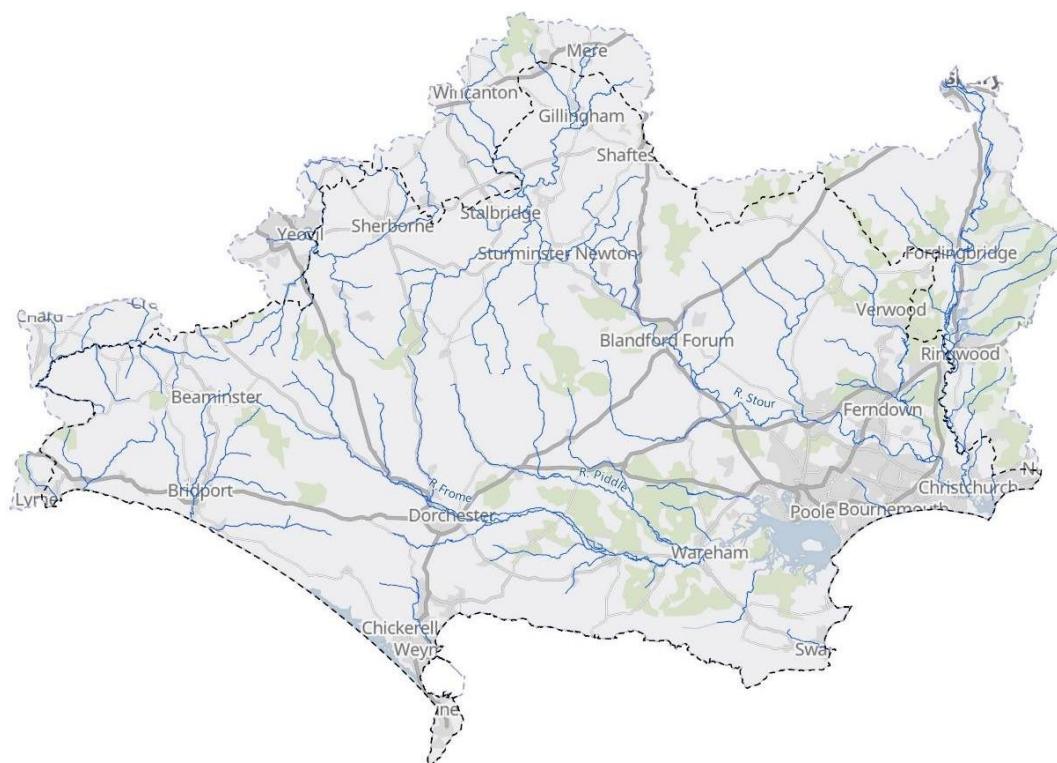




USER GUIDE: DORSET IN-RIVER HABITAT MAPPING

EXPLORING OPPORTUNITIES FOR IN-RIVER HABITAT
IMPROVEMENTS

OCTOBER 2024



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This work was funded by the Dorset Catchment Partnerships and Dorset Council's local nature recovery strategy team, and was delivered by Westcountry Rivers Trust.

This User Guide was produced by Westcountry Rivers Trust to accompany the mapping. It has been edited slightly by Dorset Council to ensure the content aligns with the presentation of the data on Dorset Explorer (the council's web mapping application).

OVERVIEW

Dorset Council are working with the Dorset Catchment Partnerships and a number of other organisations to produce a Local Nature Recovery Strategy (LNRS) for Dorset. As outlined in the Government's recent LNRS policy, responsible authorities must produce finalised strategies by March 2025. These strategies must be developed collaboratively and utilise the best available data and local knowledge. To support this work, Dorset Council and Dorset Catchment Partnerships commissioned Westcountry Rivers Trust to produce a series of maps and GIS layers focusing on in-river and riparian habitats as a resource to aid decision-making. The maps identify and prioritise potential opportunities for river improvement works in Dorset.

The work involved obtaining and collating a series of spatial datasets, which were organised and mapped with the intention to publish them on the public-facing 'Dorset Explorer' web-map. The intended audience is broad. Anyone will be able to access and explore the maps (alongside this user-guide) to support decision-making around river habitat management. Key data themes included: riparian shade; riparian tree planting; fish barriers; WFD ecological drivers; nutrient risk. As well as collating existing data, geoprocessing was carried out to analyse the combined effect of land characteristics on risks and opportunities. For example, a nutrient risk mapping exercise was carried out to identify areas that presented higher risks of nutrient pollution to waterways.

This report explains the source data and methods used to produce the GIS layers, as well as how they could be used to plan river habitat improvements. The main types of river improvement works considered during this mapping process include: barrier easement/removal; coppicing; tree planting; measures to reduce polluted surface water runoff entering watercourses (either via reducing pollution at source or disconnecting flow pathways).

The datasets are the best available for this project. Limitations or caveats are listed on the relevant data pages. Be aware that these datasets show a snapshot in time and have varying degrees of accuracy and spatial precision. Any opportunities identified are not prescriptive. However, the maps should aid discussions around river improvements across Dorset by highlighting a variety of considerations and presenting data in a user-friendly manner.

GENERAL APPROACH/WORKFLOW

The way in which these maps should be used to target or prioritise measures depends on the circumstances and needs of the individual user/s or projects. For example, whether funding is already in place or not and whether the funding has restrictions on intervention type or location. However, the maps have generally been designed to be viewed in the following order, using this document to provide supporting information and guidance:

- **Understanding current situation** – Datasets show the current characteristics of rivers across Dorset; differences and patterns across the county can be noted. It includes: river water quality; barriers to fish migration; riparian shade; priority river habitat.
- **Understanding risks** – Datasets have been scored and combined to illustrate their combined potential risk of contributing excessive nutrients to rivers. Relatively high and low risk areas can be observed across the county.
- **Understanding opportunities** – Datasets highlight where potential opportunities for river improvement works may have the greatest benefits to rivers.

PROJECT BOUNDARY

The boundary used for this mapping is based on the Dorset county boundary and the Bournemouth, Christchurch and Poole (BCP) administrative boundary. However, the boundary was extended in some areas to include river catchments that flowed into this region (see map below). This was because the mapping focused on river habitat improvements, therefore it was important to include land that contributes surface water to rivers. The Environment Agency's *Water Framework Directive (WFD) River Waterbody Catchments (Cycle 2)* was used to identify these adjoining river catchments. Note that in some areas, this extension meant that the entire river catchment was included in the project boundary; however in other areas (namely the east of Dorset), only the adjoining WFD waterbody catchment was used (i.e. the catchment surrounding a section of river). If the boundary was extended to include the entire river catchments of all rivers that flow through Dorset then the project area would have been significantly larger (i.e. would have included the whole of the Hampshire Avon river catchment). In one or two areas, the WFD catchment was trimmed to only include land flowing into the Dorset/BCP area (e.g. where one tributary flowed in and another flowed out).

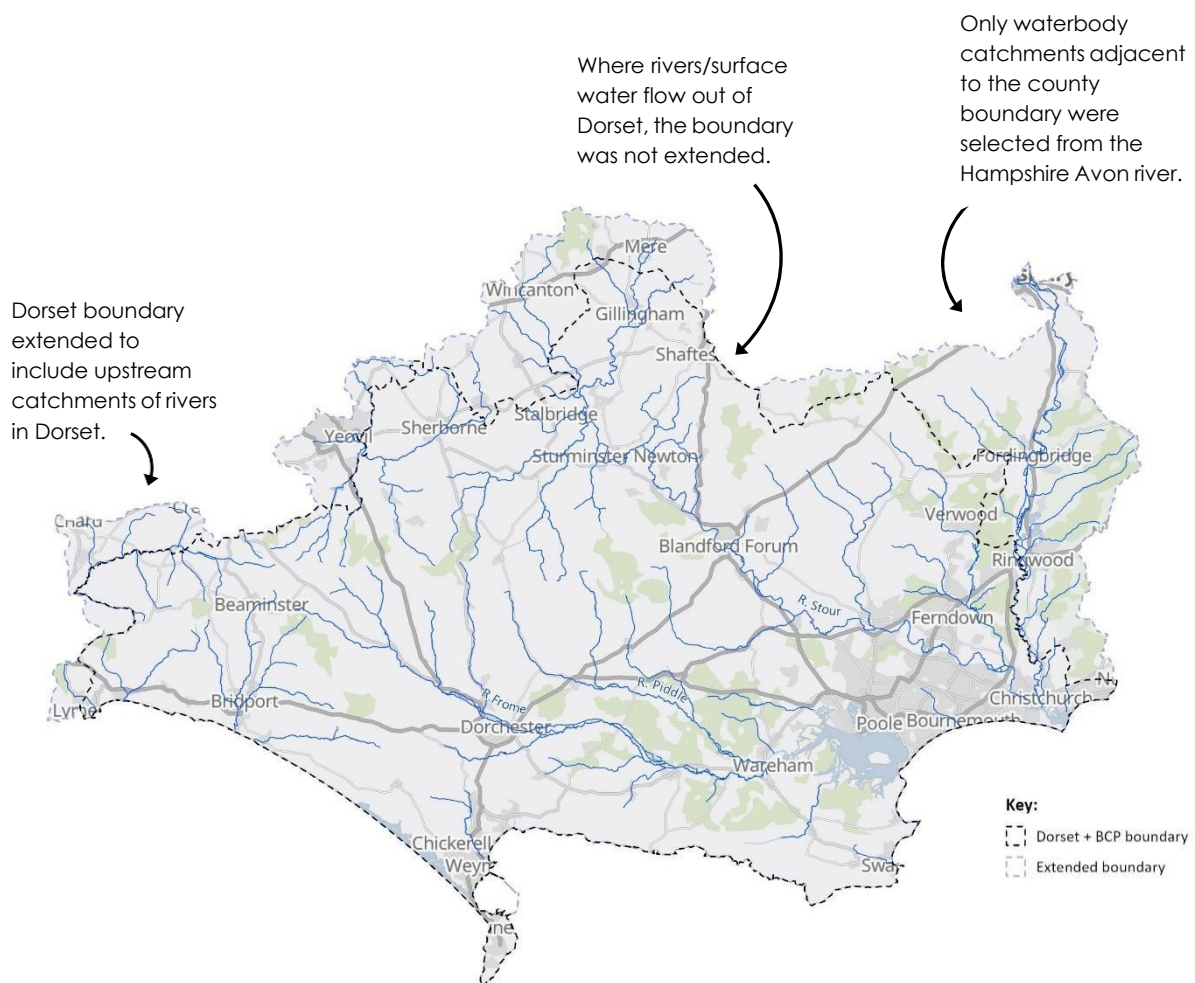


Figure 1 Map showing the project boundary (Dorset, BCP + some river catchment extensions).

UNDERSTANDING CURRENT SITUATION

RIVER WATER QUALITY AND ECOLOGICAL CONDITION

DATASET

This dataset shows the Water Framework Directive (WFD) classification (2019) for rivers, canals and surface water transfer water bodies. River water quality monitoring was carried out under the WFD by the Environment Agency (EA) each year between 2009 and 2019. This data shows the most recent nation-wide assessment of water body health; however, monitoring of selected/priority water bodies was carried out in 2022 (can be viewed on the [Catchment Data Explorer](#)).

Name	WFD River, Canal and SWT Waterbody Classifications (2019)
Publisher	Environment Agency
License	Open Government Licence
Attribution	© Environment Agency copyright and/or database right 2015. All rights reserved.
Link	Defra data services link

The WFD monitoring divides rivers in small sections called 'water bodies' and for each water body a variety of ecological and chemical elements are measured (though not all elements are measured at every site or every year). This dataset contains details of the elemental classifications as well as the overall classification, the ecological classification and the chemical classification. In the data package, it has been used to create numerous layers, to illustrate some of the key elements of river habitat quality, including: fish; invertebrates; macrophytes and phytobenthos (combined); ammonia; phosphate; pH; Dissolved Oxygen.

Ecological Status classification is derived from individual quality element assessments for biology, physico-chemical parameters and specific pollutants, as well as hydromorphological assessments and a check of Invasive Non-Native Species (INNS). Ecological Status classifications are reported for natural surface water bodies. The Ecological Status class of a water body is determined by the class of the worst (lowest) scoring element (the one-out-all-out approach), considering any exceptions as shown in the figure below.

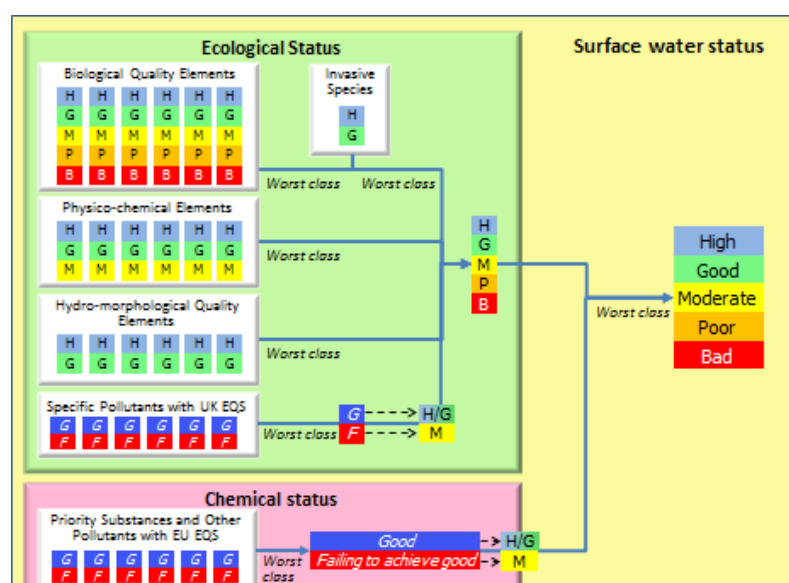


Figure 2 Diagram showing WFD surface water classification system

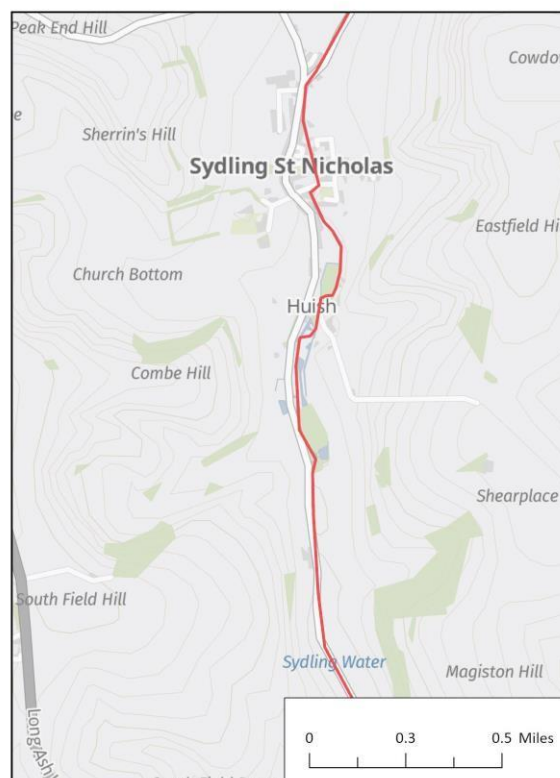
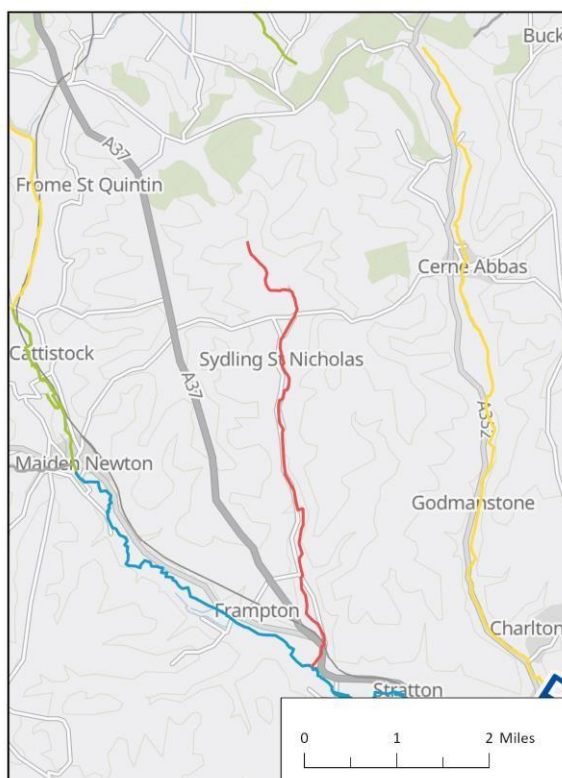
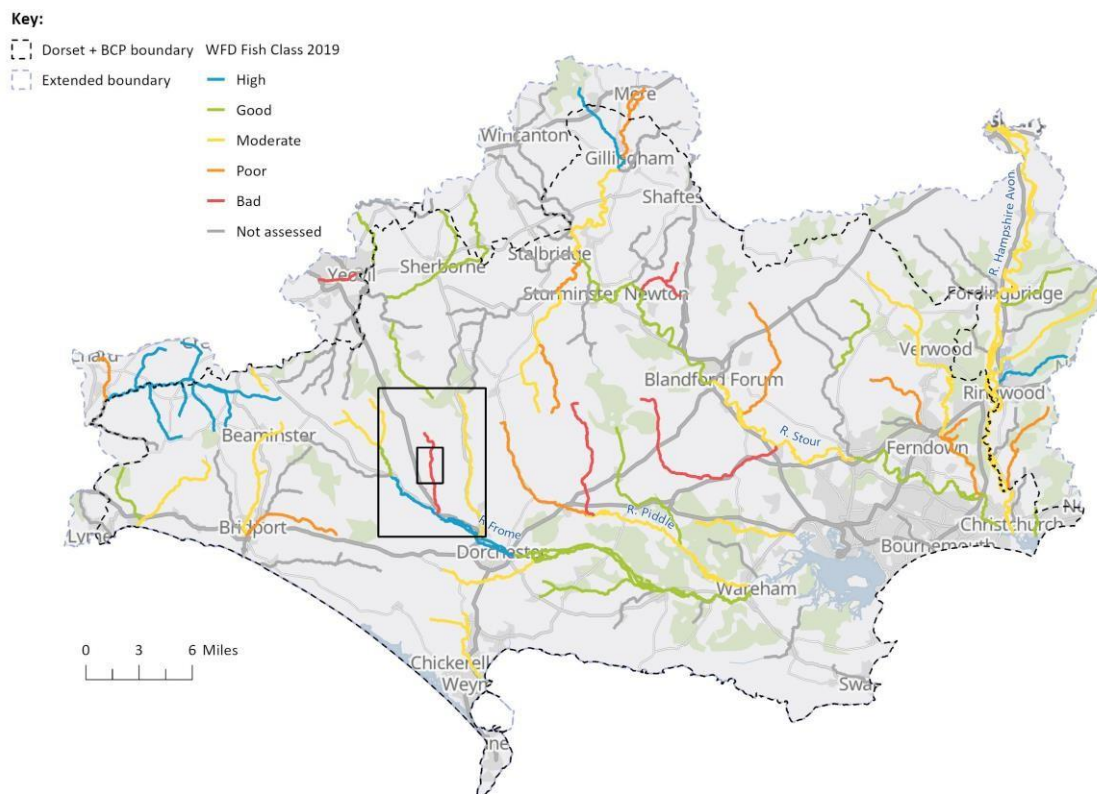
Ecological Status is reported as High, Good, Moderate, Poor or Bad. Hydromorphological elements and a check of Invasive Non-Native Species are used to determine High status only. If no Ecological Status assessment can be made (because for example there is no monitoring data to base an assessment, or no Expert Judgement classification) then the water body will be reported as 'Unassessed'.

Artificial and Heavily Modified Water Bodies (A/HMWBs) are classified using Ecological Potential. Ecological Potential is derived from an assessment of mitigation measures (the Prague Approach) and incorporating biological, physico-chemical and Specific Pollutant elements as per Ecological Status. Ecological Potential is reported as Good, Moderate, Poor or Bad Potential.

HOW TO USE IT

The WFD classification dataset gives a good overview of water quality and ecological condition of rivers across the area. If the interest is in the overall classification then this layer can be viewed and to gain better understanding of which element(s) may be causing a Moderate, Poor or Bad classification the various element layers can be viewed. Alongside the WFD classifications, the EA WFD Challenges data (Reasons for Not Achieving Good Status) give further detail as to the cause of the problem. While viewing this data (and the additional water quality datasets described on the following pages), the user should be simultaneously considering and noting the types of interventions that may help to alleviate the issues shown in different parts of the county. These notes will be of interest later, when inspecting the layers showing opportunities for improvement.

All WFD classification data is based on the suitable data that is available and this can vary depending on the monitoring regime for a particular waterbody. For example, not every element is measured in every waterbody in every year and frequency of samples may vary. However, the methodology is robust and it provides the best way to easily view and compare the ecological condition of a waterbody to help with the prioritisation of delivering actions for improvement.



Datasets used: OSGB, PB, WFD2019. See data references page for full details.

Figure 3 Example map showing the WFD classifications for fish (2019)

UNDERSTANDING CURRENT SITUATION

RIVER WATER QUALITY – NUTRIENT LEVELS

DATASET

Nutrient data from the Environment Agency water quality data archive (WIMS) was extracted for a 5-year period (2019 to 2023) for the WFD river water bodies within the project boundary. The relevant determinands that were analysed are *Phosphorus, Total as P (mg/l)* (0348) and *Nitrate as N (mg/l)* (0117). The data has been averaged per WFD river water body to give a 5-year mean value. In addition, the data has been further analysed to give seasonal 5-year means per WFD river water body (winter, spring, summer, autumn).

Name	EA Water Quality Data Archive (WIMS)
Publisher	Environment Agency
License	Open Government Licence
Attribution	Uses Environment Agency water quality data from the Water quality data archive (Beta)
Link	EA Water quality data archive

Government guidance recommends that rivers should not exceed annual mean concentrations of 0.1mg Phosphate (PO₄ -P I -1) and 6.8mg Nitrate as N (NO₃ -N I -1)*. *Note that the dataset included in the data package is for Phosphorus, Total as P so the 0.1mg/l target is not appropriate for comparison in this case. Also note that the Nitrate target in the document is 30mg/l, which can be converted to Nitrate as N by using the conversion factor 0.2259 (30mg/l x 0.2259 = 6.8mg/l).*

Chalk streams are more sensitive to nutrient pollution and therefore have much lower accepted nutrient thresholds. A study** published the expected values (annual means) of key water quality parameters for chalk streams in near-pristine condition. The values for the middle reaches are 0.04mg Total Phosphorus (P I-1) and 0.5mg Nitrate (NO₃-N I-1). *Note that the dataset included in the data package is for Phosphorus, Total as P so the 0.04mg/l target is appropriate for comparison in this case.* Layers have been added to the data package highlighting which water bodies exceed the chalk stream thresholds for Phosphorus and Nitrate, when examining the 5-year mean values for WFD monitoring.

The chalk rivers themselves are mapped using the Natural England Chalk Rivers dataset, which is included in the data package. It is based on Environment Agency Detailed River Network (DRN) version 3. All fields from the DRN have been retained. This subset of chalk rivers uses the old 1:50,000 Biodiversity Action Plan (BAP) chalk river data, BGS geology, WWF report "The State of England's Chalk Streams" and stakeholder knowledge to produce an updated chalk river network for England.

* Observatory monitoring framework-indicator data sheet, 2012. Defra.

Name	Chalk Rivers
Publisher	Natural England
License	Open Government Licence
Attribution	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2022.
Link	Natural England - Chalk Rivers

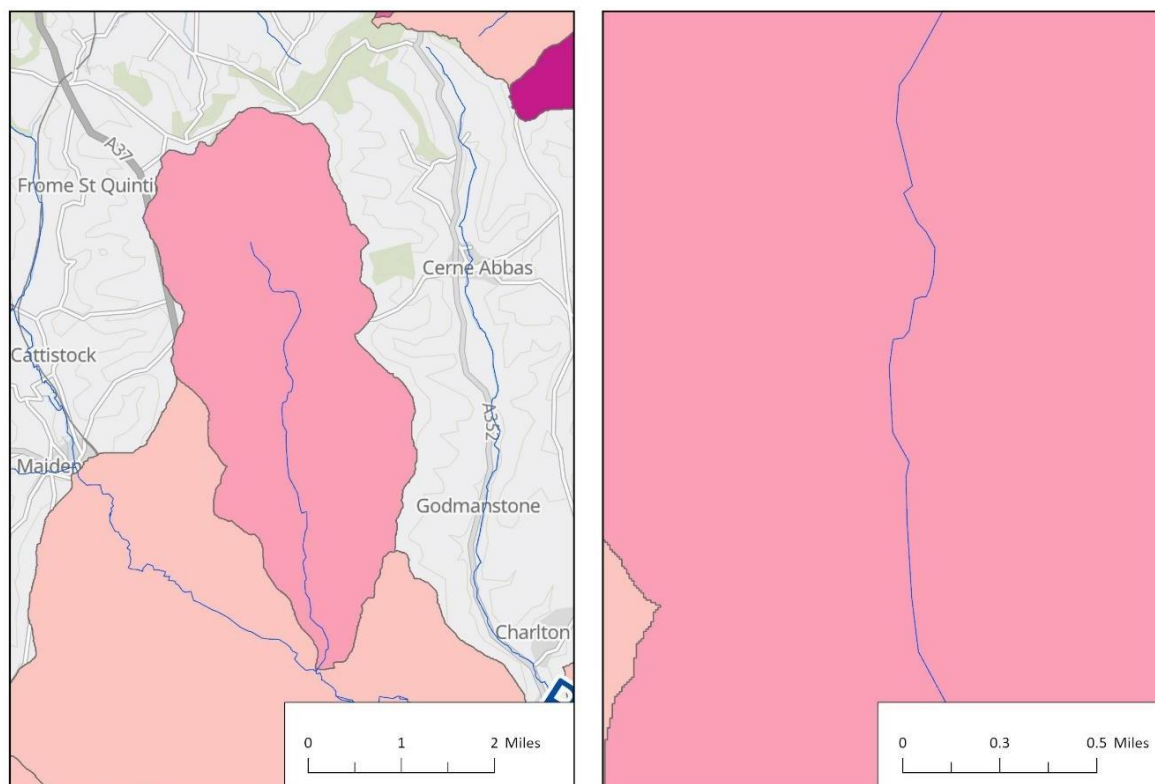
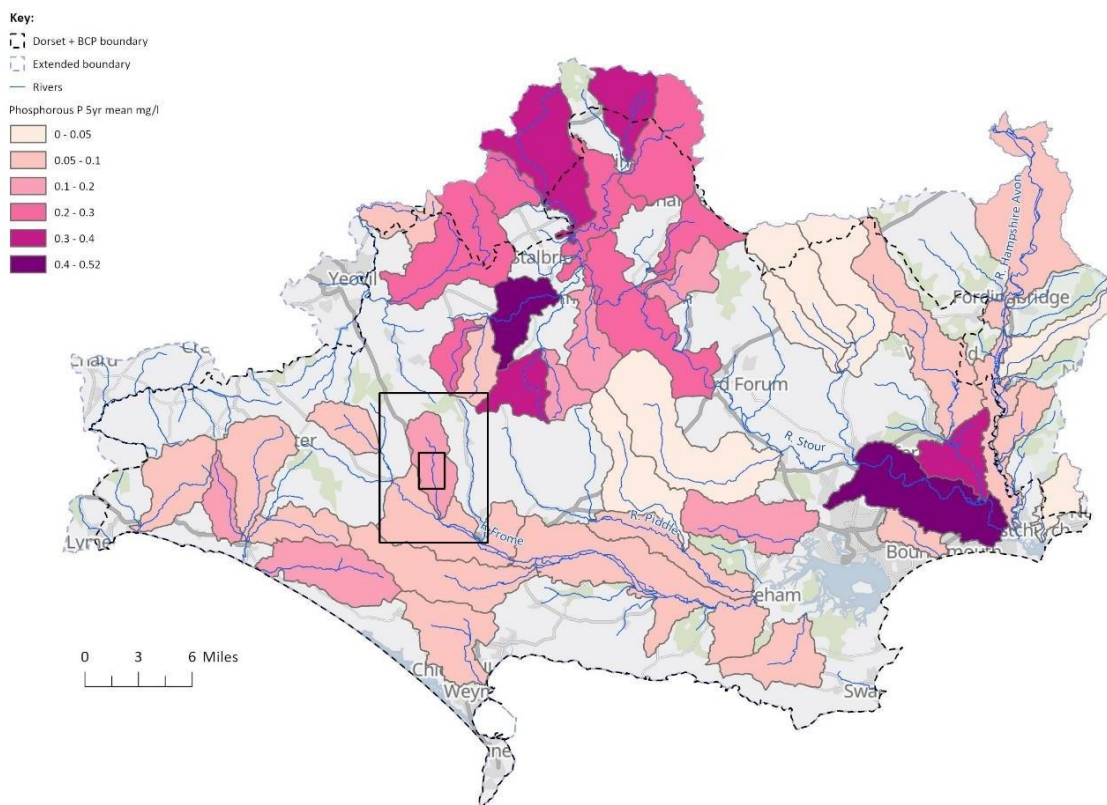
**Chalk rivers: nature conservation and management, March 1999. C P Mainstone (Water Research Centre) Produced on behalf of English Nature and the Environment Agency (English Nature contract number FIN/8.16/97-8).

HOW TO USE IT

The Phosphorus and Nitrate data layers have been symbolised to clearly show low to high concentrations using a graduated colour scheme per WFD river water body. Separate layers are available for the 5-year means from the seasonal average data. For the 5-year means, separate layers have been created to show those WFD river water bodies that exceed the relevant pollution threshold for chalk streams (as per earlier description) with a simple hatched symbol. This threshold layer can be turned on/off to understand which water bodies exceed the relevant threshold.

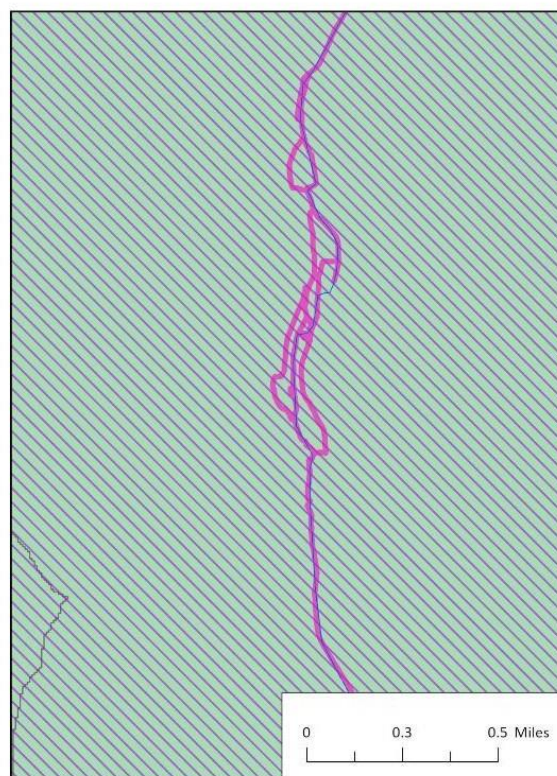
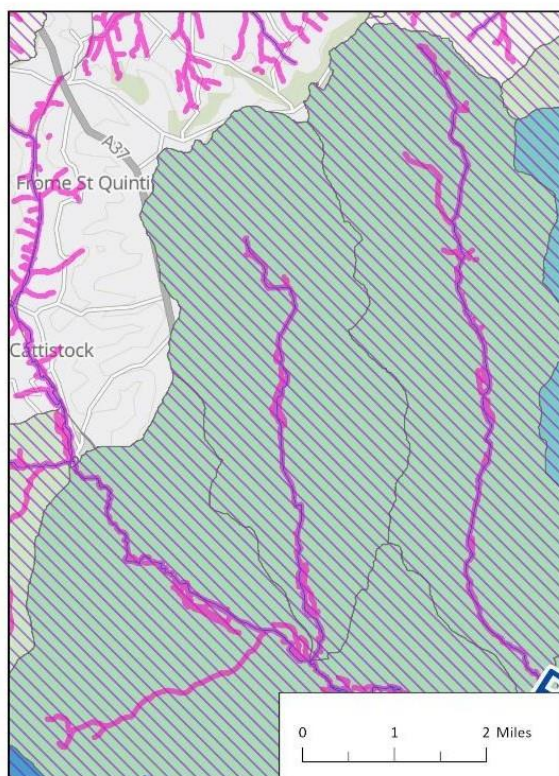
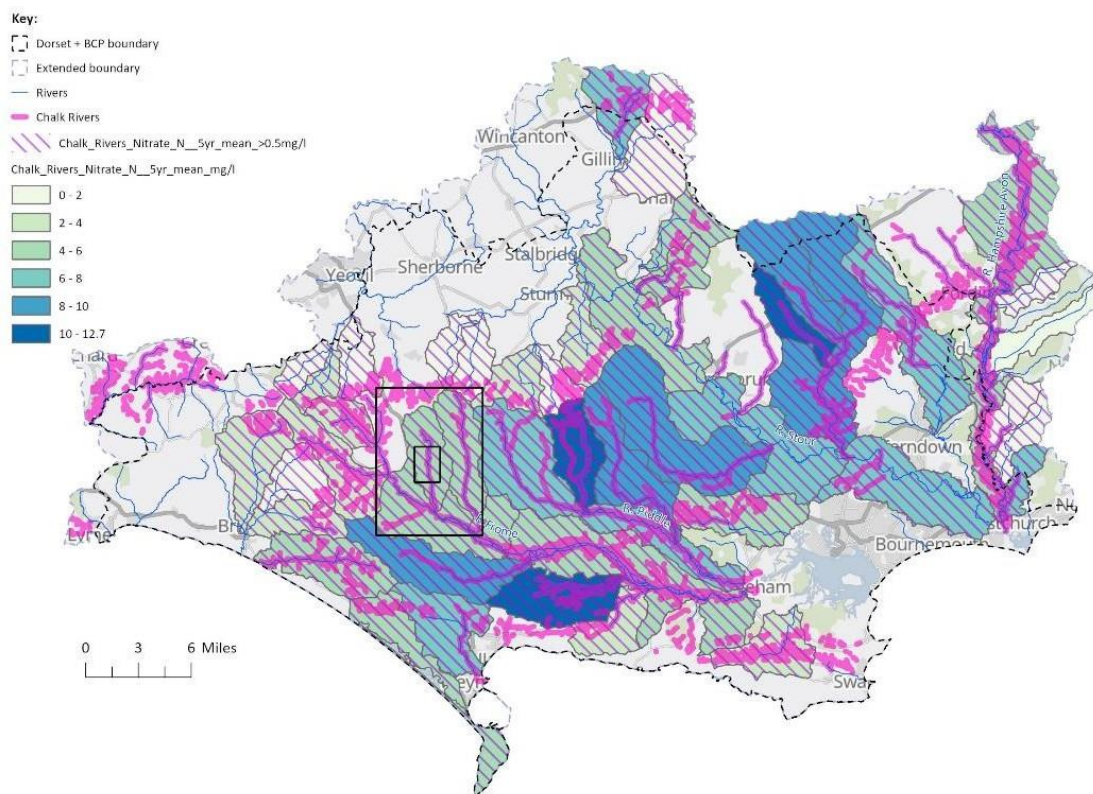
The maps can be used to easily see WFD river water bodies where there are higher levels of nutrients which may be leading to issues within the river watercourse, such as eutrophication. Measures to reduce nutrient input to rivers could be targeted in these water body catchments and any contributing upstream waterbodies.

The nutrient WIMS data was only available for certain water bodies within the project boundary. The maps show blank areas (i.e. no colour or hatching relating to P or N concentrations) where no data was available. The number of samples from each water body for P and N over the 5-year period will vary depending on the EA sampling regimes and drivers – the number of samples and location of sample points is not available as a part of this project.



Datasets used: OSGB, PB, WFD-WC, WFD-WB, WIMS. See data references page for full details.

Figure 4 Example map showing Phosphorus 5-year mean per WFD water body catchment



Datasets used: OSGB, PB, WFD-WC, WFD-WB, WIMS, CHLK. See data references page for full details.

Figure 5 Map showing Nitrate 5-year mean per WFD water body catchment, with chalk rivers (pink) and those water bodies that exceed the chalk stream threshold highlighted (hatch).

UNDERSTANDING CURRENT SITUATION

RIVER WATER QUALITY – WFD CHALLENGES

DATASET

This Environment Agency WFD Challenges data give further detail as to the cause of a water quality issue. It describes reasons why each water body may not be achieving good WFD status (RNAGS) and reasons for deterioration (RFD), noting the source, activity and sector involved in causing an element to be at less than good status. It is a good source of information on the causes of WFD failures.

Name	WFD Challenges data for South West River Basin District (Cycle 3)
Publisher	Environment Agency
License	Open Government Licence
Attribution	Contains public sector information licensed under the Open Government Licence v3.0. © Environment Agency copyright and/or database right [2019]. All rights reserved.
Link	Defra data services link

All the records in the database have a 'certainty' attribute that describes the accuracy of the reason given (Confirmed, Probable, Suspected or Not Applicable). Much of the information in this dataset is obtained through either field or data investigations to determine the cause of failure, which is often combined with information from catchment partnerships and other inputs.

This dataset is difficult to present on a map because there are often multiple failures with multiple reasons recorded for individual water bodies. In the data package this dataset is included in three forms:

- 1) A simple dataset that shows (overlapping) points within each water body, when clicked upon you can click through the [multiple listed reasons](#) for not achieving good status for that water body;
- 2) A set of layers showing the most relevant [Significant Water Management Issues](#) (SWMI) for example Point Source or Diffuse Source;
- 3) A [summarised dataset](#) that shows the total number of reasons for not achieving good status for each river water body (with a graduated colour scheme to easily see those water bodies with a greater number of RNAGS).

HOW TO USE IT

The Challenges data can be used to comprehend the current understanding of what is causing a failure. This can be helpful to understand what actions are likely to be of benefit to a particular river. For example, if the only cause of a Phosphate failure in a water body is confirmed as a point source discharge from a sewage treatment works, then working with farmers to reduce Phosphate input may not be that beneficial. Or if a cause of fish failure is confirmed as being due to a redundant barrier in the river, then a project could be delivered to remove the barrier.

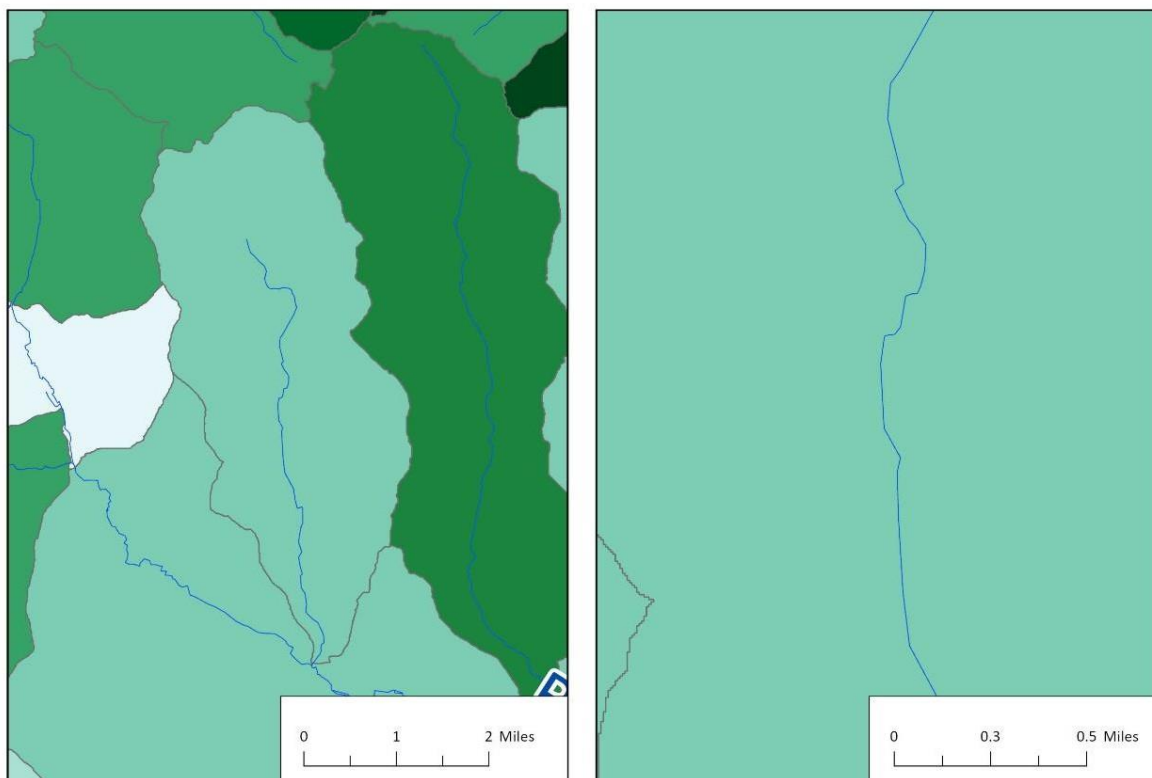
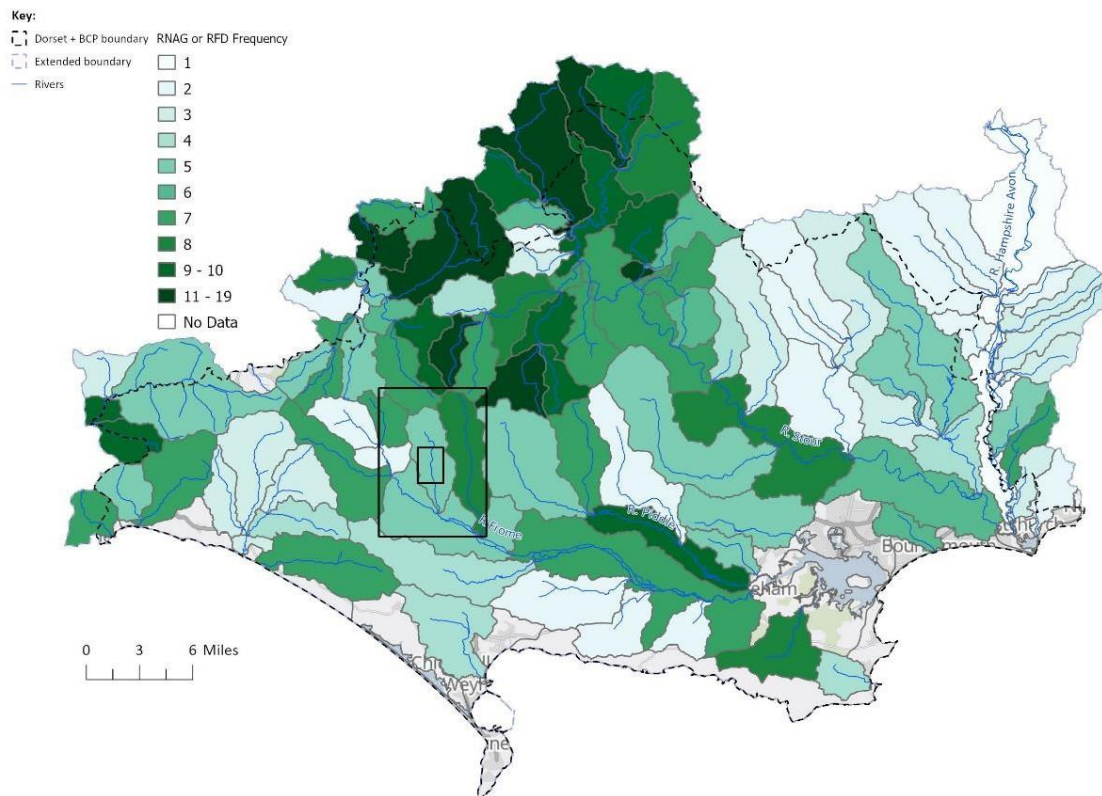
The frequency data for RNAGS could potentially be used to target effort, for example, those water bodies with multiple reasons would likely be harder to fix than one with a single reason.

The SWMI layers are useful to easily locate those water bodies which are impacted by a particular problem, for example, Diffuse Source. Further information on the sector can be found in the attributes. This could be useful in determining which water bodies to focus effort for working with the agricultural sector on diffuse pollution.

When clicking on the area highlighted for a water body you will see multiple 'search results', they all have the same water body name but different numbers. Click on each one in turn to find further information, you can click 'back to list of results' to return to the search results list and open the next one.

It is a complex dataset and for each failure the attributes should be looked at to fully understand the likely cause(s). Sometimes suspect data or a monitoring point change will have been discovered to have been causing the 'failure'. This information can be found by interrogating the attribute table.

Note, there is a specific waterbody GB108043015840 (Hampshire Avon (Lower)), which doesn't have any RNAGS data associated with it. The reason for this lacking information is unknown, but the user should be aware that this water body was at Moderate status but no data on the reasons is available.



Datasets used: OSGB, PB, WFD-WC, WFD-WB, RNAGS. See data references page for full details.

Figure 6 Map showing number of RNAGS per WFD waterbody

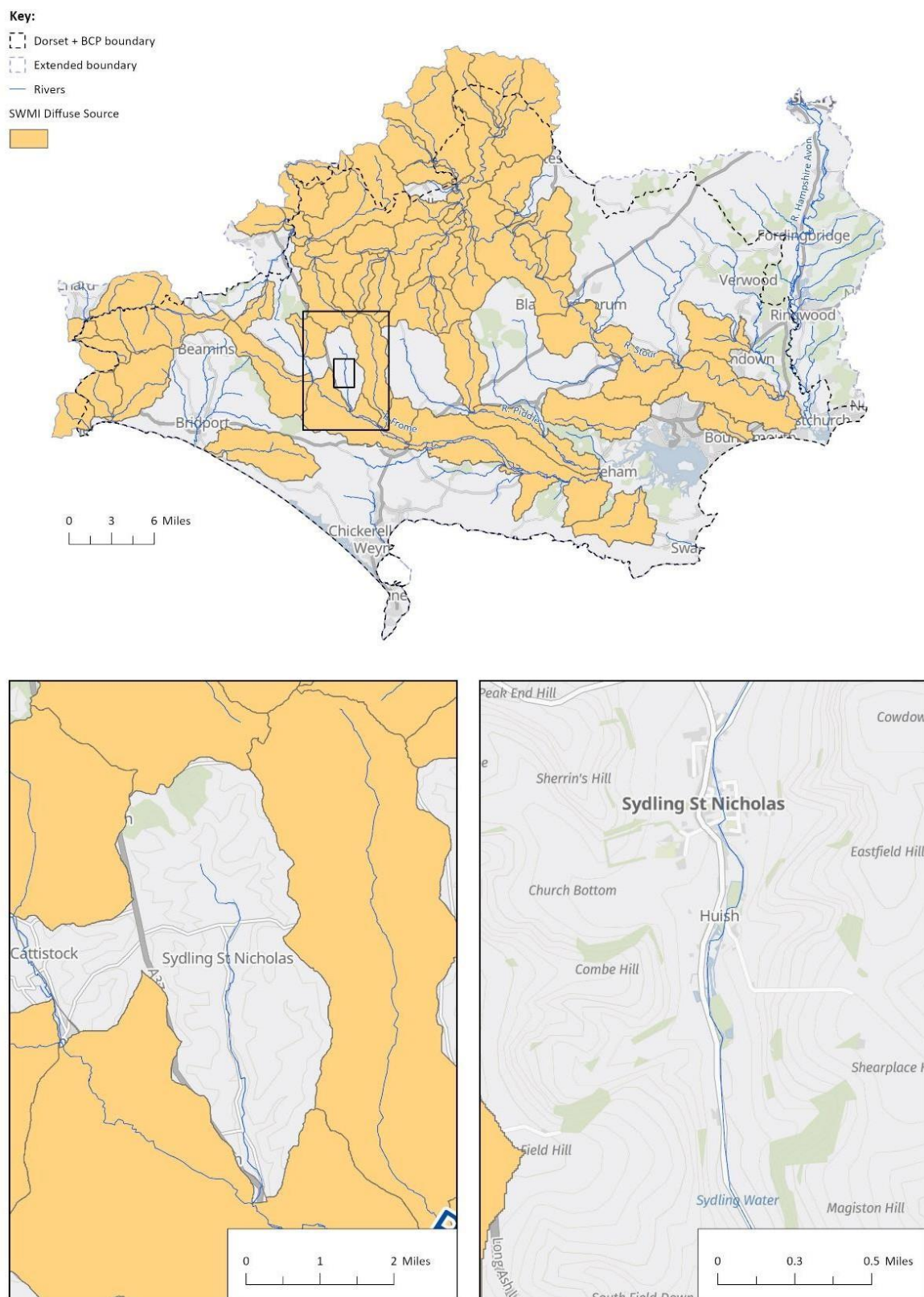


Figure 7 Map showing those waterbodies where Diffuse Source is listed as a Significant Water Management Issue

UNDERSTANDING CURRENT SITUATION

BARRIERS TO MIGRATION – RIVER OBSTACLES

DATASET

This dataset shows the location of weirs, dams and other barriers from the River Obstacles crowd-sourcing application. It is updated every 24 hours. The data used in this package was downloaded on 24/06/2024.

The *River Obstacles* initiative is a joint endeavour by the Environment Agency, Zoological Society of London, The Rivers Trust, Thames Estuary Partnership, The River Restoration Centre and Natural Apptitude.

Name	River Obstacles Database
Publisher	Environment Agency <i>et al</i>
License	Open Government Licence
Attribution	© Environment Agency copyright and/or database right 2021
Link	CaBA Data Hub

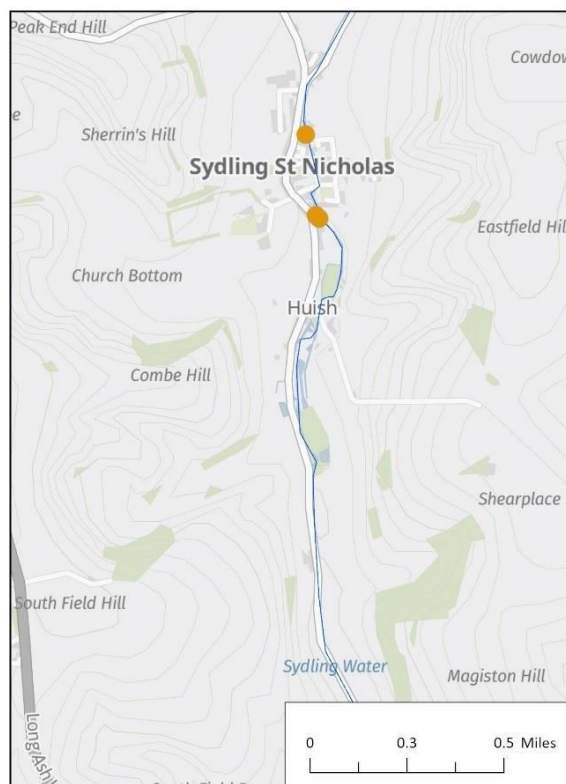
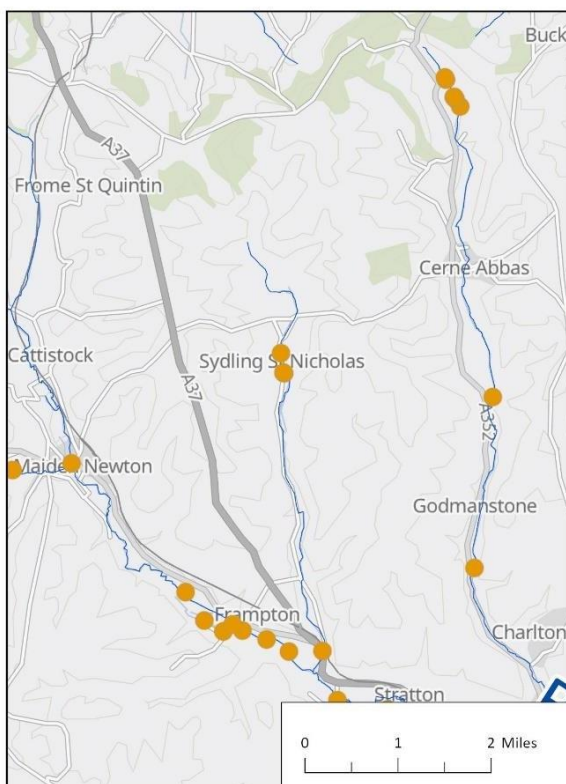
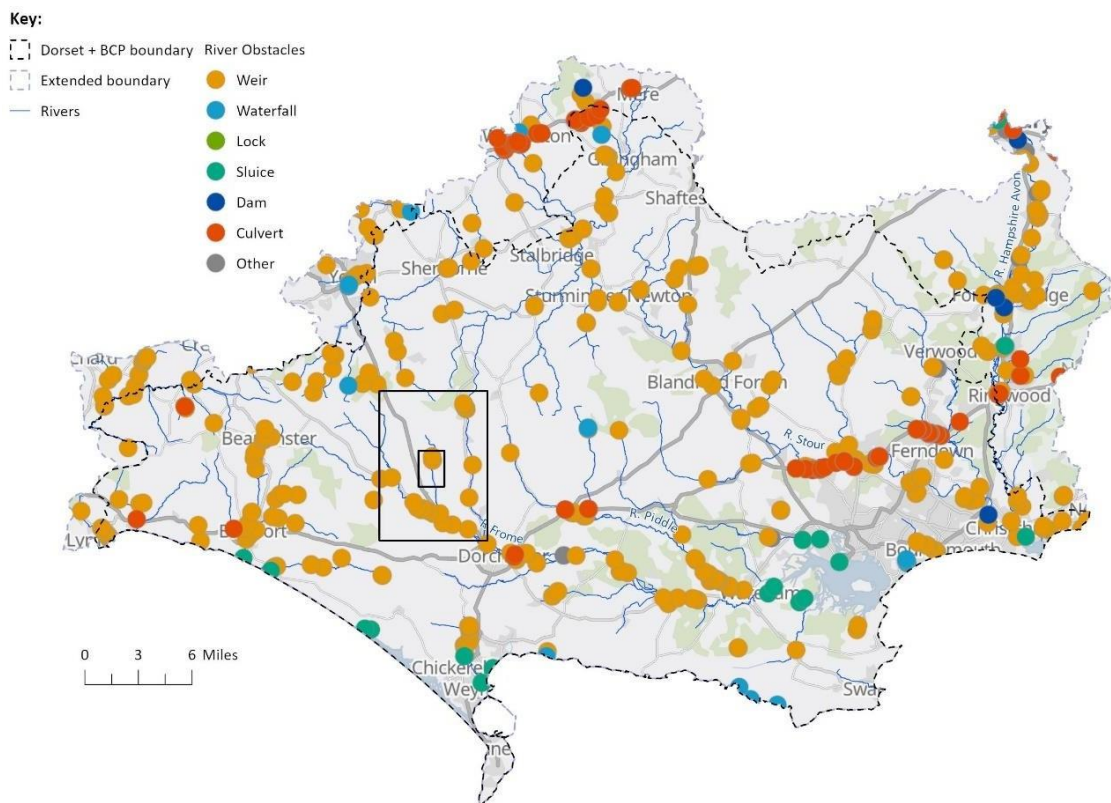
There are thousands of man-made and natural obstacles in the rivers of the UK. Many of the man-made obstacles perform important functions - for example dams, sluices, weirs and road culverts - but they can also cause problems such as restricting the movement of fish, damaging riverbanks and beds, and posing a hazard to people using boats, canoes and kayaks.

HOW TO USE IT

The mapped River Obstacles can be used to help identify redundant man-made obstacles that could potentially be removed from rivers and prioritise improvements to other obstacles that will yield the biggest environmental improvements. Information on natural obstacles can also be used to determine the natural limits to movement for different species of fish.

Numbers and locations of obstacles in a river stretch can also help to determine the best places to focus effort. Removing a single weir in a stretch that contains multiple barriers may not prove beneficial to fish passage whereas removing a barrier that opens up several tributaries and headwaters would provide a much greater benefit.

The legend shows each obstacle type in a different colour. You can click on a coloured point on the map to find more information about the obstacle.



Datasets used: OSGB, PB, WFD-WC, OBS. See data references page for full details.

Figure 8 Map showing types of River Obstacles within the project boundary

UNDERSTANDING CURRENT SITUATION

KEEPING RIVERS COOL

DATASET

This data set was created using the Environment Agency's Relative Riparian Shade map to identify areas where tree planting would benefit river habitats. That is, it supports appropriately located and designed woodland creation where it will provide dappled shade to improve aquatic ecology by reducing summer water temperatures and benefiting wildlife dispersal (for example, otter) along the corridors of habitat this creates.

Name	EWCO - Keeping Rivers Cool Riparian Buffers
Publisher	Forestry Commission
License	Open Government Licence
Attribution	Contains Forestry Commission information licensed under the Open Government Licence v3.0. Contains OS data © Crown copyright [and database right] [2024].
Link	data.gov.uk

The data represents a 50m buffer around patches of surface waterbodies (rivers) with little or no existing riparian shade.

HOW TO USE IT

Sections of river with the least amount of shading from riparian vegetation are considered to be priority areas for tree planting and therefore candidates for incentives such as additional grant aid to encourage woodland creation to provide greater shading in the future.

UNDERSTANDING CURRENT SITUATION

PRIORITY RIVER HABITAT

DATASET

The *Priority River Habitat – Rivers* dataset includes rivers and streams that are considered to have a high degree of naturalness. The classification used to map these priority rivers is based on recent work to review the river SSSI series. It evaluates four main components of habitat integrity: hydrological, physical, physico-chemical (water quality) and biological.

Streams and rivers operating under natural processes, free from

anthropogenic impact and with a characteristic and dynamic mosaic of small-scale habitats that supports characteristic species assemblages (including priority species), are the best and most sustainable expression of river ecosystems. Key elements are: a natural flow regime; natural nutrient and sediment delivery regimes; minimal physical modifications to the channel, banks and riparian zone; natural longitudinal and lateral hydrological and biological connectivity; an absence of non-native species; low intensity fishery activities. These conditions provide the best defence against climate change, maximising the ability of riverine ecosystems to adapt to changing conditions. They also provide the most valuable and effective transitional links with other priority habitats, including lakes, mires and coastal habitats. In English rivers and streams, high levels of naturalness are rare.

The *Priority River Habitat – Headwaters* dataset is the second component to the Priority River Habitat Map. Headwaters are defined as streams with a catchment area of <10km² to coincide with WFD typology boundaries. This dataset uses land cover data as a surrogate for direct information on river habitat condition (information which is generally lacking on headwaters). The headwater resource can be a significant proportion of the river habitat network, accounting for the large majority of total river length. The headwater areas selected as most natural by land cover comprise a relatively large proportion of the upland headwater resource but a very small proportion of the lowland resource.

Names	Priority River Habitat – Rivers Priority River Habitat – Headwater Areas
Publisher	Natural England
License	Open Government Licence
Attribution	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [2024].
Links	data.gov.uk – Priority River Habitat - Rivers data.gov.uk – Priority River Habitat - Headwater Areas

HOW TO USE IT

Sections of river with high naturalness should be considered when planning interventions. Interventions can be assessed to see if they could provide any additional benefit to these areas but also assessed to ensure there is no inadvertent damage to these special areas. The headwater analysis is the least certain component of the naturalness analysis. For example, highly natural headwater streams running through small catchment areas, often wooded, are not detected by the analysis. Also, land cover is a crude measure of naturalness; there are various types of impact on river habitat that are not well correlated with it (e.g. abstraction pressure, point source pollution). These issues can only be addressed through local interpretation of the final priority habitat map.

UNDERSTANDING RISKS

POTENTIAL NUTRIENT RUN-OFF RISK

DATASET

This dataset was created specifically for this project by scoring and combining key datasets relating to the risk of nutrient input to rivers. Each of the datasets were scored as high, medium or low risk (3, 2, 1) and then added together to create a combined nutrient risk map.

The input layers include:

- **Hydrological connectivity** – Using Durham University's SCIMAP model, 'surface flow index' is mapped across the land and the most hydrologically-connected areas (i.e. areas where surface water flows during heavy rainfall) are given the highest score as they are potential nutrient pathways. [Dataset: OS Terrain50].
- **Slope** – Steeper gradients are given higher scores due to their increased risk of nutrient runoff. [Dataset: OS Terrain50].
- **Soil type** – Certain soils present a higher risk of nutrient loss to rivers (e.g. sandy soils have a greater risk of erosion and clay soils with impeded drainage have a greater risk of runoff). The higher-risk soils are given a higher score for the risk map. [Datasets: Cranfield University NATMAP Vector; European Commission – DG JRC: EU Soils Database v2 Raster Library 1kmx1km (for areas outside of Dorset)].
- **Crop type** – Certain crops pose a higher risk of nutrient loss via fertiliser use or erosion*. These crops were given a higher score for the risk map. [Dataset: RPA CROME 2022].
- **Livestock density** – Higher livestock densities present a potential higher risk of nutrient loss to rivers. As total livestock numbers could be misleading (e.g. chickens do not have an equivalent impact as cattle, per head), instead the number of livestock types present at above-average densities were mapped to give an indication of high densities across multiple livestock types. [Dataset: Edina AgCensus 2016].

Name	Dorset Nutrient Run-off Risk Map
Publisher	Westcountry Rivers Trust
License	Conditional
Attribution	Created by Westcountry Rivers Trust. Contains: OS data © Crown Copyright and database right 2024; data created using Durham University SCIMAP model; Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2024]. European Commission – DG JRC: EU Soils Database v2 Raster Library 1kmx1km. © Rural Payments Agency copyright and/or database right 2023. All rights reserved; © University of Edinburgh Derived from Defra/Welsh Government/Scottish Government agricultural census surveys.
Link	NA

*Higher risk crops were identified from Defra reports** and include: potatoes, winter wheat, winter oilseed rape, winter barley, rye/triticale/durum wheat, oats, spring wheat, spring barley, vegetables (brassica), maize, beets.

**Defra (2019) Runoff and soil erosion risk assessment. Defra (2023) The British survey of fertiliser practice

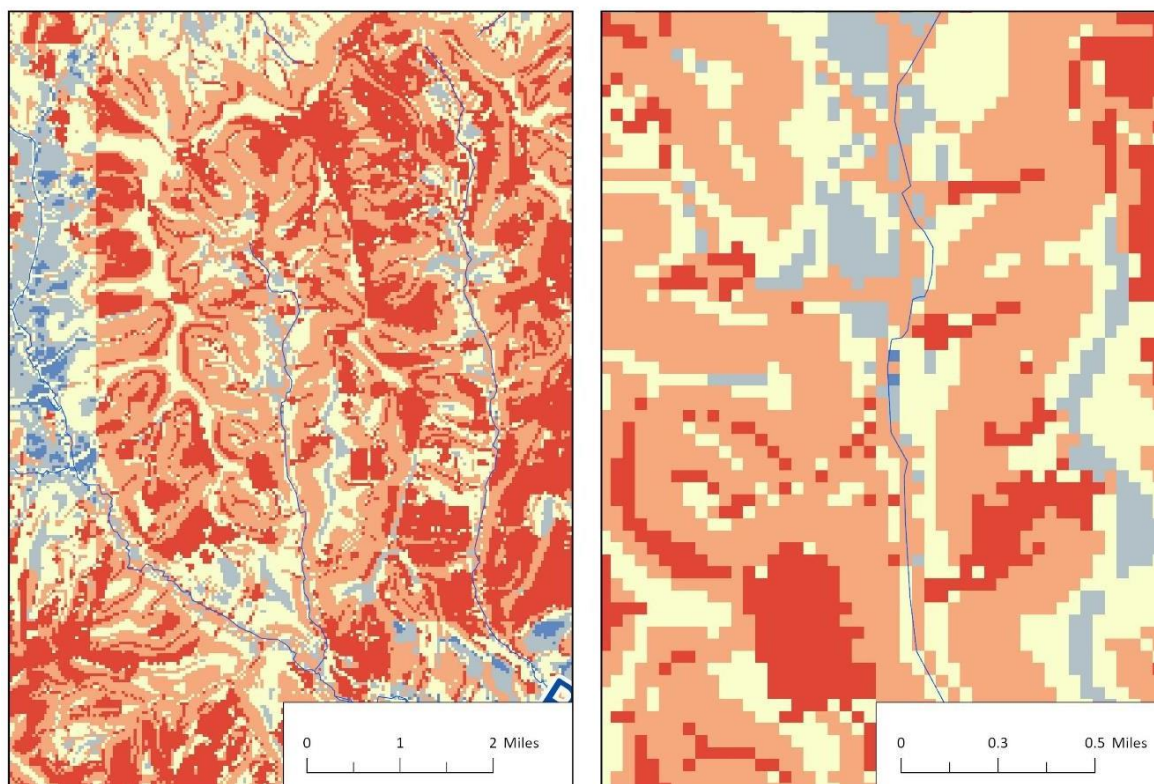
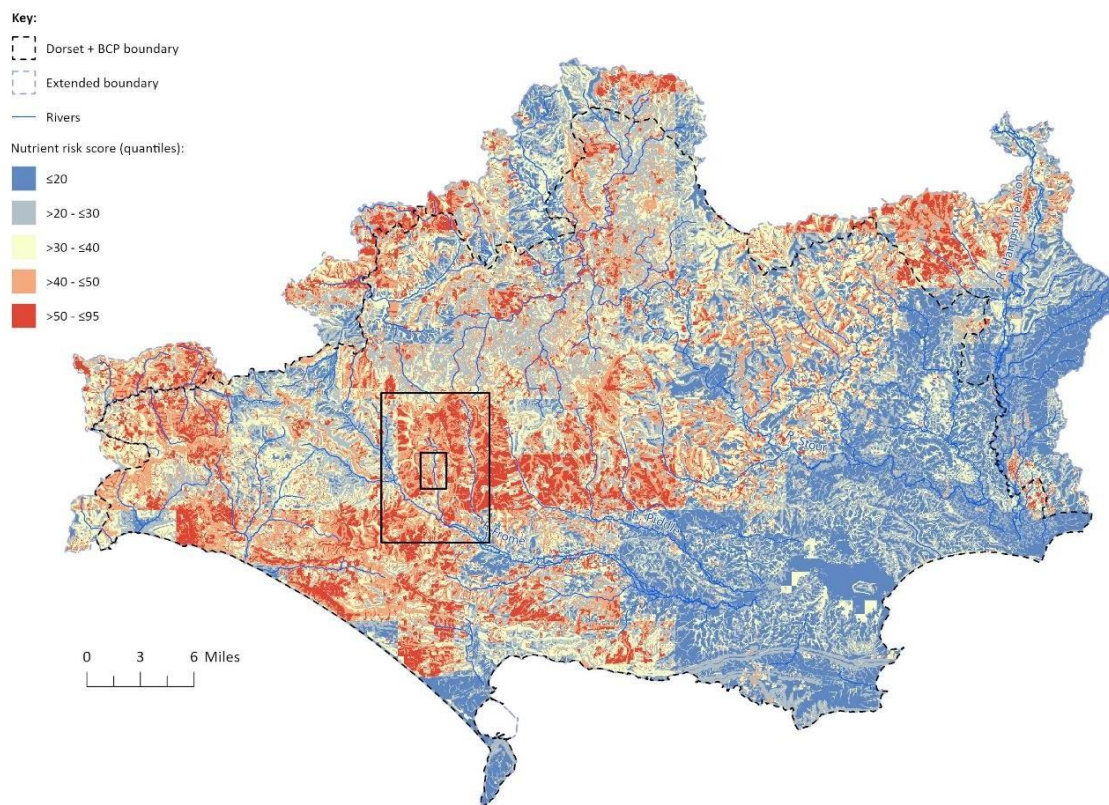
Note, an alternative risk map was produced which gave areas that have a **high density of dairy cattle** an extra weighting of 1. It does not impact the final risk map significantly but was created to acknowledge the potentially greater risk of nutrient loss from dairy farms. Clearly not all dairy farms are the same, but often dairy farms have a higher risk of nutrient loss due to higher stocking rates, leading to more crops/grass being grown with more fertiliser applied. Also, dairy cattle are given more food on average per head and produce more slurry. They are often housed in cubicles without straw, therefore produce more slurry that then needs to be applied on land and is at-risk of run-off as its more mobile. Furthermore, dairy farms may

need to use more tracks (nutrient runoff pathways) so that cattle can be moved from field to parlour twice a day, for example.

Another alternative 'combined risks – excluding livestock' map layer was created because the livestock density data was at 10km² resolution this was creating discrete breaks/harsh square lines which cut across water bodies.

HOW TO USE IT

The nutrient risk map gives an overview of locations where the risk of nutrient loss to rivers may be higher or lower across the project area. This map may support discussions about where to target land-based measures to mitigate surface water runoff and nutrient loss. It is important to note that the layers presented here are a guide (based on mostly national datasets) to where risks of nutrient runoff are highest. The compilation of datasets can be used as a planning tool. These data do not provide any indication of landowner engagement or consent and are best used in conjunction with a detailed feasibility assessment when deciding on specific measures.



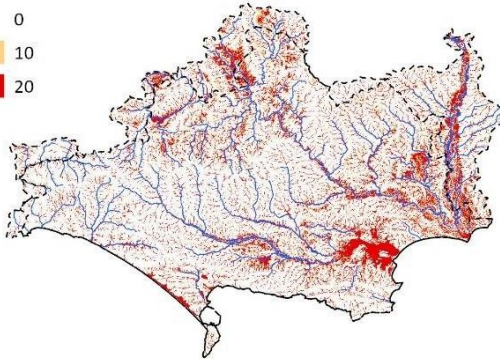
Datasets used: PB, WFD-WC, WFD-WB, NTR-RSK, TER50, NATM, EUSO, AGC,CROP. See data references page for full details.

Figure 11 Map showing the nutrient risk across the project boundary

N.b. The scores on these maps are written as multipliers of 10 (i.e. a score of 1 is shown as 10) due to some of the geoprocessing methods being incompatible with decimals.

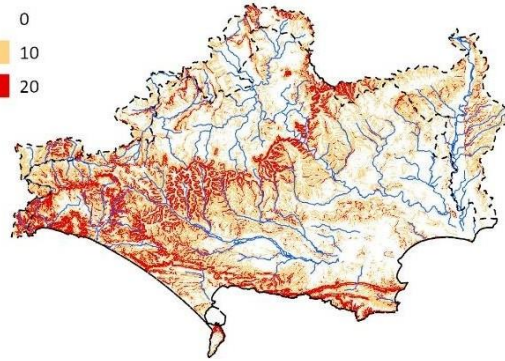
Hydrological connectivity

0
10
20



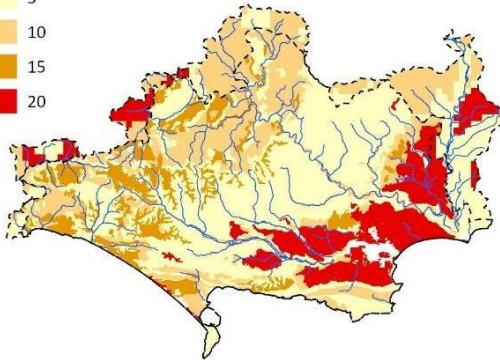
Slope

0
10
20



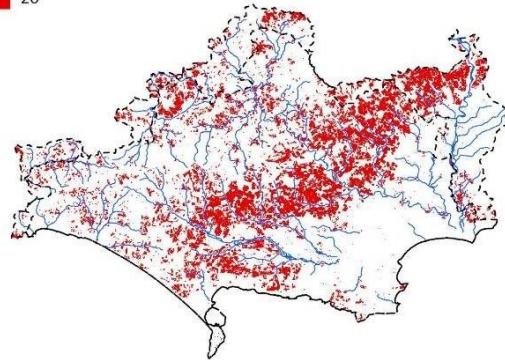
Soil type

0
5
10
15
20



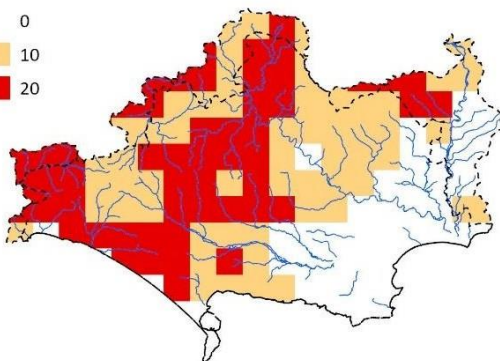
Crop type

0
20



Livestock density

0
10
20



Combined risk

0 - 20
20 - 30
30 - 40
40 - 50
50 - 95

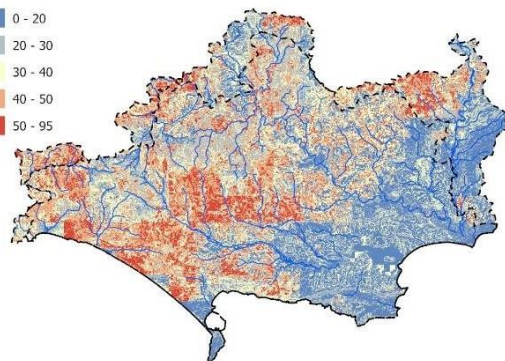


Figure 12 Map showing the input layers to the combined nutrient risk map

N.b. The scores on these maps are written as multipliers of 10 (i.e. a score of 1 is shown as 10) due to some of the geoprocessing methods being incompatible with decimals.

UNDERSTANDING OPPORTUNITIES

RIPARIAN TREE PLANTING + HABITAT CONNECTIVITY

DATASET

This dataset was created specifically for this project by scoring and combining datasets relating to riparian tree planting opportunities for habitats. It does not show where tree planting can definitely occur; other factors would need to be considered, such as land owner permissions. However, it may be used to highlight priority areas for riparian tree planting at a broad-scale.

Three layers were used to create this dataset; the features within them are scored as 1 or 0 (present or absent), describing characteristics that make riparian tree planting for habitats more or less desirable. These layers were then added together to create the riparian tree planting opportunity map, with existing woodland and roads/buildings excluded. *N.b. for the purpose of this mapping, the 'riparian corridor' is mapped as a 50m buffer around the river network.*

Name	Dorset Riparian Tree Planting Opportunity Map
Publisher	Westcountry Rivers Trust
License	Conditional
Attribution	Created by Westcountry Rivers Trust. Contains: Data from Dorset Landscape Monitoring Project (2018), Dorset Council et al – Habitat Map; Core and Stepping Stone Habitat. Contains OS data © Crown copyright [and database right] [2018]. EEA Corine Land Cover (2018). Ordnance Survey: MasterMap Water Network; OpenMap Local – Surface Water Area, Buildings. Contains OS data © Crown Copyright [and database right] [2024]. Forestry Commission: EWCO - Keeping Rivers Cool Riparian Buffers; National Forest Inventory 2022, Contains, or is based on, information supplied by the Forestry Commission. © Crown copyright and database right 2022 Ordnance Survey [AC0000814847]
Link	NA

The input layers include:

- **Riparian agricultural land** – All land within the riparian corridor was included in the analysis, but agricultural land was given a slightly higher weighting as it arguably presents a greater opportunity for tree planting. Therefore, if riparian agricultural land is present it gets a score of 1. [Datasets: Dorset Habitat Map; Corine Land Cover 2018 (for areas outside of Dorset)].
- **Land adjacent to rivers lacking shade** – A 50m buffer surrounding sections of river that have little or no shade was used to determine opportunities where tree planting may provide improved shade. These areas get a score of 1. [Dataset: FC EWCO - Keeping Rivers Cool Riparian Buffers].
- **Riparian land adjacent to fragmented woodland** – Land within 40m of a woodland patch (<1ha) (and within the 50m river buffer and without existing woodland) was given a score of 1 to highlight an opportunity where tree planting would increase habitat patch size and connectivity, supporting the 'bigger, better and more joined-up' habitat improvement approach. *Note, this dataset does not cover the wider project areas, outside of Dorset.* [Dataset: Dorset Habitat Connectivity – Woodland Stepping Stone Habitat].
- **Exclusions** – Existing woodland, buildings and surface water were excluded from the final opportunity map. [Datasets: Dorset Habitat Map; FC National Forest Inventory 2022 (for areas outside of Dorset); OS OpenMap Local].

There are numerous other factors to consider before tree planting can occur, such as existing priority habitats; grade 1 and 2 agricultural land and scheduled monuments.

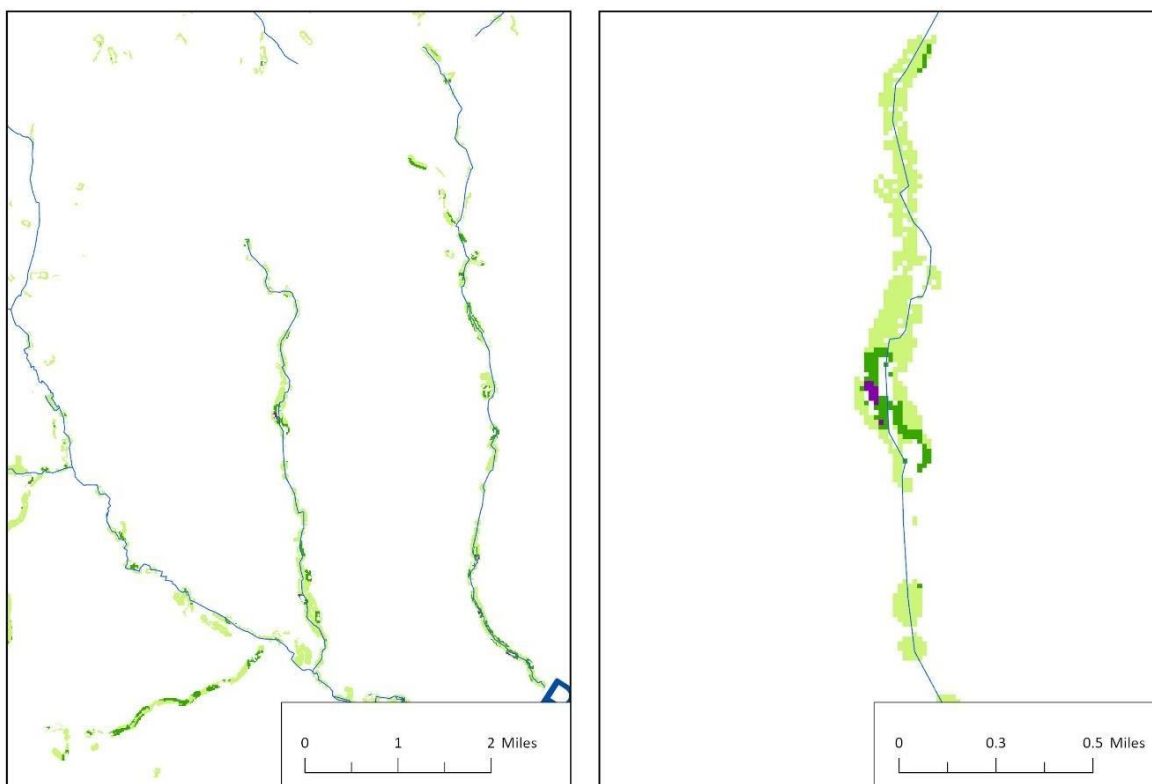
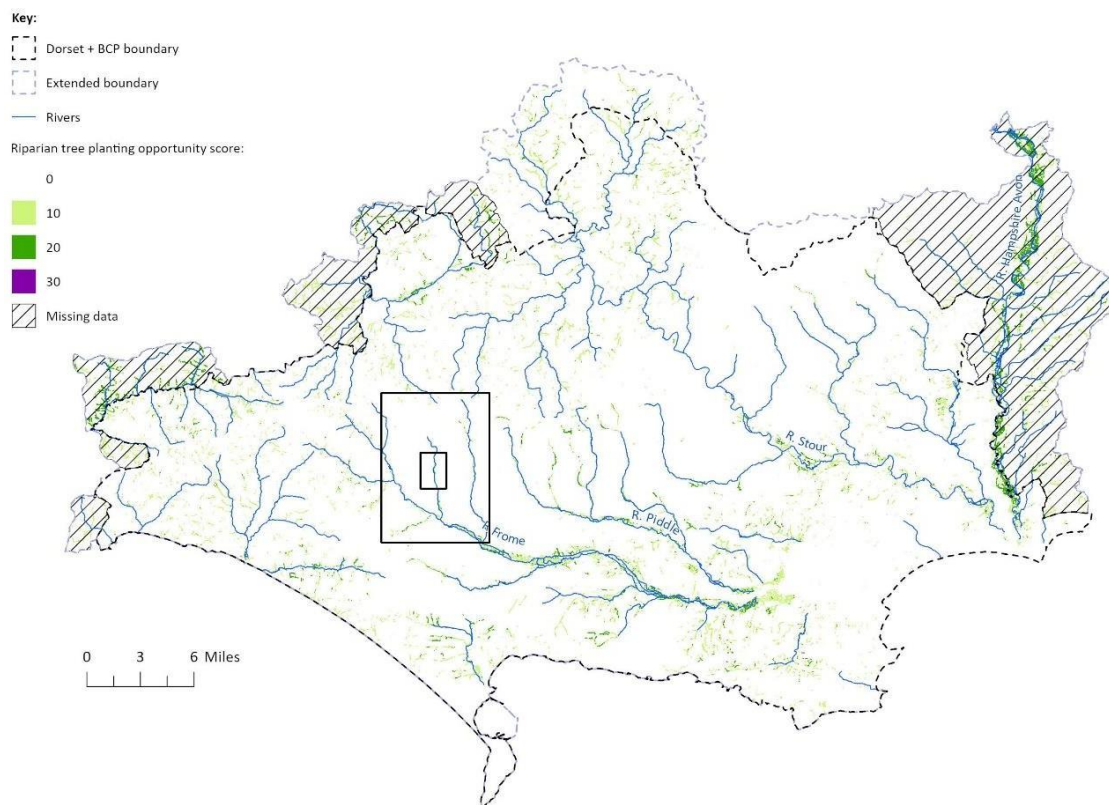
Note that a similar dataset has been produced by the Forestry Commission, which shows land sensitivity to woodland creation in England. A subset of this data (the low sensitivity layer) has been included in the data package, showing where there are likely to be fewer sensitivities to woodland creation. Areas described as having 'low sensitivity' to new woodland creation, will not

Name	England Woodland Creation Low Sensitivity Map v4.0
Publisher	Forestry Commission
License	Open Government Licence
Attribution	See data references page.
Link	FC Open Data Link

necessarily get planting agreed by the Forestry Commission. However, the low sensitivity areas have the fewest identified constraints to address. Likewise, the creation of new woodland may be appropriate outside of the 'low sensitivity' areas. The sensitivity maps exclude all land that is unsuitable for planting, including urban areas, existing woodland and habitats that are considered too wet, too rocky, and too salty to support the growth of trees.

HOW TO USE IT

The riparian tree planting opportunity map highlights some useful factors relating to tree planting for riparian and in-river habitats. It does not provide an assessment of tree planting feasibility; for example it does not indicate land-owner permission or the presence of features/assets that may be negatively impacted by woodland (e.g. non-woodland priority habitats/species; ancient monuments). However, the map may be useful as a first step in the planning process, highlighting sites that would provide multiple benefits to riparian or in-river habitats, namely improved woodland habitat connectivity and increased river shade. After panning the map to observe which areas of riparian land meet multiple criteria, it would be useful to compare the layer with the FC's England Woodland Creation Low Sensitivity Map (which has been included as a separate layer). Areas that are highlighted on both maps, (i.e. provide multiple benefits to habitats and have fewer constraints to planting) may be considered as higher priority for tree planting and taken further in their suitability assessments.



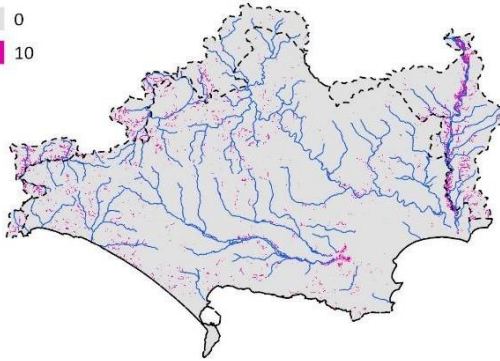
Datasets used: PB, WFD-WC, WFD-WB, TRE-OPP, DHL, DHN, CLC, OSWN, OSLOC, KRCBU, NFI. See data references page for full details.

Figure 13 Map showing potential tree planting opportunities across the project area

N.b. The scores on these maps are written as multipliers of 10 (i.e. a score of 1 is shown as 10) due to some of the geoprocessing methods being incompatible with decimals.

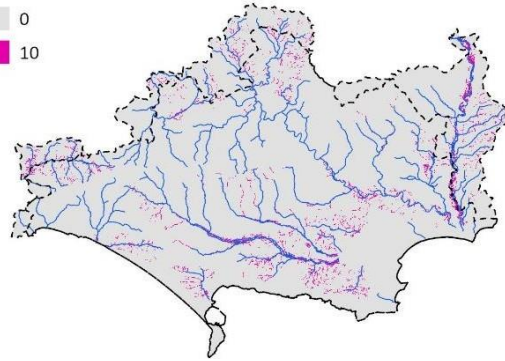
Riparian
agricultural land

0
10



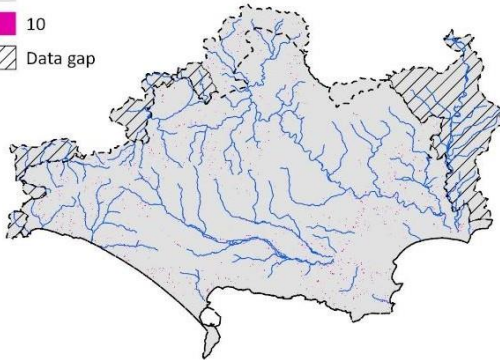
Land near
rivers lacking shade

0
10



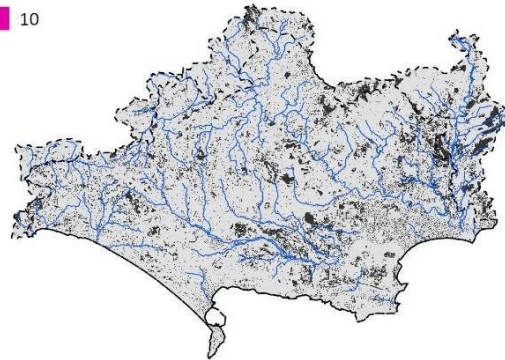
Riparian land near
fragmented woodland

0
10
Data gap



Exclusion areas

0
10



Combined Opportunity

0
10
20
30
Data gap

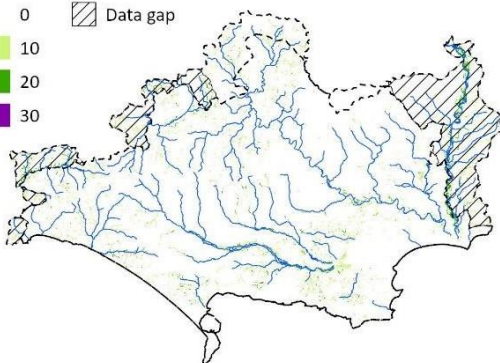


Figure 14 Maps showing the input layers to the combined riparian tree planting opportunity map

N.b. The scores on these maps are written as multipliers of 10 (i.e. a score of 1 is shown as 10) due to some of the geoprocessing methods being incompatible with decimals.

DATA SOURCES

In order of appearance in this report.

Code	Dataset	Source	Attribution Statement	Date	Link
OSGB	Ordnance Survey GB Background	Ordnance Survey	Contains OS data © Crown Copyright and database right 2023; Contains data from OS Zoomstack	Jun-23	Default basemap provided in ArcGIS Pro
PB	Project boundary (Dorset County + Bournemouth, Christchurch and Poole)	Dorset Council		2024	
WFD-WC	WFD River Waterbody Catchments Cycle 2	Environment Agency	© Environment Agency copyright and/or database right 2015. All rights reserved.	2015	Defra data services
WFD-WB	WFD River, Canal and Surface Water Transfer Waterbodies Cycle 2	Environment Agency	© Environment Agency copyright and/or database right 2016. All rights reserved.	2016	Defra data services
WFD2019	WFD River, Canal and SWT Waterbody Classifications (2019)	Environment Agency	© Environment Agency copyright and/or database right 2015. All rights reserved.	2019	Defra data services
WIMS	EA Water Quality Data Archive (WIMS)	Environment Agency	Uses Environment Agency water quality data from the Water Quality Archive (Beta)	10/07/2024	
CHLK	Chalk Rivers	Natural England	Priority Habitat Chalk Rivers, based on Environment Agency Detailed River Network v3. Data prepared Autumn 2021.	01/04/2022	NE Open Data
RNAGS	WFD Challenges data for South West River Basin District (Cycle 3)	Environment Agency	Contains public sector information licensed under the Open Government Licence v3.0. © Environment Agency copyright and/or database right [2019]. All rights reserved.	2019	Defra data services
OBS	River Obstacles Database	Environment Agency	© Environment Agency copyright and/or database right 2021	Jun-24	CaBA Data Hub
KRCBUF	EWCO - Keeping Rivers Cool Riparian Buffers	Forestry Commission	Contains Forestry Commission information licensed under the Open Government Licence v3.0. Contains OS data © Crown copyright [and database right] [2024].	2024	data.gov
PRH-RIV	Priority River Habitat - Rivers	Natural England	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [2024].	2024	data.gov
PRH-HW	Priority River Habitat – Headwater Areas	Natural England	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [2024].	2024	data.gov
NTR-RSK	Dorset Nutrient Run-off Risk Map	Westcountry Rivers Trust	Created by Westcountry Rivers Trust. Contains: OS data © Crown Copyright and database right 2024; data created using Durham University SCIMAP model; Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2024]; © Rural Payments Agency copyright and/or database right 2023. All rights reserved; © University of Edinburgh Derived from Defra/Welsh Government/Scottish Government agricultural census surveys.	2024	-
TER50	Terrain50	Ordnance Survey	© Ordnance Survey 2024	2024	OS Data Hub
NATM	NATMAP Vector	Cranfield University	Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2024]	2024	LandIS
EUSO	European Soil Database v2 Raster Library 1kmx1km	European Commission – DG JRC	Panagos, P., Van Liedekerke, M., Borrelli, P., Köninger, J., Ballabio, C., Orgiazzi, A., Lugato, E., Liakos, L., Hervas, J., Jones, A. Montanarella, L. 2022. European Soil Data Centre 2.0: Soil	2006	ESDAC

			data and knowledge in support of the EU policies. European Journal of Soil Science, 73(6), e13315. DOI: 10.1111/ejss.13315		
AGC	AgCensus	Edina	© University of Edinburgh Derived from Defra/Welsh Government/Scottish Government agricultural census surveys.	2016	Edina
CROP	Crop Map of England (CROME) 2022	Rural Payments Agency	© Rural Payments Agency copyright and/or database right 2023. All rights reserved.	2022	Defra data services
TRE-OPP	Dorset Riparian Tree Planting Opportunity Map	Westcountry Rivers Trust	Created by Westcountry Rivers Trust (2024). Contains: Data from Dorset Landscape Monitoring Project (2018), Dorset Council et al – Habitat Map; Core and Stepping Stone Habitat. Contains OS data © Crown copyright [and database right] [year]. EEA Corine Land Cover (2018). Ordnance Survey: MasterMap Water Network; OpenMap Local – Surface Water Area, Buildings. Contains OS data © Crown Copyright [and database right] [2024]. Forestry Commission: EWCO - Keeping Rivers Cool Riparian Buffers; National Forest Inventory 2022. Contains OS data © Crown copyright [and database right] [year].	2024	
DHL	Habitat Layer	Dorset AONB et al	Habitat Map data from Dorset Landscape Monitoring Project (2018). Funded by Dorset AONB, Cranborne Chase AONB, Dorset Council, Bournemouth, Christchurch and Poole Council, Wessex Water, Dorset Catchment Partnership, Dorset Wildlife Trust and Dorset Local Nature Partnership.	2018	
DHN	Core and Stepping Stone Habitat	Dorset AONB et al	Core and Stepping Stone Habitat data from Dorset Landscape Monitoring Project (2018). Funded by Dorset AONB, Cranborne Chase AONB, Dorset Council, Bournemouth, Christchurch and Poole Council, Wessex Water, Dorset Catchment Partnership, Dorset Wildlife Trust and Dorset Local Nature Partnership.	2018	
CLC	CORINE Land Cover 2018 (vector/raster 100 m), Europe, 6-yearly	European Environment Agency	https://doi.org/10.2909/960998c1-1870-4e82-8051-6485205ebbac	2018	https://doi.org/10.2909/960998c1-1870-4e82-8051-6485205ebbac
OSWN	OS MasterMap Water Network Layer	Ordnance Survey	© Ordnance Survey 2024	2024	OS Products
OSLOC	OpenMap Local	Ordnance Survey	© Ordnance Survey 2024	2024	OS Data Hub
NFI	National Forest Inventory 2022	Forestry Commission	Contains, or is based on, information supplied by the Forestry Commission. © Crown copyright and database right 2022 Ordnance Survey [AC0000814847]	2022	FC Open Data
LOW-SENS	England Woodland Creation Low Sensitivity Map v4.0	Forestry Commission	Contains, or is based on, information supplied by the Forestry Commission. © Crown copyright and database right (current year) Ordnance Survey [100021242]. © Natural England copyright [2019], reproduced with the permission of Natural England, www.gov.uk/natural-england © Crown Copyright and database right [year]. Ordnance Survey licence number AC0000851168. Derived from 1:50 000 scale BGS Digital Data under Licence 2006/072 British Geological Survey. © NERC. National Soils map © Cranfield University (NSRI) © Crown Copyright and database rights [year]. Data reproduced with the permission of RSPB. © Crown Copyright. Ordnance Survey licence number 100021787 (year).	2024	FC Open Data