Wyre Rivers Trust

&

Wyre Waters Catchment Partnership

Integrated Catchment Plan

March 2019

Thomas Myerscough

Life

Wyre Rivers Trust
"from Bowland to Bay"
A Registered Charity

NATURAL COURSE
OUR WATER. OUR FUTURE

Wyre Rivers Trust

Integrated Catchment Management Plan

Preface

The River Wyre and its catchment is located in the North West of England, the Wyre is a short river which formed by the confluence of the Marshaw Wyre and the Tarnbrook Wyre at Abbeystead. The Wyre then flows south through Scorton and Garstang before it meets its largest tributaries, the rivers Brock and Calder. The river becomes tidal at St Michaels-on-Wyre, it continues on a westerly course before turning northward and entering the Irish Sea at Fleetwood. The River Wyre and its catchment plays host to a wide variety of biotopes. The catchment is noted for its mudflats, saltmarsh, grassland and moorland, many of these habitats are protected under national and international designations.

The Wyre Rivers Trust was formed in 1998, it was formed by three local interest groups whose aim was to improve the ecological conditions seen within the riparian environment. The trust undertook a number of projects on key spawning becks in the mid and upper catchment, the projects were supported by key local stakeholders. During 2013 the Wyre Rivers Trust made a bid to become host of the Catchment Partnership for the Wyre Catchment (Figure 1). It was successful in its bid and received a grant to host the Catchment Partnership from DEFRA this sum was matched by United Utilities. The aim of the Catchment Partnership is to improve the river to a "Good" standard under the criteria set out in the Water Framework Directive (WFD) by 2027.

The Wyre Waters Catchment Partnership (WWCP) was formed in the autumn of 2013, it is made up of a wide range of organisations, each of which is a key stakeholder for the Wyre Catchment. The organisations are as follows; Environment Agency, United Utilities, Grosvenor Estates, Blackpool and the Fylde College, Wyre Council, The Friends of Garstang Walking Festival, Garstang Millennium Green Trust, Lancaster University, The Wyresdale Anglers and The Lune and Wyre Fisheries Association. More recently the partnership has been expanded to include Churchtown Flood Action Group, The Forest of Bowland AONB

The Wyre Waters Catchment Partnership undertook a series of Community Consultation Workshops in April 2014. The aim of the workshops was to capture public opinion on the environmental priorities, these priorities which will direct the work of the Wyre Waters Catchment Partnership and The Wyre Rivers Trust in the Wyre Catchment.

Contents

NB – All images within the document are credited to the Wyre Rivers Trust and Wyre Waters Catchment Partnership.

The Wyre Catchment – *Geography*

The Wyre Catchment (Figure 1) is located wholly within Lancashire and is bordered by the Lune and Ribble Catchments which are considerably larger. At its coastline the catchment is bordered by the Irish Sea, the Wyre is the most southerly river to flow into the Morecambe Bay system which is the largest area of intertidal mud flats in the UK. The catchment covers 447.74 square kilometres, with the highest point in the catchment being around 2000ft above sea level.

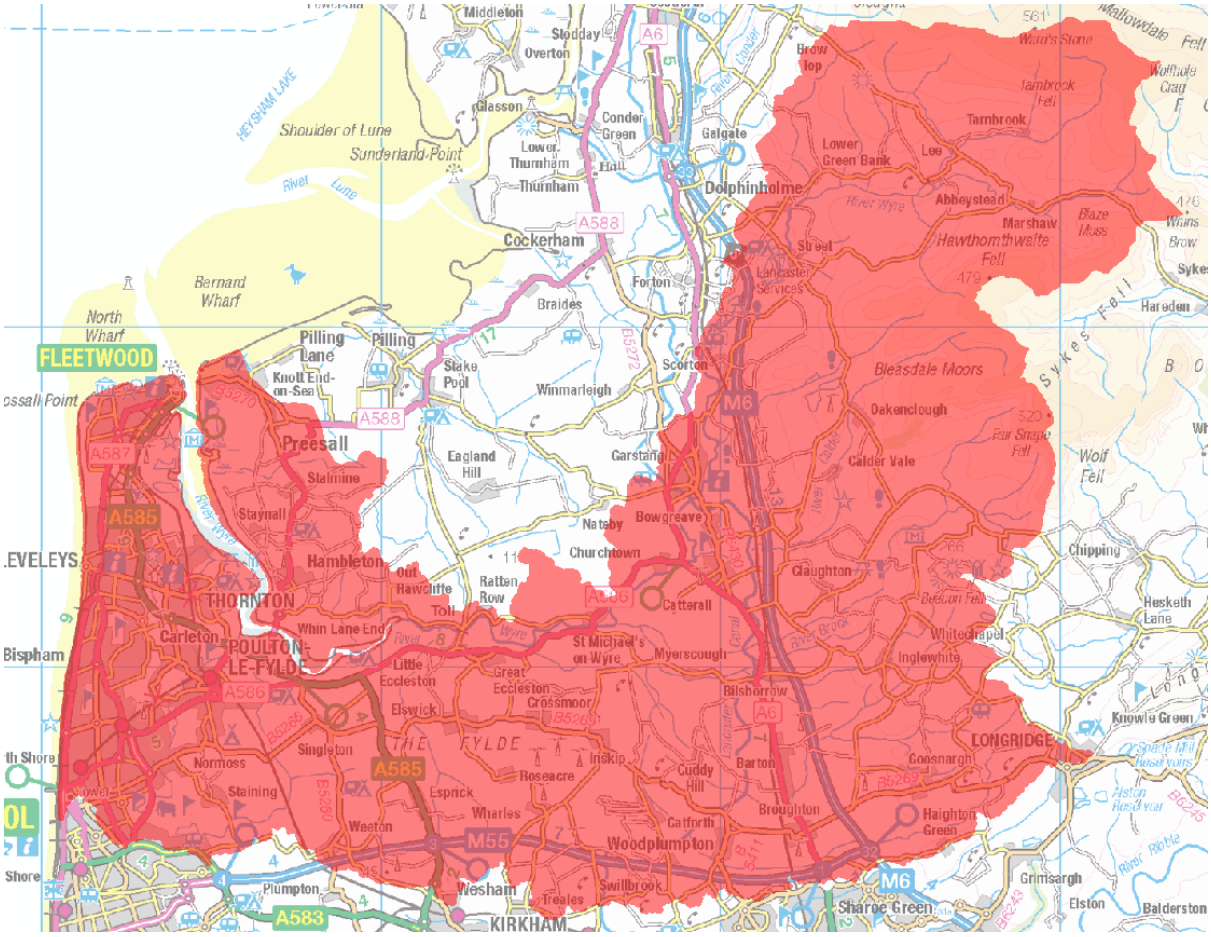

Figure 1 The River Wyre Catchment

The River Wyre is around 28 miles long and is formed when the Marshaw Wyre and Tarnbrook Wyre meet to the east of Abbeystead Reservoir. The Wyre then makes its way through Abbeystead Reservoir before it flows through the villages of Dolphinholme and Scorton. The river continues to flow southward through Garstang where it meets the first of its major tributaries; the river Calder. The Wyre then flows through the village of Churchtown, it then meets the last of its major tributaries; the river Brock and makes an abrupt turn to the west. The Wyre flows through St Michaels-on-Wyre where it becomes tidal before making its way past Great Eccleston and Little Eccleston. The Wyre then turns northward as it reaches Poulton-Le-Fylde, the mouth of the Wyre is situated between Fleetwood and Knott End-On-Sea.

As previously outlined the rivers Calder and Brock (Figure 2) are the major tributaries of the Wyre. The source of the river Calder is situated in the Forest of Bowland Area of Outstanding Natural Beauty. The Calder forms on the Bleasdale Moors at the top of Luddock's Fell where it flows in a south-westerly direction through Calder Vale to the north of Catterall before it meets the Wyre on the outskirts of Garstang. The source of the river Brock is situated around 0.7 miles from the source of the river Calder. Similarly, the source of the is situated in the Forest of Bowland AONB, the Brock flows in a south-westerly direction until it meets the Lancaster Canal where it begins its turn westward, it then flows in a north-westerly direction until meets the Wyre on the outskirts of St Michaels.

Figure 2 The Rivers Calder & Brock

The Wyre is split into three distinct operational catchments under WFD. These are named; Wyre and Calder (163.48km^2), Brock and Tributaries (125.79km^2) and Fleetwood Peninsula Tributaries (124.05km^2). A small area (34.42km^2) of the catchment is contained within the concisely named, Pilling, Ridgy, Cocker, Overton Dyke - Outer Lune Estuary operational catchment. Much of this sits in the costal area which surrounds Knott End, Hambleton and Out Rawcliffe.

There are a myriad of smaller tributaries, drains and ditches which run across the catchment and enter the river Wyre. These tributaries all have varying geomorphological features and have the potential to support a vast array of flora and fauna. The tributaries in the upper catchment such as Cam Brook, Grizedale Brook, Damas Gill and Park Brook should all form important spawning areas for Atlantic salmon, brown trout and sea trout. Whilst the tributaries which stem from the south of the catchment support a more diverse array of coarse species with occasional populations of trout. The tributaries which are influenced by the tide offer refuge for European eels and other coarse fish species but it is often the case that insensitive management over the last century has left habitats that are bland and lacking in diversity.

The Wyre Catchment – Notable Flora and Fauna

The Wyre Catchment is home to a wide variety of flora and fauna, the lower catchment is renowned for the vast flocks of migratory birds which gather on the mudflats of the estuary to feed. As a result of the huge numbers of migratory birds which gather within it, the estuarine section of the catchment is designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Specially Protected Area (SPA). The mouth of the Wyre also sits at the southern boundary of the Morecambe Bay RAMSAR site. There are a large number of species which gather on the mudflats of the estuarine area, among the most commonly seen are; Shelduck, Black Tailed Godwit, European Oystercatcher, Knot, Turnstone, Redshank, Dunlin, Plover and Sanderling.

Figure 3 Shelduck and Redshank at Knott End-on-Sea

The farmlands of the lower Wyre Catchment also host a wide variety of migratory birds, during the winter months vast gaggles of Pink Foot, Grey Lag and Barnacle Geese are often spotted along with deceits of Lapwings and herds of Curlews. The farmlands and saltmarshes are a useful source of food for the birds which are en route to their winter-feeding grounds. The estuary is also home to vast expanses of saltmarsh habitat such as Barnaby's Sands and Burrows Marsh (Figure 4), many of these saltmarshes are Natura 2000 sites. The saltmarsh habitats are home to a wide variety of flora and fauna and are also critically important feeding and roosting grounds for many migratory bird species. The saltmarshes are home to plants that are nationally scarce such as Rock Sea Lavender and Sea Wormwood. Some of the saltmarsh habitats are impacted by agricultural and industrial activity which can have impacts on the makeup of plant species which are found on the marsh.

Figure 4 A typical swathe of intertidal saltmarsh habitat within the Wyre estuary

Other habitats seen in the lower catchment include sand dunes, rock pools and clean beaches and muddy shores. Each of these habitats are home to important species of flora and fauna. The beaches of Blackpool, Cleveleys and Fleetwood are home to a wide variety of invertebrates which are food sources for fish, birds and marine mammals. Among the most commonly seen are Blow and Black Lugworm (Figure 5), Ragworm, Masked Crabs, Shore Crabs (Figure 5), Edible Crabs, Mussels, Razor Clams, Cockles and Periwinkles. Rarer species include Peacock Worms and Burrowing Piddocks

Figure 5: Black lugworm (left) returning to its burrow and a shore crab (right) at Rossall Point

The estuary of the River Wyre is a critical pathway for a number of important species of Migratory Fish. Atlantic Salmon, sea trout, eels, smelt and river lamprey all use the estuary to make their way between the Irish Sea and the Wyre. Salmon and sea trout which are returning to the Wyre to spawn will make use of the brackish waters of the estuary for a number of days to allow their bodies to adapt to increasing amounts of freshwater. In the spring months the estuary forms a thoroughfare for elvers (Juvenile European Eels) and thousands of salmon and sea trout smolts (Figure 6) as they make their way out of the Wyre. Meanwhile smelt and river lamprey are moving toward the tidal limit of the Wyre at St Michaels to complete their spawning activities. The Wyre estuary also forms a key spawning ground and home to a wide variety of marine fish species, these include commercially important species such as: cod, plaice, sole and bass. Larger marine mammals such as the Harbour Porpoise and Grey Seal also make use of the estuary.

Figure 6: A sea trout smolt caught at St Michaels-on-Wyre

The normal tidal limit of the Wyre sits at St Michaels-on-Wyre, above this point the river is markedly modified, with little tree or overhanging cover to support the wide variety of aquatic organisms that make use of this dynamic habitat. (Figure 7) At Scorton, the Wyre takes on the characteristics of a classic spate river with fast flowing glides, deep pools and shallow riffles. Each of these morphological features forms a biotope for a selection of invertebrate and vertebrate species. Pools will host the widest variety of fish species with both salmonid and coarse fish make use of this habitat at each stage of their life cycle. Riffles are the preserve of the agile brown trout, stoneloach and the bullhead, invertebrate species with special adaptations such as the *heptageniidae* or *plecoptera* will also use these habitats for a large part of their life cycles.

Figure 7: A typical reach of the lower Wyre, note the high levees and lack of tree cover, marginal habitat and overhanging cover.

Figure 8: A flatheaded mayfly nymph (left) and a brown trout (right). Both species are perfectly adapted to live and hunt in riffle habitat.

Each tributary (Figure 9) of the Wyre hosts varying freshwater communities. The tributaries can and should act as excellent nursery grounds for juvenile fish species and in the upper catchment as key spawning grounds for brown trout, salmon and sea trout that aim to create their redds in the small gravels which are present. The Mid and Upper Wyre catchment is home to a wide variety of mammal and bird species, amongst the most notable are otters, with reports and evidence of the species now spreading across the Wyre catchment. Avian species include hen harrier, lapwing, curlew along with smaller passerines such as chaffinch, gold finch, gold crest, wren and common sandpiper.

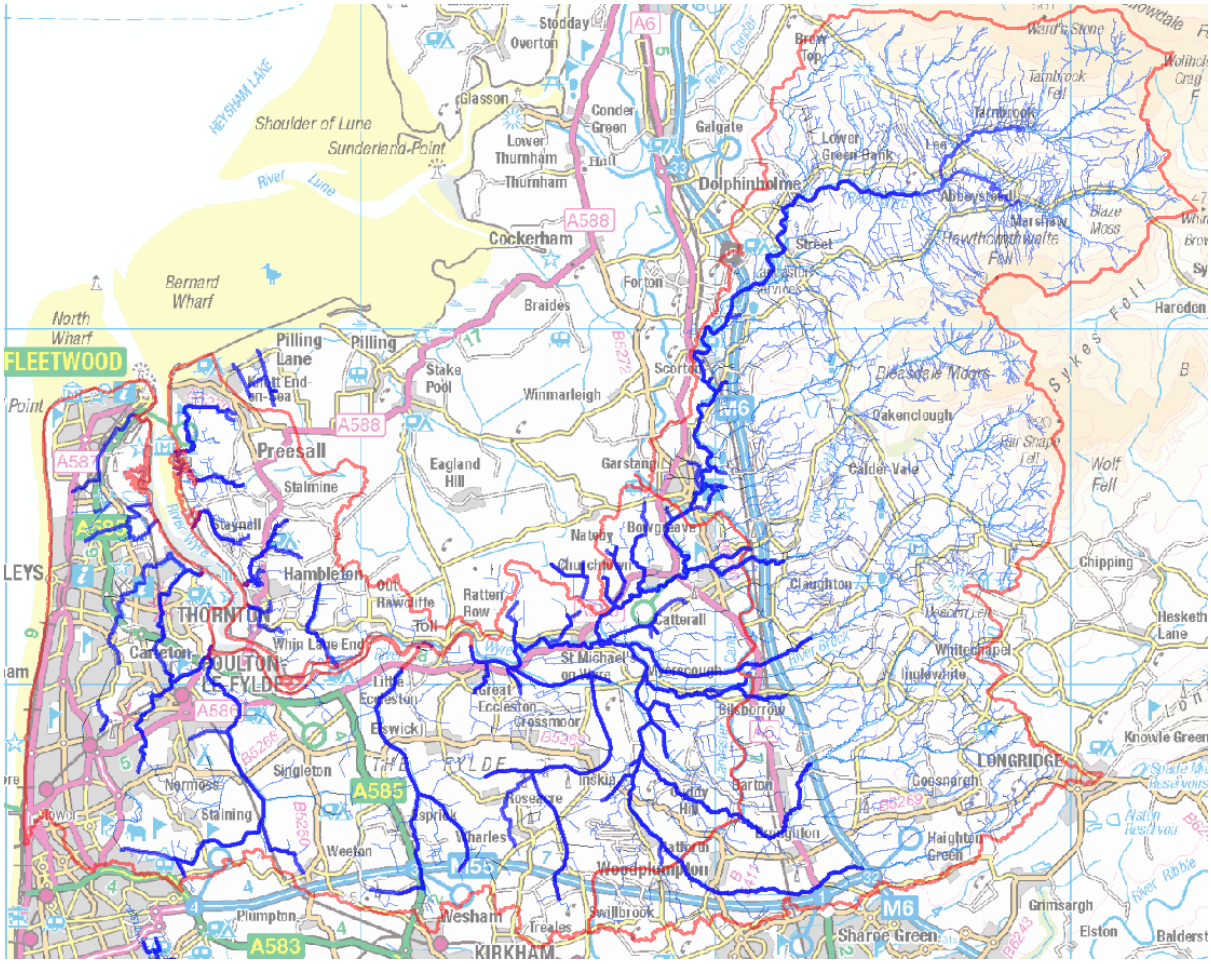

Figure 9: A map of the watercourses of the Wyre catchment. It can be seen that there are a wide ranging network of tributaries which form the catchment of the river Wyre.

The majority of the upper catchment sits within the Forest of Bowland Area of Outstanding Natural Beauty. The area is characterised by its blanket bog, peatland and heather habitats (Figure 10) which are home to a number of nationally and internationally important species. The area is one of the most important locations for breeding hen harriers in the UK, it is also home to curlews, ring ouzels, golden plovers, redwing and fieldfare. Rare invertebrate species such as the Manchester Treble Bar Moth and the Large Heath Butterfly are also present within the AONB.

Figure 10: A typical view of the upper Wyre catchment. It is dominated by vast tracts of grassland, moorland and peatlands.

Flooding

The communities of the Wyre catchment have been subject to serious flooding events for as long as they have been present. More recently the 20th century saw a number of serious floods which led to a drastic change of tack from the authorities that were charged with protecting the inhabitants of the many villages and towns of the Wyre catchment. Following floods in the 1980's, large bunds were erected around watercourses in the lower Wyre catchment. Today they can be seen spreading from Great Eccleston to Churchtown. Two large flood storage basins were also created at Catterall and Garstang, these were teamed with large hydraulic gates which can be closed to direct water into the storage basins and release it when it is safe to do so.

The winter of 2015 saw several severe weather systems hit the west coast of England, this culminated in Storm Desmond which hit on Boxing Day. Many towns and cities in the UK were subject to flooding, including Carlisle, Lancaster and Whalley. The impact on the towns and villages of the Wyre catchment was no different with the river Wyre recording its highest level since records began. Communities including those at Churchtown and St Michaels-on-Wyre were severely impacted, with four flooding events recorded in 9 days at St Michaels-on-Wyre. Churchtown was also subject to flooding during August 2016, when the Wyre rose around 4 metres in height during 11 hours.

Figure 11 St Michaels road bridge, August 2016

Following the floods of 2016, a number of local flood action groups became more active, one of which was the Churchtown Flood Action Group, which hosted a conference at Myerscough College in January 2017. Its aim was to educate and inspire victims of flooding, and the communities of the Wyre catchment. After the conference, Churchtown Flood Action Group became members of the Wyre Waters Catchment Partnership and the Wyre Rivers Trust began to collaborate with them.

The announcement of a community natural flood management fund provided an excellent early opportunity to work together. As part of a wider bid for the delivery of NFM measures to reduce flood risk within the Wyre catchment, a feasibility study was planned for the Ainspool catchment which has caused flooding in Churchtown. The Wyre Rivers Trust was successful in its bid to the DEFRA community NFM Fund and the Wyre NFM project was born in 2018 with delivery of interventions beginning in 2019. Further information on the aspirations of this plan for reducing flood risk within the Wyre catchment can be found in the high-level planning tables contained within this document.

Socio-Economic Summary

The Wyre Catchment is home to one unitary authority, two non-metropolitan districts, one county council and two borough councils. The Blackpool Unitary Authority covers a small section of the Fylde peninsula, Preston City Council covers a portion of the southern catchment whilst Lancaster City Council covers a portion of the northern catchment. The remainder of the catchment falls under the control of Lancashire County Council. Wyre Council are the local authority for the vast majority of the area, whilst Fylde Council cover a small segment of the lower catchment.

The catchment sees a wide variation of social and economic conditions. Blackpool, Fleetwood Cleveleys, Bispham and Poulton sit to the west of the river on the Fylde Coast. The local economy of the Fylde coast now relies upon tourism and the money which is spent at the many amenities which are situated within the resort. Each of the aforementioned locations benefit from the estimated 1 Billion pounds which is injected into the local economy by tourists who visit the Fylde coast every year. There are varying levels of affluence on the Fylde coast, Fleetwood has wards which are amongst the most deprived in the country and Blackpool was named as the most deprived coastal town in England in 2010. The more affluent areas of the Fylde Coast are the areas which are situated around Poulton-le-Fylde and the boundaries of Blackpool UA and the local borough councils.

Fleetwood once found itself as the biggest fishing port on the west coast of England, its trawlers accounted for a large amount of the fish which were caught in waters off the north western coast of Scotland and Icelandic waters. The connection to Icelandic waters was to be fatal for the fishing industry in Fleetwood as Iceland decided to enforce its fishing rights in its own territorial waters, causing the 1st, 2nd and 3rd Cod Wars. Following this the much of the major commercial fishing from Fleetwood declined.

To the east of the Fylde peninsula the local economy relies upon agriculture and small & medium enterprises. There is some small-scale tourism in the area which is facilitated by the ever-increasing number of caravan and chalet parks which take advantage of the scenic attributes of the catchment. Garstang, which is bisected by the river Wyre is the largest town in the upper and mid catchment, the town serves a number of outlying villages such as; Scorton, Cabus, Bilsborrow, Bowgreave, Catterall and Churchtown. The area which surrounds Garstang is the most affluent in the catchment, in part this is due to its proximity to the M6 which makes it an ideal living location for people that work in Manchester, Lancaster or Liverpool.

The majority of the land within the upper catchment is controlled by the Duke of Westminster and the Duchy of Lancaster. Historically the Forest of Bowland was an area of high importance as a royal hunting ground, as such the Lordship of Bowland is one of the oldest in the British Isles. The economy of the upper catchment is reliant upon farming, grouse shooting, small and medium rural businesses and tourism.

The Wyre and its tributaries are of great social and economic importance to the population of the Wyre Catchment. The riparian habitat which surrounds the rivers Wyre, Brock and Calder is used for a wide range of recreational activities which include but are not limited to; angling, canoeing, walking, running, bird watching, photography and cycling. Many of these activities are also undertaken by tourists who specifically visit the area to take advantage of natural attributes of the Wyre catchment.

Current WFD Status

Figure 12 shows the Overall WFD status (Cycle 2, 2016) for each of the waterbodies within the Wyre Catchment. It can be seen that there are three waterbodies which are currently at "Good" status, these are the Marshaw Wyre, Wyre Upper and Brock waterbodies. There are eight waterbodies that are currently at "Moderate" status and three waterbodies which are rated as "Poor". Around 21% of waterbodies are at good status which puts the catchment slightly above the national figure of 14%.

Figure 13 shows the significant water management issues within the Wyre catchment. It can be seen that diffuse and point source pollution is the major reason for the waterbodies within the Wyre catchment not achieving good. Other contributors include physical modification and flow (surface water abstraction). Figure 14 shows the main activities which are responsible for the significant water management issues which are seen within the Wyre catchment. Poor nutrient management is the most common activity, followed by continuous sewage discharge, misconnections and surface water abstraction. Both diffuse and point source pollution contribute large amounts of phosphate and nitrate and ammonia into the water environment. Pollution events also reduce dissolved oxygen concentrations within watercourses as the biological oxygen demand rises in response to the nutrients that are present. Misconnections which are commonly found in residential areas can lead to large amounts of phosphates entering watercourses. Surface water abstraction leads to reduced flow in watercourses, particularly during the summer months. Unfortunately, the process to revoke 100% abstraction licenses is ponderous, and so, dealing with issues that come as a result of over-abstraction can take up to 6 years. United Utilities recently applied a "hands off flow" to one of its abstraction points on the river Calder, the increased flow (9.5Ml/day) will improve water quantity within the upper Calder catchment and prevent the river from drying out in a "normal" summer. Further WFD data and evidence can be found at the Wyre RT Catchment Data Portal and at the Environment Agency Catchment Data Explorer.

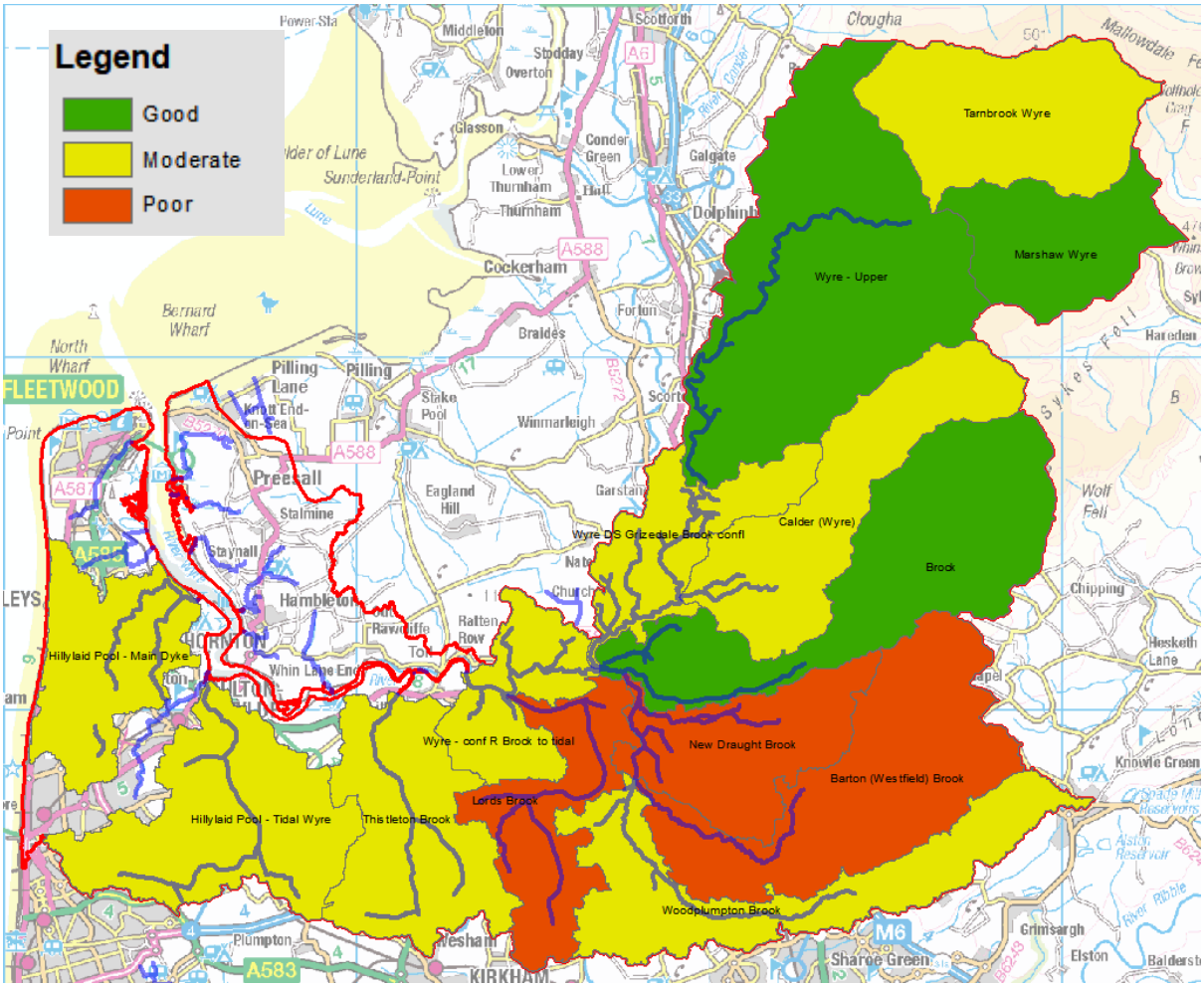

Figure 12 Overall WFD Status of each waterbody within the Wyre Catchment.

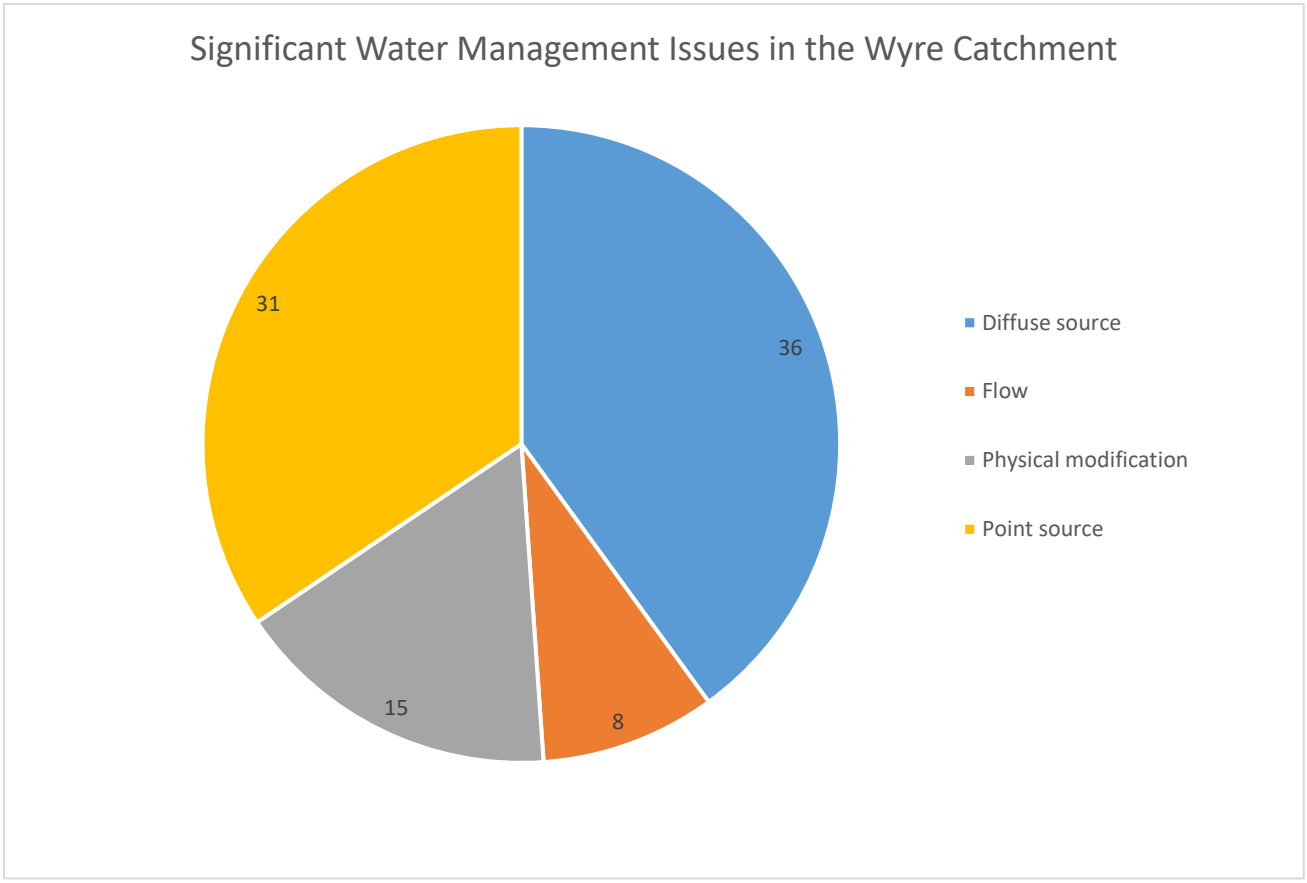

Figure 13 Significant Water Management Issues in the Wyre Catchment

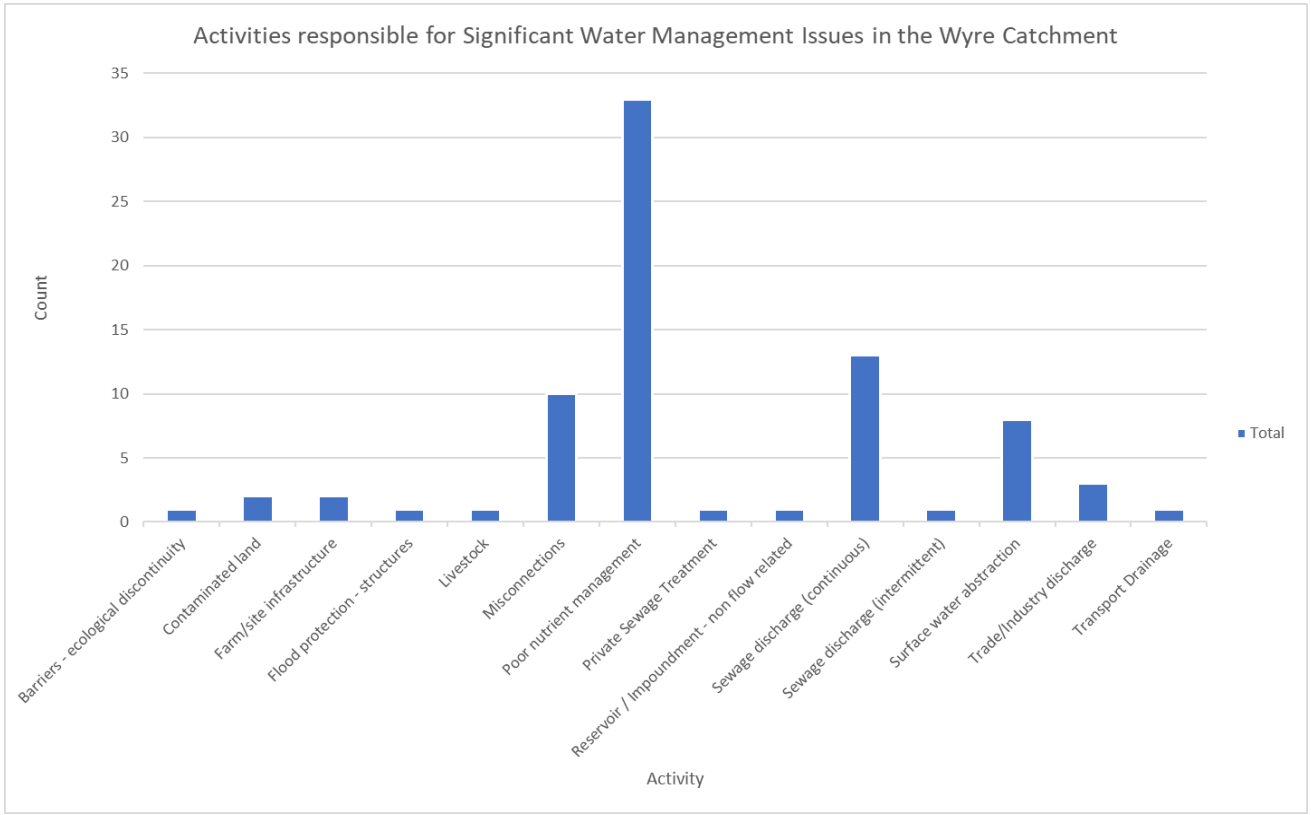

Figure 14 Activities responsible for significant water management issues in the Wyre catchment

Access, Health and Wellbeing

The members of the Wyre Waters Catchment Partnership and the Wyre Estuary Group recognise the significant benefits that can be gained from interacting with both green and blue spaces. There is a wide range of evidence which shows physical and mental wellbeing can be improved dramatically through undertaking physical activity such as walking, cycling, swimming and running in green and blue spaces. Since 2013 we have promoted the benefits of undertaking the aforementioned activities, we have also delivered a number of projects that have directly supported access (both physical and intellectual) to the environment and health and wellbeing initiatives. At three project sites we have installed interpretation panels, these are situated on footpaths and allow passing members of the public to read about the project site, the interventions which were made and why the project was delivered.

We have also supported the Garstang walking festival since 2016, hosting a river walk for between 10 & 20 participants. The walks take in a number of the project sites, where we provide information about our projects, the wider environment and the issues which face it. During the BioBlitz events which took place in 2015 and 2018 we have placed health and wellbeing at the forefront of our considerations. In 2015, members of the Thornton Practice (Figure 15) provided free health checks for participants and visitors, this resulted in a number of medical issues being detected. During the event activities included various walks to take in the saltmarsh, evening bat surveys and a dawn chorus survey.

In 2018 the theme of the Wyre Estuary BioBlitz was “Healthy Heroes”, again there were health checks and walks as part of the activity list. School children were invited to take part in the BioBlitz on the first day, they were treated to an array of activities which included a “mini-beast” safaris (Figure 14), shark egg case ID, wildlife photography, bird and bat box construction and owl pellet dissection. By delivering these short courses to children we are allowing them to access the natural environment and potentially creating an interest in the environment that could exist for 80+ years.

We will continue to incorporate access, health and wellbeing into each and every project that is developed as a result of this catchment plan.

Figure 15 Images from the 2018 (Left) and the 2015 (Right) BioBlitz events. Left - A Wyre Council ranger engaging a group of school children during a “minibeast safari”. Right - Staff members from the Thornton Practice- present at the BioBlitz to provide health checks and advice to attendees.

Vision

The vision of the Wyre Waters Catchment Partnership is to develop and support a thriving Wyre catchment that is home to a wide range of species and can support the communities which live amongst it. We desire a catchment that is home to natural environmental processes and one that is resilient to climate breakdown, invasive non-native species and flooding.

Terms of Reference

Since its inception the Wyre Waters Catchment Partnership has been developed to best serve the needs of the Wyre Catchment. No "Terms of Reference" document has been created to date and there is no current intention to create one.

Details of Wyre Waters Catchment Partnership Members

Wyre Waters Catchment Partnership

- Wyre Rivers Trust (Host), Abbeystead Estate, Catchment Sensitive Farming, Churchtown Flood Action Group, Environment Agency, The Forest of Bowland AONB, The Friends of Garstang Walking Festival, Garstang Millennium Green Trust, The Lune and Wyre Fisheries Association, The Royal Society of Biology, Wyre Council, Wyresdale Anglers, United Utilities,

Estuary Group

- Wyre Rivers Trust (Host), Brine Watch, Catchment Sensitive Farming, Environment Agency, Lancaster University, LOVEmyBEACH, Northwest IFCA, NPL Estates, RNLI Fleetwood, Royal Society of Biology, SEALIFE Blackpool, Wyre Council

Data and Evidence

The use of data and evidence to inform our project delivery strategy is paramount, it is highly unlikely that funding providers will commit to funding projects which do not have at least some form of data or evidence to support the application for funding. As a conservation charity it is often difficult to obtain our own data to support funding applications. As a matter of course we make use of the CaBA data packages, of which there are four versions. These contain a wide range of data and evidence about the Wyre catchment and are supplied by the The Rivers Trust.

CaBA Data Packages

The Wyre Rivers Trust has made constant use of the data which has been provided in the CaBA data packages. The use of GIS data has been paramount to the success of delivery across the Wyre catchment since 2014.

Local Data and Evidence

Since 2014 the Wyre Rivers Trust has been collecting data at most of the project sites that it has worked at. The data and evidence which has been collected will be uploaded to the Wyre Rivers Trust Catchment Data Portal. Where public funds have been received for the completion of the project it will be uploaded as soon as is feasible, where private funding has been received it will be uploaded following the approval of the funder. Data collected includes; Invasive Non-Native Species locations, fish survey data (all fish data), aquatic invertebrate data, flow data, bacteriological and general water quality data. Data that has been collected as part of engagement events is also available, this includes data collected during the 2015 & 2018 BioBlitz events and the 2016 World Oceans Day event. Where possible we will incorporate data and evidence which is provided by members of the Wyre Waters Catchment Partnership, although this will require the creation of a data and evidence sharing agreement.

Derived Data

Derived data is that which aids in the understanding of the Wyre catchment and allows us to prioritise the delivery of projects effectively. Derived data is effectively that which is the result of adding a number of datasets together to create a model which can be simple or complex. Good examples include SCIMAP, our Tidal Wyre prioritisation model, ecosystem services mapping or NFM prioritisation maps. SCIMAP data for the Wyre catchment is available at the WRT data portal, it indicates the diffuse pollution risk within the Wyre catchment and has been widely applied by rivers trusts and other organisations. Other derived datasets will be added to the catchment data portal in due course.

Sharing Platforms and Data and Evidence Agreement

Allowing the members of the Wyre Waters Catchment Partnership, the local communities of the Wyre catchment and a wider audience to view the data which is available for the Wyre catchment is very important. By allowing access to data and evidence we are promoting intellectual access to the catchment and allowing interested parties to gain a greater knowledge of their catchment. It also allows us to promote the projects that we have delivered and allows us to demonstrate the impact of those projects.

The Wyre Rivers Trust Catchment Data Portal can be found at;

www.wyreriverstrust.org/wyre_catchment_data_portal

N.B - For information relating to data licencing and sharing, please see the licencing statement which is attached to each dataset.

Delivery and Project Plan

What has been delivered

The Wyre Rivers Trust has been delivering projects across the Wyre catchment since 2012, its first major capital project was the "Help 3 Brooks Project" which was delivered as part of the River Improvement Fund managed by the Rivers Trust. Following the delivery of this project, the trust applied to host the catchment partnership for the Wyre catchment in the summer of 2013. The Wyre Waters Catchment Partnership was formed in October 2013 and since then has gone from strength to strength. The appointment as host of WWCP acted as a real catalyst for the Wyre Rivers Trust, it allowed it to employ its first paid member of staff which led to the development of projects and access to further funding to increase its range of delivery.

The projects which have been delivered can be roughly split (by their main aims) into the following categories; water quality, habitat quality, connectivity, Natural Flood Risk Management and monitoring, education and engagement. Their start date is noted in brackets.

Water Quality

- Scorton Habitat Scheme (2014)
- Wyre Habitat Creation Scheme (2014)
- Wyre Riparian Restoration Initiative (2015)
- Wyre Connectivity and Habitat Improvements Project (2015)
- Tidal Wyre (2016)
- Transitional and Coastal Waters Study (2017)
- Franklaw Safeguard Zone Novel Monitoring Project (2018)
- Upper Wyre Fisheries Improvement Project (2018)
- Hillylaid Pool Wetland Project (2018)

Habitat Quality

- Wyresdale Fisheries Improvement Project (2016)
- Woodplumpton Brook Renaturalisation Project (2017)
- Wyre Fisheries Development Project (2017)

Connectivity

- Help 3 Brooks Project (2012)
- Catterall Fish Passage Project (2016)
- Calder Lancaster Canal Aqueduct and Feeder Weir Feasibility Study (2017)
- Calder 3D Modelling Study (2018)

Natural Flood Risk Management

- Wyre NFM Project (2018)

Education and Engagement

- Catchment Based Approach Hosting Money (2013 onward)
- Knott End Beach Clean (2014)
- Lancashire Invasive Species Project (2014)
- INNS Recording and Monitoring in the Wyre Catchment (2014)
- Call of Nature (2015)
- Natural Course (2015)
- World Oceans Day Project (2016)
- The Ways Forward (2016)
- Wyre Smelt Project (2016)
- Abbeystead Farmer Group (2018)
- Wyre Estuary BioBlitz (2015 & 2018)

Table 1 Projects which have been delivered either wholly or in part by Wyre RIvers Trust from 2012 - 2019.

Project Name	Themes	Outcomes	Partners	Funder
Scorton Habitat Scheme	Water Quality, Riparian Habitat	~1.5km Fencing, 1600 trees planted, Interpretation panel	Wyresdale Anglers, EA, Wyre Council, Woodland Trust	Lancashire Environmental Fund
Wyre Habitat Creation Scheme	Water Quality, Riparian Habitat	~1.7km fencing, 400 trees planted, interpretation panel	Wyre Waters Catchment Partnership	United Utilities (Catchment Wise)
Wyre Riparian Restoration Initiative	Water Quality, Riparian Habitat, Bioengineering	1.1km fencing, 5 areas of bioengineering, 1 interpretation panel, 1 formalised ford	Wyre Waters Catchment Partnership	Environment Agency (Catchment Partnership Action Fund)
Wyre Connectivity and Habitat Improvements Project	Water Quality, Water Quantity, Riparian Habitat	1.25km fencing, 1 x upland water management intervention, 300 trees planted	Wyresdale Anglers, Grosvenor Estates Abbeystead	Environment Agency
Tidal Wyre	Water Quality, Bathing Waters, Data and Evidence, Education and Engagement	13km fencing, 1 x farm wetland, clean and dirty water separation, 2 x mid tier countryside stewardship applications, water capital grant applications	United Utilities, Environment Agency, Ribble Rivers Trust, Catchment Sensitive Farming, National Farmers Union	United Utilities
Transitional and Coastal Waters Study	Water Quality, Data and Evidence, Transitional and Coastal Waters	Optioneering report for TraC projects	Wyre Waters Catchment Partnership	Environment Agency
Franklaw Safeguard Zone Novel Monitoring Project	Water Quality, Data and Evidence, Education and Engagement	In Progress	United Utilities, Environment Agency, Catchment Sensitive Farming	United Utilities
Upper Wyre Fisheries Improvement Project	Water Quality, Riparian Habitat	1.5km fencing	Grosvenor Estates Abbeystead	Environment Agency
Hillylaid Pool Wetland Project	Water Quality, Wetland Creation, Biodiversity, Natural Flood Management, Urban Rivers,	In progress	Wyre Estuary Group, Wyre Council, Environment Agency, NPL	Natural Course LIFE14 IPE UK 027
Wyresdale Fisheries Improvement Project	Water Quality, Habitat Quality, Riparian Habitat	Installation of Woody deflectors in Street Brook, 150m fencing, 1 x soft engineering intervention	Wild Trout Trust, Wyresdale Anglers	Environment Agency
Woodplumpton Brook Renaturalisation Project	Water Quality, Habitat Quality, Connectivity	2 x fish easement, 12 x woody deflectors, riparian habitat improvements, ~300m fencing	Wild Trout Trust	Environment Agency
Wyre Fisheries Development Project	Water Quality, Habitat Quality, Connectivity	1 x fish easement, 10 x woody deflectors,	Wild Trout Trust	Environment Agency

Help 3 Brooks Project	Connectivity	3 x fish easement	Grosvenor Estates Abbeystead, Wyresdale Anglers	DEFRA via The Rivers Trust
Catterall Fish Passage Project	Connectivity	1 x fish easement	Wyre Waters Catchment Partnership	Environment Agency
Lancaster Canal Aqueduct and Feeder Weir Feasibility Study	Connectivity, Data and Evidence	2 x feasibility studies	Canal and Rivers Trust & Wyre Waters Catchment Partnership	Environment Agency
Calder 3D Modelling Study	Connectivity, Data and Evidence	Modelling and outline design proposals for Lancaster Canal Aqueduct and Feeder Weir	Wyre Waters Catchment Partnership	Environment Agency
Wyre NFM Project	Natural Flood Management, Habitat Quality	In progress	Environment Agency, Churchtown Flood Action Group, Grosvenor Estates Abbeystead, Wyre Waters Catchment Partnership	Environment Agency
Catchment Based Approach Hosting Money	Education and Engagement, Catchment Planning, Collaborative Working	6 years of catchment partnership hosting, multiple partnership projects	Environment Agency, Churchtown Flood Action Group, Grosvenor Estates Abbeystead, Wyre Council, Friends of Garstang Walking Festival, Catchment Sensitive Farming, United Utilities, Wyresdale Anglers, Lune and Wyre Fisheries Association, Forest of Bowland AONB,	Environment Agency
Knott End Beach Clean	Education and Engagement	58 beach cleans since March 2014. Self-sustaining group.	Wyre Council, Keep Britain Tidy	Lancashire County Council, LOVEmyBEACH.
Lancashire Invasive Species Project	Education and Engagement, Capacity Building, INNS Removal, Riparian Habitat	Japanese Knotweed inoculation programme, INNS Workshops, landowner advice and education	Ribble Rivers Trust, Lancashire Wildlife Trust, Lune Rivers Trust, Environment Agency	Environment Agency
INNS Recording and Monitoring in the Wyre Catchment	Data and Evidence, Education and Engagement	Japanese Knotweed inoculation programme, INNS Workshops, landowner advice and education. Over 500 data points for INNS within the Wyre catchment.	Wyre Waters Catchment Partnership	Forest of Bowland AONB - Sustainable Development Fund
Call of Nature	Education and Engagement	Septic tank workshops,	Wyre Waters Catchment Partnership	Morecambe Bay Partnership

		education and engagement		
Natural Course	Education and Engagement, Catchment Planning, Collaborative Working	In progress	Various	Natural Course LIFE14 IPE UK 027
World Oceans Day Project	Education and Engagement, Data and Evidence	Education and Engagement on the life forms found in Fleetwood Marina to shoppers at Fleetwood Freeport	Wyre Estuary Group, Wyre Council, SEALIFE - Blackpool, Lancashire and Cumbria Wildlife Trust, Marine Conservation Society, Royal Society of Biology, Blackpool and The Fylde College.	Wyre RT, Wyre Council, Royal Society of Biology
The Ways Forward	Education and Engagement, Riparian Habitat, Access and Recreation	Resurfacing of the Wyre Way, River clean ups, bird and bat box creation, education and engagement	Lune Rivers Trust, Wyre Council, Wyre Waters Catchment Partnership	Lancashire Environmental Fund - Dirtworks
Wyre Smelt Project	Data and Evidence	Wyre Smelt Project Report.	Natural England, Wyre Waters Catchment Partnership	Natural England
Abbeystead Farmer Group	Education and Engagement, Training,	In progress	Grosvenor Estates Abbeystead	Natural England
Wyre Estuary BioBlitz (2015 & 2018)	Data and Evidence, Education and Engagement	Identification of ~350 species in 2015 and ~720 species in 2018. Engagement of well over 2,000 people cross the events.	Wyre Estuary Group, Wyre Council, SEALIFE - Blackpool, Lancashire Wildlife Trust, Marine Conservation Society, Royal Society of Biology, Blackpool and The Fylde College, RNLI Fleetwood, HM Coastguard Knott End, WildAid, Brine Watch, Wyre Waters Catchment Partnership, NPL, ~40 eminent local scientists., Primary Schools and Wyre estuary country park users.	Wyre RT, Wyre Council, Royal Society of Biology

Summary of Projects Delivered

Table one outlines each of the projects that have been delivered wholly or in part by Wyre Rivers Trust. From Table one it can be seen that a wide variety of projects have been delivered since 2012, each of the projects has been delivered in partnership with another organisation and in most cases a wide variety of partners. This is particularly significant for a small organisation like the Wyre Rivers Trust, as it would be very difficult to deliver these projects without assistance from partners. Not included within the project table are the landowners that were involved with each project, in all cases projects could not take place without the permission of landowners. Maintenance liability is taken by landowners for each project, this is also important as there is often no budget provided by funders for the maintenance of capital works which are delivered.

Figure 16 shows the locations of projects that have been delivered wholly or in part by the Wyre Rivers Trust. It can be seen that the projects have been delivered across the Wyre catchment, incorporating small streams, major tributaries, main river, transitional and coastal waters and in urban areas. Although delivering across a catchment may not necessarily mean a catchment-based approach, it is the case that projects which have been delivered from 2015 onward have been delivered in a manner which is a strategic as possible and in a manner which places the catchment based approach at the heart of decision making.

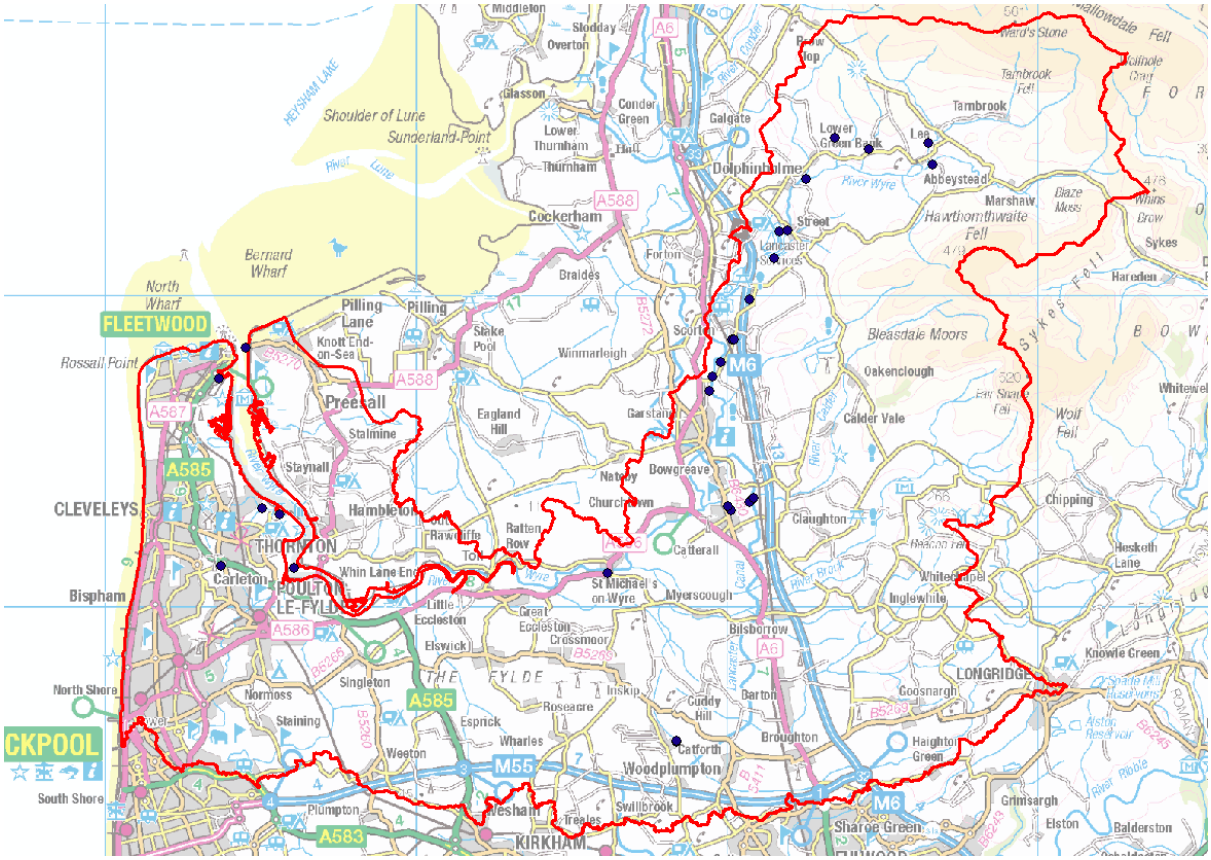

Figure 16 Projects which have been delivered either wholly or in part by Wyre Rivers Trust from 2012 - 2019.

NB - An interactive map of the projects which have been delivered since 2012 can be found at the Wyre Rivers Trust Catchment Data Portal.

Aspirational High-Level Project Plan

Members of the Wyre Waters Catchment Partnership and the Wyre Estuary Group were asked to contribute to a high-level prioritisation exercise for the Wyre catchment. To ensure that the prioritisation was based upon data and evidence, members of WWCP and Wyre Estuary Group were asked to consider the WFD reasons for not achieving of each waterbody within the catchment. This has the benefit of focusing the mind and ensuring that the interventions which are suggested are focussed on solving issues which are preventing any particular waterbody from achieving good status.

There are three waterbodies within the Wyre catchment which achieve good status under the water framework directive, these are the "Wyre - Upper", "Marshaw Wyre" and "Brock" waterbodies. In this instance the groups were asked to consider projects which can be delivered to prevent deterioration or to further improve the catchments. Flood risk and coastal erosion management was also considered as part of the process, this ensures that the plan is integrated, and that catchment management and flood risk management are considered as being inextricably linked, as is the case in the natural world.

We have also been careful to consider transitional and coastal waters and the issues which are affecting them and the species which rely upon them for some of or all of their lifecycle. It is the case that the transitional and coastal waters form the key gateway for all diadromous fish species that make use of the Wyre catchment and for that reason they are of principal importance to both the Wyre Rivers Trust and the Wyre Waters Catchment Partnership. Unfortunately, it is also the case that making a meaningful impact on water or habitat quality in transitional and coastal waters is very difficult. Despite this, we will continue to work with partners to develop and deliver projects which aim to improve these valuable waters. From an economic perspective, tourism on and around the Fylde coast provides the greatest income to businesses within the Wyre catchment. For this reason, it is also important that projects to reduce the amount of faecal matter which enters surface watercourses are at the forefront of delivery in areas that form bathing water catchments.

To provide narrative to the actions identified within the tables, we asked participants to sort projects according to seven categories; water quality, water quantity, habitat quality, connectivity, flood and coastal erosion risk management, education and engagement and "blue sky projects". The justification for using such a method is outlined below.

- Water Quality, Water Quantity, Habitat Quality and Connectivity

    - The parameters above are widely considered to be the "four pillars" of a thriving watercourse and by definition a thriving catchment. If one of the "pillars" is removed the challenges for aquatic species become greater and greater until all but the most resilient species survive. Where each of the parameters is present, natural processes can take place, this allows a diverse mix of species to survive in their given niches, building a successful ecosystem which is thriving and resilient.

- Flood and Coastal Erosion Risk Management

    - To ensure that this catchment plan is integrated we have considered flood and coastal erosion risk management (FCERM) alongside catchment management. There are multiple strands to FCERM and the focus of the Wyre Rivers Trust and WWCP will be on Natural Flood Management interventions and ensuring that we work with natural processes to create a catchment which is more resilient to high flow events. We must also work closely with the lead local flood authority and risk management authorities to ensure that traditional projects and interventions which are delivered to reduce flood risk are not of detriment to habitat quality within the Wyre catchment or the flora and fauna that reside within the catchment.

- Education and Engagement

    - Education and engagement are crucial to the management of a catchment. By engaging communities within the Wyre catchment, we can find out what is important to them and what their visions are for the Wyre catchment. We can also educate them on the issues which face the catchment and what impacts they can have on local communities and business. Education has also been shown to be important for solving issues such as misconnected drains, faulty private sewage treatment works and bad agricultural practice. By providing sound advice on the aforementioned topics a step change in thought processes can be achieved, leading to a reduction in the impact of the issues concerned.

- Blue Sky Projects

    - To provide an opportunity for the proposal of novel projects, large scale community projects or projects which achieve a wide range of benefits,

The interventions considered in the tables below are chosen on the basis of their effectiveness in delivering the outcomes that are required. For example, we know that farm advice and the delivery of interventions to improve farm infrastructure can have huge benefits for water quality. The work can be delivered in a manner which means that there are financial benefits for the farmer and/or landowner and benefits for the environment. It can also lead to a change in attitude to the environment and a step change in farming methods. They are deliberately chosen to be at a high level with little or no specific information about project locations, positive impacts can be generated from single projects, but greater benefits could be realised from projects which focus on entire operational catchments, waterbodies or sub-catchments.

Figure 17 shows the location of the operational catchments in relation to the Wyre management catchment.

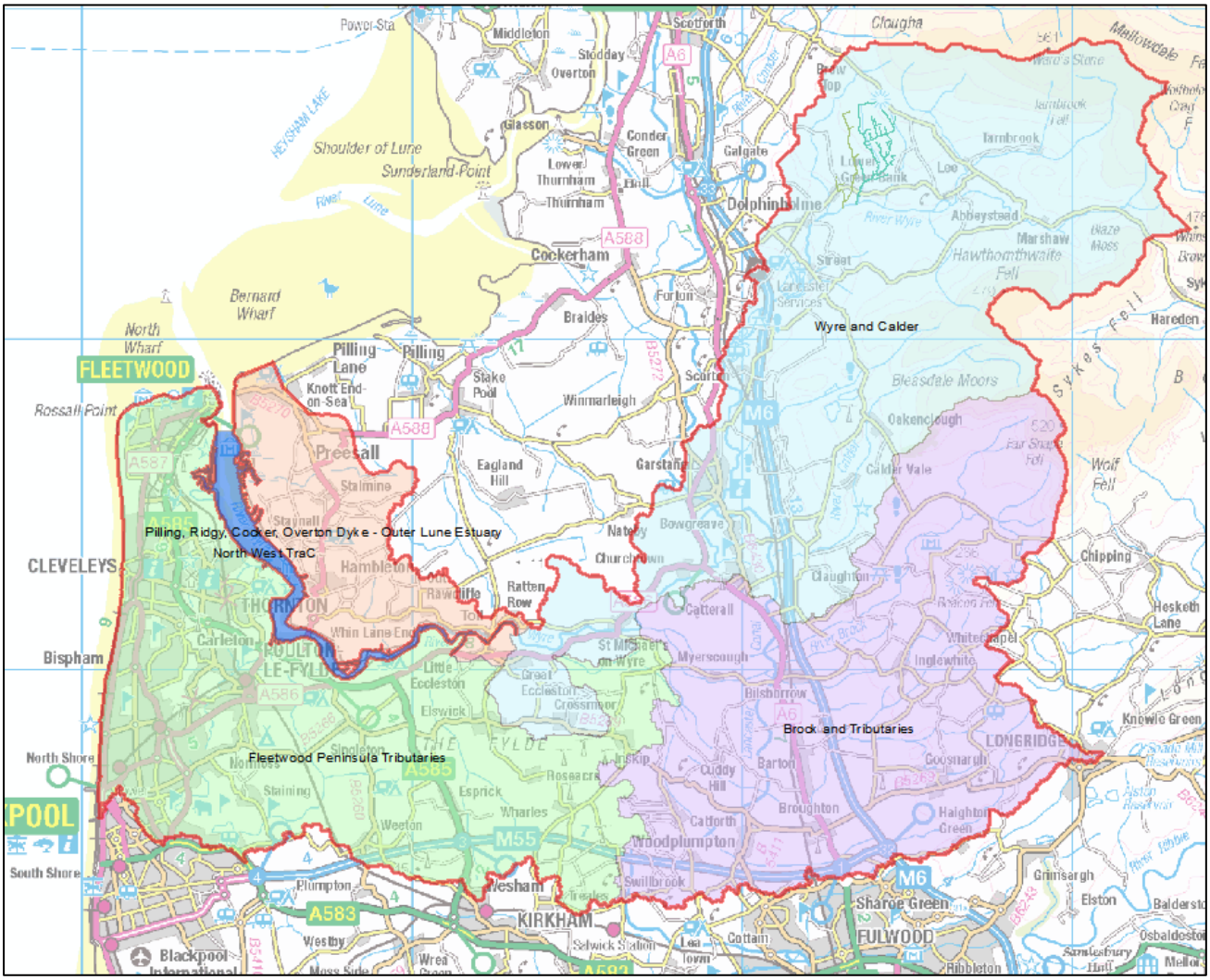

Figure 17 The operational catchments within the Wyre Management Catchment.

Each of the following tables represents an operational catchment which is situated in the Wyre catchment:

- Table 2 - Wyre and Calder
- Table 3 - Brock and Tributaries
- Table 4 - Fleetwood Peninsula Tributaries
- Table 5 - Pilling, Cocker, Overton Dyke - Outer Lune Estuary
- Table 6 - Northwest Transitional and Coastal Waters

Wyre and Calder

Table 2 High level actions for the Wyre and Calder Operational Catchment.

Theme	Issue	Interventions required	Priority Locations	Projects being delivered by other organisations
Water Quality	Point Source Pollution Diffuse Pollution Soil Loss Erosion Bathing Water Quality	- Farm advice - Improvement of farm infrastructure and land management. Promotion of farm wetlands as sustainable means of dealing with yard runoff. - Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Restoration of natural processes, woody material and the use of soft engineering within watercourses to reduce erosive power of high flows. - Soil management advice and planning	Entire catchment	Catchment Sensitive Farming Call of Nature (LOVEmyBEACH) Garstang WwTW has an UWWTD directive and now has an annual average P consent of 2mg/l. This scheme was delivered 14/11/18 CSO Monitoring (UU) Wyre SGZ Investigation (CSF, EA, UU, WRT) Countryside Stewardship (NE/RPA) EA Farm Campaigns Wyre Coast and Countryside Service Conservation and Access Management
Water Quantity	Abstraction	- Working in partnership with United Utilities to ensure that sustainable abstraction is taking place.	Calder, Tarnbrook Wyre, Fylde Aquifer (St Michaels-on-Wyre)	United Utilities - Hands off flow applied at Oakenclough Abstraction Point 2018. Implement compensation flows Grizedale Reservoir – reg date 22/12/24 – level of compensatory flow to be released into the watercourse to be modelled and agreed Investigation into the impact of groundwater abstractions in the Fylde aquifer on surface water bodies in Wyre St Michaels – reg date 31/03/22
Habitat Quality	Biodiversity Invasive Non-Native Species Lack of instream habitat	- Creation of riparian buffer strips - Peat restoration - Woodland creation - Wetland creation/restoration - INNS Strategy for Himalayan Balsam and Japanese Knotweed - Installation of large woody material, trailing cover and wood deflectors into watercourses. - Work with natural processes	Entire Catchment	Forest of Bowland AONB - Peatland restoration, Haytime Project Countryside Stewardship (NE/RPA) Woodland Creation (Forestry Commission) Wyre Coast and Countryside Service Conservation and Access Management
Connectivity	Barriers to migration Habitat Corridors	- Weir removal (Small weirs on tributaries) - Fish passes or easements (Large weirs which cannot be removed) - Eel passage measures on tidal flaps. - The creation of wildflower, grassland, hedgerow and woodland habitats in areas such as road verges, public open space and wastelands.	Entire Catchment	Scorton weir feasibility study - Wyre Rivers Trust/Wyresdale Anglers (UU) Investigate and appraise fish passage at the Wyre/Calder intake – reg date 31/03/22
Flood and Coastal Erosion Risk Management	Peatland habitat degradation Fluvial Flooding Surface Water Flooding	- Work with Forest of Bowland AONB to assist them with selection of sites for peatland restoration. - Wide scale delivery of NFM interventions (leaky dams, offline ponds, wetlands, riparian buffer strips, tree planting, soil management).	Upper Wyre and Calder. Ainspool as trial for lowland NFM	Environment Agency - Mid Wyre Review, Wyre Landscape Assessment & Fluvial Audit. Derived Datasets to allow NFM prioritisation. Churchtown Flood Action Group - Churchtown Bund Forest of Bowland AONB, Grosvenor Estates, EA - Peatland restoration
Education and Engagement	Misconnections, Private Sewage Treatment Works Increase understanding of natural processes Intellectual access to rivers. Bathing Water Quality	- Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Work with local organisations and schools to increase awareness of rivers and natural processes. - Work with local flood action groups - Increasing awareness of the impact of public access with regard to erosion and point source pollution, and Invasive Non-Native Species. - Develop River Care groups	Entire Catchment	Call of Nature (LOVEmyBEACH)
Blue Sky Projects	Water Quality Agri-Environment Schemes Funding	- Novel phosphate removal - Payment for eco-system services - public payment for public goods - Medium term plan to cover all capital projects for WFD related improvements. - Delivery of “Mid” and “Upper” Wyre BioBlitz’s as part of a three year cycle to incorporate Wyre Estuary BioBlitz. - “Lost Catchment” - Rewetting and NFM feasibility study.	Entire Catchment	DEFRA New Environmental Land Management Schemes

Brock and Tributaries

Table 3 High level actions for the Brock and Tributaries Operational Catchment.

Theme	Issue	Interventions required	Priority Locations	Projects being delivered by other organisations
Water Quality	Point Source Pollution Diffuse Pollution Soil Loss Erosion Road Runoff Bathing Water Quality	- Farm advice - Improvement of farm infrastructure and land management Promotion of farm wetlands as sustainable means of dealing with yard runoff. - Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Restoration of natural processes to watercourses in areas where previous dredging and canalisation has taken place. - Work with partners to develop study to assess the impacts of inputs from M6, M55 and A6. - Work with EA/UU to monitor & report CSO discharges - Soil management advice and planning	Woodplumpton Brook, Barton Brook, Brock	Catchment Sensitive Farming Call of Nature Environment Agency Road Runoff Study Barton Brook has a WFD driver for P so the site is getting a 0.5mg/l P consent. Reg date is 31/03/20 Whittingham Cottage has a supply and demand driver. Small treatment works to be closed and flows to be diverted into the nearby network – completion date is 31/03/19 CSO Monitoring (UU) Countryside Stewardship (NE/RPA) EA Farm Campaigns Wyre Coast and Countryside Service Conservation and Access Management
Water Quantity		- *No evidence to show that there are issues with water quantity.*		
Habitat Quality	Biodiversity - Aquatic invertebrates Invasive Non-Native Species Lack of instream habitat Lack of spawning habitat for fish.	- Creation of riparian buffer strips - Woodland creation - Wetland creation/restoration - INNS Strategy for Himalayan Balsam and Giant Hogweed - Installation of large woody material, trailing cover and woody deflectors into watercourses. - Returning heavily modified watercourses to paleochannels or promoting a return to natural processes.	Barton Brook, Woodplumpton Brook, New Draught Brook D/S M6	Countryside Stewardship (NE/RPA) Woodland Creation (Forestry Commission) Wyre Coast and Countryside Service Conservation and Access Management
Connectivity	Barriers to migration Habitat Corridors	- Weir removal (Small weirs on tributaries) - Fish passes or easements (Large weirs which cannot be removed). Work with Canal and Rivers Trust to develop action plan for Brock, Barton Brook and Woodplumpton Brook Weirs. - The creation of wildflower, grassland, hedgerow and woodland habitats in areas such as road verges, public open space and wastelands.	Brock, Barton Brook, Woodplumpton Brook	
Flood and Coastal Erosion Risk Management	Peatland habitat degradation Fluvial Flooding Surface Water Flooding	- Wide scale delivery of NFM interventions (leaky dams, offline ponds, wetlands, riparian buffer strips, tree planting, soil management). - Work with natural processes Investigate scope for any further peat restoration projects (Brock) - Take part in consultations on housing developments within north Preston and Woodplumpton Brook Catchment to ensure that increased surface water runoff is managed correctly. - Work with EA Asset Maintenance teams to integrate habitat creation/restoration into management of watercourses - Work with local flood action groups	Brock, Woodplumpton Brook, Barton Brook. Bleasdale Estate	Fair Snape Fell - Peat Restoration - Forest of Bowland AONB
Education and Engagement	Misconnections, Private Sewage Treatment Works, Understanding of natural processes Intellectual access to rivers. Bathing Water Quality	- Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Work with local organisations and schools to increase awareness of rivers and natural processes. - Increasing awareness of the impact of public access with regard to erosion and point source pollution, and Invasive Non-Native Species. - Develop River Care groups	Entire Catchment	Call of Nature Project (LOVEmyBEACH)
Blue Sky Projects	Water Quality	- Phosphate investigation and delivery of complete sub-catchment project to address results	Woodplumpton Brook	

Fleetwood Peninsula Tributaries

Table 4 High level actions for the Fleetwood Peninsula Tributaries Operational Catchment.

Theme	Issue	Interventions required	Priority Locations	Projects being delivered by other organisations.
Water Quality	Point Source Pollution Diffuse Pollution Soil Loss Erosion Road Runoff Bathing Water Quality	- Farm advice - Improvement of farm infrastructure and land management. Promotion of farm wetlands as sustainable means of dealing with yard runoff. - Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Restoration of natural processes to watercourses in areas where previous dredging and canalisation has taken place. - Work with partners to develop study to assess the impacts of inputs from road drains. - Work with EA/UU to monitor & report CSO discharges - Soil management advice and planning	Royles Brook, Hillylaid Pool, Lords Brook, Thistleton Brook, Main Dyke	Catchment Sensitive Farming Call of Nature Elswick WwTW discharging into Thistleton Brook –1.5 mg/l P limit - Reg date is 31/12/21 Inskip WwTW discharging into Lords Brook - 3 mg/l P limit and a 4mg/l ammonia limit – Reg date is 31/12/21 CSO Monitoring (UU) Countryside Stewardship (NE/RPA)
Water Quantity		- *No evidence to show that there are issues with water quantity.*		
Habitat Quality	Biodiversity - Aquatic invertebrates & Fish Invasive Non-Native Species Lack of instream habitat Lack of spawning habitat for fish.	- Creation of riparian buffer strips - Woodland creation - Wetland creation/restoration - INNS Strategy for Himalayan Balsam, Giant Hogweed, Japanese Knotweed and Rosa Rugosa - Installation of large woody material, trailing cover and woody deflectors into watercourses. - Returning heavily modified watercourses to paleochannels or promoting a return to natural processes.	Lords Brook, Thistleton Brook, Hillylaid Pool, Main Dyke, Royles Brook	Countryside Stewardship (NE/RPA) Woodland Creation (Forestry Commission) Wyre Coast and Countryside Service Conservation and Access Management
Connectivity	Barriers to migration Habitat Corridors	- Delivery of fish easements within culverts. Scope and develop daylighting projects of culverted watercourses. - Eel passage measures on Tidal Flaps - The creation of wildflower, grassland, hedgerow and woodland habitats in areas such as road verges, public open space and wastelands.	Lords Brook, Thistleton Brook, Hillylaid Pool, Main Dyke, Royles Brook	
Flood and Coastal Erosion Risk Management	Fluvial Flooding Surface Water Flooding	- Wide scale delivery of NFM interventions (leaky dams, offline ponds, wetlands, riparian buffer strips, tree planting, soil management). - Work with natural processes Take part in consultations on housing developments to ensure that increased surface water runoff is managed correctly. - Work with EA Asset Maintenance teams to integrate habitat creation/restoration into management of watercourses - Work with local flood action groups to develop action plans for surface water flooding. - Develop and deliver surface water management project for Thornton - Urban NFM project (feasibility and development)	Hillylaid Pool, Royles Brook, Main Dyke	Management Plan - Wyre Strategic Flood Risk Assessment
Education and Engagement	Misconnections, Private Sewage Treatment Works, discharges from industry Increase understanding of natural processes Intellectual access to rivers. Bathing Water Quality	- Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Work with local organisations and schools to increase awareness of rivers and natural processes. - Continue to be a member of the Marine Monitoring Group for the Halite Gas Storage Project - Develop River Care group for urban watercourses. - Continue the delivery of Wyre Estuary BioBlitz's on a three-year cycle - Increasing awareness of the impact of public access with regard to erosion and point source pollution, and Invasive Non-Native Species. - Develop River Care groups	Entire Catchment	Call of Nature Project (LOVEmyBEACH) Wyre Waters Catchment Partnership Estuary Group Wyre Great Outdoors Programme (Wyre Council, Lancs Wildlife Trust)
Blue Sky Projects	Engagement & Access	- Environment centre at Wyre Estuary Country Park. To incorporate research laboratories and public engagement lecture theatre. - Creation of a nature reserve to promote biodiversity.	Hillylaid Pool	

Pilling, Cocker, Overton Dyke - Outer Lune Estuary

Table 5 High level actions for the Pilling, Cocker, Overton Dyke - Outer Lune Estuary Operational Catchment.

Theme	Issue	Interventions required	Priority Locations	Projects being delivered by other organisations.
Water Quality	Point Source Pollution Diffuse Pollution Soil Loss Bathing Water Quality	- Farm advice - Improvement of farm infrastructure and land management. Promotion of farm wetlands as sustainable means of dealing with yard runoff. - Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Restoration of natural processes to watercourses in areas where previous dredging and canalisation has taken place. - Work with EA/UU to monitor & report CSO discharges	Wardleys Pool, Pegs Pool, Grange Pool,	Catchment Sensitive Farming (Wyre and Lower Lune Catchment) Countryside Stewardship (NE/RPA) EA Farm Campaigns
Water Quantity		- *No evidence to show that there are issues with water quantity.*		
Habitat Quality	Biodiversity - Aquatic invertebrates & Fish Invasive Non-Native Species Lack of instream habitat Lack of spawning habitat for fish.	- Creation of riparian buffer strips - Woodland creation - Wetland creation/restoration - INNS Strategy for Himalayan Balsam, Giant Hogweed, Japanese Knotweed and Rosa Rugosa - Installation of large woody material, trailing cover and woody deflectors into watercourses. - Returning heavily modified watercourses to paleochannels or promoting a return to natural processes.	Wardleys Pool, Pegs Pool, Grange Pool	Countryside Stewardship (NE/RPA) Woodland Creation (Forestry Commission)
Connectivity	Barriers to migration Habitat Corridors	- Eel passage measures on Tidal Flaps - The creation of wildflower, grassland, hedgerow and woodland habitats in areas such as road verges, public open space and wastelands.	Wardleys Pool, Pegs Pool, Grange Pool	
Flood and Coastal Erosion Risk Management	Fluvial Flooding Surface Water Flooding	- NFM interventions (leaky dams, offline ponds, wetlands, riparian buffer strips, tree planting) - Take part in consultations on housing developments to ensure that increased surface water runoff is managed correctly. - Work with EA Asset Maintenance teams to integrate habitat creation/restoration into management of watercourses - Work with local flood action groups to develop action plans for surface water flooding.	Wardleys Pool, Pegs Pool, Grange Pool	Management Plan - Wyre Strategic Flood Risk Assessment
Education and Engagement	Misconnections, Private Sewage Treatment Works, discharges from industry Increase understanding of natural processes Intellectual access to rivers. Bathing Water Quality	- Increasing awareness of misconnections in residential properties and businesses. - Septic Tank awareness and education on correct maintenance - Work with local organisations and schools to increase awareness of rivers and natural processes. - Continue to be a member of the Marine Monitoring Group for the Halite Gas Storage Project - Continue the delivery of Wyre Estuary BioBlitz's on a three-year cycle	Entire Catchment	Call of Nature Project Wyre Waters Catchment Partnership Estuary Group LOVEmyBEACH
Blue Sky Projects				

Northwest Transitional and Coastal Waters

Table 6 High level actions for the Northwest Transitional and Coastal Waters Operational Catchment.

Theme	Issue	Interventions required	Priority Locations	Projects being delivered by other organisations
Water Quality	Point Source Pollution	- Work with EA/UU to monitor & report CSO discharges - Work with local industry to ensure that discharges to the Wyre are working at consented levels and are improved where necessary. - Delivery of projects within the bathing water catchments and beyond to reduce the amount of faecal matter which enters watercourses and thus is present in bathing waters.	Morecambe Bay, Wyre TraC, Wyre Catchment	
Water Quantity		- *No evidence to show that there are issues with water quantity within this operational catchment.*		
Habitat Quality	Biodiversity Invasive Non-Native Species Marine Litter and Microplastics	- Work with partners to promote, develop and/or deliver works to restore coastal and intertidal habitats. - INNS Strategy for Himalayan Balsam, Giant Hogweed, Japanese Knotweed and Rosa Rugosa. Work with Northwest IFCA to identify and educate stakeholders on key marine INNS within this area. - Work with partners to develop and deliver a coastal and estuarine juvenile fish survey programme to understand the importance of the estuary to various fish species. - Develop and deliver a project to deploy an acoustic monitoring array to monitor migrations of BAP species such as; Atlantic salmon, sea trout, European eel, European smelt and river lamprey - Continue to deliver the Knott End beach clean and 7 regular beach and estuary cleans, and work with LOVEmyBEACH, Wyre Council and local communities to further develop beach clean and estuary clean groups on the Fylde Coast	Morecambe Bay, Wyre TraC	NWIFCA INNS Programme LOVEmyBEACH - Beach Care Programme Dynamic Dunescapes - Wyre Dunes Group (NE, Wyre Council) Wyre Coast and Countryside Service Conservation and Access management
Connectivity	Barriers to migration	- Eel passage measures on Tidal Flaps	Morecambe Bay, Wyre TraC	
Flood and Coastal Erosion Risk Management	Coastal Flooding and Erosion	- Continue to work with the Wyre Beach Management Group to provide advice and guidance. - Promote the role of saltmarshes and sand dunes in coastal protection	Morecambe Bay, Wyre TraC	Wyre Beach Management Project, Hambleton Flood Defence Scheme, Shoreline Management Plans - Cells 11b & 11c
Education and Engagement	Intellectual access to coastal and estuarine habitats.	- Continue to be a member of the Marine Monitoring Group for the Halite Gas Storage Project - Continue to deliver "Ecology for all" courses across the habitats of the Wyre Estuary. - Continue the delivery of Wyre Estuary BioBlitz's on a three-year cycle - Work with Lancashire Wildlife Trust to assist in the delivery of the "Living Seas" project - Wyre Great Outdoors Programme – Public engagement activities	Morecambe Bay, Wyre TraC	Call of Nature Project Wyre Waters Catchment Partnership Estuary Group Living Seas Project - Lancs Wildlife Trust LOVEmyBEACH Beach Care - Wyre Great Outdoors programme – (Wyre Council, Lancs Wildlife Trust)
Blue Sky Projects	Engagement & Access Biodiversity	- Environment centre at Wyre Estuary Country Park. To incorporate research laboratories and public engagement lecture theatre. - Creation of a nature reserve to promote birds. - Continue the delivery of Wyre Estuary BioBlitz's on a three-year cycle - Fleetwood/Thornton Intertidal Project - Development of coastal NFM measures and use of existing infrastructure to create intertidal habitats. - Develop Rossall Point Tower as a coastal visitor centre with engagement around coastal processes, Marine Life and recreational disturbance.	Morecambe Bay, Wyre TraC	Rossall radar-based nearshore monitoring system Rossall Point wave buoy monitoring

Project Database

The project database (Table 7) has been populated with projects from the Wyre Rivers Trust, many of which would be delivered via collaboration with members of the Wyre Waters Catchment Partnership and other partners such as the Wild Trout Trust. These projects are not quite shovel ready, as permits etc have not been sought for their delivery, the projects have been scoped and costed using the judgement of WRT staff and trustees. This table is intended to be a working document and it is expected that members of the catchment partnership, communities within the Wyre Catchment and stakeholders will be able to add projects to this database via the Wyre Rivers Trust Catchment Data Portal.

Table 7 Project Database - A table to show projects which have been scoped and costed by the Wyre Rivers Trust. Further additions will be made at the request of partners, local communities and other stakeholders.

Project Name	Location	Detail	Funding Required
King Georges Playing Field NFM Project	King Georges Playing Field - Thornton	Delivery of NFM measures on Royles Brook at the KGPF. Wetlands, backwaters and flood storage pond to be created along with improvements to habitat within the brook and in the riparian zone.	£30-40,000.00 A wider project to include citizen science, a rivercare group, ID of further NFM Measures and detailed monitoring could be delivered for £90K
Lancaster Canal Feeder and Aqueduct Weir (Calder) - Fish Passage Project	River Calder at Catterall	Delivery of fish passage structures on two large weirs situated within the lower reaches of the river Calder, This would open up 17.8km of habitat to spawning fish.	~£100k for the delivery of a bypass channel on the feeder weir. ~£125k for the delivery of a technical fish pass on the aqueduct weir.
Preston Road (Inskip) Fish Easement Project	Lords Brook at Preston Road, Inskip.	Delivery of a fish easement on the culvert which facilitates the passage of Lords Brook under Preston Road.	~£2,500.00
Scorton Weir Feasibility Study	Scorton Weir, River Wyre	Collaborate with Wyresdale Anglers to create a short fish passage feasibility study for Scorton Weir.	~£2,000.00
Abbeystead Road (Dolphinholme) Fish Easement Project	Damas Gill at Abbeystead Road, Dolphinholme	Delivery of a fish easement on the culvert which facilitates the passage of Damas Gill under Abbeystead Road	£2,000.00

Grizedale Book Restoration Project	Grizedale Brook, from confluence with Wyre to Higher Lane (Barnacre with Bonds)	Delivery of a number of interventions to improve water quality, habitat quality and connectivity within Grizedale Brook. - Riparian Fencing - Woody Deflectors - Instream Cover - Fish Easements - Replace ford with Bridge. - Farm Advice - Septic Tank & Misconnection Advice	~£90,000.00
Catterall Fencing Project	River Calder, from Garstang Road Bridge to Stones Lane Ford	Delivery of riparian fencing and tree planting on River Calder. Additional watering points for livestock may be necessary.	~£5,000.00
River Grizedale Fencing Project	River Grizedale, from confluence of the Tarnbrook Wyre to Rakehouse Brow	Delivery of riparian fencing and tree planting on the River Grizedale to complement fencing delivered under FIP in 2018.	~£3,000.00
Ainspool NFM Project	Ainspool from source to confluence with the Wyre at Churchtown.	Deliver a suite of NFM measures within the Ainspool in collaboration with Churchtown Flood Action Group	~£30,000.00
Wyre Estuary Juvenile Fish Survey	Wyre Estuary from Normal Tidal Limit (St Michaels) to Wyre Light, Fleetwood.	Delivery of a monitoring project to understand the use of the Wyre Estuary as a nursery area by marine fish species.	~£30,000.00 per annum
Wyre Priority Fish Monitoring Study	Wyre Estuary from Normal Tidal Limit (St Michaels) to Wyre Light, Fleetwood.	Delivery of a monitoring project to understand the use of the Wyre Estuary as a migratory pathway by BAP Fish Species.	~£60,000.00

Monitoring and Evaluation Plan

Monitoring and evaluation is a crucial component of this integrated catchment plan. Without monitoring it is very difficult to identify the impact of any project which is delivered, whilst evaluation allows us to assess the development and the progress of the Wyre Waters Catchment Partnership. The evaluation of the partnership will also allow us to ensure that the partnership becomes self-sustaining and an indispensable element of delivering projects to improve the Wyre, its tributaries and its catchment.

WWCP Monitoring Plan

Working with members of the partnership we will develop a comprehensive monitoring plan for the Wyre Waters Catchment Partnership. Table 8 outlines a basic monitoring plan for the WWCP, it includes the parameters to be measured, a short strategy, the techniques that can be used, data which is freely available from other organisations and priority waterbodies for monitoring. Owing to the costs of regular monitoring it has been considered important to integrate citizen science into the monitoring plan.

Table 8 Monitoring outline for the Wyre Catchment

Parameter	Strategy	Techniques	Data from other organisations	Priority Waterbodies
Water Quality	Monitor rural and urban water quality using a variety of techniques. To inform prioritisation of future projects and inform evaluation of the success of previous projects.	- Nutrient, BOD and Bacteriological sampling using accredited laboratory for analysis. - Long term muti-parameter water quality meter deployment - Riverfly monitoring group. (Rural only) - Bespoke phosphate and nitrate monitoring - Passive sampling - Outfall Safaris - Wet Weather walkovers - Soil Sampling	- Environment Agency Routine Sampling Data - United Utilities Routine Raw Water Samples	Tarnbrook Wyre, Marshaw Wyre, Upper Wyre, Wyre D/S Grizedale Brook Conf, Calder, Brock, New Draught Brook, Barton Brook, Woodplumpton Brook, Thistleton Brook, Lords Brook, Hillylaid Pool
Water Quantity	Monitor the impact of abstraction on impacted watercourses within the Wyre Catchment.	- Fixed Point Photography - Walkovers - Aquatic invertebrate sampling - Electrofishing	- Environment Agency Routine Sampling Data - Anecdotal evidence from landowners, communities and angling groups	Calder, Tarnbrook Wyre, Upper Wyre

Habitat Quality	Monitor habitat quality within watercourses	- Fixed Point Photography - River Habitat Survey Walkovers - Aquatic invertebrate sampling - Electrofishing - Salmonid redd counting - Soil Sampling	- Environment Agency Routine Sampling Data	Tarnbrook Wyre, Marshaw Wyre, Upper Wyre, Wyre D/S Grizedale Brook Conf, Calder, Brock, New Draught Brook, Barton Brook, Woodplumpton Brook, Thistleton Brook, Lords Brook, Hillylaid Pool
Connectivity	Monitor the impact of Weirs and other barriers within watercourses	- Electrofishing - Fluvial audits - Aquatic invertebrate sampling - Redd Counts	Existing barrier datasets	Tarnbrook Wyre, Marshaw Wyre, Upper Wyre, Wyre D/S Grizedale Brook Conf, Calder, Brock, Lords Brook
Education and Engagement	Monitor the impact of the education and engagement strategies that are employed and the engagement events that take place.	- Questionnaires - Water Quality Monitoring (to assess impact of misconnection/private sewage treatment works advice.	- Environment Agency Routine Sampling Data	All
Wyre Waters Catchment Partnership Evaluation	Evaluating the performance and development of the Wyre Waters Catchment Partnership	- Continuous evaluation of the performance of the partnership.	- Nil	N/A
Individual Project Monitoring and Evaluation	Monitoring and Evaluation of individual projects delivered by WRT in collaboration with WWCP members.	- Nutrient, BOD and Bacteriological sampling using accredited laboratory for analysis. - Long term muti-parameter water quality meter deployment - Bespoke phosphate and nitrate monitoring - Passive sampling - Fixed Point Photography - River Habitat Survey Walkovers - Aquatic invertebrate sampling - Electrofishing - Soil Sampling	- Baseline data collected prior to project. - Environment Agency Routine Sampling Data	Project Locations

Citizen Science

Citizen science is the collection and analysis of data by members of local communities, often it is delivered within an area that has a connection with the group or individual that is undertaking a citizen science activity. Citizen science can be applied to a wide range of monitoring activities, whether simple or more complex. Good examples of citizen science programmes include the riverfly monitoring initiative, West Country Rivers Trusts "C.S.I" project and work delivered by the Friends of Bradford's Becks. More locally we have used citizen scientists to collect, collate and analyse data for our 2015 and 2018 BioBlitz events, to identify the locations of invasive non-native species and in the analysis of coastal habitats as part of our ecology for all programme.

Table 9 Proposals for the development of Citizen Science Programmes within the Wyre Catchment.

Name	Focus	Resource required	Cost per participant
"Ecology for All"	One day courses to focus upon key habitat types and food webs within the Wyre catchment. These include the muddy shore, saltmarsh, sand dunes, aquatic ecology and the Morecambe Bay foodweb.	Lead tutor and support. Basic scientific equipment, microscopes, macroscopes, field guides and other course materials.	To be benchmarked throughout 2019 courses.
Urban River Care Group	Water and Habitat Quality within the Hillylaid Pool waterbody. Combined with outfall safaris to assess impact of point source inputs.	Tutor, simple water quality monitoring equipment (N, P test kits, pH meter, TDS meter), recording form or recording app. Regular meetings to discuss and analyse results	Health and safety Kit £35.00/Participant Monitoring Kit £175.00/Participant based electronic pH/temperature meter, Nitrate, Phosphate, Turbidity and Coliform Bacteria tests.
Riverfly Monitoring Group	Water and Habitat Quality within the Upper Wyre waterbody.	Riverfly accredited tutor, riverfly monitoring kits, reporting mechanism. Irregular meetings to discus and analyse results.	Monitoring Kit ~£110.00/participant
Soil Survey Group	Water Quality, Natural Flood Management, Habitat Quality	Accredited tutor, soil monitoring kits, guidance (Worm Week methodology etc) Reporting mechanism, irregular meetings to discuss and analyse results	To be investigated