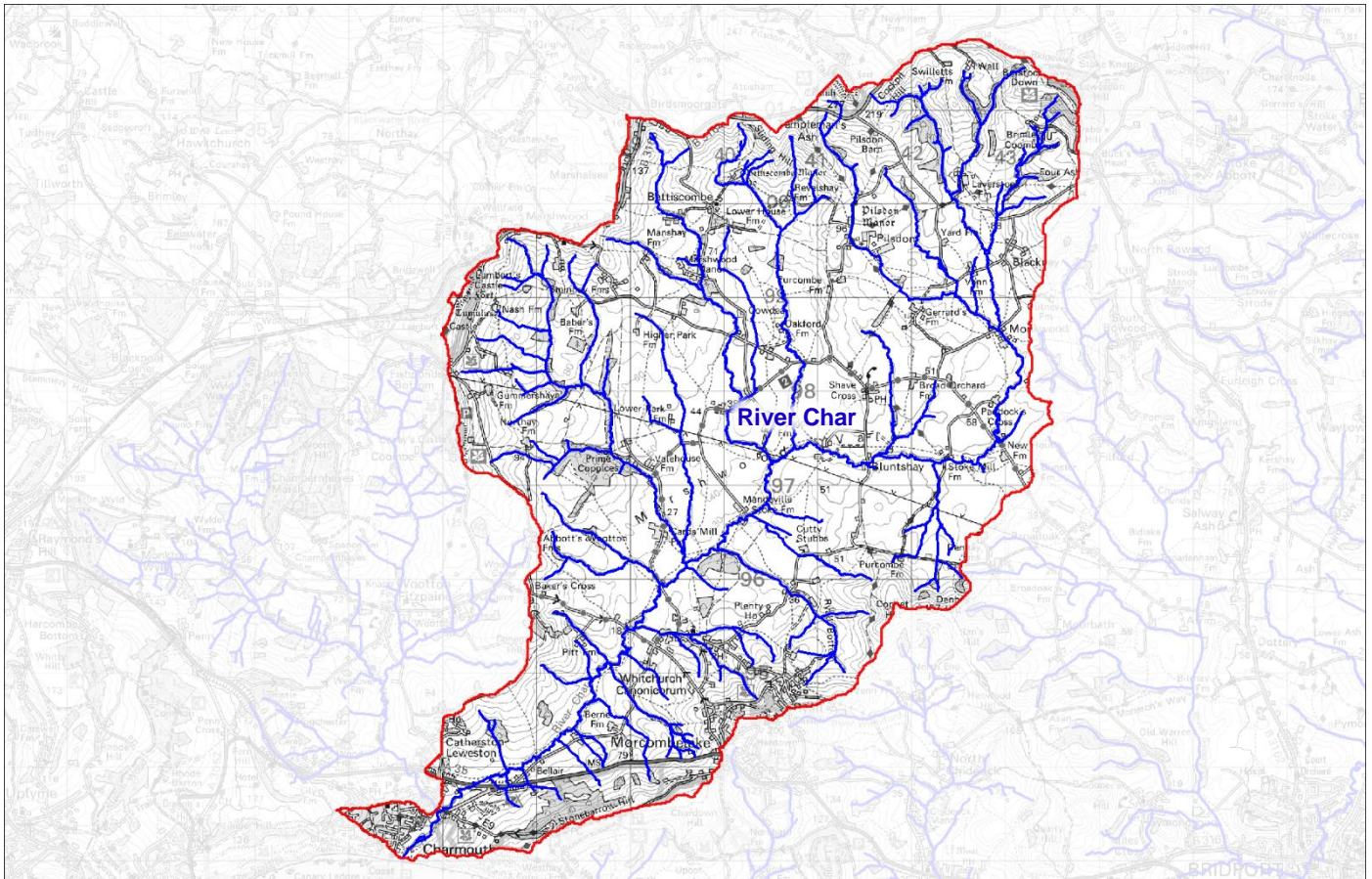




River Char



Map of the River Char catchment

Key

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River



Catchment boundary

Introduction

The source of the Char is said to be on the flanks of Lewesdon Hill but other tributaries run down from Bettiscombe and Marshwood village. Its valley quickly broadens to become the Marshwood Vale which, as its name suggests, is characterised by clay soils and lies wet for much of the year. It is a 'flashy' catchment with rapid run-off. The Char is approximately 16 km long. The entire catchment is in the Dorset Area of Outstanding Natural Beauty and the coastal strip, known as the Jurassic coast, has been designated a UNESCO World Heritage site.

Medium to large dairy units dominate much of the area with agricultural land use in the catchment being nearly all permanent and temporary grassland. The exception to this is maize cultivation, the extent of which varies from year to year. It is a renowned pastoral landscape with bountiful hedges and hedgerow



trees, and the catchment is rimmed with characterful hill forts. The river is not formally fished and, it is believed, has never been stocked resulting in an unusually 'natural' brown trout population of high conservation value.

River length	16.77 km
Catchment area	38.15 km ²
Geology	It rises on clay and flows through mudstone for the majority of its course.
Land use	Intensive dairy dominates land use
Principle towns and villages	Pilsden, Bettiscombe, Marshwood, Fishpond Bottom, Whitchurch Canonicorum, Morecombelake, Charmouth

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 Char 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 Char.

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

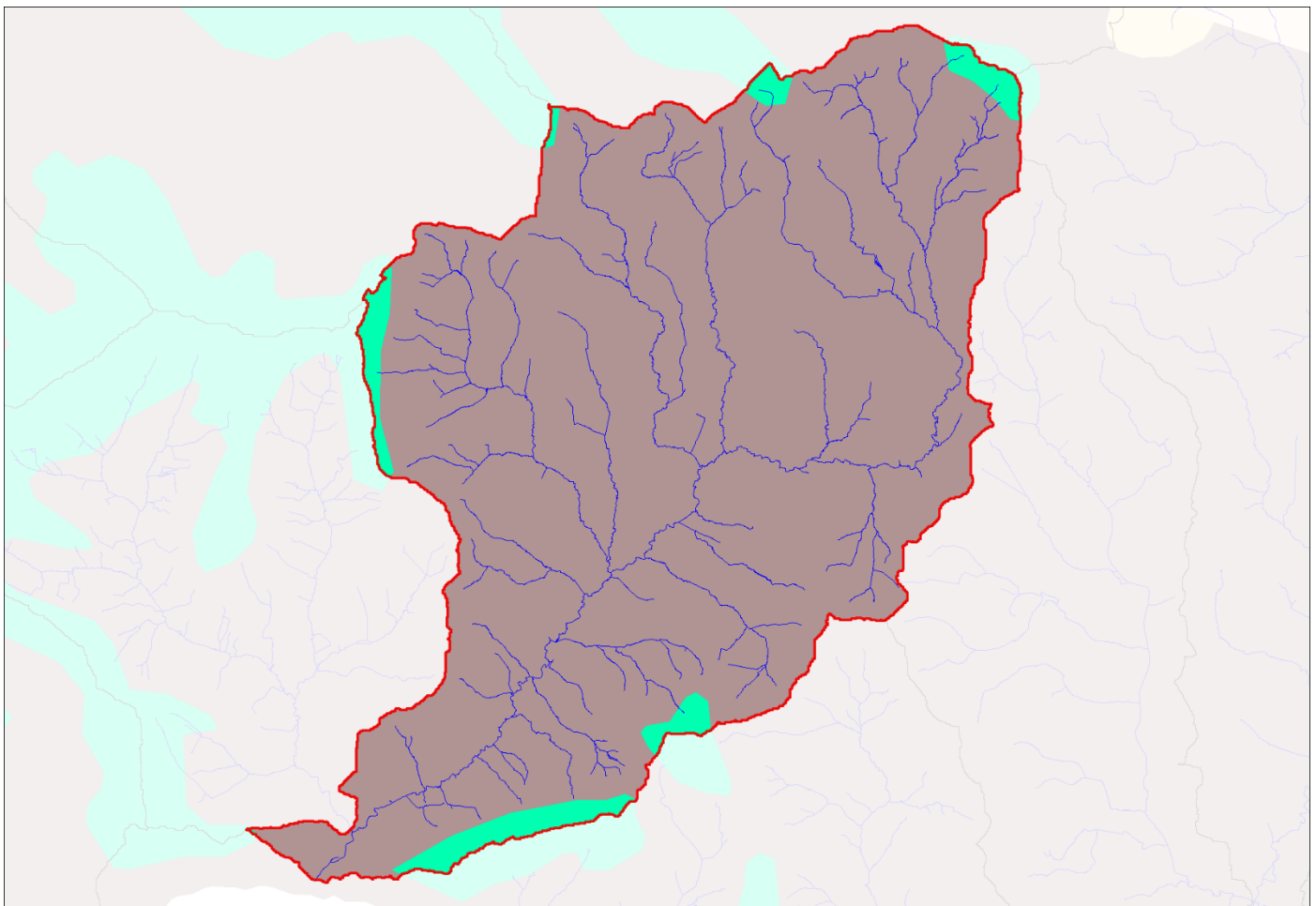
Geology

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 dominated by 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. In the headwaters are little pockets of the Gault Formation and Upper Greensand Formation, which are again made up of mudstones, sandstones and limestone. These were formed in shallow seas between 94 and 112 million years ago in the Cretaceous Period.

The Lias rocks significantly impede drainage and are therefore the primary reason for the damp character of the Char Valley. The Gault and Greensand are more permeable, absorbing water. This water reappears at the join between the Gault / Greensand and Lias at springs. The Gault / Greensand has the potential to naturally elevate the levels of phosphate found in the watercourse.

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

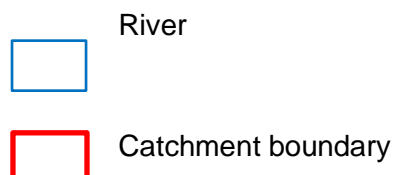


Map of the River Char underlying geology



Key

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





-  Lias Group: mudstone, siltstone, limestone and sandstone
-  Gault Formation and Upper Greensand Formation: mudstone, sandstone and limestone,



Soil types

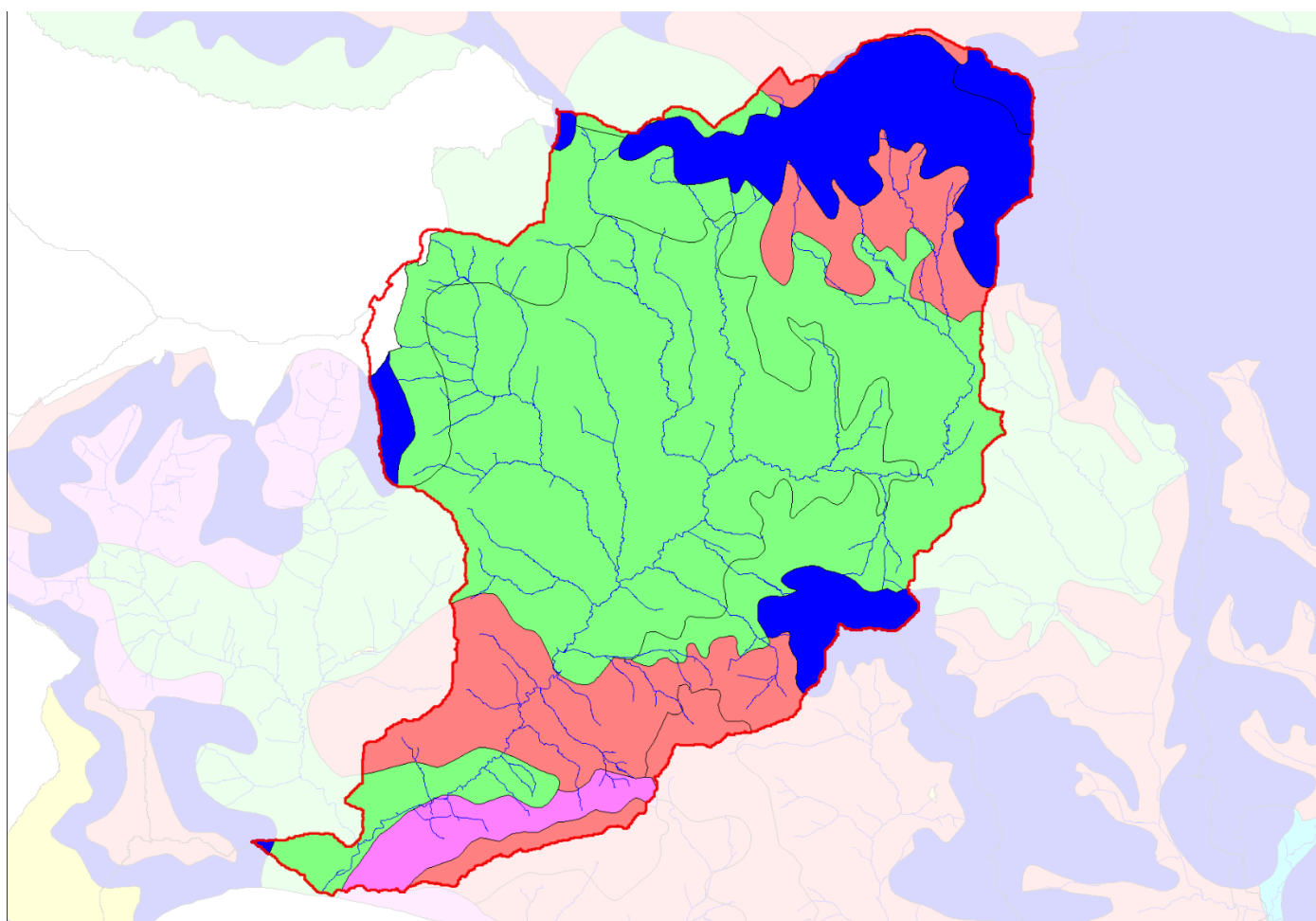
Heavily influenced by the underlying geology, soils are at the interface between biotic (living) and abiotic (non-living) worlds. These are important stores of carbon and biodiversity in their own right and provide the foundations from which others can grow. Soils can be broadly described as basic (acid), calcareous (alkaline) and neutral. The soils of the Char catchment are mostly neutral with some acid.

The dominant soil type, as characterised by Cranfield University's Soilscales, is '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.

Other soils in the catchment are:







- 'Freely draining slightly acid loamy soils'. These are freely draining to local groundwater and rivers and have low fertility and low carbon storage potential. They are suitable for neutral and acid pastures and deciduous woodlands; and can be used for arable and grassland. The main risks to the water environment are groundwater contamination with nitrate; siltation and nutrient enrichment of streams from soil erosion on certain of these soils.
- '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.
- 'Very acid loamy soils with a wet peaty surface'. Peat can store water all year round, but the underlying soils can become dry. They feed into the surrounding stream network. They have low fertility with high carbon storage potential. They host grass moor and heather moor with flush and bog communities in wetter parts. They can be used for rough grazing, forestry and grassland. The main risks are gripping or over grazing, particularly in winter, leading to accelerated erosion. Out-wintering and stock feeding practices need care if loss of vegetation and erosion are not to result.

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



Map of the River Char catchment soils

Key

-  River
-  Catchment boundary
-  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
-  Soilscape 16: very acid loamy upland soils with a wet peaty surface

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



Land use

The geology and soils of the Char 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 Char, 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 Char 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 66% of the catchment area. This is a high percentage. Improved grassland will predominantly be used to support dairy cows. 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 12% 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 dairy 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.

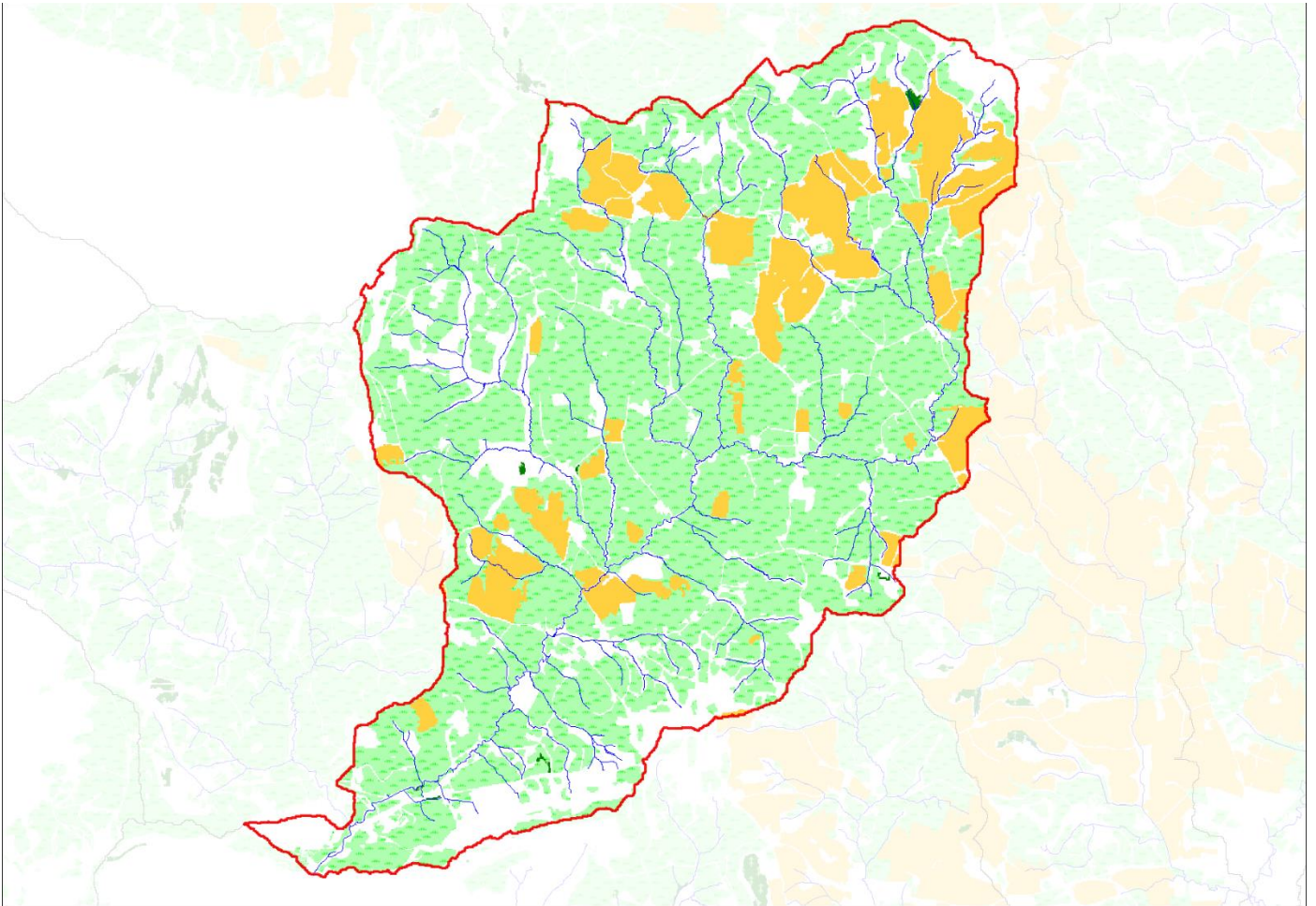
In total, intensive land use covers close to 80% of the catchment area and therefore has the potential to have significant effects on the water environment of the River Char.

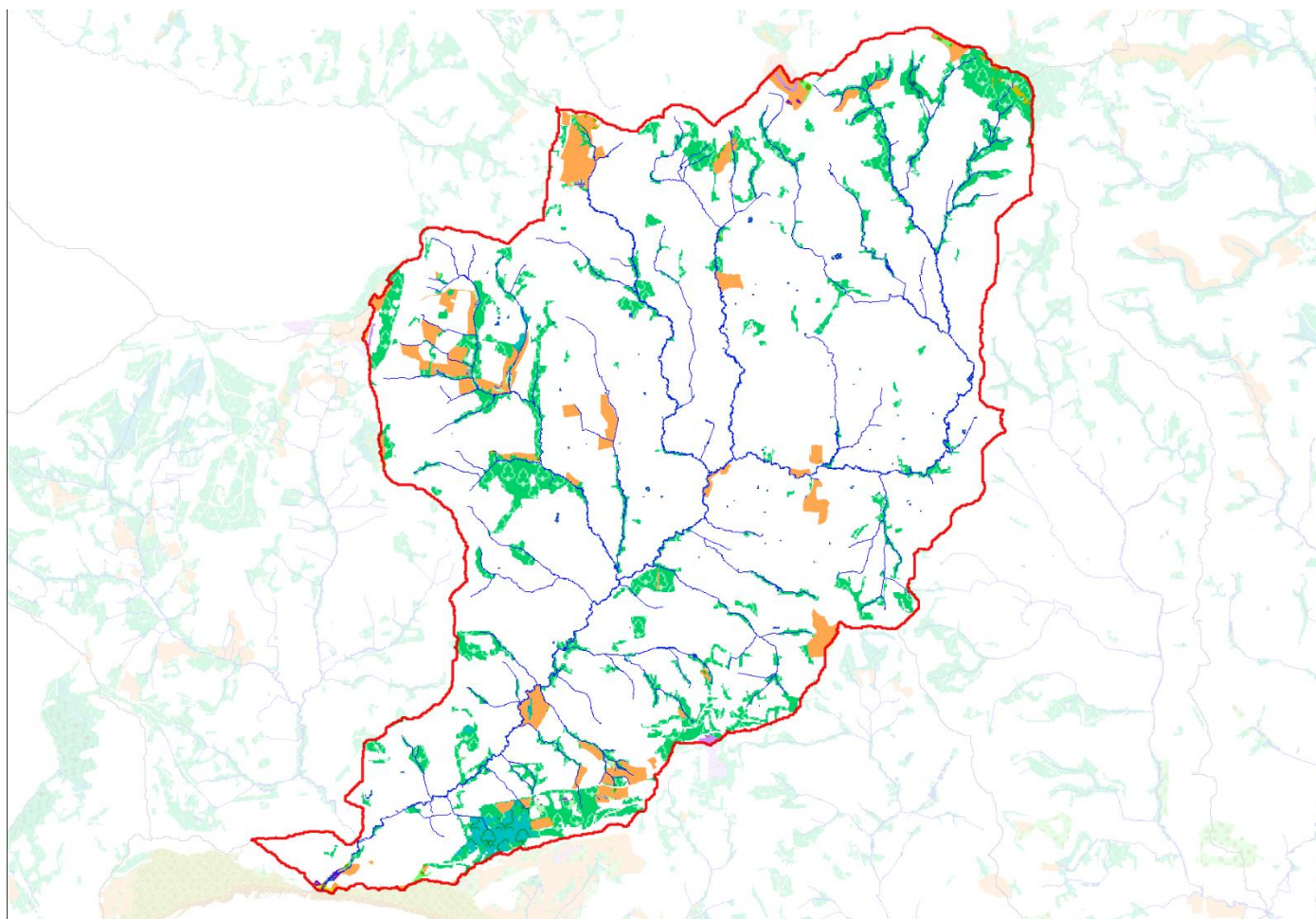
Extensive land use

Covering the remaining 20% of the catchment area are habitats associated with more extensive land use. The most significant of these is broadleaved woodland, including wet woodland, which covers 12%. The other significant category is semi-improved grassland, which covers 3% 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 5% 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 is a very small area of coastal habitat.



































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

Key

-  River
-  Catchment boundary

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	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 Char catchment are grassland and woodland. There are small areas of heathland that straddle the boundary, associated with the greensand geology, and two wetland sites near the mouth of the river.

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 a total of 19%. There is, therefore, significant capacity for restoration and enhancement to help meet this target. 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 that straddle the catchment boundary in the south-west and one in the north. There are no grassland units above this threshold.

Grassland

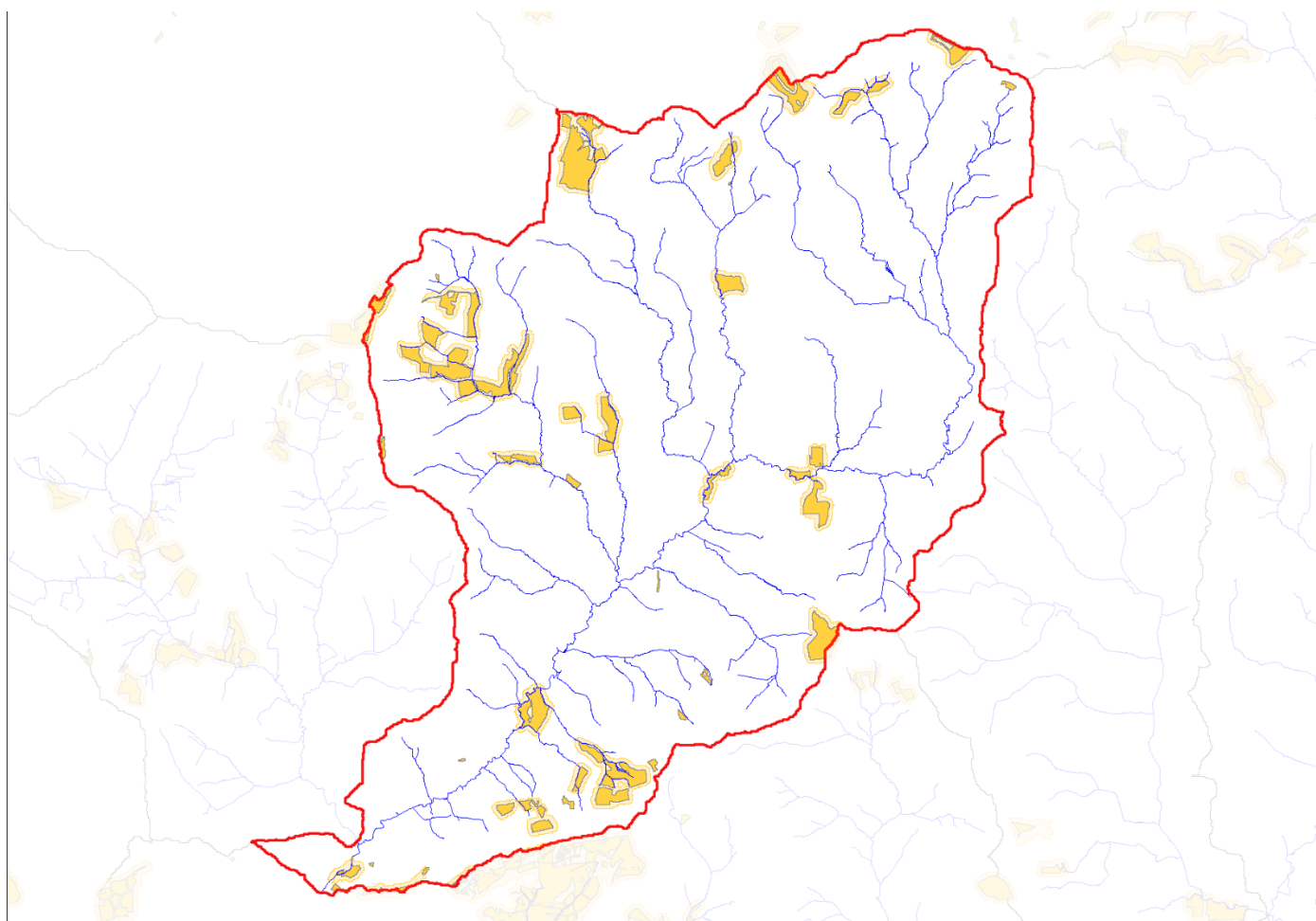
138 ha of 'core' and 'stepping stone' habitat exist within the catchment over 74 locations, none of which are over 40ha. These are mostly in the headwaters of the river on the steeper slopes. These sites support a grassland ecological network (for an average medium dispersal species) of 280ha over 24 locations.

Woodland

567 of 'core' and 'stepping stone' habitat exist within the catchment over 137 locations, three of which are above 40ha. These are in the headwaters and along the watercourse itself. These sites support a woodland ecological network (for an average medium dispersal species) of 948ha over 46 locations.





Heathland and wetland

Heathland sites are tightly restricted to specific underlying soils and geology. There is little opportunity for restoration and enhancement within the catchment. There are very few wetland sites within the catchment, which means species reliant on this habitat are poorly serviced in the Char catchment.

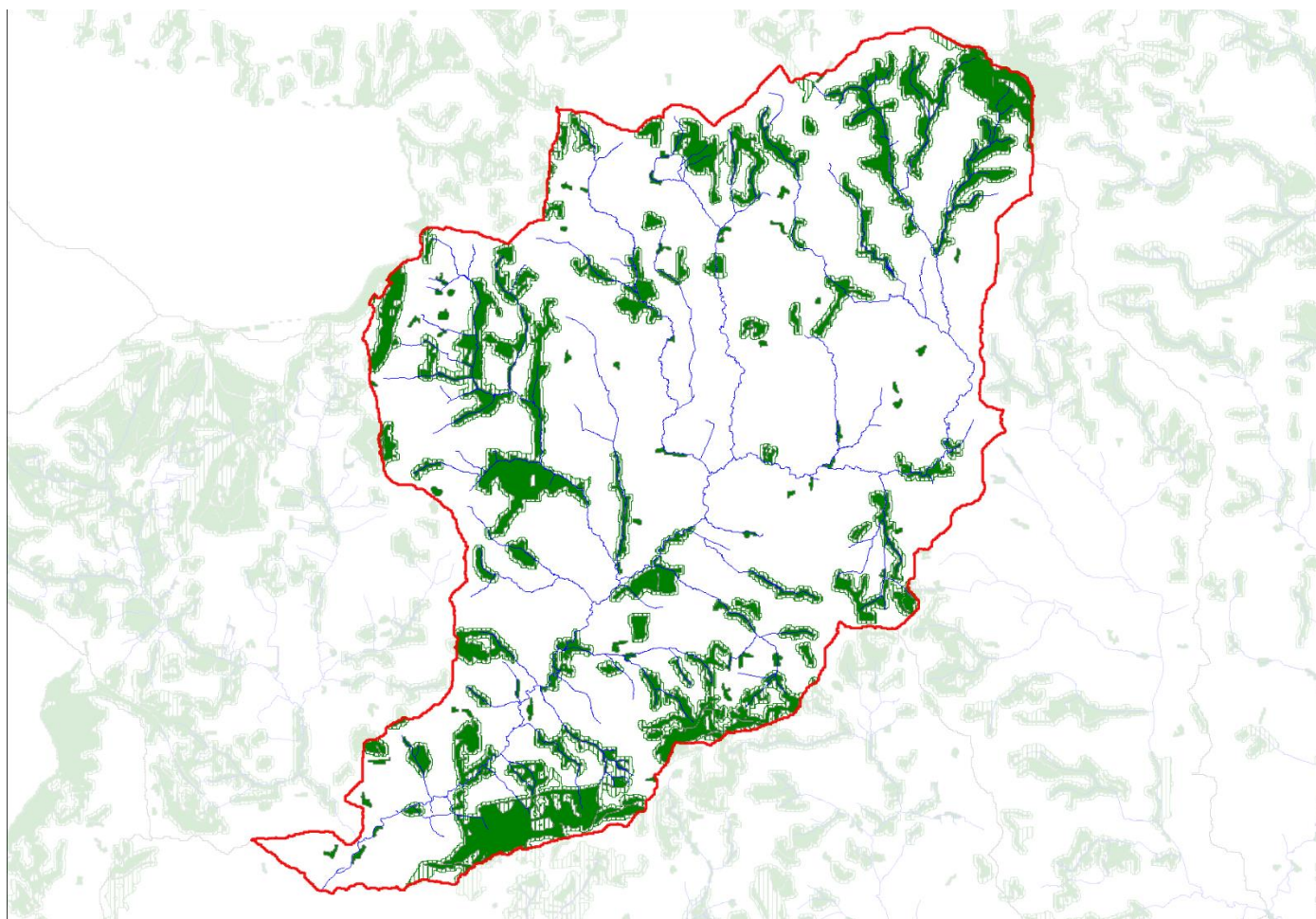


Map of the River Char catchment grassland ecological network

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 Char catchment woodland ecological network

Key

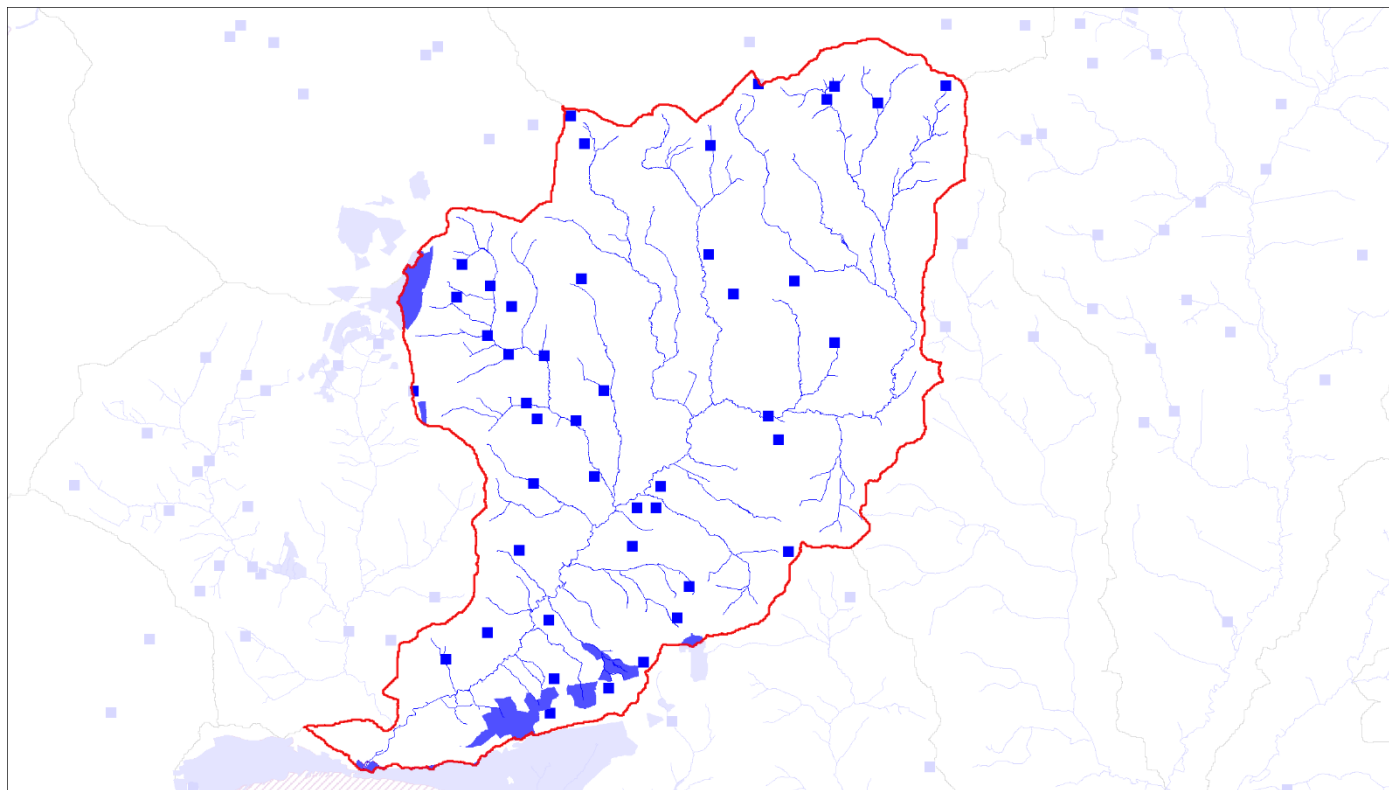
-  River
-  Catchment boundary
-  Woodland core (>1ha) and stepping stone (<1ha) sites
-  Woodland ecological network for a medium dispersal species

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Designations

There are parts of three Sites of Special Scientific Interest (SSSI) within the catchment, covering approximately 79ha. These are Lambert's Castle SSSI, Morecombelake SSSI and West Dorset Coast SSSI. The West Dorset Coast SSSI is part of the wider Sidmouth to West Bay Special Area of Conservation (SAC). There are 44 Sites of Nature Conservation Interest covering approximately 269ha.



Map of the River Char 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 Char into categories that reflect their overall condition. These are **High** > **Good** > **Moderate** > **Poor** > **Bad**. The Char is categorised as **Moderate**. The aim is to have waterbodies classed as Good, so the Char is currently considered to be a failing watercourse. It was also 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	Moderate
	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:

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

The impacts on the biology of the river are a reduced fish population with limited species diversity and abundance, compared to what you would expect in a natural stream of similar characteristics. Phosphate contamination will lead to 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 Char:

- Poor soil & nutrient management in the agricultural sector leading to diffuse sediment & phosphate pollution
- Inadequate agricultural infrastructure leading to point source phosphate pollution that impacts fish populations.
- Private sewage treatment works leading to point source phosphate pollution.
- More information is needed to understand the sources of PBDE and Mercury.

¹ <https://environment.data.gov.uk/catchment-planning/WaterBody/GB108044009790>



To get a local perspective on the condition and threats face by the River Char, we carried out an online consultation with the community over Spring 2021. This also includes the neighbouring Monkton Wyld Stream too. We received 33 responses. Of these, 83% felt there were issues affecting the character and quality of the river. The main causes of concern were felt to be:

- Sediment from fields and roads
- Run-off from fields
- Discharge from septic tanks and sewage treatment works
- Flooding
- Poor condition for wildlife
- Invasive plant species
- Other issues were also identified, particularly gully and ditch management along with debris in the river

As well as a general community consultation, we also spent time finding out the thoughts of 11 farmers in the area. These aligned with the wider community consultation: agriculture is contributing to the moderate condition of the River Char. Examples given included slurry and dirty water being spread on wet land, erosion of maize ground as well as historic high use of nitrogen. As well as agriculture, it was recognised that poor management of septic tanks was an issue, along with increased rural traffic and invasive species. There was thought to be an increase in the incidence of flash flooding, particularly on roads, and erosion of the channel as a result of flash flooding (a natural function of this type of stream). In terms of future farming in the area, the change from Common Agriculture Policy support to the incoming Environment Land Management support presents a short-term challenge, and looking further forward, so does the changing climate.

We have also consulted other stakeholders about their views on the threats facing the River Char, including Dorset Council, Wessex Water and the Environment Agency, amongst others. We did this in 2015 and updated it in 2021. The findings again reinforce the concerns of the community, with land management, sewerage, flooding and invasive species all issues recognised by stakeholders. There was also concern raised about alteration of the river leading to increased erosion. Concern was also raised about woody debris in the river.

The combined areas of most concern, as identified by the Environment Agency and other agencies, local people and those that work in the area are:

1. Sediment and phosphate contamination from agriculture
2. Phosphate pollution from septic tanks
3. Flash flooding
4. Poor habitat for wildlife
5. The impact of invasive species, particularly Himalayan balsam
6. The desire for the river to function as naturally as possible, but without causing issues downstream
7. The impact of invasive species, particularly Himalayan balsam



Action

Through our engagement with organisations and individuals over the winter of 2020, several potential opportunities were highlighted for the Char 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 Charmouth 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 Char Catchment that address water quality⁶.
 - Catchment Sensitive Farming⁷

We will now explore actions that we can deliver with the local community, and a state of the River Char report that goes into more details is available from the Parish Council website⁸.

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>

⁸ <https://www.charvalley.org/riverchar.html>