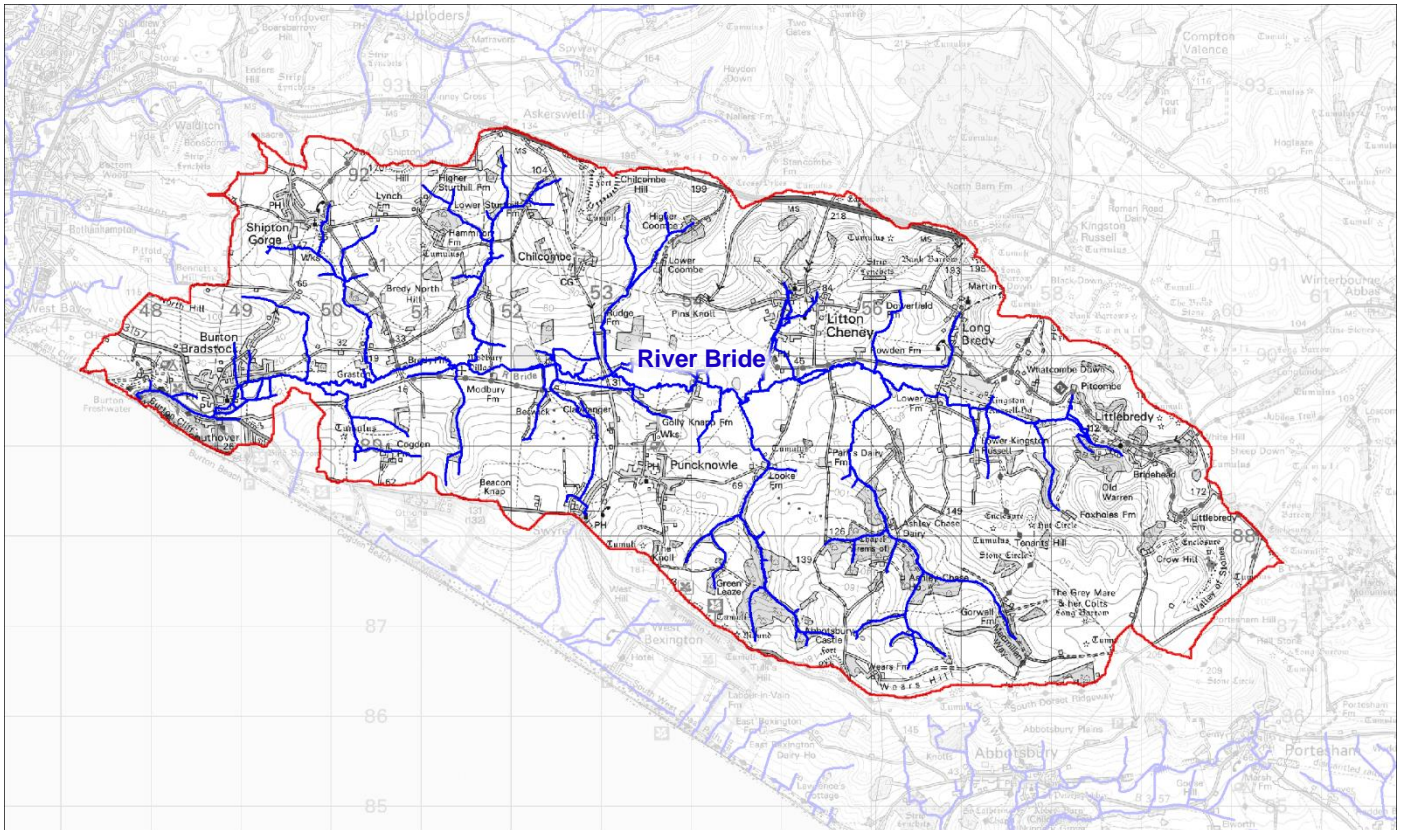


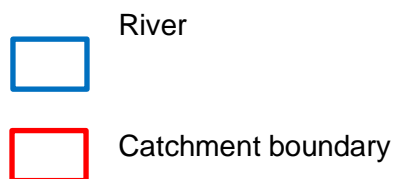


River Bride



Map of the River Bride catchment

Key



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Introduction

The Bride rises in a lake in hills at Bridehead near Dorchester and flows west through an increasingly wide and gently sloping valley to Burton Bradstock. The river is approximately 16km long. The area contains numerous designated environmental sites and the whole of the area is in the Dorset Area of Outstanding Natural Beauty. The coastal strip, known as the Jurassic coast, has been designated a UNESCO World Heritage site.

The unique environmental and landscape features of the area attract many tourists to the area. Tourism is important in terms of population and business, particularly in the coastal communities. Inland, the agriculture is predominately small livestock units and permanent grassland as the steep slopes and intricate geology have discouraged intensive agriculture.

River length	15.9 km
---------------------	---------



Catchment area	47.15 km ²
Geology	Chalk in the upper catchment, leading through sandstones to mudstones and clays
Land use	Small livestock units and permanent grassland
Principle towns and villages	Burton Bradstock, Shipton Gorge, Chilcombe, Puncknowle, Litton Cheney, Long Bredy, Littlebredy

No river in England is in pristine condition, and it is the responsibility of the Environment Agency to monitor how far from pristine the condition of our waterbodies has deviated. It is up to us to tackle the issues affecting the River Bride and make a difference on the ground (because if we don't work together and make a difference, who will?). By conserving and enhancing existing habitats of importance, restoring habitats where possible and working with natural process, it is possible to make meaningful improvements to the condition of the water environment, and ultimately the wellbeing of communities living within the catchment.

The next sections explores the state of the river and wider catchment, the areas that have been identified as at risk from the Environment Agency and from local people, and potential areas to explore that will help deliver our aim of improving the condition of the River Bride.

This document should be seen as a starting point for discussion and is not meant to be comprehensive. We can work with communities to explore opportunities to help improve the river and wider catchment.



Environment

Geology

The geology under our feet heavily influences how water moves through the catchment, the soils that form above it and the plants and animals that live here. It also influences how we use the land to produce food.

The catchment is a mix of rock types. The headwaters are dominated by the White Chalk Group, before moving through the Gault and Upper Greensand Formation into Kellaways and Oxford Clay before moving into the Oolites and finally the Lias Group. It is quite a complex picture for such a small catchment and has a significant impact on how water flows through the landscape.

Exploring the rock groups from east to west:

The Bracklesham Group and Barton Group. A small outcrop of this group of rocks just creep into this catchment. The rocks are made up of sand, silt and clay, and were formed in shallow seas some 34 to 56 million years ago. They are the youngest rocks in the catchment.

Next comes the White Chalk. It was laid down in warm, shallow seas about 90-100 million years ago, during the cretaceous period. This rock is made up of tiny calcareous skeletons of organisms called coccolithophores which makes the rock porous, with the ability to hold significant amounts of water, like a sponge. This provides a stable flow of calcium-rich water into the river. This stable flow of temperature-constant water provides the perfect conditions for plants, insects and fish to thrive. 'Chalk streams' are almost unique to southern England and are therefore considered globally rare habitats. Because the Bride quickly flows over a succession of other rock types, it is not considered a 'classic' chalk stream - such as the River Avon in Wiltshire - but none-the-less it is of importance for wildlife because of these characteristics.

Following on from the chalk comes the Gault Formation and Upper Greensand. These are made up of mudstones, sandstones and limestones. These were formed in shallow seas between 94 and 112 million years ago in the Cretaceous Period.

Then there is the Lias Group of rocks. This group is made up mudstones, siltstones, limestone and sandstone that were deposited in shallow seas some 172 to 204 million years ago in the Jurassic and Triassic Periods.

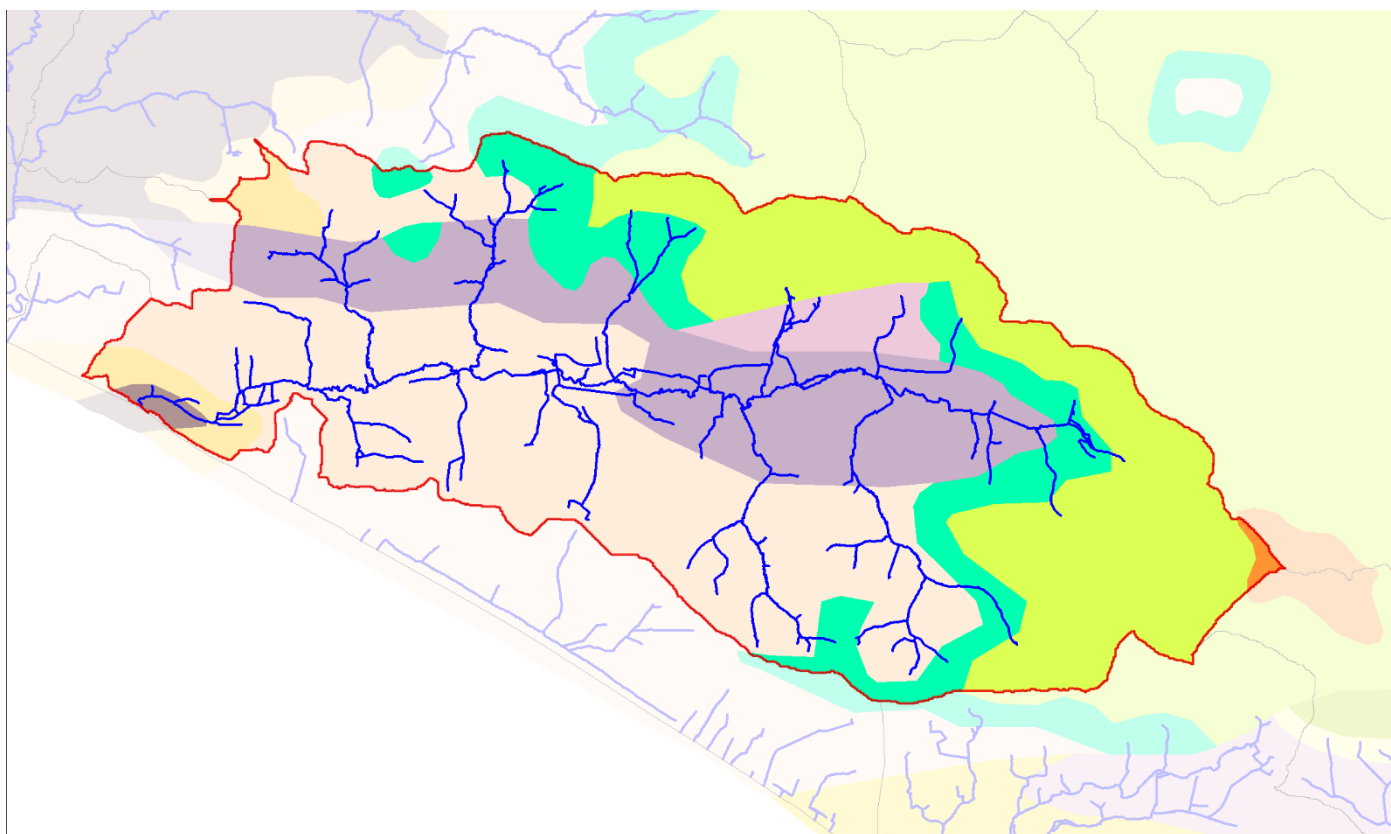
The Lias rocks significantly impede drainage and are therefore the primary reason for the damp character of the Valley. As mentioned, the Chalk, is more permeable, absorbing water and so water reappears at the join between the Chalks and Gault / Greensand at springs.

The Gault / Greensand has the potential to naturally elevate the levels of phosphate found in the watercourse.

Further downstream, the dominant rock type is the Great Oolite, made up sandstones, siltstones, mudstones and limestones, deposited in warm shallow seas rich in corals some 165 to 168 million years ago in the Jurassic Period.

There are pockets of other rock types within the catchment, but lesser in extent. There are the Inferior Oolite which make up the iconic cliffs at Burton Bradstock and the West Walton Formation, Apmthill Clay and Kimmeridge Clay Formation that lies around Litton Cheney.

The map below shows the extent of the geology within the catchment.



Map of the River Bride underlying geology

Key

-  River
-  Catchment boundary
-  Lias Group: mudstone, siltstone, limestone and sandstone
-  Inferior Oolite group: limestone, sandstone, siltstone and mudstone
-  Great Oolite Group: sandstone, limestone and argillaceous rocks
-  Gault Formation and Upper Greensand Formation: mudstone, sandstone and limestone,
-  White Chalk Subgroup
-  Bracklesham Group and Barton Group; sand, silt and clay
-  West Walton Formation, Ampthill Clay Formation and Kimmeridge Clay Formation: mudstone, siltstone and sandstone

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Geology Data © British Geological Survey and United Kingdom Research & Innovation 2021



Soil types

Heavily influenced by the underlying geology, soils are at the interface between biotic (living) and abiotic (non-living) worlds. These are important stores of carbon and biodiversity in their own right and provide the foundations from which others can grow. The characteristics of soil dictate what can grow from them, including habitats, crops for food and forage for animals. Soils can be broadly described as basic (acid), calcareous (alkaline) and neutral. The soils of the Bride catchment are very varied, reflecting the underlying geology and they go from very acid, through neutral to more alkaline.

There is no one dominant soil type, as characterised by Cranfield University's Soilscales, so the current uses and potential for wildlife is very varied. These are described below:

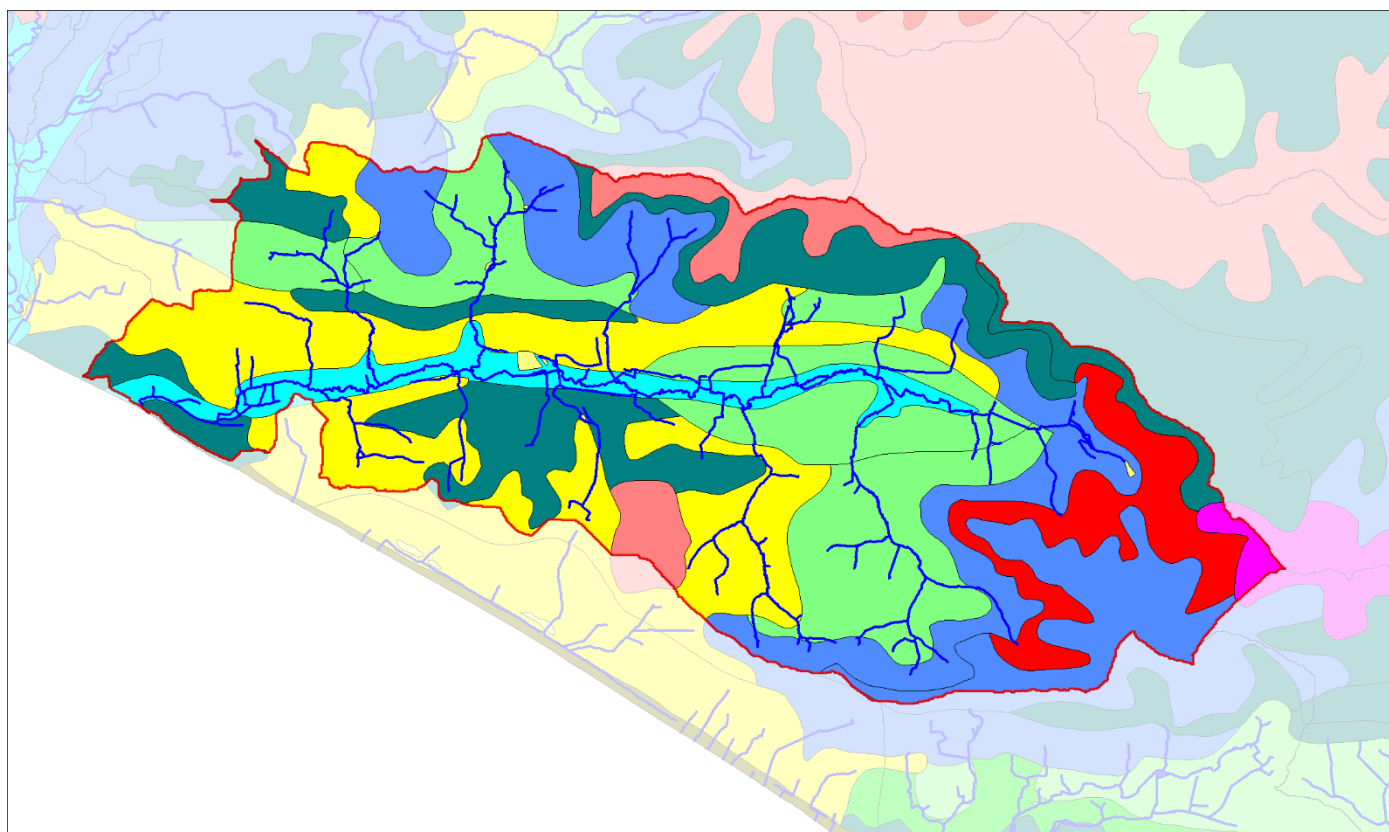
- 'Freely draining slightly acid loamy soils'. They are freely draining and have low fertility. They are suitable for neutral and acid pastures and deciduous woodlands and can be used for grassland and arable. There is low potential for carbon storage. Water drains to local groundwaters and streams network and the main risks are groundwater contamination with nitrate and siltation and nutrient enrichment of streams from soil erosion.
- 'Slightly acid loamy and clayey soils with impeded drainage.' These slightly impede drainage, feed into the stream network, have moderate to high fertility but low carbon storage potential. They are suitable for a wide range of pasture and woodland types and can be used for arable and grassland. The main risks to the water environment are drained farmland making streams more vulnerable to pollution run-off and rapid through-flow; surface capping can trigger erosion of fine sediment.
- 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.' They impede drainage and have moderate fertility. They are suitable for seasonally wet pasture and woodland habitat and can be used for grassland and arable, with some woodland. There is low potential for carbon storage. Water drains to a stream network (rather than groundwater) and the main risks are associated with overland flow from compacted or poached fields. Organic slurry, dirty water, fertiliser, pathogens and fine sediment can all move in suspension or solution with overland flow or drain water.
- 'Shallow lime-rich soils over chalk or limestone'. These are freely draining to groundwater, lime-rich moderate fertility and have low to medium carbon storage potential. They have the potential to host herb-rich downland pastures along with beech hangers and other lime-rich woodlands. They are used for arable and grassland and they particularly vulnerable to leaching of nitrate and pesticides to groundwater. Surface capping and erosion of chalk soils on steeper slopes under cereals is linked with eutrophication and silting of streams and their gravel spawning beds.
- 'Lime-rich loamy and clayey soils with impeded drainage'. They have slightly impeded drainage which discharges to the stream network. They are highly fertile and have low carbon storage potential. They have the potential to host base-rich pastures and classic chalky boulder clay ancient woodlands along with some wetter areas and lime-rich flush vegetation. They are used for arable some grassland and historically have been drained, are nitrate vulnerable leading to the potential for rapid pollutant transport. Surface capping can trigger sheet erosion of fine sediment to stream network.
- 'Loamy and clayey floodplain soils with naturally high groundwater'. They are naturally wet and drain to the water table. They have moderate fertility and have medium carbon storage potential. They have the potential to host wet flood meadows with wet carr woodlands in old river meanders. They are used for grassland and some arable. The main risks to the water environment are their close proximity to rivers, resulting in increased pollution risk from floodwater scouring and drainage water after spreading of fertiliser or slurry.
- 'Freely draining lime-rich loamy soils'. They are freely draining to chalk groundwater aquifers. They are lime-rich and have moderate fertility. They have low carbon storage potential. They can host herb-rich chalk pastures and lime-rich deciduous woodlands. They are used for arable with grassland on steeper slopes / higher altitude. The main risks to the water environment are leaching



of nitrates to groundwater. Surface capping and erosion of soils under cereals is linked with nutrient enrichment of chalk streams and their gravel spawning beds.







- 'Freely draining very acid sandy and loamy soils'. These freely drain to groundwater, have very low fertility and have medium carbon storage potential. They have potential for lowland heathland and are used for forestry with extensive grazing possible. The main risks to the water environment are erosion along footpaths.

The map below shows the extent of the Soilscape in the catchment.



Map of the River Bride catchment soils





Key

- | | |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  | River |
|  | Catchment boundary |
|  | Soilscape 3: Shallow lime-rich soils over chalk or limestone |
|  | Soilscape 18: slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils |
|  | Soilscape 6: freely draining slightly acid loamy soils |
|  | Soilscape 8: slightly acid loamy and clayey soils with impeded drainage |

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Soils Data © Cranfield University (NSRI) and for the Controller of HMSO 2021



-  Soilscape 9: Lime-rich loamy and clayey soils with impeded drainage
-  Soilscape 20: Loamy and clayey floodplain soils with naturally high groundwater
-  Soilscape 5: Freely draining lime-rich loamy soils
-  Soilscape 14: Freely draining very acid sandy and loamy soils



Land use

The geology and soils of the Bride catchment have strongly influenced how this land has been used. Where it is fertile and accessible to farm machinery, it may be used for arable crops or intensive grass for dairy or beef. Where the soil is less fertile or the land too steep or waterlogged, then it may be more extensively used, leaving fragments of semi-natural habitats. This fragmentation of semi-natural habitat has increased greatly since the Second World War because of improved capability of farm machinery and techniques that make farming marginal land economically viable, alongside government incentives. This was driven by an increasing population and subsequent higher demand for food. As a result, over 97% of all semi-natural habitats mapped in Dorset in the 1930s have been converted to agriculturally improved arable or grassland. This will have knock-on impacts on the water quality of the River Bride, with increased contamination of sediments and nutrients from agriculture along with increased isolation of the semi-natural habitat that exists along the river corridor.

Looking in a bit more detail at the land use of the Bride catchment, we can split it down into a number of categories that are described below. The figures are derived from a study undertaken in 2018 that mapped land use in the Dorset AONB from existing data, aerial photography and satellite images.

Intensive land use

Improved grassland covers 52% of the catchment area. Improved grassland will predominantly be used to support livestock. The grassland will be planted 'leys' dominated with grass species, such as ryegrass, possibly with clovers, that are periodically ploughed up and replanted. To maintain their condition, they will be treated with nitrates and phosphates several times during the growing season.

Arable covers 26% of the catchment area. This will include several crop types grown within the catchment, grown in rotation along with maize which is grown as a fodder crop to support livestock production. Winter cereals and maize are high risk crops with regards to soil erosion, particularly on steep slopes, because bare soil is exposed at times of potential high rainfall. Good agricultural practises can mitigate these risks, by, for example, growing of cover crops that bind soils together.

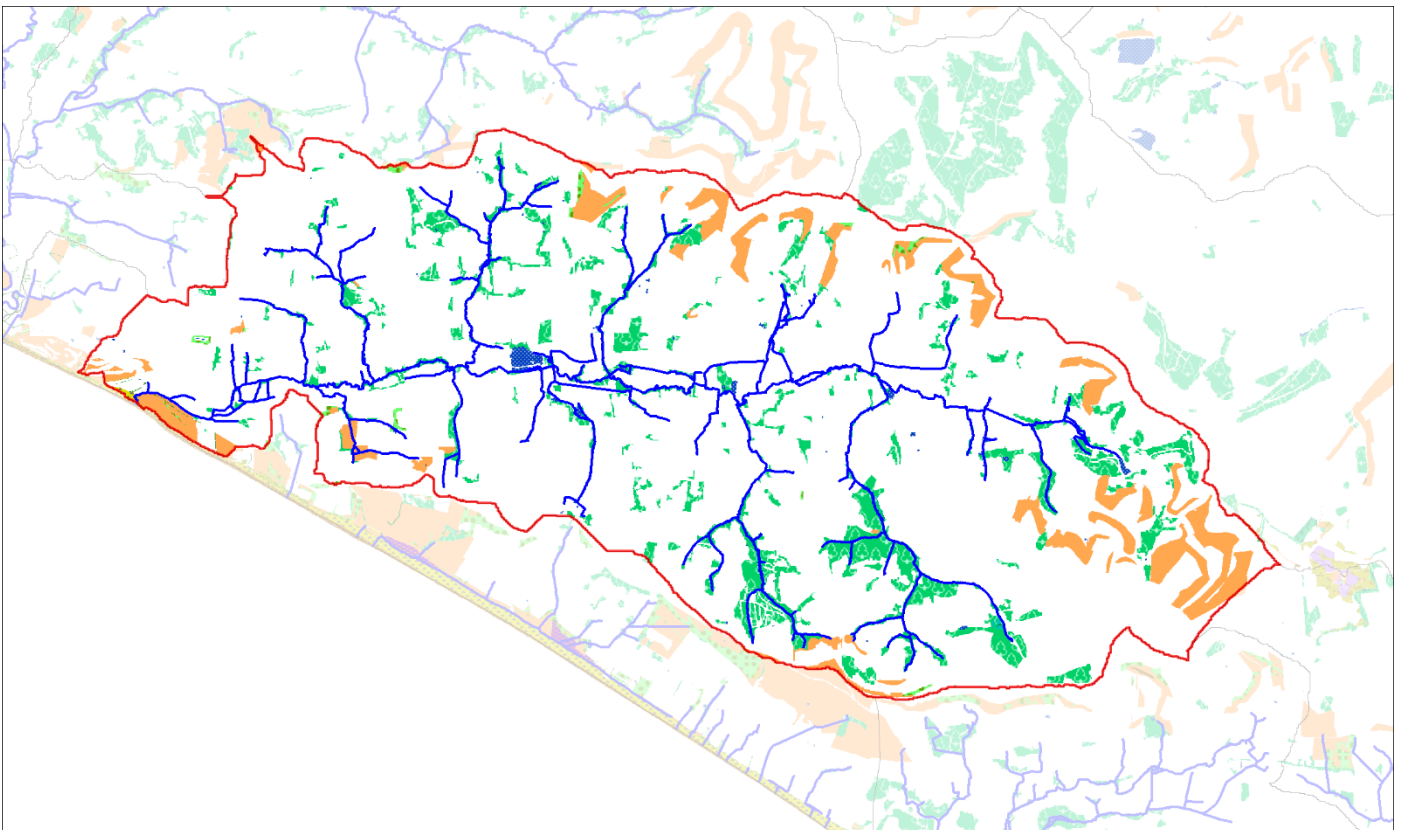
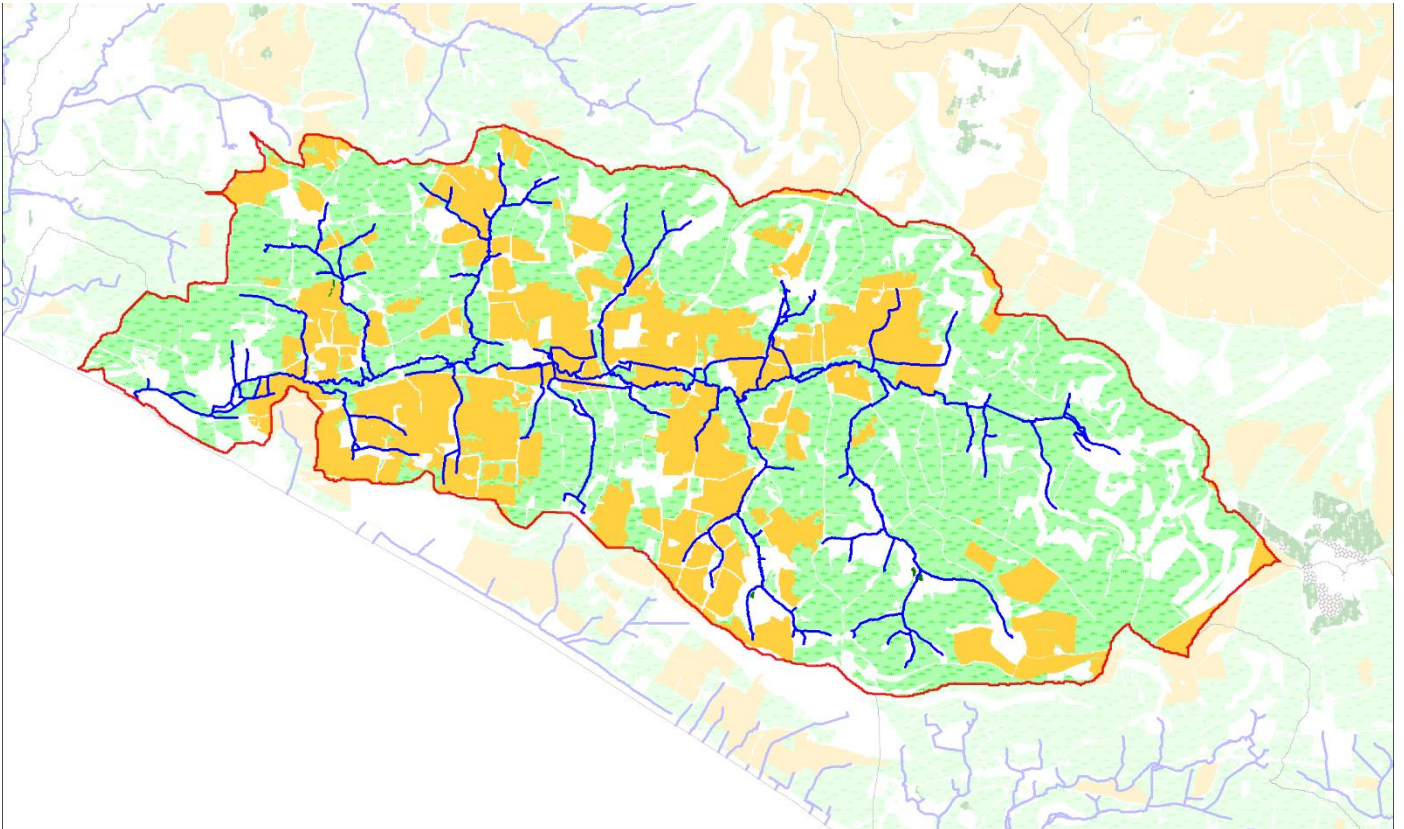
In total, intensive land use covers close to 80% of the catchment area and therefore has the potential to have significant effects on the water environment of the River Bride.

Extensive land use

Covering 14% of the catchment area are habitats associated with more extensive land use. This is low coverage compared to other areas of the Dorset AONB. The most significant of these is broadleaved woodland, including wet woodland, which covers 9%. The other significant category is semi-improved grassland, which covers 5% of the catchment. Semi-improved grassland is not as rich in wildlife as semi-natural grasslands because it has been improved in the past to favour a grass-dominated sward. However, having not been ploughed up recently and as intensively managed, it holds great potential for restoration back to semi-natural habitat.

Other land use

Urban land cover takes up 6% of the area, and there is an additional 1% that has been classified as gardens (though this category is hard to define because the individual areas are quite small). 1% is water and there are areas of coastal habitat that are important but not extensive, at the mouth of the river.





Map of the River Bride catchment intensive land use (top) and extensive land use (bottom)

Key































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River



Catchment boundary

	Arable		Quarry
	Bare ground		Saltmarsh
	Bracken		Sand dune
	Broadleaved woodland		Scrub
	Cliffs and rocky shore		Semi-improved grassland
	Coniferous plantation		Shingle above high tide mark
	Felled woodland		Tall herb and fern
	Gardens		Unimproved grassland (Acid)
	Hedgerow		Unimproved grassland (Calcareous)
	Improved grassland		Unimproved grassland (Neutral)
	Intertidal habitat		Urban
	Lowland dry heath		Water
	Marshy grassland		Wet heath
	Mixed woodland		Wet woodland
	Parkland/scattered trees		Wetland

Land use categories



Ecological networks

We have undertaken further analysis of the land use data to identify areas of habitat that are important for the survival of native species, as they provide shelter and food for them. We also looked at how easily these species can move through the landscape between these 'core' habitat sites. We have broken this analysis down into four broad habitat types: grassland, woodland, heathland and wetland. For each of these, we have identified: 'core' habitat, which are extensive land use blocks over 1ha in size; 'stepping stones', which are extensive land use blocks less than 1ha in size; and the 'ecological network', which maps how a species can move between the 'core' habitat blocks using the 'stepping stones' and wider intensive land use. It is vital for the survival of species that they have access to adequate 'core' habitats to shelter, feed and reproduce as well as adapt to extreme weather and climate change.

The most significant networks within the Bride catchment are grassland and woodland. There are no heathland sites and only 9 wetland stepping stone sites.

It is the governments ambition to have 30% of the land managed for wildlife. If we total the 'core' habitat blocks within the catchment, this gives us that total of 15%, so there is potential to increase more extensive land use. Natural England also recognise that for a site to function naturally, it should be at least 40ha in size. There are two woodland blocks above this threshold. There are no grassland units above this threshold.

Grassland

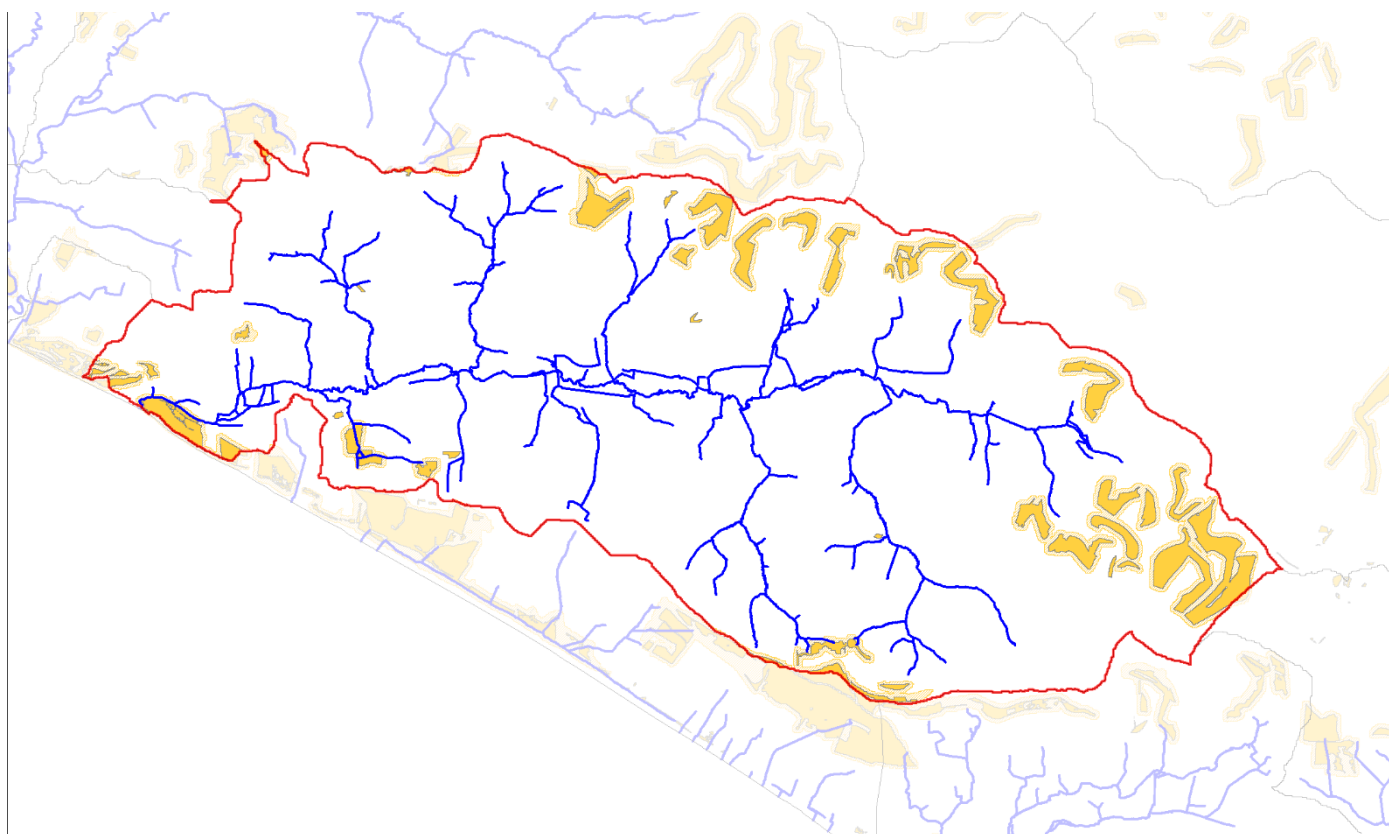
239ha of 'core' and 'stepping stone' habitat exist within the catchment over 53 locations, none of which are over 40ha. The larger sites are mostly in the headwaters of the catchment. These sites support a grassland ecological network (for an average medium dispersal species) of 407ha over 16 locations.

Woodland

521ha of 'core' and 'stepping stone' habitat exist within the catchment over 193 locations, two of which are above 40ha. These sites support a woodland ecological network (for an average medium dispersal species) of 1121ha over 59 locations.





Heathland and wetland

There are no heathland sites because the required geological and soil conditions do not exist within the catchment. There are very few wetland sites within the catchment, which means species reliant on this habitat are poorly serviced in the Bride catchment.

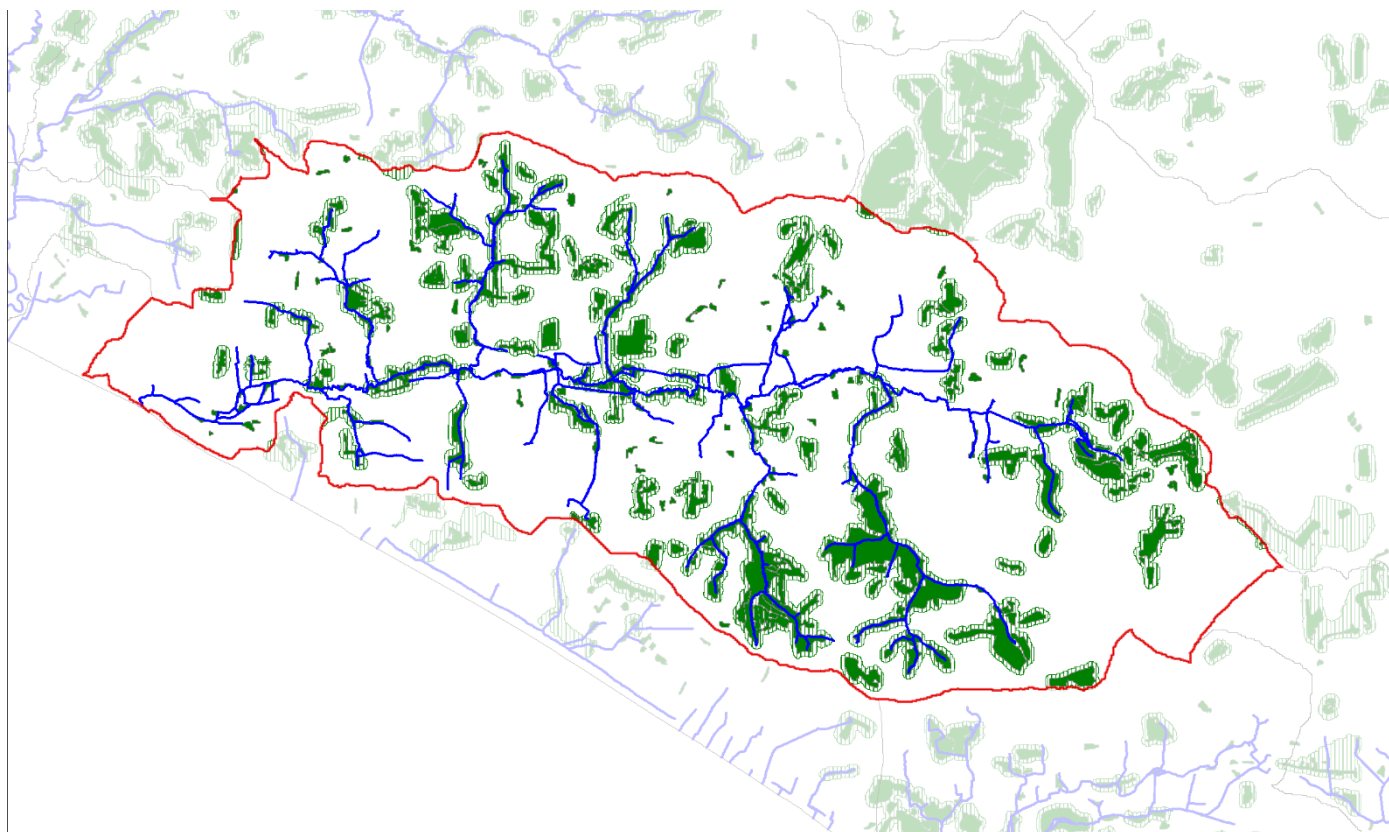


Map of the River Bride catchment grassland ecological network

Key





-  River
-  Catchment boundary
-  Grassland core (>1ha) and stepping stone (<1ha) sites
-  Grassland ecological network for a medium dispersal species

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Map of the River Bride catchment woodland ecological network

Key

-  River
-  Catchment boundary
-  Woodland core (>1ha) and stepping stone (<1ha) sites
-  Woodland ecological network for a medium dispersal species

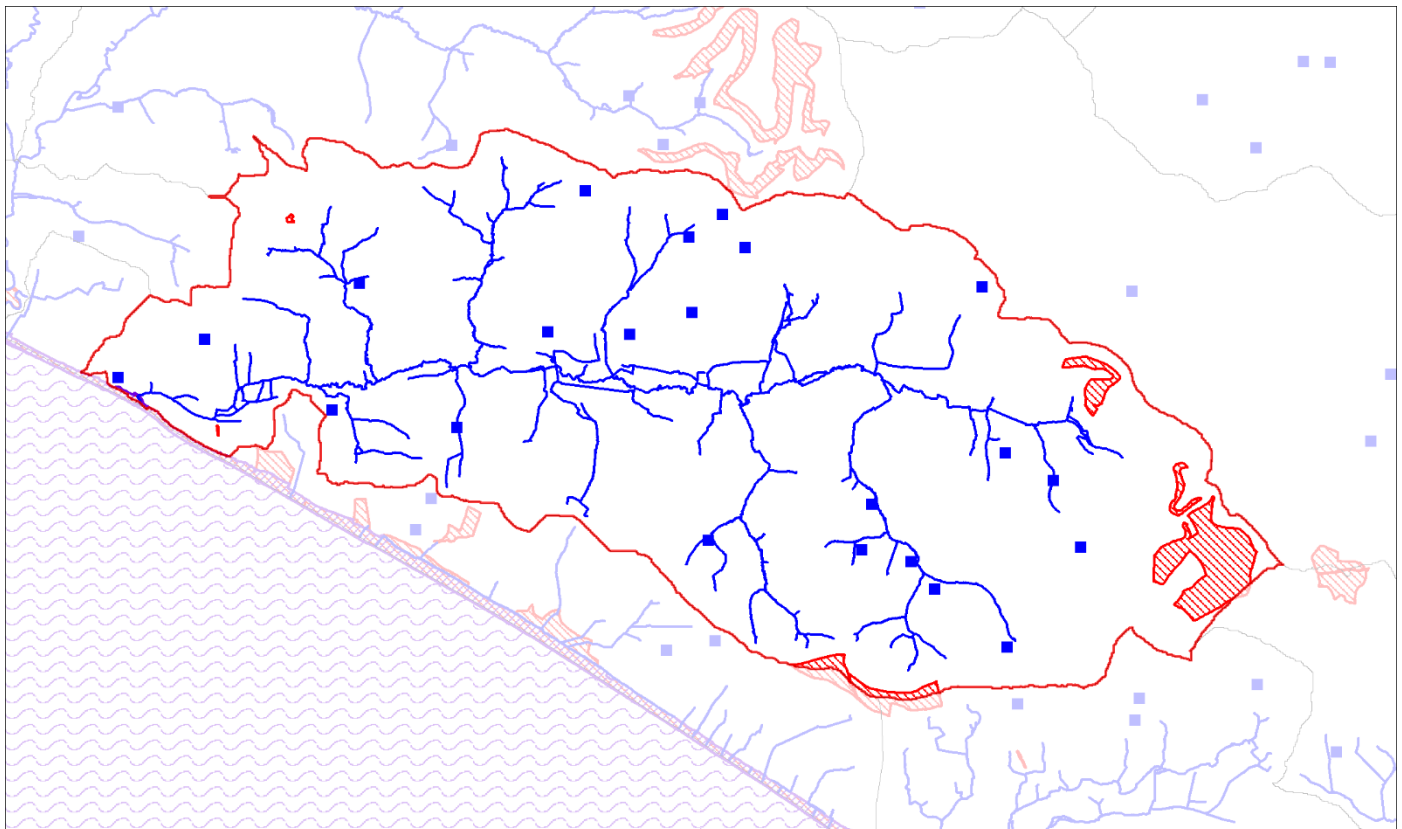
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Designations






There are five Sites of Special Scientific Interest in the catchment, covering approximately 129 ha. These are Abbotsbury Castle SSSI, Burton Bradstock SSSI, Peashill Quarry SSSI, Pitcombe Down SSSI and Valley of Stones SSSI. It also takes in small parts of the West Dorset Coast SSSI, which is also Special Area of Conservation and World Heritage Site.

There are 22 Sites of Nature Conservation Interest covering approximately 224ha.



Map of the River Bride catchment environmental designations

Key

-  River
-  Catchment boundary
-  Sites of Special Scientific Interest (national)
-  Special Area of Conservation (international)
-  Sites of Nature Conservation Interest – point (local)

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Issues & Impacts

Water Framework Directive assessment:

The Environment Agency classify waterbodies such as River Bride into categories that reflect their overall condition. These are **High** > **Good** > **Moderate** > **Poor** > **Bad**. The Bride is categorised as **Moderate**. The aim is to have waterbodies classed as Good, so the Bride is currently considered to be a failing watercourse. It was classified as Moderate in 2013, 2014, 2015 and 2016.

The areas that the Environment Agency monitor to come up with their classification are summarised below. There is more detail behind these categories, which is available from the Catchment Data Explorer website¹.

Classification area		Condition assessment category
Overall		Moderate
Ecological	Biological	High
	Hydromorphological	Supports Good
	Physico-chemical	Moderate
	Specific pollutants	No data
Chemical	Priority substances	Good
	Other pollutants	Does not require assessment
	Priority hazardous substances	Bad

The specific elements that are currently failing are:

- Phosphate
- Polybrominated diphenyl ethers (PBDE)
- Mercury and its compounds

The impacts on the river from phosphate are increased algal growth which, when it breaks down, will limit oxygen availability in the river for other forms of plants and animals. Little is currently known about the impacts of the hazardous substances on wildlife, and this an area of further work for the Environment Agency.

The Environment Agency have identified the following threats to the River Asker:

- Poor nutrient management in the agricultural sector leading to diffuse phosphate pollution
- Point source wastewater treatment leading to phosphate pollution
- Industry discharges leading to point source phosphate pollution
- Physical modification because of flood protection and urbanisation
- More information is needed to understand the sources of PBDE and Mercury.

The situation in the Bride Catchment is complicated because the river has been heavily modified in the past to service the large number of historic mills along the river. This means that the natural functioning of the

¹ <https://environment.data.gov.uk/catchment-planning/WaterBody/GB108044009550>



river has been compromised and is unlikely to be restored. Any ambitions for the catchment have to be set against this background.

Local assessment:

To get a local perspective, we carried out consulted other stakeholders about their views on the threats facing the River Bride, including Dorset Council, Wessex Water and the Environment Agency, amongst others. We did this in 2015 and updated it in 2021. The main issues are sediment from agriculture, morphology impacting wildlife, diffuse agricultural pollution, phosphates from Puncknowle Sewage Treatment Works, invasive species, and flooding in Burton Bradstock

The combined areas of most concern, as identified by the Environment Agency and local stakeholders are:

1. Sediment and phosphate contamination from agriculture
2. Phosphate pollution from Sewage Treatment Works
3. Physical modification of the watercourse that impacts wildlife
4. Flooding of property



Action

Through our engagement with organisations and individuals over the winter of 2020, several potential opportunities were highlighted for the Bride catchment. These are highlighted below:

- Wessex Water are developing Drainage and Waste Water Management Plans² that set out how Wessex Water will enhance their assets and networks to ensure they continue to deliver for their customers and the environment in a sustainable and affordable way and in the face of future challenges such as population growth and climate change. Combined Sewage Overflows have discharged a number of times over the past three years, but not above a threshold where further action would take place.
- Litter Free Coast & Sea³ are working with agencies, businesses and local groups to engage with communities surrounding beach locations and find collaborative solutions that improve everyone's enjoyment of Dorset beaches. Currently this does not include Freshwater Beach but may do in the future.
- There are funding options available to farmers to help them manage their land better for the water environment. New schemes will be starting in 2024 that will have a greater focus on managing for the water environment but up until then existing Countryside Stewardship schemes are open for new applications and extensions, along with opportunities outlined in the Agricultural Transition Plan⁴. Of particular interest / relevance are:
 - Farming in Protected Landscapes: a grant programme to help farmers deliver projects that benefit, nature, climate, people and place. It runs until March 2024⁵.
 - Woodland Creation Grants from the Forestry Commission. There are high priority areas for woodland planting along the fringes of the Bride Catchment that address water quality⁶.
 - Catchment Sensitive Farming⁷

² <https://wessexwater.maps.arcgis.com/apps/MapSeries/index.html?appid=e371301c24ca4228b36db3a3a6ba8560>

³ <https://www.litterfreecoastandsea.co.uk/current-projects-and-campaigns/beach-profiles/>

⁴

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/954283/agricultural-transition-plan.pdf

⁵ <https://www.dorsetaonb.org.uk/resource/farming-in-protected-landscapes/>

⁶ <https://www.forestergis.com/Apps/MapBrowser/>

⁷ <https://www.gov.uk/guidance/catchment-sensitive-farming-reduce-agricultural-water-pollution>