

BEACON ACTION PLAN
for the
BOLLIN CATCHMENT

BEACON STEERING GROUP
February 2024

Contents	<u>Page</u>
1.0 Purpose	3
2.0 Introduction	3
3.0 The Vision	3
4.0 Key Issues	4
5.0 Ecosystem Service Benefits	11
6.0 Resources Required 2021 – 2025	13
References	14
Appendix 1 – Bollin Catchment Waterbodies	15
Appendix 2 – Project Listing	16

1.0 Purpose

The **purpose of the BEACON Action Plan for the Bollin Catchment** is to:

- Identify key issues for the Bollin Catchment
- Identify specific projects that meet identified needs
- Identify potential funding that is required
- Encourage partners to work together on the co-design and co-delivery of an agreed plan.

2.0 Introduction

The Bollin Catchment forms a major segment in the south-western part of the Upper Mersey Management Catchment. It is divided into three Sub-Catchments:

- The River Bollin – its headwaters are on the western edge of the Peak District in Macclesfield Forest with four water supply reservoirs owned by United Utilities. It flows in a north-westerly direction through Macclesfield and Wilmslow, under a Manchester Airport runway, past Dunham Massey to its confluence with the Manchester Ship Canal east of Lymm;
- The River Dean also has its headwaters on the western edge of the Peak District though with only one water supply reservoir; it joins the Bollin west of Wilmslow; and,
- The Brooks and Meres – a combination of brooks and six meres that join into Birkin Brook which has its confluence with the Bollin just to the east of Dunham Massey/the A56. It is a rural area with villages and farming being the major land use and with Knutsford the only town.

The River and Lake waterbodies are detailed in **Appendix 1**.

BEACON (Bollin Environmental Action and Conservation) was set up 14 years ago to control and manage invasive non-native species within the Bollin Catchment; subsequently its concerns have expanded into water quality and catchment issues. Its Steering Group comprises a wide range of partners from the voluntary, private and statutory sectors. A priority for BEACON is working with community groups and volunteers. BEACON is part of Mersey Rivers Trust.

The Upper Mersey Catchment Partnership approved in 2019 a Catchment Plan for the Upper Mersey Catchment (**Ref.1**). The BEACON Action Plan for the Bollin Catchment complements the Upper Mersey Plan by focussing on BEACON's concerns for the Bollin Catchment and by providing a level of detail that is not possible in the Upper Mersey Plan.

3.0 The Vision

BEACON's Vision is

To have a healthy land and river catchment where people and our natural wildlife thrive. This will be achieved through evidence-led local action, surveys and monitoring, education and awareness raising.

4.0 Key Issues

The key issues and concerns of BEACON within the Bollin Catchment are set out below under five headings:

- The quality of our rivers, brooks and meres
- Flood risk
- Biodiversity and ecology
- Recreation, leisure and landscape
- Community engagement.

4.1 Water Quality

PARTNERSHIP GOAL

The rivers, brooks and streams, meres, lakes and ponds of the Bollin Catchment are clean and healthy enough to support populations of a diverse and iconic wildlife.

Current Situation

The intention under the Water Framework Directive (WFD) is that all designated rivers and lakes (waterbodies) achieve 'Good' Ecological Status by 2027. An exception is for significantly artificially altered ('heavily modified') waterbodies, where the aim is to achieve 'Good Ecological Potential'. There are 11 heavily modified waterbodies in the catchment. The 2019 status for the Bollin Catchment waterbodies (22 in total) (see **Appendix 1**) is that:

- None achieve Good status
- 16 are Moderate (of which 11 are heavily modified)
- Six are Bad or Poor – five of these are in the Brooks and Meres sub-catchment, the remaining one is the River Dean (Bollington to Bollin).

There has been no overall change in Ecological Status between 2013 and 2019 – three waterbodies have improved, while three have deteriorated. For Chemical Status all the Bollin rivers and lakes were previously Good; they now all Fail. This is because new chemical tests have been introduced – these include an increase in the number of chemicals being monitored and an improvement in methodologies.

It should also be remembered that the Environment Agency (EA) data only refers to the main river and lake network. There are many small waterbodies (streams, ditches, lakes, ponds) that form an important part of the water environment, but are not monitored by the EA. A 2018 citizen science survey of 22 small streams flowing into the River Bollin found that 11 were Nitrate polluted, three had some Nitrate pollution and the remaining eight were clean. Two other studies found that ponds are a good source of clean water (**Ref.2**). The contribution of small waterbodies is generally unrecognised.

Data collection is a useful tool to go alongside EA monitoring; for the many small waterbodies that are not part of the main river/lake network it offers the opportunity to identify specific local concerns. In the past limited use has been made of water quality data for a variety of reasons. However, the Catchment Monitoring Cooperative, led by The Rivers Trust and United Utilities, aims to combine river water quality data in a local

collaborative evidence base. This will allow data collected through citizen science and community monitoring to contribute to evidence-based integrated catchment management. The Upper Mersey has been selected as one of eight demonstrator catchments to develop and implement the proposal.

Furthermore, funded through the Green Recovery Challenge Fund, Mersey Rivers Trust has trained 11 volunteers as River Guardians in the Bollin catchment. These volunteers undertake monthly water quality sampling and kick sample surveying of aquatic invertebrates at priority locations along the River Bollin and its tributaries.

Pressures

Agriculture and rural land management is the main 'Reasons for Not Achieving Good' (RNAG) status (apart from physical modification), specifically with issues around nutrient/soil/livestock management, farm infrastructure and livestock access to rivers.

Other reasons include:

- The water industry with concerns relating to sewage discharges
- Misconnections and private sewage treatment, a significant section of the catchment is not connected to the main sewage network
- Invasive non-native species
- Urbanisation, including run-off from roads.

Most of the RNAGs occur in the Brooks and Meres sub-catchment. Specific RNAGs for each waterbody can be found at Catchment Data Explorer

<https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3039>

Actions

The Steering Group will develop and support activities that reduce pollution across the Catchment. These will include:

- Supporting farmers and land managers to improve farm infrastructure and management with farm advice and tailored Water Management Plans
- Supporting the work of Environment Agency Catchment Sensitive Farming Officers and the creation of Farm Reviews
- United Utilities delivering significant improvements to wastewater treatment over AMP7 (2020-25)
- United Utilities planning of AMP8 (2025-30), Place-based planning and the creation of the Drainage and Wastewater Management Plan
- Actions for better management of private and small-scale wastewater treatment works (package plants and domestic septic tanks)
- Supporting the development of a well-funded and supported River Guardian network to assist with water quality monitoring.

4.2 Flood Risk

PARTNERSHIP GOAL

High flows in the catchment are managed primarily using natural processes to create more resilient rivers and landscape.

Current Situation

In terms of flood risk only relatively few houses/commercial properties/schools within the Bollin Catchment are at risk of flooding, although the Bollin riverside footpath network and farmland is consistently compromised due to flooding.

Climate change projections suggest the UK will face increased winter rainfall in the future and short-term high intensity rainfall events are likely to become more common (**Ref.3**). A 2020 blog by Jamie Hannaford (principal hydrologist at the UK Centre for Ecology & Hydrology) stated, 'there have been increases in peak river flows and floods have become more frequent' and 'Increases in high river flows ... are most noticeable in the north and west of the UK' (**Ref.4**). This will increase the challenges of managing excessive stormwater and its subsequent effect on flooding and water quality.

The 31st July 2019 downpour at the eastern end of the catchment is an example – it led to Pott Shrigley school (on a River Dean headwater) being flooded, damage to Twinnies Bridge and adjoining walls (at the confluence of the Dean and the Bollin), and riverbank slumping on the Bollin at Quarry Bank Mill with a significant sediment accumulation at the weir that led to the water turbine being out of action for some months. The Bollin at Dunham Massey burst its banks flooding adjacent farmland. The River Dean also saw its highest ever maximum-recorded flow of 1.72m at the Stanneylands Gauging Station, just upstream from its confluence with the Bollin.

Pressures

Climate change will be important over future decades, with more frequent high intensity rainfall events in winter months, and drier warmer summers.

The large increase in urban development (see section 4.3) is likely to lead to quicker run-offs into surface water drainage and more surface water flooding unless appropriate mitigation is provided.

Actions

The Steering Group will develop and support activities that reduce the impact of high flows across the Catchment which will include:

- Natural Flood Management projects such as tree planting, hedgerow creation, wetland and woodland creation, and leaky dams on small streams and in upland areas
- Promoting the use of Sustainable Drainage Systems (SuDS) for new and existing developments
- The creation of a wetland area in the Carrs Park, Wilmslow which will slow the flow of water, cleaning it naturally and reducing flood risk
- Place-based planning in collaboration with United Utilities and other water management stakeholders to reduce flooding around the confluence of the Bollin and the Dean near the Carrs Park, Wilmslow.

4.3 Biodiversity and Ecology

PARTNERSHIP GOAL

The Bollin Catchment is rich in wildlife, with high quality natural habitats including healthy rivers and lakes, ponds and streams, wetlands and riparian habitats (such as meadows, woodlands) supporting a wide range of species.

Current Situation

Barriers and modifications affect the natural functioning of the rivers and ecology of the catchment. Despite being mostly rural in nature, the Bollin Catchment has 11 'heavily modified' waterbodies (8 lakes, 3 rivers) out of a total of 22 waterbodies (see **Appendix 1**). In the Bollin Sub-catchment of the seven waterbodies only one – the Bollin (River Dean to Ashley Mill) – is 'natural'. Five of the heavily modified are reservoirs in the headwaters of the Bollin and Dean.

Barriers to fish passage exist in the middle and upper sections of the Bollin and Dean. The most recent major fish/eel passage created was on the River Bollin at Quarry Bank Mill five years ago.

There are numerous sites designated for their ecological/biodiversity characteristics – International – Ramsar (wetlands of international importance); National – National Nature Reserve, Site of Special Scientific Interest (SSSI), Priority Habitats (woodland, wetland, grassland, heathland); and, Local – Local Nature Reserve, Local Wildlife Site/Site of Environmental Importance.

There is a concentration of sites:

- around and including Tatton Park and the Meres
- along the River Bollin and some tributaries between Macclesfield and Dunham Park
- along the River Dean from the A34 to its confluence with the Bollin.

Despite their international/national designation:

- for WFD status three of the Meres are classed as Poor or Bad Ecological status for water quality, and none are Good status
- for SSSI condition assessment four of the Meres are assessed as 'Unfavourable' and one as 'Favourable'.

Elsewhere the designated sites/areas are scattered throughout the catchment.

Invasive non-native species (INNS) are widespread throughout the catchment, particularly Himalayan Balsam, Japanese Knotweed and Giant Hogweed, along with Killer Shrimp, Signal Crayfish and American Mink. The impact of these is to damage native habitats and species, and so contribute to ecological deterioration.

Pressures

Urban development

A significant amount of urban development is underway and planned for the Bollin Catchment over the next 20 years – these include:

- New Garden Villages at Handforth and Woodford potentially impacting the River Dean
- Housing development on Longridge Nature Reserve, Knutsford, including 225 new homes between Booth Mere and Birkin Brook
- Airport City developments – the River Bollin
- Northern Powerhouse rail improvements/developments alongside the Bollin
- HS2 – the Brooks and Meres and the Bollin
- Upgrading the M56 to a Smart Motorway from Lymm to Manchester Airport
- Tatton motorway services, a proposed motorway service area at Junctions 7 and 8 of the M56, adjacent to Birkin Brook
- Numerous small-scale housing and employment developments.

Barriers and modifications to watercourses

Whilst a number of barriers (weirs) have been overcome by the construction of fish passes, there are still some to be appraised. Significant stretches of the Bollin have been artificially modified, and the river environment degraded. There may also be the opportunity for improvements to river morphology to enable a more natural river functioning.

Farming

Farming practices identified in Section 4.1 also contribute to a deterioration in biodiversity and ecology. This includes cattle poaching leading to soil run-off into watercourses and inadequate field margins again leading to soil run-off.

Invasive Non-Native Species (INNS)

Over the past 10 years control INNS management by volunteer action and landowners, initiated by BEACON, has contributed to reducing the extent of Himalayan Balsam, Japanese Knotweed and Giant Hogweed. Over the next five years it should be possible to reduce significantly the extent of Japanese Knotweed and Giant Hogweed through a combination of adequate resources supporting volunteer and landowner action and the current United Utilities' INNS action plan for its wastewater treatment sites.

However, certain species (e.g. American Mink and American Signal Crayfish) have not been tackled due to lack of expertise and resource, whilst new INNS (such as Killer Shrimp, American Skunk Cabbage, Australian Swamp Stonecrop and Floating Pennywort) are either starting to become established in the Bollin Catchment, or pose a threat as they are already established in catchments neighbouring the Bollin.

Drought

Climate change leading to drier, warmer summers could have an impact on biodiversity and ecology, for example in reduced flows in the upper reaches of the Bollin, Dean and the Bollin Brooks.

Actions

The Steering Group will develop and support activities that improve the ecology and biodiversity of the Catchment such as:

- Encouraging and supporting volunteer and landowner action to address the pressures listed above (e.g. INNS control, riparian habitat improvements)
- The preparation of an INNS strategy and action plan for the catchment, including the

- mapping the presence of INNS in the Bollin catchment
- Re-naturalising and restoring river channels and riparian habitats where possible, including removing barriers to fish and eel passage
- Enhancing the ecology and amenity value of river/stream corridors through tree planting and the installation of buffer zones
- Supporting farmers and landowners to ensure appropriate livestock and land management
- Supporting the delivery of green infrastructure in both rural and urban areas
- Supporting and developing citizen science monitoring.

4.4 Recreation, Leisure and Landscape

PARTNERSHIP GOAL

Local residents and visitors can access and enjoy river and lakeside environments and their benefits without harming the environment.

Current Situation

The Covid-19 pandemic has highlighted the importance of accessible, public countryside sites as well as local parks and footpath routes for physical and mental health.

There are four areas in the catchment which are significant visitor attractions – Macclesfield Forest, Quarry Bank and Dunham Massey (all on the River Bollin), and Tatton Park and its meres. The Bollin catchment acts very much as a ‘green lung’ for Greater Manchester.

People are able to access the natural and built heritage of the Bollin valley via a network of trails and footpaths that run throughout the catchment. The Bollin Valley Way is a 24-mile recreational path shadowing the course of the River Bollin, that is managed by the Bollin Valley Partnership. The route gives walkers a feel of the valley's variety as it takes in fields and woodlands, towns and villages, and acts as a spine to the valley linking many local places of interest in one walking route. The Bollin Valley Way intersects with the Trans Pennine Trail, a long-distance route which links the North and Irish seas and the North Cheshire Way, a 71-mile long-distance footpath; these routes are used by thousands of people each year.

Some stretches of the Bollin are very well-used by local residents, such as Riverside Park, Macclesfield, the Carrs Park, Wilmslow and the southern end of the Quarry Bank Estate. There is very limited recreational use of the River Dean and the brooks, due to lack of public access, although walkers can enjoy the Gritstone Trail and Middlewood Way that take in parts of the River Dean and its tributaries.

Apart from a small area of the Bollin and Dean headwaters in the Peak District National Park there is no national landscape designation (including Area of Outstanding Natural Beauty) covering the catchment. However, significant areas are covered by the Local Landscape Designation which identifies landscapes of the highest quality and most value in Cheshire East (the majority of the catchment) – these are:

- the Peak Fringe, covering the headwaters of the Rivers Dean and Bollin;
- the Bollin Valley, covering most of the Bollin Valley from the edge of Macclesfield to Manchester Airport with a small extension into the Dean Valley;
- Rostherne Mere and Tatton Park; and
- Alderley Edge and the West Macclesfield Wooded Estates.

Trafford Council covers the right bank of the Bollin from the M56 to its confluence with the Manchester Ship Canal - a large section of the lower Bollin is designated as Protected Landscape, including Dunham Park.

Pressures

Visitor numbers

Visitors numbers, including dogs, at some sites create pressures that are detrimental to the local ecology and riverine environment; however, the recreational benefits may balance out the cost of environmental damage. During the coronavirus pandemic recreation sites and paths saw a large increase in visitors and these numbers remain high; sensitive management of such areas will be important to maximise the values of such sites.

A related issue relates to children playing in the water – a natural activity on a hot summer's day where there is easy access to the river or lake, but one with health risks due to poor water quality. None of the rivers are designated inland bathing waters, and there are no flotation devices available.

Urbanisation

Major developments highlighted in section 4.3 (e.g. HS2) could be significantly detrimental to the landscape unless significant mitigation measures are implemented. Additionally rising population through the many housing developments is likely to lead to increased pressure on existing recreation areas and infrastructure.

Actions

The Steering Group will develop and support activities that improve recreation and leisure yet balance access with the need to protect other ecosystem services. These include:

- Development and improvement of the footpath, bridleway and cycle networks to improve access for recreational activities
- Promotion of access to the outdoors as part of healthy lifestyles and engagement with nature
- Supporting community groups which aim to promote and protect the river environment
- Campaigns to raise awareness of biosecurity issues for recreational users
- Working through the planning system, including Neighbourhood Plans, to support appropriate mitigation measures and provision of improved access and protection of valued areas
- Development of Riverside Park recreational areas as well as wetland and woodland improvement, riverbank restoration and meadow management
- Development of the Dean Valley Catchment

- Monitoring of coliform bacteria in the Bollin catchment with a particular focus on the Carrs Park, Wilmslow which is a popular bathing spot in the summer months.

4.5 Community Engagement

PARTNERSHIP GOAL

Local residents and communities are involved with a wide range of activities that benefit their local water environment and landscape.

Current Situation

Community engagement with residents has been a key feature of action within the Bollin Catchment. BEACON's success in tackling invasive non-native species has depended upon mobilising volunteers, including training some in the use of chemicals for controlling Giant Hogweed and Japanese Knotweed.

Local groups have taken action relating to their stretch of the rivers and surrounding land, such as Friends of the Carrs (Wilmslow), Friends of Bowdon Bollin, Avro Golf Club (River Dean), Kerridge Ridge and Ingersley Vale Initiative (Dean headwaters). Birkin Fly Fishing Club and Mottram St. Andrew Fly Fishing Club have also been active on the stretches of the rivers they manage.

The National Trust has used volunteers extensively for riverside work at Quarry Bank and Dunham Massey. Bollin Valley Partnership has also run numerous community and educational events, and its rangers manage sites adjacent to the Bollin and Dean. Furthermore, volunteer River Guardians supported by Mersey Rivers Trust will continue to collect water quality data to inform future work in the Bollin catchment.

Community engagement is a primary focus of the United Utilities funded Bollin CaST project. Through the CaST project a series of workshops were delivered by Mersey Rivers Trust to local primary schools and scouting organisations; in total these sessions were attended by over 630 people. The workshops included both classroom-based and practical sessions which focused on topics including the sustainable use of water, invasive non-native species and practical river dipping activities.

In addition, in June of 2022 Mersey Rivers Trust and the Bollin Valley Partnership hosted a community Bioblitz at Riverside Park, Macclesfield as part of the CaST project. This was the first large-scale event post-covid and was attended by over 150 people.

Pressures

Community engagement has improved following the reduction experienced during 2019/20 as a result of the coronavirus pandemic. Opportunities for community involvement are abundant and thus far in 2022 BEACON has hosted over 25 volunteer work parties. However, volunteer action and engagement, and community support

requires resources, in setting up opportunities, in providing easy access to small grants for direct action, and in providing coordination and on-going support.

Volunteer action needs to be developed with a clear plan in coordination with key organisations such as the Environment Agency and United Utilities.

Actions

The Steering Group will develop and support activities that support community engagement such as:

- Organising, and working with others, to provide volunteer activities, such as balsam bashes, community educational events and clean-up events
- Providing training to volunteers on how to organise balsam bashes and in the use of pesticides
- Developing a River Guardian network in conjunction with the Environment Agency and United Utilities.

5.0	Ecosystem Service Benefits
	Natural capital is described as the elements of nature that directly or indirectly produce value to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions. Natural assets are the living and non-living elements of nature including species, soils, freshwater, land, minerals, air and oceans.
	Ecosystem services are the functions and products that flow from natural assets and provide benefits – economic, environmental, social, cultural and spiritual benefits – that enrich our lives and underpin the economy. The main ecosystem service benefits that are generated by the Actions above are detailed in TABLE 1 (page 13).

TABLE 1 – Actions and Ecosystem Service Benefits

Actions	Water quality	Flood protection	Climate regulation	Maintenance of nursery populations & habitats	Cultural services (visitors, relaxation, tranquillity)
Water Quality					
Improving rural and farmland management	√√√	√		√	
Wastewater treatment works upgrades	√√√			√	
Better management of private wastewater	√√√			√	
Rostherne Mere catchment plan	√√√			√	
River Guardian Network	√√√			√	
Flood risk					
Natural Flood Management projects	√√	√√√	√	√√	
Sustainable Drainage Systems	√√	√√√	√	√√	√
Biodiversity & Ecology					
Invasive Non-Native Species action	√	√		√√√	√√
River restoration and habitat creation	√√	√√	√√√	√√√	√√
Green infrastructure	√√√	√√√	√√√	√√√	√√
Recreation, Leisure & Landscape					
Footpath and access improvement					√√√
Biosecurity campaigns	√			√√√	√
Encouraging mitigation measures for major developments	√√		√√	√√	√√√
Community Engagement					
Encouraging and supporting volunteer activity	√√	√		√√√	√√
Training for volunteers	√√			√√√	

6.0	Resources Required 2021 – 2025
	The indicative level funding required for the Actions outlined in Section 4 over the five years (2021-25) is approaching £1.9m (see TABLE 2). It excludes the costs of the wastewater treatment improvement works as United Utilities is committed to funding this through its Asset Management Plan 7 (2020-25). Some of the cost estimates have been worked up in some detail, others should be regarded as indicative. Some of the Actions do not have a direct cost attributed to them.
	Actions that have volunteer involvement are also identified – two (River Guardian Network and INNS action) are dependent for implementation on volunteers, four others have some participation.
	A detailed listing of Actions and Projects is set out in Appendix 2 .

TABLE 2 - Funding Required 2021 - 2025

Actions	Partner(s)	Volunteer Involvement	Total Cost 2021 - 25
Water Quality			
Improving rural and farmland management	CWT, EA, MRT, NT	-	£340,000
Wastewater treatment works upgrades	UU	-	Already committed
Improvement to private wastewater disposal	MRT	-	£90,000
Rostherne Mere catchment plan	NE, EA, MRT	-	£130,000
River Guardian Network	MRT, EA, UU, Groundwork	√√√	£100,000
Water Quality total			£660,000
Flood risk			
Natural Flood Management projects	MRT, EA, BVP, CWT, NT, Landowners	√	£250,000
Flood risk total			£250,000
Biodiversity & Ecology			
Invasive Non-Native Species action	MRT, BVP, NT, Landowners	√√√	£100,000
River restoration and habitat creation	NT, CRT, MRT, Landowners	-	£630,000
Fish passage	EA, MRT	√	£60,000
Biodiversity & Ecology total			£790,000
Recreation, Leisure & Landscape			
Access improvements	BVP, CEC, NT, Tatton Estates, Local groups	√	£150,000
Biosecurity campaigns	MRT	√	£20,000
Recreation, Leisure & Landscape total			£170,000
Community Engagement			
Actions and costs included above			-

TOTAL FUNDING REQUIRED (ex UU Wastewater treatment)						£1,870,000
BVP	Bollin Valley Partnership	CWT	Cheshire Wildlife Trust	MRT	Mersey Rivers Trust	
CEC	Cheshire East Council	EA	Environment Agency	NT	National Trust	

References

1. The Upper Mersey Catchment Plan available at <http://www.healthywaterwaystrust.org.uk/index.php/projects/caba>

Our Vision

A healthy and flourishing river environment in which individuals, communities and organisations contribute to delivering environmental, economic and social benefits for all

Our objectives set out what we will do to deliver our vision:

1. *Developing an evidence base upon which informed decisions can be taken*
2. *Developing cleaner and healthier water bodies*
3. *Developing integrated water management*
4. *Enhancing the natural aspects of our catchment*
5. *Engaging the community*

Our action plan sets out what activity areas the partnership will deliver annually to work towards achieving our vision. The Actions Required are:

- *Enhancing Agri-Environments – improving farm infrastructure and land management practices*
 - *River Restoration – restoring natural river processes and function*
 - *Urban Diffuse Pollution – misconceptions/public awareness /education*
 - *Natural Flood Management – a range of measures to slow the flow of water and retain water within landscape*
 - *Invasive Species Control – reducing the impact and preventing further spread of invasive non-native species*
 - *Peatland – upland habitat restoration*
 - *Tackling Rural Misconnections and Septic Tank Care*
 - *Monitoring – electro fishing surveys, water quality testing, riverfly monitoring*
 - *Woodland Creation and Management*
 - *Education – increasing opportunities for people to learn, enjoy and volunteer for rivers.*
2. McGoff, E *et al* 'Finding clean water habitats in urban landscapes: professional researcher vs citizen science approaches' *Science of The Total Environment* Vols 581–582, 1 March 2017, Pp. 105-116 and Williams, P *et al* 'Nature based measures increase freshwater biodiversity in agricultural Catchments' *Biological Conservation* Vol 244, April 2020; both highlight the role of ponds as potential sources of clean water. The River Bollin citizen science stream survey was carried out at Quarry Bank Estate 2017-18.
 3. BBC News resource 'What will climate change look like in your area?' <https://www.bbc.co.uk/news/resources/idx-d6338d9f-8789-4bc2-b6d7-3691c0e7d138>
 4. Blog (20-Feb-20) on the CarbonBrief website (<https://www.carbonbrief.org/>) by Jamie Hannaford (principal hydrologist at the UK Centre for Ecology & Hydrology) 'Are UK floods becoming worse due to climate change?' <https://www.carbonbrief.org/guest-post-are-uk-floods-becoming-worse-due-to-climate->

[change?utm_source=UKCEH+newsletter&utm_campaign=a816b1d713-EMAIL_CAMPAIGN_2020_02_26_04_08&utm_medium=email&utm_term=0_f8768e24ab-a816b1d713-522739481](https://www.bolton.gov.uk/change?utm_source=UKCEH+newsletter&utm_campaign=a816b1d713-EMAIL_CAMPAIGN_2020_02_26_04_08&utm_medium=email&utm_term=0_f8768e24ab-a816b1d713-522739481)

Appendix 1 – Bollin Catchment Waterbodies – Water Framework Directive Assessment (2019)

Waterbody Name	River/ Lake	Heavily modified	Overall Status	Ecological Status	Chemical Status
<i>Bollin Sub-catchment</i>					
Bollin (Ashley Mill to Manchester Ship Canal)	River	✓	Moderate	Moderate	Fail
Bollin (River Dean to Ashley Mill)	River	-	Moderate	Moderate	Fail
Bollin (Source to Dean)	River	✓	Moderate	Moderate	Fail
Bottoms Reservoir Macclesfield	Lake	✓	Moderate	Moderate	Fail
Ridgegate Reservoir	Lake	✓	Moderate	Moderate	Fail
Teggs Nose Reservoir	Lake	✓	Moderate	Moderate	Fail
Trentabank Reservoir	Lake	✓	Moderate	Moderate	Fail
<i>Dean Sub-catchment</i>					
Dean (Bollington to Bollin)	River	-	Poor	Poor	Fail
Dean (Lamaload to Bollington)	River	✓	Moderate	Moderate	Fail
Harrop Brook	River	-	Moderate	Moderate	Fail
Lamaload Reservoir	Lake	✓	Moderate	Moderate	Fail
<i>Brooks + Meres Sub-catchment</i>					
Sugar Brook	River	-	Moderate	Moderate	Fail
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook)	River	-	Bad	Bad	Fail
Birkin Brook - Source to Mobberley Brook	River	-	Poor	Poor	Fail
Mobberley Brook	River	-	Moderate	Moderate	Fail
Little Mere	Lake	✓	Moderate	Moderate	Fail
Melchett Mere	Lake	-	Poor	Poor	Fail
Rostherne Mere	Lake	-	Bad	Bad	Fail
Tatton Mere	Lake	-	Poor	Poor	Fail
Tatton Mere South East (formerly Tatton Mere South)	Lake	✓	Moderate	Moderate	Fail
Moor Pool (formerly Tatton Mere West)	Lake	✓	Moderate	Moderate	Fail
The Mere at Mere	Lake	-	Moderate	Moderate	Fail

Over the period 2013 to 2019 there have been six changes in **Ecological Status** – three improvements, three deteriorations:

<u>Improvements</u>	<u>from</u>	<u>to</u>
Bollin (River Dean to Ashley Mill)	Poor	Moderate
Tatton Mere	Bad	Poor
The Mere at Mere	Poor	Moderate

<u>Deteriorations</u>		
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook)	Moderate	Bad
Melchett Mere	Moderate	Poor
Sugar Brook	Good	Moderate

Source: Catchment Data Explorer <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3039>