented the in-river concentration source apportionment as a sector catchment average because of uncertainties in diffuse inputs and to be consistent with the revised 'polluter pays principle' methodology.

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.

## Compliance Statistics and Sector Reductions

We have followed the revised 'polluter pays principle' methodology to estimate the sector share of the targets as a catchment average. We estimated the baseline (2009) sector share of the target using data from the PR19 models. We estimated the recent sector concentration 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.

Simcat SAGIS produces outputs for phosphate, ammonia, and nitrate. Where needed, we estimated total nitrogen values from the sum of total ammonia and nitrate values.

As these figures are a catchment average reduction there will locations in the catchment that will need to achieve a greater reduction, and some where a lesser reduction will be needed depending on the recent overall 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 are not required, for example where the point sector discharges are subject to uniform emission standards.

The more detailed DWPP modelling will present overall compliance and sector compliance at plotting points within the designated reaches of each designated site alongside the overall catchment average statistics.

## Targets

We have used the Common Standards Monitoring Guidance (CSMG) targets for phosphate, nitrate, and total nitrogen (where available) which are variable across the different catchments. The targets are agreed for water dependent protected areas by Natural England and the Environment Agency and have been collated online on the Catchment Data Explorer https://environment.data.gov.uk/catchment-planning/downloads/Habitats_site_European_site_Protected_Area_Targets.xlsx

## Catchment Average Targets

Each DWPP catchment has specific water quality target(s). The catchment average target is based on the target values attributed to each modelled plotting point (spaced no more than 1km along all modelled reaches). We attribute the modelled plotting points in designated reaches the target value for the corresponding SSSI unit. We then propagate these target values upstream to the modelled plotting points in the undesignated reaches because the upstream quality must improve for the target water quality to be met in the designated reaches.

This catchment average approach is referred to in the revised ‘polluter pays principle’ methodology.

**Table 5: Point and diffuse sub-sectors with confidence in the sector data.**

| Sector | Sub-sector | Description | Confidence in data |
|---|---|---|---|
| **Point** | STWs – Sewage Treatment Works | Large, predominantly water company managed, domestic discharges. | Medium – High<br><br>High where monitoring data is used. |
| **Point** | Intermittent Discharges (Storm Overflows) | Inputs from sewerage network storm overflows and storm tanks at STWs. | Low – High<br><br>High where updated using local data. |
| **Point** | Industry | Permitted industrial discharges. | High |
| **Diffuse** | Rural Land Use | Inputs from farmland, forestry, grassland etc. | Medium |
| **Diffuse** | Urban Runoff | Estimation of urban run-off from impermeable surfaces potentially contaminated from misconnected drains. | Low |
| **Diffuse** | Septic Tanks | Estimation of unsewered properties | Low-Medium |
| **Diffuse** | Highways | Estimation of inputs from motorway and truck road run off only. | Low |
| **Diffuse** | Atmospheric deposition (nitrogen only). | Estimation of inputs from atmospheric deposition. | Medium |

# Results

We have collated outputs for each of the River Catchments and the Estuarine, Wetland and Lake Catchments and presented summary tables and figures below.

Several catchments have draft Diffuse Water Pollution Plans dating from circa 2014/15, 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 Plans and the figures presented here. These differences may be for several reasons, including:

- Modelling improvements between the PR19 and PR24 models
- Revisions to the ‘polluter pays principle’ methodology
- Changes to site targets
- Improvements to sector inputs such as water company investment

The modelling improvements that are most likely to have affected these results are as follows:

- Headwater areas and flows have been recalculated using an improved methodology.
- Headwater input loads are now divided up and allocated to the sectors.
- Loadings from rural land are now modelled and correlated with river flows using power curves rather than non-parametric distribution files.
- Storm overflows are now included in all our models.
- A new suite of calibration tools has been developed which calibrate against the whole of the water quality distribution curve, not just the mean.

## Source Apportionment

We have presented source apportionment figures by input sector loads, using figures from the PR24 calibration models to highlight the dominant sources of nutrients under the ‘recent’ scenario.  This closely represents what is currently happening in catchments as it is based on data up to 2020 (2021 in some cases).

The river catchment input load source apportionment (Table 6, Table 7 and Figure 2) is based on modelled outputs at the downstream end of each catchment. The estuarine, wetland and lake input load source apportionments (Table 8, Figure 3 and Figure 4) are based on modelled outputs at the entry point(s) to the designated site and direct discharges where applicable.

Phosphorus input load source apportionment is dominated by diffuse sources of nutrients, particularly from rural land use. This is with the notable exception of the Camel, Kent, and Poole Harbour catchments, where point sources dominate at the catchment scale. The Hampshire Avon, Itchen, Mease, Broads and Stodmarsh catchments have notable

contributions from ‘urban’ sources, which include estimates of inputs from impermeable surfaces (roads) and potentially misconnected drainage, this is to be expected in catchments where there are large conurbations.

In the estuarine, wetland and lake catchments, the total nitrogen input load source apportionment is dominated by rural land use inputs with the exception of the Teesmouth catchment, where there are large industrial and wastewater treatment works discharging directly to the estuary.

**Table 6: River catchments phosphate input load source apportionment (recent scenario, PR24 calibration models).**

| Catchment | Point | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| River Avon (Hampshire) | 20% | 46% | 28% | 3% | 3% |
| River Axe | 14% | 83% | 1% | 1% | 0% |
| River Camel | 73% | 21% | 4% | 1% | 0% |
| River Clun | 12% | 80% | 6% | 2% | 0% |
| River Dee | 16% | 83% | 0% | 1% | 0% |
| River Derwent (Yorkshire) | 44% | 53% | 2% | 1% | 0% |
| River Derwent & Bassenthwaite Lake (DWPP catchment) | 56% | 43% | 0% | 0% | 0% |
| River Derwent & Bassenthwaite Lake (NN catchment) | 48% | 50% | 0% | 0% | 0% |
| River Eden | 43% | 55% | 2% | 1% | 0% |
| River Ehen | 25% | 73% | 1% | 1% | 0% |
| River Itchen | 36% | 30% | 20% | 4% | 11% |
| River Kent (DWPP catchment) | 69% | 30% | 0% | 1% | 0% |
| River Kent (NN catchment) | 15% | 83% | 0% | 2% | 0% |
| River Lambourn | 14% | 70% | 14% | 2% | 0% |
| River Mease | 22% | 43% | 30% | 5% | 0% |
| River Tweed (England) | 14% | 83% | 1% | 2% | 0% |
| River Wensum | 18% | 68% | 13% | 1% | 0% |
| River Wye/ Lugg (DWPP catchment) | 21% | 75% | 2% | 2% | 0% |
| River Wye/ Lugg (Lugg NN catchment) | 14% | 81% | 2% | 2% | 0% |
| Wye Valley (Peaks) | 35% | 48% | 16% | 1% | 0% |

**Table 7: River catchments nitrate input load source apportionment (recent scenario, PR24 calibration models).**

| Catchment | Point | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| River Clun | 2% | 98% | 0% | 0% | 0% |

**Table 8: Estuarine, Wetland and Lake catchments phosphate and total phosphorus input load source apportionment (recent scenario, PR24 calibration models).**

| Catchment | Determinand | Point | Rural Land Use | Urban | Septic Tanks | Other | Notes |
|---|---|---|---|---|---|---|---|
| Broads | Orthophosphate (OP) | 44% | 41% | 14% | 2% | 0% | |
| Ant Broads & Marshes SSSI | Orthophosphate (OP) | 64% | 8% | 23% | 4% | 0% | TP targets converted to OP target for DWPP assessment |
| Yare Broads & Marshes SSSI | Orthophosphate (OP) | 46% | 41% | 13% | 1% | 0% | TP targets converted to OP target for DWPP assessment |
| Bure Broads & Marshes SSSI | Orthophosphate (OP) | 26% | 50% | 20% | 4% | 0% | TP targets converted to OP target for DWPP assessment |
| Chesil & The Fleet | Total Phosphorus (TP) | | | | | | Simcat SAGIS modelling not available |
| Esthwaite | Total Phosphorus (TP) | 70% | 29% | 0% | 2% | 0% | |
| Hornsea Mere | Total Phosphorus (TP) | | | | | | Simcat SAGIS modelling not available |
| Ouse Washes | Orthophosphate (OP) | 57% | 27% | 14% | 2% | 0% | TP targets converted to OP target for DWPP assessment |
| Poole Harbour | Orthophosphate (OP) | 75% | 23% | 1% | 1% | 0% | Poole Harbour target expressed as OP |
| Somerset Levels & Moors | Orthophosphate (OP) | 33% | 54% | 11% | 2% | 0% | TP targets converted to OP target |

| Catchment | Determinand | Point | Rural Land Use | Urban | Septic Tanks | Other | Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | for DWPP assessment |
| Stodmarsh | Orthophosphate (OP) | 56% | 24% | 17% | 3% | 0% | |
| Waveney Sites (several SSSI) | Orthophosphate (OP) | 29% | 64% | 4% | 2% | 0% | TP targets converted to OP target for DWPP assessment |
| Broads | Total Nitrogen (TN) | 21% | 73% | 4% | 0% | 2% | |
| Chesil & The Fleet | Total Nitrogen (TN) | | | | | | Simcat SAGIS modelling not available |
| Hornsea Mere | Total Nitrogen (TN) | | | | | | Simcat SAGIS modelling not available |
| Poole Harbour | Total Nitrogen (TN) | 21% | 76% | 0% | 0% | 3% | |
| Solent | Total Nitrogen (TN) | 13% | 77% | 2% | 0% | 6% | |
| Stodmarsh | Total Nitrogen (TN) | 39% | 55% | 2% | 0% | 4% | |
| Teesmouth & Cleveland Coast | Total Nitrogen (TN) | 61% | 33% | 1% | 0% | 5% | |

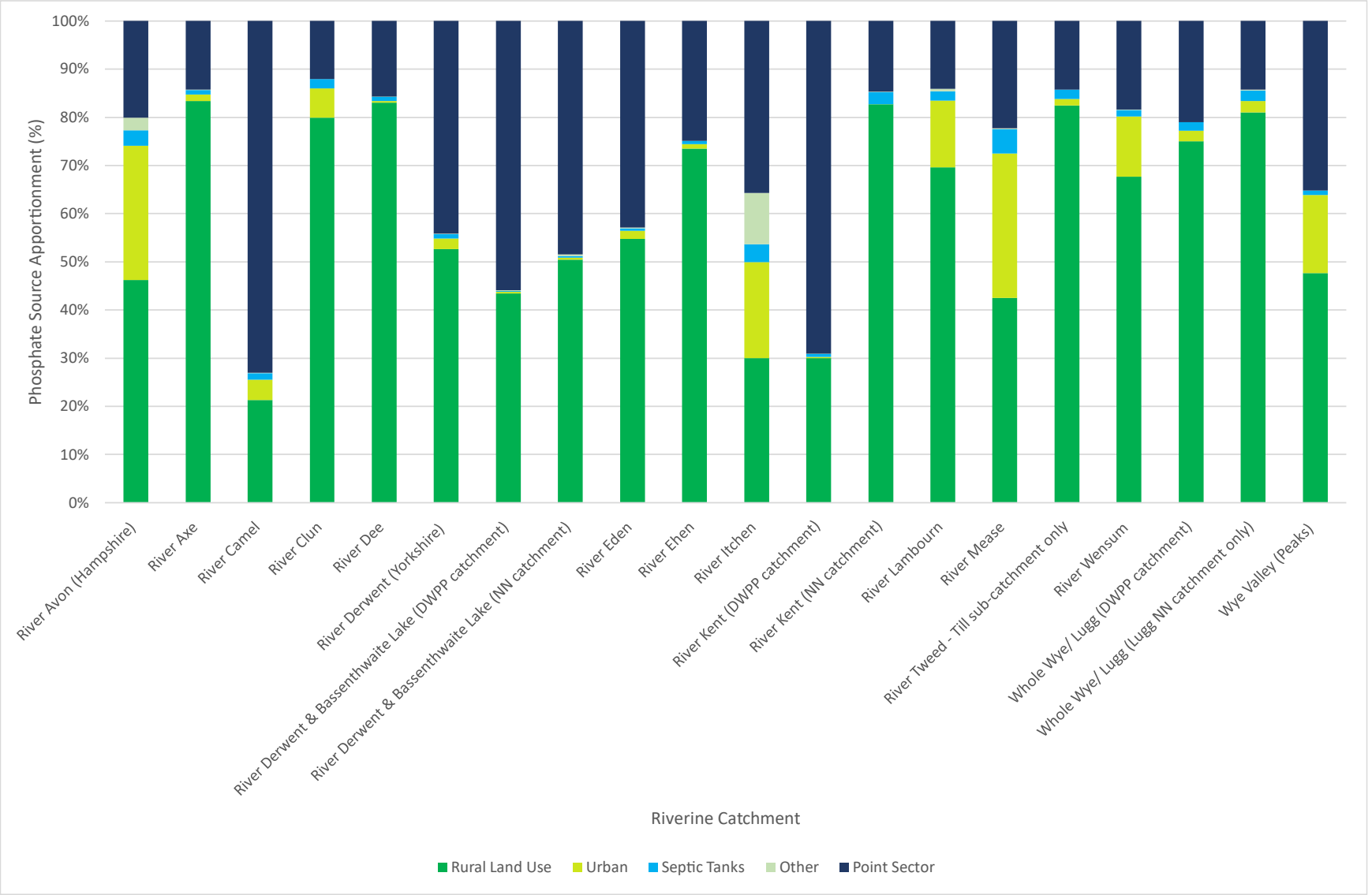


**Figure 2: Phosphate input load source apportionment in the riverine catchments (recent scenario, PR24 calibration models).**

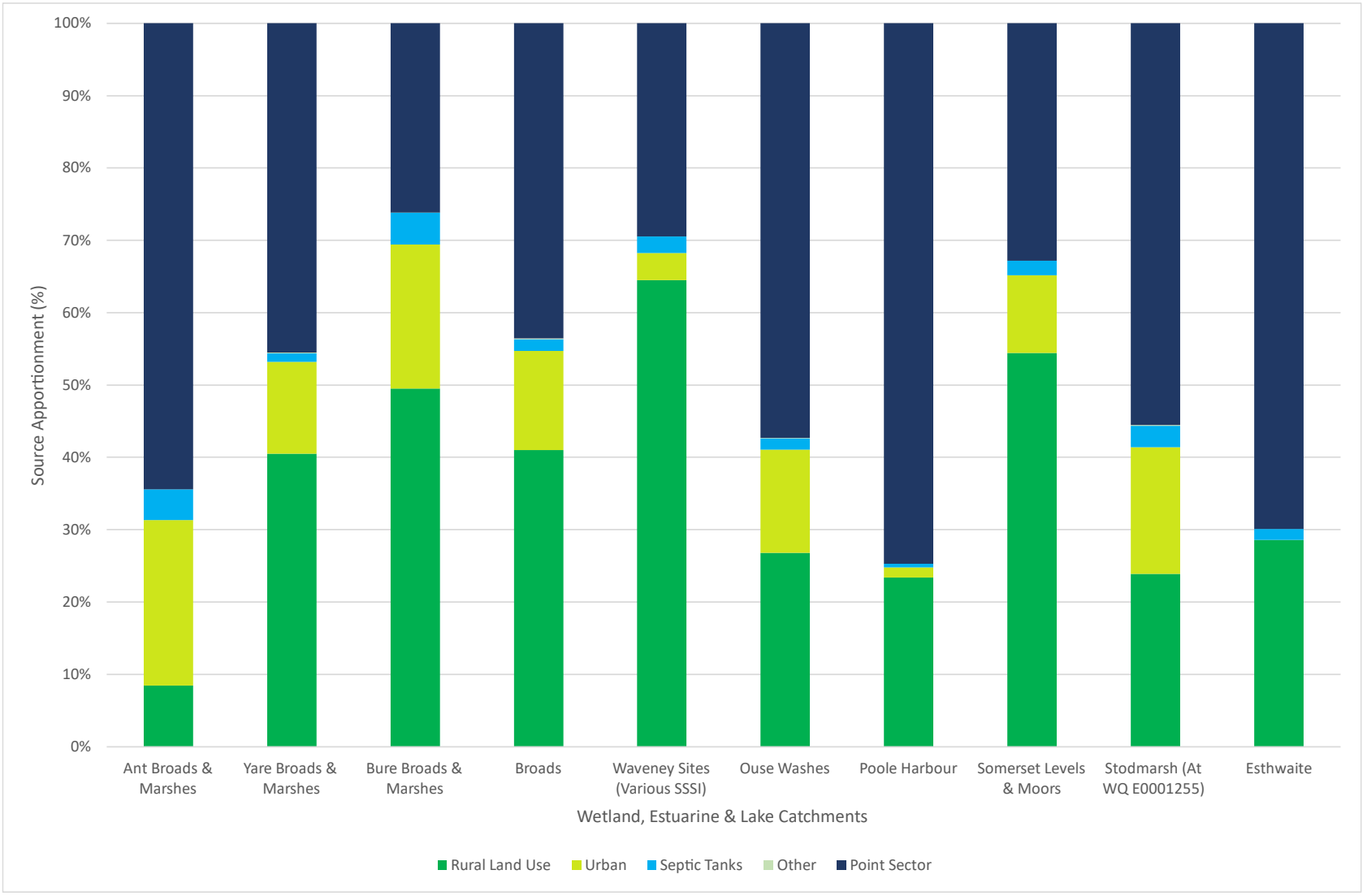


**Figure 3: Phosphate/ total phosphorus (Esthwaite only) input load source apportionment in the estuarine, wetland and lake catchments (recent scenario, PR24 calibration models).**

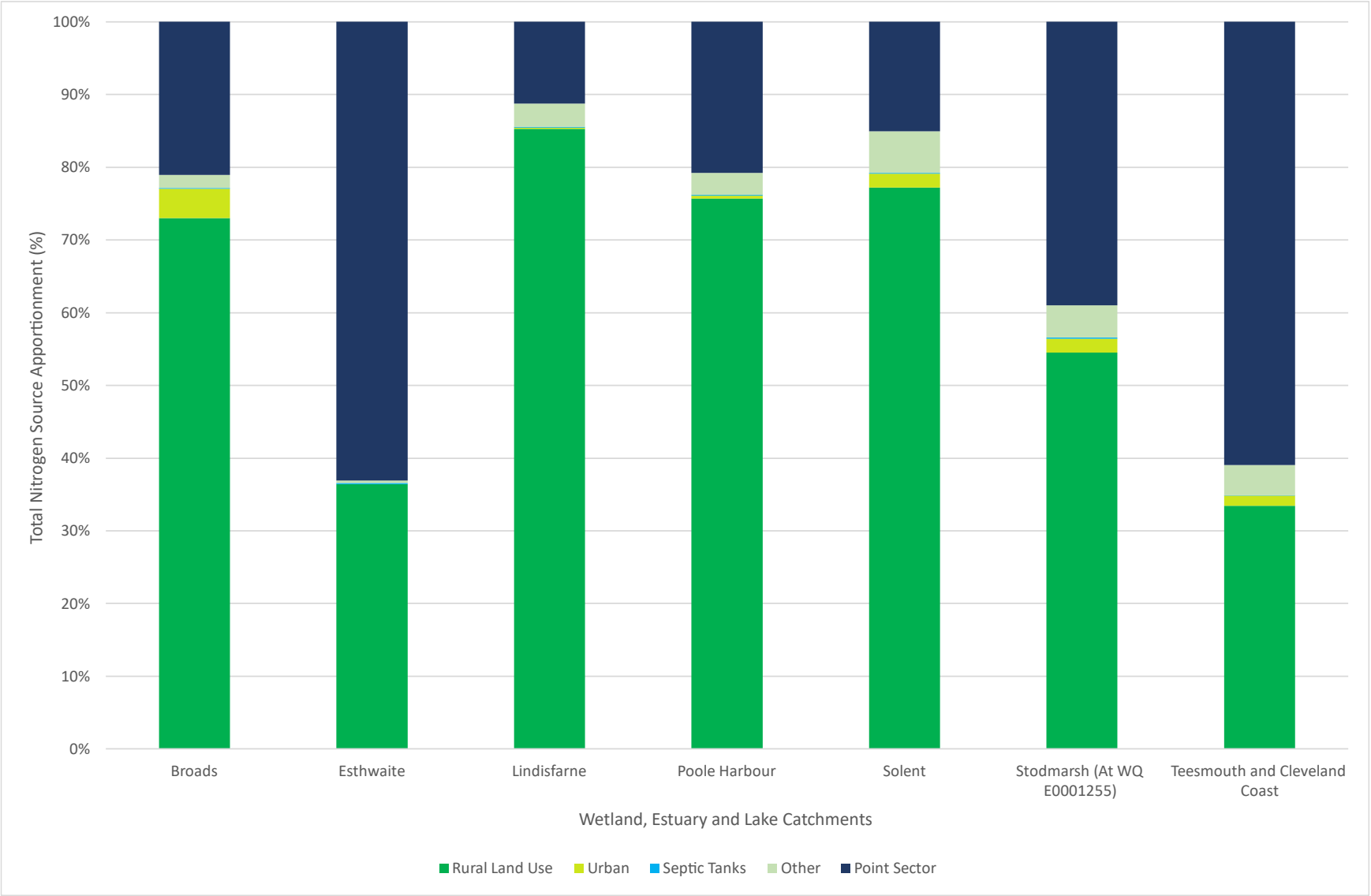


**Figure 4: Total nitrogen input load source apportionment in the estuarine, wetland and lake catchments (recent scenario, PR24 calibration models).**

# Compliance Statistics and Sector Reductions

We have followed the revised ‘polluter pays principle’ methodology to derive a close approximation of the current catchment scale percentage reductions needed by the point and diffuse sectors to achieve the sector share of the target. Through comparison with the catchment scale Farmscoper outputs, this gives an indication of how achievable the reductions are for the agriculture sub-sector by applying the farm mitigation measures available in Farmscoper V5. These measures only represent those required to comply with water-related regulations and in current agri-environment incentive schemes. This comparison gives a residual percentage reduction required to meet the diffuse sector share.

There are currently no tools available to help us evaluate how achievable the reductions needed are for the other diffuse sub-sectors.

We will conduct further analysis to assess the benefits of water company investment in achieving the point sector reductions required in the more detailed DWPP modelling.

## River Catchments - Phosphorus

Table 9 summarises the catchment scale diffuse sector reduction required for each catchment alongside the reduction in nutrient losses estimated from the four Farmscoper V5 scenarios. The reductions required to achieve the catchment scale diffuse sector share of the target ranges from 0 to 90% across the catchments.

Where catchments have 0% diffuse reduction indicated at the catchment scale, the more detailed DWPP modelling will reveal the sub-catchment(s) where reductions are required. For example, the overall catchment reduction needed for the Kent catchment is 0% but the more detailed DWPP modelling has shown that a 34% reduction is required in the Flodder Beck sub-catchment.

The percentage reduction in losses estimated using Farmscoper V5 ranges from 8 to 44% across the river catchments. The residual diffuse sector reductions required under the high regulatory compliance scenario (scenario 3) are up to 79% (Clun catchment). Under the Theoretical Maximum scenario (scenario 10), the residual diffuse sector reduction is up to 57% (Dee catchment). These residual reductions will not be required uniformly across catchments. The detailed modelling through 2024 will confirm the reductions needed at the sub-catchment scale.

## River Catchments – Nitrogen

The Clun Special Area of Conservation (SAC) is the only riverine site with a nitrogen-related target due to the presence of Freshwater Pearl Mussel. There are two nitrogen-related targets that could apply in the catchment:

1. 1.5mg/l Total Oxidised Nitrogen (TON) as an annual average – referenced in the 2022 Conservation Objectives: Supplementary Advice
2. 0.125mg/l nitrate as a median – referenced in Common Standards Monitoring Guidance for Freshwater Fauna

Using the tighter of these targets (0.125mg/l nitrate as a median) means that an 97% reduction in diffuse sector inputs is required to meet the diffuse sector share of the nitrate target (Table 10). With the less stringent target, this reduces to a 54% diffuse sector reduction. We are working with Natural England to understand which target is the most appropriate for the unique local conditions of the Clun Freshwater Pearl mussel habitat, given the tighter target is based on generalised international data.

The high regulatory compliance Farmscoper scenario (scenario 3) estimates a 3% reduction, and the Theoretical Maximum scenario (scenario 10) estimates a 13% reduction. We therefore estimate the residual reduction to be between 41-94%, depending on the target and the Farmscoper scenario applied in the catchment (Table 10).

## Estuarine, Wetland and Lake catchments – Phosphate and Total Phosphorus

Similarly, Table 11 summarises the catchment scale diffuse sector reductions required for the estuarine, wetland and lake sites alongside the reduction in nutrient losses estimated from the four Farmscoper V5 scenarios. The catchment scale diffuse reductions required to achieve the catchment diffuse sector share of the target range from 3 to 85%.

For the Site of Special Scientific Interest (SSSI) sub-catchments of the Broads, we have converted the total phosphorus SSSI targets for the lakes to phosphate targets to be applied in the respective rivers at the compliance points. Similarly, we have taken a precautionary approach for the Ouse Washes, with the total phosphorus Ouse Washes target applied as a phosphate target at Earith where there is connectivity between the Great Ouse and the Ouse Washes.

The percentage reduction in losses estimated from Farmscoper V5 ranges from 8 to 42%. The residual diffuse sector reductions required under the high regulatory compliance scenario (scenario 3) are up to 71% (Yare Broads and Marshes catchment). Under the Theoretical Maximum scenario (scenario 10), the residual diffuse sector reduction is up to 70% (Somerset Levels and Moors catchment). These residual reductions will not be required uniformly across catchments. The detailed modelling through 2024 will confirm the reductions needed at the sub-catchment scale in those catchments where we are undertaking further modelling.

## Estuarine, Wetland and Lake catchments – Total Nitrogen

Similarly, Table 12 summarises the catchment scale diffuse sector reductions required for the estuarine, wetland and lake sites alongside the reduction in nutrient losses estimated

from the Farmscoper V5 scenarios. The catchment scale reductions required to achieve the diffuse sector share of the target range from 3 to 87%.

The percentage reduction in losses estimated from the Farmscoper V5 scenarios ranges from 5 - 21%. The residual diffuse sector reductions required under the high regulatory compliance scenario (scenario 3) are up to 84%, under the Theoretical Maximum scenario (scenario 10), the residual diffuse sector reduction is up to 70% (both in The Broads SAC catchment). These residual reductions will not be required uniformly across catchments. The detailed modelling through 2024 will confirm the reductions needed at the sub-catchment scale in those catchments where we are undertaking further modelling.

In almost all catchments, we estimate the fair share reduction required by the diffuse sector to be several times greater than the estimated reduction in losses achieved when applying catchment-wide rural land use measures, even when applying the most optimistic of measure uptake rates. 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 or habitat creation within and alongside farming.

**Table 9: River catchments phosphorus diffuse sector catchment statistics. While some overall catchment average figures indicate zero reduction required, there will be sub-catchments where reductions are required, we will confirm these through more detailed modelling in 2024.**

| Catchment | Diffuse Sector Share Target (mg/l) | Diffuse Sector Reduction Required | Farmscoper Modelled Outputs | | | | Residual Diffuse Reduction Required |
|---|---|---|---|---|---|---|---|
| | | | FS Sc3 | FS Sc4 | FS Sc8 | FS Sc10 | |
| River Avon (Hampshire) | 0.024 | 62% | 9% | 12% | 23% | 42% | 20-53% |
| River Axe | 0.033 | 69% | 16% | 20% | 23% | 41% | 28-53% |
| River Camel | 0.013 | 0% | 11% | 14% | 21% | 44% | 0% |
| River Clun | 0.005 | 90% | 11% | 14% | 22% | 42% | 48-79% |
| River Dee | 0.010 | 85% | 13% | 16% | 17% | 28% | 57-72% |
| River Derwent (Yorkshire) | 0.019 | 39% | 10% | 12% | 20% | 35% | 4-29% |
| River Derwent & Bassenthwaite Lake (DWPP catchment) | 0.013 | 0% | 11% | 13% | 14% | 23% | 0% |
| River Derwent & Bassenthwaite Lake (NN catchment) | 0.014 | 0% | 11% | 13% | 14% | 23% | 0% |
| River Eden | 0.016 | 38% | 14% | 17% | 18% | 29% | 9-24% |
| River Ehen | 0.004 | 0% | 7% | 9% | 10% | 17% | 0% |
| River Itchen | 0.018 | 46% | 8% | 10% | 23% | 43% | 3-38% |
| River Kent (DWPP catchment) | 0.011 | 0% | 12% | 15% | 16% | 30% | 0% |
| River Kent (NN catchment) | 0.007 | 29% | 12% | 15% | 16% | 30% | 0-17% |
| River Lambourn | 0.017 | 78% | 10% | 12% | 22% | 41% | 37-68% |
| River Mease | 0.024 | 83% | 10% | 12% | 19% | 32% | 51-73% |
| River Tweed (England) | 0.020 | 8% | 8% | 10% | 18% | 34% | 0% |
| River Wensum | 0.010 | 76% | 9% | 12% | 21% | 37% | 39-67% |
| Whole Wye/ Lugg (DWPP catchment) | 0.018 | 66% | 10% | 13% | 18% | 34% | 32-56% |
| River Lugg | 0.013 | 85% | 11% | 14% | 23% | 42% | 43-74% |
| Wye Valley (Peaks) | 0.008 | 65% | 11% | 13% | 15% | 30% | 35-54% |

**Table 10: River catchments nitrate diffuse sector catchment statistics. Total Oxidised Nitrogen (TON) is comprised of nitrate and nitrite concentrations. SAGIS-Simcat produces nitrate outputs only, these have been used against the TON target. Nitrite levels are comparatively very low in the environment.**

| Catchment | Determinand | Statistic | Diffuse Sector Share Target (mg/l) | Diffuse Sector Reduction Required | Farmscoper Modelled Outputs FS Sc3 | FS Sc4 | FS Sc8 | FS Sc10 | Residual Diffuse Reduction Required |
|---|---|---|---|---|---|---|---|---|---|
| River Clun | nitrate | median | 0.074 | 97% | 3% | 4% | 6% | 13% | 84-94% |
| River Clun | TON | mean | 1.365 | 54% | 3% | 4% | 6% | 13% | 41-51% |

**Table 11: Estuarine, wetland and lake catchments phosphate and total phosphorous diffuse sector catchment statistics. The Fleet is not represented in Simcat SAGIS and so it has not been possible to apportion the sector concentration. We have estimated sector loads that indicate a 78% reduction in diffuse loads is necessary.**

| Catchment | Diffuse Sector Share Target (mg/l) | Diffuse Sector Reduction Required | Farmscoper Modelled Outputs FS Sc3 | FS Sc4 | FS Sc8 | FS Sc10 | Residual Diffuse Reduction Required |
|---|---|---|---|---|---|---|---|
| Broads (Bure, Trinity, Yare, Ant & Upper Thurne Broads only) | 0.009 | 78% | 9% | 11% | 20% | 36% | 69-42% |
| Ant Broads & Marshes | 0.008 | 26% | 7% | 9% | 20% | 28% | 0-19% |
| Yare Broads & Marshes | 0.01 | 80% | 9% | 11% | 20% | 34% | 71-46% |
| Bure Broads & Marshes | 0.011 | 57% | 8% | 10% | 22% | 42% | 15-49% |
| Chesil and the Fleet (Total Phosphorus) | TBC | TBC | 11% | 14% | 16% | 27% | TBC |
| Esthwaite (Total Phosphorus) | 0.013 | 0% | | | | | |
| Hornsea Mere (Total Phosphorus) | TBC | TBC | 9% | 11% | 17% | 28% | TBC |
| Ouse Washes | 0.029 | 66% | 8% | 10% | 18% | 31% | 35-58% |
| Poole Harbour | 17kg/d | 48% | 12% | 15% | 24% | 46% | 2-36% |
| Somerset Levels and Moors | 0.025 | 85% | 15% | 19% | 23% | 39% | 46-70% |
| Stodmarsh (Total Phosphorus) | 0.025 | 65% | 10% | 18% | 31% | 37% | 28-55% |
| River Waveney (at Geldeston Meadows SSSI) | 0.041 | 35% | 8% | 10% | 18% | 29% | 6-27% |

**Table 12: Estuarine, wetland and lake catchments total nitrogen diffuse sector catchment statistics.**

| Site to which nutrient neutrality advice applies | Diffuse Sector Share Target | Diffuse Sector Reduction | Farmscoper Modelled Outputs | | | | Residual Diffuse Reduction Required |
|---|---|---|---|---|---|---|---|
| | | | FS Sc3 | FS Sc4 | FS Sc8 | FS Sc10 | |
| Broads (Bure, Trinity, Yare, Ant & Upper Thurne Broads only. Target taken from the designated Broads.) | 0.697mg/l | 87% | 3% | 4% | 8% | 17% | 70-84% |
| Chesil and the Fleet | TBC | TBC | 5% | 7% | 10% | 21% | TBC |
| Esthwaite | 0.362 | 0% | Unavailable | Unavailable | Unavailable | Unavailable | TBC |
| Hornsea Mere | TBC | TBC | 4% | 6% | 11% | 20% | TBC |
| Lindisfarne | TBC | TBC | Unavailable | Unavailable | Unavailable | Unavailable | TBC |
| Poole Harbour | 1200kg/d | 48% | 2% | 3% | 6% | 15% | 33-46% |
| Solent | TBC | TBC | 3% | 4% | 9% | 20% | TBC |
| Stodmarsh | 0.75mg/l | 75% | 3% | 4% | 9% | 17% | 58-72% |
| Teesmouth & Cleveland Coast | TBC | TBC | 5% | 7% | 11% | 18% | TBC |

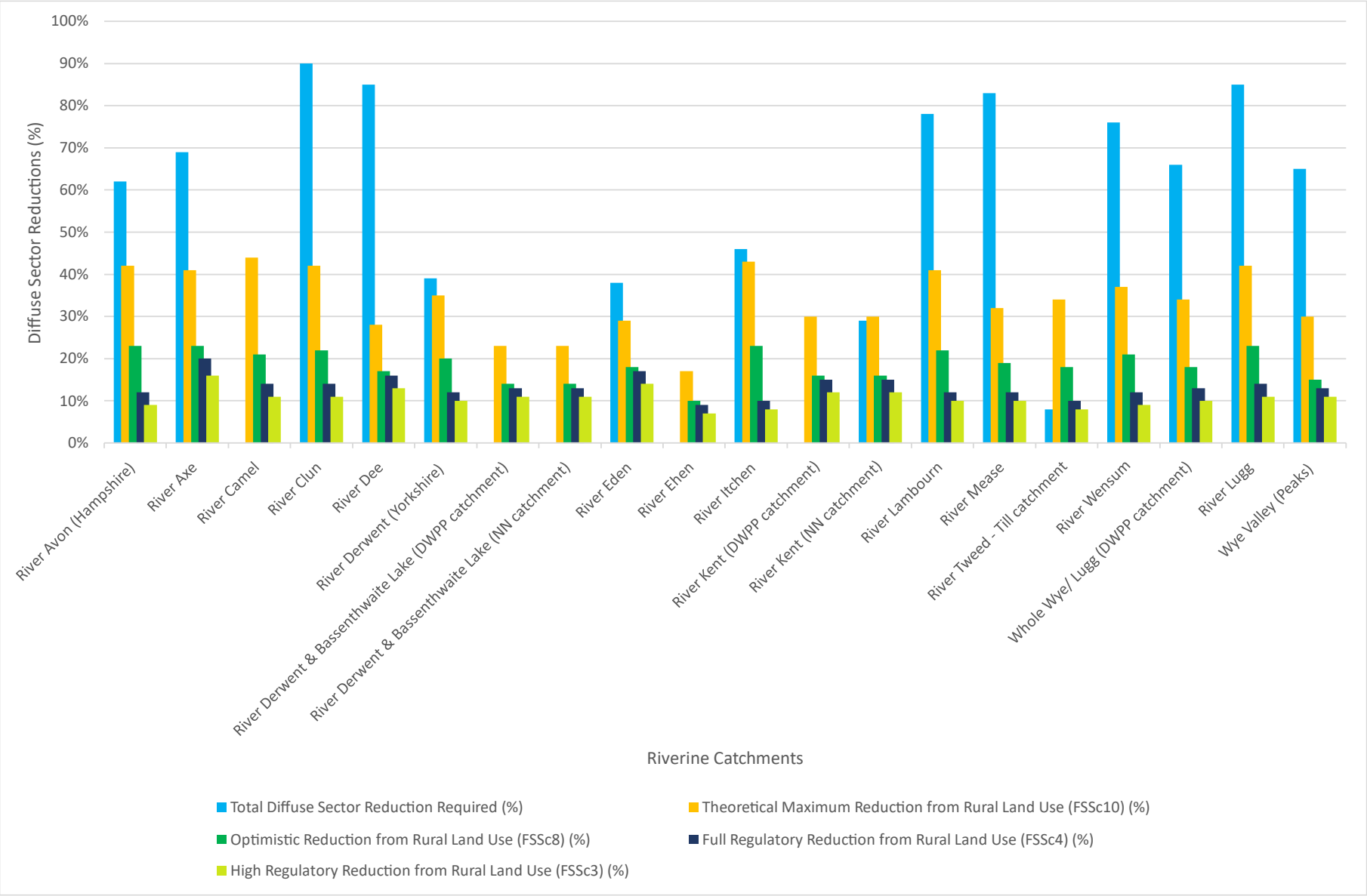


**Figure 5: Total diffuse sector percentage reductions required for phosphorus in each riverine catchment alongside estimated reductions in losses from Farmscoper v5 under different agricultural mitigation measure uptake rate scenarios.**

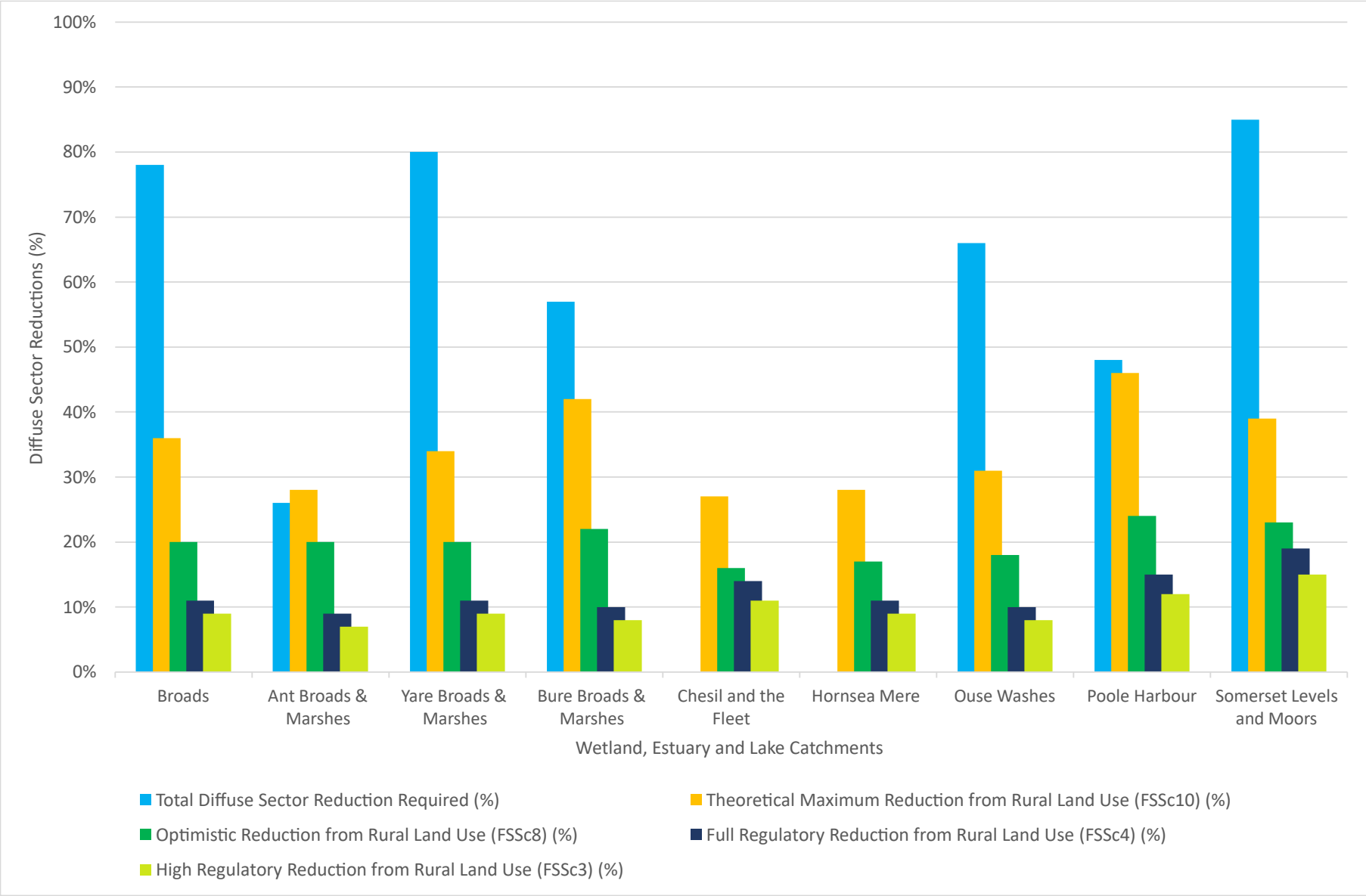


**Figure 6: Total diffuse sector percentage reductions required for phosphorus in each estuarine, wetland and lake catchment alongside estimated reductions in losses from Farmscoper v5 under different agricultural mitigation measure uptake rate scenarios.**

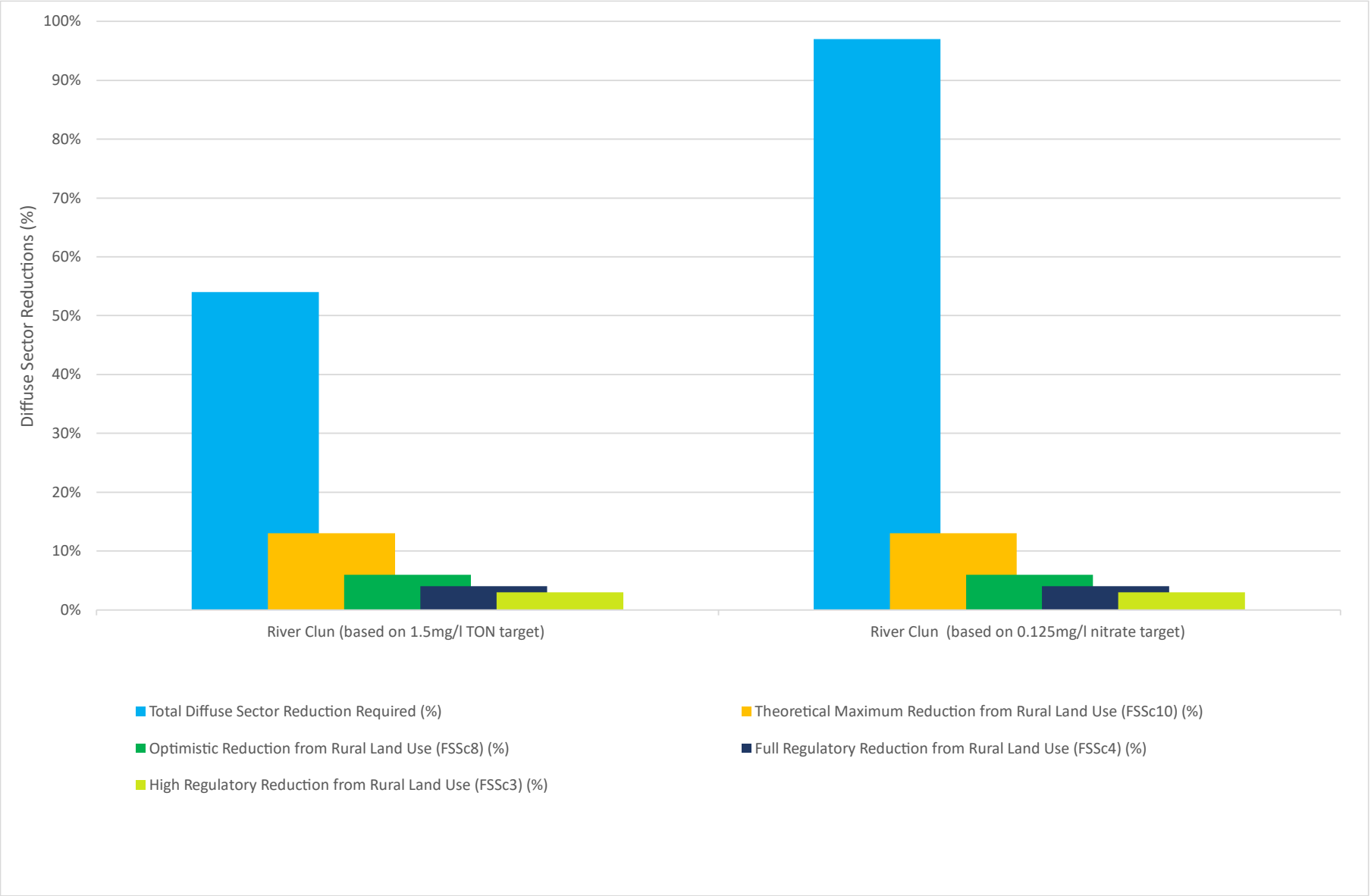


**Figure 7: Total diffuse sector percentage reductions required in the Clun alongside estimated reductions in losses from Farmscoper v5 under different agricultural mitigation measure uptake rate scenarios, based on the TON target (left) and separately, the nitrate target (right).**

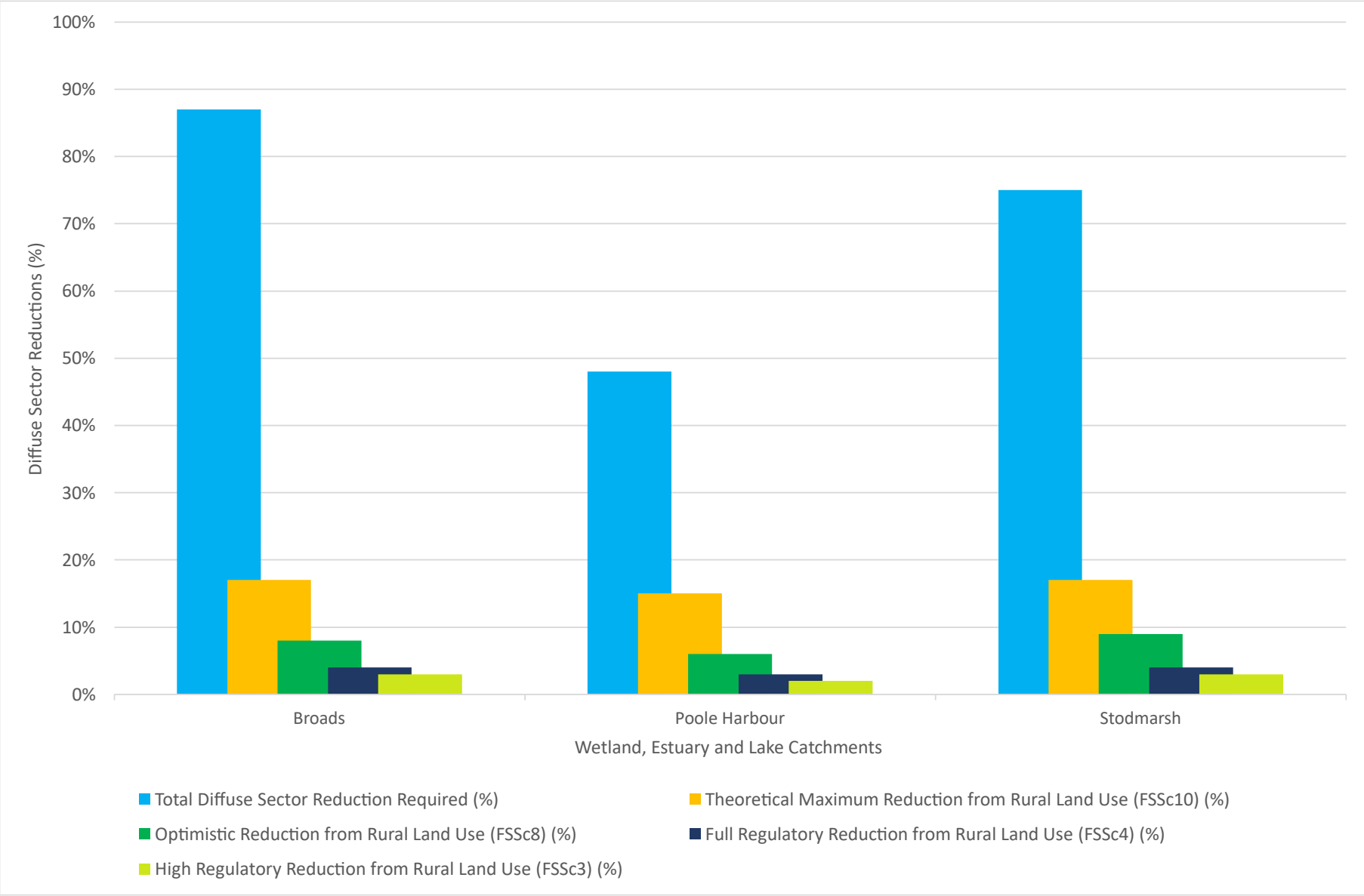


**Figure 8: Total diffuse sector percentage reductions required for total nitrogen in each estuarine and wetland catchment alongside estimated reductions in losses from Farmscoper v5 under different agricultural mitigation measure uptake rate scenarios.**

# River Catchments

## River Avon (Hampshire)

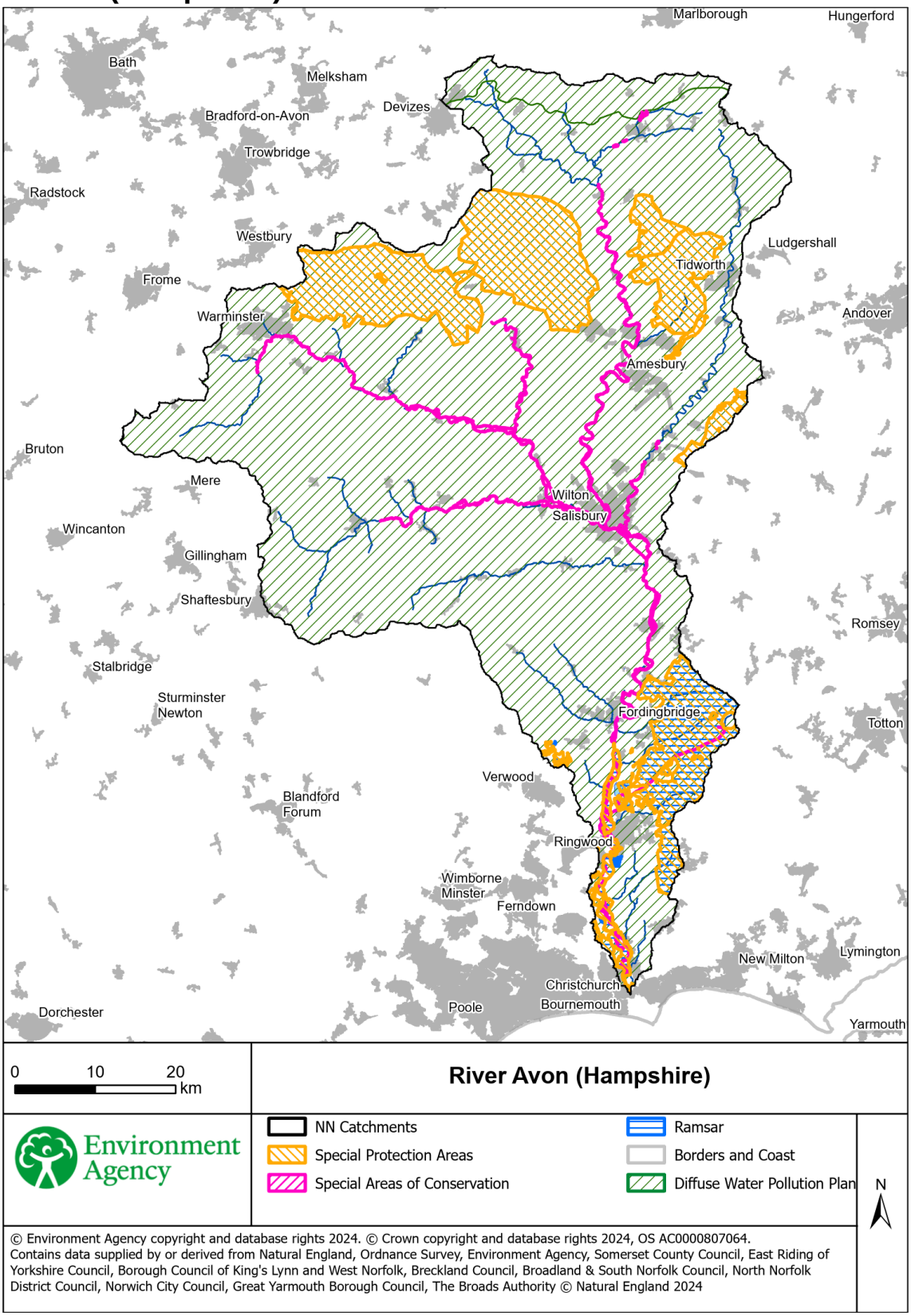


**Figure 9: Hampshire Avon Catchment**

No further modelling under the DWPP programme is proposed for the Hampshire Avon in 2024.

**Table 13: Indicative input load source apportionment for the Hampshire Avon catchment based on catchment endpoint figures (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate (input load) | 20% | 46% | 28% | 3% | 3% |

**Table 14: Indicative phosphate catchment average statistics and sector reductions for the Hampshire Avon catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target (consistent with those used in PR24 planning) | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.024 | 0.024 | 0.048 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.063 | 0.027 | |
| Sector Reduction Required | 62% | 11% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 9% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 12% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 23% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 42% | n/a | |
| Residual % Diffuse Sector Reduction | 20-53% | n/a | |

## River Axe

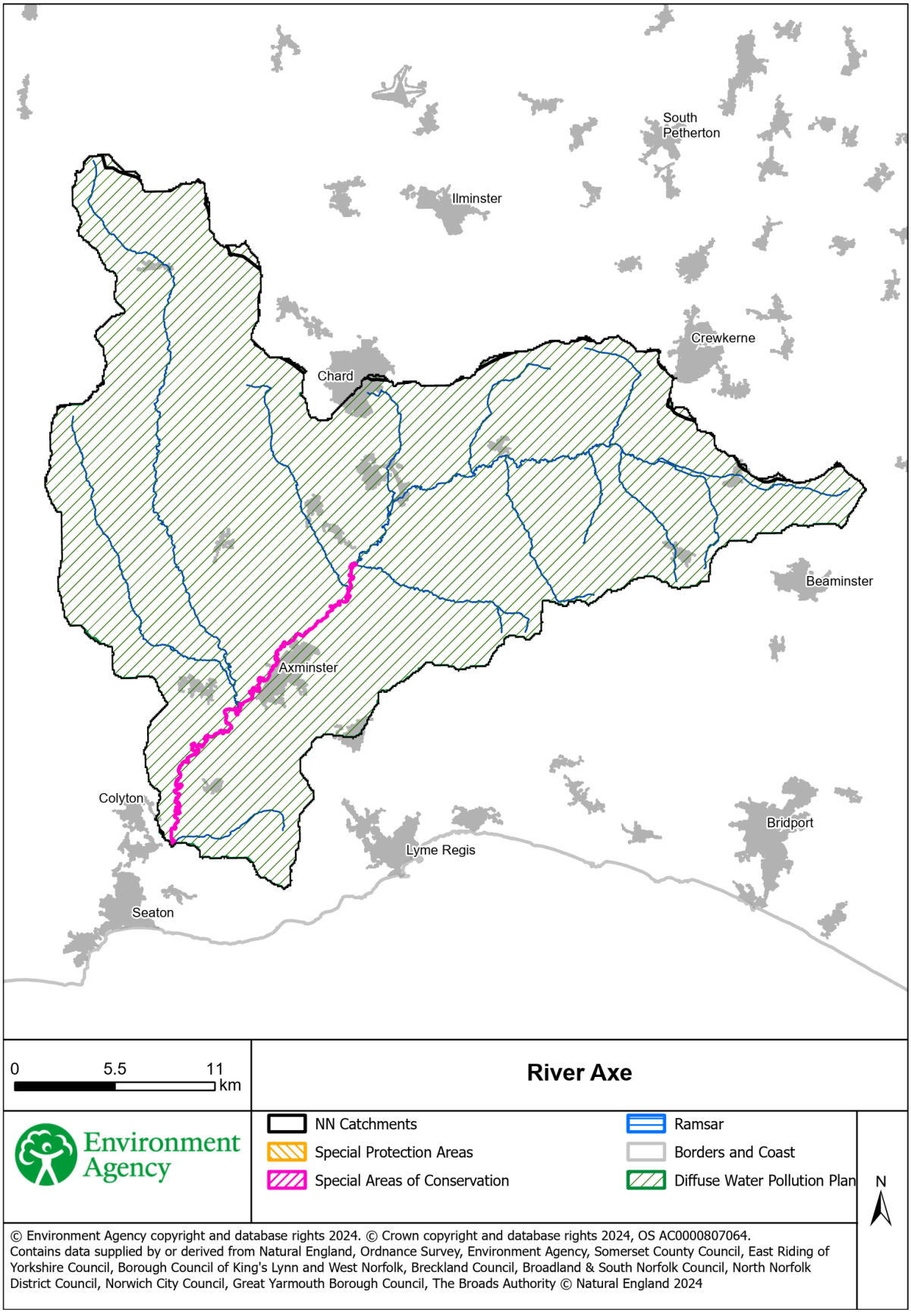


**Figure 10: River Axe Catchment**

No further modelling under the DWPP programme is proposed for the River Axe in 2024.

**Table 15: Indicative input load source apportionment for the River Axe catchment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 14% | 83% | 1% | 1% | 0% |

**Table 16: Phosphate catchment average statistics and sector reductions for the River Axe.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 66% | 34% | |
| Sector Share of Mean Target (mg/l) | 0.033 | 0.017 | 0.05 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.105 | 0.016 | |
| Sector Reduction Required | 69% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 16% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 20% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 23% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 41% | n/a | |
| Residual % Diffuse Sector Reduction | 28-53% | n/a | |

## River Camel

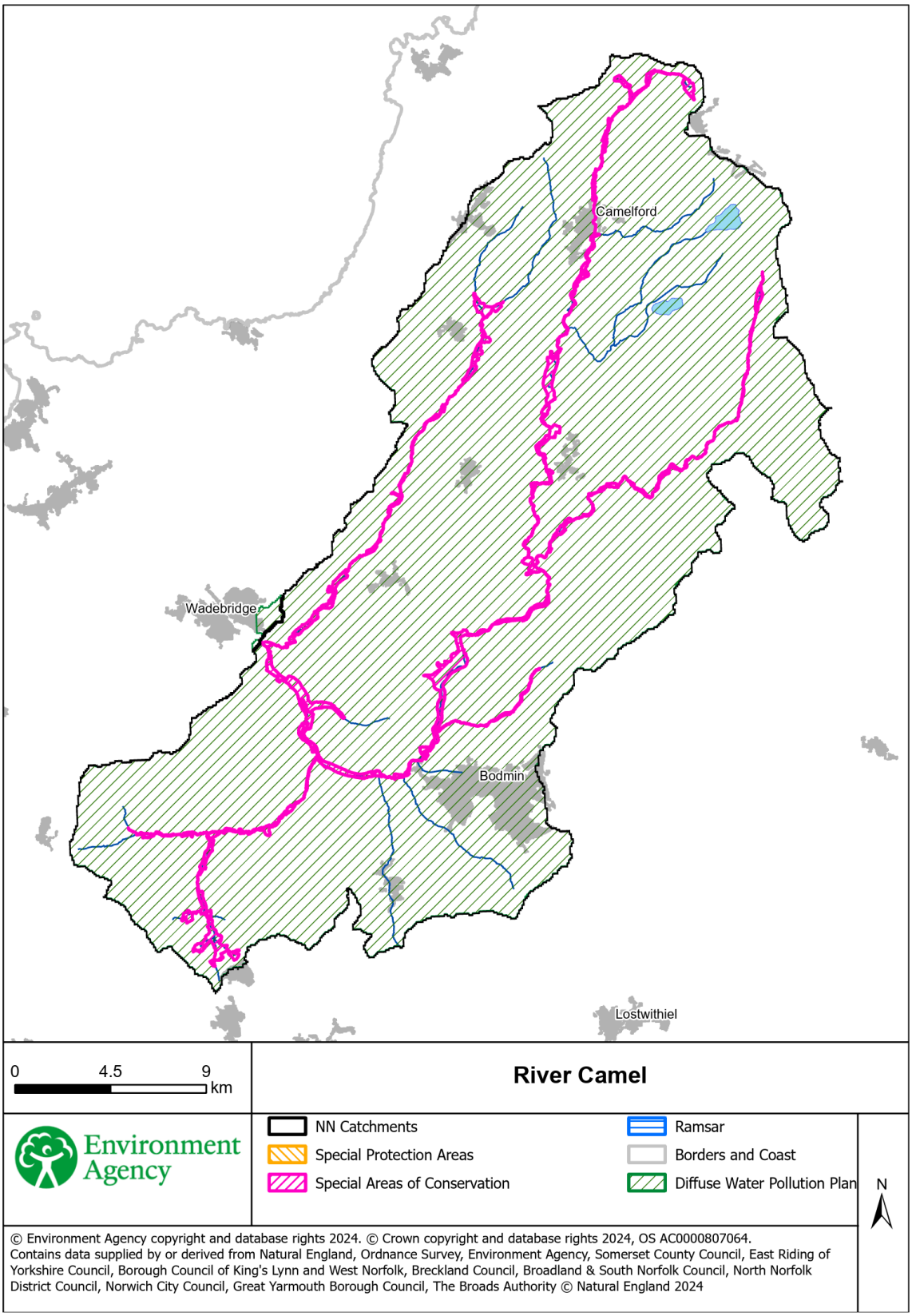


**Figure 11:River Camel Catchment**

**Table 17: Indicative input load source apportionment for the River Camel catchment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 73% | 21% | 4% | 1% | 0% |

**Table 18: Indicative phosphate catchment average statistics and sector reductions for the River Camel catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 52% | 48% | |
| Sector Share of Mean Target (mg/l) | 0.013 | 0.011 | 0.024 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.012 | 0.010 | |
| Sector Reduction Required | 0% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 14% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 21% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 44% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

Where at the catchment average scale it appears that sector reductions are not required, the detailed DWPP modelling will confirm the sub-catchment areas where the sector share is exceeded and where measures need to be identified.

# River Clun

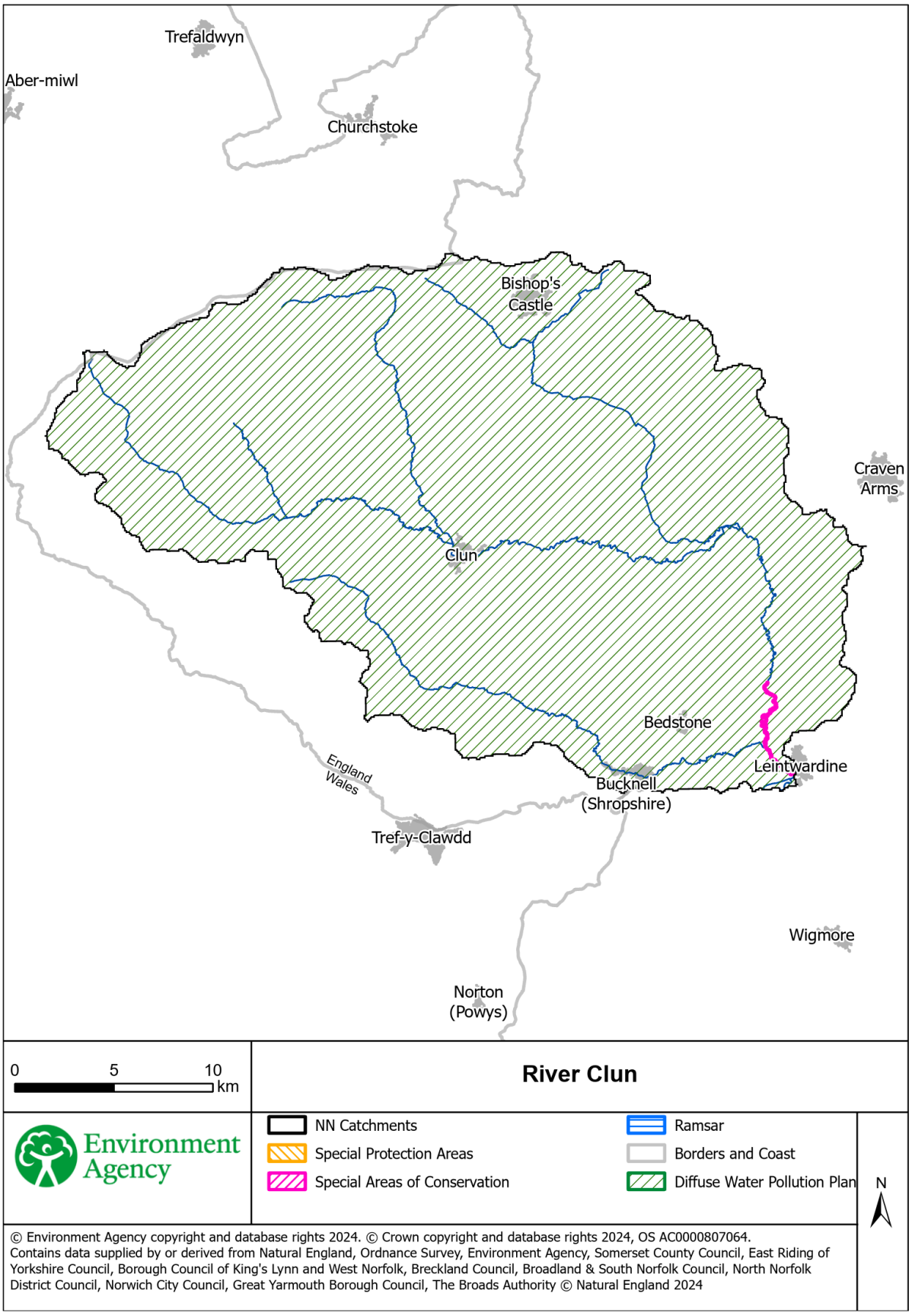


**Figure 12: River Clun Catchment**

**Table 19: Indicative input load source apportionment for the River Clun catchment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 12% | 80% | 6% | 2% | 0% |
| Nitrate | 2% | 98% | 0% | 0% | 0% |

**Table 20: Indicative phosphate catchment average statistics and sector reductions for the Clun catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.005 | 0.005 | 0.01 |
| Recent Modelled Sector Mean Concentration (mg/l) | 0.05 | 0.005 | |
| Sector Reduction Required | 90% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 14% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 22% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 42% | n/a | |
| Residual % Diffuse Sector Reduction | 48-79% | n/a | |

**Table 21: Indicative nitrate catchment average statistics and sector reductions for the Clun.**

| | Diffuse | Point | Diffuse | Point |
|---|---|---|---|---|
| Potential Target | Nitrate 0.125mg/l | Nitrate 0.125mg/l | TON 1.5mg/l | TON 1.5mg/l |
| Statistic | Median | Median | Mean | Mean |
| Baseline (2009) Sector Share of the Target | 59% | 41% | 91% | 9% |
| Sector Share of Mean Target (mg/l) | 0.074 | 0.051 | 1.365 | 0.135 |
| Modelled Recent Sector Mean Concentration (mg/l) | 2.731 | 0.006 | 2.972 | 0.120 |
| Sector Reduction Required | 97% | 0% | 54% | 0% |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 3% | n/a | 3% | n/a |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 4% | n/a | 4% | n/a |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 6% | n/a | 6% | n/a |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 13% | n/a | 13% | n/a |
| Residual % Diffuse Sector Reduction | 84-94% | n/a | 41-51% | n/a |

Where at the catchment average scale it appears that sector reductions are not required, the detailed DWPP modelling will confirm the sub-catchment areas where the sector share is exceeded and where measures need to be identified.

## River Dee

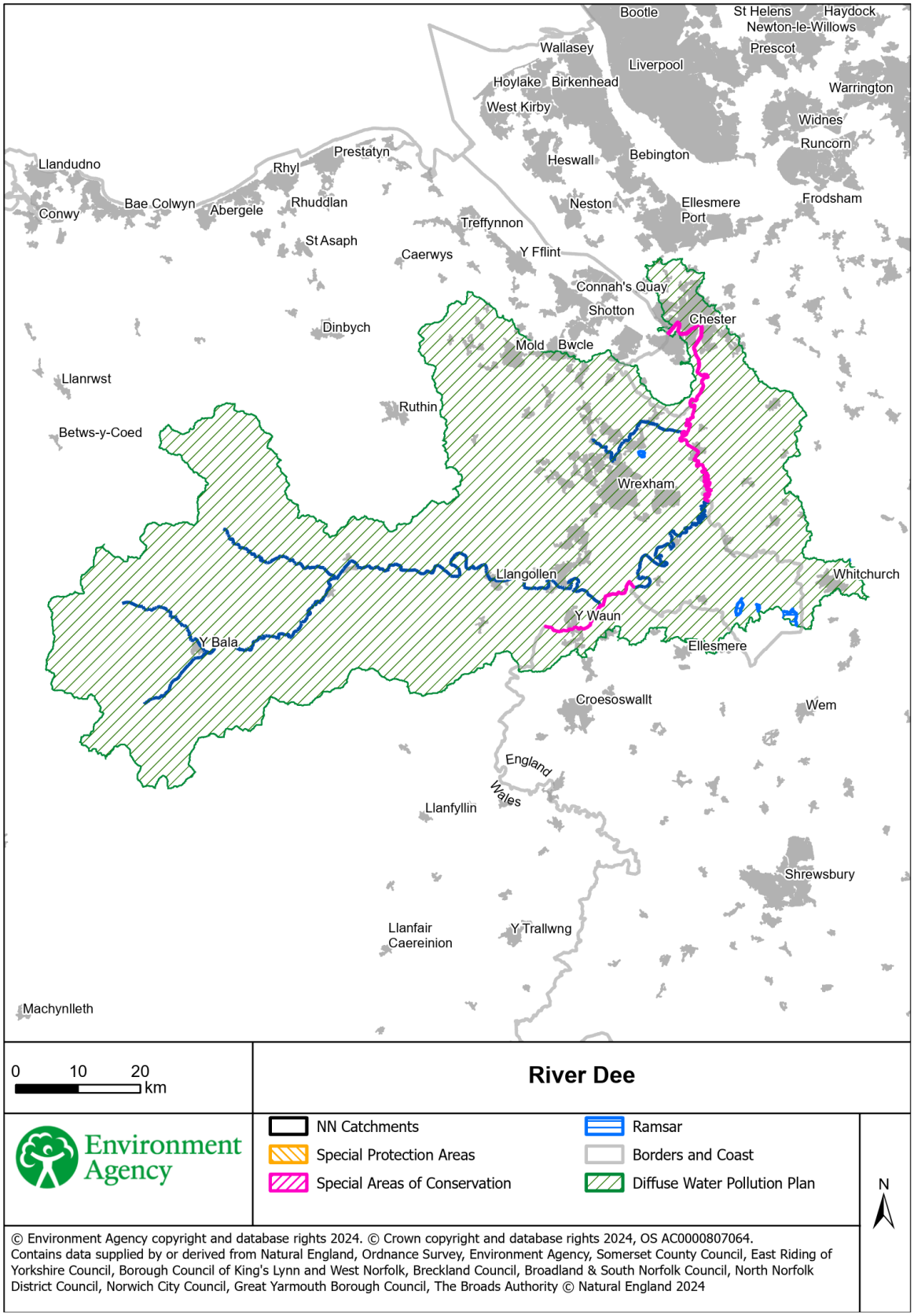


**Figure 13: River Dee Catchment**

**Table 22: Indicative input load source apportionment based on River Dee catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 16% | 83% | 0% | 1% | 0% |

**Table 23: Indicative phosphate catchment average statistics and sector reductions for the Dee catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.01 | 0.01 | 0.02 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.066 | 0.026 | |
| Sector Reduction Required | 85% | 62% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 13% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 16% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 17% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 28% | n/a | |
| Residual % Diffuse Sector Reduction | 57-72% | n/a | |

## River Derwent (Yorkshire)

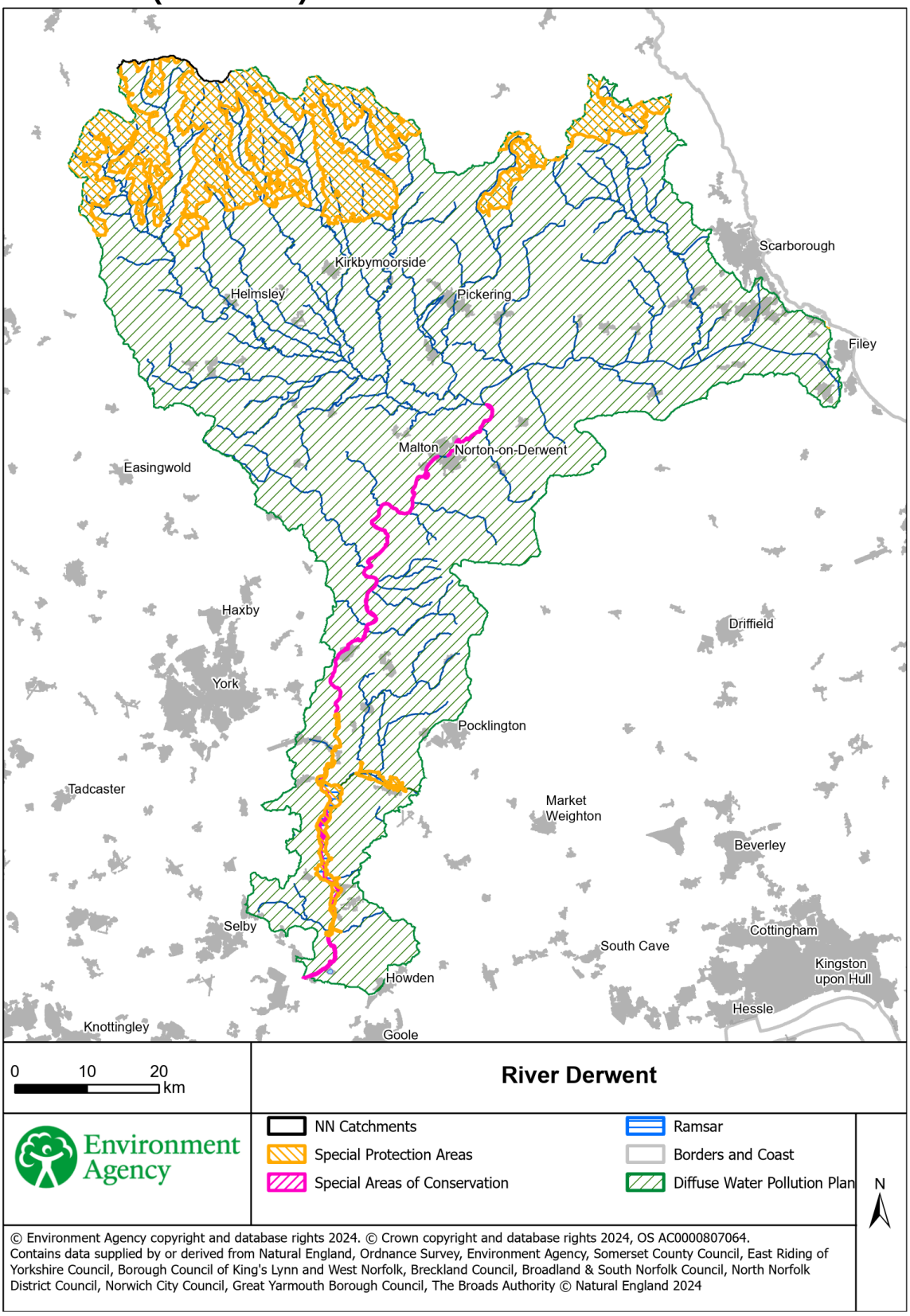


**Figure 14: River Derwent Catchment**

**Table 24: Indicative input load source apportionment for the River Derwent (Yorkshire) catchment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 44% | 53% | 2% | 1% | 0% |

**Table 25: Indicative phosphate catchment average statistics and sector reductions for the River Derwent (Yorkshire) catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 38% | 62% | |
| Sector Share of Mean Target (mg/l) | 0.019 | 0.031 | 0.05 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.031 | 0.033 | |
| Sector Reduction Required | 39% | 7% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 10% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 12% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 20% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 35% | n/a | |
| Residual % Diffuse Sector Reduction | 4-29% | n/a | |

## River Derwent & Bassenthwaite Lake

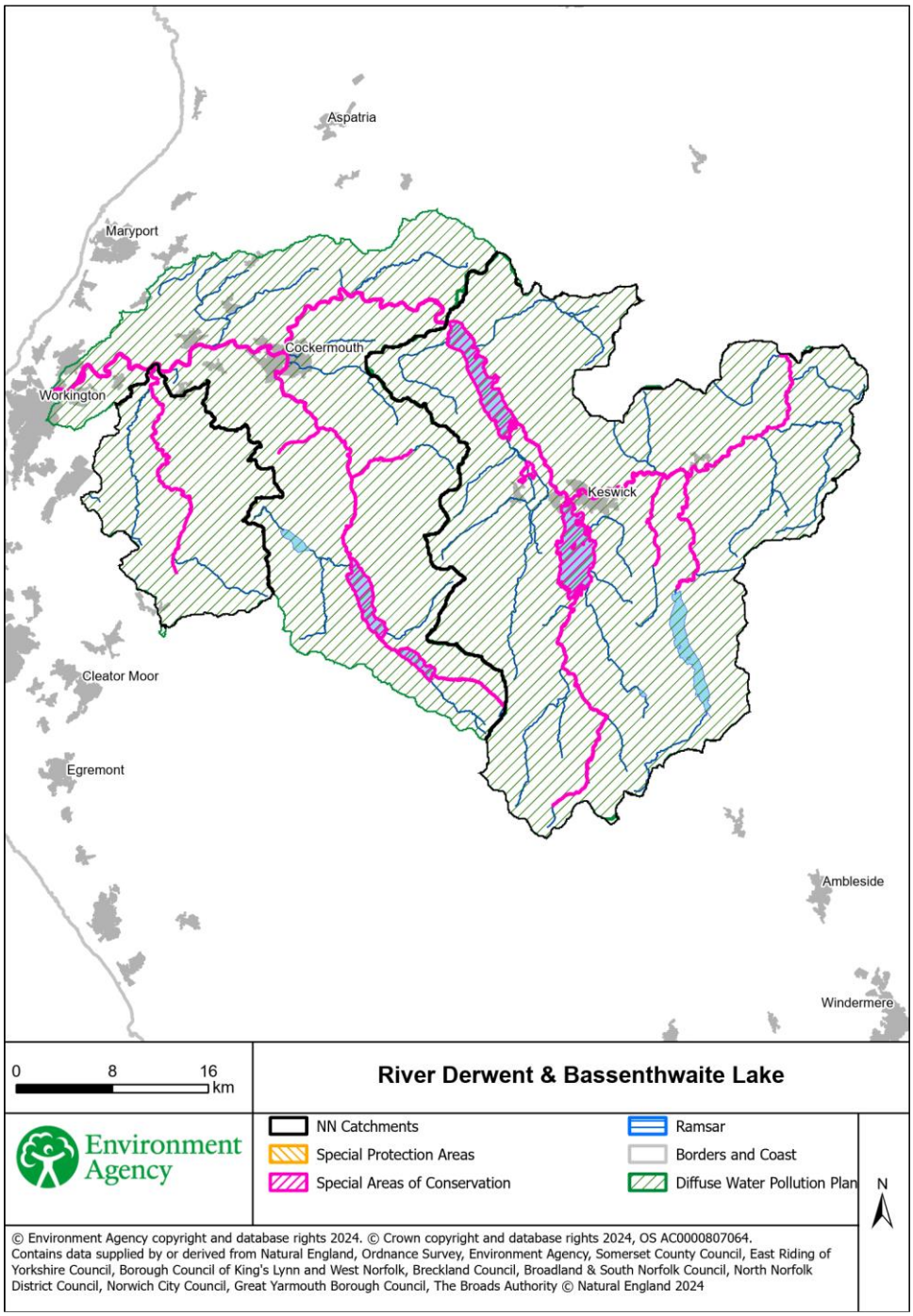


**Figure 15: River Derwent and Bassenthwaite Lake Catchment**

The figures presented here are catchment averages for the combined riverine-lake catchment. The detailed DWPP modelling, planned for summer 2024, will consider the compliance of and loads to Bassenthwaite Lake more specifically.

While the catchment average figures indicate that no diffuse reduction is required, the detailed DWPP modelling will likely highlight specific reaches and sub-catchments where reductions are required (as demonstrated by the detailed modelling for the River Kent).

**Table 26: Indicative input load source apportionment for the combined River Derwent and Bassenthwaite Lake catchment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| DWPP Catchment | 56% | 43% | 0% | 0% | 0% |
| Nutrient Neutrality Catchment | 48% | 50% | 0% | 0% | 0% |

**Table 27: Indicative phosphate catchment average statistics and sector reductions for the River Derwent & Bassenthwaite Lake DWPP catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 76% | 24% | |
| Sector Share of Mean Target (mg/l) | 0.013 | 0.004 | 0.017 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.011 | 0.006 | |
| Sector Reduction Required | 0% | 28% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 13% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 14% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 23% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

Where at the catchment average scale it appears that sector reductions are not required, the detailed DWPP modelling will confirm the sub-catchment areas where the sector share is exceeded and where measures need to be identified.

**Table 28: Phosphate catchment average statistics and sector reductions for the River Derwent & Bassenthwaite Lake catchment where Nutrient Neutrality advice applies. Based on Farmscoper V5 Outputs for the whole DWPP catchment, not just the catchment where Nutrient Neutrality advice applies.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 78% | 22% | |
| Sector Share of Mean Target (mg/l) | 0.014 | 0.004 | 0.018 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.006 | 0.005 | |
| Sector Reduction Required | 0% | 13% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 13% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 14% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 23% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

## River Eden

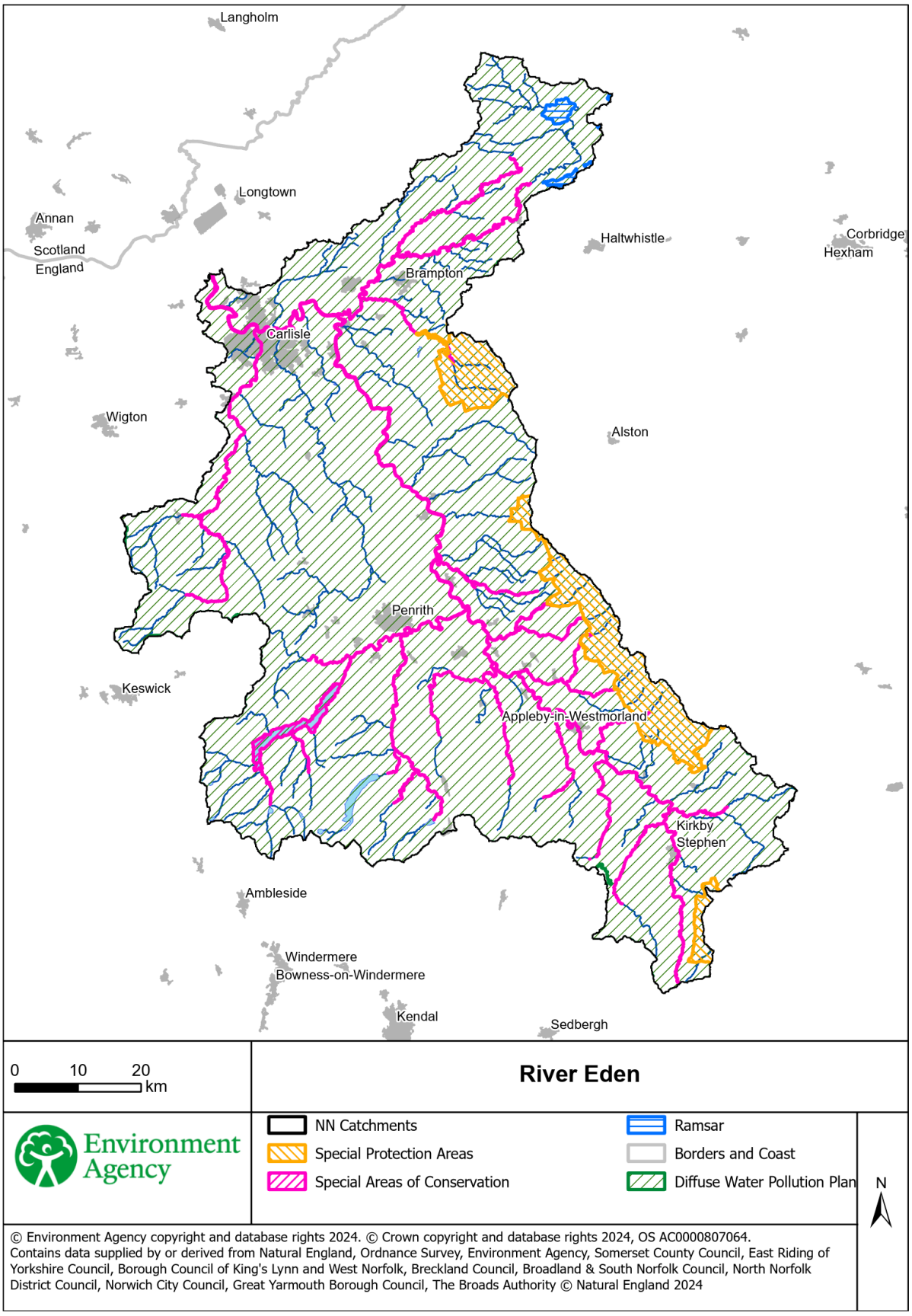


**Figure 16: River Eden Catchment**

**Table 29: Indicative input load source apportionment for the River Eden based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 43% | 55% | 2% | 1% | 0% |

**Table 30: Indicative phosphate catchment average statistics and sector reductions for the River Eden catchment**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 72% | 28% | |
| Sector Share of Mean Target (mg/l) | 0.016 | 0.006 | 0.022 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.025 | 0.007 | |
| Sector Reduction Required | 38% | 16% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 14% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 17% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 18% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 29% | n/a | |
| Residual % Diffuse Sector Reduction | 9-24% | n/a | |

## River Ehen

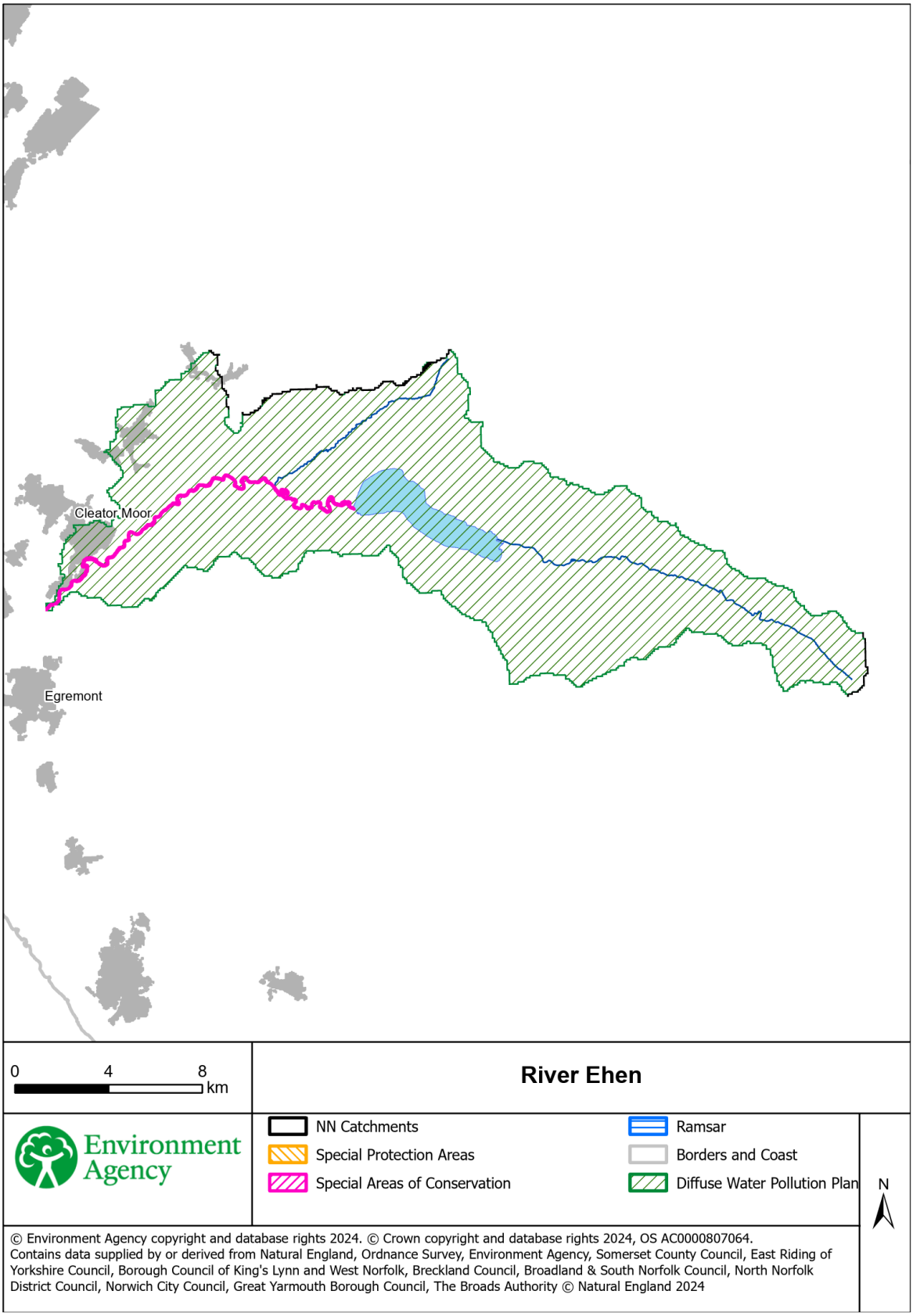


**Figure 17: River Ehen Catchment**

**Table 31: Indicative input load source apportionment for the River Ehen based on catchment endpoint (recent scenario, PR24 calibration models)..**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 25% | 73% | 1% | 1% | 0% |

**Table 32: Indicative phosphate catchment average statistics and sector reductions for the River Ehen catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 83% | 17% | |
| Sector Share of Mean Target (mg/l) | 0.004 | 0.001 | 0.005 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.003 | 0.001 | |
| Sector Reduction Required | 0% | n/a | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 7% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 9% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 10% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 17% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

Where the catchment average figures indicate that no diffuse reduction is required, the detailed DWPP modelling will likely highlight specific reaches and sub-catchments where reductions are required (as demonstrated by the detailed modelling for the River Kent).

## River Itchen

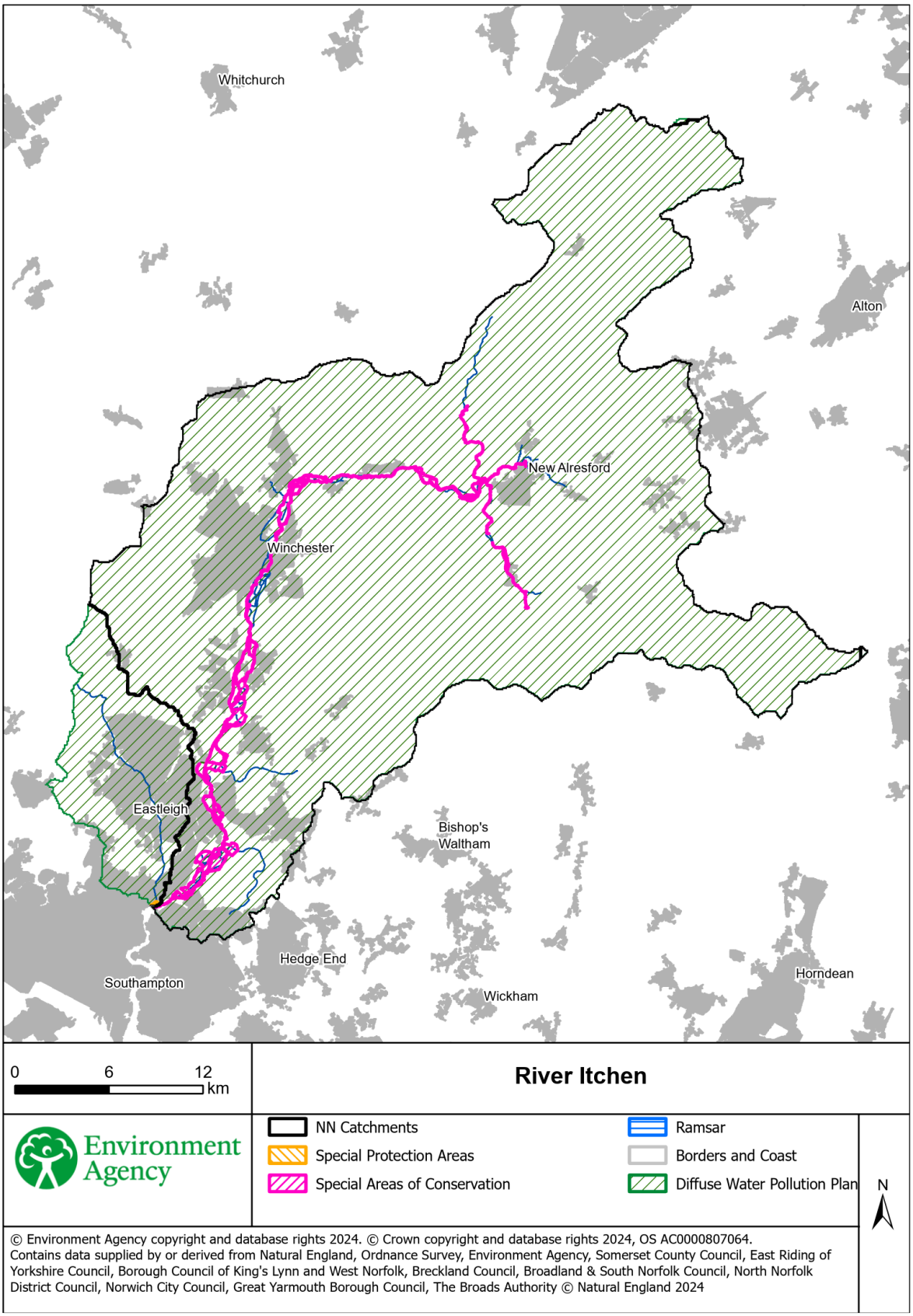


**Figure 18: River Itchen Catchment**

**Table 33: Indicative input load source apportionment for the River Itchen based on catchment endpoint (recent scenario, PR24 calibration models)..**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 36% | 30% | 20% | 4% | 11%* |

*Other inputs are predominantly a representation of the 'diffuse' component of the cress and fish farm discharges that arises from the abstracted borehole water rather than the farm processing.

**Table 34: Indicative phosphate catchment average statistics and sector reductions for the River Itchen.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.018 | 0.018 | 0.035 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.033 | 0.007 | |
| Sector Reduction Required | 46% | n/a | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 8% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 10% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 23% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 43% | n/a | |
| Residual % Diffuse Sector Reduction | 3-38% | n/a | |

## River Kent

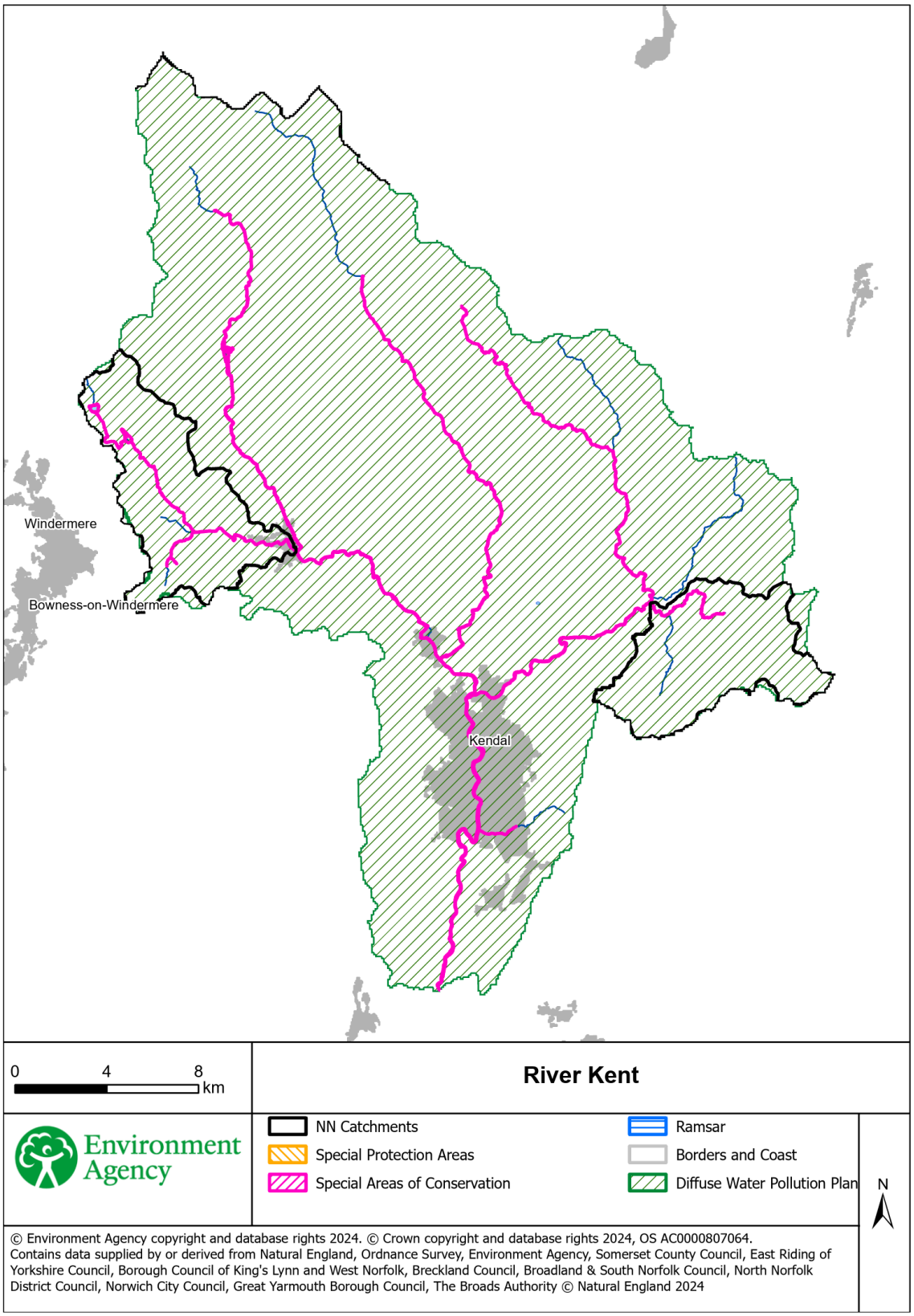


**Figure 19: River Kent Catchment**

No further modelling under the DWPP programme is proposed for the River Kent in 2024.

**Table 35: Indicative input load source apportionment for the River Kent based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| DWPP Catchment | 69% | 30% | 0% | 1% | 0% |
| Nutrient Neutrality Catchment only | 15% | 83% | 0% | 2% | 0% |

**Table 36: Phosphate catchment average statistics and sector reductions for the River Kent DWPP catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 62% | 38% | |
| Sector Share of Mean Target (mg/l) | 0.011 | 0.007 | 0.017 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.008 | 0.003 | |
| Sector Reduction Required | 0% | n/a | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 12% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 15% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 16% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 30% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

Where the catchment average figures indicate that no diffuse reduction is required, the detailed DWPP modelling has shown that a 34% reduction is required in the Flodder Beck sub-catchment.

**Table 37: Indicative phosphate catchment average statistics and sector reductions for the River Kent, where nutrient neutrality advice applies only. Based on Farmscoper V5 Outputs for the whole DWPP catchment, not just the catchment where Nutrient Neutrality advice applies.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 54% | 46% | |
| Sector Share of Mean Target (mg/l) | 0.007 | 0.006 | 0.012 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.009 | 0.002 | |
| Sector Reduction Required | 29% | n/a | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 12% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 15% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 16% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 30% | n/a | |
| Residual % Diffuse Sector Reduction | 0-17% | n/a | |

## River Lambourn

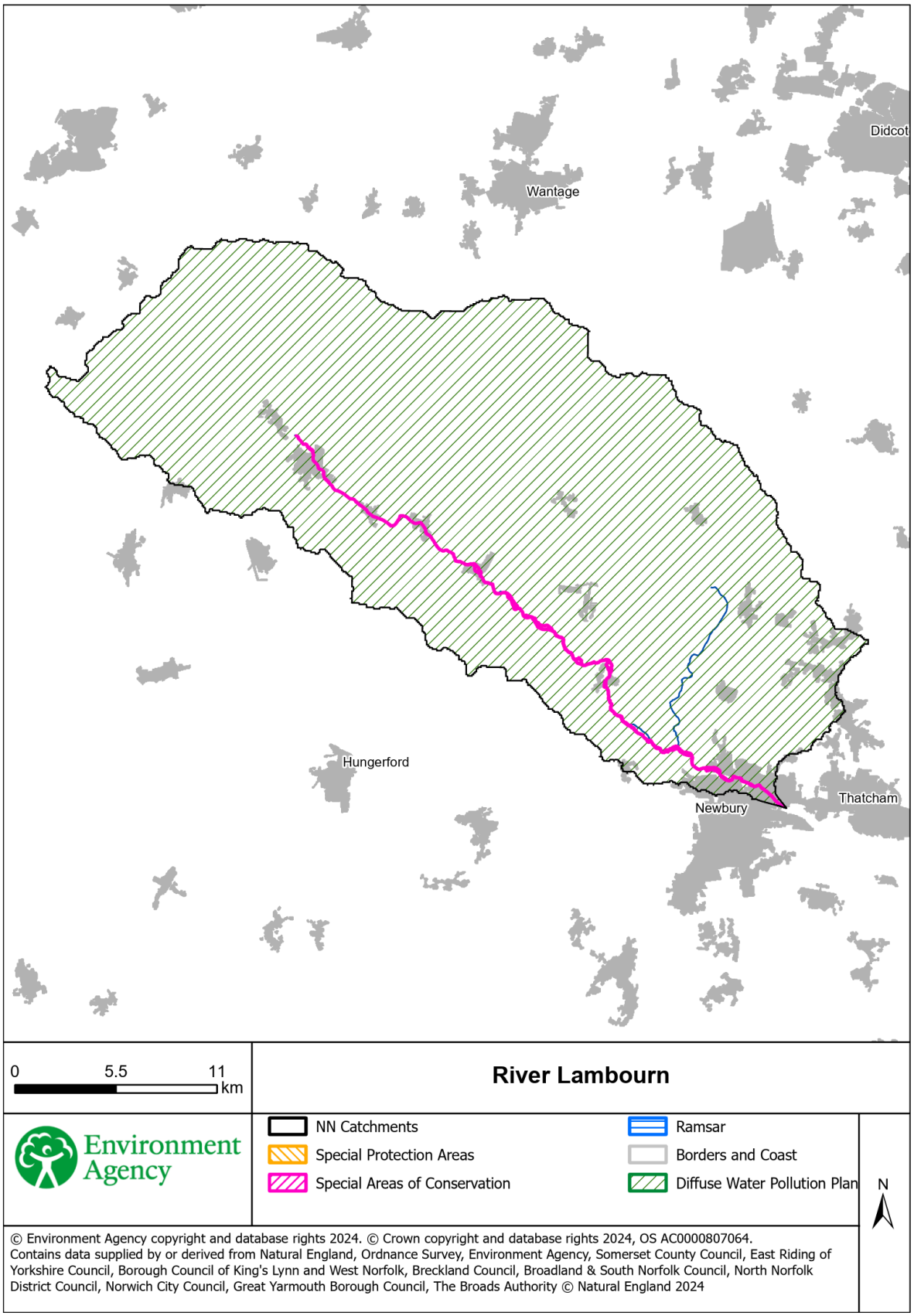


**Figure 20: River Lambourn Catchment**

No further modelling of the River Lambourn catchment is proposed for 2024, the site does not fall within the DWPP Programme.

**Table 38: Indicative input load source apportionment for the River Lambourn based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 14% | 70% | 14% | 2% | 0% |

**Table 39: Indicative phosphate catchment average statistics and sector reductions for the River Lambourn.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 61% | 39% | |
| Sector Share of Mean Target (mg/l) | 0.017 | 0.011 | 0.028 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.079 | 0.018 | |
| Sector Reduction Required | 78% | 38% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 10% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 12% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 22% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 41% | n/a | |
| Residual % Diffuse Sector Reduction | 37-68% | n/a | |

## River Mease

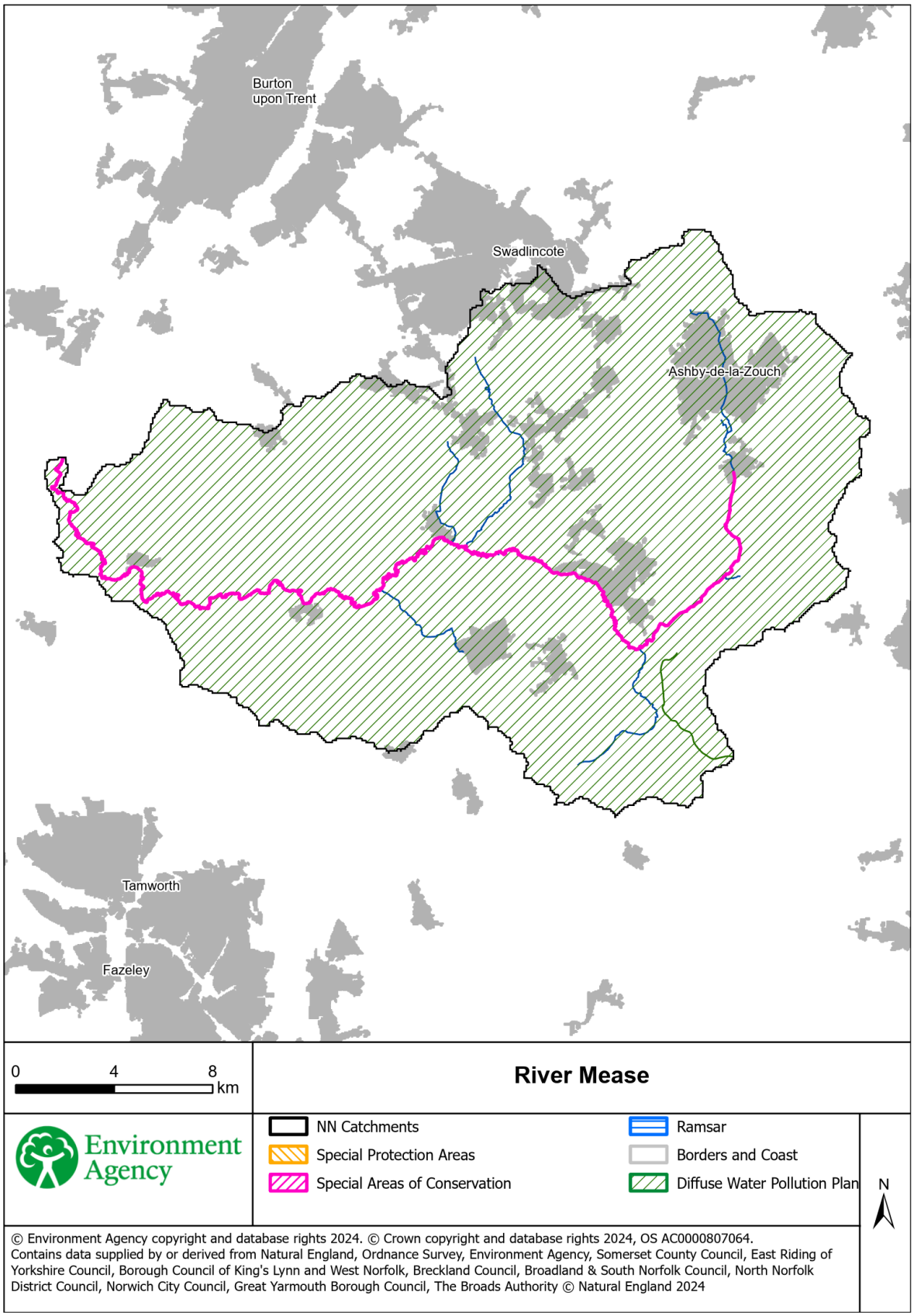


**Figure 21: River Mease Catchment**

**Table 39: Indicative input load source apportionment based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 22% | 43% | 30% | 5% | 0% |

**Table 40: Indicative phosphate catchment average statistics and sector reductions for the River Mease catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.024 | 0.024 | 0.048 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.140 | 0.053 | |
| Sector Reduction Required | 83% | 55% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 10% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 12% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 19% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 32% | n/a | |
| Residual % Diffuse Sector Reduction | 51-73% | n/a | |

## River Tweed – Till sub-catchment only

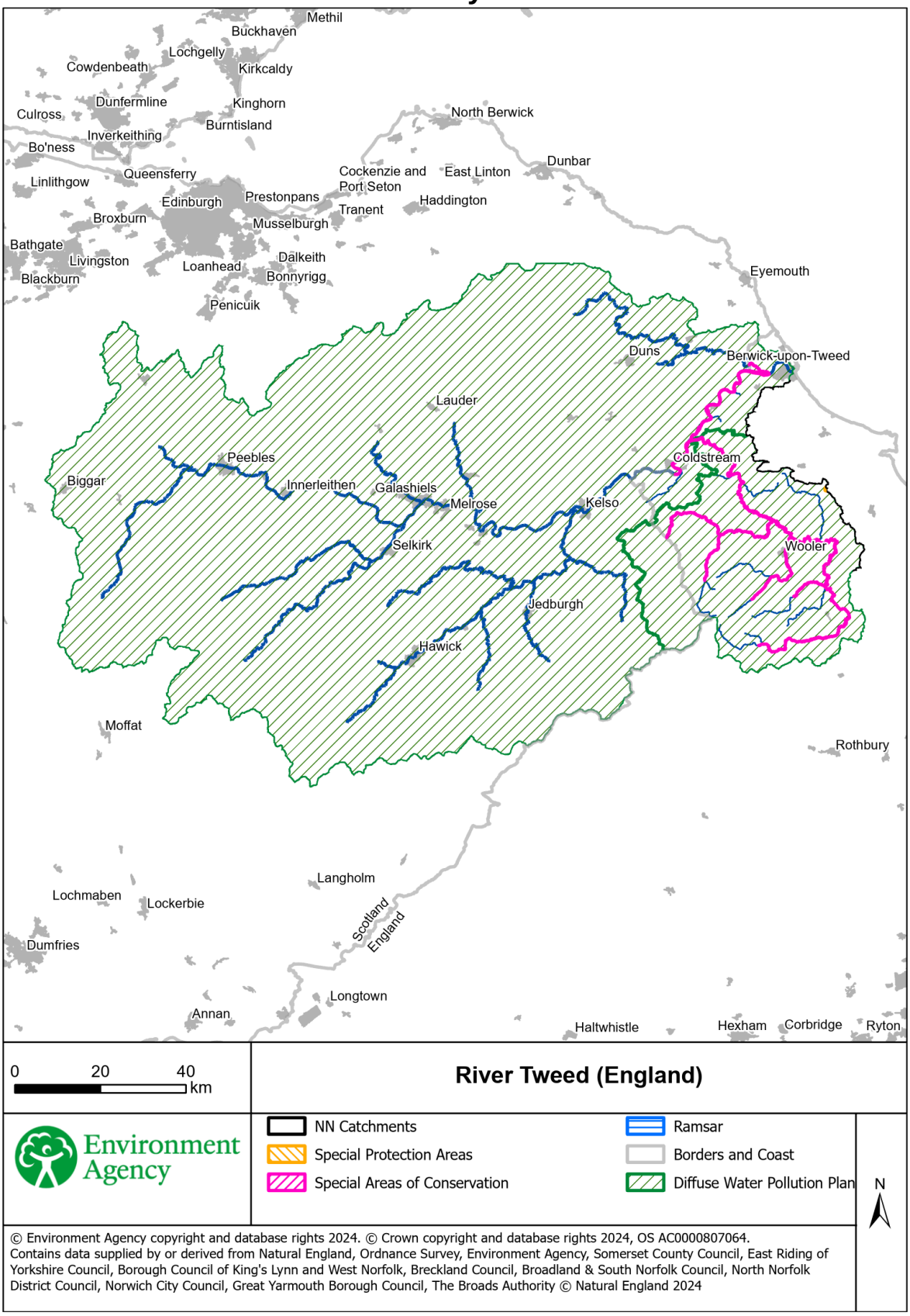


**Figure 22: River Tweed Catchment**

**Table 41: Indicative input load source apportionment for the River Tweed (Till sub-catchment only) based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 14% | 83% | 1% | 2% | 0% |

**Table 42: Indicative phosphate catchment average statistics and sector reductions for the River Tweed (Till catchment only).**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 94% | 6% | |
| Sector Share of Mean Target (mg/l) | 0.02 | 0.001 | 0.021 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.022 | 0.002 | |
| Sector Reduction Required | 8% | 40% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 8% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 10% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 18% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 34% | n/a | |
| Residual % Diffuse Sector Reduction | 0% | n/a | |

## River Wensum

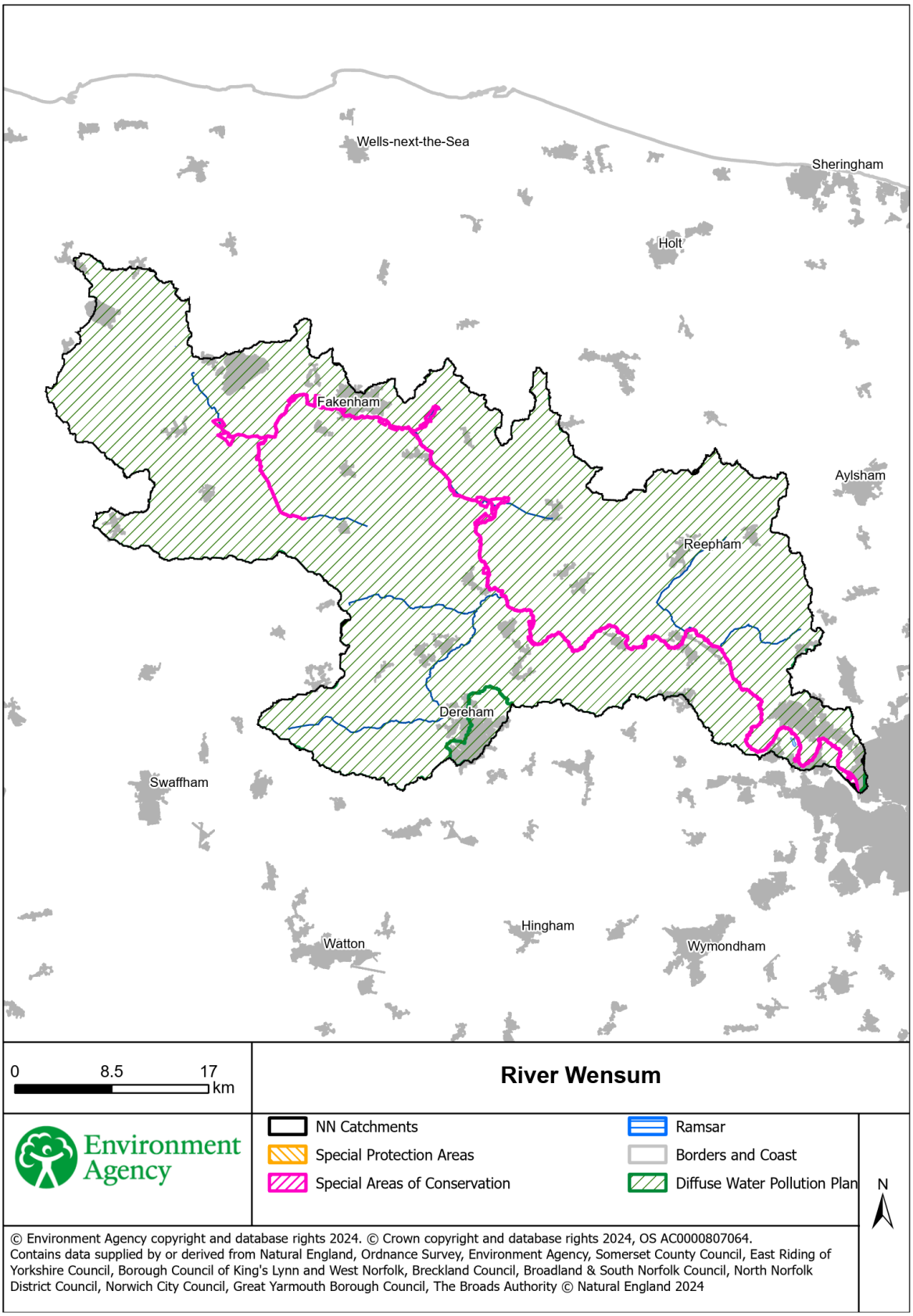


**Figure 23: River Wensum Catchment**

No modelling under the DWPP programme is proposed for the River Axe in 2024.

**Table 43: Indicative input load source apportionment for the River Wensum based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 18% | 68% | 13% | 1% | 0% |

**Table 44: Indicative phosphate catchment average statistics and sector reductions for the River Wensum.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 48% | 52% | |
| Sector Share of Mean Target (mg/l) | 0.01 | 0.01 | 0.02 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.04 | 0.017 | |
| Sector Reduction Required | 76% | 39% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 9% | | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 12% | | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 21% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 37% | n/a | |
| Residual % Diffuse Sector Reduction | 39-67% | n/a | |

## River Wye (inc. River Lugg)

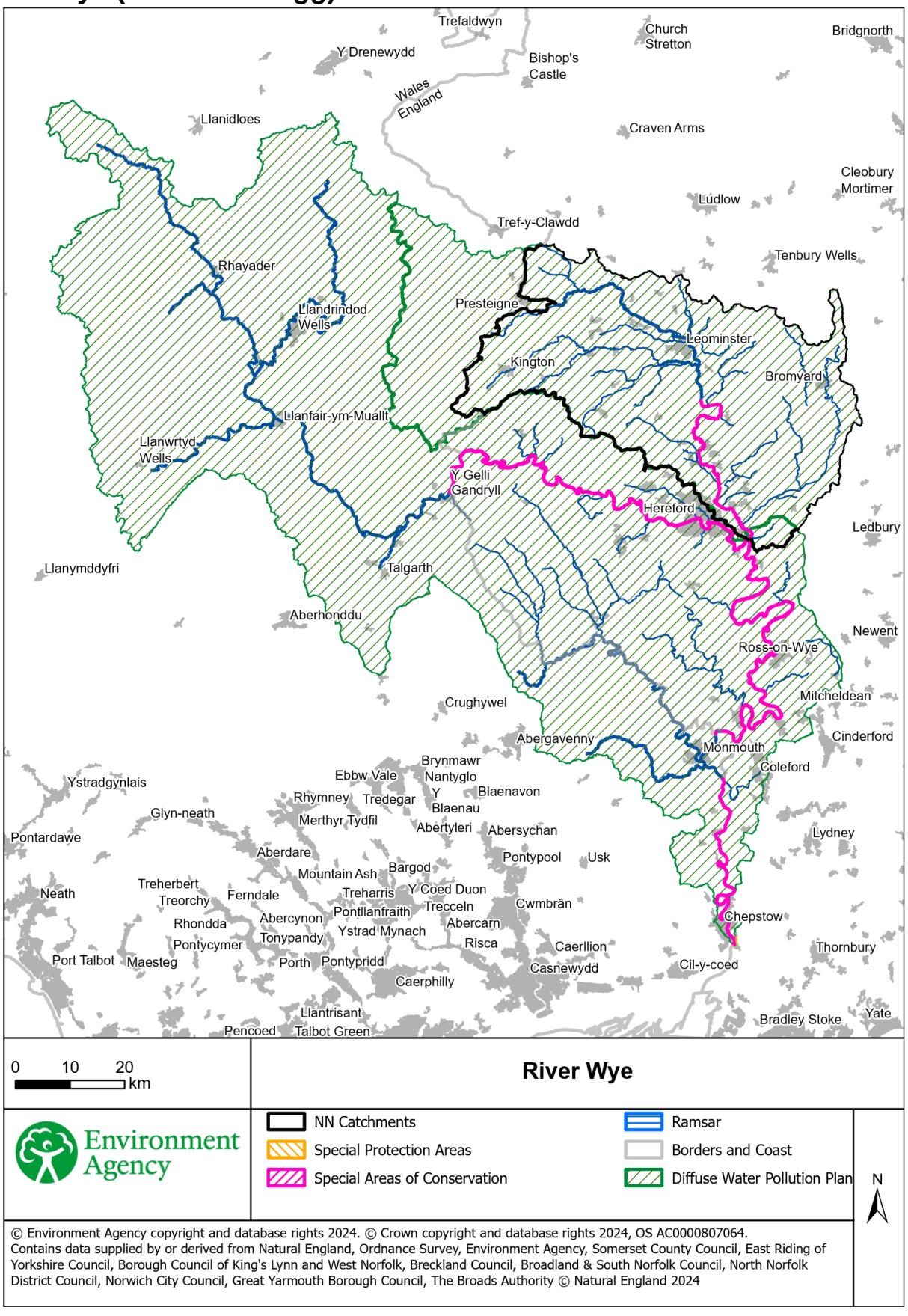


**Figure 24: River Wye Catchment**

No further modelling under the DWPP programme is proposed for the River Wye in 2024.

**Table 45: Indicative input load source apportionment for the Rivers Wye and Lugg based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| DWPP Catchment | 21% | 75% | 2% | 2% | 0% |
| Nutrient Neutrality Catchment only (Lugg) | 14% | 81% | 2% | 2% | 0% |

**Table 46: Indicative phosphate catchment average statistics and sector reductions for the River Wye DWPP catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 75% | 25% | |
| Sector Share of Mean Target (mg/l) | 0.018 | 0.006 | 0.024 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.054 | 0.011 | |
| Sector Reduction Required | 66% | 43% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 10% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 13% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 18% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 34% | n/a | |
| Residual % Diffuse Sector Reduction | 32-56% | n/a | |

**Table 47: Indicative phosphate catchment average statistics and sector reductions for the River Lugg catchment only, where nutrient neutrality advice applies.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.013 | 0.013 | 0.027 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.090 | 0.022 | |
| Sector Reduction Required | 85% | 39% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 14% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 23% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 42% | n/a | |
| Residual % Diffuse Sector Reduction | 43-74% | n/a | |

## Wye Valley (Peaks)

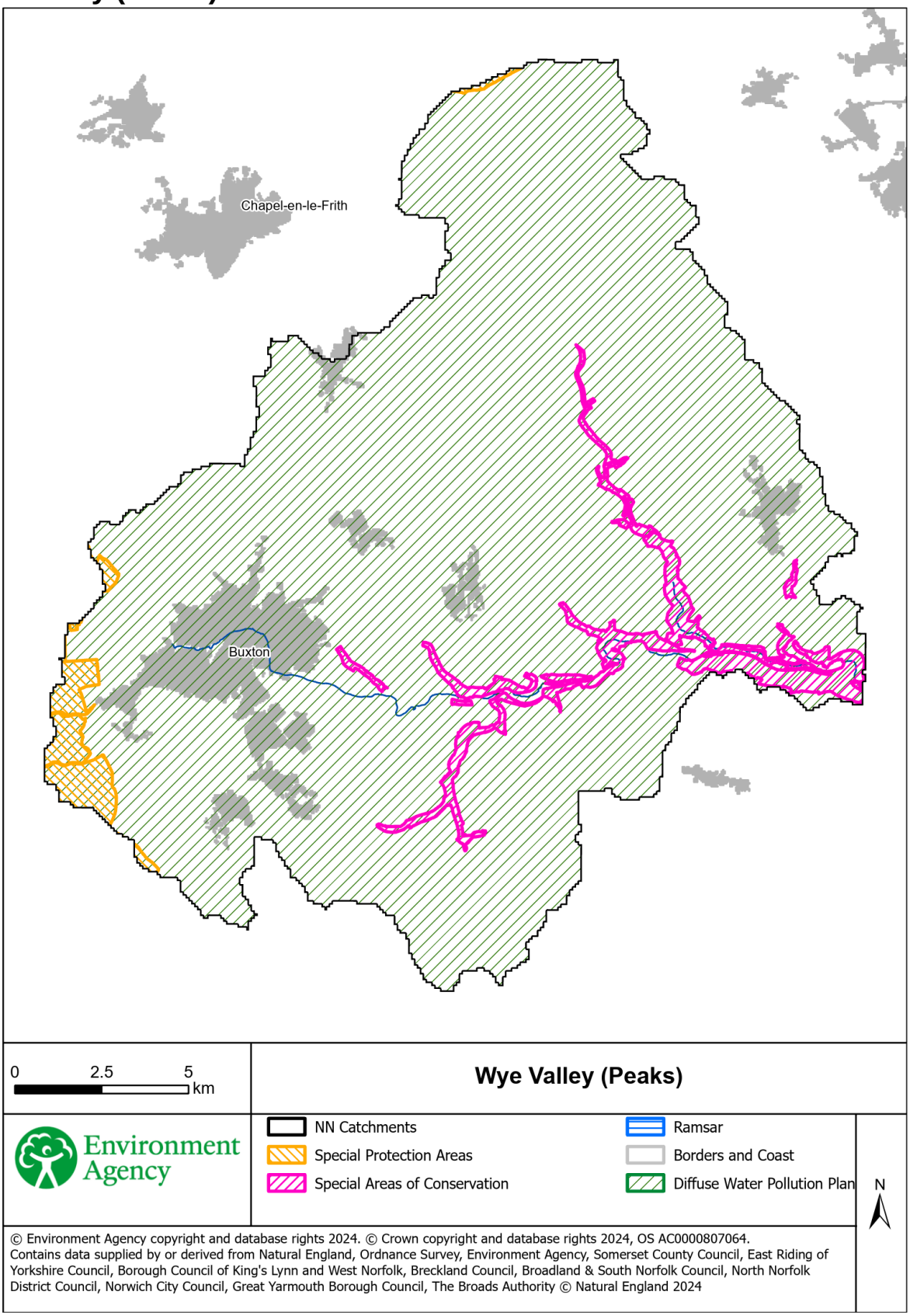


**Figure 25: River Wye (Peak District) Catchment**

**Table 48: Indicative input load source apportionment for the River Wye (Peak District) based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 35% | 48% | 16% | 1% | 0% |

**Table 49: Indicative phosphate catchment average statistics and sector reductions for the Wye Valley (Peak District).**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.008 | 0.008 | 0.015 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.022 | 0.02 | |
| Sector Reduction Required | 65% | 63% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 11% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 13% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 15% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 30% | n/a | |
| Residual % Diffuse Sector Reduction | 35-54% | n/a | |

# Estuarine, Wetland and Lake Catchments

## Ant Broads and Marshes SSSI

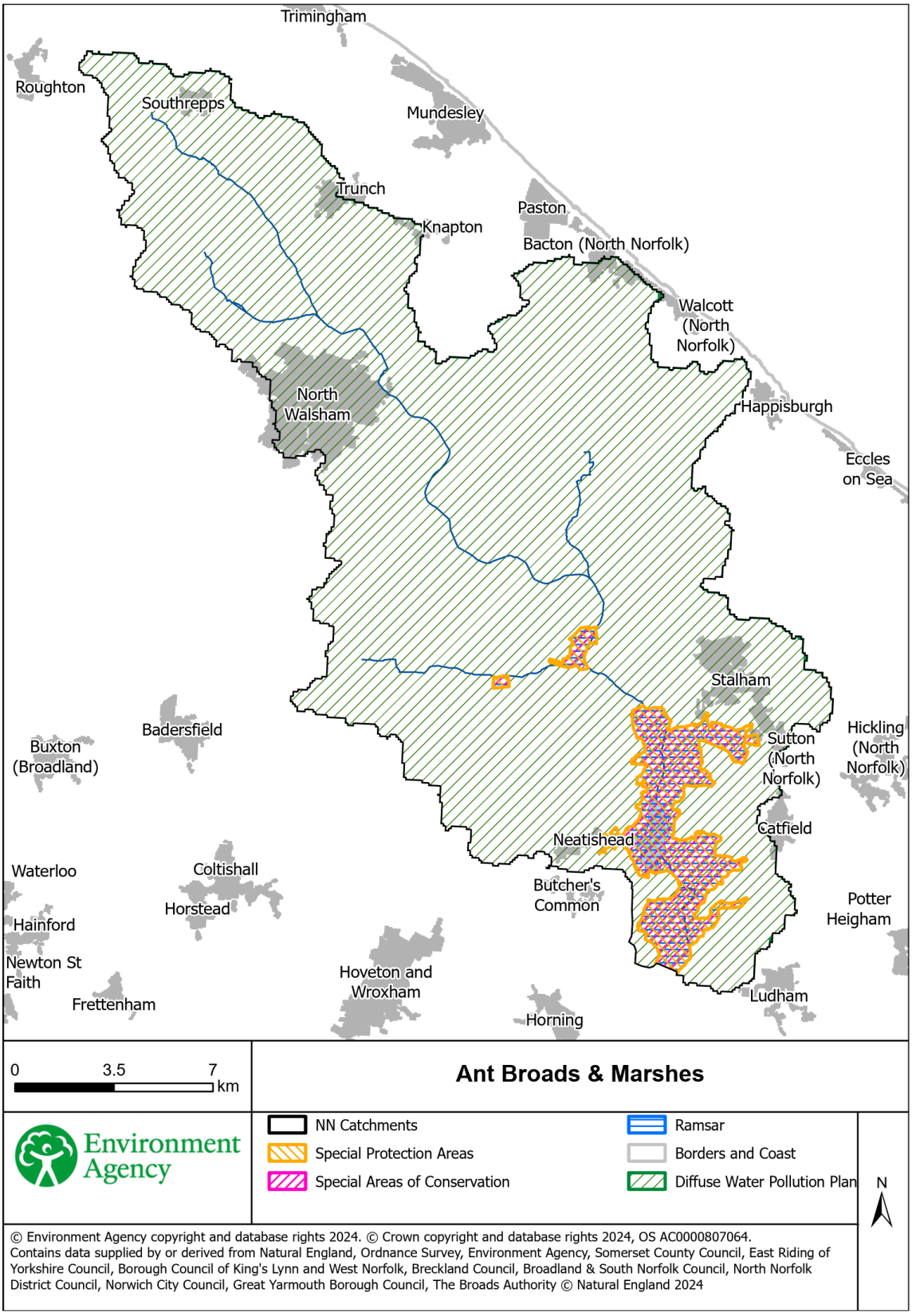


**Figure 26: Ant Broads and Marshes Catchment**

No further modelling under the DWPP programme is proposed for the Ant Broads and Marshes SSSI in 2024.

**Table 50: Indicative input load source apportionment for the Ant Broads and Marshes based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 64% | 8% | 23% | 4% | 0% |

**Table 51: Phosphate catchment average statistics and sector reductions for the Ant Broads and Marshes catchment, a component of The Broads nutrient neutrality catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.008 | 0.008 | 0.015 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.01 | 0.031 | |
| Sector Reduction Required | 26% | 76% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 7% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 9% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 20% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 28% | n/a | |
| Residual % Diffuse Sector Reduction | 0-19% | n/a | |

## Bure Broads and Marshes SSSI

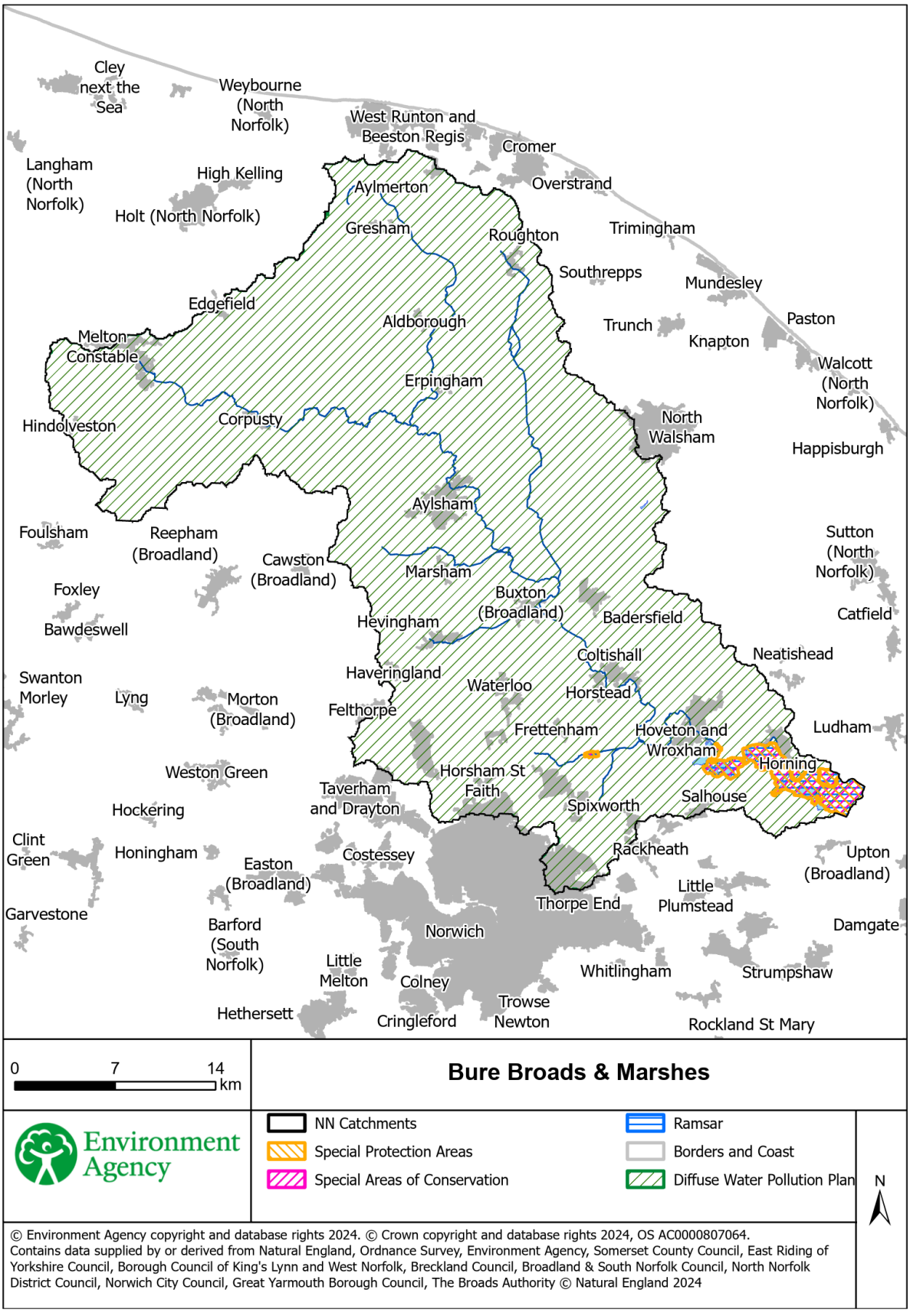


**Figure 27: Bure Broads and Marshes Catchment**

No further modelling under the DWPP programme is proposed for the Bure Broads and Marshes SSSI in 2024.

**Table 52: Indicative input load source apportionment for the Bure Broads and Marshes based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 26% | 50% | 20% | 4% | 0% |

**Table 53: Indicative phosphate catchment average statistics and sector reductions for the Bure Broads and Marshes catchment, a component of The Broads nutrient neutrality catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 63% | 37% | |
| Sector Share of Mean Target (mg/l) | 0.011 | 0.006 | 0.017 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.025 | 0.01 | |
| Sector Reduction Required | 57% | 40% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 8% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 10% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 22% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 42% | n/a | |
| Residual % Diffuse Sector Reduction | 15-49% | n/a | |

## Broads SAC (Bure, Trinity, Yare, Ant & Upper Thurne Broads)

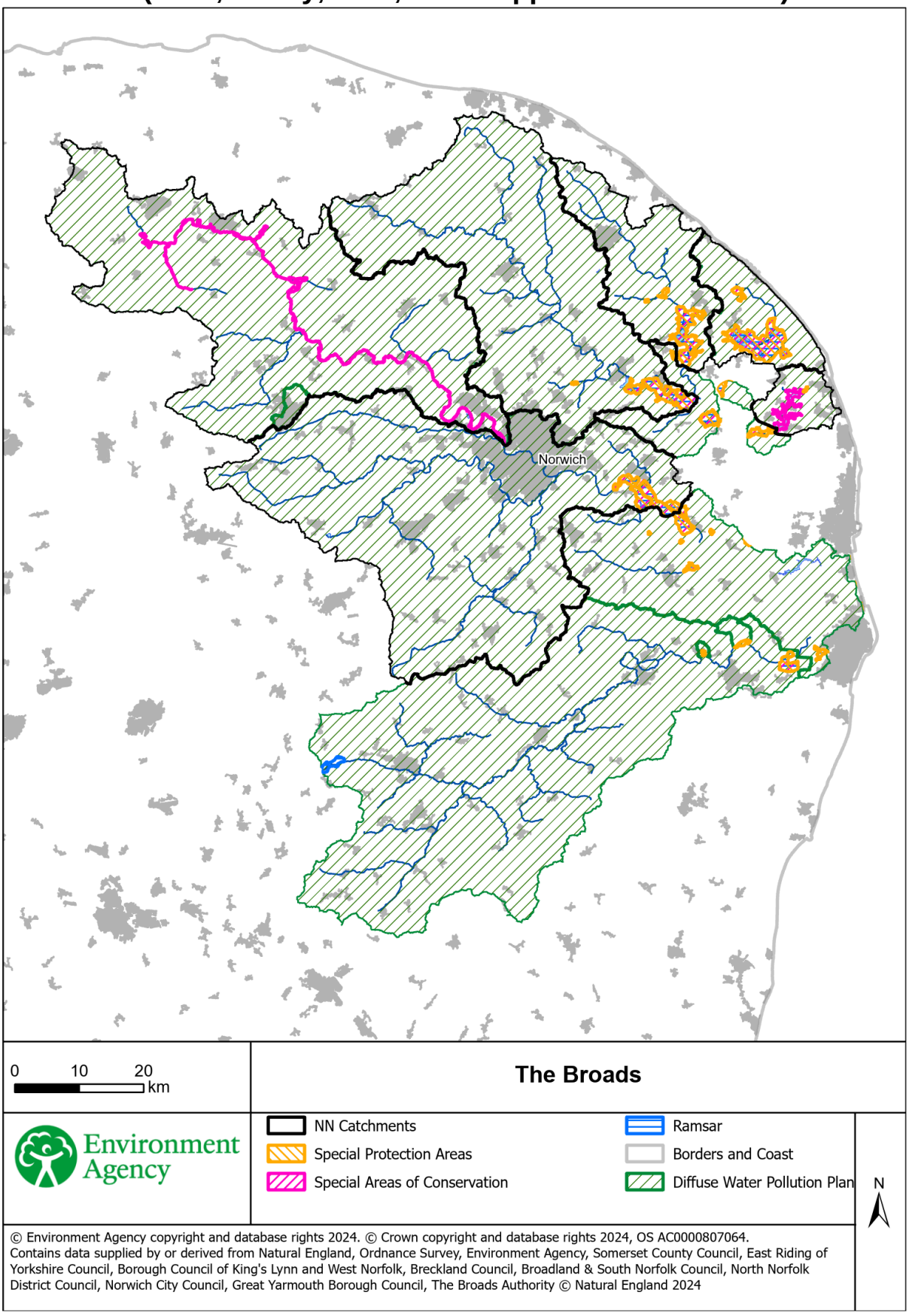


**Figure 28: Broads Catchment**

No further modelling under the DWPP programme is proposed for the Broads in 2024.

**Table 54: Indicative input load source apportionment for The Broads based on catchment endpoint (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 44% | 41% | 14% | 2% | 0% |
| Total Nitrogen | 21% | 73% | 4% | 0% | 2% |

**Table 55: Indicative phosphate catchment average statistics and sector reductions for The Broads catchment where nutrient neutrality advice applies.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.009 | 0.009 | 0.019 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.043 | 0.039 | |
| Sector Reduction Required | 78% | 76% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 9% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 11% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 20% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 36% | n/a | |
| Residual % Diffuse Sector Reduction | 58-42% | n/a | |

**Table 56: Indicative total nitrogen catchment average statistics and sector reductions for The Broads catchment where nutrient neutrality advice applies.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 65% | 35% | |
| Sector Share of Mean Target (mg/l) | 0.697 | 0.376 | 1.07 |
| Modelled Recent Sector Mean Concentration (mg/l) | 5.293 | 0.515 | |
| Sector Reduction Required | 87% | 27% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 3% | | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 4% | | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 8% | | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 17% | | |
| Residual % Diffuse Sector Reduction | 70-84% | | |

## Chesil & The Fleet

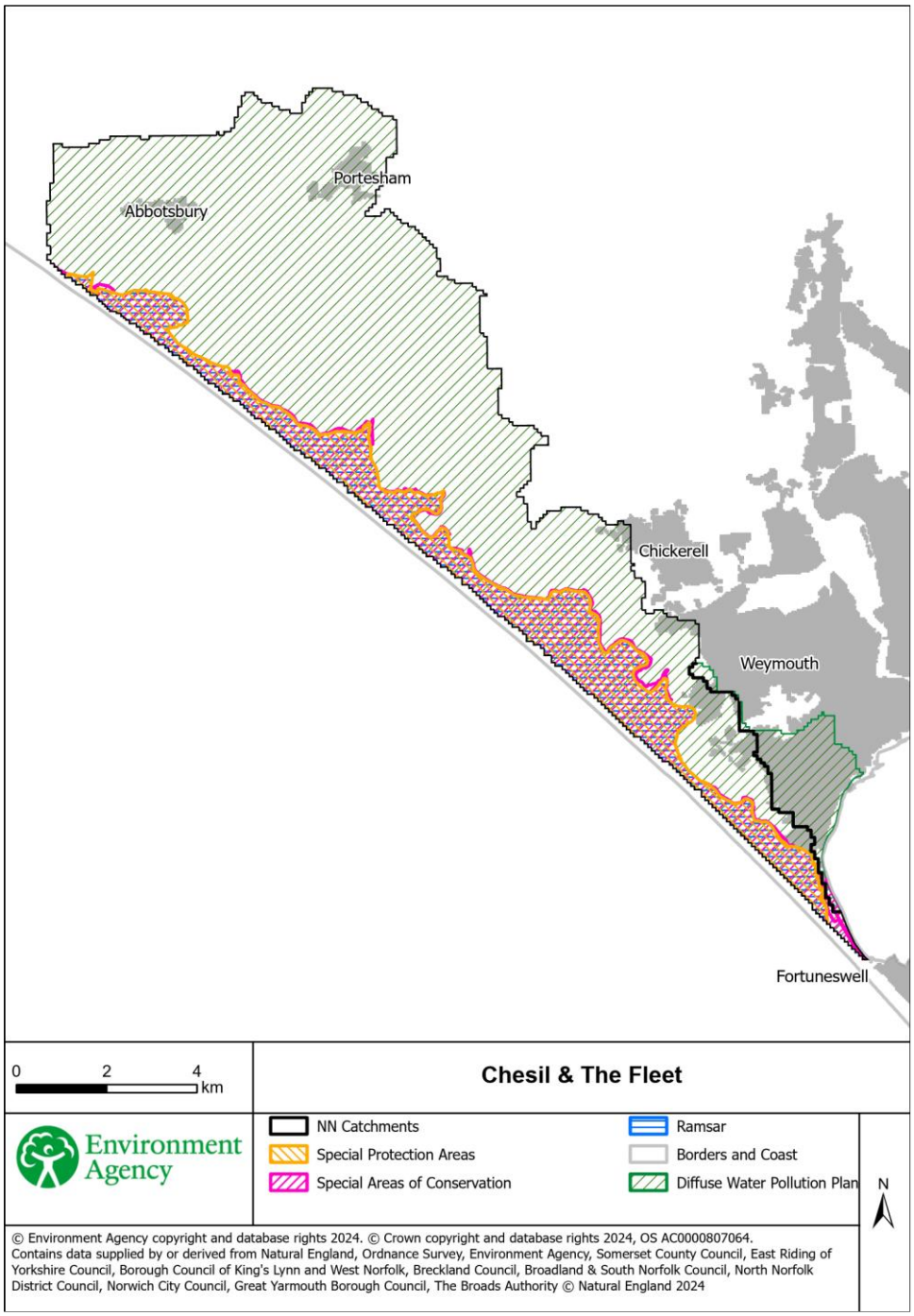


**Figure 29: Chesil and the Fleet Catchment**

**Table 57: Indicative source apportionment based on estimated loads to the Inner Fleet.**

| | Point Sources | Diffuse |
|---|---|---|
| Total Phosphorus | 2% | 98% |
| Total Nitrogen | 14% | 86% |

Our Simcat SAGIS models are not suitable for modelling the Fleet Lagoon. Work is ongoing to explore whether there are other suitable modelling tools.

## Esthwaite

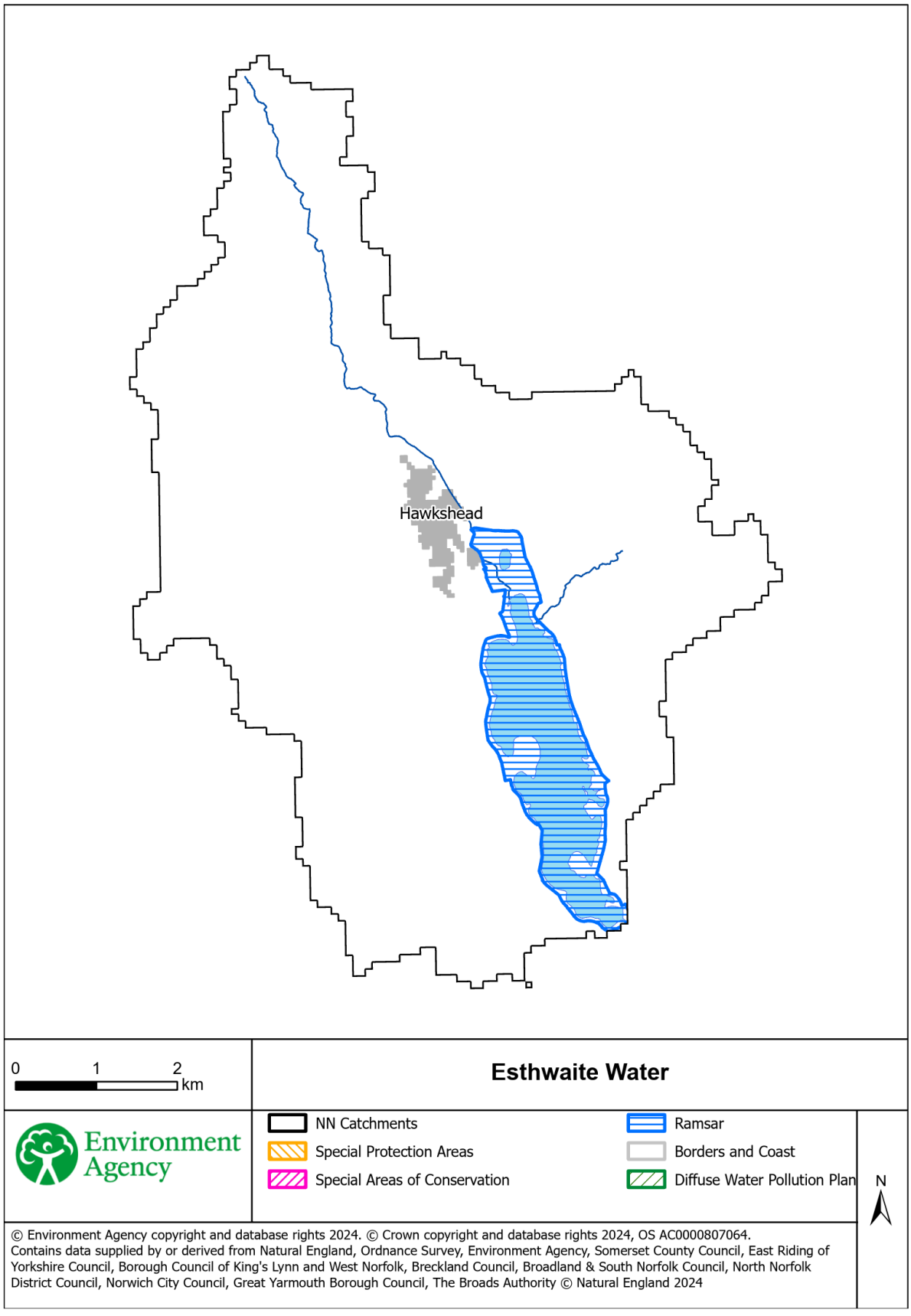


**Figure 30: Esthwaite Catchment**

**Table 58: Indicative input load source apportionment for Esthwaite (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Total Phosphorus | 70% | 29% | 0% | 2% | 0% |
| Total Nitrogen | 63% | 36% | 0% | 0% | 0% |

**Table 59: Indicative total phosphorus catchment average statistics and sector reductions for Esthwaite.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 86% | 14% | |
| Sector Share of Mean Target (mg/l) | 0.013 | 0.002 | 0.015 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.006 | 0.005 | |
| Sector Reduction Required | 0% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | Not available | Not available | Not available |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | Not available | Not available | Not available |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | Not available | Not available | Not available |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | Not available | Not available | Not available |
| Residual % Diffuse Sector Reduction | Not available | Not available | Not available |

**Table 60: Indicative total nitrogen catchment average statistics and sector reductions for Esthwaite.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 47% | 53% | |
| Sector Share of Mean Target (mg/l) | 0.36 | 0.41 | 0.77 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.06 | 0.06 | |
| Sector Reduction Required | 0% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | Not available | Not available | Not available |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | Not available | Not available | Not available |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | Not available | Not available | Not available |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | Not available | Not available | Not available |
| Residual % Diffuse Sector Reduction | Not available | Not available | Not available |

## Hornsea Mere

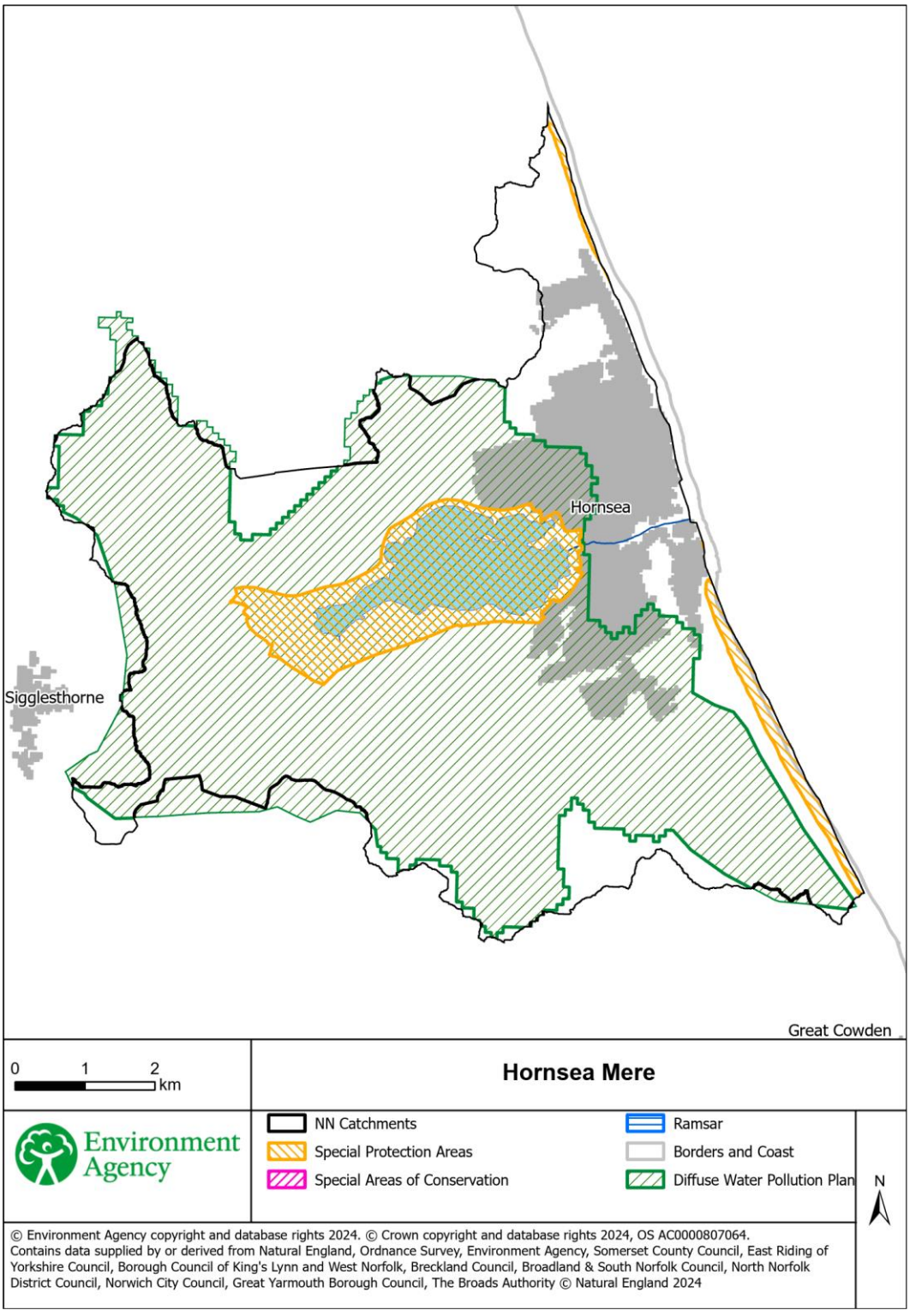


**Figure 31: Hornsea Mere Catchment**

The representation of Hornsea Mere in the Simcat SAGIS model is not satisfactory for us to present the data here. Work is ongoing to better understand the site and finalise the DWPP.

## Lindisfarne

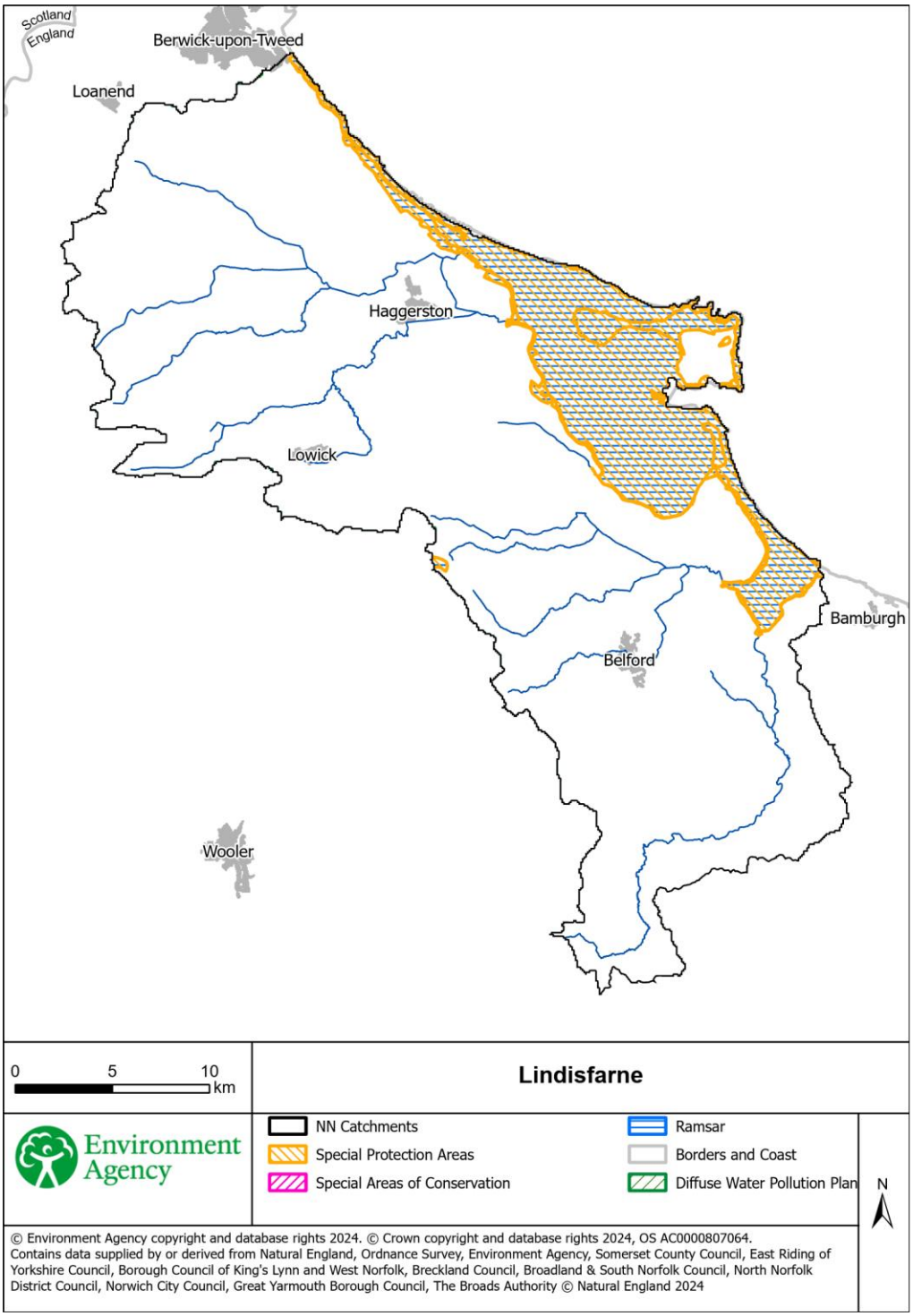


**Figure 32: Lindisfarne Catchment**

**Table 61: Indicative input load source apportionment for Lindisfarne (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Total Nitrogen | 11% | 85% | 0% | 0% | 3% |

## Ouse Washes

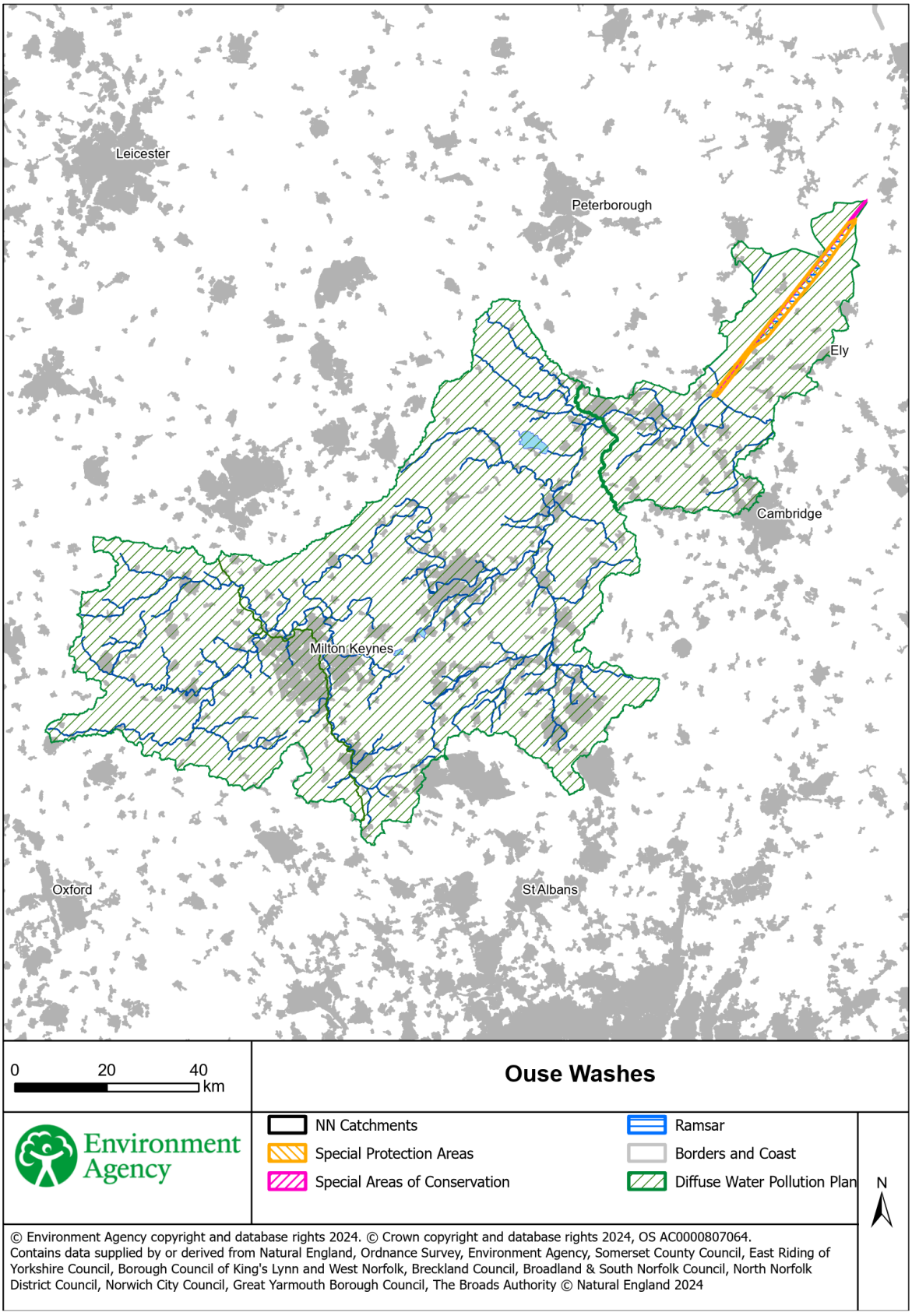


**Figure 33: Ouse Washes Catchment**

**Table 62: Indicative input load source apportionment for the Ouse Washes at Earith (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphorus | 57% | 27% | 14% | 2% | 0% |

**Table 63: Indicative phosphorus catchment average statistics and sector reductions for the Ouse Washes.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 29% | 71% | |
| Sector Share of Mean Target (mg/l) | 0.029 | 0.071 | 0.1 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.086 | 0.165 | |
| Sector Reduction Required | 66% | 57% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 8% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 10% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 18% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 31% | n/a | |
| Residual % Diffuse Sector Reduction | 35-58% | | |

## Poole Harbour

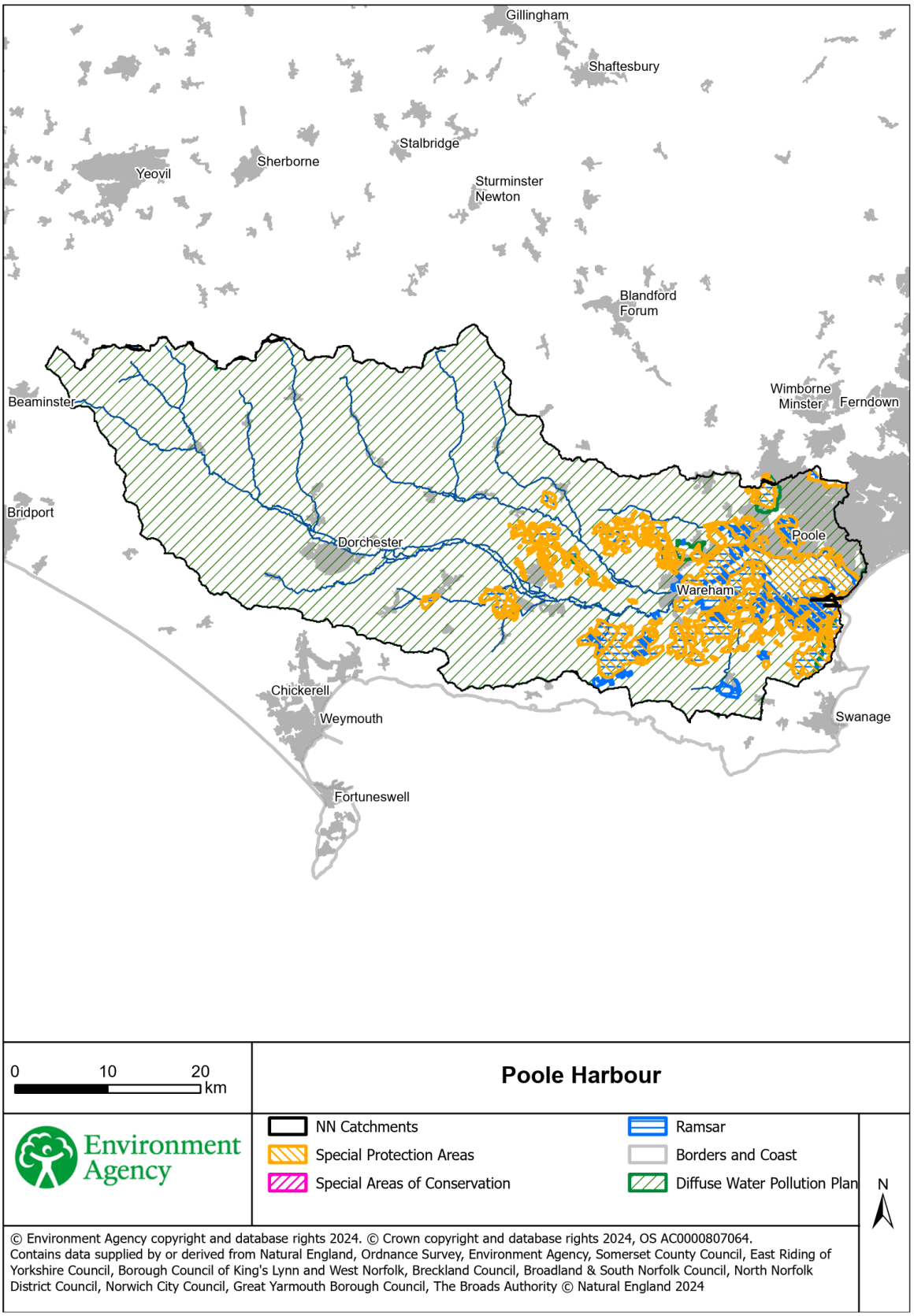


**Figure 34: Poole Harbour Catchment**

No further modelling under the DWPP programme is proposed for Poole Harbour in 2024.

**Table 64: Indicative input load source apportionment from all freshwater inputs and direct discharges to Poole Harbour (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 75% | 23% | 1% | 1% | 0% |
| Total Nitrogen | 21% | 76% | 0% | 0% | 3% (Atmospheric deposition) |

**Table 65: Indicative phosphorus catchment average statistics and sector reductions for Poole Harbour based on loads (inc. direct discharges). Target from Restoring the water quality of Poole Harbour, Results of technical investigation and recommendations, April 2021, EA & NE.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 28% | 72% | |
| Sector Share of Mean Target (T/yr) | 6 | 16 | 22 |
| Modelled Recent Sector Mean Concentration (mg/l) | 12 | 52 | |
| Sector Reduction Required | 49% | 70% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 12% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 15% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 24% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 46% | n/a | |
| Residual % Diffuse Sector Reduction | 2-36% | | |

**Table 66: Indicative total nitrogen catchment average statistics and sector reductions for Poole Harbour based on loads (inc. direct discharges). Target from Restoring the water quality of Poole Harbour, Results of technical investigation and recommendations, April 2021, EA & NE.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 80% | 20% | |
| Sector Share of Mean Target (T/yr) | 1200 | 300 | 1500 |
| Modelled Recent Sector Mean Concentration (mg/l) | 2298 | 533 | |
| Sector Reduction Required | 48% | 44% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 2% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 3% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 6% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 15% | n/a | |
| Residual % Diffuse Sector Reduction | 33-46% | | |

## Solent

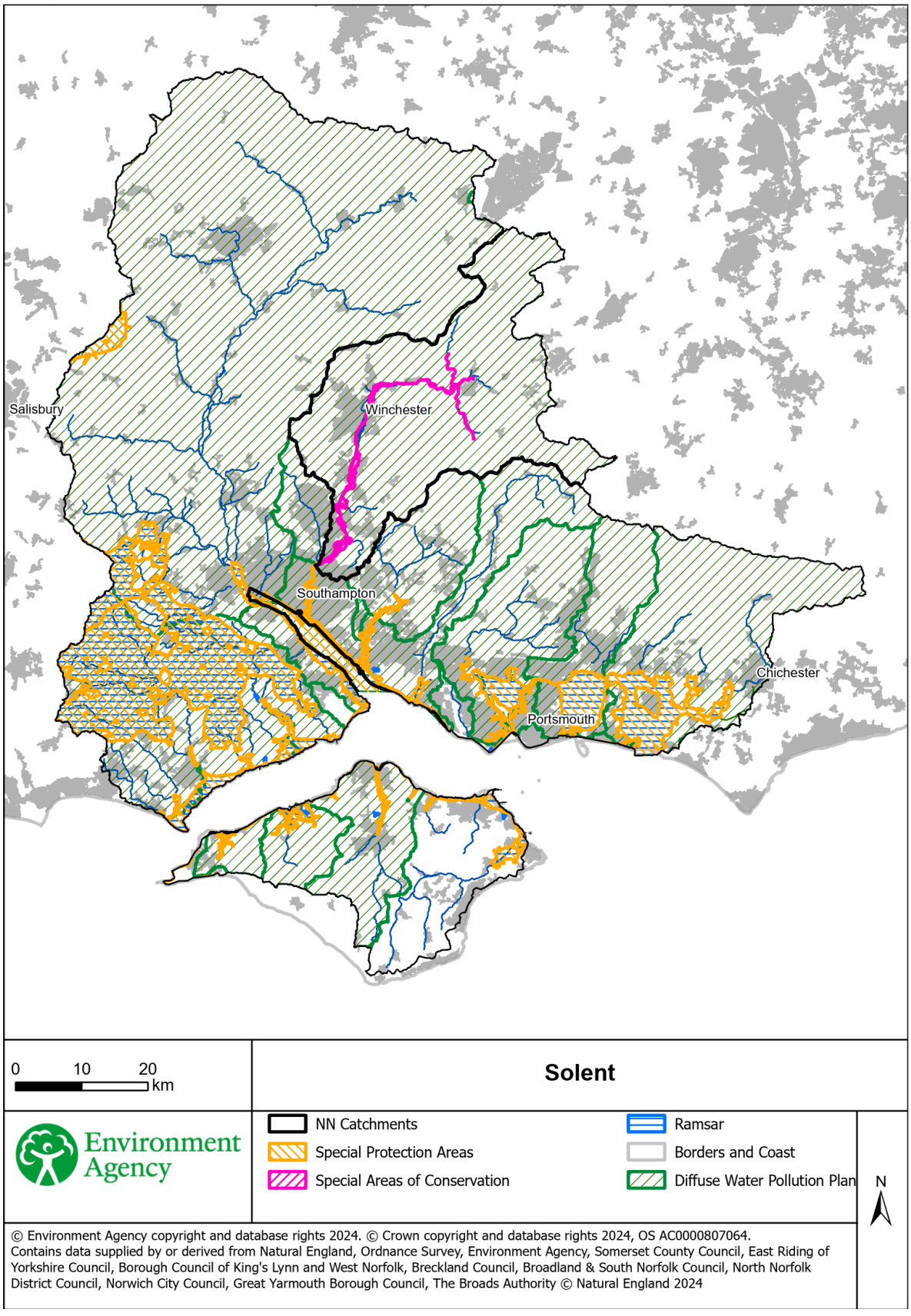


**Figure 35: Solent Catchments**

No further modelling under the DWPP programme is proposed for the Solent in 2024, while we await targets.

**Table 67: Indicative input load source apportionment by load from all freshwater inputs and direct discharges (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Total Nitrogen | 15% | 77% | 2% | 0% | 8% |

**Table 68: Indicative total nitrogen catchment average statistics and sector reductions for the Solent. Awaiting target confirmation to provide diffuse sector reductions required.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | tbc | | |
| Sector Share of Mean Target (mg/l) | tbc | | |
| Modelled Recent Sector Mean Concentration (mg/l) | | | |
| Sector Reduction Required | | | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 3% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 4% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 9% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 20% | n/a | |
| Residual % Diffuse Sector Reduction | tbc | | |

## Somerset Levels & Moors

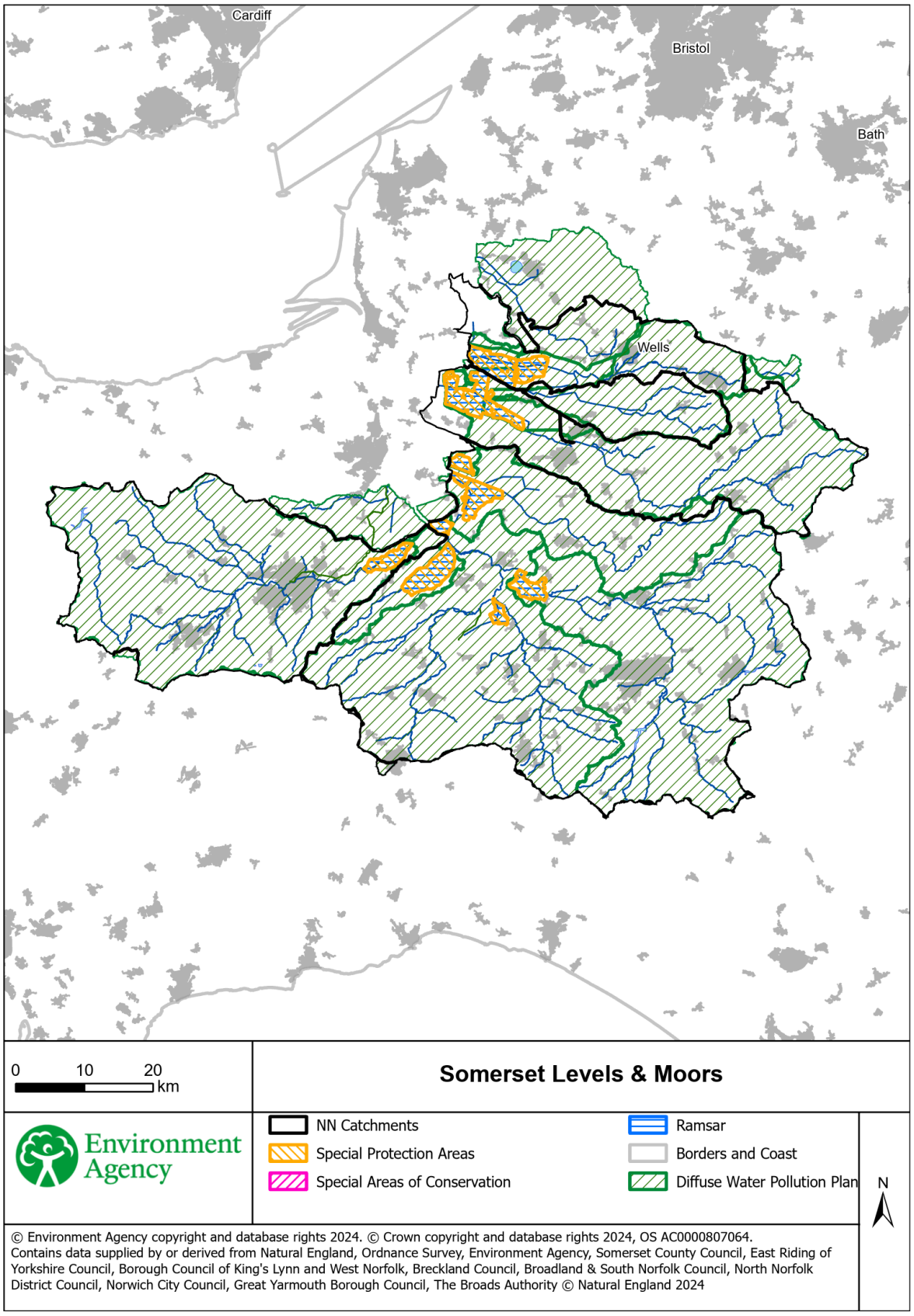


**Figure 36: Somerset Levels and Moors Catchments**

No further modelling of the Somerset Levels and Moors catchment is proposed for 2024, the site does not fall within the DWPP Programme.

**Table 69: Indicative input load source apportionment by load for the Somerset Levels and Moors (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 33% | 54% | 11% | 2% | 0% |

**Table 70: Indicative phosphate catchment average statistics and sector reductions for the Somerset Levels and Moors nutrient neutrality catchment.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.025 | 0.025 | 0.05 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.167 | 0.101 | |
| Sector Reduction Required | 85% | 77% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 15% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 19% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 23% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 39% | n/a | |
| Residual % Diffuse Sector Reduction | 46-70% | n/a | |

# Stodmarsh

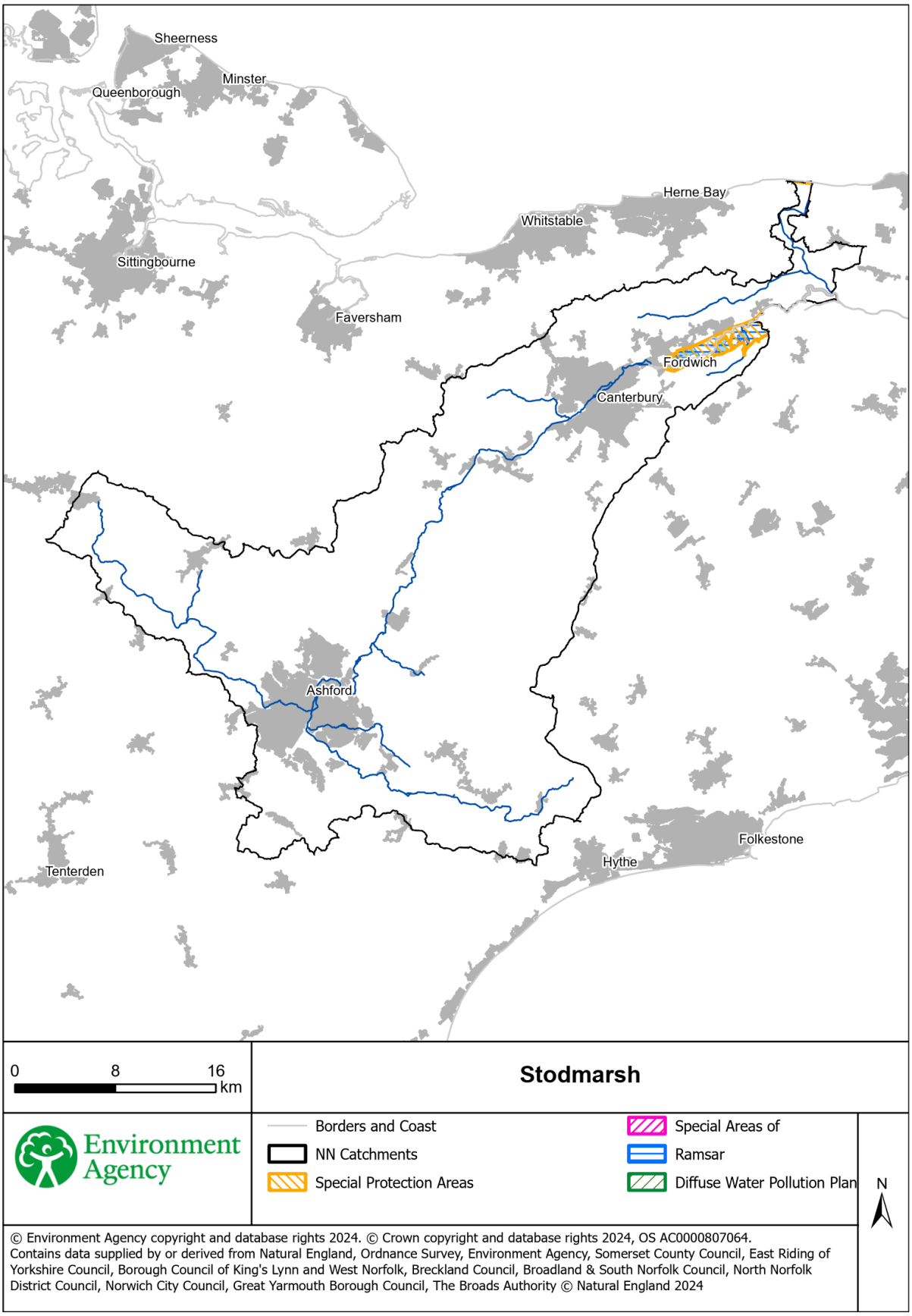


**Figure 37: Stodmarsh Catchment**

No further modelling of the Stodmarsh is proposed for 2024, the site does not fall within the DWPP Programme.

**Table 71: Indicative input load source apportionment for Stodmarsh at point WQE0001255 (compliance assessment point) and including direct discharges (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 56% | 24% | 17% | 3% | 0% |
| Total Nitrogen | 39% | 55% | 2% | 0% | 4% |

**Table 72: Indicative phosphate statistics and sector reductions for Stodmarsh at point WQE0001255 (compliance assessment point). Total phosphorus CSMG target has not been converted to orthophosphate.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.025 | 0.025 | 0.049 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.071 | 0.202 | |
| Sector Reduction Required | 65% | 88% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 10% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 18% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 31% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 37% | n/a | |
| Residual % Diffuse Sector Reduction | 28-55% | n/a | |

**Table 70: Indicative total nitrogen catchment average statistics and sector reductions for Stodmarsh.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.75 | 0.75 | 1.5 |
| Modelled Recent Sector Mean Concentration (mg/l) | 3.033 | 4.408 | |
| Sector Reduction Required | 75% | 83% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 3% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 4% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 9% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 17% | n/a | |
| Residual % Diffuse Sector Reduction | 58-72% | | |

## Teesmouth Catchment

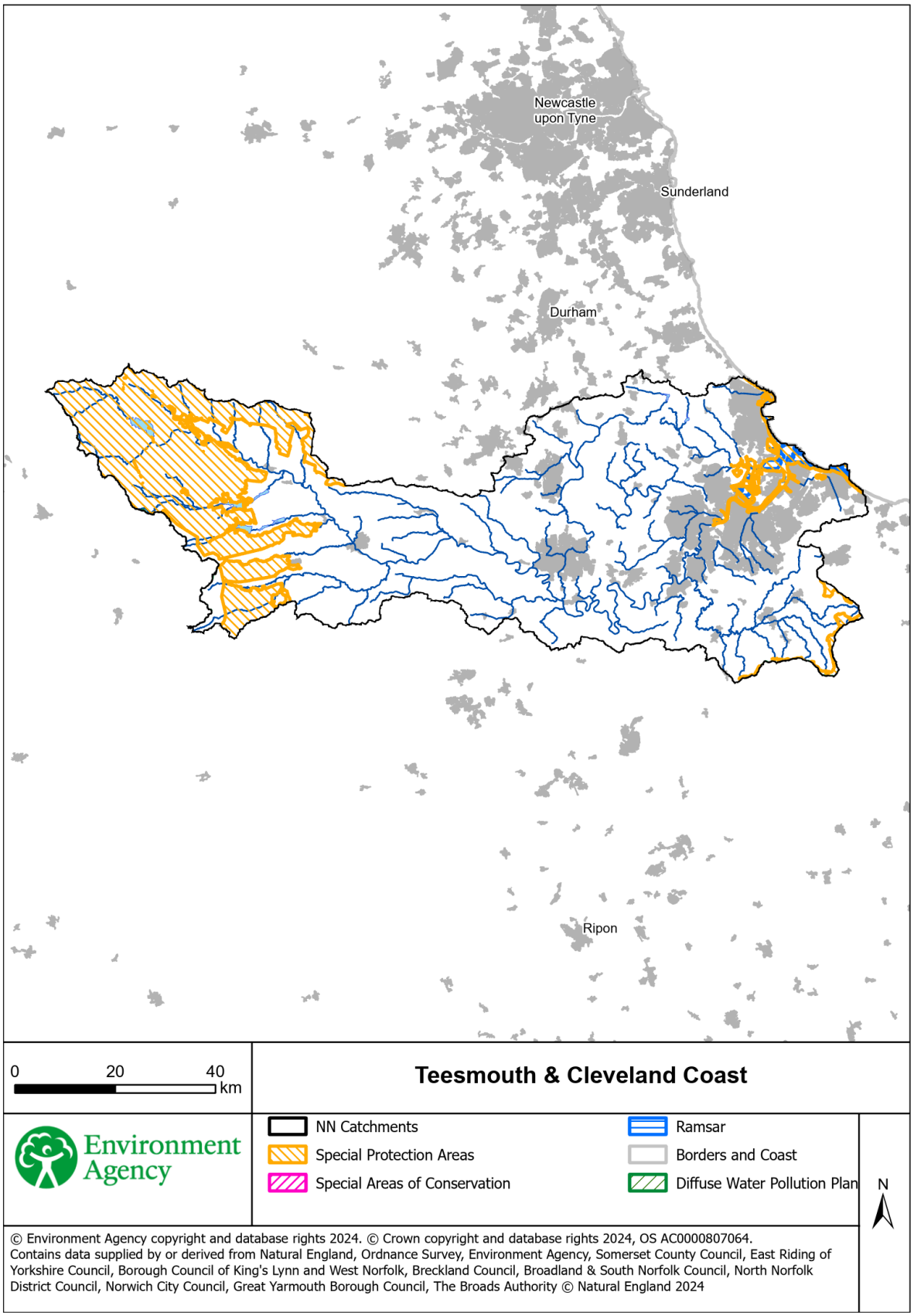


**Figure 38: Tees Catchment**

No further modelling of the Teesmouth is proposed for 2024, the site does not fall within the DWPP Programme.

**Table 73: Indicative input load source apportionment for Teesmouth (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Total Nitrogen | 61% | 33% | 1% | 0% | 5% |

**Table 74: Indicative total nitrogen catchment average statistics and sector reductions for Teesmouth nutrient neutrality catchment. Awaiting target confirmation to provide diffuse sector reductions required.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | TBC | | |
| Sector Share of Mean Target (mg/l) | TBC | | |
| Modelled Recent Sector Mean Concentration (mg/l) | | | |
| Sector Reduction Required | | | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 5% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 7% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 11% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 18% | n/a | |
| Residual % Diffuse Sector Reduction | TBC | | |

## Waveney Catchment – (Geldeston Meadows SSSI, Stanley and Alder Carrs SSSI and Sprats Water and Marshes SSSI.)

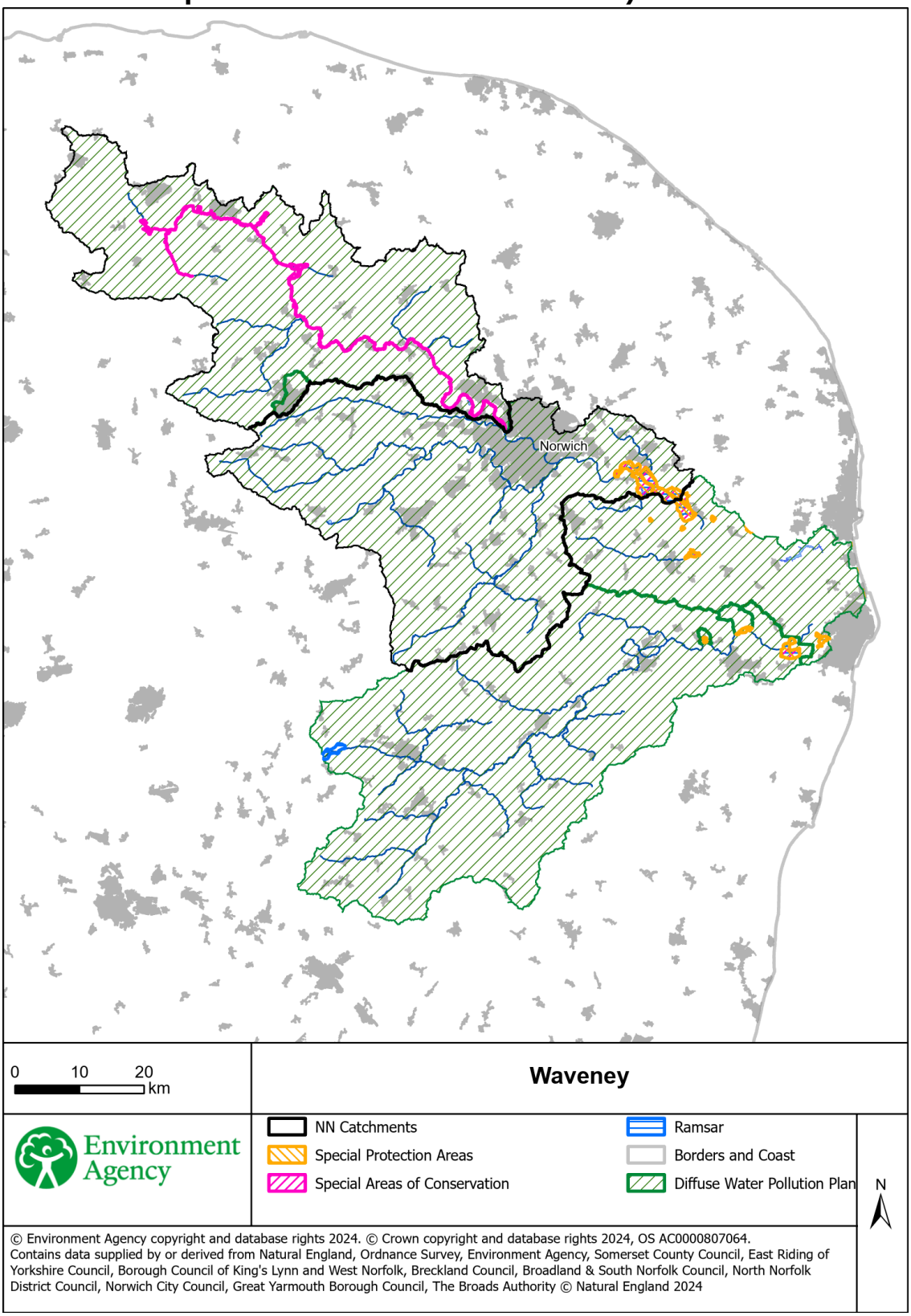


**Figure 39: Waveney Catchment**

**Table 75:Indicative input load source apportionment for the Waveney sites at Geldeston Meadows SSSI (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 29% | 64% | 4% | 2% | 0% |

**Table 76: Indicative phosphate catchment average statistics and sector reductions for the Waveney catchment at Geldeston Meadows SSSI.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 41% | 59% | |
| Sector Share of Mean Target (mg/l) | 0.041 | 0.059 | 0.1 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.063 | 0.04 | |
| Sector Reduction Required | 35% | 0% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 8% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 10% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 18% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 29% | n/a | |
| Residual % Diffuse Sector Reduction | 6-27% | n/a | |

## Yare Broads and Marshes SSSI

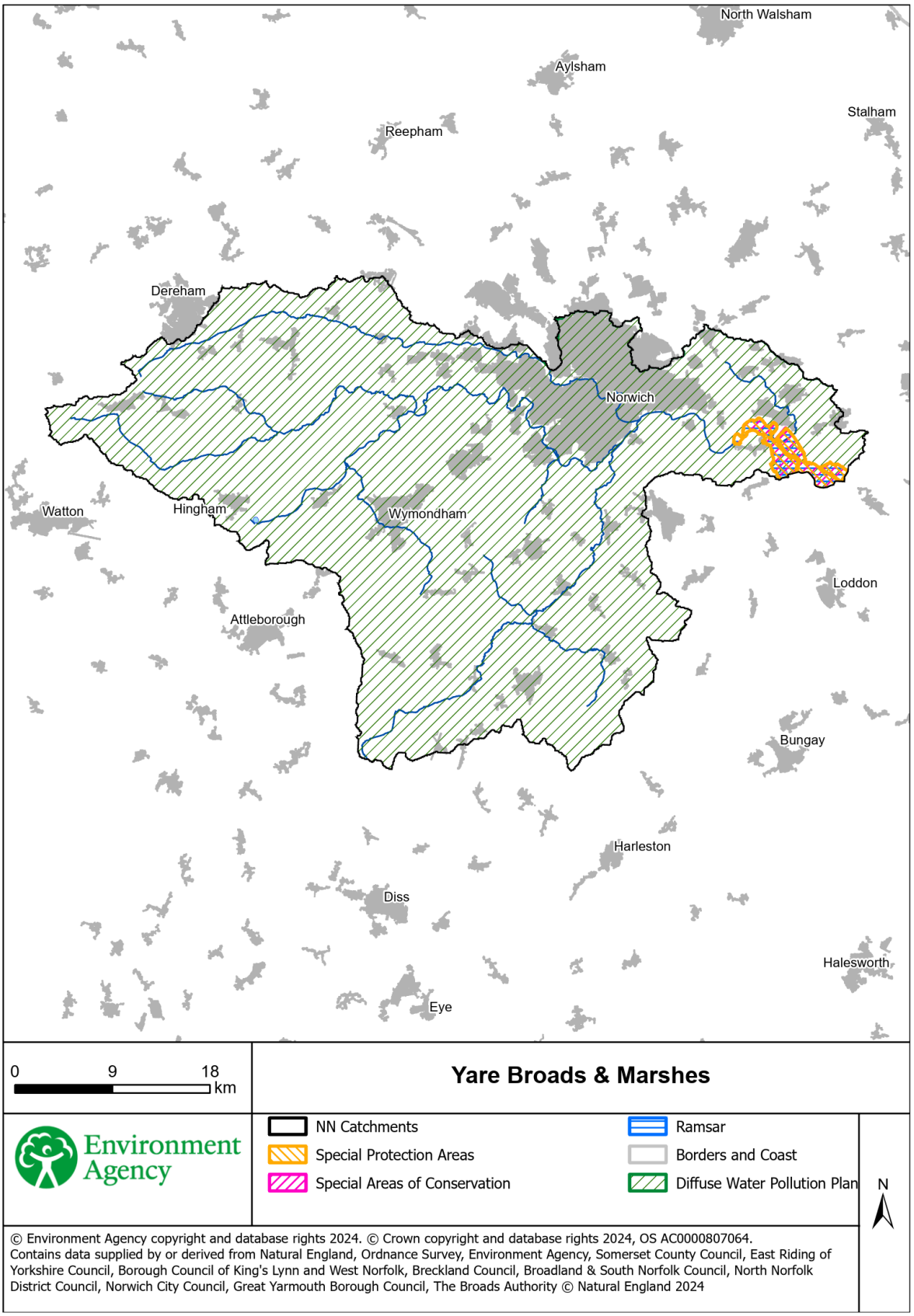


**Figure 40: Yare Broads and Marshes Catchment**

No further modelling of the Yare Broads and Marshes catchment is proposed for 2024.

**Table 77:Indicative input load source apportionment for the Yare Broads and Marshes SSSI (recent scenario, PR24 calibration models).**

| | Point Sources | Rural Land Use | Urban | Septic Tanks | Other |
|---|---|---|---|---|---|
| Phosphate | 46% | 41% | 13% | 1% | 0% |

**Table 78: Indicative phosphate catchment average statistics and sector reductions for the Yare Broads and Marshes SSSI.**

| | Diffuse | Point | Total |
|---|---|---|---|
| Baseline (2009) Sector Share of the Target | 50% | 50% | |
| Sector Share of Mean Target (mg/l) | 0.01 | 0.01 | 0.02 |
| Modelled Recent Sector Mean Concentration (mg/l) | 0.051 | 0.086 | |
| Sector Reduction Required | 80% | 88% | |
| High Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 3) | 9% | n/a | |
| Full Regulatory Compliance Reduction in losses (Farmscoper V5, Scenario 4) | 11% | n/a | |
| Optimistic Uptake of Measures (Farmscoper V5, Scenario 8). | 20% | n/a | |
| Theoretical Maximum Reduction in Losses (Farmscoper V5, Scenario 10). | 34% | n/a | |
| Residual % Diffuse Sector Reduction | 46-71% | n/a | |

# Input load figures used to calculate source apportionment

**Table 79: Riverine site input loads (kg/d) and input load source apportionment after calibration, before in-river processes (recent scenario, PR24 calibration models).**

| River Catchment | Determinand | STW (kg/d) | Intermittents (kg/d) | Industrial (kg/d) | Rural Land Use (kg/d) | Highways (kg/d) | Urban (kg/d) | Atmospheric Deposition (kg/d) | Septic Tanks (kg/d) | Background (arising from cress/ fish farms abstractions) (kg/d) | Point (%) | Rural Land Use (%) | Urban (%) | Septic Tanks (%) | Other (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **River Avon (Hampshire)** | PO4 | 37.010 | 0.783 | 7.663 | 104.520 | 0.195 | 63.120 | | 7.356 | 5.598 | 20% | 46% | 28% | 3% | 3% |
| **River Axe** | PO4 | 9.899 | 0.918 | 0.860 | 68.289 | 0.038 | 1.073 | | 0.773 | | 14% | 83% | 1% | 1% | 0% |
| **River Camel** | PO4 | 29.068 | 1.962 | 0.000 | 9.069 | 0.033 | 1.793 | | 0.575 | | 73% | 21% | 4% | 1% | 0% |
| **River Clun** | PO4 | 2.066 | 0.005 | 0.000 | 13.720 | 0.000 | 1.046 | | 0.328 | | 12% | 80% | 6% | 2% | 0% |
| **River Dee** | PO4 | 50.830 | 2.486 | 0.699 | 286.800 | 0.022 | 1.060 | | 3.279 | | 16% | 83% | 0% | 1% | 0% |
| **River Derwent (Yorkshire)** | PO4 | 53.760 | 0.699 | 3.624 | 69.310 | 0.102 | 2.843 | | 1.289 | | 44% | 53% | 2% | 1% | 0% |
| **River Derwent & Bassenthwaite Lake (DWPP catchment)** | PO4 | 11.360 | 3.948 | 0.404 | 12.227 | 0.054 | 0.076 | | 0.055 | | 56% | 43% | 0% | 0% | 0% |
| **River Derwent & Bassenthwaite Lake (NN catchment)** | PO4 | 7.768 | 1.818 | 0.715 | 10.726 | 0.063 | 0.089 | | 0.066 | | 48% | 50% | 0% | 0% | 0% |
| **River Eden** | PO4 | 80.820 | 31.130 | 1.947 | 145.310 | 0.282 | 4.549 | | 1.382 | | 43% | 55% | 2% | 1% | 0% |
| **River Ehen** | PO4 | 0.225 | 0.400 | 0.024 | 1.917 | 0.000 | 0.026 | | 0.018 | | 25% | 73% | 1% | 1% | 0% |
| **River Itchen** | PO4 | 17.390 | 1.499 | 0.000 | 15.914 | 0.052 | 10.530 | | 1.980 | 5.612 | 36% | 30% | 20% | 4% | 11% |
| **River Kent (DWPP catchment)** | PO4 | 10.140 | 9.673 | 0.111 | 8.656 | 0.009 | 0.072 | | 0.201 | | 69% | 30% | 0% | 1% | 0% |
| **River Kent (NN catchment)** | PO4 | 0.204 | 0.010 | 0.000 | 1.204 | 0.001 | 0.000 | | 0.036 | | 15% | 83% | 0% | 2% | 0% |
| **River Lambourn** | PO4 | 1.614 | 0.152 | 0.020 | 8.812 | 0.057 | 1.752 | | 0.251 | | 14% | 70% | 14% | 2% | 0% |
| **River Mease** | PO4 | 3.695 | 0.321 | 0.000 | 7.669 | 0.036 | 5.419 | | 0.904 | | 22% | 43% | 30% | 5% | 0% |
| **River Tweed (England) - Till sub-catchment only** | PO4 | 2.875 | 1.800 | 0.000 | 27.054 | 0.000 | 0.427 | | 0.635 | | 14% | 83% | 1% | 2% | 0% |
| **River Wensum** | PO4 | 6.668 | 0.157 | 1.362 | 30.085 | 0.031 | 5.561 | | 0.588 | | 18% | 68% | 13% | 1% | 0% |
| **Whole Wye/ Lugg (DWPP catchment)** | PO4 | 128.300 | 2.797 | 0.909 | 471.300 | 0.144 | 14.040 | | 10.890 | | 21% | 75% | 2% | 2% | 0% |
| **Whole Wye/ Lugg (Lugg NN catchment only)** | PO4 | 29.760 | 0.441 | 0.000 | 171.730 | 0.402 | 5.030 | | 4.485 | | 14% | 81% | 2% | 2% | 0% |
| **Wye Valley (Peaks)** | PO4 | 4.189 | 0.202 | 0.000 | 5.946 | 0.000 | 2.033 | | 0.114 | | 35% | 48% | 16% | 1% | 0% |
| **River Clun** | Nitrate | 24.950 | 0.021 | 0.000 | 596.657 | 0.000 | 1.497 | | 2.391 | | 2% | 98% | 0% | 0% | 0% |

**Table 80: Estuarine, wetlands and lakes site input loads (kg/d) and input load source apportionment (recent scenario, PR24 calibration models).**

| Estuaries, Wetlands and Lakes | Determinand | STW (kg/d) | Intermittents (kg/d) | Industrial (kg/d) | Rural Land Use (kg/d) | Highways (kg/d) | Urban (kg/d) | Atmospheric Deposition (kg/d) | Septic Tanks (kg/d) | Point (%) | Rural Land Use (%) | Urban (%) | Septic Tanks (%) | Other (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ant Broads & Marshes SSSI** | PO4 | 1.860 | 0.051 | 0.000 | 0.250 | 0.000 | 0.678 | 0.000 | 0.126 | 64% | 8% | 23% | 4% | 0% |
| **Yare Broads & Marshes SSSI** | PO4 | 66.530 | 0.902 | 1.398 | 61.250 | 0.145 | 19.200 | 0.000 | 1.752 | 46% | 41% | 13% | 1% | 0% |
| **Bure Broads & Marshes SSSI** | PO4 | 4.685 | 0.119 | 0.000 | 9.097 | 0.003 | 3.655 | 0.000 | 0.817 | 26% | 50% | 20% | 4% | 0% |
| **Broads** | PO4 | 73.456 | 1.145 | 1.398 | 71.479 | 0.148 | 23.945 | | 2.812 | 44% | 41% | 14% | 2% | 0% |
| **Esthwaite** | TP | 1.041 | 1.033 | 0.000 | 0.508 | 0.341 | 0.000 | 0.000 | 0.045 | 70% | 29% | 0% | 2% | 0% |
| **Waveney Sites (Various SSSI)** | PO4 | 25.700 | 0.313 | 0.281 | 57.530 | 0.000 | 3.357 | 0.000 | 2.039 | 29% | 64% | 4% | 2% | 0% |
| **Ouse Washes** | PO4 | 404.100 | 11.950 | 8.781 | 198.750 | 0.543 | 105.500 | 0.000 | 11.560 | 57% | 27% | 14% | 2% | 0% |
| **Poole Harbour** | PO4 | 119.579 | 2.294 | 111.344 | 72.948 | 0.055 | 4.386 | | 1.501 | 75% | 23% | 1% | 0% | 0% |
| **Somerset Levels & Moors** | PO4 | 254.820 | 4.281 | 0.493 | 431.087 | 0.135 | 84.755 | 0.000 | 16.146 | 33% | 54% | 11% | 2% | 0% |
| **Stodmarsh (At WQ E0001255) plus direct discharge from Westbere STW** | PO4 | 58.440 | 1.220 | 0.000 | 25.680 | 0.100 | 18.780 | | 3.180 | 56% | 24% | 17% | 3% | 0% |
| **Broads** | TN | 2411.065 | 4.562 | 8.088 | 8406.959 | 110.008 | 464.886 | 98.004 | 9.237 | 21% | 73% | 4% | 0% | 2% |
| **Esthwaite** | TN | 16.521 | 2.625 | 0.000 | 11.055 | 0.000 | 0.000 | 0.107 | 0.039 | 63% | 36% | 0% | 0% | 0% |
| **Lindisfarne** | TN | 99.158 | 1.416 | | 762.275 | 0.107 | 1.277 | 28.377 | 1.138 | 11% | 85% | 0% | 0% | 3% |
| **Poole Harbour** | TN | 2009.976 | 11.634 | 248.463 | 8276.420 | 0.139 | 47.979 | 333.478 | 8.750 | 21% | 76% | 0% | 0% | 3% |
| **Solent** | TN | 8065.804 | 48.093 | 1475.200 | 49270.558 | 1.994 | 1213.506 | 3648.134 | 96.576 | 15% | 77% | 2% | 0% | 8% |
| **Stodmarsh (At WQ E0001255) plus direct discharge from Westbere STW** | TN | 1736.475 | 4.295 | 0.000 | 2435.520 | 0.269 | 83.295 | 197.400 | 8.454 | 39% | 55% | 2% | 0% | 4% |
| **Teesmouth and Cleveland Coast (inc. Direct discharges)** | TN | 11604.042 | 370.255 | 605.999 | 6904.118 | 0.583 | 279.719 | 850.381 | 16.015 | 61% | 33% | 1% | 0% | 4% |

# References

Gooday, R. D., Anthony S.G., Chadwick, D.R., Newell-Price P., Harris D., Duethmann D., Fish R., Collins A.L., Winter M. (2014). Modelling the cost-effectiveness of mitigation methods for multiple pollutants at farm scale. Science of the Total Environment, 468-469, 1198-1209.

# List of abbreviations

**ADAS**

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

**AMP6/ AMP7**

Asset Management Plan 6 and 7. Water Company investment in assets, including for environmental requirements over the periods 2015-2020 and 2020-2025 respectively. AMP6 was set by Price Review 2014 (PR14), AMP7 was set by Price Review 2019 (PR19).

**DWPP**

Diffuse Water Pollution Plan

**NEAP-N**

ADAS model providing annual 1 km grid loadings of nitrate.

**PR14/ PR19/ PR24**

Price Review 2014, 2019 and 2024. Five yearly Price Reviews are led by Ofwat to set the price, investment, and services from Water Companies in relation to their customers. Investment for environmental requirements goes through this regulation process. Price reviews - Ofwat

**PSYCHIC**

ADAS model providing annual 1 km grid loadings of phosphate.

**SAGIS**

Source Apportionment Geographical Information System

**SAC**

Special Area of Conservation

**SPA**

Special Protection Area

**SSSI**

Site of Special Scientific Interest

**STW/ WWTW**

Sewage Treatment Works/ Wastewater Treatment Works

**UKWIR**

United Kingdom Water Industry Research

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