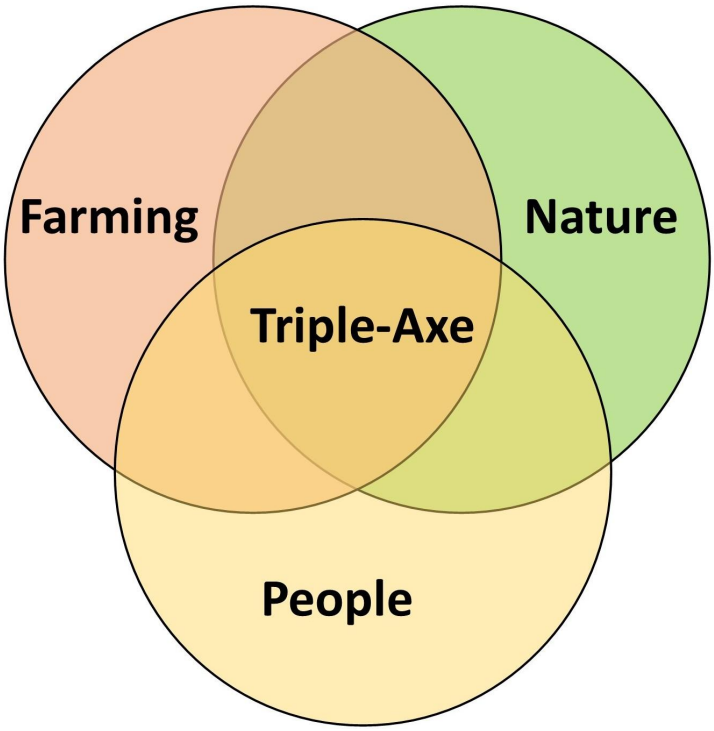
‘TRIPLE-AXE’

An Action Plan for the River Axe Catchment
2021 - 2026



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For the East Devon Catchment Partnership

Catchment Based Approach
Partnerships for Action

Contents

1. Executive Summary

1.1 Summary of Key Issues for the Catchment

1.1.1 The first section of this Action Plan (Chapter 4, the State of the Axe) describes the Axe catchment in detail and presents a wide range of evidence on the river system's current performance and the reasons for the poor condition of the River Axe Site of Special Scientific Interest/Special Area of Conservation.

1.1.2 In summary, high suspended solid levels are making the bed of the river system excessively silty, affecting fish breeding grounds and invertebrate populations, restricting light penetration, reducing river flora diversity and leaving water crowfoot more prone to washing out during high flows. High phosphate levels associated with these suspended solids are meanwhile stimulating algal and aquatic plant growth and damaging the wider ecosystem. The sources of these problems, which are often interconnected, can be summarised as follows:

1.1.3 High phosphate levels are originating primarily from agricultural diffuse pollution (which is calculated to be responsible for approximately 70% of the load);

1.1.4 High sediment loads are originating from:

a. Excessive rain water run-off from farmland, typically caused by compaction of soils by machinery and livestock, poaching of river banks and fields by livestock, and erosion from bare arable fields.
b. Erosion of destabilized banks colonised by Himalayan Balsam.
c. Excessive bank and bed erosion triggered by unnaturally high flows, damage to river bed armouring and loss of floodplain connection.
d. Artificial channel modifications and channel management (e.g. weirs, bridges, bank protection, culverting and gravel extraction) causing the river to behave abnormally and increasing erosion rates.

1.1.5 Also concerning, but with a lower overall level of impact, are:

a. High sediment loads caused by erosion of banks triggered by the death of alder trees suffering from Alder Root Disease.
b. High phosphate levels originating from commercial/household effluent (approx. 30% of the load).
c. The lack of bankside trees in the lower catchment compounds many of these problems, allowing banks to destabilise as the protection of root systems is lost, and sediment from farmland to readily reach the river.
d. The loss of riparian and slope wetlands that are able to act as buffers and perform a filtering role.
e. Air-borne ammonia emissions from farming activities with deposition in soils and waters.

1.1.6 Many of these impacts originate in modern farming practices, with the main factors being:

a. Increasing herd sizes and grazing pressure on the catchment, leading to greater soil poaching and compaction, and increasing demand for maize.
b. Increasing maize cultivation on inappropriate soils and harvesting operations late in the year during wet weather.
c. The compaction of soils by farm machinery increasing overland flow which both increases the rate of water transfer to the river channel and also increases the vulnerability of the land surface to erosion.
d. Allowing livestock to graze right up to the riverbank top, which can damage riparian vegetation and contribute to bank erosion.
e. Installation of field drains and drainage ditches can increase both sediment transfer to the river channel and decrease the time it takes the river to respond to rainfall events.
f. Ad-hoc channel modifications implemented by farmers within the catchment, such as dredging and tipping to alleviate the perceived risk from flooding and channel migration.

1.1.7 In addition to all of the above:

a. The Axe has a history of intense rainfall causing widespread surface water flooding of small communities and isolated properties.
b. Areas of wildlife-rich habitat across the catchment have become damaged, disconnected and isolated, restricting biodiversity and the ability of wildlife to move across the landscape as well as damaging ecosystem services like flood management and diffuse pollution buffers.
c. Soils show depleted levels of carbon which, together with reduced woodland and trees in the landscape, represent an opportunity lost for carbon sequestration.
d. Tourism, second only to agriculture in the economy of the area, is likely to be damaged by the river's poor condition.
e. Resident communities are often disconnected from the river which may be seen as either damaging when in flood or damaging in its erosive effects.

1.2 Summary of Action Plan Proposals

1.2.1 The **Vision** for the catchment is that '*People and wildlife in the Axe catchment flourish, living in a nature-rich, resilient landscape that sustains viable farming and the wellbeing and livelihoods of our communities*'.

1.2.2 The overarching **targets** for pursuing this vision are:

a. To reduce phosphate and suspended sediment inputs to the River Axe to a level that allows recovery of the River Axe SAC (for phosphate, to halve losses from an estimated current loss of 42,400kg per year, to 20,000kg per year by 2031. For suspended sediment, to halve losses from a current estimate of 12,000 tonnes per year, to 6,000 tonnes per year by 2031).

b. To commence removal of the main infrastructure modifications towards the restoration of the River Axe SSSI.

These targets will be pursued initially between 2021 and 2026, completed between 2026 and 2031, and monitored and maintained thereafter.

1.2.3 The desired **outcomes** of pursuing this Action Plan are that:

a. Farming enterprises will be enabled to operate within the ecological limits of the land, providing plentiful public goods and ecosystem services alongside wholesome food from profitable farms.
b. Habitat mosaics will be connected and created that are better, bigger, more numerous and joined.
c. Flagship species will be able to move freely to new climate spaces, and natural processes will be operating across the catchment.
d. The river channel and floodplain will be allowed to develop and retain a range of natural features with their associated biodiversity.
e. Residents and businesses in the catchment will have a better understanding of its ecology and agricultural management, and will be supporting a thriving, resilient nature-rich environment.

1.2.4 The key **principles** underpinning the Action Plan are:

a. A focus on supporting farming businesses to further improve, adapt or transform.
b. Involving farmers, their representatives, milk companies and the wider industry, with a focus on business as well as environmental advice.
c. Encouraging peer support networks to share best practice and collaborate in practical ways.
d. Targeting activity to the sub-catchments that are either most vulnerable or appear to be generating the most impact.
e. Tying this work to the development of a Nature Recovery Network.
f. Involving the whole community.
g. Increasing the focus on regulatory obligations and enforcing regulations when required.
h. Recognising the costs of this work and access the finance required.
i. Investing in monitoring to enable gauging of problems and improvement.
j. Creating a single programme that cuts across county, AONB and organisational boundaries, supported by all partners and agencies.

1.2.5 The Triple-Axe Action Plan is an integrated programme operating across three **main themes**: Farming, Nature and People.

<u>Farming Actions</u>

a. A co-ordinated advice and support service with a single point of contact for farmers.
b. For individual farms, a structured business and environmental transformation programme.
c. An inspection and regulatory compliance programme.
d. Access to new opportunities for natural capital investment and delivery.

e. Peer-to-peer farm support networks, benchmarking groups and farm cluster cooperation.
f. A network of demonstration farms that farmers and the public can visit.

Nature Actions

a. Adoption of nature-based solutions.
b. Encourage riparian tree planting and new wetlands throughout the catchment.
c. Reduce livestock pressures on the river banks.
d. Remove/lower in-channel control structures to re-establish more natural conditions in the river.
e. Re-meander or reconnect meanders to restore habitat and improve channel diversity.
f. Encourage the retention of gravels within-channel.
g. Restore banks using soft engineering.
h. Control invasive species.
i. Establish a baseline and monitor the impact of the changes on water quality and biodiversity.

People Actions

a. Undertake a Triple-Axe awareness campaign.
b. Organise visits to demonstration farms.
c. Promote local Triple-Axe produce as a way of supporting the changes needed.
d. Signpost and support citizen science and volunteering activities.
e. Encourage domestic septic tanks / STWs owners to improve monitoring and maintenance.
f. Encourage people to reduce their own impacts by "loving their loo".
g. Establish a Triple-Axe visitor donation scheme.

1.2.6 It is proposed that a **Triple-Axe team** will be created, hosted by an appropriate organisation or organisations, and reporting to a **Management Group** incorporating representatives of the key stakeholders.

1.2.7 An indicative **budget** is presented totalling £2.5 million in revenue and at least £4.5 million in capital costs, over four years.

1.2.8 Suggestions are offered for creating a blended **finance** mix with some sources potentially forming match funding for others.

For further information about the Triple-Axe Action Plan please contact:

Tim Youngs, Manager of the Blackdown Hills Area of Outstanding Natural Beauty at tim.youngs@devon.gov.uk

2. How this Action Plan was developed

2.1 This Action Plan and accompanying documents were commissioned by the East Devon Catchment Partnership in October 2020. Consultants (Dominic Acland, James Maben and Gavin Saunders) were then appointed to lead the process of developing the plan in close consultation with members of the Partnership, guided by a Steering Group. All meetings and discussions were held online.

2.2 The first step was to produce a 'light-touch' State of the Axe report which reviewed the evidence available and drew out the key issues affecting the river system. This was the subject of Workshop One held in early December 2020.

2.3 Based on feedback from this workshop the consultant team then developed an 'Outline Action Plan' which identified some core principles and a broad proposal to address the priority issues. This was the subject of Workshop Two in January 2021. At the same time the team organised interviews with farmers in the catchment to understand the issues they were facing; held further discussions with stakeholder organisations; secured further data relevant to the catchment to inform the State of the Axe report; began looking at a sub-catchment targeted approach; and reviewed the strategic context.

2.4 The second workshop triggered detailed discussions with a team of Partnership members from the National Farmers Union, the Farming and Wildlife Advisory Group SW and the Environment Agency, who had begun developing a proposal to engage with the farming community through a programme of technical advice and holistic business planning. This programme fitted well with the emerging Action Plan and the partners agreed to align their work with it.

2.5 At Workshop Three in February 2021 these ideas were developed into a draft Action Plan with three main themes: Farming, Nature and People, all of which inter-connected. The plan included a 4-year budget and suggested that all of the agencies concerned agreed to work under the umbrella of the plan so that farmers could be offered an integrated approach. The feedback from this last workshop was then used to generate this final Action Plan.

2.6 Participating organisations:

1. Axe Vale Rivers Association
2. Axe Vale & District Conservation Society
3. Blackdown Hills AONB
4. Devon Wildlife Trust
5. Dorset AONB
6. East Devon AONB
7. East Devon District Council
8. Environment Agency
9. Farming and Wildlife Advisory Group SW
10. Friends of the Coly
11. Natural England/ Catchment Sensitive Farming
12. National Farmers Union
13. South Somerset District Council
14. Somerset Wildlife Trust
15. South West Water
16. Westcountry Rivers Trust

3. How to use this document

The document is split into the following main sections. Click the headings below to navigate to the start of each section. Alternatively you can follow links from the contents page to find more specific sections of the document.

State of the Axe	A detailed analysis of how the catchment is currently functioning, the challenges faced and the opportunities for improvement. Follow this link for high-res versions of selected maps.
Learning from previous programmes	Details of relevant work programmes delivered within the catchment to date.
Strategic alignment	A review of relevant local and national strategies and how these are aligned with this action plan.
Case studies	Examples of relevant local, regional and national best practice projects, and results of a series of farmer interviews from the catchment.
Vision, Targets and Outcomes	The vision behind the Action Plan and a summary of targets and outcomes.
Principles	The key principles underpinning the Action Plan including farming focus, nature recovery, regulation, monitoring and community involvement.
Triple Axe Action Plan	The three Action Plan themes (Farming, Nature, People) and associated programmes for delivery between 2021 and 2026.
Budgets and funding	A detailed breakdown of costs of delivering the three Action Plan themes between 2021 and 2026.

4. The State of the Axe

4.1 The nature of the Axe catchment

4.1.1 GEOGRAPHY

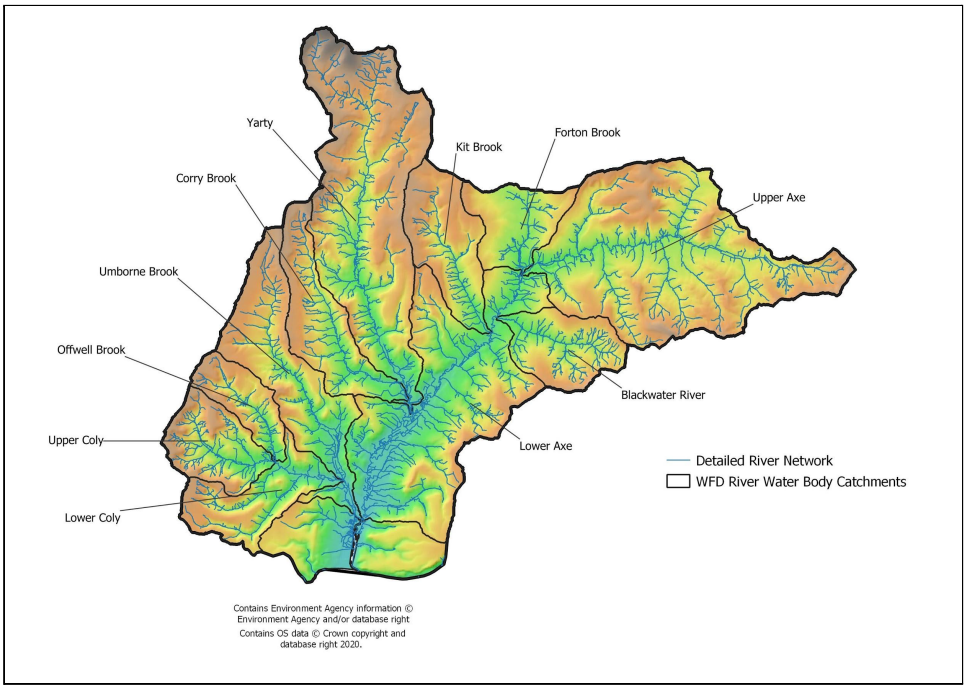
4.1.1.1 Extent

The River Axe catchment covers an area of 308 km^2 across Devon, Somerset and Dorset. The Axe is a shallow, non-navigable river which rises at 150m above sea level near Beaminster and flows for 35km west and south past the town of Axminster and into Lyme Bay. The main tributaries are the Yarty, which rises at 290m near Bishopswood, and the Coly which rises at 250m near Honiton.

The confluence of the River Yarty and Axe lies just to the south of Axminster. The main tributaries in the upper reaches of the Axe are the River Synderford and Blackwater River on the east side and River Kit or Kit Brook on the west. In the lower reaches of the catchment significant tributaries include the River Coly, Offwell Brook and Umborne Brook, on the western side of the Axe.

The Axe and its tributaries cover a total length of approximately 418 km. Data from the Environment Agency hydrometric gauging station at Weycroft Bridge near Axminster show that the average daily discharge from the river is 5.4 cumecs, and that the flow exceeds this 30% of the time and is below this level 70% of the time.

Figure 2: Sub-catchments



4.1.1.2 Geology

The headwaters of the River Axe flow from Greensand and Chalk geologies. The mid and lower reaches of the Axe are underlain by low-permeability Mercia Mudstone, Lias Clays and Greensand. The River Yarty and Corry Brook are predominantly underlain by Greensand geology with mixed permeability. The soils are generally acid loamy and clayey soils with impeded drainage. There are six geological SSSIs in the catchment.

The Axe catchment has a distinctive river valley landscape with a wide floodplain, tightly meandering river courses and valley sides which are formed by surrounding higher land. The valley sides have a strong hedgerow pattern with hedgerow trees coupled with small broadleaved woods, giving rise to a generally wooded character overall, though land use is mainly pastoral, made up of predominantly improved grassland (Note 1).

4.1.2 ECOLOGY

4.1.2.1 River Axe SSSI and SAC

A 13km stretch of the lower reaches of the River Axe, from the confluence with the Blackwater River to the tidal limit near Colyford, was designated as a Site of Special Scientific Interest under the Wildlife and Countryside Act 1981 in 1999 and as a Special Area of Conservation under the EU Habitats Directive in 2005.

Figure 3: Bedrock geology

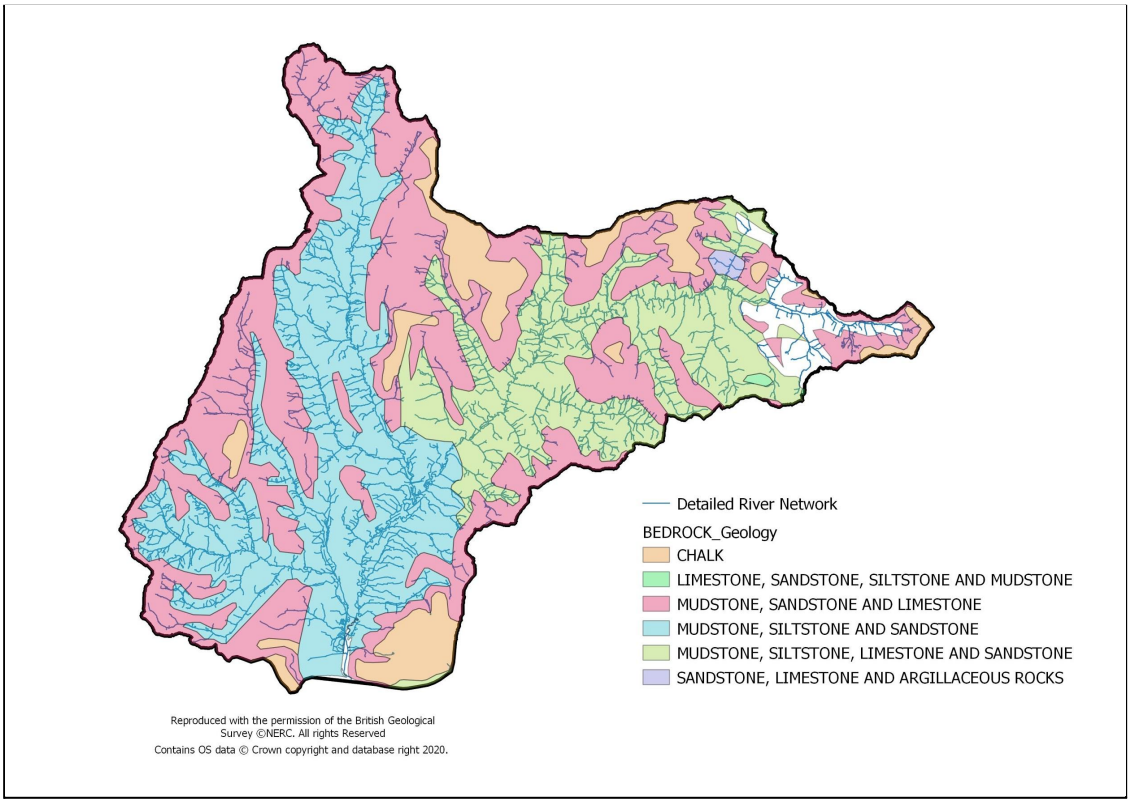


Figure 4: Soil types

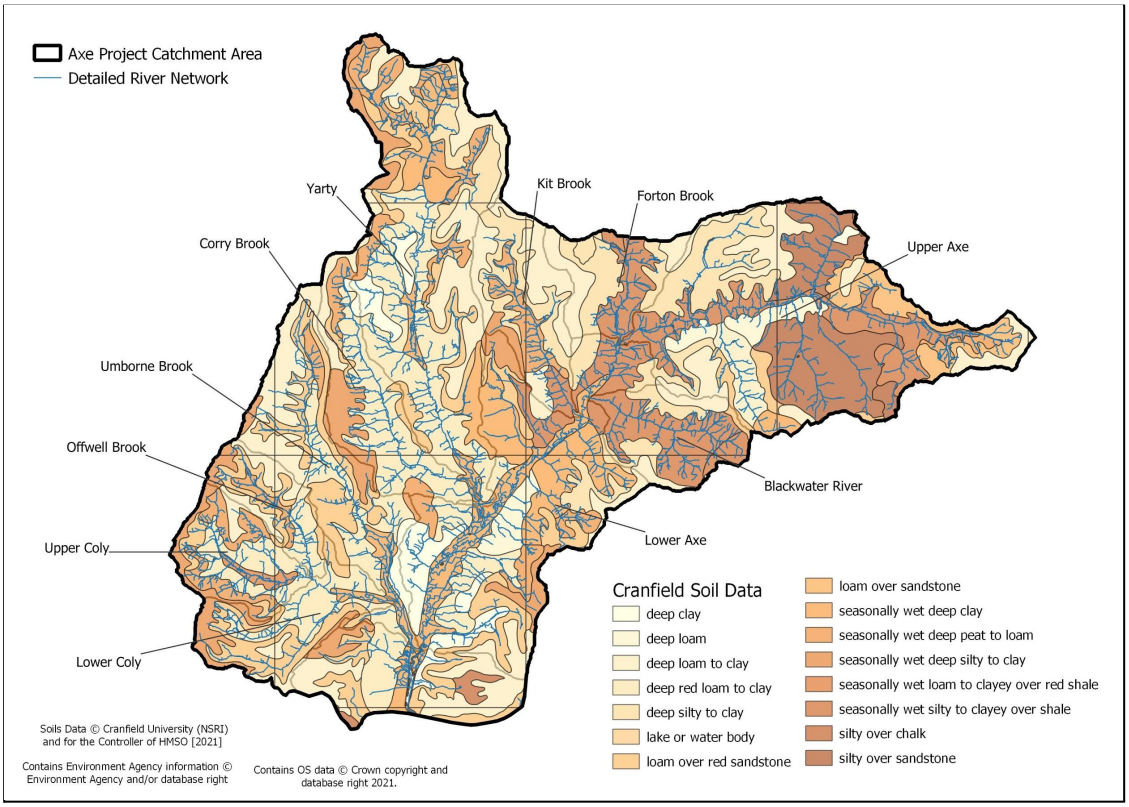


Figure 5 - soil drainage

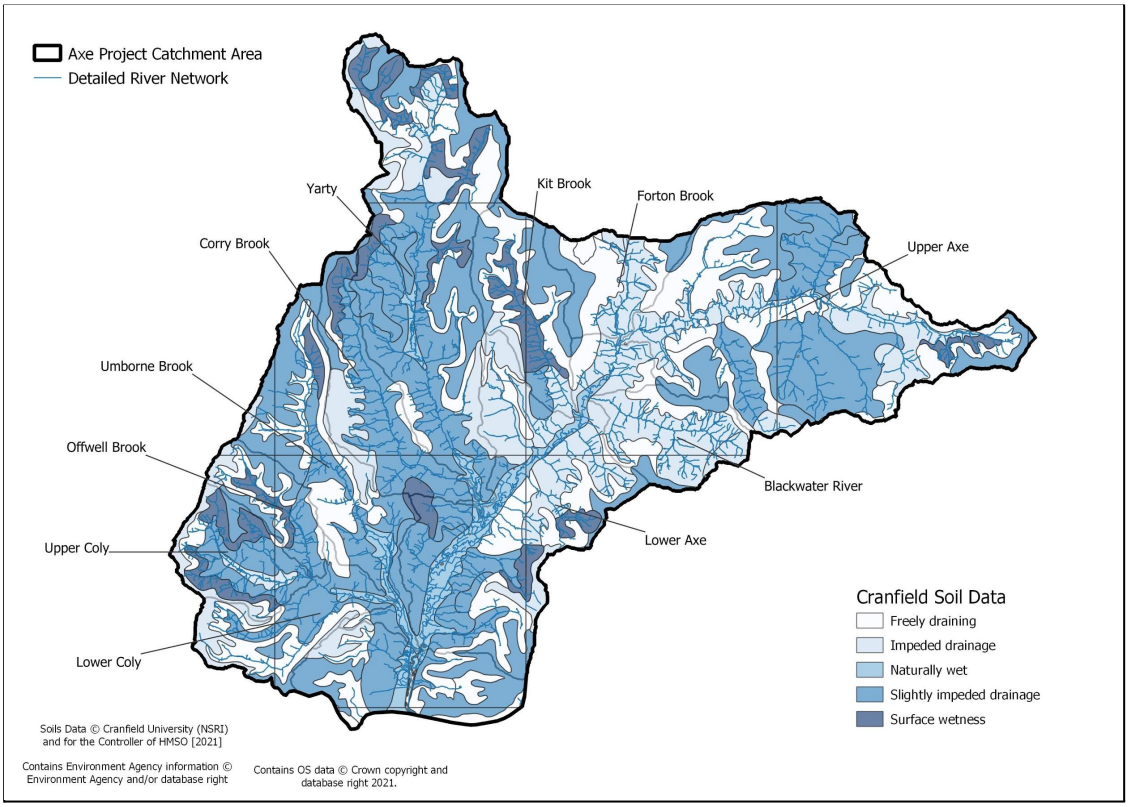
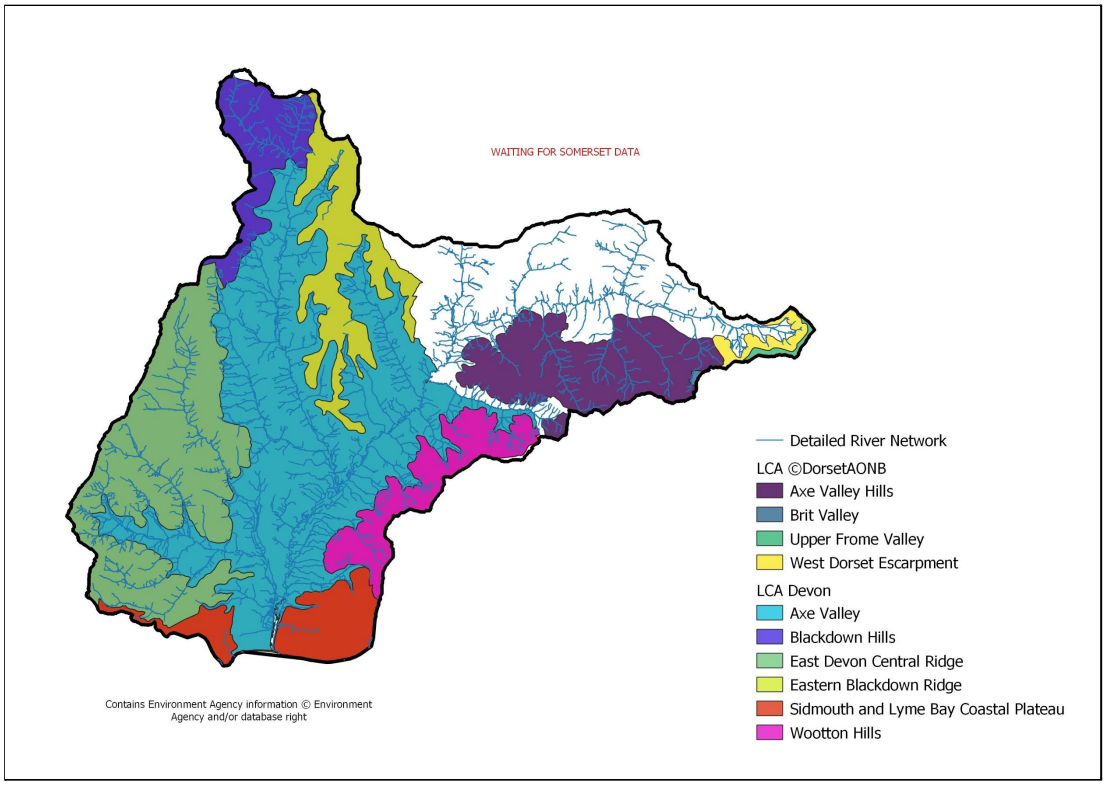


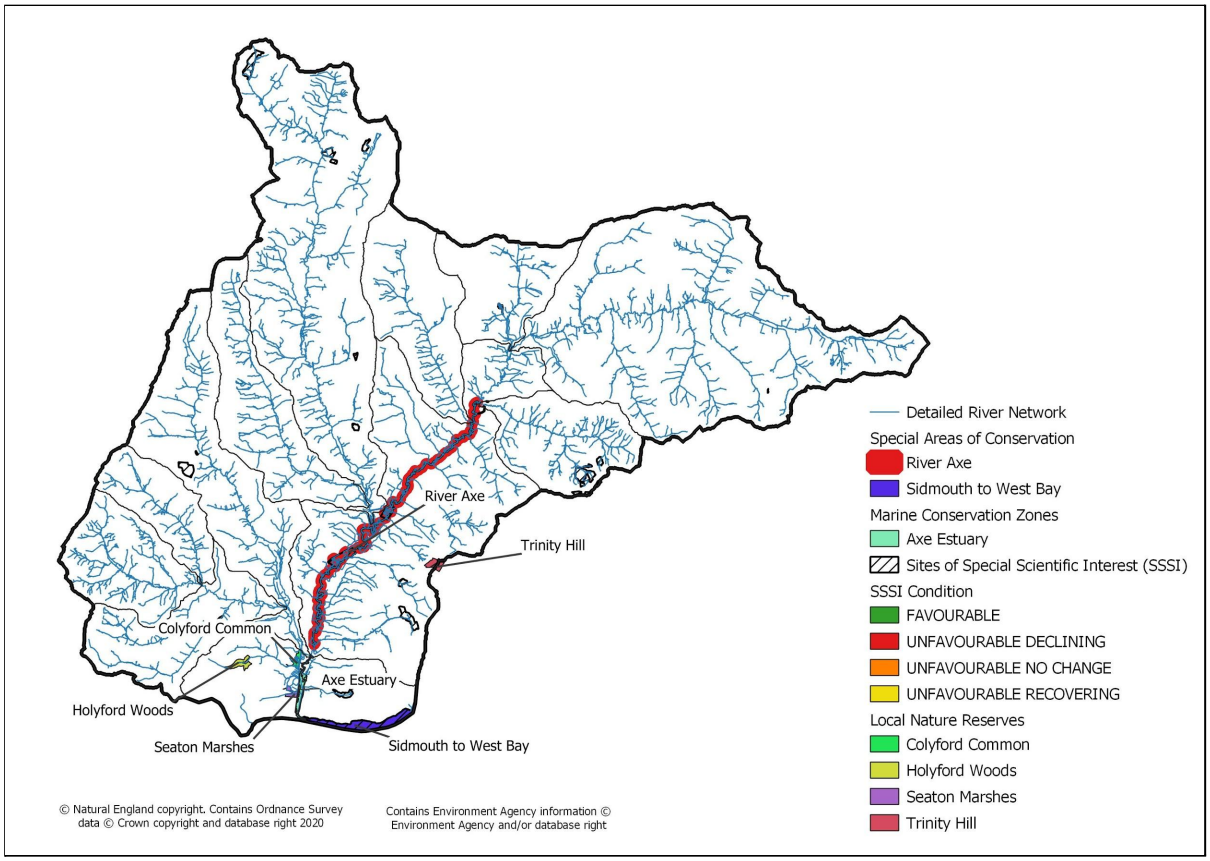
Figure 6: Landscape Character Areas



The designated area of the River Axe SSSI covers 22.94 ha. The primary reason for designation is the river habitat, as a good example of unusually active lowland river types. Over its length the SSSI displays a river environment modified by centuries or human activity, whilst still retaining many of its natural geomorphological and important ecological features.

The mixed alluvial geology of sandstones and limestones in the lower reaches of the river, and its active geomorphology, give rise to calcareous waters with many niche habitats which naturally support an exceptionally rich aquatic plant community, notably a large population of Short-leaved Water-starwort, a nationally scarce species. A variety of plant communities are represented, including in the higher reaches a community type usually confined to sandstone catchments in Scotland. In the lower reaches this gives way to a community more typical of rivers flowing slowly over clay. All of the community types represented within the SSSI have an above-average diversity of higher plants.

Figure 7: Designated sites and SSSI condition



The diverse flora results from the high bed stability of the lower reaches of the river, compared to the upper reaches where the steep banks concentrate the energy of floodwaters onto the riverbed. Also the relative scarcity of trees along the river banks allows much light to reach the riverbed.

The river provides a wide variety of habitats for invertebrates including several scarce dragonflies and damselflies, caddis flies, flies and true bugs. Of particular interest is the presence of the nationally rare Medicinal Leech *Hirudo medicinalis,* protected under Schedule 5 of the Wildlife and Countryside Act, 1981. The SSSI contains species of fish considered to be important within a European context, with Atlantic Salmon, Bullhead and Brook Lamprey present. In addition, the river supports a run of Sea Trout and has a population of the non-migratory Brown Trout. The river supports Kingfishers, Sedge Warblers, Reed Buntings, Grey Wagtails and Sand Martins, and a small population of Otters.

The Axe is an active river system, demonstrating contemporary planform change in a lowland gravel bedded river. Downstream translocation of meanders, changes in sinuosity and meander wavelength are all observed along the stretch of the river south of Axminster.

The SAC designation is for the presence of 'Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion' plant assemblages. At the time of designation the river was considered to be one of the best examples of this type in the UK.

4.1.2.2 Other terrestrial habitats

Seaton Marshes Nature Reserve, comprising Seaton Marshes, Black Hole Marsh, Colyford Common and Stafford Marsh, is a freshwater grazing marsh managed by East Devon District Council, covering 150 ha at the lower end of the River Axe just inland from Seaton. The site supports significant populations of wildfowl and wading birds.

There is a concentration of unimproved habitats in the upper reaches of the Yarty, comprising springline mire and wet heath (on Yarty Moor SSSI and in small sites around Bishopswood and Buckland St Mary, and at Stockland Turbaries) and unimproved neutral and acid grassland (eg. at Bishopswood Meadows nature reserve and Long Lye SSSI). The Umborne valley has a concentration of unimproved neutral grassland and wet meadows. The Offwell Brook emerges from a large area of woodland.

There are eight biological SSSIs across the catchment, representing springline mire, freshwater wetland, neutral and calcareous grassland.

There is a relatively dense network of hedgerows across the catchment, notably in the Kit River valley (Wambrook), upper and mid Yarty valley, Umborne and Coly valleys. Woodland cover is generally sparse, with fragmented clusters of broadleaved and coniferous woodlands in the upper Coly valley, upper Yarty, Kit River and mid Axe around Winsham and Chard Junction.

Figure 8: Existing Habitats

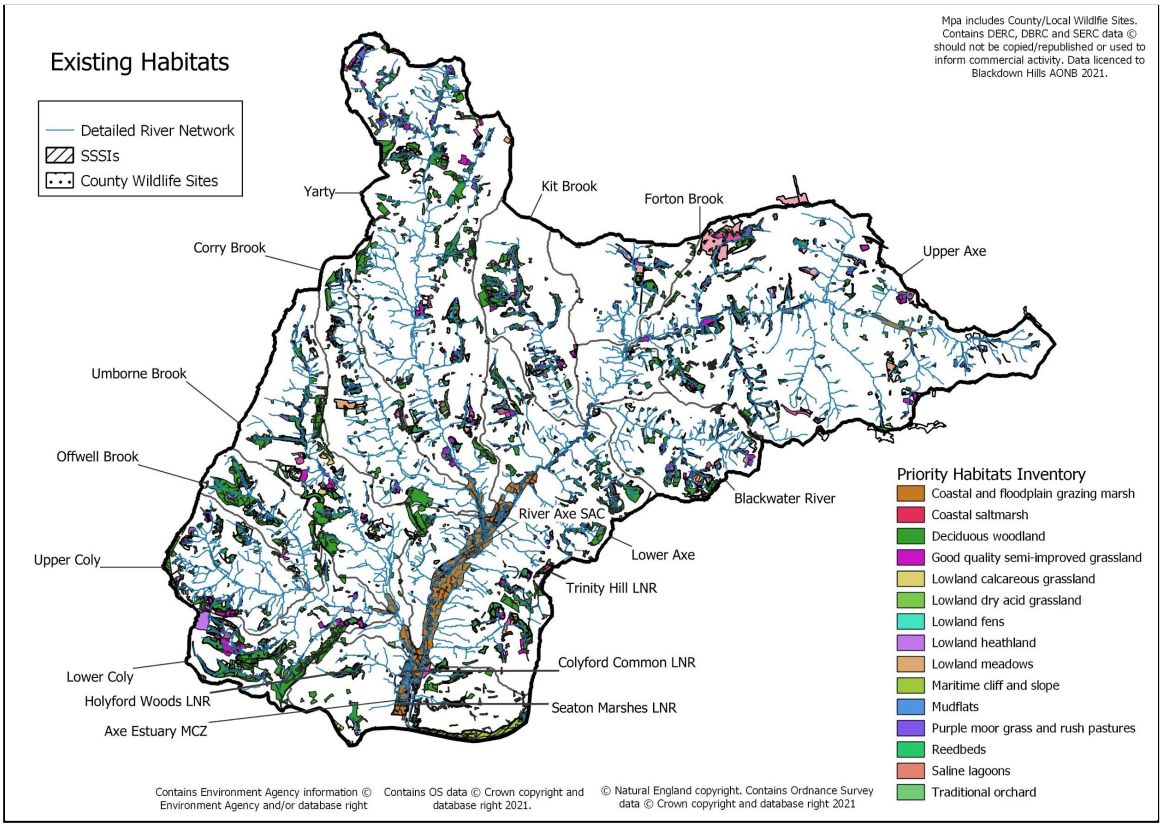


Figure 9: Priority habitats

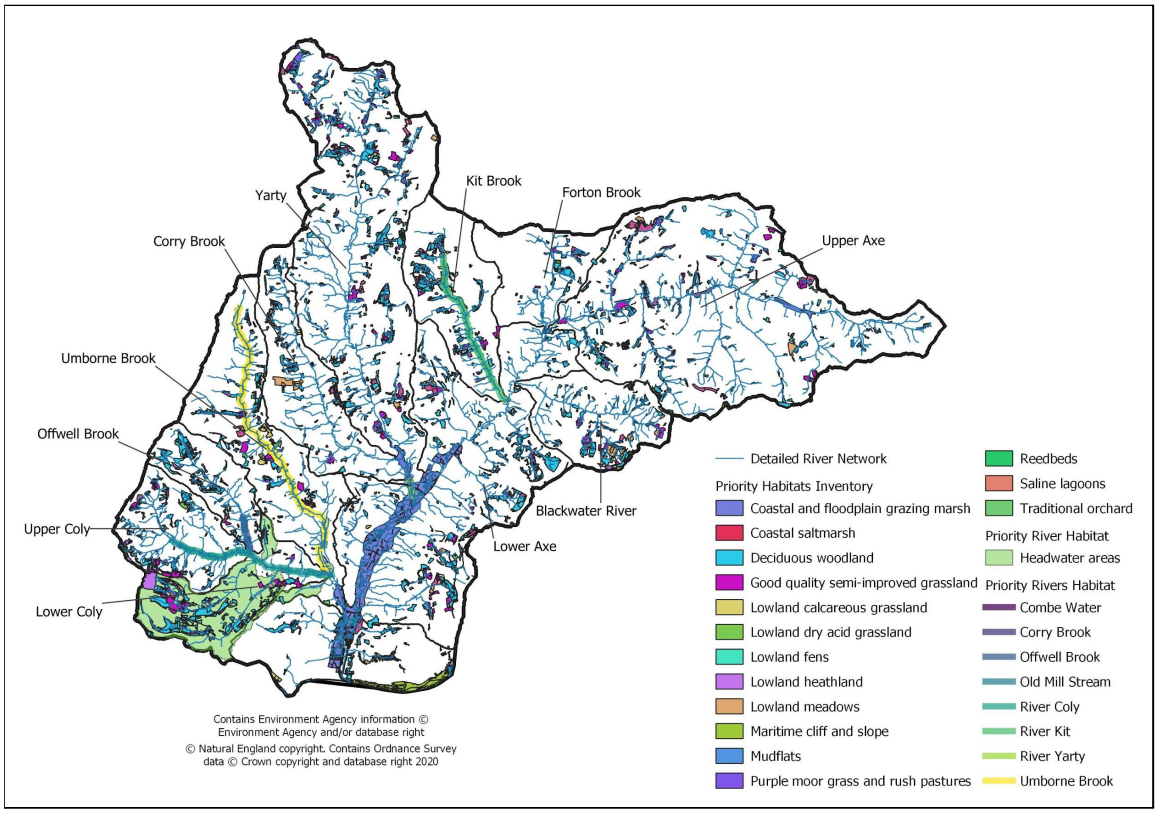
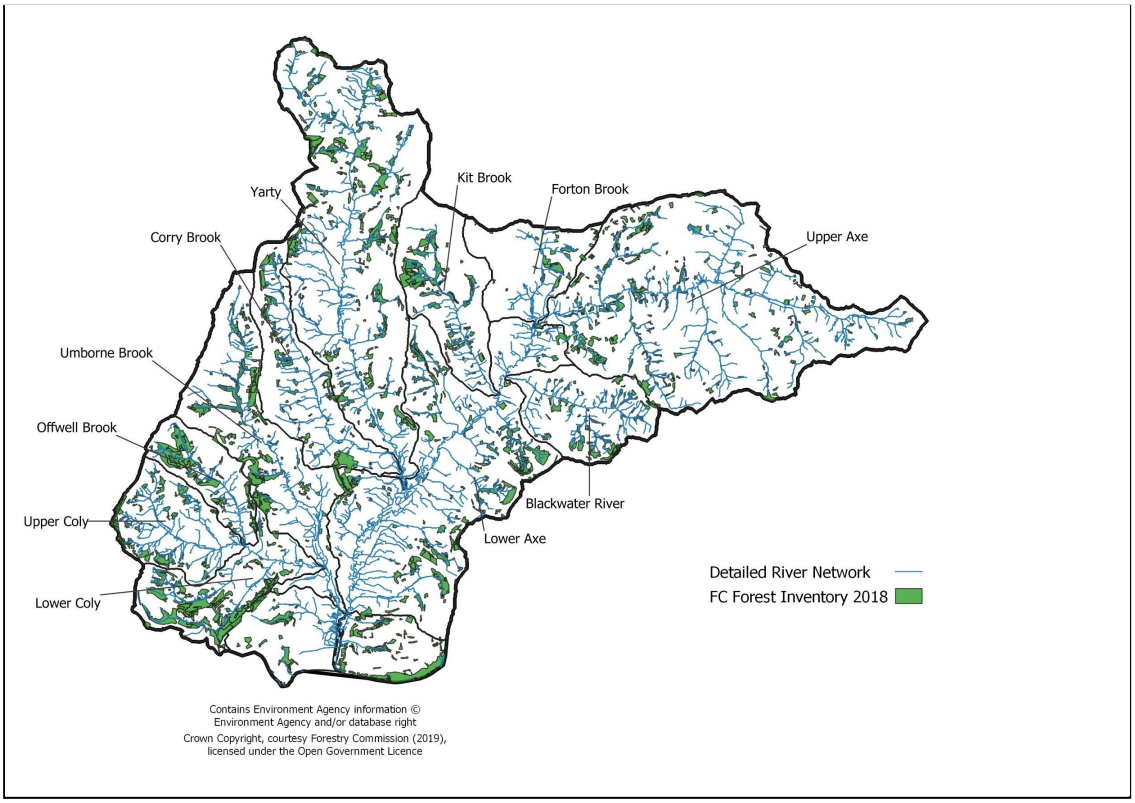


Figure 8: Woodland cover



4.1.2.3 Intertidal and marine environment

The Axe Estuary Marine Conservation Zone (MCV) was designated in 2019 and is an inshore site covering an area of approximately 0.33 km² at the mouth of the Axe Estuary and is an important link between the surrounding wetlands and Lyme Bay. The areas of coastal saltmarshes, intertidal sediments and rocky habitats act as important nursery grounds for juvenile fish, including sea bass, and support habitats for sensitive species of birds, crustaceans (such as crabs, lobsters and barnacles) and molluscs (such as mussels, native oysters and cockles). The estuary is also home to the critically endangered European eel. Due to the highly dynamic nature of the site, the areas of intertidal sediments, consisting of muds, coarse and mixed sediments, create a mosaic of different habitats supporting a wide variety of species.

The MCZ is directly affected by upstream water quality from the River Axe. Efforts to improve upstream land management and water quality to reduce sediment and nutrient loads will be beneficial to the MCZ.

The Lyme Bay Annex 1 Reefs comprise of outcropping bedrock, stony reef and biogenic reefs. The range of bedrock types found within the area contributes to the variety of different habitats and subsequently adds to the diversity of the site. A study by Hiscock & Breckels (2007) described the site as a biodiversity "hot spot" after identifying particularly high species richness in the area (Note 3).

Figure 9: Axe MCZ - Map produced by Natural England 2019

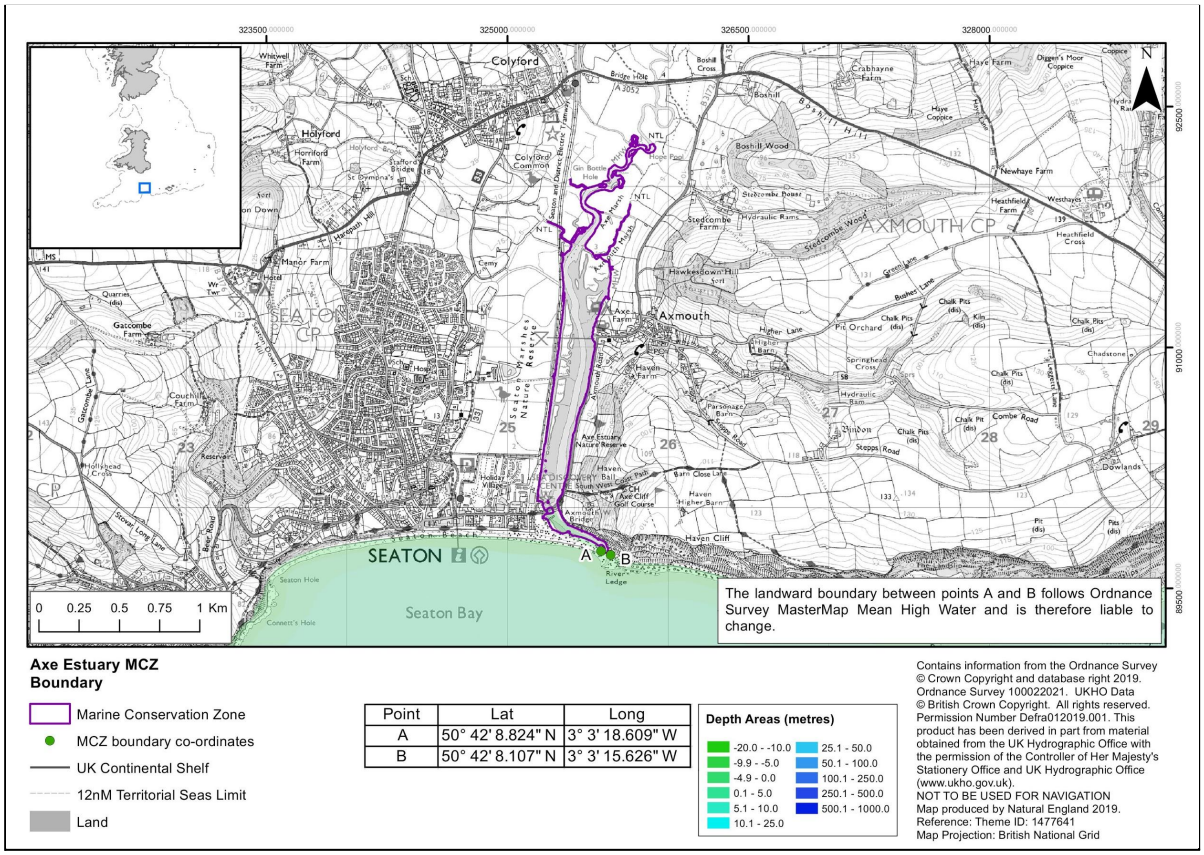
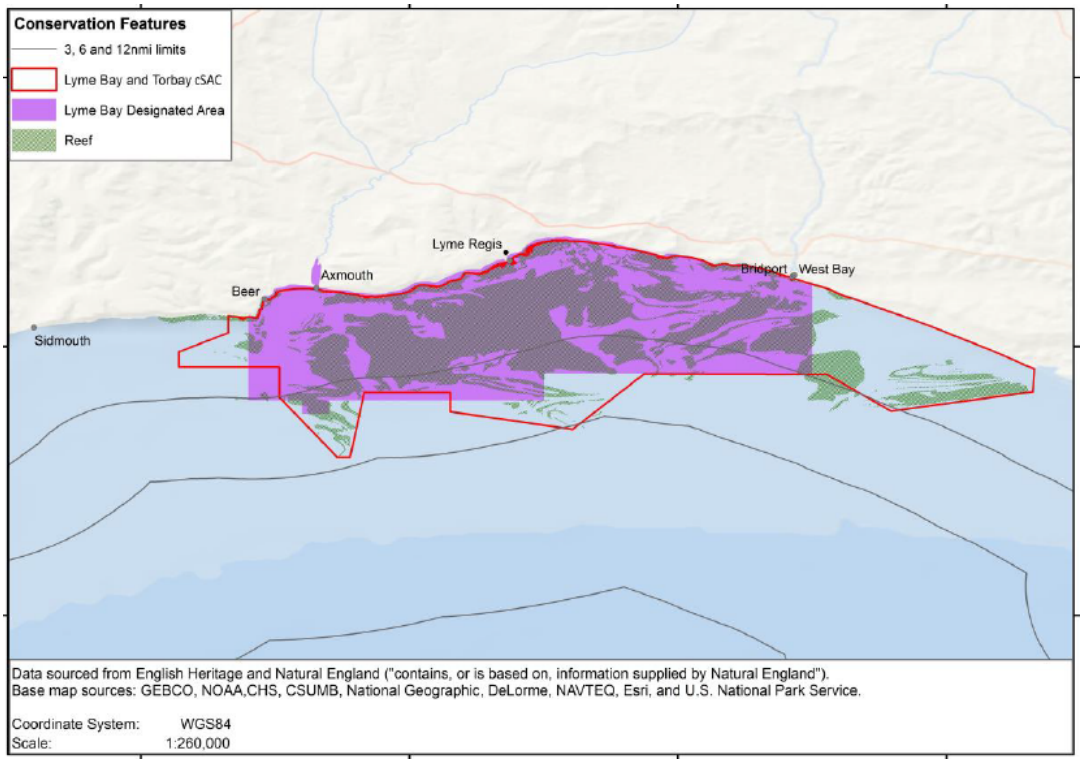


Figure 10: Marine designations



The reefs are renowned for their dense floral and faunal assemblages, and are known to support both nationally and internationally important marine species including: Sponges (*Cliona celata*), Corals (*Alcyonium digitatum, Caryophillia smithii*), Anemones (*Aiptasia mutablilis*), Bryozoans (*Pentapora fascialis*) and Sea fans (*Eunicella verrucosa*). The colonial pink sea fan (*Eunicella verrucosa*) is of particular note and is listed for conservation under the Wildlife and Countryside Act 1981 and is included in the IUCN Red List. Other notably rare species recorded in the area include the sunset cup coral *Leptopsammia pruvoti* and nationally rare sponge *Adreus fascicularis*[1].

4.1.3 HERITAGE

An investigation of the Lower Palaeolithic site at Broom, Devon, highlighted the importance of the archaeological and geological legacy resulting from more than 150 years of field investigations. The site, which has produced large numbers of Palaeolithic artefacts and is located in Middle Pleistocene fluvial sediments approximately 300,000 years old, is generally regarded as the most important open-air archaeological site of earlier Palaeolithic age in south-western Britain[2].

The name 'Axe' derives from a Celtic word meaning 'abounding in fish' (also expressed in the names Exe and Usk). The earliest human settlements are marked by a number of Neolithic bowl barrows in the western half of the catchment. Late Bronze Age and Iron Age fortifications include Stockland Great and Little Castle, Membury Castle, Lambert's Castle, and Howley Farm hillfort near Yarcombe.

Roman occupation is evidenced by the route of the Fosse Way which runs south west to north east across the lower catchment, the Exeter to Dorchester road running west to east, a Roman hillfort at Axminster, and by a Roman villa at Whitestaunton. There is a Norman motte castle at Castle Hill, Wilmington, and the major Medieval Cistercian Forde Abbey near Winsham, together with the lost Abbey at Newenham, close to the confluence of the Axe and the Yarty, south of Axminster. The Axe Boat is a scheduled wreck of a medieval coastal sailing vessel in the Axmouth estuary. Beckford Bridge, over the Yarty near Dalwood, is a single-arch post-medieval packhorse bridge.

The market town of Axminster has a Celtic origin, and is sited at the junction of the Fosse Way and Exeter to Dorchester Roman roads. It hosted a cattle market from 1210 until the outbreak of Foot & Mouth in 2001. The town has been closely associated with carpet making since the eighteenth century.

The floodplain of the Axe has been extensively farmed since the Roman period and by the Medieval period is documented as containing areas of strip farming with meadow management that incorporated seasonal meadow flooding.

[1] This section of text and plan are taken from the Lyme Bay Fisheries and Conservation Reserve: Integrated Fisheries Management Plan 2014, Appendix D.
[2] The Axe Valley at Broom, CP Green and Rob Hosfield, 2013

4.1.4 AGRICULTURE

The catchment is substantially dominated by dairy farming, reflecting the good grass-growing conditions it provides. The major land cover is improved grassland farmed for grazing or forage, with arable crops including maize, winter and spring cereals. According to data from the Rural Land Register in 2013 and the Agricultural Census of 2010 there were around 1000 individual farm holdings in the catchment at that point, covering around 36,300ha (88%) of the catchment area. Of the mapped farmland in the catchment, c.15,000ha (38% of the farmed area) are under temporary or improved grassland and c.15,800ha (41% of the farmed area) have been used to grow any form of crops. The remainder is under rough/permanent pasture or woodland/forestry. The total area of woodland/forestry in the catchment is 3,890ha (9% of the catchment area).

RLR data indicates that c.370 of the farm holdings within the Axe catchment are over 30ha in size. The 2010 Agricultural Census indicates that there are approximately 87 pig/poultry holdings, 101 dairy, 109 beef and 200 arable (predominantly maize and wheat) farms in the catchment area.

A comparison of AgCensus returns between 2000 and 2010 clearly show an intensification across the catchment for cattle, sheep, maize and temporary grassland. The amount of land used for temporary grassland decreased in the north-east of the catchment, and increased in the north-west between 2000 and 2010. In addition land used for maize cropping increased in the north-east around the upper Axe and Blackwater sub-catchment.

Figure 11: Landcover 2007

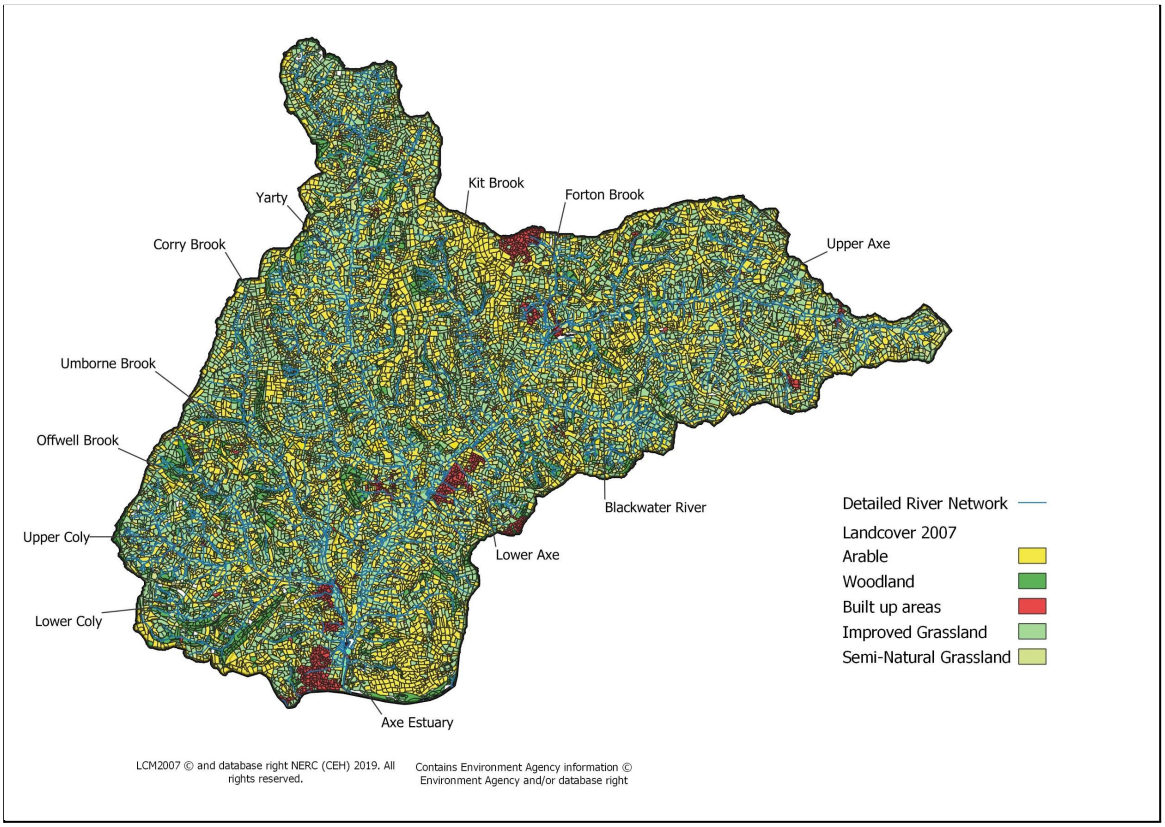


Figure 12: Landcover 2015

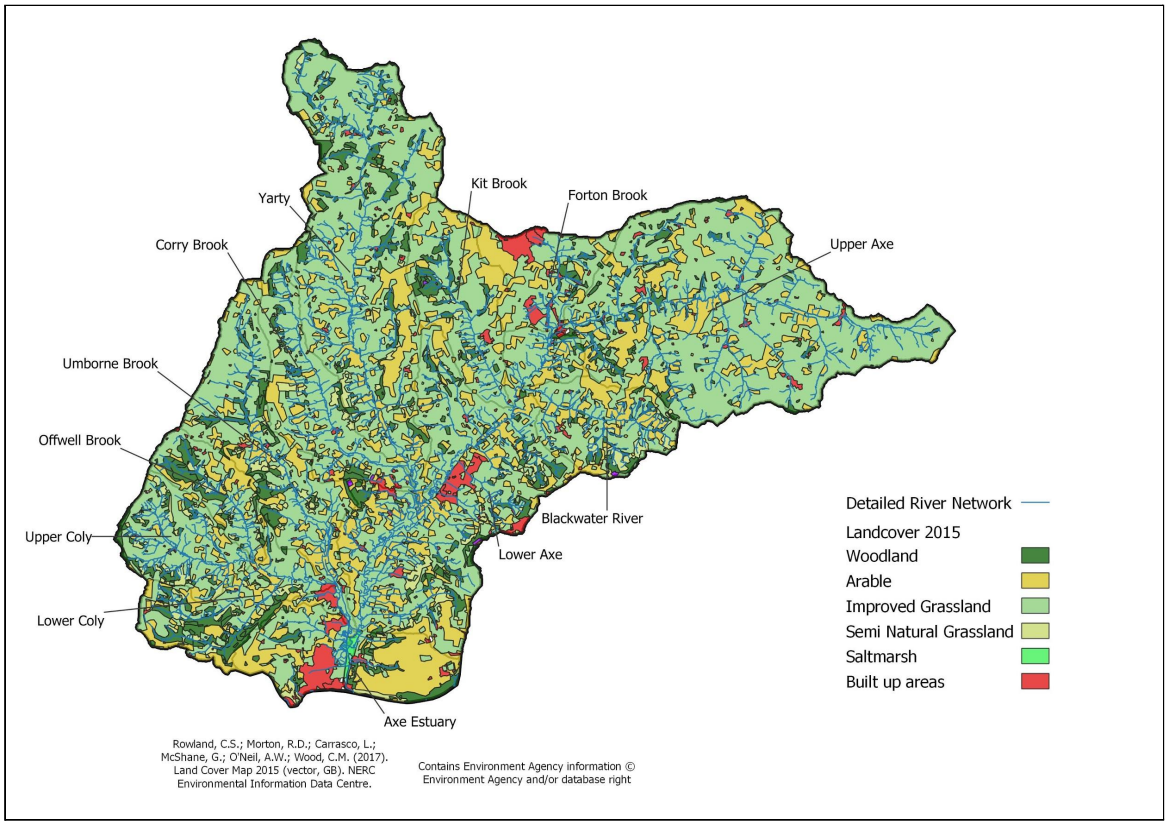
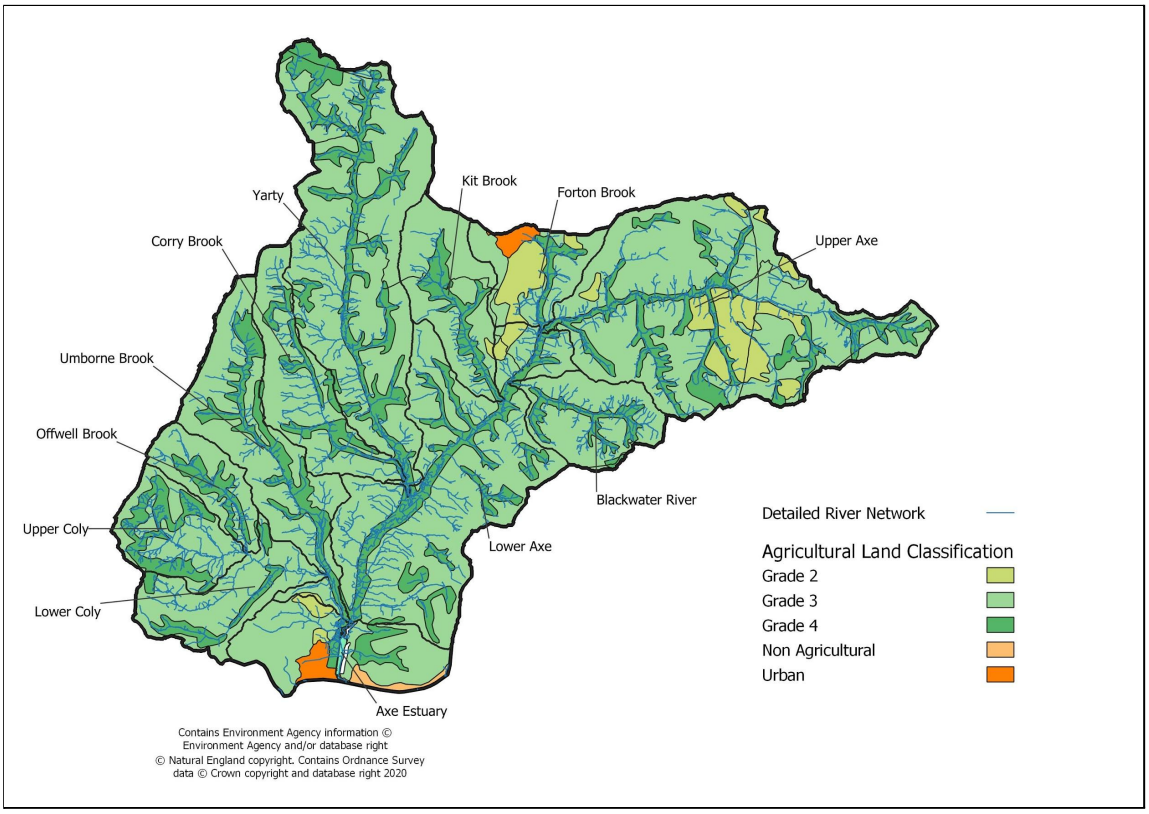


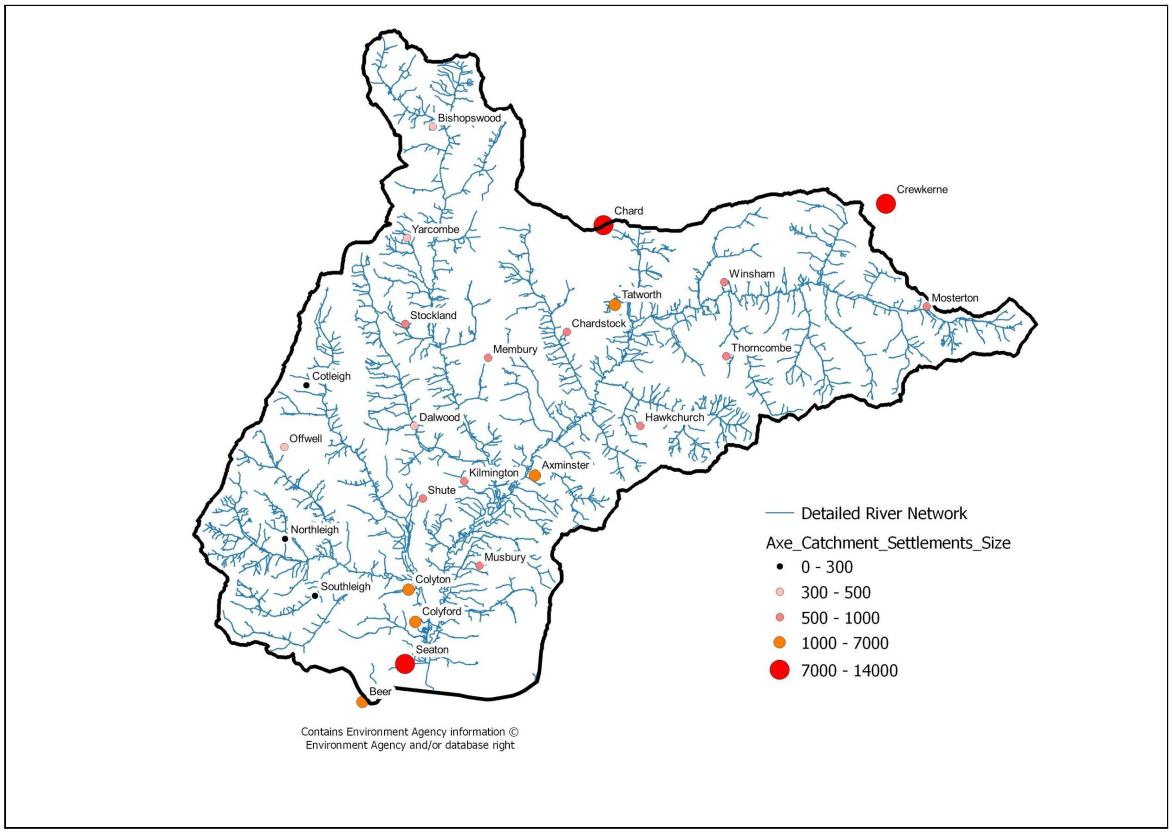
Figure 13: Agricultural land classification



4.1.5 URBAN SETTLEMENT AND POPULATION

The Axe catchment has a human population of approximately 76,000, at an average density of 0.2/km^2. The two major towns in the south of the catchment are Seaton (c.6800 residents) and Axminster (c.6100 residents). The main towns in the north of the catchment are Chard (c.9300 residents) and Crewkerne (c.7500 residents). Major roads dissect the catchment including the A303 and A30 across the upper reaches and the A35 across the lower reaches. The economy of the catchment is dominated by agriculture, forestry and fishing. Tourism and retail also provide major sources of income.

Figure 14: Settlement size



4.2 How the catchment is currently functioning

4.2.1 WATER QUALITY

Under the Water Framework Directive Assessment in the Environment Agency's Ecological and Chemical Classification for Surface Waters, the Axe catchment's rivers and streams are divided into 13 units. In the 2019 Cycle 2 assessment, for ecological status 12 of these units were defined as being Moderate and one as Poor. For chemical status, all 13 fell into the Fail category. By comparison, in the previous 2016 Cycle 2, for ecological status 10 units had been Moderate, two Poor and one Bad; while for chemical status, all 13 units were Good at that time (Note 4).

The river exhibits a range of ecological problems associated with high phosphate concentrations, with algal (phytobenthos) communities smothering the river bed and aquatic plants, silty river gravels and loss of salmonid spawning and juvenile river habitats. Soluble reactive phosphorus and suspended solids are the main water quality drivers for failure in the River Axe SAC/ SSSI.

Figure 15: WFD overall status 2016

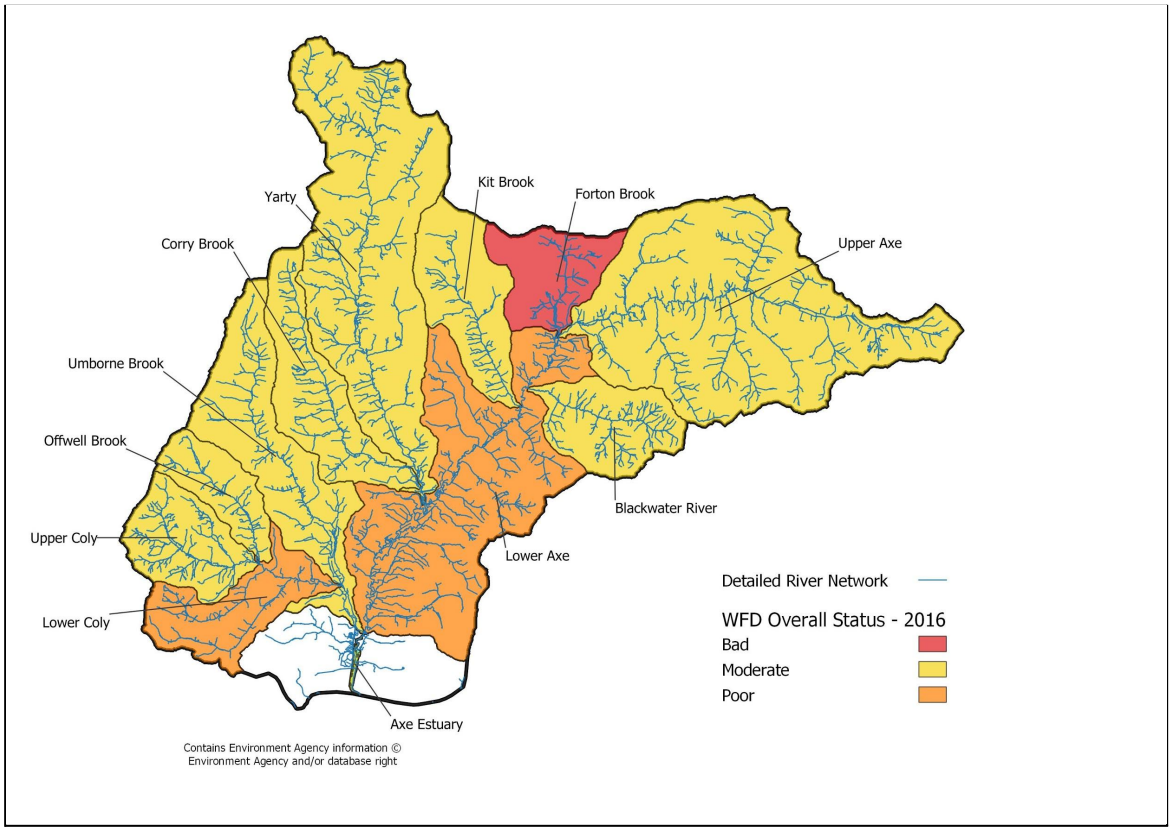
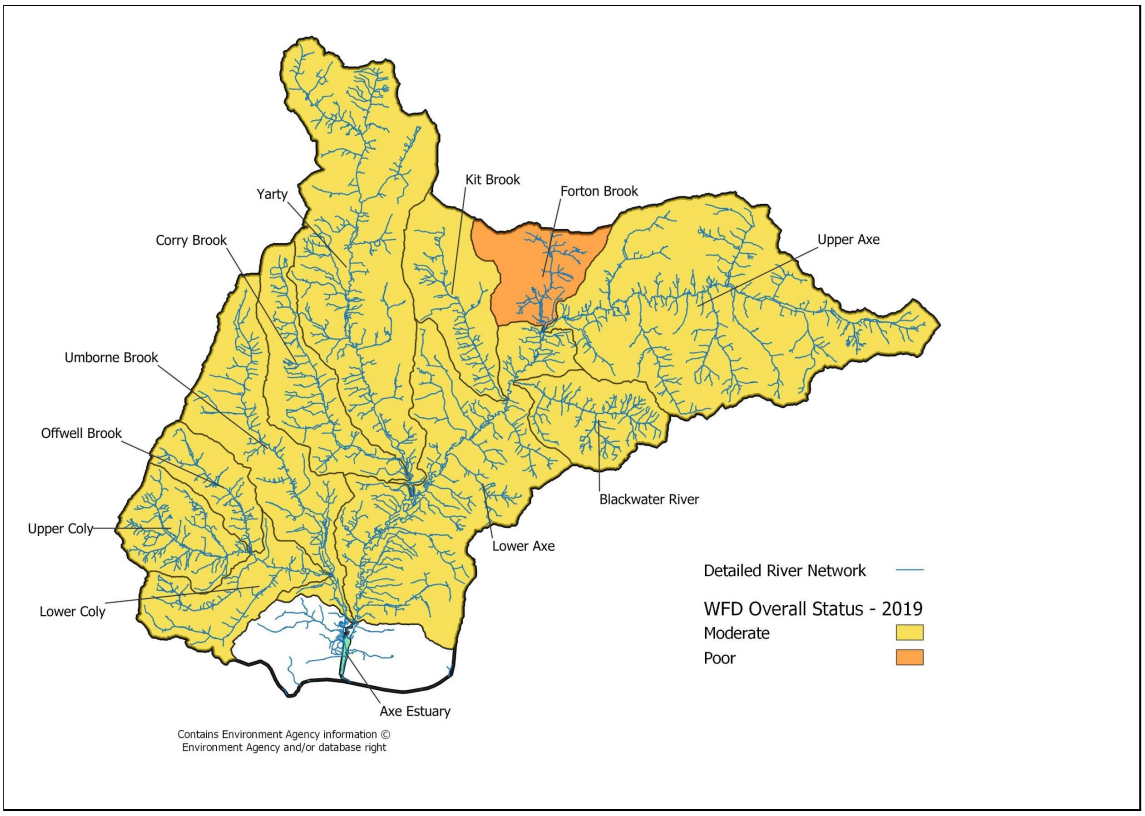


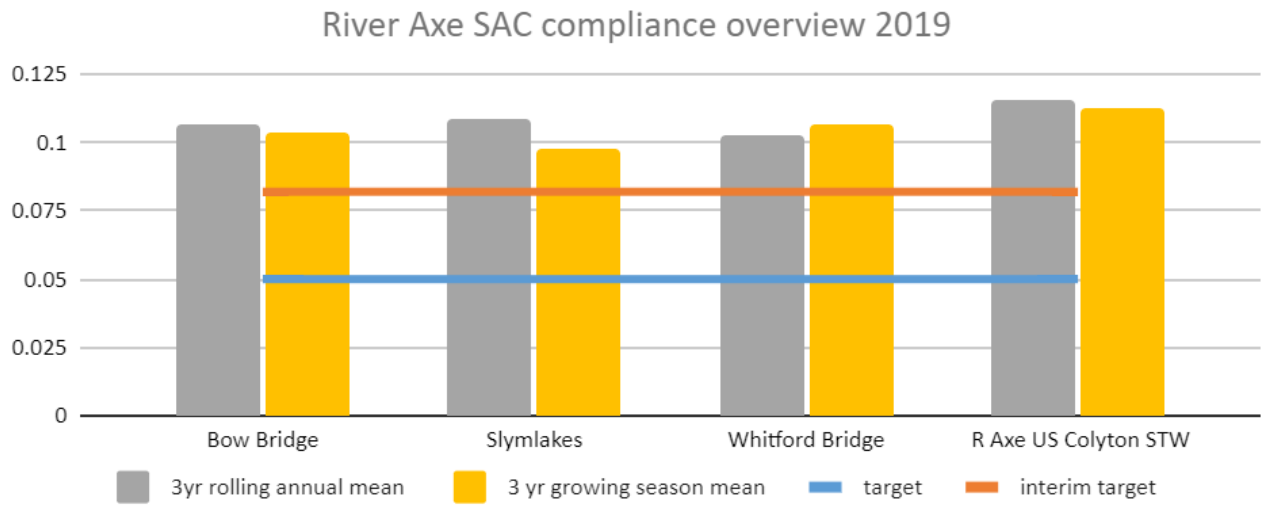
Figure 16: WFD overall status 2019



The tables below show phosphorus readings from monitoring points on the part of the River Axe that is designated as a SAC. The standards for the SAC are tighter than the WFD Good standard. The SAC standards are exceeded by over 100%; in other words, phosphate levels need to halve for the SAC standard to be achieved.

Sample Point Name	Target	Interim target	3yr rolling annual mean	3 yr growing season mean
Bow Bridge	0.05	0.082	0.106	0.104
Slymlakes	0.05	0.082	0.109	0.097
Whitford Bridge	0.05	0.082	0.103	0.106
R Axe US Colyton STW	0.05	0.082	0.116	0.113

Environment Agency modelling using Farmscoper and adjusting for the relatively high levels of soil compaction observed in the catchment, indicates that approximately 30,000 kg of phosphorus and 12,000 tonnes of sediments are currently entering the river system from diffuse agricultural pollution. Source apportionment studies have shown that approx. 72% of the phosphorus and 50% of the sediment in the river originates from agricultural diffuse pollution, meaning that approximately 42,000 kg of phosphorus and 24,000 tonnes of sediment enters the river per year from all sources.



Farmscoper models that if 80% of farms in the catchment complied with Farming Rules for Water, losses from diffuse agricultural pollution could be reduced to just under 16,000kg; and if further measures were introduced this could be further reduced to around 14,000kg.

In other words, tackling agricultural diffuse pollution in this way could achieve the majority of reduction needed but there will need to be additional work on other sources to reach the target of a 50% overall reduction in phosphates.

A numeric target for soil loss (as sediment) is difficult to specify in part because soil losses can vary by orders of magnitude year to year and between fields. However, phosphate losses are linked to soil loss (as water-borne sediment), so a halving of soil loss from agricultural land would support the objective of halving phosphate loss. Measures to reduce sediment losses from in-channel erosion are also needed to return the river to a more natural sediment transport regime.

4.2.2 FLOODING

According to the South West Flood Risk Management Plan there are many sources of flood risk within the Axe catchment. The risks of flooding are from rivers, sea and surface water. The catchment is very steep and is susceptible to short-duration intense rainfall. There has been a history of intense rainfall causing widespread surface water flooding of small communities and isolated properties.

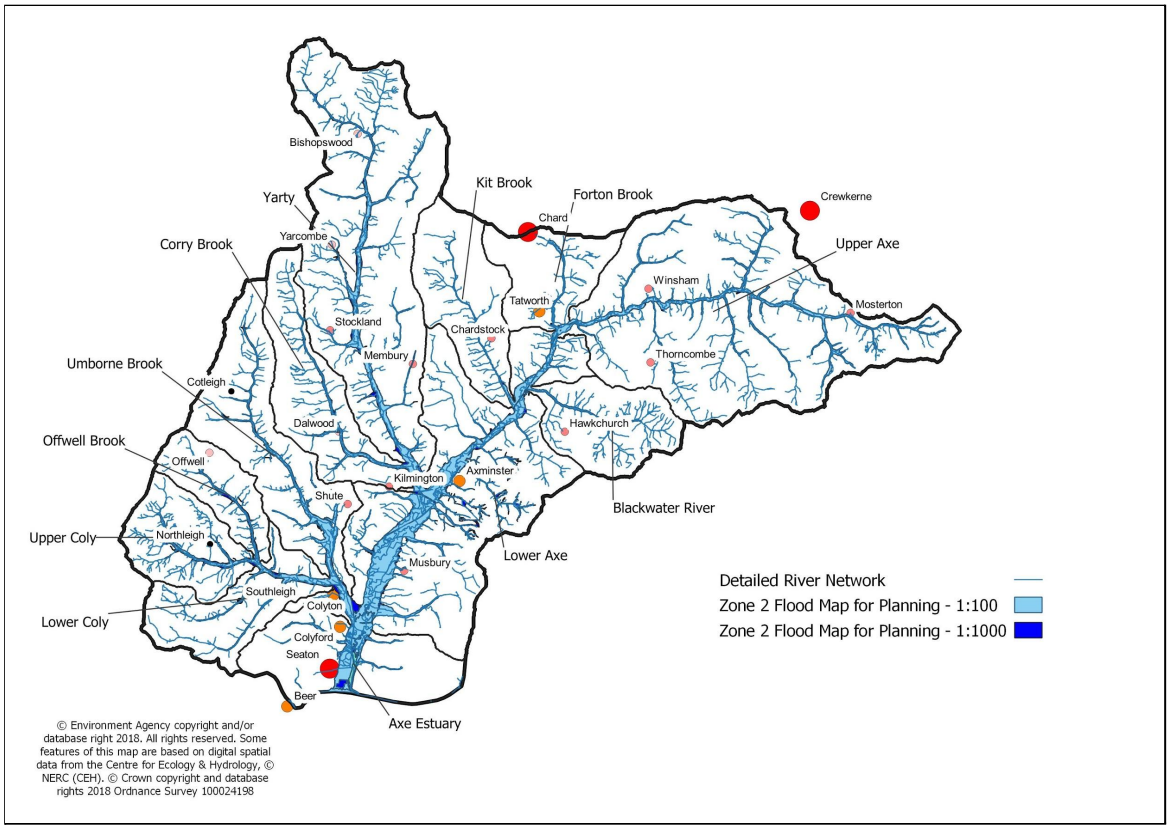
The River Axe generally responds to rainfall, though more slowly than the other East Devon rivers. The flood peaks of the Axe reduce as they reach the wide floodplain, but the river is often slow to recede in its lower reaches. The greensand geology is important in storing and slowly releasing groundwater into the tributaries of the Axe, maintaining flow through dry periods.

The River Axe SSSI/SAC is entirely within the 1% annual probability flood extent. The Axe estuary is influenced by both fluvial and tidal flooding. However, flooding is one of the natural river processes that is important in maintaining the conservation status of the site.

Although the majority of Axminster is on higher ground, some properties and industrial units along the north west side of the town near Stoney Bridge are located within the floodplain of the River Axe. Currently flood warning times are less than two hours from the River Axe in Axminster. Flood defences provide some protection to properties at risk. An earth embankment on the right bank was designed to provide a 1 in 60 year standard of protection, though in reality this is now estimated to be a 1 in 20 year standard of protection. The railway embankment and stone revetments on the left bank provide a 1% annual probability standard of protection, although these were not designed as formal flood defence assets.

Seaton is at risk of flooding from combined tidal and fluvial flood events from the Axe estuary with the main source of flooding from the sea. The main source of future flood risk in Seaton will continue to be tidal flooding from the Axe estuary.

Figure 17: Flood risk map



4.2.3 SOILS

Approximately 80% of the soils in the Axe catchment are heavy clay, which is poorly draining and inherently vulnerable to compaction and erosion (River Axe N2K Catchment Regulatory project report - Note 6). Agricultural operations such as maize growing and winter manure spreading have emphasised these vulnerabilities, causing knock-on deleterious effects on water courses through sediment pollution and intensification of rainfall run-off.

The above report also notes that erosion of river banks and the loss of riparian trees is a widespread issue, with river channels becoming more incised, releasing further sediment into the river.

A three-year Riverfly Census monitoring programme carried out by Salmon and Trout Conservation from 2015-18 throughout the main body of the River Axe concluded that: "The invertebrate community consistently exhibited stress from excess fine sediment throughout the survey. No sample site was completely free from evidence of sediment impact" (Note 14).

4.2.4 HABITATS AND SPECIES

The condition for the River Axe SAC/SSSI is currently classified as 'unfavourable declining', (defined as: *"the unit/feature is not being conserved and will not reach favorable condition unless there are changes to site management or external pressures. The site condition is becoming progressively worse, and this is reflected in the results of monitoring over time, with at least one of the designated feature's mandatory attributes not meeting its target with the results moving further away from the desired state. The longer the SSSI unit remains in this poor condition, the more difficult it will be, in general, to achieve recovery"* - Note 3). The main reasons cited by Natural England for the unfavourable classification are: inappropriate weirs, dams and other structures, overgrazing, siltation and water pollution, especially from agricultural run-off and effluent discharges. Additional causes relate to invasive Himalayan Balsam; heavily grazed riparian zones; and failures in Bullhead population structures and invertebrate assemblages (Note 5).

Migratory fish populations, especially salmon, provide a strong indicator of the health of the river. The publication 'Conserving Natura 2000 Rivers Ecology Series No. 7 Ecology of the Atlantic Salmon' sets out that salmon require very good water quality to thrive, typical of that found in upland streams and spring-fed chalk streams.

Historically the Axe was a renowned salmon fishery. However, this predates the last comprehensive survey for the Axe catchment by the National Rivers Association carried out in 1994 (http://www.environmentdata.org/archive/ealit:2423/OBJ/19000428.pdf) which demonstrated that the salmon population had already collapsed by this point from a previously very healthy population in the 1950s and 1960s as evidenced by the rod caught catches shown in the appendix to the survey.

The Centre for Environment, Fisheries and Aquaculture Science's latest assessment for salmon in the Axe, in its report 'Salmon Stocks and Fisheries in England and Wales in 2019', classified salmon stocks as being 'at risk' both for present compliance and also for predicted compliance in 2024. This is further highlighted by the

Environment Agency's latest published statistics for rod caught salmon in 2018, published June 2020,https://www.gov.uk/government/publications/salmonid-and-freshwater-fisheries-statistics/salmonid-and-fisheries-statistics-for-england-and-wales-2018) which reported just one single rod caught salmon from the river Axe.

There are two other important species that historical evidence shows were previously endemic to the river Axe but have now almost totally disappeared: roach and dace.

The plans overleaf use a dataset that is a subset of "WFD Classification Status Cycle 2" and contains classification data for fish in rivers. Fish can be used to indicate the ecological status of a river. Metrics on river fish composition, abundance and prevalence are run through the FCS2 classification tool. The actual (observed from actual fish surveys) values for these metrics are compared with a predicted value (reflecting a river in pristine condition). The comparison of the observed to expected values is known as an Ecological Quality Ratio (EQR). EQRs are used to produce a fish classification (High, Good, Moderate, Poor, Bad) of the water body for Water Framework Directive (WFD) purposes.

There are concerns about predation of native species by mink and the Devon Water-Vole Recovery project, which ran from 2006-11, attempted to control the species. They are known to predate on sand martin, kingfisher, dipper, grey wagtail, water vole, crayfish amongst others.

Figure 18: River obstructions and fish status 2016

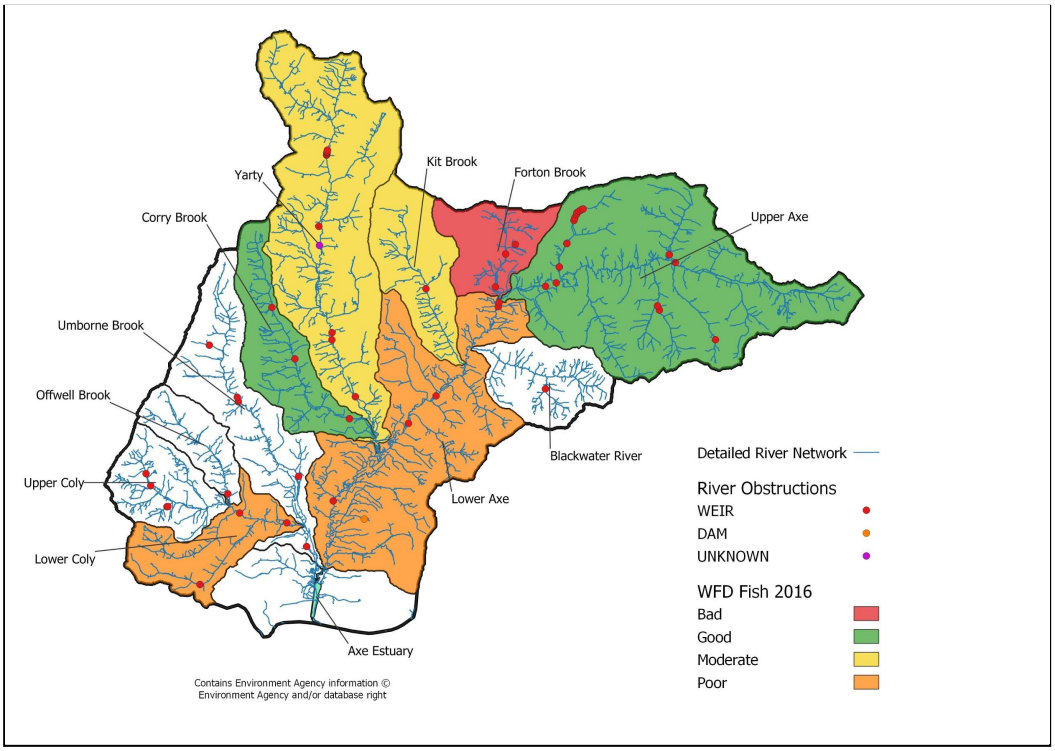
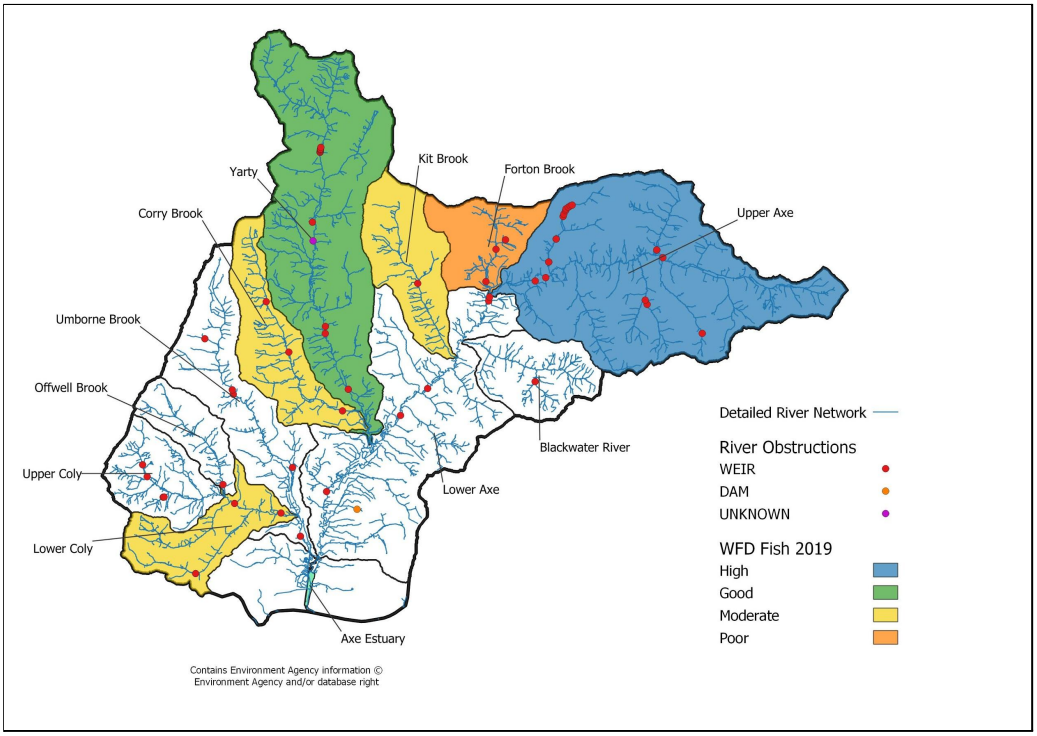


Figure 19: River obstructions and fish status 2019



NB: the Forton Brook failure is thought to be partly due to barriers to fish migration below the sampling point.

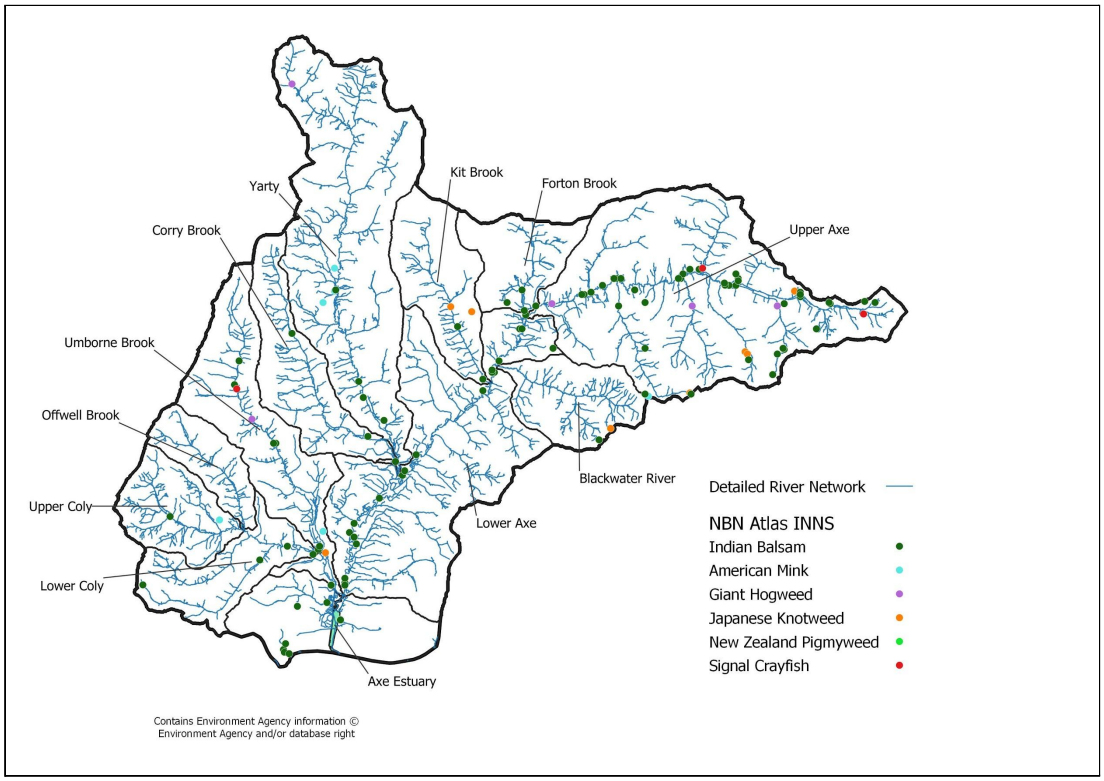
4.2.5 RIVER CHANNEL CONDITION

The most significant influences on channel behaviour and morphology in the Axe catchment are: Sediment supply, lateral confinement, gradient, and bank cohesion.

In general the geomorphological quality of the Axe catchment is very good. The morphological diversity of the channel is either medium or high. Anthropogenic modifications tend to be localised and urban influences are minimal. This means that the main influences on channel morphology and behaviour tend to be natural. However, there are a number of additional factors which lead to localised deviation from the natural behaviour of the river:

- Livestock poaching
- Channel modifications including bank protection, realignment and weirs.
- Invasive species, primarily Himalayan Balsam.
- Diseased alders
- The increase in maize farming
- The absence of riparian vegetation, mainly in the lower catchment.

Figure 20: Invasive species status



The key geomorphological issues in the Axe catchment are the following (taken from Note 15):

- A high volume of fine sediment supplied through a combination of bank erosion caused by channel weathering, invasive species and livestock poaching.
- High inputs of sediment from the wider catchment, through field ditches and surface runoff from arable land.
- Channel modifications such as bank protection, channel re-alignment, re-sectioning, culverting and weir construction lead to reductions in channel morphological diversity, inhibit natural geomorphological processes and in some instances, such as weirs, inhibit the passage of migratory fish species.
- Channel planform changes and associated bank erosion along the River Axe are in part a reflection of the natural behaviour of meandering rivers. However, localised channel modifications such as bend removal, channel re-alignments and bank protection, conducted throughout the last 200 years, have complicated the natural behaviour of the river channel. It is therefore extremely difficult to determine the extent to which contemporary river behaviour is natural or a result of the anthropogenic interference. It is likely that channel activity represents a combination of natural and artificial influences. Further anthropogenic interference may lead to an unpredictable and undesirable channel response.
- Himalayan Balsam is extremely widespread in the catchment. The detrimental effect of this plant on riparian vegetation and riverbank stability is contributing to the transfer of sediment, particularly fine material, to the river channel. The species out-competes native riparian plants during the summer, retarding their growth. The balsam then dies back in the winter leaving the river channel margins free from vegetation which increases the vulnerability of the riverbanks to erosion.

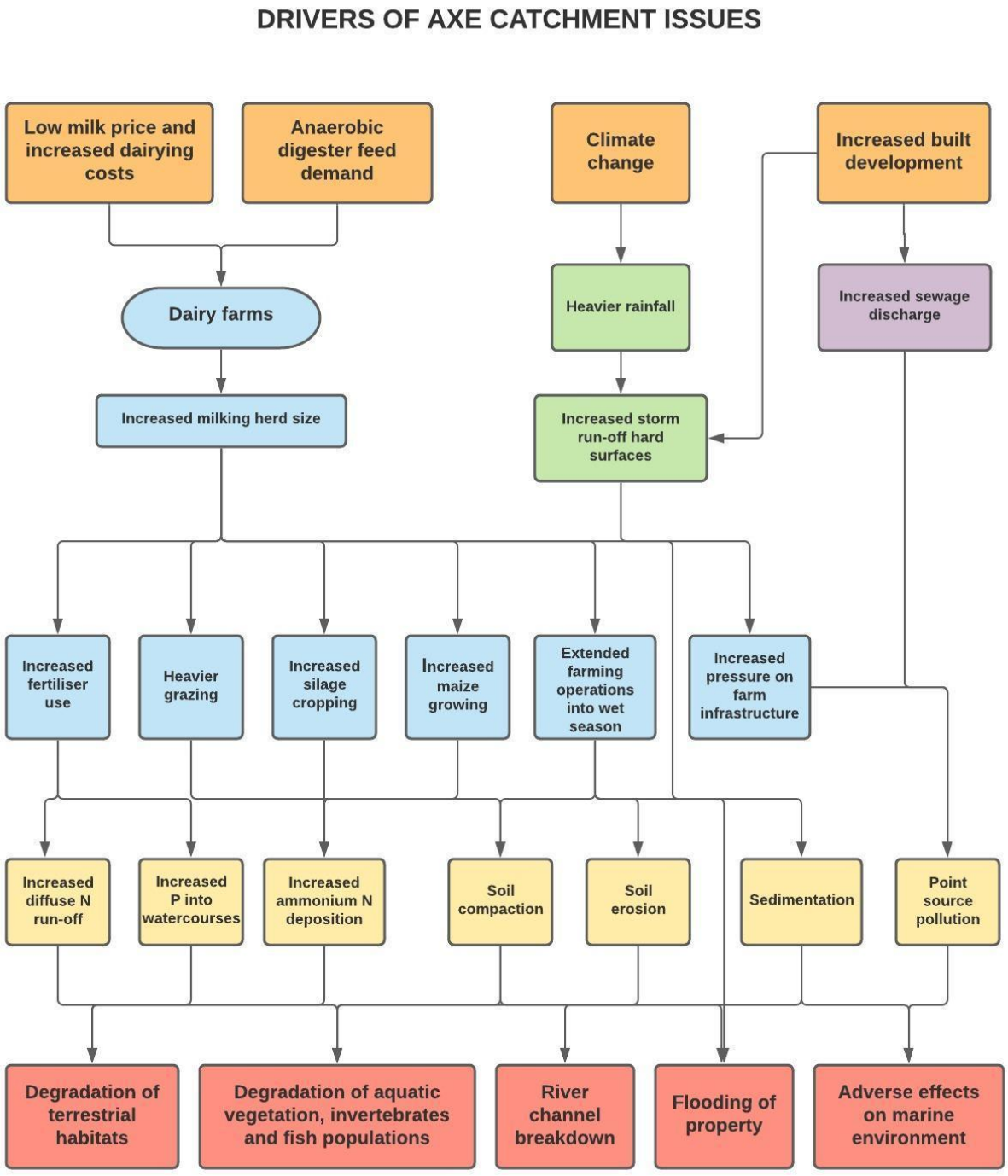
4.2.6 MARINE HABITATS

The Axe Estuary Marine Conservation Zone, designated in 2019, is damaged by the high phosphate levels and excessive sediment being transported into it from the catchment.

The notable conservation features of the Lyme Bay reefs have historically been impacted by extensive commercial fishing up until the statutory closure of the area in July 2008 (to demersal towed fishing gears). The closure was in response to the impact of both scallop dredging and demersal fishing on the reef features and associated biota. The conservation objectives of the Lyme Bay and Torbay SCI Annex 1 reefs are now to ‘maintain or restore the reefs to favourable condition’.

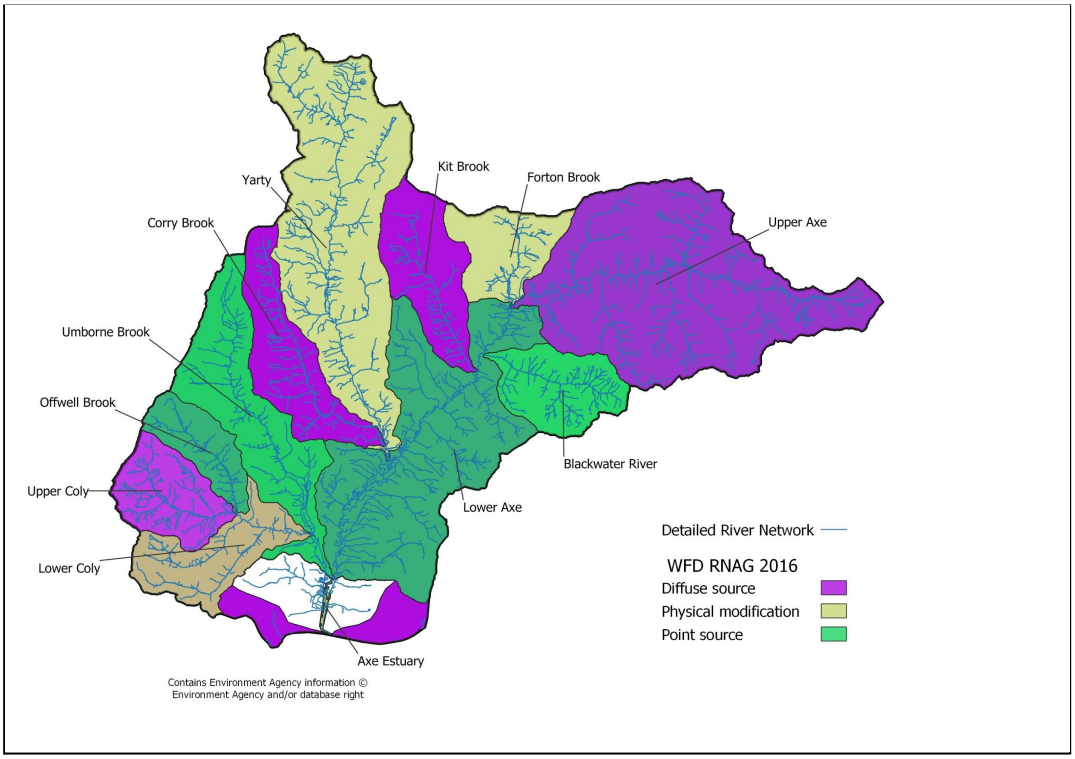
4.3 The drivers behind current pressures on the catchment

4.3.1. OVERVIEW



Of 53 Reasons for Not Achieving Good Status (RNAGS) cited by the Environment Agency for the Axe catchment, 36 are assigned to agriculture, 11 to the water industry, and 6 to domestic, industry, urban or other (Note 4). Agricultural issues are hence the major drivers behind current pressures on the catchment.

Figure 21: WFD Reasons for Not Achieving Good Status 2016



NB: While these are the dominant RNAG for each of the WFD waterbodies they are not the only ones. For example the Yarty has significant pressure from agricultural diffuse pollution, despite being listed here as primarily physical modification.

4.3.2 AGRICULTURE

4.3.2.1 The economics of the dairy industry

The tradable milk quota system introduced in the mid 1980s led to a reduction in the overall number of dairy farms and considerable amalgamation of remaining holdings into fewer, larger units. Subsequent price competition between supermarkets and a concentration of processing into a small number of large supply chain companies has kept down the farm gate price of milk, despite on-farm production costs continuing to rise. The average price paid to farmers has not increased significantly for 20 years, and across the UK dairy profits halved in 2018/19 to around 2.5p/litre, though they have recovered slightly since then.

The low milk price combined with rising costs has placed dairy farms under intense commercial pressure to increase efficiency and expand herds and milk production to remain viable. As a result dairy farming has substantially restructured over the last two decades, though investment has been focussed more on milking parlours, housing and yards, than on slurry infrastructure or soil management.

4.3.2.2 Dairy herd size

Out of a total of 437 farm holdings considered in the River Axe N2K Regulatory Project of 2019 (Note 6), 125 were classified as intensive dairy, with herds between 100 and 500 milking cows. These numbers represent a large increase in the concentration of animals on the land, with each animal being heavier (as breed preference moves towards higher milk yield), and with more intense nutritional requirements. Higher stock numbers, combined with the increased prevalence of heavy farm machinery, has led to greater pressure on soils, which consequently lose their ability to function properly.

4.3.2.3 Maize production

There has been an increasing trend to grow maize as a fodder crop to boost milk output. However some 80% of the land across the Axe catchment consists of poorly-draining heavy clay soils which are inherently ill-suited to maize growing. Maize is also being grown to supply feedstock to two local Anaerobic Digestion sites, one at Snowdon Hill Farm near Chard and one at Higher Bere Chapel Farm near Winsham. These Combined Heat and Power plants produce bio-energy for on-site use. Both plants use manures, slurries and other crop residues as well as maize, but the latter has created a demand for maize which is being drawn from a wide radius.

4.3.2.4 Timing of agricultural operations

A desire to take a silage crop from temporary grass leys prior to planting maize in the spring can delay drilling, and a wet autumn may further delay ripening, leading to late harvesting when soils are wet and most vulnerable to compaction. This in turn leads to late preparation of the land for winter, when any operation is damaging. Soils damaged as a result of these operations will erode in heavy rains, and subsequent application of manures may cause nutrient run-off into watercourses. Winter manure spreading is increasingly common, including on sacrificial winter stubbles, which causes problems on saturated, compacted heavy clay soils. When slurry is applied to wet spring soils, phosphorus loss can occur following high rainfall, as well as ammonium-N and microbial pathogens.

4.3.2.5 Farm infrastructure

Point sources of nutrient pollution include farm infrastructure designed to store and manage animal waste and other materials such as animal food. Key infrastructure includes dung heaps, slurry pits, silage clamps, uncovered yards, feeding troughs and gateways. Animal access points to watercourses can also lead to the direct delivery of phosphates to the water, as well as increased sediment disturbance.

A substantial proportion of dairy farms do not have adequate storage for manures and slurries. Storage may have inadequate volume (four months storage is a legal requirement), may lack weather cover, leading to excessive dilution from rain water, may have leakage issues, or may catastrophically fail causing significant pollution incidents. Further issues surround adequacy of silage clamps and fuel storage.

Across 86 farm audits carried out by the Environment Agency during the River Axe N2K Catchment Regulatory Project between 2016 and 2019, 95% of farms (targeted on the basis of their size, farm type and potential high impact) were found to not be complying with slurry storage regulations, and 49% of these farms were polluting the river Axe.

Figure 22: Maize distribution 2016-2020

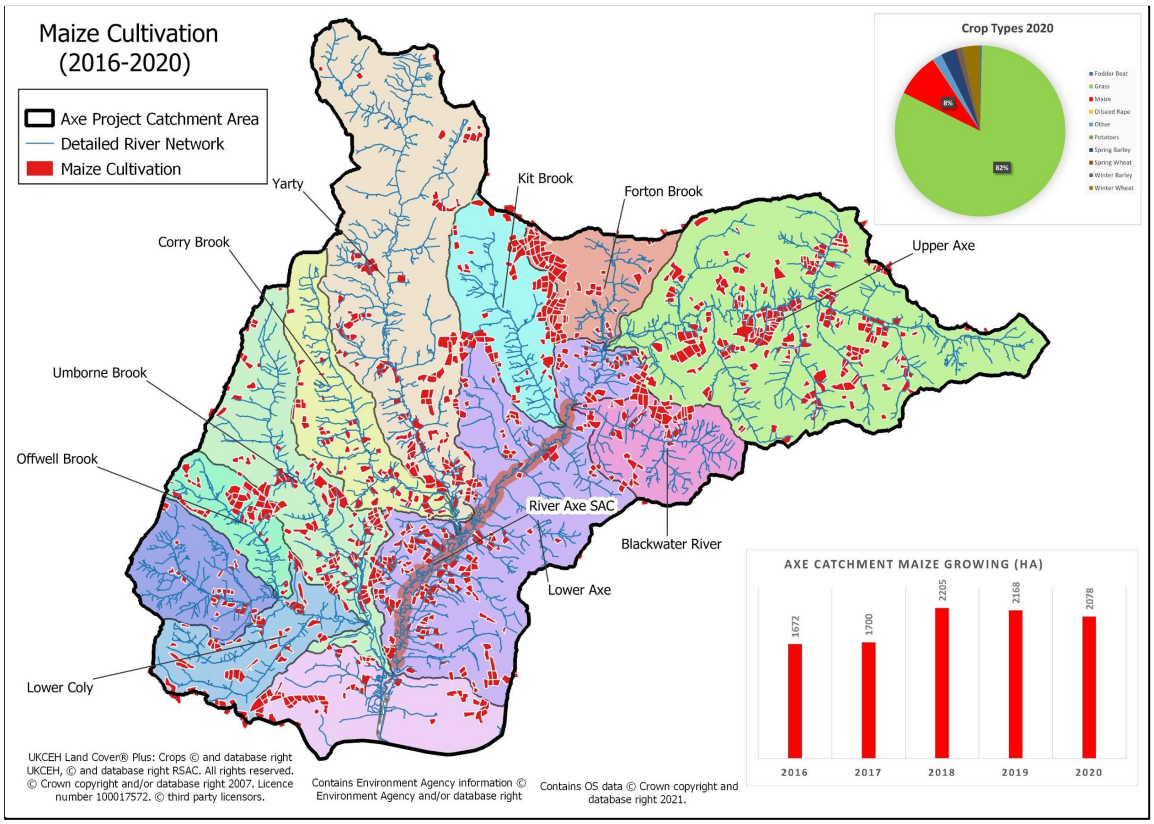


Figure 23: Heat maps for maize growing

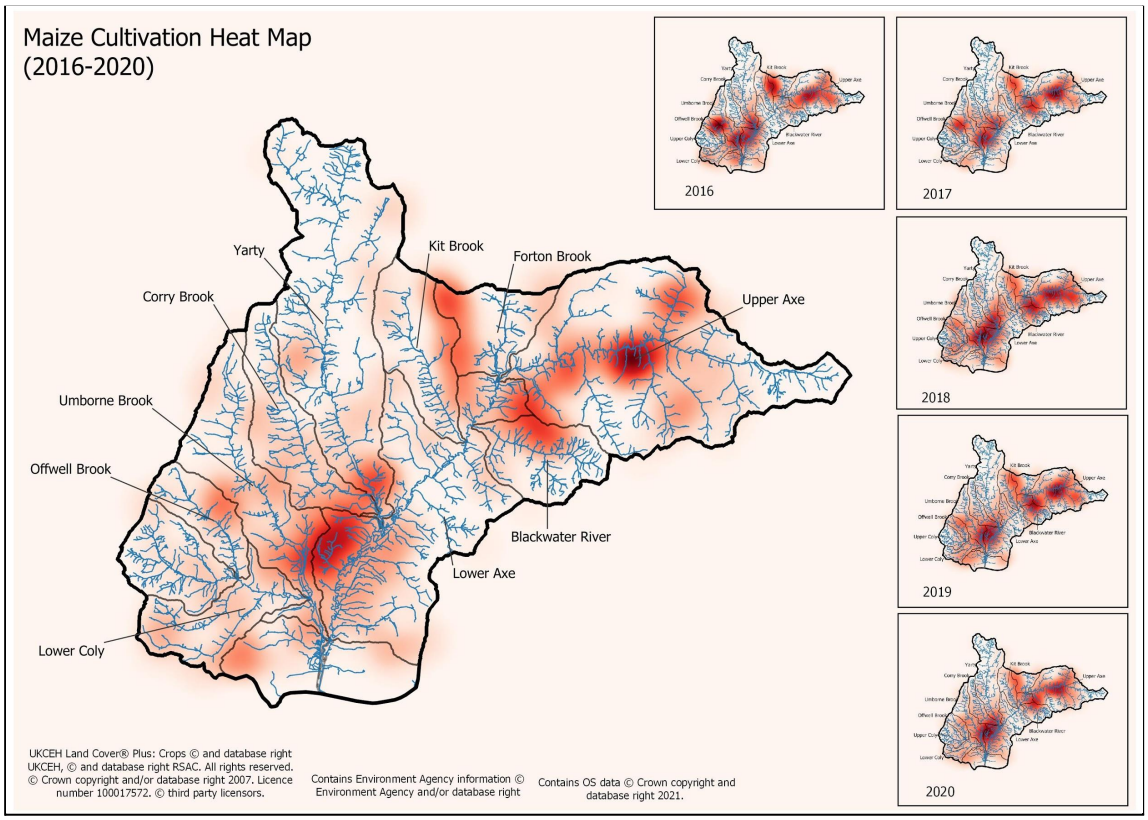


Figure 24: Maize Growing overlaid on Soil Vulnerability

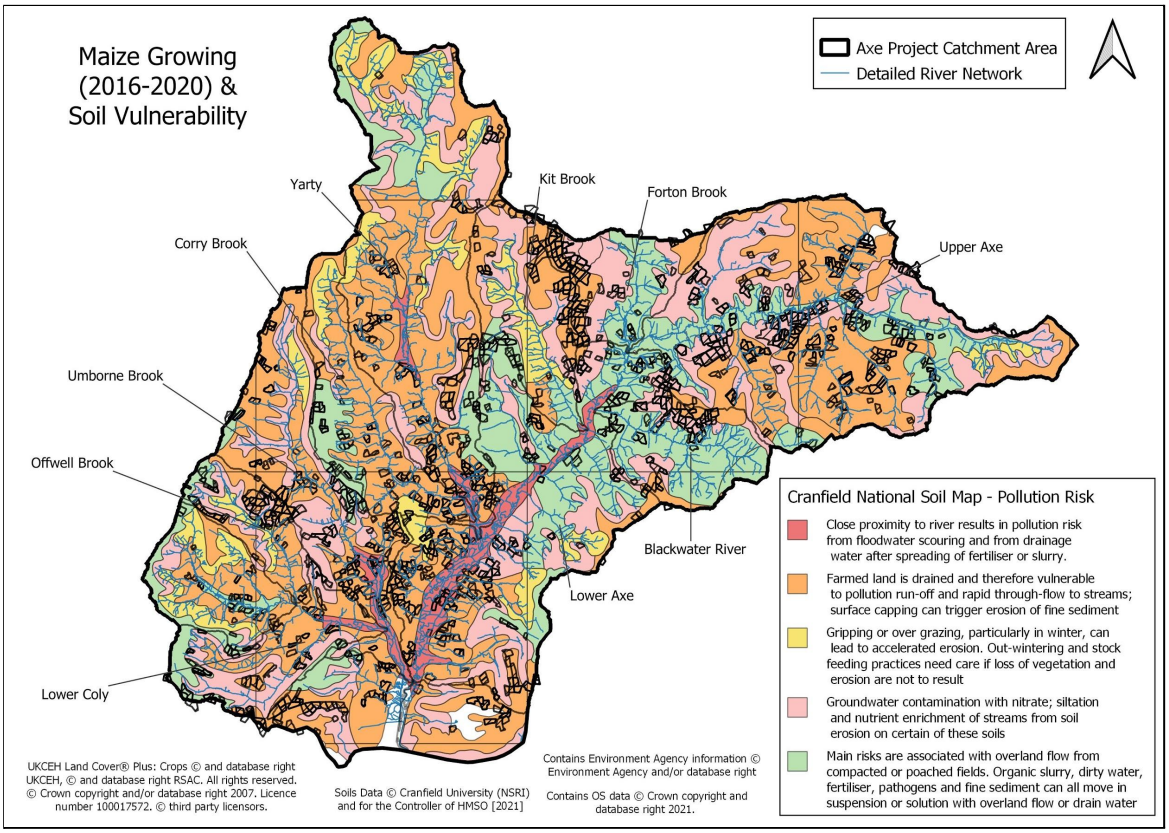
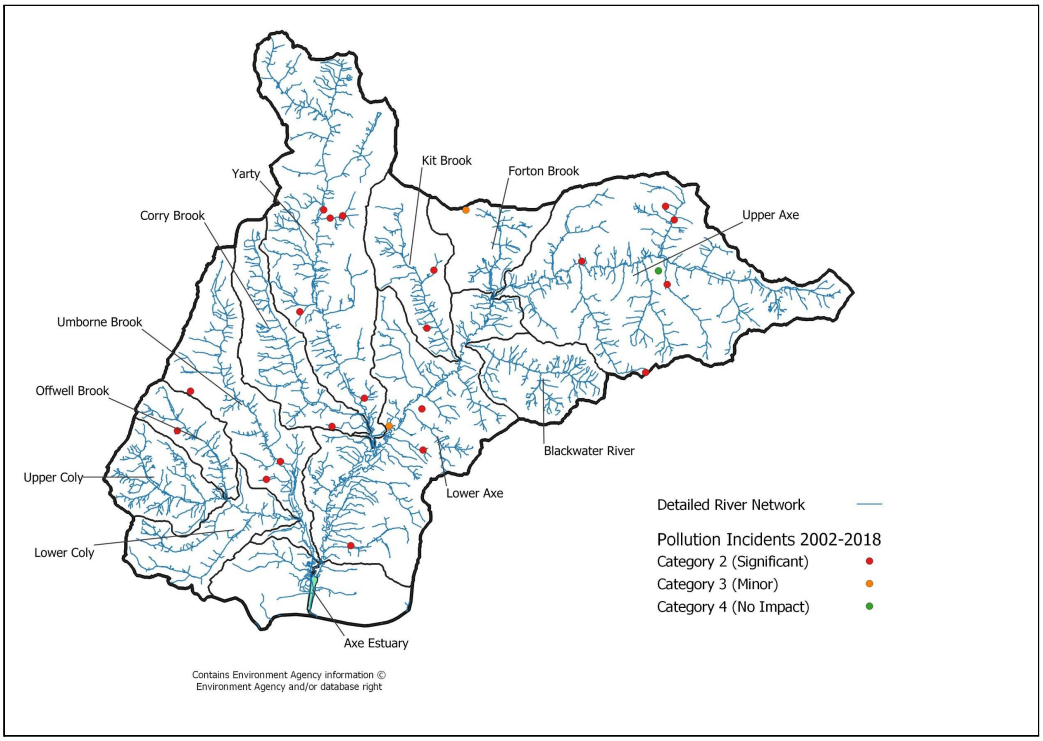
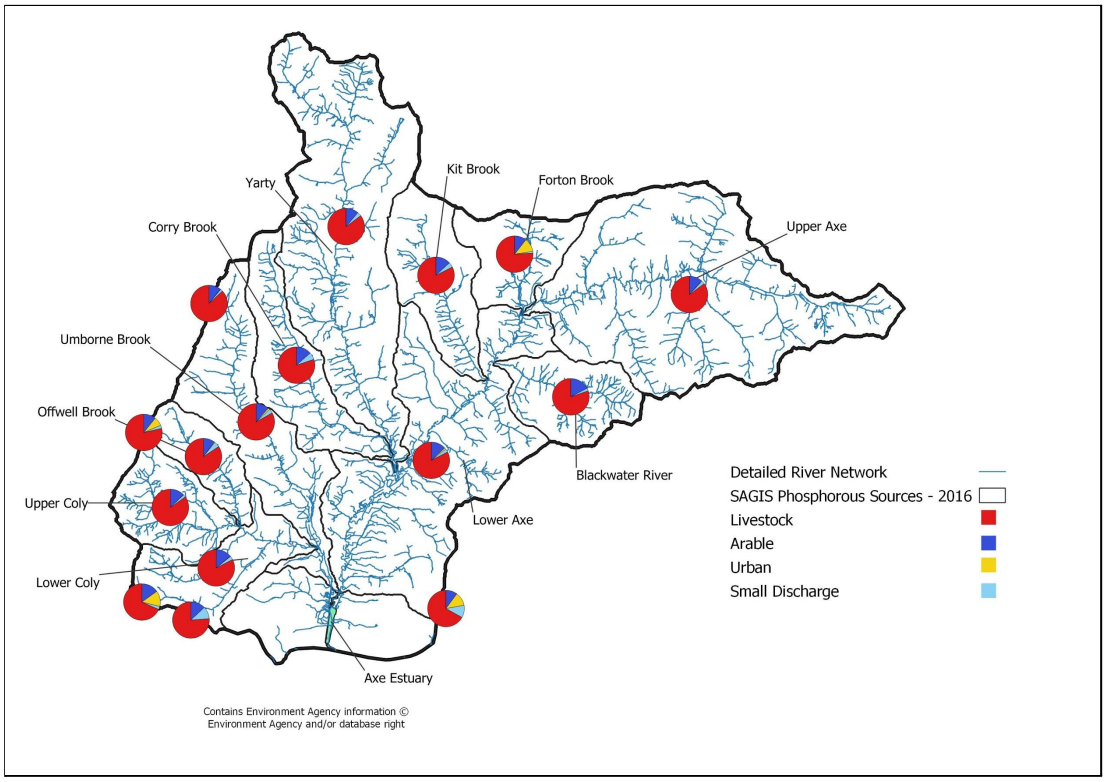


Figure 25: Pollution incidents 2002-2018



NB: It is believed that pollution incidents are chronically under-reported, especially with respect to soils-driven FRfW

Figure 26: Phosphorus sources 2016



4.3.2.6 Ammonia deposition

Concentrations of ammonia in the air are greatest in those parts of the country with the most livestock farming, particularly where ammonia emissions are mainly from pig, poultry and cattle farming. High concentrations of ammonia are also found in some urban areas. Ammonia can also react with other chemicals in the atmosphere to produce fine particles. Most of these particles are removed from the atmosphere by rain, while the gaseous ammonia is absorbed by land surfaces (such as soil, water and vegetation). Ammonia compounds can be transported in the atmosphere over long distances.

There is little ammonia deposition to intensively farmed land with high nitrogen fertiliser inputs, because that land is largely a net source of ammonia. As a result, ammonia deposition is mainly to unfertilised land with low nitrogen content. This makes semi-natural habitats most vulnerable to ammonia deposition. Raised N levels in foliage may affect plant tolerance of stress, and causes changes to vegetation composition. In a number of habitats across the UK ammonium-N deposition is already above critical load. Nitrogen deposition can also make soil and surface waters more acidic.

Cattle farming produces 44% of UK total ammonia emissions. Most of the ammonia losses are from manure spreading on land and from livestock housing (Note 11).

4.3.2.7 Livestock access to river channels

Allowing livestock to grazing right up to the riverbank top can damage riparian vegetation and contribute to bank erosion. Meanwhile allowing livestock unrestricted access into watercourses to find drinking water can increase the amount of sediment dislodged to pass downstream.

4.3.2.8 Farmer awareness

The N2K Catchment Regulatory Project (Note 6) found that awareness amongst farmers of their pollution responsibilities was generally low, and the application of the Environment Agency's pollution control to farming was also poorly understood by farmers. Awareness of the risk of fines and criminal proceedings was also low, including of the cross-compliance/Good Agricultural and Environmental Condition (GAEC) rules relating to dealing with soil erosion and post-harvest management of late-harvested crops.

Where farmers were aware of mitigation measures available to counter pollution from maize growing, these were often poorly understood. The use of buffer strips, or following up with a grass re-seed were the commonest cited measures taken, but the full suite of planning and management options needed to ensure maize is grown responsibly were poorly appreciated. Grass re-seeds appeared to be favoured despite evidence that run-off can be made worse by a late-drilled grass re-seed after maize. However most farmers knew that growing maize on steep fields was a high risk activity, and those that continued to choose these fields stated that they had no alternatives.

In general terms, uptake of Environmental Stewardship and Countryside Stewardship over the last ten years demonstrates an awareness of the need to take steps to address environmental issues, albeit the income from these schemes may be the main incentive for participation.

4.3.3 DEVELOPMENT

4.3.3.1 Housing and industry

The East Devon Local Plan 2013-31 identifies a need for 17,100 new homes across the district during this period, the majority in the West of the district. However, Axminster is one of the other main growth towns identified, accommodating land for 1481 new homes during the plan period, 650 of these yet to be granted planning consent at the point of the plan's adoption in 2016. The Local Plan also permits development in villages and other rural locations "primarily focused on meeting local needs".

The South Somerset Local Plan is currently under review. A 2019 consultation on the new Local Plan covering the period 2016-36 identified preferred options for housing development including an additional 1995 homes in Chard during the period 2016-36. Approximately half of these new homes are allocated on land within the Axe catchment.

There are 31 sewage treatment works and six industrial discharge locations across the catchment.

The Axe Nutrient Management Plan, while not yet completed, is a planning policy requirement linked to housing growth (see section D2.3)

Figure 27: Consented discharges

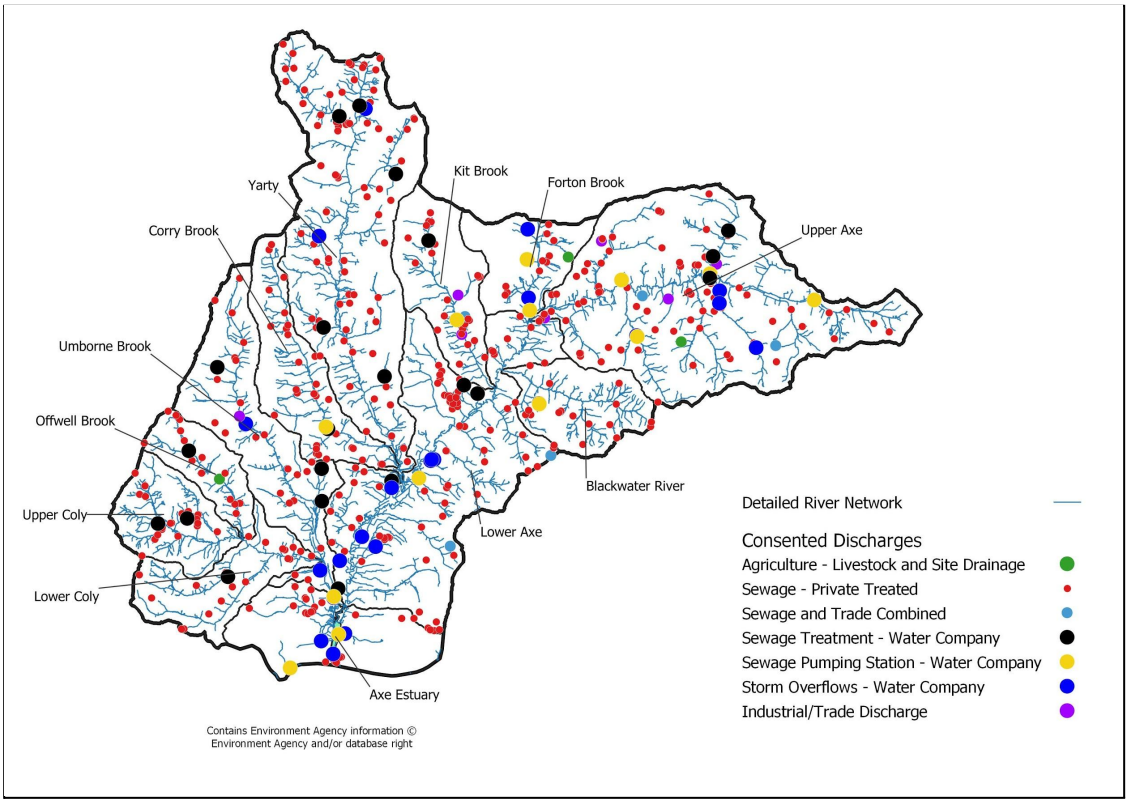
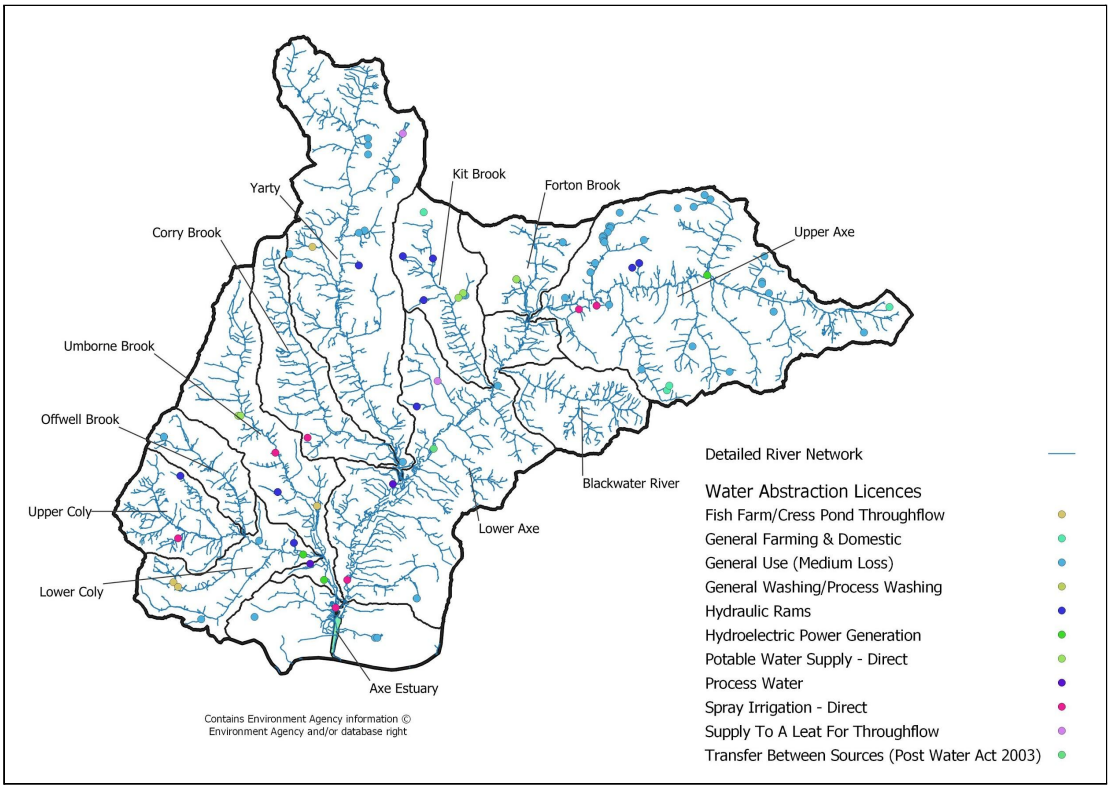


Figure 28: Water abstraction licences



4.3.4 CLIMATE

4.3.4.1 Overall impact of a changing climate

The UK Climate Change Risk Assessment 2017 states that "Climate change presents a substantial risk to the UK's native wildlife and to the vital goods and services provided by natural capital, including food, timber and fibre, clean water, carbon storage, and the cultural benefits derived from landscapes. Projected increases in soil aridity and wildfire risks, changes in the availability and temperature of freshwater, and the acidification and warming of UK seas, will exacerbate existing pressures including pollution, habitat loss, invasive species, and the over-exploitation of natural resources" (Note 7).

4.3.4.2 Rainfall pattern and intensity

In general the UK is likely to see warmer, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes. Despite summers being drier overall, the intensity of rainfall events is likely to increase.

According to the UKCP18 Headline Findings (Note 8): "Winters in the UK, for the most recent decade (2009-2018), have been on average 5% wetter than 1981-2010 and 12% wetter than 1961-1990. Summers in the UK have also been wetter, by 11% and 13% respectively".

4.3.5 GOVERNANCE

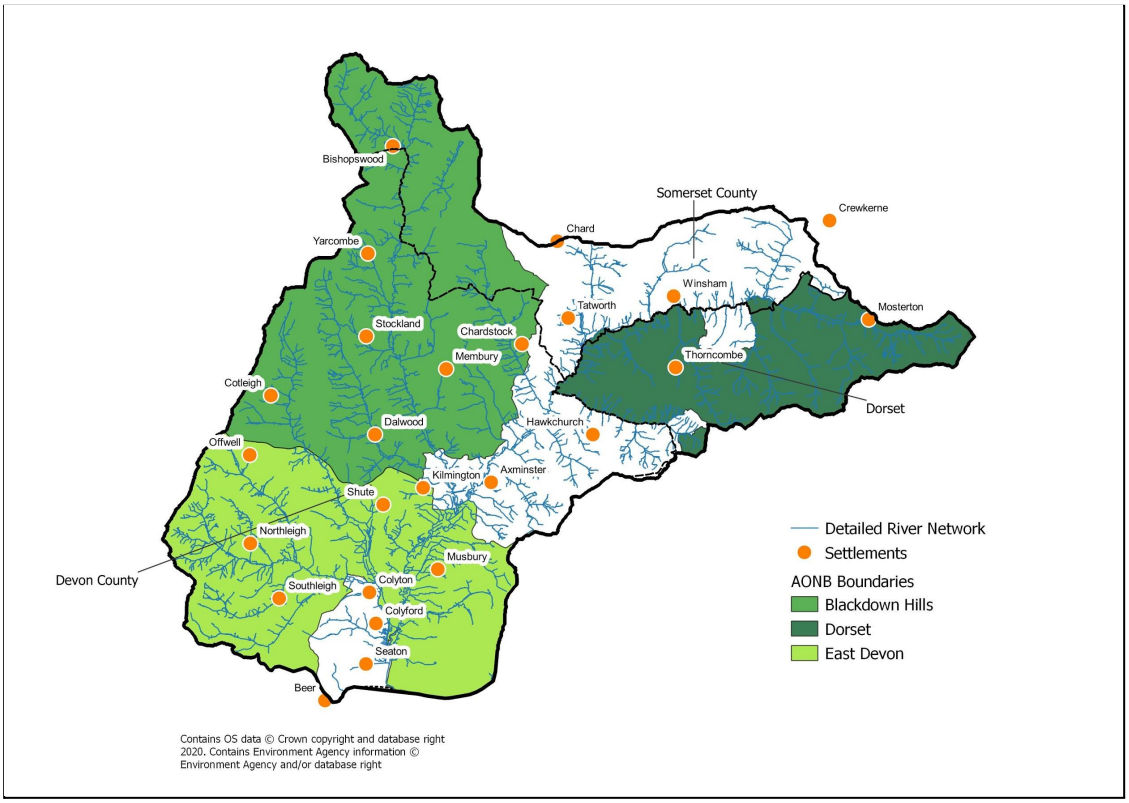
4.3.5.1 Local government

The Axe catchment spans three counties (Devon, Dorset and Somerset) and three district authorities (East Devon, West Dorset and South Somerset). Thus responsibility for planning-related matters affecting catchment condition are split across jurisdictions, with scope for a lack of overview. The catchment covers parts of three AONBs (East Devon, the Blackdown Hills and Dorset), but the boundaries of these omit a central section of the River Axe valley from Axminster north to the Somerset border, including much of the River Axe SSSI. This area of 'white space' is thus not subject to the benefits of protected landscape designation.

4.3.5.2 Regulatory activity

Environment Agency regulatory activity has been limited for the last 15 years, due to a national steer to focus on the voluntary approach, and has been minimal in the last decade due to the reducing Grant in Aid funding available to the Agency for this work. In 2017 the annual number of farm visits required for the whole of Devon and Cornwall to satisfy the national Key Performance Indicator for the Agency was halved to 65, representing 0.5% of farms in the region, and equating to only 2 visits per annum in the Axe catchment. Hence currently farmers can assume they are highly unlikely to receive a regulatory visit.

Figure 29: AONB boundaries



4.3.5.3 Coordination

The River Axe N2K Regulatory Project Report (Note 6) suggests there is an issue in the referral process between the Environment Agency and the Rural Payments Agency, over cross-compliance breaches on soil erosion, relating to the length of time taken for referred cases to be acted upon, and conflicting conclusions reached.

4.3.5.4 Advice

Nutritionists engaged by dairy farmers to advise on diet for high-yielding dairy cows are promoting the use of maize as an aid to increase milk production. Agronomists in turn may not be giving adequate consideration to the suitability of land for growing the crops that farmers are being advised to grow.

4.3.5.5 Agricultural Transition

Following Brexit, the phasing out of the Basic Payment Scheme (BPS) over the next 4 years will have a very large impact on farm business profitability and strategic decision making. Many farmers will be highly dependent on the funding mechanisms put in place by the UK government to replace BPS, and will be anxious to understand how and when the new Environmental Management Scheme (ELM) will work and be accessible to them. Others may be less dependent on BPS in their business, and may greet the change as an opportunity to intensify their operations in order to maximise market benefit.

4.4 Opportunities for addressing current pressures

4.4.1 OVERVIEW

The following opportunities have been identified through the course of the development of this Action Plan.

4.4.2. REGULATION AND CROSS-COMPLIANCE

4.4.2.1 Water Framework Directive

The Water Framework Directive (WFD) requires all EU Member States to protect and where possible enhance the condition of all bodies of water. The WFD requires protected areas including the River Axe SAC to be meeting their objectives by 2027. The river is not currently achieving the required standard of Good Ecological Status (GES).

As the River Axe is not currently achieving its SSSI or WFD objectives the Environment Agency, Natural England and others are obliged to undertake work to ensure that the required standards are achieved in the future. The development of a whole river restoration plan and its implementation (in combination with other actions) is required so the River Axe achieves its SSSI and WFD objectives.

4.4.2.2 Regulatory activity

Despite the longstanding restrictions on its regulatory enforcement, the Environment Agency secured £120,000 in 2016 for a three year regulatory farm visit campaign during the winter periods, during which time it carried out 86 farm audits. As a result of these advice-led but regulatory visits farmers in the catchment either constructed or were in the process of constructing 33 slurry stores, 3 silage clamps, 10 fuel stores and have carried out 21 infrastructure repairs (Note 6). The report concluded: “Neither advice, incentives nor regulation delivered in isolation of the others will generate the desired environmental improvements in water quality”.

4.4.2.3 Nutrient Management Plan

The driver for the Nutrient Management Plan is the proposal for a substantial residential development scheme (832 dwellings) on the north-east edge of Axminster as well as more scattered smaller developments (totalling 691 dwellings) across the catchment (a total of 1523 dwellings). This housing-led development will result in additional phosphate (P) entering the River Axe, specifically as a result of increased sewage being created and the fact that sewage treatment plants do not strip all P out of their discharges. The impact of additional P loading will further deteriorate the quality of the SSSI/SAC and this fact would need to be noted through the assessment which under the Habitat Regulations would need to accompany a planning application. The adverse impacts, if not to be mitigated, would be likely to be reason to refuse planning permission.

The Nutrient Management Plan quantifies approximate potential net additional levels of P that could arise from development and highlights, in principle (with generic quantification of positive impacts), many potential options for mitigation. The plan was completed in February 2021 and was in the process of being assessed by East Devon District Council as this report was being finalised.

The Nutrient Management Plan suggests that the net impact of the development of the NE Axminster Urban Extension will be an additional 31 kg/year of phosphorus loading on the River Axe; and other developments in the catchment are likely to contribute a further 366 kg-P/year.

The plan recommends the formation of a Working Group to oversee delivery of the NMP and identify and enable projects which can demonstrate net P reductions. Where P reduction can be demonstrated from any project then it potentially becomes a legitimate project on which developer contributions can be spent.

Note that the NMP is designed to ensure that net phosphorus levels remain constant and does not address the challenge of **reducing** P levels to enable the River Axe SAC to return to good condition.

4.4.3. AGRICULTURAL INCENTIVES AND FARMER ENGAGEMENT

4.4.3.1 Agri-environment scheme take-up to date

As well as ELS, OELS and HLS schemes taken up over the past ten years, there has been a surge in uptake of Mid Tier agreements in parts of the catchment (Yarty, Upper Coly and Upper Axe), reflecting advisory efforts by Catchment Sensitive Farming officers and others in the last two years.

4.4.3.2 Catchment Sensitive Farming

Since 2006 the Catchment Sensitive Farming (CSF) programme has helped farmers take action to address agricultural diffuse water pollution using advice and incentives working in specific Priority Catchments where agriculture is having the most significant impact on rivers, lakes and estuaries. Evaluation of the programme by Environment Agency and independent farmer survey has demonstrated the effectiveness of CSF's approach in reducing pollutant loads and improving water quality. Phase 4 of CSF has capitalised on this previous work to address diffuse water pollution working with a wide range of partners.

The key features of the approach are as follows:

- The basic unit of CSF delivery is the Water Framework Directive Water Management Catchment. Within each catchment are areas defined as a high priority for water quality for the Countryside Stewardship scheme. These are the priority areas for CSF, which are termed here Water Priority Areas (WPA).
- CSF success relies on partnership opportunities to increase the intensity of work in these areas and to extend the approach to other areas.
- CSF deploys measures that address water quality objectives for Protected Areas (Natura 2000 sites, Bathing Water, Shellfish Waters and Drinking Waters) and Good Ecological Status of lakes failing due to diffuse water pollution from agriculture.

- The incentives element of CSF is provided through Countryside Stewardship (CS), using mainly the Mid-Tier with Higher Tier where there are opportunities to do so. Water capital items are available, as part of the Capital Grant (previous Water Capital Grant in Mid Tier) process or with land management options in Mid-Tier and Higher Tier.
- In addition CSF has provided advice through direct delivery by CSF Officers and contracted through the Farm Advice Framework (FAF). The gains achieved by CSF go beyond water quality, and include farm business benefits and resilience, hazard and ecosystem services including flood mitigation, climate change adaptation, fisheries, and land biodiversity.
- The whole of the River Axe catchment is a High Priority Area for water quality due to diffuse pollution from agriculture and the impact of sediment and phosphate on the ecology of the river. Of the approximately 275 Priority Farms in the High Priority Area of the Axe catchment, more than 60% have received an advisory visit from either a CSFO or a specialist adviser, covering aspects of Infrastructure, Soil and Water Management, Nutrient mapping and Planning, Maize management, Ammonia Reduction or assistance in accessing grants. In the four years of CSF from 2016/17, CSF has approved or supported in excess of £3.75 million in grants that will improve water quality by either increasing the storage capacity of effluents or slurry and manures, or separating clean and dirty water, as well as limiting sediment pathways to the catchment. In 2018 infrastructure improvements supported by CSF effectively removed pollutants equivalent of 46 Olympic swimming pools of domestic sewage from the catchment.

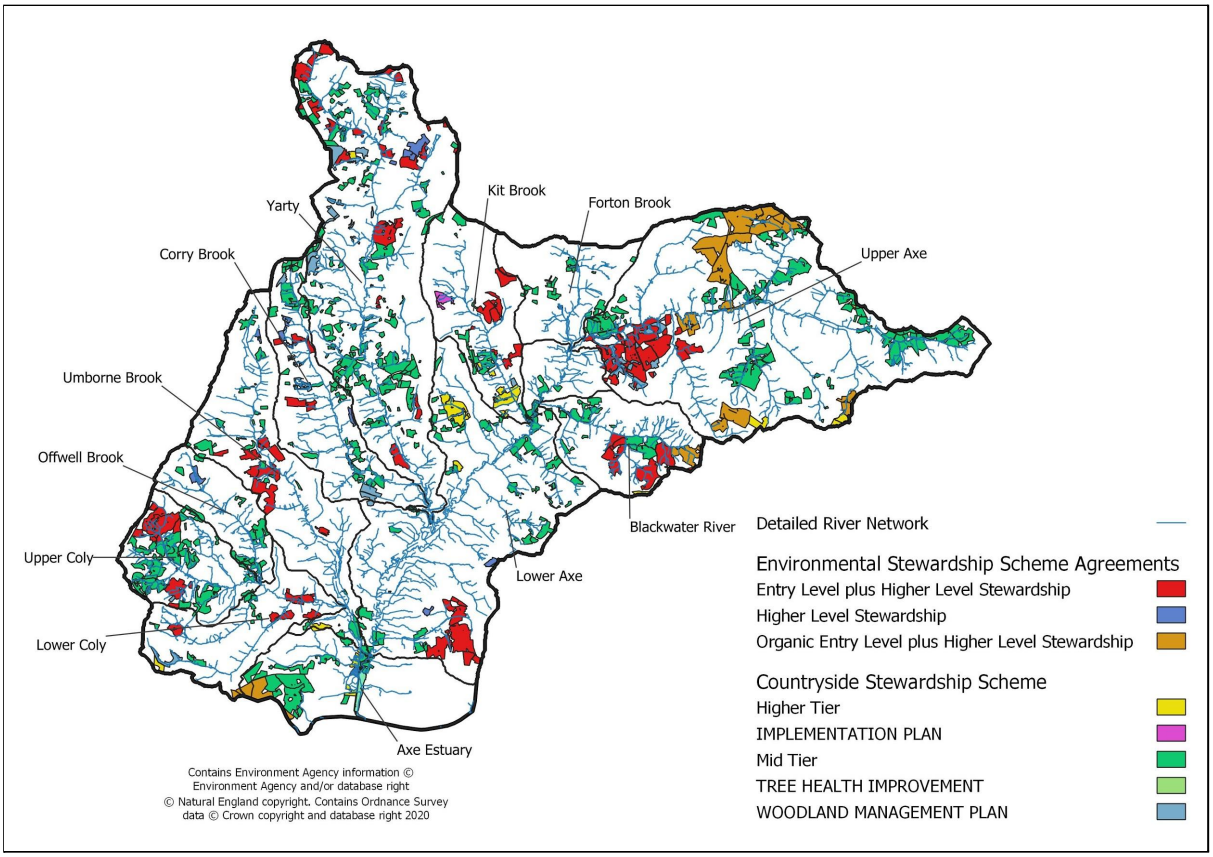
CSF is the main provider of targeted farm advice in the catchment. The voluntary approach has benefited from the partnership with the Environment Agency in the N2K project on the Axe that has combined complementary voluntary and regulatory approaches. This has been particularly marked in enhancing the contact with previously hard to reach farmers. CSF has also benefited from the relationship with, and thereby increased its reach through the CABA, WCRT, FWAGSW, AONBs and Facilitation groups.

4.4.3.3 Environmental Land Management

The forthcoming Environmental Land Management (E.L.M.) scheme is described by Defra as “the cornerstone of the government’s new agricultural policy. Founded on the principle of ‘public money for public goods’, E.L.M. will provide a powerful way of achieving the goals of the 25 Year Environment Plan and commitment to net zero emissions by 2050, while supporting our rural economy.”

E.L.M. will pay farmers for managing their land to deliver ‘public goods, namely clean air, clean and plentiful water, thriving plants and wildlife, protection from environmental hazards, beauty, heritage and engagement with the environment, and reduction of and adaptation to climate change. It will comprise three components: a Sustainable Farming Incentive (SFI) intended to be available to all farmers; a Local Nature Recovery component encouraging local collaboration; and a Landscape Recovery component for landscape-scale initiatives.

Figure 30: Environmental Stewardship and CSS agreements



4.4.3.4 Farm advisory services

E.L.M. will include provision for advisors to be approved locally for the delivery of ELM applications. As this new provision becomes established there could be an opportunity to coordinate E.L.M. advice with wider agricultural advice including agronomy and nutrition.

Amongst the priorities to be addressed by local advice in the Axe catchment must be the current low level of understanding amongst farmers of the Farming Rules for Water.

4.4.3.5 Dialogue with the farming community

The current Blackdown Hills E.L.M. Trial has pursued an approach based on farmer ambassadors initiating a peer-to-peer dialogue with a cluster of farmers in the Yarty catchment. This has succeeded in pulling into a dialogue several farmers who have not engaged in environmental issues before. The process will include creating a collective dialogue early in 2021 to explore farmer attitudes to E.L.M. and public goods.

The peer-to-peer approach looks able to create constructive engagement which could be used to create a conversation with farmers who are representative of the wider catchment and its agricultural issues. Such farmer engagement could create a more positive sense of involvement amongst farmers in the partnership to address the catchment's environmental issues.

4.4.4. AGRICULTURAL INTERVENTIONS

4.4.4.1 Best Farming Practices

The toolbox of Best Farming Practices that can minimise pollution to watercourses consists of the following:

4.4.4.2 Soil management

A. Cultivate and drill across the slope
B. Avoid overwinter tramlines
C. Establish in-field grass buffer strips
D. Adopt minimal cultivation systems
E. Avoid high risk crops next to watercourses

4.4.4.3 Livestock management

A. Reduce overall stocking rates on livestock farms
B. Reduce field stocking rates when soils are wet
C. Move feeders and water troughs at regular intervals
D. Construct troughs with a firm but permeable base
E. Reduce dietary N and P intakes

4.4.4.4 Fertiliser management

A. Do not apply fertiliser to high risk areas
B. Avoid spreading fertiliser on fields at high risk time
C. Use clover in place of grass

4.4.4.5 Farm infrastructure

A. Fence off rivers and streams from livestock
B. Construct bridges for livestock crossing streams
C. Re-site gateways away from high-risk areas
D. Farm track management
E. Establish new hedges
F. Establish riparian strips
G. Establish and maintain artificial wetlands

4.4.4.6 Manure management

A. Increase the capacity of farm yard manure (slurry) storage
B. Install covers on slurry stores
C. Site manure heaps away from watercourses
D. Site manure heaps on concrete and collect effluent
E. Minimise volume of dirty water and slurry produced

4.4.4.7 Trees, woodland and hedgerow planting and management

There may be opportunities for floodplain woodland creation to assist with river channel restoration and sediment trapping. Similarly there may be a role for agroforestry in addressing soil conservation and stability in vulnerable areas.

4.4.5 RIVER CHANNEL RESTORATION AND FLOODPLAIN RECONNECTION

Natural England has identified a range of actions or 'remedies' required to bring the River Axe SSSI into favourable condition (Note 10). The actions required include developing a whole-river restoration plan and initial implementation of actions. Other actions include implementing a diffuse water pollution plan, catchment sensitive farming initiatives, and an invasive species control strategy.

4.4.5.1 Working With Natural Processes

- Supporting and continuing positive management in parts of the river that are already in good health
- Supporting and allowing the river to recover where natural processes are already working well
- Assisting natural recovery through change in land and river management practices
- Ensuring the river and catchment is resilient and can adapt to future pressures brought about by climate change
- Understanding how geomorphology and ecology respond to restoration.

4.4.5.2 Channel restoration measures

Based on the rationale for SSSI river restoration (Natural England 2006) and experience restoring other SSSI rivers, the following types of restoration and management measures apply to the River Axe:

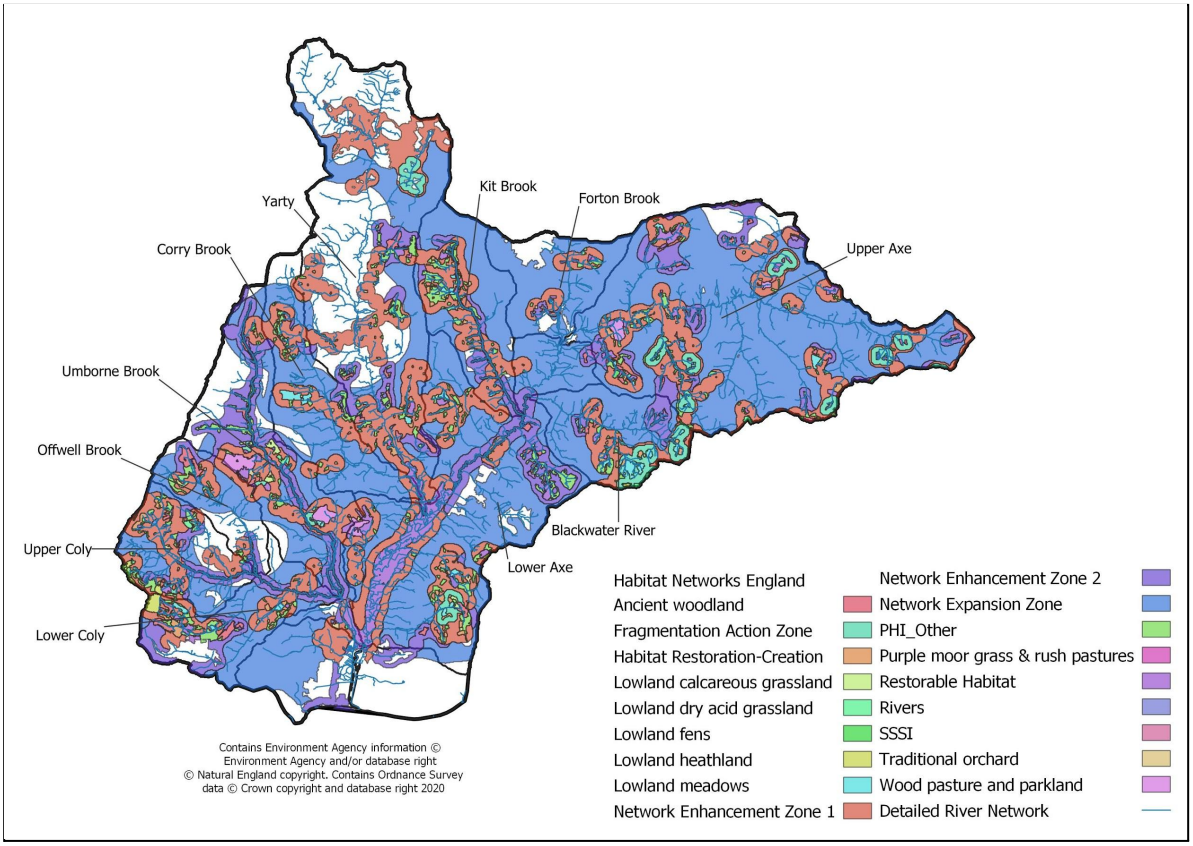
- Reduced/modified channel maintenance and other operations, such as fewer removals of gravel shoals and large woody debris, to promote natural recovery of form and function.
- Removal/lowering of in-channel control structures, to re-establish riffle and run habitat, restore characteristic water depths, velocities, reduce siltation and allow free movement of sediment and fauna.
- Sensitive restoration of banks, using soft engineering including strategic tree planting and, where possible, facilitating dynamic channel processes within the floodplain to restore riparian wetland flora and fauna.
- Re-meandering or meander reconnection to restore habitat length/area and improve flow, substrate and depth diversity, thereby providing improved habitat conditions for a wide range of characteristic fauna and flora.
- Livestock management to stabilise banks and reduce siltation and channel widening. Preferably through reducing stock densities or if not possible through setting back fencing from the channel top to allow some channel movement and occasional grazing/cutting of vegetation as appropriate.
- Restoration of lost bankside tree cover to increase structural diversity of the banks and provide shade and complex bank structures within the channel.
- Control of invasive exotic plant and animal species to ensure continuity of native plant assemblage and to reduce impacts to river banks and beds, and to maintain the ecological balance of the watercourse.

4.4.6 HABITAT ENHANCEMENT, RESTORATION AND RECREATION

4.4.6.1 Nature Recovery Network strategy

Local Nature Recovery Strategies (LNRS) are intended to help deliver the Government's ambition to create a national Nature Recovery Network (NRN), as set out in the 25 Year Environment Plan. LNRS will identify, map and prioritise local actions to create bigger, better and more connected natural places that benefit people, wildlife and the economy. LNRS will roll out across all areas in England once the Environment Bill receives royal assent.

Figure 31: Habitat Network zones



4.4.6.2 Habitat expansion opportunities through WWNP

Using the Environment Agency 2017 WWNP opportunity data, it is possible to visualise how the catchment could look with a variety of nature based solutions implemented.

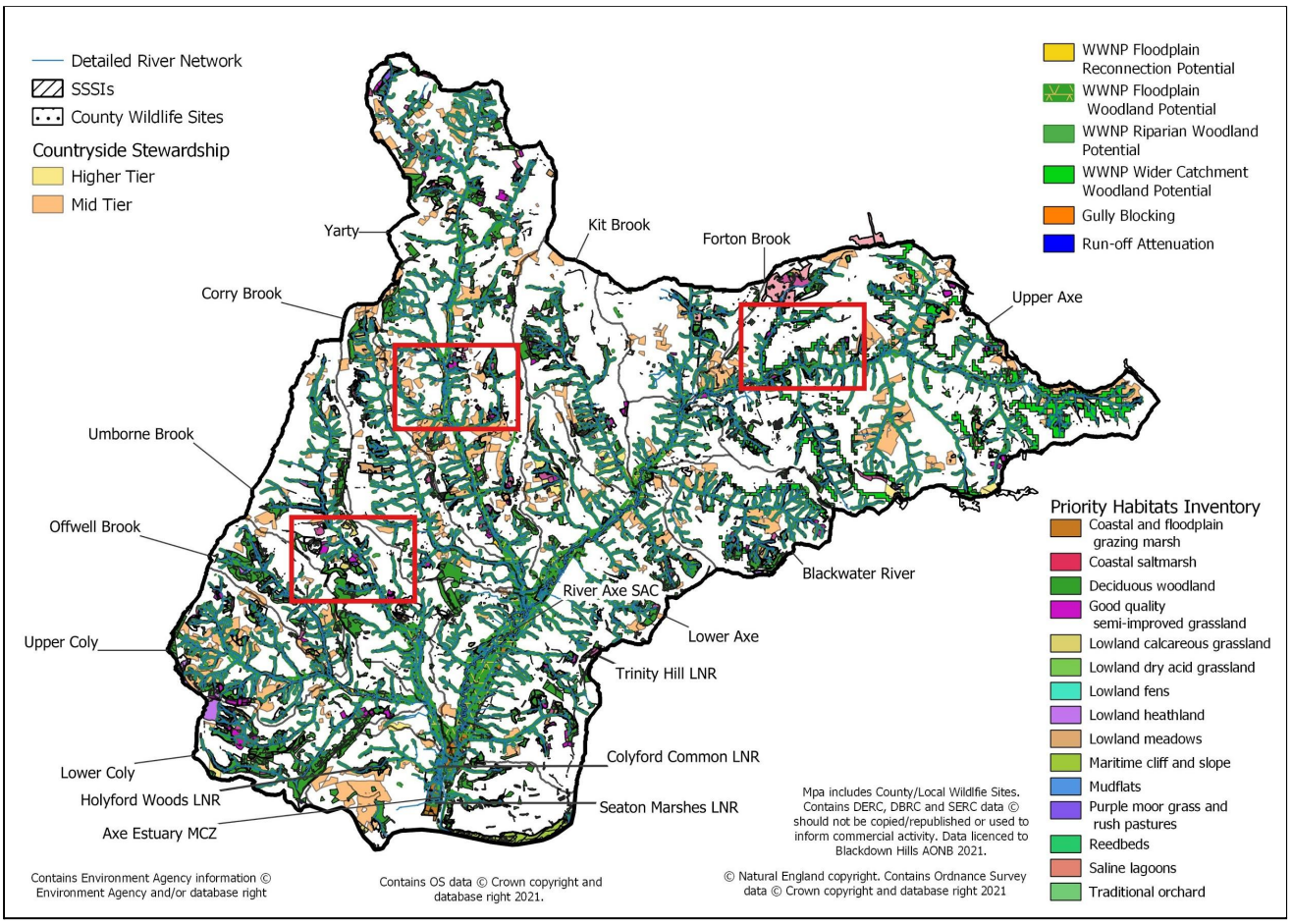
The maps below provide a starting point for identifying potential measures that help achieve flood risk management benefits, but would also provide wider ecosystem service benefits. Because these maps are strategic and indicative in nature, they should be used as a screening tool to signpost areas for more detailed, local field or modelling investigations.

The maps show a number of WWNP opportunities:

- Floodplain reconnection;
- Run-off attenuation features;
- Gully blocking as a subset of run-off attenuation features on steeper ground;

- Tree planting covering 3 categories (floodplain, riparian and wider catchment woodland).

Figure 32: Habitat Expansion opportunities through WWNP



Three zones (shown as red boxes) are shown in closer detail overleaf to illustrate how WWNP opportunities might serve to join a wider network of existing habitat into a connected whole, within the following three sub-catchments:

- Upper Axe
- Umbourne Brook
- Yarty

Figure 33: Yarty catchment example - Existing Habitats

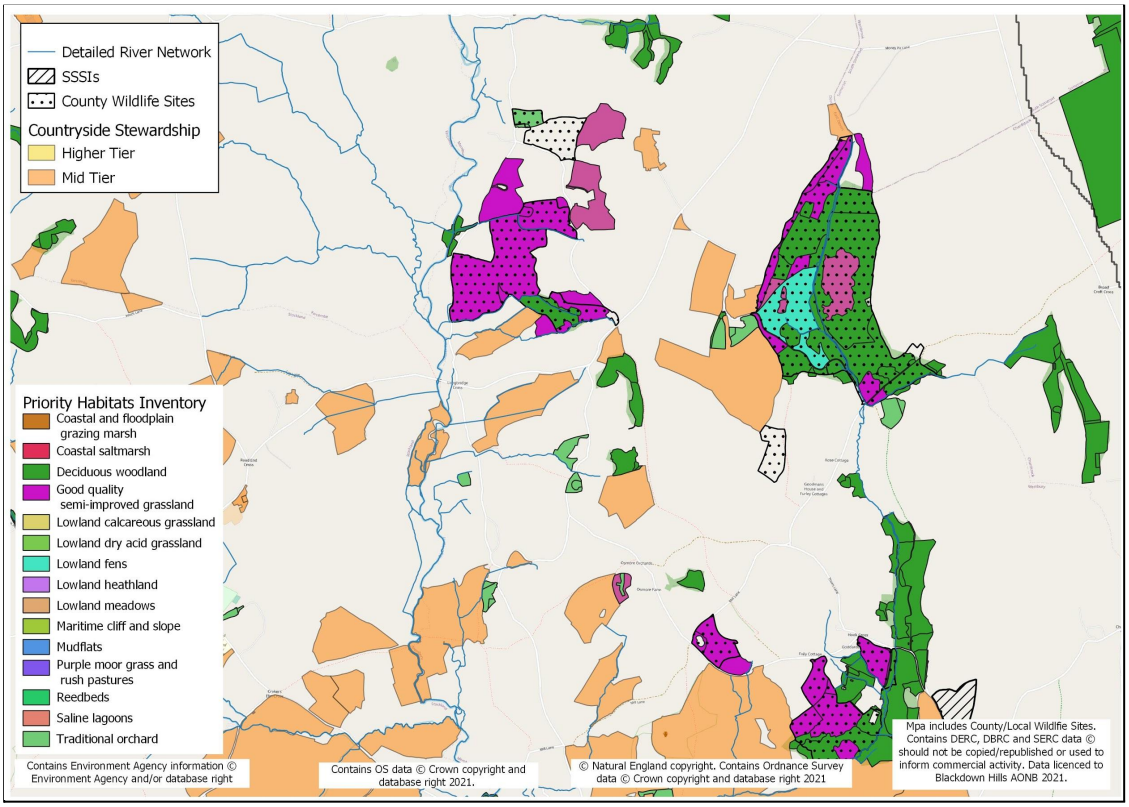


Figure 34: Yarty catchment example with WWNP opportunities overlayed

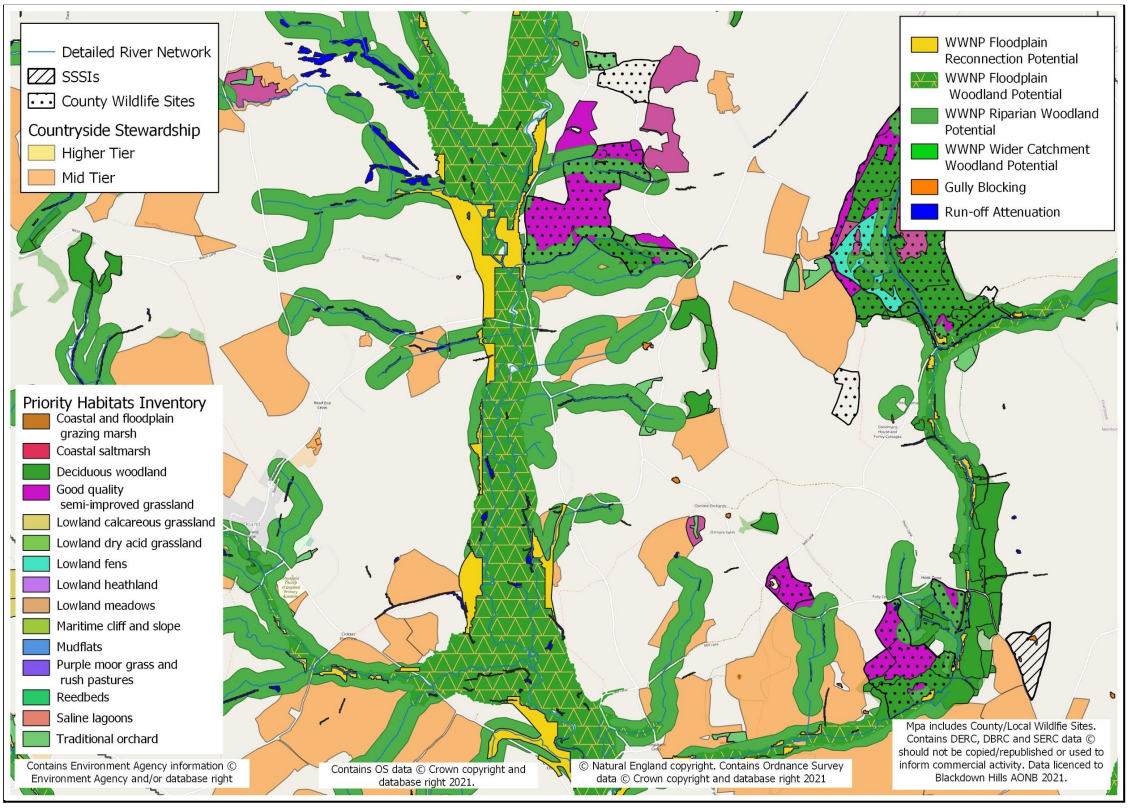


Figure 35: Upper Axe catchment example - Existing Habitats

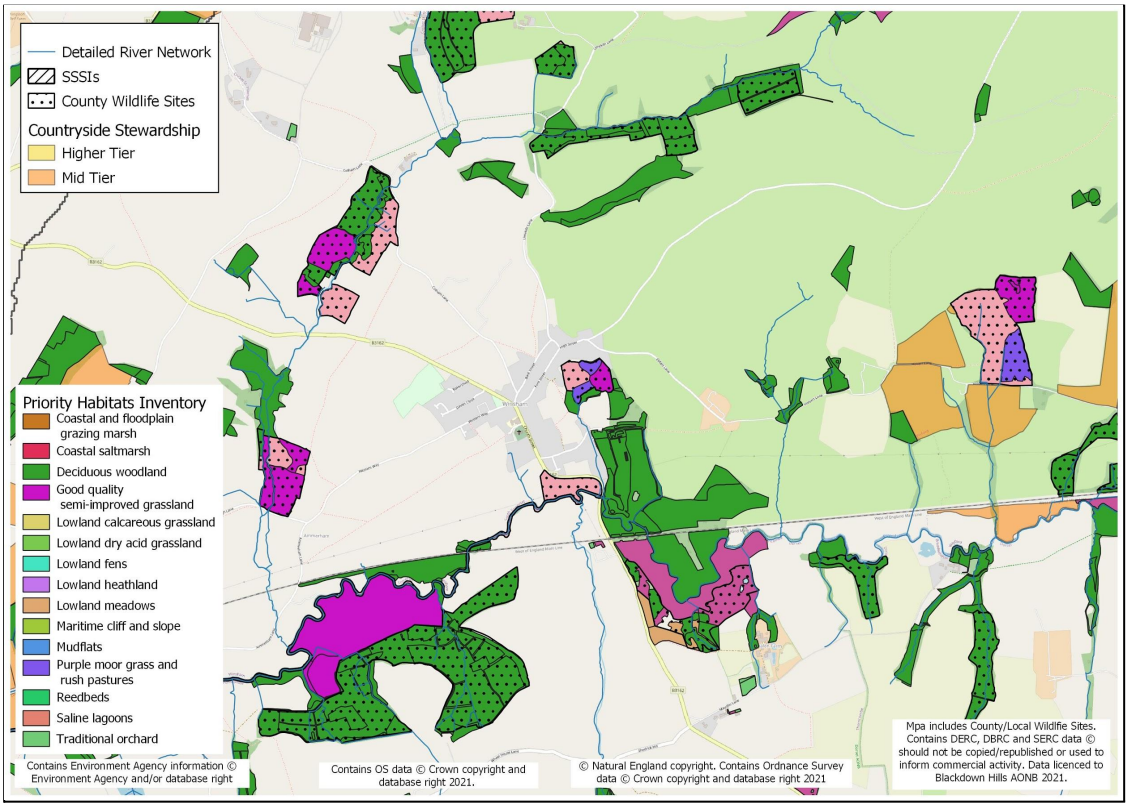


Figure 36: Upper Axe catchment example with WWNP opportunities overlayed

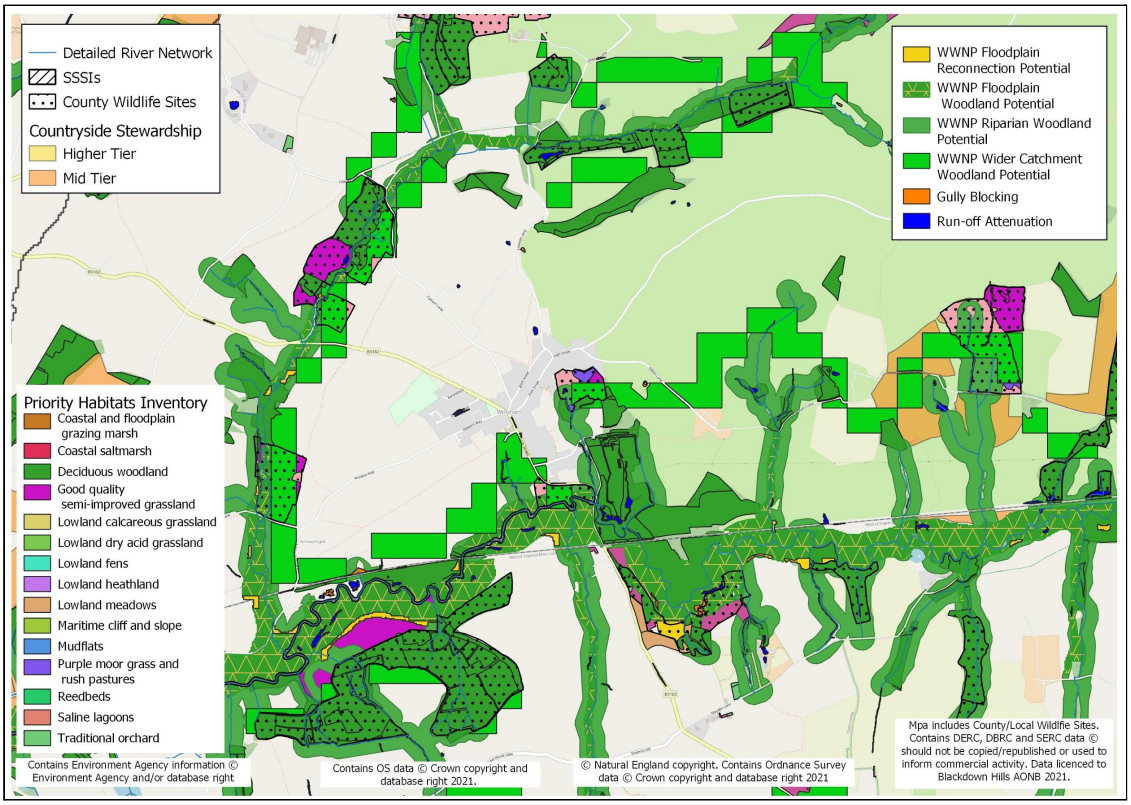


Figure 37: Umborne Brooks catchment example - Existing Habitats

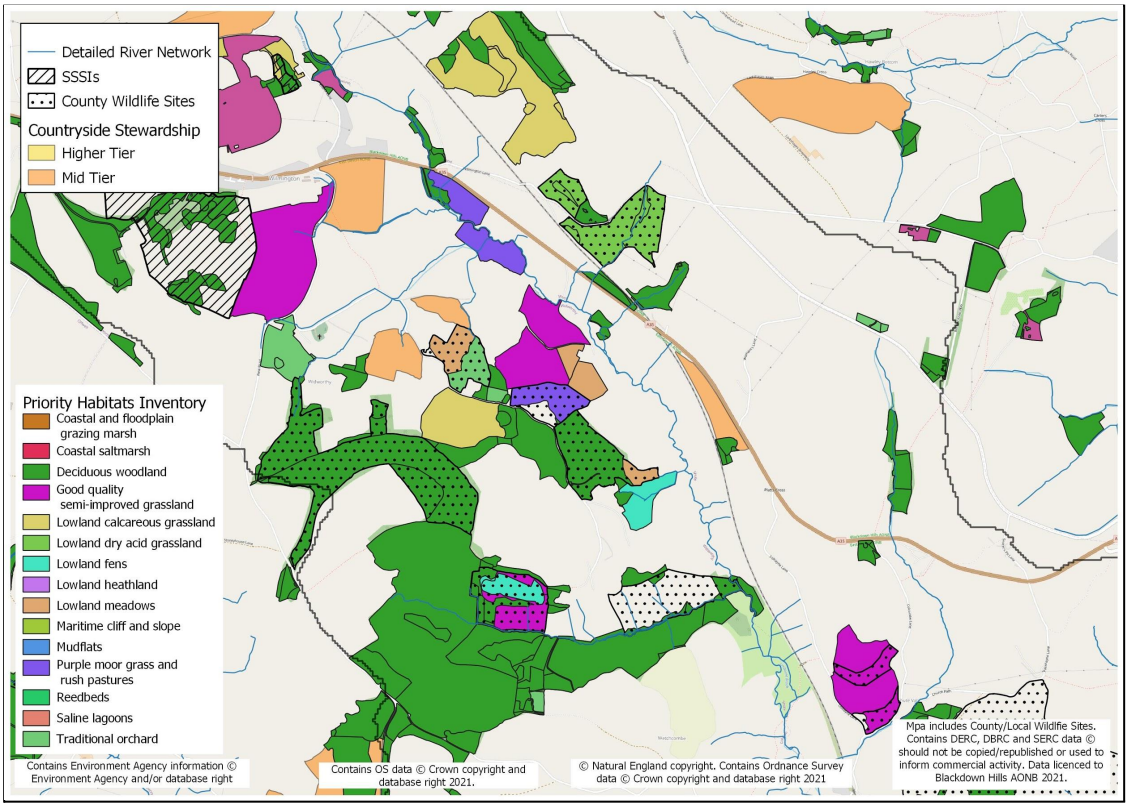
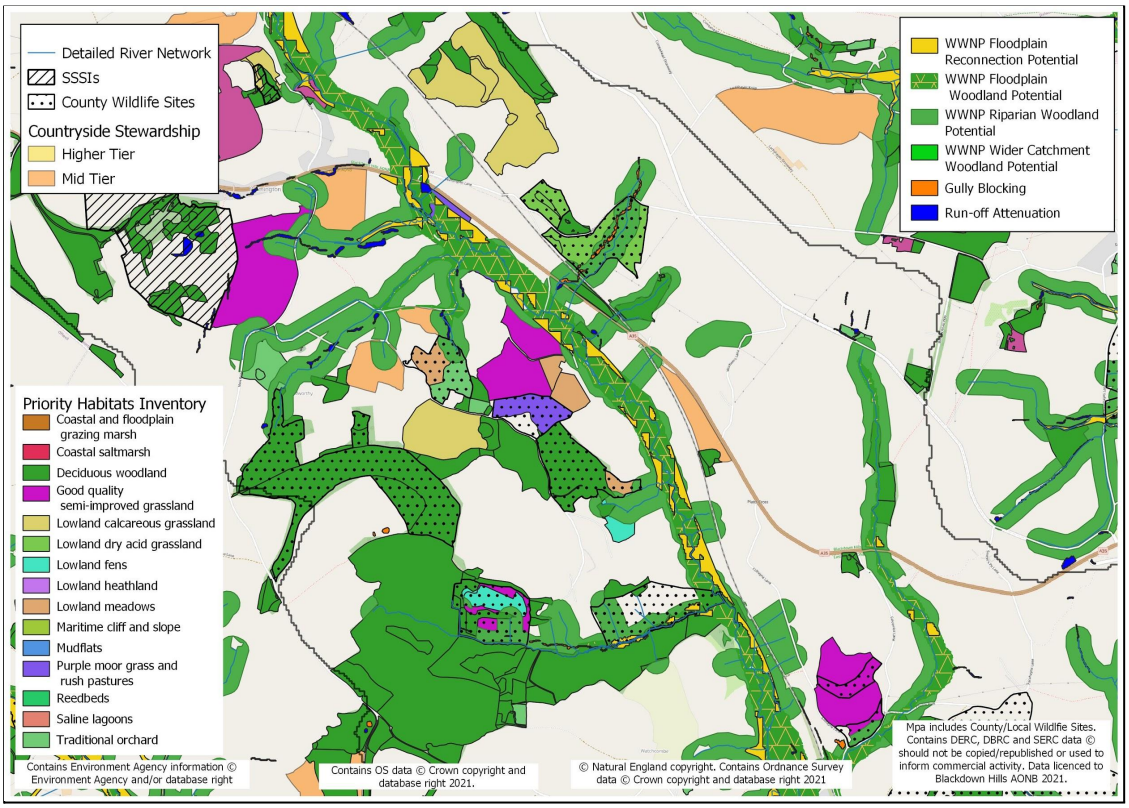


Figure 38: Umbourne Brook catchment example with WWNP opportunities overlayed



4.4.7 MONITORING

The current approach to the measurement of water quality in the Axe catchment is relatively coarse. Current resources prevent the sampling of all metrics, every year, in every location, and hence the data available can create a false, lagged picture. In addition the Environment Agency's monitoring activity is subject to change, so it can be hard to compare data year on year. Locations of sampling are also subject to change and can be sporadic.

A new River Surveillance Network (RSN) approach is being introduced nationally and is designed to remove bias and give a more accurate picture of river health nationally. Random sampling points are identified as part of this approach, and these include points within the Axe catchment. The frequency of monitoring is yet to be set but it is intended to be long term and could include annual monitoring on the Axe.

4.4.8 GOVERNANCE COORDINATION

4.4.8.1 Colchester Declaration

The National Association of AONBs launched the declaration at the 2019 Landscapes for Life Conference in Colchester. It states that:

- Natural Beauty has intrinsic value and means so much to people
- AONBs should be places of rich, diverse and abundant wildlife
- Nature recovery is central to the conservation and enhancement of natural beauty
- Climate change is the biggest threat to humanity and one of the greatest threats to biodiversity. Designated landscapes offer some of the most powerful solutions to the challenges of climate change
- The network of AONBs and National Parks, their teams, partnerships, authorities and stakeholders offer a unique solution to tackling environmental challenges.

The Axe Catchment is one of just five national pilots that aim to demonstrate how the AONB family can create significant change on the ground. The Axe pilot will focus on championing nature recovery through environmental land management in the context of holistic delivery of public goods and services).

The three AONBs covering much of the Axe catchment have resolved to work collaboratively to manifest the Colchester Declaration in their areas and deliver the Axe Catchment pilot, through the development of a LNRS, and to seek to extend that work over the 'white space' between their three boundaries.

4.4.8.2 Agency coordination

There are references in recent reports on work in the Axe catchment, to disconnects between agency actions leading to poor resolution of pollution casework (eg. the Environment Agency and the Rural Payments Agency - cited in Note 6). Given the seriousness of issues in the Axe catchment there is a need for local agreement on coordination of effort.

4.4.9 MARKET INFLUENCE

4.4.9.1 Extending the conversation to include the market drivers

Given that many of the environmental issues affecting the Axe catchment are ultimately driven by market forces in the dairy industry, local efforts to avert these issues will continue to be foiled until or unless those market forces are addressed. An opportunity needs to be found for a dialogue with the wider dairy industry, which can serve to highlight the full current cost of dairy production in this area - and more widely.

The milk processing and retailing sector projects an image of environmental responsibility. For example, the Arla dairy cooperative website states that: "*..every step we take, from farm to fridge, is focussed on one ambition, to leave the farms, the food and the world around us in even better shape for the next generation*" (Note 12). Aside from the question of the truthfulness of this statement, there is a conversation to be had about how the industry might support producers in moving towards realising this goal. There ought to be scope for the industry to use such moves for marketing benefit.

Meanwhile current interest in examining the full implications of how we produce our food, for example through True Cost Accounting (Note 13) can serve to draw more attention to the currently unsustainable cost of dairy production.

5. Learning from previous programmes

5.1 Many of the problems listed above have been present and escalating for the last 50 years; some for even longer. The issues were well understood by the late 1980's and numerous audits, plans and initiatives have since been launched, including:

- 1988 River Axe Corridor Survey – DWT
- 1997 Catchment Management Plan
- 1994 designation of the Blackdown Hills ESA
- The Cycleau project (2004-6)
- Designation as a Nitrate Vulnerable Zone
- Designation as a priority area for Countryside Stewardship
- Catchment Sensitive Farming (since 2006 – and due to be extended and expanded)
- The Axe Diffuse Water Pollution Plan (2014)
- Woods for Water priority area

5.2 However, whilst many of these plans and surveys identify similar issues affecting the river and promote on-the-ground solutions that are known to be effective if implemented, none have yet succeeded in reversing the decline in the river's condition.

5.3 Why have these interventions not been successful? The feedback we have received suggests:

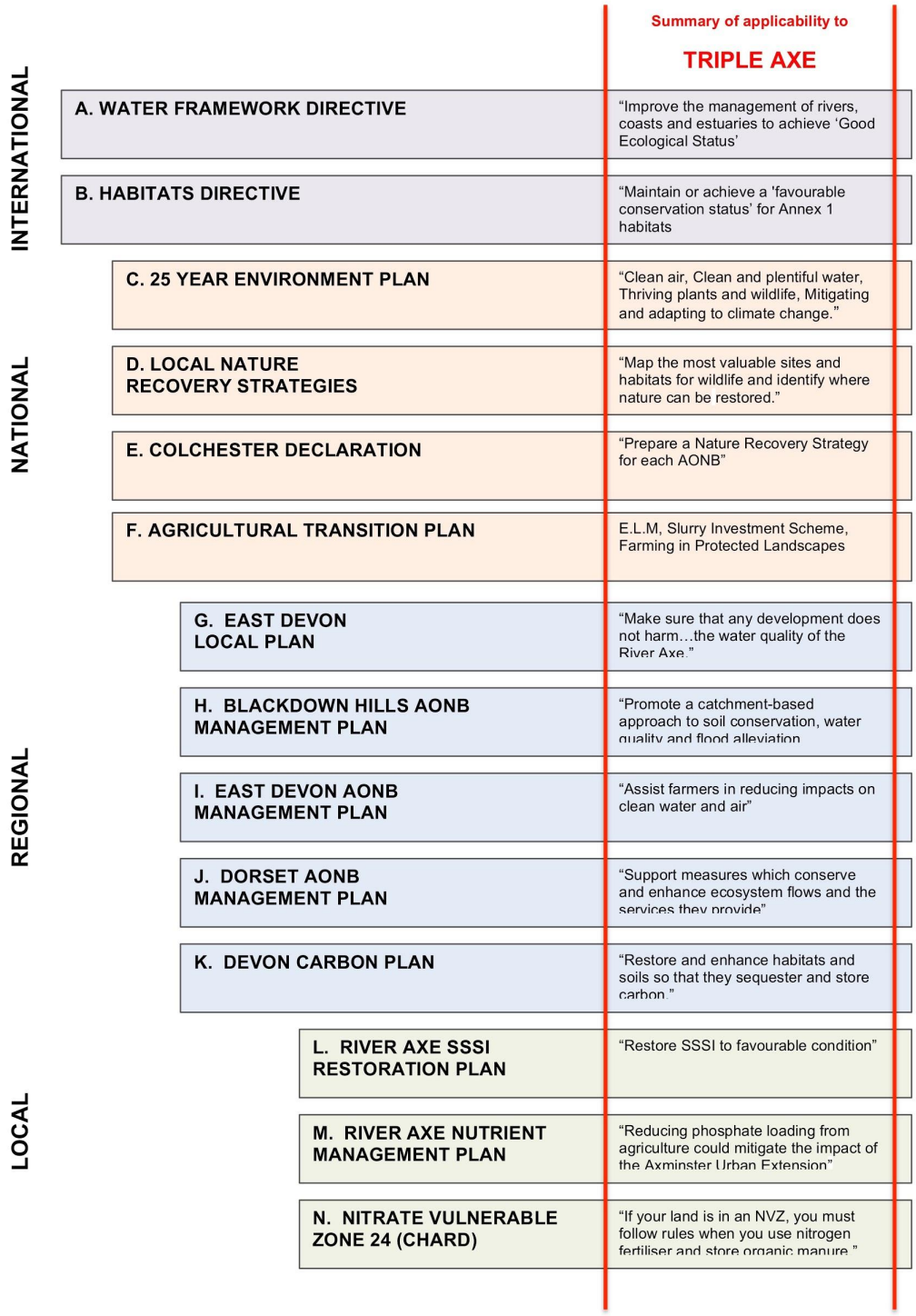
- Some pressures are escalating – including the extent of maize growing, size of dairy herds, extraction of gravels, population levels / sewage discharges and climate change related pressures, – which counteract improvements achieved.
- Many farmers are not sufficiently aware of current regulations, how their operations impact the river or what steps they could take to reduce those impacts.
- Commercial farm advisors are often focused more on profit than environmental sustainability.
- Even when they understand the impacts, many farmers are unable or unwilling to change their practices because, in their perception, to do so would incur unaffordable costs or require unimaginable changes to their farming systems. As the 2019 SSSI Restoration Plan states: "it remains a challenge to find a route to achieving favourable condition and good ecological status and maintaining agricultural production".
- Under-resourced inspection and enforcement services mean that illegal land management practices often go undetected and unpunished.
- In places the river's normal geomorphological function has broken down and land-use changes alone will not be sufficient to restore normal function. Here engineered solutions (both hard and soft/green) are needed in conjunction with those land use changes.
- Some initiatives have been too fragmentary, siloed or dispersed to trigger change, often due to a lack of resources.

- The fact that the catchment is split between 3 AONBs and 3 counties makes coordination more difficult.
- A community-wide approach that recognises the need for all stakeholders to be involved has not been attempted.
- Farmers have rarely been given a voice in the design and delivery of programmes and a peer-support approach has not yet been adopted.

An effective action plan must address these issues whilst building upon foundations laid by previous and current programmes.

6. Strategic Context

6.1 The Triple Axe proposals align with key clauses from the following relevant strategic documents:



6.2 Key aligned strategic documents

The following strategic documents are relevant to this Action Plan. The relevant content is given in full in Appendix 2.

6.2.1 WATER FRAMEWORK DIRECTIVE
6.2.2 HABITATS DIRECTIVE
6.2.3 25 YEAR ENVIRONMENT PLAN
6.2.4 LOCAL NATURE RECOVERY STRATEGIES
6.2.5 THE COLCHESTER DECLARATION 2019
6.2.6 EAST DEVON LOCAL PLAN
6.2.7 BLACKDOWN HILLS AONB MANAGEMENT PLAN
6.2.8 EAST DEVON AONB MANAGEMENT PLAN
6.2.9 DORSET AONB MANAGEMENT PLAN
6.2.10 DEVON CARBON PLAN
6.2.11 RIVER AXE SSSI RESTORATION PLAN
6.2.12 RIVER AXE NUTRIENT MANAGEMENT PLAN
6.2.13 NITRATE VULNERABLE ZONES (NVZ) 2017

7. Case Studies

7.1 National Project Case Studies

The following national case studies illustrate best practice approaches from elsewhere in the UK which are relevant to the Triple Axe Action Plan. Full summaries of the most relevant information plus web links are given in Appendix 3.

7.1.1 River Mease Catchment Project (Trent Rivers Trust)
www.trentriverstrust.org/project/rivermeasecatchmentproject

7.1.2 The Phosphate Project (Kennet Catchment Partnership)
www.kennetcatchment.org/projects/live/phosphate-project

7.1.3 Phosphorus in the Eye Brook Catchment (Game & Wildlife Conservation Trust)
https://www.gwct.org.uk/allerton-archive/catchment-research/phosphorus-from-agriculture-riverine-impact-study-paris/phosphorus-in-the-eye-brook-catchment/

7.1.4 Water and Integrated Local Delivery (WILD) - Upper Thames (FWAG SW & EU partners)
https://oppla.eu/casestudy/18425

7.1.5 The Wye Ithon Severn Ecosystems (WISE) Project
https://www.wyeuskfoundation.org/the-wye-ithon-severn-ecosystems-wise-project

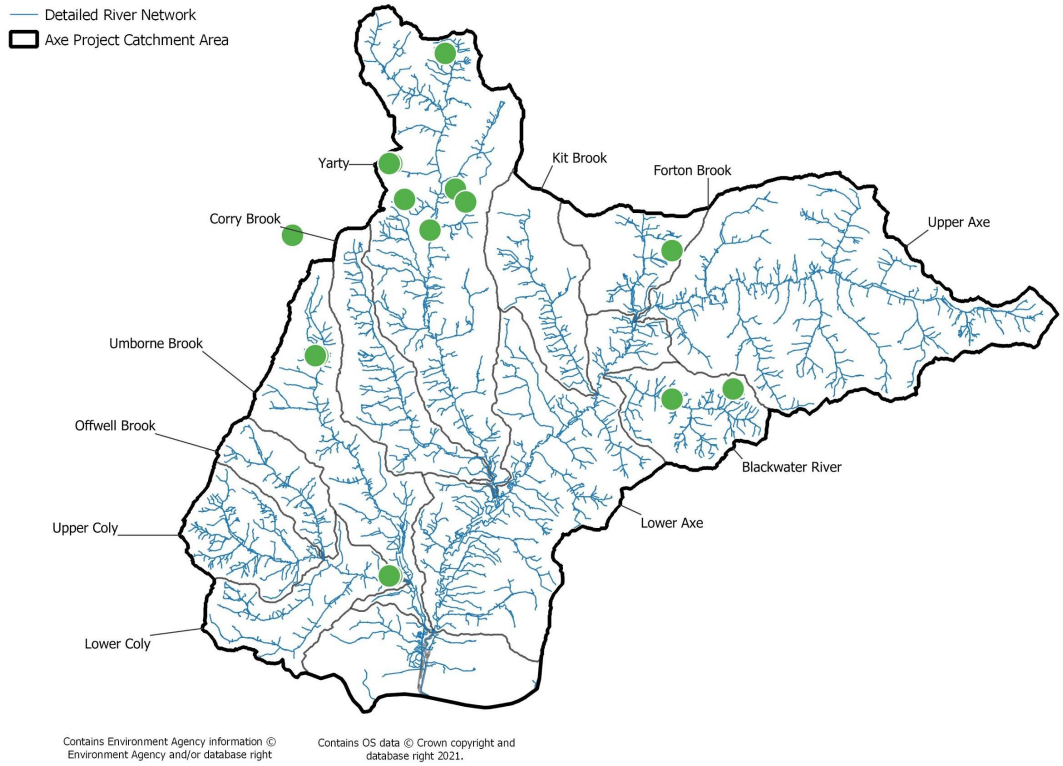
7.1.6 Channel Payments for Ecosystem Services (West Country Rivers Trust and EU partners)
https://wrt.org.uk/project/cpes/

7.1.7 The Demonstration Test Catchments Evidence Compendium (Defra)
http://www.wensumalliance.org.uk/research_reports/14879_WT15116_DTC_Evidence_Compendium_final.pdf

7.2 Local Farming Case Studies

7.2.1 A series of interviews was undertaken during the action planning process with 15 farms across the catchment, to explore their current business, environmental measures, and attitude to the future and to their peers. A summary of key information from these is given below, with full interview outputs given in Appendix 1.

Locations of farms interviewed (NB some are close together with dots overlapping)



7.2.2 6 interviews were carried out specifically for this project, while information for the remaining 9 is derived from farm visits carried out in the Yarty sub-catchment as part of the E.L.M test and trial, at the end of 2020.

7.2.3 Summary of key information gathered

Farm	A	B	C	D	E	F	G
Sub catchment	Blackwater	Blackwater	Coly	Forton Brook	Umborne	Yarty	Yarty
Farm type	Mixed dairy, beef, sheep	Dairy	Beef	Dairy	Mixed dairy, sheep	Mixed dairy, beef	Dairy
Holding area/ha	242	233	50	160	114	200	71
Milking cows	200	370	-	180	110	300	120
Young stock	80			70	30	150	75
Beef cattle	120	-	90	-	-	350	-
Breeding ewes	280	-	-	-	600	-	-
Total livestock units	366.4	370	72	222	176	670	165
Stocking rate (LU per ha)	1.5	1.6	1.4	1.4	1.5	3.4	2.3
At least 5 months slurry storage?	Yes	No	No	Yes	No	No	No
Slurry store covered?	Yes	No	No	Yes	No	No	No
Winter slurry spreading?	Yes	Yes	No	No	No	Yes	Yes
Risk of soil erosion issues?	High	Low	Low	Low	Low	High	Low
Maize grown? Risk level?	Yes, medium	No	No	Yes, low	No	Yes, medium	No
Agri-env	Mid Tier	Mid Tier	HLS+ELS	No	Mid Tier	Mid Tier	Mid Tier
Advice	Environment Agency, Ecologic	CSF	Ecologic	No	FWAG, Ecologic	Environment Agency	John Cossens, CSF

Farm	H	I	J	K	L	M	N	O
Sub catchment	Yarty	Yarty	Yarty	Yarty	Yarty	Yarty	Yarty	Yarty
Farm type	Beef	Dairy	Beef	Mixed dairy, sheep	Mixed dairy, beef	Dairy	Mixed dairy, beef	Sheep
Holding area/ha	190	69	89	171	81	120	174	16
Milking cows		124		110	90	300	180	
Young stock				40	40	50		
Beef cattle	300		120		50		410	
Breeding ewes				500				40
Total livestock units	240	124	96	174	154	330	508	3.2
Stocking rate (LU per ha)	1.3	1.8	1.1	1.0	1.9	2.8	2.9	0.2
At least 5 months slurry storage?	No	No	No	Yes	Yes	No	Yes	N/A
Slurry store covered?	No	No	No	Yes	Yes	No	Yes	N/A
Winter slurry spreading?	No	No	Yes	No	No	Yes	No	N/A
Risk of soil erosion issues?	Low	Medium	High	Medium	Medium	Medium	Medium	Low
Maize - risk level?	No	No	No	No	No	No	Yes, medium	No
Agri-env	Mid Tier	ELS	No	Mid Tier	Water Capital only	Mid Tier	Mid Tier	No
Advice	No	CSF	No	Own agent, CSF	CSF	Environment Agency, CSF	Greenslade Taylor Hunt	No

7.2.4 Headline observations from the farmer interviews

Although the 15 farms interviewed do not provide a statistically representative cross section of the whole catchment, they include the full spectrum from intensive dairy through to low-input beef and sheep, and including conventional and organic.

- 4 out of 15 farms have an overall stocking rate above 2.0 livestock units per hectare.
- 11 out of 15 are already in some form of agri-environment agreement
- 7 out of 15 admit to currently undertaking winter slurry spreading
- Only 4 out of 15 are growing maize
- 9 out of 15 have less than 5 months slurry storage
- 9 out of 15 do not have a covered slurry pit
- 9 out of 15 had received visits either from CSF or from John Cossens, or both.

It was striking that half the farmers interviewed expressed concerns about some of their peers, in terms of attitudes to pollution, soil management and other issues, albeit while acknowledging some of their own weaknesses. The overall sense was that all farmers were at least aware of the issues surrounding good farming practice, maize growing risks and winter soil management, and conscious that practice across the catchment is going to need to improve.

8. Vision, Targets and Outcomes

8.1 The Vision:

People and wildlife in the Axe catchment flourish, living in a nature-rich, resilient landscape that sustains viable farming and the wellbeing and livelihoods of our communities.

8.2 Targets:

<table>
<tr><th>2021 - 2026</th><th>2026 - 2031</th><th>2031 - 2036 +</th></tr>
<tr><td>Reduce phosphate and suspended sediment inputs to the River Axe to a level that allows recovery of the River Axe SAC.</td><td>Benefit of reduced P and SS enables return of the River Axe SAC to good condition.</td><td rowspan="2">Monitor and maintain these gains.</td></tr>
<tr><td>Commence removal of main infrastructure modifications towards the restoration of the River Axe SSSI.</td><td>Completion of removal of infrastructure modifications enables return of the SSSI to favourable condition.</td></tr>
<tr><td colspan="3">Delivery of the Vision and wider Outcomes: Nature Recovery; Sustainable Farming; Thriving Communities</td></tr>
</table>

8.3 Modelled targets for pollution reduction required[3]

Pollution type	Current losses all sources / year	Diffuse share	Other share	Target losses all sources by 2031
Phosphorus	**42,400 kg**	**30,500 kg (72%)**	**11,900 kg (28%)**	**20,000 kg**
Sediment	**NA**	**12,000 tonnes**	**NA**	**6,000 tonnes**

[3] Please see section 4.2.1 for a description of the development of these targets.

8.4 Outcomes (over the next 15 years and beyond)

- Farming enterprises are operating within the ecological limits of the land, providing plentiful public goods and ecosystem services alongside wholesome food from profitable farms.
- Habitat mosaics (including mire, wetland, woodland and heathland) have been connected and created that are better, bigger, more numerous and joined, operating as a resilient, viable, functioning and interconnected carbon rich Nature Recovery Network. Native woodlands have been extended and connected to create continuous woodland cover along the majority of the river corridor, allowing the river to function more naturally.
- Flagship species such as salmon, horseshoe bats, dormice, water voles and fritillary butterflies are able to move freely to new climate spaces, with designated nature conservation sites operating as 'core nature areas' in the Network. The arrival of beavers in the catchment has been prepared for and people welcome the positive contribution they can make to river health and a diverse ecosystem allied to farming. Movements of salmon, sea trout and eels are unrestricted and spawning habitat has been restored.
- Natural processes are operating across the catchment with the river channel and floodplain being morphologically dynamic, but not unstable, and allowed to develop and retain a range of natural features with their associated biodiversity. The benefits of the restored catchment and river system extend into the estuary and marine environment, improving the MCZ and SAC protected habitats.
- Residents and businesses in the catchment have a better understanding of its ecology and agricultural management and are providing practical support to encourage and enable a thriving, resilient nature-rich environment.

An essential means of achieving this vision will be:

- Stakeholders (including farmers and landowners, residents and businesses) have a sense of ownership of this plan. Delivery of the vision is through cooperation across sectors in managing the catchment with nature's recovery, climate resilience and delivery of public goods & services at its core.

Partners' strategies and other detailed action plans will help deliver connected outcomes of this plan:

- Local businesses are thriving and profitable, reaping the benefits from a nature rich landscape.
- New developments are sustainable, resilient and exemplars of green development including appropriate use of resources and recycling.
- Existing settlements and infrastructure are retrofitted to ensure careful use of natural resources and pollution and flood risk is greatly reduced.
- People can access and make a 'connection to nature' from wherever they live in the Axe catchment, and opportunities are available to all.

9. Principles

Underpinning this Action Plan are the following key principles:

9.1 A focus on farming

We know that intensive agriculture is the source of at least two-thirds of the phosphates in the river and much of the sediment load. Therefore, our focus must be on supporting the development of farming practices in the Axe catchment that reduce phosphate pollution and soil erosion and tackle the significant problem of soil compaction. These changes alone will not be sufficient to restore the river to good condition, but farming is the largest single influence on the river's condition and must therefore be at the forefront of this action plan.

9.2 Involving farmers and farmer awareness

The plan recognises that for the vision to be successful for the agricultural sector it must meet both business and environmental needs. As such the plan is focused on bringing farmers more fully into the decision-making process and supporting them to adapt to different business models. At a **strategic level** farmers, statutory agencies, community groups and NGOs need to work collaboratively together to deliver the plan. This should include **engagement with milk companies** to help farmers achieve their transition plans. At **individual farm level**, to achieve realistic transition plans for their business farmers need to understand current regulations better, how to achieve compliance and how this affects their current and potential business models. To do so they need access to both business and environmental assessments of farm sustainability and close support in considering options and implementing change, and that business and environmental advice needs to be harmonious in the messages it gives to the farming community. This means integrating any new interventions closely with existing programmes such as Catchment Sensitive Farming.

9.3 Peer support networks

Networks of farmers sharing best practice, benchmarking key farm performance metrics and creating clusters that can collaborate in practical ways are an important part of the solution, supported by coordinated advisory support. This networked approach will help roll out change, solve problems collectively and encourage other farmers to adopt new approaches.

9.4 Targeted

Latest data backs up previous research undertaken by the Westcountry Rivers Trust (2014), to identify the sub-catchments that are either most vulnerable or appear to be generating the most impact. These are the Upper Axe, Yarty and Blackwater River. These areas should be given priority, as investment here is most likely

to yield the quickest results in terms of water quality. In addition, farms that are likely to have the greatest impacts, wherever they are in the catchment, need to be targeted at the earliest opportunity.

9.5 Nature Recovery Network

Multiple benefits for nature can and will be generated by this project, which will help deliver the developing Nature Recovery Network. The Triple-Axe Action Plan should influence and be fully aligned with the emerging statutory Local Nature Recovery Strategies (LNRS) for Devon, Dorset and Somerset and with AONB Nature Recovery Plans. In the Axe catchment, in line with the Colchester Declaration and the fact that the Axe is one of only five national pilot schemes to demonstrate how AONBs can deliver significant change, those Strategies and Plans should prioritise actions that help deliver the Triple Axe Action Plan. Investment decisions must in the short to medium term focus on those nature-based solutions that also achieve improvements in water quality and river function. Additional carbon sequestration and flood risk reduction benefits will also be realised through this plan.

9.6 Involving the whole community

The plan needs to be understood and supported by residents and businesses across the catchment because the changes needed – on and off farms – will impact on people's lives. The plan needs to involve people in its implementation backed by a public programme to raise awareness of the issues – including the role of domestic sewage - and the opportunities that flow from addressing them. A public-facing accreditation scheme should be established that recognises the public benefits of the work farmers are doing: a Triple-Axe badge that can be used on produce or at the farm gate.

9.7 Financing the changes

Making the changes needed on farms and across the wider system will be costly. Initial capital costs can be high and helping farms transition to more sustainable long-term systems and markets will also require ongoing revenue support. Farmers must bear the costs of compliance; whilst existing schemes, such as Catchment Sensitive Farming, can help with works over and above those needed for compliance to support transition plans. But, improved access to finance is likely to be necessary to realise change at the scale required. Opportunities emerging include using environmental credits, the mechanism of the Axe Nutrient Management Plan, the Biodiversity Net Gain requirement and the Agricultural Transition Plan (Sustainable Farming Initiative and Higher Tiers of ELM). Any investment into the farm business will need strong business planning and a view to where profit can be maximised for that farm within the environmental and market constraints of the area. Taking such an approach is likely to enable the best chance for transforming the area and meeting the vision for this plan.

9.8 The need for regulation

Alongside the programme of farmer support and advice there needs to be an increased focus on communicating regulatory obligations together with resources to increase inspections and enforce

regulations if required. The recent N2K Axe project shows how a combined inspection and support regime can deliver the changes needed and this programme should be extended. If the Triple-Axe Action Plan fails to secure the improvements needed in the condition of protected sites through this combined approach, then it is likely that a much more intensive and specific agricultural regulatory regime will need to be introduced.

9.9 Monitoring

Water quality monitoring levels are currently insufficient to identify problems or improvements quickly. A Monitoring Plan is needed to ensure that sufficient baseline data, improvements – and any deterioration – are captured. This needs to include substantial investment at the beginning of the process to renew the Condition Assessment for the SAC and carry out a full invasive species audit. There is an appetite in the community to carry out 'citizen science' water quality and invertebrate monitoring, which should be encouraged and coordinated across the catchment to supplement other monitoring activities. On-farm monitoring by farmers should also be encouraged. Additionally, automatic monitors that can measure phosphate and suspended solid levels are needed at points through the catchment.

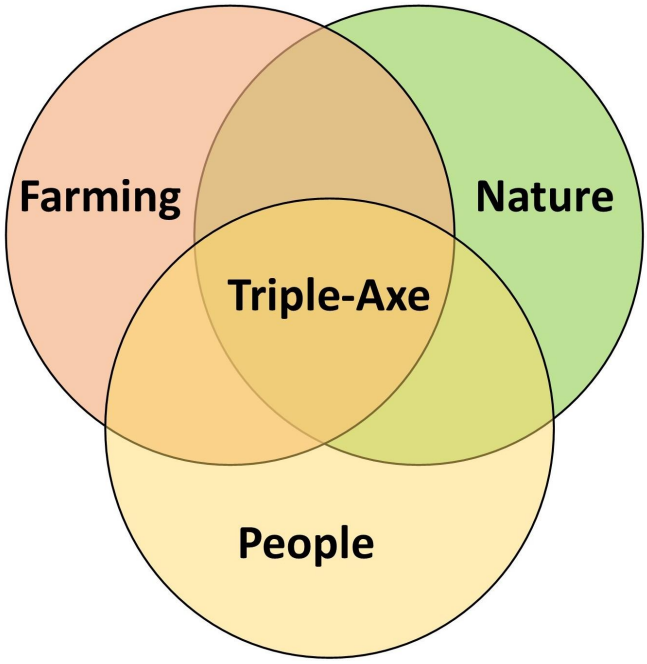
9.10 Coordination and branding

A single programme is needed that cuts across county, AONB and organisational boundaries, supported by all partners and agencies, to generate the energy to make the changes needed. The programme needs to integrate with and build on existing initiatives (e.g. CSF, WfW, ELM, AxeN2K). At the same time the programme needs its own identity and central coordination, without being branded primarily by any one partner. Delivery partners need to operate under the programme's branding and farmers need a single point of contact.

10. Action Plan Themes

10.1 OVERVIEW

The Triple-Axe Action Plan has been developed to respond to the above Principles. It is an integrated programme operating across three main themes: Farming, Nature and People, to deliver the Vision and Outcomes. The themes overlap extensively and many actions are interdependent across themes.



The majority of land in the catchment is farmland, and the farming industry is key to achieving the changes needed. Achieving nature recovery goals is a primary driver and, as nature recovery can take place mainly on farms, the bulk of the work will entail working with farmers to achieve nature-based solutions on their land. Involving local communities in the project is the other key driver because public support for farming to change is important, and individual and community actions can also help improve the state of the Axe and generate many other benefits for people and nature.

The first year of delivery, **2021-22**, will pilot this new approach. Allowing for building the funding package and a start-up phase, action is not expected to start on the ground until **September 2021**. The full programme will then commence in **April 2022** and run for three years until **March 2025**. By this point the key target of phosphate loss reduction should have been substantially achieved, although due to the legacy of phosphate in the system it is expected to take another 5 years for phosphate levels to drop to target levels.

10.1.1 Farming Actions

1. A co-ordinated **advice and support service** with a single point of contact for farmers.
2. For individual farms, a **structured business and environmental transformation programme** to:
   a. analyse the farm business and its environmental impacts / constraints, matching land use to land capability including biodiversity, soils, cropping, livestock density, manure management
   b. identify measures to achieve regulatory compliance
   c. seek more substantive business transformation to match land capability
   d. improve farm viability
3. An **inspection and regulatory compliance** programme.
4. Ongoing support for **implementing farm transformation** plans including access to grant funding
5. Access to new opportunities for **natural capital investment** and delivery
6. **Monitoring** the impacts of changes
7. **Peer-to-peer** farm support networks, benchmarking groups, farm cluster cooperation.
8. Establish a network of **demonstration farms** that farmers and the public can visit.

10.1.2 Nature Actions

1. Adopt **nature-based solutions, working with natural processes** wherever possible in securing farm improvements.
2. Encourage **riparian tree planting and new wetlands** throughout the catchment but especially on floodplains and to connect existing natural habitats.
3. Reduce **livestock pressures** on the river banks.
4. Encourage the **retention of woody debris** and the development of gravel shoals in the river.
5. **Remove/lower in-channel control structures** to re-establish riffle and run habitat, restore characteristic water depths and velocities, reduce siltation and allow free movement of sediment and fauna.
6. **Re-meander or reconnect meanders** to restore habitat length / area and improve flow, substrate and depth diversity.
7. Encourage the **retention of gravels** within channel, address unlicensed gravel extraction and target gravel reintroduction.
8. **Restore banks** using soft engineering.
9. Control **invasive exotic plant and animal** species.
10. Establish a baseline and monitor the impact of the changes on water quality and biodiversity.

10.1.3 People Actions

1. Undertake a Triple-Axe **awareness campaign** engendering pride in the environment, working closely with other programmes active in the catchment**.**
2. Organise visits to **demonstration farms.**
3. Encourage the supply and purchase of **local Triple-Axe produce** as a way of supporting the changes needed.

4. Signpost and support **water quality and wildlife citizen scientists** and **teams of volunteers** to grow and plant trees and tackle invasive species
5. Encourage **domestic septic tanks / STWs** owners to install monitoring devices and adopt maintenance contracts.
6. Encourage people to **reduce their own impacts** by "loving their loo".
7. Establish a Triple-Axe **visitor donation scheme** where visitors can voluntarily contribute towards the project.

10.2. Triple-Axe Farming

10.2.1 Timetable and targets

Initially (in 2021-22) a pilot programme will be rolled out to test and refine the approach, develop tools and materials and ensure that assumptions informing the future programme are accurate. Farmer feedback and adviser experience will help make improvements for the wider roll-out of the programme. In this phase 15 farms will be targeted with support. This pilot phase will commence in September 2021, subject to funding and will employ one full-time Farm Advisor (FA) for the period September 2021 to March 2022. Each farm is estimated to require 8 days of FA time and 8.5 days of specialist consultancy over the period of implementing the farm action plan.

Over the following three years (2022-25) a further 240 high-impact farms will be targeted, so that by the end of the programme 255 farms will be compliant and conditions should be in place to enable the SAC to recover over the next 5 years. This will entail employing 3 full-time Farm Advisors. Beyond that point monitoring will continue to ensure there is no regression.

There are 437 farm holdings in the catchment but by using a targeted approach those most likely to be affecting water quality are expected to go through the programme. Farmers will pay for 30% of the costs of the support programme, the balance being met from a mixture of public and / or commercial funding sources. Farms will receive public funding to provide greater public goods, not to comply with regulations.

The aim of the programme is, by 2026:

- to achieve 16,000 kg / year reductions in phosphate losses from farms.
- to achieve 6,000 tonnes / year reductions in sediment losses from farms.
- to ensure 255 farms targeted as having potentially high impacts are compliant with farming regulations.
- to generate new and / or restored wildlife rich habitats on farms and maximise opportunities to create a nature-rich and connected landscape across the catchment.[4]
- to improve long-term farm profitability based on combined business and environmental resilience.

[4] Target figures for the area of natural habitats created / restored need to be developed in the next phase of the project.

10.2.2 Farm Advisory Service details

From Year 2 the programme will be coordinated by three Farm Advisors (FAs). Each farm will have a single FA contact point. Farmers will receive vouchers to enable them to purchase specialist input from a range of accredited contractors who have been vetted to ensure that they are aligned with the Triple-Axe outcomes. The FA will work alongside the farmer to input data from the specialists into a Farmbench-type tool (possibly developed for this project if nothing suitable is already on the market), identify options, make decisions and develop a detailed action plan.

The programme will work seamlessly with Catchment Sensitive Farming and the N2K Axe Project, building on their substantial track record and reputation in the catchment. 125 "intensive grazing" farms already visited by these projects are expected to be included in the Triple-Axe programme which will be able to provide further in-depth support to assist farms to become compliant whilst remaining profitable. Farmers will be referred to the Triple-Axe programme by CSF and N2K and the resources available via CSF will form a major part of the delivery package.

10.2.3 Farm Transformation process

The Triple-Axe approach entails a **4-step farm transformation** process. Not all farms will need to go through the whole process and some farms may need a lower level of input than others. A complex farm business with significant environmental impacts would be expected to require the full scope of the process.

This process, and the table that details it, was originally designed by colleagues in the NFU and FWAGSW, and adapted for this report.

The four-step process consists of:

1. **Farm Business and Environmental Analysis**
    a. Compliance with existing regulations and assurance schemes
    b. Assess inherent land capability including biodiversity, soils, geology, topography, climate, safe machinery work / grazing days, flow pathways, nutrient loading, soil compaction, watercourses
    c. Impact of current farming regime
    d. Current farm commodity returns/ margins
    e. Effect of transition from BPS to ELM, use of Countryside Stewardship

2. **Options Appraisal and Action Plan**
    a. Identify how compliance with environmental regulations can be met and/or maintained.
    b. Identify options to match land use with land capability using input from environment, nutrition, soils and agronomy advisors from Step 1.
    c. Carry out a full farm business options appraisal based on the above to assess impact on net margins, including the value of environmental improvements.
    d. Develop a costed action plan including identifying sources of funding and other support.

3. Implementation

a. Advise on grant funding or other financial investment and signpost to sources of support.
b. Advise on implementation of new land management practices and infrastructure changes.

4. Review

a. Advise on annual monitoring of compliance and environmental impacts.
b. Provide access to ongoing support / signposting peer groups.
c. Opportunity for further review and revisit steps 1-3 if necessary.

This process is detailed more fully in the table overleaf.

10.2.4 Farm Transformation Action Planning process

Phase 1 - Farm Business and environmental analysis	
Activities and tools	**Resource needed**
1.1 Business Health check	
Calculate net margins - inputs versus outputs. Identify the effect of transitioning from BPS to ELM. Use Farm Bench / accounting tools.	2 Farm Advisor days - set up agreement, commission specialists needed.
	1.5 consultant days.
1.2 Regulations review	
Identify current compliance to regulation and risks of non-compliance. Identify path and timeframes to compliance.	1.5 consultant days.
Review farm assurance schemes and supermarket / supplier requirements	
Farm infrastructure audit.	Provided by CSF. 1.5 consultant days
1.3 Does land use match land capability?	
Farm biodiversity audit.	2 consultant days
Map soil associations, geology, topography, flow pathways, save machinery work days, save grazing days, soil compaction survey.	
Identify inherent capability of the land (soil type, slopes, watercourses, connectivity).	
Match stocking rate to available land.	
Flow pathway and risk mapping	
Nutrient management - soil indices and nutrient loading	
Soil testing, nutrient risk mapping, P N C balances to avoid pollution swapping	
Total Farm Advisor Days - phase 1	**2**
Total Consultant Days - phase 1	**6.5**

Phase 2: Farm business and environmental options appraisal	
Activities and tools	**Resource needed**
2.1 Meet / maintain compliance with environmental regulations	
Develop Farm environmental compliance action plan with detailed costings and strategy.	3 Farm Advisor days, synthesising the reports and working with the farmer to develop solutions. 2 consultant days responding to queries and commenting on integrated plans (including biodiversity specialist, farm infrastructure specialist, agronomist/nutrient adviser, soil specialists, nutritionalist, farm business adviser).
Explore links with CSF and other catchment partnership projects.	
Future proof the farm business for forthcoming regulations (e.g. clean air).	
Identify steps needed, cost implications and timelines - below considerations may affect compliance.	
2.2 Identify options to match land use with land capability	
Identify areas where spreading is not allowed / risky	
Crop charter - plan which crop and establishment techniques are suitable for which fields. Improve yields / quality of output versus inputs.	
Identify ELM that are relevant for the farm.	
Identify ways of reducing nutrient loading and risks of losses. Focus on P (N, C as additional) balances to avoid pollution swapping.	
Optimise livestock numbers to the land / land type available. Identify ways of improving forage (yield, ratio of inputs to outputs, nutritional value).	
2.3 Full farm business options appraisal.	
Incorporate the above identified options into net margins to see the impact on the effects on the farm business	
Identify potential grants available currently and in the future	
Produce final action plan ready for implementation.	
Set up monitoring systems / tools.	
Total Farm Advisor Days - phase 2	**3**
Total Consultant Days - phase 2	**2**

Phase 3: Action plan implementation	
Activities and tools	**Resource needed**
3.1 Implement action plan	
Apply for grant funding	2 Farm Advisor days. Implementation is farmer-led. Farm Advisor role is to support and enable.
Implement changes across the farm	

Phase 4: Monitoring, peer support, review	
Activities and tools	**Resource needed**
4.1 Monitor outcomes	
Identify the impact of the changes; account for costs and savings from compliance.	Delivered via Project Monitoring Plan
3.4 Peer support network	
Visits to best practice farms & present ongoing monitoring results	Delivered under separate project budget line.
Workshops and farmer groups for peer-to-peer exchange on progress and what works and what didn't work.	
3.5 Review business plan	
Identify steps taken and results.	1 Farm Advisor day. Review is farmer-led. Farm Advisor role is to support and enable.
Review against plans.	
Revise / adapt as necessary.	
Total Farm Advisor Days - phases 3 and 4	**3**
Total Consultant Days - phases 3 and 4	**0**

Total Farm Advisor Days - all phases	**8**
Total Consultant Days - all phases	**8.5**

10.2.5 Peer Group support

Alongside this 4-step 1:1 process a number of 1:many workshops and many:many peer-support groups / networks will be organised under the umbrella of the Triple-Axe project by delivery partners or spontaneously by farmers. These will identify and promote best practice farms and farming techniques and create opportunities for farms to form cooperative clusters that can, for example import/export manures or land swap.

10.2.6 Project branding

In addition, farms will be able to adopt the Triple-Axe branding for their produce, where this helps them access new or existing markets and some may become demonstration farms that can host farm visits or provide new public access (see People section for more on this).

10.2.7 Coordination

All existing (and any new) farm advice programmes working in the catchment will need to be closely coordinated with the Triple-Axe project to ensure that farmers receive a consistent message and to give the best chance of securing their cooperation. The Axe N2k project should be extended for the duration of the project so that the emphasis on regulatory compliance can continue to work alongside the support programme. Environment Agency officers would coordinate their input closely with Triple-Axe. The Catchment Sensitive Farming programme, already well-established across the catchment, will also be an essential partner in securing the project's goals and will work in tandem with Triple-Axe.

10.3 Triple-Axe Nature

10.3.1 On Farm

Many of the actions identified under the theme of Nature need to be delivered on farmland. New woodlands and wetlands, protected and restored river banks, extensive / low-input grazing systems and invasive species removal will not only improve the landscape for wildlife but may also often help a farm meet its targets for phosphate and soil losses; **therefore the adoption of nature-based solutions and achieving nature recovery targets will be an integral part of the Farm Business Advice Service** and securing funding for these from grants or other investment opportunities will be an important element of the service.

A biodiversity audit / review will be conducted for each farm taking part in the programme. This will provide the base for realising opportunities to achieve nature recovery targets and create a balanced framework of interventions that make the most of nature-based solutions. The Farm Advisors will be able to access further technical biodiversity expertise as they develop each Farm Transformation Plan.

10.3.2 Nature Recovery Network

There are many existing initiatives across the catchment focused on nature recovery, operating at a variety of scales and all engaging either with farmers, landowners or communities. All of these existing initiatives need

to be fully coordinated with the Triple-Axe project to avoid duplication and confusion, especially when working with landowners and managers. These projects are a fantastic resource and their contributions are essential, but their energy needs to be focused wherever relevant to help achieve the goals of the overall project. Nature Recovery Network Strategies will be a valuable means of achieving this coordination and as these are fleshed out and begin to be implemented, they must align with the priorities of the Triple-Axe project. These strategies must ensure that investment designed to connect, create and extend natural habitats in the Axe catchment is focused initially on achieving the target of improved water quality and river recovery. The three county-led Local Nature Recovery Strategies must align with each other in the Axe catchment to ensure that Triple-Axe priorities are embedded.

To realise these approaches on the ground the project will include input from a **Nature Recovery Network specialis**t to plan best-practice solutions for nature network recovery alongside pollution reduction on farms participating in the study. This will identify how to connect individual farm improvements into the wider nature recovery network and inform approaches to adopt across the full programme. In the initial pilot phase this work will focus on two or three exemplar farms and the learning from this will be applied by the Farm Advisors as they develop Farm Action Plans, with continued input from the Nature Recovery Specialist.

10.3.3 Community action for nature

Some Nature actions will be delivered with the help of volunteers, community groups and NGOs, on farms or on public land. Tree planting, invasive species removal and small-scale natural bank protection measures are examples. A **local projects fund** is included in the project to assist with the costs of delivering these works (i.e. materials, contractors). A full-time Community Coordinator is also included in the project to manage the volunteering element of this work, in close cooperation with existing community groups in the catchment.

10.3.4 Modifications removal

Removal or alteration of artificial structures / modifications (e.g. partial lowering of weirs, alteration of artificial abstractions or partial removal and green replacement of bank protection, improvement to migration routes by fish passes or bypass channels) will usually be led by Environment Agency staff, but again may well be carried out in alignment with other farm management and infrastructure interventions.
For major locations the Agency is liable to be a lead player, including as a funding route for delivery - this would be the case for Whitford and Stoney Bridge/Town Weir. For Weycroft it may be aligned to a future highways project. For more minor structures, such as bank-side revetments, even the likes of the weirs through the A35 section, then funding is liable to be via landowners, although this may well be supported by stewardship funding.

10.3.5 Invasive species

An invasive species removal programme is an important part of the programme. This should build on the experience of the Axe Invasives Project from 2012-17, involving local communities, but also allowing sufficient budget for the employment of contractors so that eradication of Himalayan balsam in particular can be substantially achieved across the catchment by 2026. The budget allows for the employment of a project coordinator for 7 months each year, working closely with the Community Coordinator to maximise volunteer input. Complete eradication of Himalayan balsam is not practical in this timescale because of the extent of

spread of the species and the persistence of its seed; however substantial improvement is possible and once the very challenging first phase of removal has been accomplished it is feasible for local voluntary groups to adopt sections of the river to maintain these gains in the long term with lower intensity workload and without the need for specific project funding.

A baseline survey of invasive species (Japanese Knotweed, Giant Hogweed and Himalayan Balsam) is needed in the first year of the project to enable swift roll-out of control activity in 2022 and budget is included for this work.

10.3.6 Monitoring

Monitoring of water quality and the wider impact of interventions is an essential part of the process and a separate budget for delivering consistent and focused monitoring is needed. Currently the Environment Agency is monitoring phospate levels but its monitoring of other values is not consistent year by year in specific locations.

The Environment Agency is introducing a new River Surveillance Network (RSN) approach nationally which is designed to remove bias and give a more accurate picture of river health nationally. Random sampling points are identified, and these do include points within the Axe catchment. Frequency of monitoring is yet to be set but it is intended to be long term and could include annual monitoring on the Axe.

A detailed Monitoring Plan for the catchment is needed to integrate statutory monitoring activities with community-led initiatives such as Citizen Science Investigations (via the Westcountry Rivers Trust) and Riverfly monitoring. This will be established in the first year of the project and will identify any additional long-term monitoring required. Costs are additionally allocated for the delivery of enhanced monitoring through the project period and this should include the cost of automatic monitoring points for phosphorus and suspended sediments.

Finally, the last Condition Assessment of the River Axe SAC was undertaken around 10 years ago and this needs to be updated as a first step in the process; budget is also included for this.

The Axe Estuary Marine Conservation Zone (MCZ) is directly affected by upstream water quality from the River Axe. Upstream water quality improvements from improved land management, reduced sediment and nutrient loads will be beneficial to the MCZ and the project should monitor these impacts.

10.4 Triple-Axe People

This theme has two main strands. One is involving people in community activities that can help deliver the farming and nature outcomes. The other is tackling people's direct impacts on water quality, specifically addressing waste water from their homes.

10.4.1 Community activities

The Triple-Axe project will provide an umbrella brand and coordinating hub for volunteering and community activities relating to the environment across the catchment. The project will develop and deliver an awareness campaign, using strong branding and messaging, to encourage people to get involved in practical actions that will make a difference to the state of the Axe. The campaign will coordinate with existing community initiatives and organisations and tap into their networks and contacts.

A pilot programme should be delivered in 2021-22 and then rolled out fully in 2022-25.

Undertaking this work will require staff resource. This could be located alongside the farm advice team but there may be a better home for this person within an existing cross-catchment community-focused organisation. Wherever the role is best located, close coordination with the farm team will be essential.

The Community Coordinator will:

1. Liaise with existing community organisations and networks and ensure good coordination across the catchment
2. Organise events including walks, workshops and visits to demonstration farms, linked to existing event programmes
3. Signpost volunteers to activities and organisations organised by others, including water quality and wildlife citizen scientists and teams of volunteers to grow and plant trees and tackle invasive species
4. Work with local food retailers and hubs (eg village shops, In My Back Yard) to develop the Triple-Axe brand for local produce
5. Work with local pubs, restaurants and accommodation providers to establish the visitor donation scheme

The Community Coordinator will need an activity budget to support this programme, including a budget for an **awareness campaign** and to commission partner organisations to deliver **new volunteering activities**. Ultimately it is anticipated that around 20 organisations would be supported to enable 600 volunteers to provide 12,000 volunteer days per year towards the project.

10.4.2 Domestic waste water programme

The aim of this programme is to target pollution caused by domestic waste water. The main focus will be on communities and properties that are not on the main sewer network where there is a risk that septic tanks or package treatment plants are not functioning well. Typically, a drainage survey is needed and staff time over

a period of years is required to raise awareness and follow up on issues with individual property owners. The Environment Agency has previously found that the cost of this intervention in a village / hamlet of less than 250 people amounts to £7,000 spread over a 3-year period. The work would include raising awareness of the requirement for older septic tank systems to be replaced with small sewage treatment plants, encourage domestic septic tanks / STWs owners to install monitoring devices and adopt maintenance contracts and address misconnection issues.

The Westcountry Rivers Trust (2014) calculated that approximately 500 properties in the catchment are more than 250m from the main sewer network and do not have a consented discharge. These properties would need to be prioritised for visits and follow-up work and a cost for this in staff time has been included in the budget.

Alongside this an Axe-specific version of South West Water's "loving your loo" project is needed to encourage people to reduce their own waste water impacts and a budget for this campaign is included.

10.5 Triple-Axe Project Management

The Triple-Axe team will report to a Management Group incorporating representatives of the key stakeholders, comprising:

3 Areas of Outstanding Natural Beauty	Farming and Wildlife Advisory Group SW	Devon Wildlife Trust
Environment Agency	National Farmers Union	West Country Rivers Trust
District Councils	South West Water	Axe Vale Rivers Association
Natural England / Catchment Sensitive Farming	Country Landowners Association	Relevant community representative groups eg Devon Together, Dorset Community Action, Spark

The team will be hosted by an appropriate organisation or organisations and project management costs are included in the budget. It is assumed that staff will work mainly from home and will be resident within or close to the catchment.

A partnership approach could be taken to the project hosting to reflect the different skills required in the team. For some funding pots there will need to be just one applicant, who then subcontracts to others as required.

Significant in-kind match can be generated by aligning existing activity in the Axe and creating a powerful new force for change, delivering a shared vision. The value of this match will be researched and evaluated during the pilot phase.

11. Programme

The following tables identify actions under the three themes with cost descriptions: the first table covers the pilot phase and the second indicates the likely shape of the full project over the course of one year.

Action	Outputs	Delivered by	Cost	Outcomes
Year 0: 2021-22 - PILOT PHASE				
1. Triple-Axe Farming				
Farm Business Advisory Service – Pilot phase	15 farms taken through 4-step process	Triple-Axe		15 farms ready to implement well-developed transition plans.
	120 days Farm Advisor (average 8 days per farm) over 8 months	Triple-Axe	£27,000 – (1 x FTE incl on-costs for 8 months)	
	120 days specialists (average 8 days / farm)	Accredited specialists / partners	£72,000 – (120 days x £600)	Programme approach confirmed for roll-out in Years 1-3.
Peer support network	2 farmer groups / clusters established	Partners	£5,000 – (£2,500 per group)	
Inspection and compliance	Inspection visits to 20 farms via N2K project	Environment Agency	Funded externally to the project	
Demonstration farms	2 demonstration farms identified and promoted	Triple-Axe	Included in above	Opportunities for improved public access identified.
2. Triple-Axe Nature				
Nature Recovery Network demonstration	Model for 3 flagship farms to demonstrate approaches that help deliver nature recovery network connectivity.	Triple-Axe and partners	£10,000 for specialist input.	Modelled approach to roll out in the full programme.
Axe Invasives Project	Prepare programme and network of volunteers for delivery in 2022 season	Triple-Axe	£6,000 - (0.5 FTE coordinator employed for 4 months (December – March) by partner organisation).	Work plan for 2022 season in place and ready to deliver.
	Survey invasives throughout the catchment.	Contractors	£25,000	Ability to target effort immediately on areas of greatest impact.

Action	Outputs	Delivered by	Cost	Outcomes
Re-naturalise river channel	Commence feasibility work on one major modification removal.	Environment Agency	Funded externally to the project	Plans made for one major removal in 2022-24
Local projects fund	Small-scale interventions outside of the farm-led programme	Volunteers, contractors	£20,000	Improved water quality in 4 locations. Confidence in utility of the fund / use of volunteers.
3. Triple-Axe People				
Launch a community-wide engagement programme	Employ Community Coordinator	Triple-Axe	£27,000 – (1 FTE incl on-costs for 8 months)	Programme approach tested and plans confirmed for roll-out in Years 1-3. Establish baseline of levels of awareness of and engagement with the River Axe.
	Trial a website and media awareness campaign		£5,000 design costs	
	Engage 8 organisations and 200 volunteers in activities (total 4,000 volunteer days)	Partner organisations	£20,000 – (£2,500 / organisation to support volunteers)	
Domestic waste water programme	Unconsented discharges project / love your loo campaign	Environment Agency / South West Water	£5,000	Detailed desk study of at-risk properties; ground-truthing exercise; and action plan for implementation in next phase. Plan for launch of enhanced love your loo campaign.
4. Triple-Axe Project Management				
Project coordination	Overheads for host organisation/s	Triple-Axe host organisation/s	20% project cost = £54,000	Project is managed well and best value secured.
Monitoring Plan	Develop a 5-year Monitoring Plan and record baseline levels at selected locations.		£10,000	Confidence that impacts of the programme will be measured.
	Carry out a full Condition Assessment of the River Axe SAC	Natural England / Environment Agency	£55,000	Establish up to date baseline for assessment of future changes.

Action	Outputs	Delivered by	Cost	Outcomes
Year 1: 2022-23 (and broadly repeated in Years 2 and 3) - FULL PROGRAMME PHASE				
1. Triple-Axe Farming				
Farm Business Advisory Service – Pilot phase	80 farms taken through 4-step process	Triple-Axe		Phosphorus losses reduced
	640 days Farm Advisor (average 8 days per farm)	Triple-Axe	£120,000 – (3 x FTE incl on-costs)	Sediment losses reduced
	640 days specialists (average 8 days / farm)	Accredited specialists / partners	£384,000 – (640 days x £600)	Woodland planting / wetland creation
	Capital costs	CSF, NMP, other	Funded externally to the project	Improved farm resilience and profitability
Peer support network	4 farmer groups / clusters established	Partners	£10,000 – (£2,500 per group)	
Inspection and compliance	Inspection visits to 80 farms via N2K project	Environment Agency	Funded externally to the project	Greater awareness of regulations and alignment with Farm Business.
Demonstration farms	6 demonstration farms identified and promoted	Triple-Axe	Included in above	Improved public access
2. Triple-Axe Nature				
Nature Recovery Network	Specialist support to maximise Nature Recovery Network connections	Partners	£20,000	Individual farm improvements are designed to realise high nature connectivity and restoration.
Axe Invasives Project	Roll out programme across the catchment	Triple-Axe working with volunteers, contractors	£78,000, including cost of pt coordinator, contractors, volunteer costs	Reduced risk of bank erosion, diversification of bank habitats

Action	Outputs	Delivered by	Cost	Outcomes
Re-naturalise river channel	Commence feasibility work on one major modification removal.	Environment Agency	Funded externally to the project	Plans made for one major removal in 2022-24
Local projects fund	Small-scale interventions outside of the farm-led programme	Volunteers, contractors	£20,000	Improved water quality in 4 locations. Confidence in utility of the fund / use of volunteers.
3. Triple-Axe People				
Launch a community-wide engagement programme	Employ Community Coordinator	Triple-Axe	£27,000 – (1 FTE incl on-costs for 8 months)	Programme approach tested and plans confirmed for roll-out in Years 1-3. Establish baseline of levels of awareness of and engagement with the River Axe.
	Trial a website and media awareness campaign		£5,000 design costs	
	Engage 8 organisations and 200 volunteers in activities (total 4,000 volunteer days)	Partner organisations	£20,000 – (£2,500 / organisation to support volunteers)	
Domestic waste water programme	Unconsented discharges project / love your loo campaign	Environment Agency / South West Water	£5,000	Detailed desk study of at-risk properties; ground-truthing exercise; and action plan for implementation in next phase. Plan for launch of enhanced love your loo campaign.
4. Triple-Axe Project Management				
Project coordination	Overheads for host organisation/s	Triple-Axe host organisation/s	20% project cost = £54,000	Project is managed well and best value secured.
Monitoring Plan	Develop a 5-year Monitoring Plan and record baseline levels at selected locations.		£10,000	Confidence that impacts of the programme will be measured.
	Carry out a full Condition Assessment of the River Axe SAC	Natural England / Environment Agency	£55,000	Establish up to date baseline for assessment of future changes.

12. Project Budget

TRIPLE-AXE ACTION PLAN BUDGET

REVENUE ITEMS					
Action	**2021-22**	**2022-23**	**2023-24**	**2024-25**	**TOTALS**
Triple-Axe Farming					
Farm Advisor(s)	27,000	120,000	122,400	124,800	**394,200**
Specialists	72,000	384,000	384,000	384,000	**1,224,000**
Peer support network	5,000	10,000	10,000	10,000	**35,000**
Triple-Axe Nature					
Nature Recovery Network specialist	10,000	20,000	20,000	20,000	**70,000**
Axe Invasives Project	31,000	78,000	78,000	78,000	**265,000**
Monitoring Plan	10,000	20,000	20,000	20,000	**70,000**
Triple-Axe People					
Community Coordinator	27,000	40,000	40,800	41,600	**149,400**
Awareness campaign	5,000	10,000	10,000	10,000	**35,000**
Volunteer engagement via partner orgs	20,000	60,000	60,000	60,000	**200,000**
Domestic waste water programme	5,000	30,000	30,000	30,000	**95,000**
Triple-Axe Project Management					
Project coordination (15% project cost)	54,000	110,000	110,000	110,000	**384,000**
SAC Condition Assessment	55,000	0	0	0	**55,000**
Total Expenditure	**321,000**	**882,000**	**885,200**	**888,400**	**2,976,600**
Farmer contributions @ 30% of advice costs	29,700	151,200	151,920	152,640	**485,460**
Sub-total net revenue cost	**291,300**	**730,800**	**733,280**	**735,760**	**2,491,140**
CAPITAL ITEMS					
Local projects fund	20,000	50,000	50,000	50,000	**170,000**
CSF / Countryside Stewardship	0	1,250,000	1,250,000	1,250,000	**3,750,000**
SSSI modifications removal	0	100,000	2,000,000	100,000	**2,200,000**
Sub-total capital costs	**20,000**	**1,400,000**	**3,300,000**	**1,400,000**	**6,120,000**
TOTAL PROJECT COST	**311,300**	**2,130,800**	**4,033,280**	**2,135,760**	**8,611,140**

NB: some of the costs above are already included in partner budget lines. More precise allocations to be determined in the next phase of project development.

13. Funding

A blended finance mix of the following is in the mix for discussion, with some sources potentially forming match funding for others. The project may need to be broken down into component parts to maximise funding opportunities.

1. Water Environment Improvement Fund
2. Countryside Stewardship capital spend (via Catchment Sensitive Farming)
3. Phase 3 E.L.M trial (Landscape scale)
4. Farming in Protected Landscapes (FiPL) programme from 2021 to 2024
5. E.L.M. from 2024
6. Axe Nutrient Management Plan
7. Agricultural transition monies:
    - Farming in Protected Landscapes via AONBs
    - Slurry Improvement Scheme (which is likely to include obligations for uptake of other cross-compliance measures)
8. Investment Readiness Fund to support the pilot phase (submission deadline 26 March 2021)
9. Carbon and other offsetting schemes that attract private investment
10. Biodiversity Net Gain obligations to mitigate development
11. Green Recovery Fund
12. National Lottery Heritage Fund
13. Devon County Council and Environment Agency Flood Risk Management funds
14. South West Water
15. The Prince's Countryside Fund
16. Other grant-making trusts and foundations
17. European Union funding (possibly for pilot year)
18. Time in kind from partners

Appendix 1: Farm Case Studies - Full Interview Data

Farm	A	B
Size of holding	117ha owned + 125ha rented	233ha + 130ha rented
Owned/tenanted	Owned	Tenanted
Sub catchment	**Blackwater**	**Blackwater**
Landscape setting	Mostly sloping land on north bank of river, with some directly bordering the river	Level and gently sloping land between Blackwater and Synderford, with small frontage close to Blackwater
Overview	Medium-sized mixed dairy farm which has reduced size of milking herd in recent years, which has made the farm easier to manage. Acknowledges some issues with silage pit leakage etc, but is making improvements and recognizes issues	A first-generation young organic farming couple with much enthusiasm and progressive ideas
Main farm business	200 milking cows (was previously 300), 120 beef cattle, 280 sheep	370 organic milking cattle on home farm, youngstock on rented land. Educational visits and also developing a glamping venture
Milk contract	Muller/Sainsbury's. Contract doesn't include any environmental requirements	Arla Organic. Participating in Arla R500 Resilience programme
Slurry	Slurry store updated 5 years ago. Now 5 months storage. Reported recently for spreading slurry (using umbilical injection system), because heavy rain came soon after and caused run-off to river. Feels this was genuine unforeseen bad luck rather than bad practice as such	Slurry store currently uncovered, no dirty/clean water separation, theoretically 6 months storage but increasing annual rainfall means it is less than that. Keen not to spread slurry when pastures can't use it but need investment to reduce volume pressure
Soils	Some erosion issues on bare winter arable land	Very interested in soil health, and have come to see the farm more holistically as a result. Being organic means it takes longer to raise fertility (compared with chemical fertiliser use) but eventual gains are more sustainable
Maize	About 30 ha of maize. Always empty the slurry store after the maize has been harvested, and get it out ASAP, then drill the stubbles. Poor late season conditions sometimes mean the grass doesn't take, before wet weather comes	No maize. They grow whole-crop forage peas and barley, undersown, plus red clover leys, all grazeable
Watercourses	Land fronting the Blackwater River is generally down to pasture, though sometimes parts have been under maize	Small arm of land comes close to Blackwater River but separated by thick band of scrub and woodland
Habitats	River frontage, hedges	Woodland (retained by estate), ponds, hedges

Agri-env schemes	Went into Mid Tier last year, mainly to get grant to cover and upgrade eaking silage pits. Also enabled fencing out of river banks and some low-input grassland	Previously in OELS. Went into Mid Tier in 2019 to cover yard and put permanent pasture in as low input, plus hedges etc. Disappointed to discover they could have gone for more capital money to cover slurry pit
Impact of BPS loss	Worried, but can weather it. E.L.M payments will be important and hopes they will help to replace BPS loss	They support the move away from area payments and are keen to make most of E.L.M in due course
Advice/training needs	George Greenshields did Mid Tier. Has had visits from John Cossens, related to silage pit issues	They have proactively sought advice on soils (soil science sampling visit), CSF meetings. Keen to learn all the time
Collaborative working	Personally not keen on workshops and group sessions. Hasn't joined East Devon Facilitation Group.	Have been involved with Livestock Improvement Corp discussion groups, and are supporting a Rewilding project on part of rented land. Have taken part in LEAF educational sessions and Open Farm Sunday.
View of wider farming community	Feels most farms are moving towards better environmental practice. Acknowledges that they themselves have made some mistakes, and have had issues particularly with silage storage	They believe there is a big need for more education of older generation farmers on issues around soils, maize growing, cover crops. They are keen to stress to others that their embracing of regenerative farming is based on sound business sense, not 'hippy'
Summary of position and attitude to future environmental support	Acknowledges some past issues with late slurry spreading and maize but moving in right direction	Energetic and go-ahead organic farmers keen to innovate, learn and work with others to embrace regenerative farming practices

Farm	**C**	**D**
Size of holding	50ha	160ha
Owned/tenanted	Owned	Tenanted
Sub catchment	**Coly**	**Forton Brook**
Landscape setting	On floodplain of Coly, with large river frontage.	On west-facing gentle slopes draining to the Brook
Overview	A small beef farmer, formerly dairy, environmentally minded. Concerned that his son, doesn't share his attitude and will 'plough it all up' – hopes to educate him before that time comes!	A young couple who have recently taken on a dairy holding and have innovated, including setting up a successful direct vending outlet
Main farm business	90 beef cattle (formerly 75 milking cows). Also a holiday let	180 milking cows

Milk contract	Came out of dairy 7 years ago, because parents no longer able to work the farm and operation was too much for him alone. Also knew infrastructure needed investment. Is now in beef, which though less profitable is more manageable	Arla contract. Participating in Arla R500 Resilience programme. Also set up direct vending outlet because farm is close to a main road. This has become very popular locally with a good customer base promoted via Facebook
Slurry	Old infrastructure, but suited to current beef operation	Good quality storage with 6 months storage
Soils	Has cared for soils consciously for years	Careful to avoid erosion
Maize	None	Make sure they cut their maize early, sow cover crop and do not cultivate or spread slurry in winter. Feel strongly that maize growing should be subject to individual site risk assessment to avoid growing on high risk situations.
Watercourses	Substantial frontage along Coly, all in pasture, very little riverside tree cover. Would like to do something about that	No direct river frontage on the farm
Habitats	Semi-improved grassland and hedges	Hedges and copses
Agri-env schemes	In HLS + ELS, and has been in agreements for 20 years	Drew up a Mid Tier application themselves in 2020, but landlord got cold feet and wouldn't sign it
Impact of BPS loss	Will miss BPS, but is optimistic that E.L.M will provide an adequate replacement, "if they get it right".	Currently goes to the landlord
Advice/training needs	George Greenshields did most recent application	Have not had environmental advisory support, manage by themselves. They feel it's really important that farm environmental advisors know about farming, not just environment.
Collaborative working	Has not taken part in East Devon FF events but it's not really his thing. Prefers to have a good advisor on the end of a phone	Would like to see a local farm group/cluster established, led by farmers, which could share experience and promote best practice, through discussion, farm visits etc.
View of wider farming community	Feels some of the "bigger boys" need to have a stronger line taken with them, to get them to improve their environmental performance. He feels most are aware of the issues, though there is still a lack of basic understanding of good farming practices.	Feel that many farmers in the area are doing their best, with good intentions to improve their environmental practice. However there are a few 'bad apples' who are making things worse for the whole community. Some will keep going with maize, winter spreading etc until they are compelled to stop. No excuse for winter slurry spreading, and many farmers simply need better educating to stop bad practice
Summary of position and attitude to future environmental support	Content to remain small and work with the grain of the land	Keen to see more farmer communication and collaboration, and measures to improve env performance of those who are behind

Farm	E	F
Size of holding	114 ha	165ha + 35ha grass keep
Owned/tenanted	Owned	Owned
Sub catchment	**Umborne**	**Yarty**
Landscape setting	Mostly sloping ground close Brook, near the top of the catchment	Mostly sloping land on east side of Yarty valley, 2km from the river
Overview	Traditional small mixed livestock farm, using sheep on the steeper permanent pasture and cattle on the rest, with some rotation between the two	A medium-sized, heavily stocked dairy farm, which has made some investments in slurry storage but cautious of outside pressures
Main farm business	110 milking cows, 600 breeding ewes, a few beef cattle	Dairy (300 milking cows), beef (500-600 cattle including young stock). Also B&B
Milk contract	Arla. Contract obligations address environmental issues to some extent, eg. wanting to know about slurry storage adequacy	Muller
Slurry	3-ring tower slurry store in good condition, providing 4 months storage	Currently 3-4 months storage. Yard improvements planned under Mid Tier: roofing of silage clamps, concreting, machinery tracks. 2 year time window for capital works is challenging when covering silage clamps as the work can only be done when they are empty
Soils	Mostly permanent grassland	Potentially winter erosion issues
Maize	Used to grow some maize but not for some years. Prefers to keep the land in grass for the flexibility it provides for moving between cattle and sheep	Arable rotation includes maize, winter wheat, occasionally stubble turnips as a winter cover crop, 2-5 year rye grass leys
Watercourses	Some of the holding abuts the Umborne Brook, though because it's quite close to the source, and is on sloping ground, never floods. Some bankside tree cover.	Small tributary stream of Yarty runs along bottom boundary of farm, buffered by strip of conifer woodland
Habitats	Stream frontage and wooded strips	Woodland and hedges
Agri-env schemes	Went into Mid Tier in 2019, mainly to access grant to cover silage yard. Also put in some unfertilized pasture and low input grassland, but not including riparian land. Had not been in a scheme before MT.	Previous ESA. Two applications to HLS were turned down. Used an agent (FWAG SW) for Mid Tier application in 2019
Impact of BPS loss	Moderately concerned about loss of BPS but hoping that E.L.M will provide accessible payments which will replace it	Ok if E.L.M provides enough replacement support and if it is simple to access

Advice/training needs	Several sources of advice for Mid Tier; working with George Greenshields for E.L.M trial	Have engaged with CSF (infrastructure audit), had a visit from John Cossens. Could be interested in soil carbon storage guidance
Collaborative working	Has taken part in the East Devon E.L.M Test & Trial	Demonstration events on herbal leys with facts on yields, costs and management would be useful. Need everyone to coordinate
View of wider farming community	"Naming no names", feels some farmers have built themselves into a corner by investing heavily to point where land is overstocked, but they don't know how to reverse back from that position. Feels many have got the message about the need to be more environmentally sustainable but others will need help or choose not to see the problem	Everyone doing their best, need to coordinate more and have less bureaucracy
Summary of position and attitude to future environmental support	Traditional rotational grazing with sheep and cattle, not pushing land too hard	Heavy stocking and currently inadequate infrastructure but have committed to improvement through Mid Tier agreement

Farm	**G**	**H**
Size of holding	71ha	60ha in hand + 130ha rented out
Owned/tenanted	Owned	Owned
Sub catchment	**Yarty**	**Yarty**
Landscape setting	Shallowly sloping land at top of Yarty, 2km from river	Shallowly sloping land on west side of Yarty valley, c.500m from river
Overview	A progressive small dairy farm with an interest in environmental actions	Large beef farm all on permanent pasture.
Main farm business	Dairy (120 milking cows, 75 young stock)	300 mixed breed beef animals bought in as stores at 9-10 months.
Milk contract	Arla. Has done a farm carbon assessment through their contract	N/A
Slurry	Current slurry store is not compliant. Roofing, guttering , yard concreting and cross drains through Mid Tier in last 2 years has helped to separate clean and dirty water and reduce volume of slurry produced	Large concrete sided slurry pit with weeping wall system. Umbilical pump to land for liquid
Soils	Has installed livestock tracks which have reduced compaction and erosion. The farm has moved to herbal leys which are building soil fertility. Soil testing has helped guide towards reducing P and K fertilizer use	All permanent pasture so good soil retention and organic matter content

Maize	Has moved from growing wheat and maize to a mostly grazing-based system	No land under arable, all permanent pasture
Watercourses	All streams / ditches are fenced off. A papa pump is providing water to troughs to keep livestock out of watercourses	Small streams and springs only
Habitats	Streams and hedges, some semi-improved pasture	Hedges
Agri-env schemes	Was inspected after ELS agreement, which put them off going into Mid Tier for a while. If joining a scheme and delivering outcomes makes a farm more vulnerable to inspections, it feels like being picked on for trying to do the right thing. ELMS should reward people who are already delivering public goods as well as those who can make large improvements	Was in old ESA scheme. Just applied for Mid Tier CS that will include Capital Water Quality options such as covering slurry pit and concrete yard renewal
Impact of BPS loss	Concerned about prospect of losing BPS, hoping milk price will hold up	Very concerned about BPS loss
Advice/training needs	Very good experiences with CSF and the CSF-John Cossens (Environment Agency) 'double act'. Involved in bench marking in a grazing group. This has been a really useful tool	Keen to see training for young hedgelayers, and help with creating local mobile slaughterhouse capacity
Collaborative working	Always interested in training, especially if it means discussing with other farmers and learning from each other	Agreed to take part in E.L.M Test & Trial through peer approach from neighbouring farmer
View of wider farming community	Major positive changes on the farm made possible by good relationship between son, who runs the farm, and father, making the transition much easier. A common barrier to change on many farms is the fathers' late retirement and attitude of 'we have always done it this way'. A lot of the neighbours are in CS agreements and one is also part of grazing benchmarking group	Probably unique in that the Meyrick family estate owns several of the neighbouring farms and thereby has long term influence on a large area. Good potential for connectivity over the estate farms and woodland
Summary of position and attitude to future environmental support	A progressive farm offering a best-practice example of moving towards regenerative practices in terms of herbal leys and other measures	Somewhat sceptical about environmental matters but open to discussion and runs a clean farm demonstrating good practice

Farm	**I**	**J**
Size of holding	69ha	89ha
Owned/tenanted	Rented from grandparents	Owned
Sub catchment	**Yarty**	**Yarty**
Landscape setting	Gently sloping land on east side of mid Yarty valley, with substantial river frontage	At head of a steep valley bisected by the A303, draining into a small tributary stream of the Yarty

Overview	Medium sized dairy farm which on cusp of deciding to intensify in face of loss of BPS	Small mixed beef and arable farm
Main farm business	Dairy (124 milking cows)	Beef (120 cattle) and arable
Milk contract	Arla. Has done carbon budgeting through Arla (Promar did the calculations)	N/A
Slurry	Slurry store needs roofing	The farm mainly produces FYM, but also has a slurry store (uncovered) with a capacity of 70,000 gallons – need for spreading once throughout an average winter. Would like to roof the store to reduce that need
Soils	Installed cow tracks, some through CSF and some self-funded. Would like E.L.M to include incentives for maintaining good soil structure, e.g. grassland slitting or subsoiling	Needs some measures like buffer margins or undersowing to reduce loss to erosion
Maize	Recently switched to being grass-based and buying in Maize	No maize. Arable ground on typical rotation WW-WW-WB-WO-4-5 year grass ley
Watercourses	Land next to Yarty is prone to flooding. Majority of river frontage is fenced off	Small stream drains under the A303
Habitats	Is interested in woodland creation	Some wet woodlands. Would like to create ponds in place where water lies on fields in winter
Agri-env schemes	In ELS, capital-only scheme for yard concreting, expires October 2021. Was previously in ESA. Plans to apply for Mid Tier next year for further infrastructure work	Never been in an agreement. Was discouraged by an agent many years ago from trying, though could probably have gained from going into a scheme
Impact of BPS loss	Not too worried about BPS at the moment, as long as the milk price stays stable	Concerned but not yet sure of options
Advice/training needs	CSF has been helpful	May be interested in E.L.M but will need plenty of advice
Collaborative working	Collective working to ensure wildlife corridors across the landscape could work, if incentivized. Agreed to take part in E.L.M Test & Trial	Agreed to take part in E.L.M Test & Trial. Has not taken part in other group activities
View of wider farming community	Interested in how others decide to change over next few years	Feels most of his neighbours are more intensive than he is. Gets on with some, not others
Summary of position and attitude to future environmental support	Currently at a stage where needs to decide whether to increase production/cattle numbers or reduce inputs and have more land available for future ELMS schemes. At the moment, leaning towards increasing production	Small traditional farm just about getting by, open to change, but not currently planning anything specific

Farm	**K**	**L**
Size of holding	171ha	81ha

Owned/tenanted	Owned	Owned
Sub catchment	**Yarty**	**Yarty**
Landscape setting	Shallow slopes of west side of Yarty valley, close to river	On east facing slopes of Yarty valley, below A30
Overview	Traditional medium sized mixed dairy farm with good infrastructure and mostly permanent pasture	Small dairy farm with good infrastructure and systems
Main farm business	Mixed dairy (100-110 milking cows), 40 beef, and sheep (500 breeding ewes)	Dairy (90 milking cows), some beef (50 dairy heifers / store cattle)
Milk contract	Arla	Arla
Slurry	Yard works have recently been completed to separate clean and dirty water. Now 9-10 months slurry storage	Has built a new slurry store, now 6-7 months storage. A contractor is used for umbilical spreading of slurry in the spring, and David spreads via splash plate for the rest of the year
Soils	Is experimenting with herbal leys which could reduce erosion risk	Possibly interested in herbal leys to improve soil structure
Maize	No maize. Arable crops include turnips and wholecrop barley with grass leys.	Used to grow some, now all grass
Watercourses	Livestock is kept out of ditches and streams by fencing and putting in troughs	No direct river or stream frontage
Habitats	Would like to restore the traditional orchard if the payment rate was right	Some unimproved pasture on steepest slopes
Agri-env schemes	Previously ELS. Now Mid Tier. Accessing yard capital grants made it worthwhile financially to include field management options in the agreement	Water Capital Grants for roofing only
Impact of BPS loss	It will be a challenge	Could farm profitably without BPS, but the investments and work BPS pays for help the local economy, therefore delivers rural development
Advice/training needs	Used own land agent for MT application. Had a lot of involvement with CSF which worked well. Advisers are often too directed by selling products or particular projects. Demonstration events on herbal leys showing yields and management would be useful	A lot of involvement with CSF which has been helpful
Collaborative working	Discussion groups are helpful. Used to share machinery in the past, but now use contractors. Farmers are not the best to work together	Could see collaborative working with some of the neighbours but not others.
View of wider farming community	Feels that the Environment Agency does not have enough stick to prevent the intensive farms from polluting, causing erosion etc. A lot of farms will try and intensify, if they don't embrace E.L.M	Believes it's time everyone learns to do without area based subsidy and works more for the money

Summary of position and attitude to future environmental support	Cautious of future changes but open to suggestions	Traditional small beef farm, open to some modest changes in environmental practice

Farm	**M**	**N**	**O**
Size of holding	120ha	174ha	16ha
Owned/ tenanted	Tenanted	Half owned and half rented	Owned
Sub catchment	**Yarty**	**Yarty**	**Yarty**
Landscape setting	Land on low-lying west banks of River Yarty at Yarcombe	Open high plateau land on east side of Yarty valley	Small fields on western slope of Yarty valley below wooded brow and A30
Overview	Substantial dairy farm that is entirely grass-based, with interest in innovation	Medium sized dairy farm on open level land, following generally good practices on maize growing and slurry management	Small farm increasingly focused on environmental management
Main farm business	Dairy (300 milking cows) – grazing and silage feed based	180 cow dairy. 410 stock with followers and rearing bull calves to stores	Grass sheep keep to a neighbouring farm
Milk contract	Arla	Muller/Sainsburys	N/A
Slurry	Major yard infrastructure improvements are already underway and further planned under Mid Tier. Keen to do further work to create 5.5 months storage and be SSAFO compliant	Cattle yards, feeding yards and silage clamps all covered. Slurry pit open with separator to remove solids before entering pit. Silage storage area covered under Mid Tier	N/A
Soils	Seasonal livestock exclusion from fields that sit wet in the winter. All fields currently strip grazed. Aim is to graze as much as possible unless soil conditions are too wet.	Cover crops successfully established on maize growing land, and because it is level land there is no erosion problem	Permanent pasture
Maize	Fully grass-based forage system, no maize	Position on plateau and without streams/flowing ditches maize poses less of a threat to water and soil quality	No arable
Watercourses	Streams are electric fenced. Two places where cattle cross the river over a ford. No poaching issues by the river. Troughs in every field.	None on farm	Streams are in good condition, not fenced, but no poaching or bank erosion
Habitats	Some semi-improved pasture on steep slopes	Only hedges	Hedgerows and small copses

Agri-env schemes	Two Mid Tier agreements covering capital money for slurry lagoon roofing etc and grassland options. Water capital items are great to improve the infrastructure	Previously in ELS as a requirement of milk contract. Now in Mid Tier which funded covering silage clamps	Aiming to re-wild part of the land (5.4 ha), fencing the area, planting trees at low density, letting hedges grow up with light conservation grazing
Impact of BPS loss	BPS money was used to invest in infrastructure rather than propping up the business. Will be missed, but hopefully major improvements will have been made by then	Hoping that maintaining good milk contract and staying efficient will plug financial loss of BPS	Not a big issue
Advice/training needs	Farm Infrastructure Audit and visit from John Cossens formed basis of improvement plans. Cossens has been firm but fair and the 'double act' with him and CSF has worked well. If the Environment Agency would give more practical advice, farmers would perhaps have less of a barrier receiving them onto their farms	Used Greenslade Taylor Hunt for Mid Tier application. Would be interested in maize management training with latest development in under-sowing, buffer strips, early harvest varieties	None to date but agreed to take part in E.L.M Test & Trial
Collaborative working	Very interested in working with other farmers with similar systems and learn from each other. Interested in farm bench marking	Potentially could coordinate with neighbours on hedge management etc	Only letting grazing so not seeking collaboration at present
View of wider farming community	Maybe difficult to work directly with neighbours as systems are different, but possible to collaborate on measures like hedge management and buffering watercourses etc	Manor house to north is looking at rewilding their land which is a concern if it causes weeds to spread. Most dairying neighbours don't grow maize but their land is less suitable	Extremely critical of some farmers in the area: one further up the valley who ploughs steep/sloping fields down to the river causing serious erosion in wet weather; a dairy farm lower down the valley, keeping too many cows on a small acreage and hauling maize for miles across the county
Summary of position and attitude to future environmental support	The main aim of the business going forward will be to optimize productivity and to send out as much milk out of the farm gate as possible, and keen to innovate and explore new approaches	An efficient dairy unit seeking to become more so to weather the coming changes	Not an active farmer but sympathetic to some neighbours and critical of others

Appendix 2 - Alignment with Key Strategic Documents

The following strategic documents are relevant to this Action Plan. The relevant content is given. in full in Appendix 2

6.2.1 WATER FRAMEWORK DIRECTIVE

(Subject to transfer into UK legislation post-Brexit)

The Water Framework Directive (WFD) (2000/60/EC)

The Directive introduced a comprehensive river basin management planning system to help protect and improve the ecological health of our rivers, lakes, estuaries and coastal and groundwaters. This is underpinned by the use of environmental standards to help assess risks to the ecological quality of the water environment and to identify the scale of improvements that would be needed to bring waters under pressure back into a good condition.

The WFD requires member states to protect and where possible enhance the condition of all bodies of water. It requires protected areas including the River Axe Special Area of Conservation to be meeting their objectives by 2015 (or in cases where there are significant pressures to address, 2021 or 2027). The river is not currently achieving the required standard of Good Ecological Status (GES).

6.2.2 HABITATS DIRECTIVE

(Subject to transfer into UK legislation post-Brexit)

The Conservation (Natural Habitats etc.) Regulations: SI 1994/2716)

The directive requires member states to identify natural habitats and species of community interest which may occur in their territories. States must maintain or achieve a 'favourable conservation status' for these species and habitats through designation of protected 'Special Areas for Conservation' (SACs), and also through special measures to protect individual species. In the UK this has been implemented through the maintenance and extension of SSSIs.

Relevant Annex 1 habitat: "Sections of water courses with natural or semi-natural dynamics (minor, average and major beds) where the water quality shows no significant deterioration."

6.2.3 25 YEAR ENVIRONMENT PLAN

"A Green Future: Our 25 Year Plan to Improve the Environment, sets out what the UK Government will do to improve the environment, within a generation. Measures are listed under ten headings:

1. Clean air
2. Clean and plentiful water
3. Thriving plants and wildlife

4. A reduced risk of harm from environmental hazards such as flooding and drought
5. Using resources from nature more sustainably and efficiently
6. Enhanced beauty, heritage and engagement with the natural environment

In addition, we will manage pressures on the environment by:

7. Mitigating and adapting to climate change.
8. Minimising waste.
9. Managing exposure to chemicals.
10. Enhancing biosecurity."

Clean and plentiful water

"We will achieve clean and plentiful water by improving at least three quarters of our waters to be close to their natural state as soon as is practicable by:

- reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies
- reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans
- supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025
- minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters; we will make sure that potential bathers are warned of any short-term pollution risks

Thriving plants and wildlife

"We will achieve a growing and resilient network of land, water and sea that is richer in plants and wildlife.

On land and in freshwaters, we will do this by:

- restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term
- creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits
- taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human induced extinction or loss of known threatened species in England and the Overseas Territories
- increasing woodland in England in line with our aspiration of 12% cover by 2060: this would involve planting 180,000 hectares by end of 2042."

6.2.4 LOCAL NATURE RECOVERY STRATEGIES

Local Nature Recovery Strategies (LNRS) will help map the most valuable sites and habitats for wildlife and identify where nature can be restored. The Environment Bill will require all areas in England to establish LNRSs. Current pilots are being run by Defra in collaboration with Natural England to:

- develop a set of maps which show most valuable existing sites and habitats for wildlife
- use these maps to identify opportunities for recovering nature – for wildlife, for people, and as a contribution to tackling climate change and improving the environment
- bring a broad range of groups of people together to identify and agree priorities for restoring nature.
- The LNRSs will underpin the new Nature Recovery Network (NRN).

6.2.5 THE COLCHESTER DECLARATION 2019

The National Association of AONBs made a declaration of intent in 2019 which states:

"We believe:

1. Natural Beauty has intrinsic value and means so much to people
2. AONBs should be places of rich, diverse and abundant wildlife
3. Nature recovery is central to the conservation and enhancement of natural beauty
4. Climate change is the biggest threat to humanity and one of the greatest threats to biodiversity.
5. Designated landscapes offer powerful solutions to the challenges of climate change
6. The network of AONBs and National Parks, their teams, partnerships, authorities and stakeholders
   offer a unique solution to tackling environmental challenges.

We pledge:

By July 2020

1. To enable an approach that creates opportunities within AONBs for people to make an emotional connection with nature.
2. To prepare a Nature Recovery Plan for each AONB

By 2024

1. To embed an ecosystems services approach into all AONB Management Plans
2. To ensure all AONB management plans include meaningful measures around climate change mitigation and adaptation, including clear, measurable targets to support Net Zero

By 2030

1. That at least 200,000 ha of SSSIs in AONBs will be in favourable condition
2. That at least 100,000 ha of wildlife-rich habitat outside of protected sites will have been

created/restored in AONBs to further support the natural movement of plants and animals

3. That at least 36,000 ha of new woodland will have been planted or allowed to regenerate in AONBs following the principle of the right tree in the right place

4. That, by each AONB immediately adopting a species on the threatened list and by preparing and delivering a Species Action Plan, at least thirty species relevant to AONBs will be taken off the list by 2030.

We call on Westminster and Welsh Governments to provide the power and resources to make these targets achievable."

6.2.6 EAST DEVON LOCAL PLAN

Relevant Strategies and Policies:

Strategy 20 – Development at Axminster

In Axminster we will support and reinforce the town's role as a self-contained medium- sized town, serving the employment, commercial and community service needs of the settlement and its rural surroundings. Proposals for development in Axminster should be consistent with the strategy, which is to … make sure that any development does not harm wildlife and habitats in the Axminster area. In particular, the water quality of the River Axe and the surrounding wildlife sites should be protected.

Strategy 47 - Nature Conservation and Geology

Development proposals that would cause a direct or indirect adverse effect upon internationally and nationally designated sites will not be permitted unless:

a) They cannot be located on alternative sites that would cause less or no harm.

b) The public benefits of the development clearly outweigh the impacts on the features of the site and the wider network of natural habitats.

c) Prevention, mitigation and compensation measures are provided.

d) In respect of Internationally designated sites, the integrity of the site will be maintained.

Habitat Regulations and Mitigation of Potential Adverse Impacts of Development

Where development or the occupants of development could lead to adverse biodiversity impacts due to recreational or other disturbance, we will require mitigation measures and contributions to allow for measures to be taken to offset adverse impacts and to create new habitats. This will be of particular importance where development could impact upon 'European Designated Sites' (In the case of other impacts to internationally, nationally and locally designated sites, we will seek appropriate mitigation measures). Where European designated sites might be affected there will be a need for Appropriate Assessment in line with Conservation and Species Habitat Regulation requirements. Mitigation measures will be required if harmful impacts are predicted or could arise.

EN14 - Control of Pollution
Permission will not be granted for development which would result in unacceptable levels, either to residents or the wider environment.
Pollution of surface or underground waters including:
a) Rivers, other watercourses, water bodies and wetlands.
b) Water gathering grounds including water catchment areas, aquifers and groundwater protection areas.
c) Harbours, estuaries or the sea.
Pollution of sites of wildlife value, especially European designated sites or species.

EN18 - Maintenance of Water Quality and Quantity
The Council will require developers to take appropriate measures to ensure that development does not adversely affect the quality or quantity of either surface or groundwater. Development that would result in adverse impacts or potential for pollution will be restricted within Source Protection Zones.

EN19 - Adequacy of Foul Sewers and Adequacy of Sewage Treatment Systems
New development will not be permitted unless a suitable foul sewage treatment system of adequate capacity and design is available or will be provided in time to serve the development. Development where private sewage treatment systems are proposed will not be permitted unless ground conditions are satisfactory and the plot is of sufficient size to provide an adequate subsoil drainage system or an alternative treatment system.

6.2.7 BLACKDOWN HILLS AONB MANAGEMENT PLAN

Relevant policies:

Natural Capital and ecosystem goods and services (NC) management objective and policies
NC1: Promote a catchment, multiple-benefit, collaborative-based approach to soil conservation, water quality and flood alleviation improvements utilising the Otter, Axe, Culm and Parrett/Tone catchments

6.2.8 EAST DEVON AONB MANAGEMENT PLAN

Relevant policies:

Partnership Plan: Key targets 2019–24
"..Improved water quality in the rivers Otter, Sid, Axe and Lim."

Delivery Plan
Theme 1: Place
Environmental quality and climate
"Work with partners on the East Devon Catchment Partnership to deliver climate change adaptation measures and promote sustainable management of our natural resources."

"Assist farmers in reducing impacts on clean water and air."

Theme 2: People & Prosperity
"Actively engage in the Catchment Sensitive Farming programmes."
"Work with partners to develop and support sustainable farming and land management practices and reduce flood risk."

6.2.9 DORSET AONB MANAGEMENT PLAN

Relevant policies:

A1: Management of land and sea conserves and enhances natural heritage, natural assets, ecosystem flows and the services they provide

d. Develop and support measures and activities which conserve and enhance the AONB's natural assets including priority habitats and species, ecosystem flows and the services they provide.

6.2.10 DEVON CARBON PLAN

Key Outcomes:

"The landscapes of Devon are enriched by actions to increase the sequestration and storage of carbon through carefully located tree planting, habitat restoration for wildlife and a more diverse farmed environment.

Actions to aid carbon sequestration and storage are located appropriately to greatly aid adaptations to climate change, such as flood control measures.

11.5 Goal: restore and enhance habitats and soils so that they fulfil their natural potential for carbon sequestration and storage."

6.2.11 RIVER AXE SSSI RESTORATION PLAN

From Executive Summary:

"The 2011 Natural England condition assessment (ECUS, 2011) of the River Axe SSSI showed that the site is in unfavourable condition. The reasons for unfavourable condition include physical modifications such as weirs, poor riparian habitat quality due to overgrazing and invasive plants, diffuse water pollution and siltation.

For the River Axe SSSI, Natural England has identified a range of actions or 'remedies' required to get the river into favourable condition. The actions required include developing a whole river restoration plan

and initial implementation of actions. Other actions include implementing a diffuse water pollution plan, catchment sensitive farming initiatives, and an invasive species control strategy."

6.2.12 RIVER AXE NUTRIENT MANAGEMENT PLAN

From Executive Summary:

"The report includes a calculation of the potential increase in phosphate loading to the river that could result from housing growth in the catchment, and specifically the proposed NE Axminster Urban Extension. It then describes a series of measures which could be put in place in the catchment to reduce this loading, or to reduce the phosphate loading from the agricultural sector. It is shown that it is feasible to put in place sufficient mitigation to ensure that the NE Axminster Urban Extension can be delivered with no net increase in phosphate loading to the river."

6.2.13 NITRATE VULNERABLE ZONES (NVZ) 2017

Groundwater 24 – Chard:
"If your land is in an NVZ, you must follow rules when you use nitrogen fertiliser and store organic manure."

Appendix 3: National Case Studies

1. River Mease Catchment Project (Trent Rivers Trust)

The River Mease is a designated Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) for its valuable community of fish species and aquatic plants. The site is currently failing to achieve good ecological status primarily due to poor water quality because of high phosphate levels, which lead to damaging environments for plants and animals and can harm the very species for which the site is under protection.

Trent Rivers Trust is currently delivering two contracts of work in order to improve water quality and river habitat throughout the Mease catchment:

- The Environment Agency has provided funding to deliver river restoration schemes to improve river habitat and function on the River Mease and its tributaries.
- A developer contribution scheme has been developed which funds the delivery of phosphate reduction activities and schemes across the catchment.
- The developer contribution scheme allows reduction of source pollution and interception of sediment pollution, while the Environment Agency river restoration scheme funds schemes that enhance the river environment itself.

Web: www.trentriverstrust.org/project/rivermeasecatchmentproject

2. The Phosphate Project (Kennet Catchment Partnership)

The Kennet Catchment Partnership is working on a catchment wide project to help tackle the impacts of phosphorus-rich wastewater. Areas of the catchment with the highest phosphate concentrations have been identified and a series of different interventions are being used:

- Septic Tanks - owners of private sewerage are provided with guidance on to keep their systems in good order, preventing costly repair bills and avoiding environmental pollution. The guidance combines the recent 'General Binding Rules' associated with private sewage treatment and best practice advice which will keep systems working effectively.
- Cleaning products – Promotional literature shows how everyone can make a difference by choosing to use phosphate free and low phosphate cleaning products. A project leaflet distributed to households highlights that while phosphate-free products can be readily purchased, some commonly used cleaning products are nearly a third phosphate.
- Farm advisory visits - Catchment Sensitive Farming officers work with farmers to help them reduce all types of Diffuse Water Pollution from Agriculture.

Web: www.kennetcatchment.org/projects/live/phosphate-project

3. Phosphorus in the Eye Brook Catchment (Game & Wildlife Conservation Trust)

The GWCT have been undertaking research through the Defra-funded 'Phosphorus from Agriculture: Riverine Impacts Study' (PARIS) project. This has investigated the relationship between farming and stream nutrients, especially phosphorus.

PARIS explored the physical and chemical processes in streams in two sub-catchments of the Eye Brook and their impact on wildlife. A summary of the findings is as follows:

- Phosphorus is strongly associated with eroded soil particles. Weekly sampling revealed that average concentrations of phosphorus were four times as high in the arable catchment as in the grass one.
- Grassland buffers the stream up to a point, but even here, phosphorus concentrations increase during extreme rainfall. Such intense storm events are predicted to increase under future climate change so understanding this relationship between land use and water quality is important.
- The project sampled water upstream and downstream of houses (potential sources of domestic phosphorus from septic tanks) to define the domestic and agricultural sources separately. The phosphorus concentration was three to four times higher downstream of houses than upstream, where farming was the only source.
- In terms of annual phosphorus yield, diffuse agricultural sources contributed more than 95%, but the small contribution from domestic sources was a major contributor at base flow when this continuous source was not diluted by water from the surrounding land.
- Improving the Eye Brook as a habitat and a resource can only be achieved at the community level, and we work closely with other members of the catchment community, not least through the Eye Brook Community Heritage Project, which brings together research results (such as those from PARIS) with the local knowledge of farmers and others.

Web:
https://www.gwct.org.uk/allerton-archive/catchment-research/phosphorus-from-agriculture-riverine-impact-study-paris/phosphorus-in-the-eye-brook-catchment/

4. Water and Integrated Local Delivery (WILD) - Upper Thames (FWAG SW & EU partners)

WILD uses a facilitation-based approach to meet WFD objectives. The project has built a lasting multi-stakeholder partnership bringing farmers and local communities together to provide economic and social benefits. The project area covers of 26,000ha in the central part of the Upper Thames catchment that forms the headwaters of the Thames river basin.

- There is a national regulatory framework that has been adjusted locally for WFD and the WILD partnership. This Integrated Local Delivery framework is a tried and tested approach that has increased the level of confidence amongst stakeholders in the project.

- Advice and engagement covers regulation, Common Agricultural Policy greening, cross-compliance, Agri-Environment Support schemes in combination with WFD and local flooding issues.
- Identified 'Farmer Guardians' work with agencies and project partners to promote sustainable land management. Providing contact points amongst the community such as the farmer guardian network promotes accountability.
- A Payment for Ecosystem Services scheme developed with water company to reduce chemical pollutants in water. Partnership seen as a shared problem-solving network.

Key lessons learnt:

- Water issues are key: WFD, flooding, drinking water, sewage infrastructure, development.
- Farmers critical of regulation and inspection approach, communities feel unable to resolve water issues due to complex arrangements for ditch and watercourse management.
- Facilitation and engagement are crucial, as are personalities: current WILD project lead is respected by the farming community, Gloucester Rural Community Council is respected by local communities.
- Evidence of increased understanding on some issues e.g. upstream and downstream impacts of action, importance of soil and impact of coordinated action.
- WILD is about engagement, communication, knowledge, consistency and trust. Key aspects are presence of facilitator, willingness of agency to 'stand-back' and engage with a wide range of stakeholders.

Web: https://oppla.eu/casestudy/18425

5. The Wye Ithon Severn Ecosystems (WISE) Project

Starting in August 2018 and funded by Welsh Government's Sustainable Management Scheme, WISE is working with farmers to protect and enhance natural resources in a way that benefits agricultural businesses, rivers and the wider community. The project is in partnership with Severn Rivers Trust and involves areas such as nutrient management, soil health, water quantity and biodiversity. As well as delivering environmental value, effective land management can also improve water quality in rivers, reduce flood risk, improve soil quality, enhance biodiversity and improve carbon sequestration.

- Work with Farmers - Catchment Advisors are working with farmers to find practical ways in which they can change agricultural practices to benefit both their business and the aquatic environment.
- Natural Flood Management - With Powys County Council, the Foundation is also developing a scheme that pays farmers to mitigate against flooding, thereby reducing the need for costly "hard" defences further downstream.
- Water Quality - The Foundation is also working with Tesco's suppliers within the project area on nutrient management, providing advice and grant funding to reduce the risk of diffuse and point source pollution and to improve soil health.
- The project will develop catchment scale markets for phosphate and hopefully flood and drought management. These markets will allow for the external costs of pollution (such as fishing days lost to

algal blooms) to be monetised and reduced, improving the state of the whole of the Ithon and main stem of the Wye.

- Before the project ends in June 2021, at least 275 farms will have been visited covering 41,000 hectares of agricultural land in mid Wales.
- Farm visits will consist of a tailor made farm report and opportunity maps developed for the use of the farmer. The report will highlight existing benefits the farm is contributing to the environment and wider society as well as additional opportunities.

Web: https://www.wyeuskfoundation.org/the-wye-ithon-severn-ecosystems-wise-project

6. Channel Payments for Ecosystem Services (West Country Rivers Trust and EU partners)

The EU Partnership project Channel Payments for Ecosystem Services (CPES) brings together organisations on both sides of the English Channel, with the ambition to influence and improve water quality through the development and trialling of new financial instruments. Fourteen partners are working towards a common goal: to improve water quality by implementing sustainable Payments for Ecosystem Services (PES) schemes in six case-study catchments in Southern England and Northern France.

- On the River Lyd, the project has been working with a group of companies via the Tamar Water Stewardship Business Board (TWSBB) with direct and indirect links to the catchment through their operations and supply chains. The Board is working towards key objectives such as best practice in soil and nutrient management through supporting their farm producers.
- The TWSBB is now officially recognised as one of just four case studies in the UK, as part of the Courtauld Commitment 2025 Water Ambition where the Food and Drink sector have pledged to reduce their environmental footprint – waste, water and Carbon.
- In December 2019 / January 2020, an online auction offered grant funding to landowners. This invited them to bid an offered price against options they were willing to undertake such as watercourse fencing, buffer strips or soil decompaction. It also offered habitat enhancement through woodland planting or the creation of new ponds or wetlands. The funding behind the auction was obtained via the Business Board.
- With strong bidding interest outstripping available funds, two clear messages were that farmers are interested in implementing measures for environmental protection if they support the farm business, and a clear and simple application process will also encourage greater uptake.

Web: https://wrt.org.uk/project/cpes/

7. The Demonstration Test Catchments Evidence Compendium (Defra)

The Demonstration Test Catchments (DTC) programme was commissioned by Defra with the aim of testing the hypothesis that it is possible to cost-effectively reduce the impact of pollution from agriculture on water body status, whilst maintaining sustainable food production through the implementation of on-farm mitigation measures.

The DTC programme was established to address the gap in empirical evidence on the cost-effectiveness of combinations of on-farm mitigation measures at catchment scales and to explore ways to bring science into stakeholder-led catchment management, demonstrating the use of local expertise to solve local problems.

This nationally coordinated programme of research ran from 2009 – 2019 and focused on four study catchments that represent the major farm types (i.e. arable, livestock, mixed) and the main rainfall and soil combinations across England and Wales. Theprogramme had three main roles:

- A programme of linked and co-ordinated research projects: to provide underpinning research, from farm to catchment scale, that informed policy and practical approaches for the reduction of agricultural diffuse pollution and the improvement of ecological status in freshwaters, whilst maintaining economically viable food production.
- A research platform: to host longer-term collaborative research on diffuse pollution from agriculture, funded by multiple organisations. The aim was to establish a community of researchers and stakeholders enabling short and longer-term policy-relevant research questions to be answered, steering research and translating science into practice.
- A demonstration and co-ordination activity: to demonstrate scientifically robust approaches to diffuse pollution mitigation and explore ways to bring science into stakeholder-led catchment management.

Web:
http://www.wensumalliance.org.uk/research_reports/14879_WT15116_DTC_Evidence_Compendium_final.pdf

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