Cirencester Waterways: Environment and People
Final Report

October 2024

Foreword:

The Cirencester Waterways: Environment and People Symposium was held on June 12th 2024 at the Royal Agricultural University. The aim of the symposium was to engage a diverse group of stakeholders, raise awareness and promote discussion of flood risk, low flow and drought issues in the Churn catchment, with a focus on Nature-Based Solutions in the upper Churn catchment above Cirencester. The symposium was opened by Richard Mullings, the Symposium Facilitator, with a welcome address from Dr Kelly Hemmings, Associate Professor in Ecology and Agro-ecosystems and the Revd. Dr Nicholas Henderson, The Friends of Gumstool Brook. The round up address was given by Andrew Tubb, CEO of Cirencester Town Council.

Throughout the symposium there was an opportunity for attendees to participate in a Q&A and panel discussion hosted by Professor Chris Short, University of Gloucestershire; as well as populating maps with local knowledge.

An interim report was published in August 2024 providing an overview of the symposium and outlining a range of issues and opportunities along with a proposed way forward; this Final Report is published by Cirencester Town Council for and on behalf of the organisations involved in co-ordinating the symposium and includes formal recommendations and costings.

Acknowledgements:

We are grateful to the Kate Winstone Trust for the grant which supported this event and the gathering of important river flow data. It is also important to acknowledge the Friends of Gumstool Brook, Royal Agricultural University, Cirencester Wildlife Group, Cirencester Community Development Trust and the Cirencester Town Council for their collaboration in organising the event.

Contents

1. The Upper Churn Catchment

1.1 The Upper Churn catchment upstream of Cirencester is mainly rural, with farming as the predominant land use. The River Churn flows through this upper catchment from its source at Seven Springs to Cirencester, a distance of about 22km with a catchment area of 84km^2.

1.2 The Churn continues to flow south-east to its confluence with the River Thames at Cricklade, a total distance of around 37km from its source with a total catchment area of 127km^2.

1.3 In the Upper Churn catchment, the River Churn is joined by two tributaries, the Elkstone Brook and the Daglingworth Stream. The confluence of the Elkstone Brook with the Churn is in the village of Perrott's Brook with the Daglingworth Stream joining the Churn in Cirencester.

1.4 During summer, river flows in the reaches upstream of Cirencester and the Daglingworth Stream can fall to very low levels due to groundwater levels in the underlying Cotswolds aquifers declining naturally. As a result, the groundwater baseflow supplied to the river becomes minimal causing low flows and, in some cases, dry stream beds.

1.5 During exceptionally wet weather, flooding can also occur with notable flood events having occurred in Cirencester as well as further downstream. Flood impact can derive directly from the River Churn (fluvial flooding), intense rain storms (pluvial) as well as groundwater flooding and a combination of these flood types.

1.6 The Churn catchment is part of the Environment Agency (EA) Upper Thames operational catchment, which extends from its source southwest of Cirencester in Coates, to Lechlade in the Cotswolds. It also falls within the area of the Upper Thames Catchment Partnership (see paragraph 1.14).

1.7 The Churn is designated as a main river from its confluence with the Thames upstream to Baunton and is the responsibility of the respective riparian owners along the watercourse.

1.8 The Environment Agency carries out maintenance, improvement or construction work on main rivers to manage flood risk. Other rivers and tributaries are called 'ordinary watercourses'. As the lead local flood authority for the Churn catchment, Gloucestershire County Council (GCC) along with Cotswold District Council (CDC) carries out flood risk management work on ordinary watercourses.

1.9 Concerned about low river flows and the deterioration of water and environmental conditions in the waterways in and Cirencester, the Friends of the Gumstool Brook (FOGB) was founded in 2013. With particular concern about the phenomenon of a summer 'drying up' of streams and flooding, the FOGB objectives focus on monitoring, renewal and restoration.

1.10 The watercourses within Cirencester are complex, in part related to their artificial nature. For example, the lower reaches of the Daglingworth Stream can receive a significant contribution of flow from the River Churn at the Gloucester Street sluices via Mill Pond (also referred to as the Mill Pound) for Barton Mill. Downstream along Riverside Walk, the Gumstool Brook reconnects the Daglingworth Stream to the River Churn. Appreciating the artificial nature and complexity is an important factor in understanding the occurrence and mitigation of high and low river flows.

1.11 Covering many of the above items, the opening session of the symposium focused on the Upper Churn Catchment and the scene was set for the symposium by the following speakers:

- Dr Al Davis – Flood Risk Management Advisor – Environment Agency
- James Blockley – Flood Risk Manager – Gloucestershire County Council
- Dr Mike Jones – Friends of Gumstool Brook

1.12 Dr Al Davis explained the EA flood responsibilities as follows:

- providing a warning and informing role;
- flood risk management for rivers and a strategic overview;
- advice on flood mitigation.

1.13 Dr Davis highlighted that it was vital for statutory organisations to work together with the public and stakeholders, such as land owners. As an example of successfully working together, Natural Flooding Management (NFM) implementation elsewhere in the Thames catchment was highlighted, particularly in the Evenlode catchment.

1.14 To highlight forums that involve several organisations, Dr Davis identified the Upper Thames Catchment Partnership, which incorporates the River Churn, and is hosted by the Farming and Wildlife Advisory Group (South West) (FWAG).

1.15 The Partnership follows a 'catchment-based approach' and its priorities are to:

- restore high quality and connected habitats;
- improve land management and support sustainable agriculture;
- reduce foul water run-off;
- improve water and flood risk management.

1.16 Information about the Partnership and work of FWAG can be found via the following link:

https://www.fwagsw.org.uk/upper-thames-catchment-partnership

1.17 As assessed under the Water Framework Directive (WFD), Dr Davis noted that the ecological status of the River Churn from its source to its confluence with the River Thames is currently assessed as Moderate. This is the case for the Daglingworth Stream while the ecological status of the Elkstone Brook is assessed as Good.

1.18 With regard to flooding, Dr Davis highlighted that the EA produces and updates maps that identify areas of fluvial flood risk. Using maps, he demonstrated the difference between areas of fluvial flood risk and the much less extensive areas of recorded historical fluvial flooding.

1.19 There are three EA river flow gauging stations on the River Churn, two upstream of Cirencester and the other downstream at Cerney Wick. The gauging station closest to Cirencester demonstrates that the Churn is characterised by a wide range of flow rates with very low flows in 1995, 2003 (dry), and 2011 and very high in 2000 and 2014 with significant variability over time.

1.20 In seeking to gain an understanding as to why there is such variability, Dr Mike Jones provided an overview of the Cotswold's geology which is dominated by 160 to 200 million years old Jurassic bedrock which underpins the fundamental characteristics of the area.

1.21 A key feature being permeable limestone aquifers which are underlain, separated and overlain by mudstones & clays, with superficial gravel aquifers important around Cirencester & downstream. This geology creates strong influences on groundwater & river interactions, with baseflow of groundwater from aquifers to rivers, rainfall runoff from non-aquifers and leakage from rivers to aquifers that can be natural or potentially induced by groundwater pumping.

1.22 Dr Jones went on to share about the importance of citizen science and how the FOGB had been gathering environmental data to provide information and insight into what causes the low and high stream flows. This is now being supported and enhanced through funding from the Kate Winstone Trust to commission professional spot gauging of flow in Daglingworth Stream and parts of the River Churn.

1.23 Dr Jones highlighted that to mitigate flood and low flow risks and improve resilience, answers to questions such as 'what, how much, & where?' in relation to Nature Based Solutions needed to consider:

1.23.1 How and where does geology influence groundwater and river/stream water interactions?

1.23.2 When are groundwater and river/stream water interactions most dynamic and responsive to extreme weather events?

1.24 Whilst building an understanding of how the water flows within the Upper Churn catchment, James Blockley shared the proactive approach of GCC as the Lead Local Flood Authority under the Flood and Water Management Act 2010, as well as its responsibilities under the Land Drainage Act 1991.

1.25 These responsibilities include:

- managing flood risk from surface water, groundwater and ordinary watercourses;
- investigating and reporting flooding incidents;

- producing a local flood risk management strategy;
- being a statutory consultee on major developments;
- consenting works on ordinary water courses;
- enforcing works to maintain the flow on ordinary water courses.

1.26 GCC's key objectives with regard to flooding are to:

- improve their understanding of local flood risk;
- put in place plans to manage these risks;
- avoid inappropriate development and ensure new development doesn't increase flooding elsewhere;
- increase public awareness of flooding and encourage local communities to take action;
- support response to, and recovery from, flooding incidents;
- ensure close partnership working and co-ordination with other risk management authorities in Gloucestershire.

1.27 For further information relating to flood risk and emergency response, including the Flood Online Reporting Tool, please visit:

https://www.gloucestershire.gov.uk/planning-and-environment/flood-risk-management/flooding-information/flood-guide/

Word Cloud: Based on speaker presentations.

2. Nature Based Solutions

2.1 The second session of the symposium focused on the mechanics of nature-based solutions (NBS); the speakers were:

- Pete Belk - Natural Flood Management Project Development Officer – Gloucestershire County Council
- Kay Lacey – Chair - Pang Valley Flood Forum
- Corrie Grafton – Thames Natural Flood Management Advisor – Wildfowl and Wetlands Trust

2.2 NBS leverage nature and the power of healthy ecosystems to protect people, optimise infrastructure and safeguard a stable and biodiverse future (Source: International Union for Conservation of Nature).

2.3 The Pang Valley Flood Forum was established out of a need to address the risk and impact of flooding, adopting a community focused approach which drew on personal flooding experience, in depth local knowledge and established relationships.

2.4 A key issue for the Pang Valley was the impact of flash floods and various Large Woody Debris (LWD) projects were initiated with funding from Defra and the Thames Regional Flood and Coastal Committee (RFCC).

2.5 LWD plays a crucial role in natural flood management (NFM). Essentially, LWD refers to entire trees, branches, or root plates that have fallen into or been placed strategically into watercourses.

2.6 LWD is one NFM technique, which are also known as leaky dams. These slow down the flow during heavy rainfall events, help to store water that can recharge aquifers then release water more slowly to support low flows as well as act as sediment traps.

2.7 When applied at a landscape scale, leaky dams provide a cost-effective way to reduce flood risk; allowing water to accumulate temporarily, it helps prevent downstream flooding.

2.8 There are various benefits to this type of NFM:

- water quality;
- habitat creation;
- a catalyst for natural processes;
- drought resilience.

2.9 When introducing NFM to an area careful consideration needs to be given to local conditions during low, high, and flood flows. The leaky dams are created by considering both upstream water pressure and potential upward movement during floods and must ensure they allow low/normal flows to pass through avoiding impenetrable barriers.

2.10 Data and mapping are key to knowing where to use NFM and the impact it could have, i.e. where fast and slow flow is needed and which assets such as gullies and bridges need to be kept clear to prevent flood during high water level conditions.

2.11 With citizen science and local knowledge, maps were created by the Pang Valley Flood Forum to show the locations of gullies, culverts, bridges, grips (a channel or ditch that helps direct water away from the carriageway and into ditches), gutters, sluices, ponds, aquifers, watercourses, and geology.

2.12 Corrie Grafton shared how the Wildfowl and Wetlands Trust has collaborated with the Thames RFCC, the catchment of which includes the River Churn.

2.13 The WWT's role includes:

- support for flood risk managers and other stakeholders;
- catchment-wide promotion of priority and opportunity mapping;
- delivery of learning opportunities including webinars, site visits and conferences;
- reviewing & providing advice on levy funding and project ideas from stakeholders;
- external non-regulatory perspective.

2.14 Useful advice on how to develop an NFM project was outlined and included:

- initial desk-based scoping;
- site visits;
- partner conversations;
- catchment partnerships;
- learning from others;
- community engagement;
- consents and permissions;
- monitoring and maintenance plans;
- risk management.

2.15 As a result of the success of the first phases of the NFM programme, the Thames RFCC recently approved the extension of this project and ring-fenced £1.2 million of levy for small-scale NFM schemes to be allocated before March 2027.

2.16 Pete Belk, shared about the Rivers Trust 'State of Our Rivers Report' published in April 2024. Only 15% of English rivers are in good ecological health. The UK is a nature depleted country, and our watercourses are an indicator of this.

2.17 Not just pollution, but a range of historical factors such as straightening and draining catchments, abstraction, modifying channels, urban development and huge changes in land use have had an impact, in addition to extended periods of extremes such as dry hot and wet weather.

2.18 With our catchments having deteriorated in their capacity to hold water, at a time when dry and wet weather events are becoming more extreme, driven by climate change, we need to undrain our catchments to prevent scenarios of high-risk flooding and flash floods in our town centres.

2.19 In Gloucestershire a Natural Flood Management Partnership was established in 2023. This is a collaborative approach, facilitated by GCC to expand the scale, scope and impact of NFM in Gloucestershire, for communities and nature.

2.20 The core purpose of the partnership is to:

- work together to build a pipeline of NFM projects across the county;
- provide or source funding;
- provide the tools, network and support to ensure our NFM is impactful.

2.21 This work will build on the success of existing projects e.g. Stroud and Evenlode, be embedded in GCC's Flood Risk Strategy as the Lead Local Flood Authority and actively engage communities and landowners.

3. Rural and Urban Perspectives

3.1 The third session of the day focused on rural and urban perspectives with the following speakers:

- Jenny Phelps MBE – Farming and Wildlife Advisory Group
- Nicola Simpson – Gloucestershire Wildlife Trust

3.2 The role of the Gloucestershire Wildlife Trust in tackling flooding is to:

- reduce localised flooding;
- increase biodiversity;
- reduce river pollution;
- raise awareness through education and engagement.

3.3 We need to reverse the impermeable nature of our urban environment through localised projects such as sustainable urban drainage systems (SuDS) which mimic natural water catchments and creating areas that intercept runoff; SuDS use, store or soak up runoff ensuring a healthy water cycle.

3.4 Small scale SuDS can be installed as rain water gardens for domestic dwellings, community buildings and sports venues; green verges can be created as part of the public realm along with wild bus stops and permeable surfaces; in addition to creating attenuation basins.

3.5 Education and engagement are an important part of these projects as well as raising awareness of the issues and need for a response, in a partnership and collaborative way, across the whole community.

Word Cloud: Based on plenary session.

4. Break Out Session Plenary

4.1 During the breakout sessions the following questions were considered:

4.1.1 How can communities contribute to Nature Based Solutions within the catchment?
4.1.2 How can we address periods of low flow in the catchment as well as high flow?
4.1.3 How can we create effective partnerships to deliver Nature Based Solutions in areas where opportunities have been identified?
4.1.4 How can we create opportunities for habitat and biodiversity whilst delivering Nature Based Solutions?
4.1.5 With either £50k or £100k of funding what projects would you put forward to improve waterways in the catchment?

4.2 The feedback from the discussion on these questions by each of the breakout groups is collated and summarised in the following paragraphs.

4.3 Community Engagement Feedback:

4.3.1 establish a river community network to raise awareness and facilitate collaboration with local groups;
4.3.2 implement citizen science initiatives for monitoring and data collection to engage the community e.g. monitoring nutrients and river fly surveys;
build an evidence base for nature-based solutions to encourage uptake from landowners;
4.3.3 community-led projects to be facilitated and overseen with established organisations to secure funding;
4.3.4 resources and delivery vehicle are needed.

4.4 Addressing Low Flow and High Flow Feedback:

4.4.1 understand the natural vs. induced flow patterns in the catchment;
4.4.2 determine acceptable low flow levels and explore groundwater aquifer management, gravel beds, and water meadow restoration as potential solutions;
4.4.3 tube wells (or monitoring boreholes) placed close to the river upstream and leaky dams could be storage opportunities to manage high flows;
4.4.4 changing how we think about water as a resource e.g. banking and investing in it;
4.4.5 adjust sluice operation via the Memorandum of Understanding and learn from adjustments;
4.4.6 improve soil conditions. Half of the Upper Thames catchment is arable land and soils are generally not in good condition. Every 1% increase in soil organic matter holds 20,000 gallons of water for a period of time and slowly releases it. This could be used to build resilience and reduce high and low flows.

4.5 Creating Effective Partnerships to Deliver Nature Based Solutions Feedback:

4.5.1 funding for people who can foster strong partnerships with landowners, farmers, and community groups to deliver Nature-Based Solutions;
4.5.2 the need for financial stability and resilience to support partnership development with landowners;
4.5.3 ensure there is space for collaboration;
4.5.4 a role for Town and Parish Councils to form clusters similar to the role Farming Clusters have.

4.6 Habitat and Biodiversity Feedback:

4.6.1 nature-based solutions can improve habitat and biodiversity;
4.6.2 utilise the Local Nature Recovery Strategy as a spatial plan for decision-making;
4.6.3 consider species as well as habitats when developing projects;
4.6.4 having a list of big and small projects, and obtaining buy-in from stakeholders.

4.7 Project and Funding Ideas and Options:

4.7.1 hiring an officer to facilitate project development and coordination;
4.7.2 piloting innovative projects to build an evidence base and learning opportunities;
4.7.3 gathering baseline data on the catchment's condition;
4.7.4 developing storyboards and communicating projects to the community;
4.7.5 increasing permeability of built environments through green infrastructure initiatives;
4.7.6 create funding hubs to pool resources and deliver solutions where it will have the most impact;
4.7.7 championing projects in town council-managed green spaces.

4.8 Top Ten Takeaways:

4.8.1 Based on the feedback from the breakout group discussion and key points raised during the Plenary session, the top ten takeaway messages were:

1. action;
2. NFM – a citizen science;
3. collective collaboration;
4. re-wind – re-wild;
5. communicate and raise awareness;
6. rain garden – our personal response;
7. hold it back, soak it in and roughen it up;
8. learn from others;
9. we need local resources and we need them now;
10. when we work with nature, instead of imposing our own will, the solution is often found within the problem.

5. Issues and Opportunities

5.1 During the symposium delegates were able to identify issues relating to flooding, pollution and dry/low flows, as well as opportunities for nature-based solutions.

5.2 Three maps were produced:

5.2.1 issues and opportunities with the Open Street Map background;
5.2.2 issues and opportunities with a satellite image background;
5.2.3 issues and opportunities with Open Street Map background and locations of current citizen science monitoring.

5.3 These maps can be found within the Appendix to this report.

6. The Way Forward

6.1 Throughout the symposium it was clear that local knowledge, being inclusive of individuals with a passion and creating conditions within which to work collaboratively are vital. If we are to successfully develop and deliver projects which mitigate flood risk and address issues relating to low and high flow along the River Churn and its tributaries, we have to work together.

6.2 In reflecting on the symposium there are 4 key components to what happens next:

- People
- Partners
- Planning Ahead
- Project Delivery

6.3 As a starting point additional river flow gauging was arranged to continue developing a more detailed understanding of the rivers, how they interact with groundwater in the underlying aquifers and how this changes seasonally. This is funded through the CCDT Ltd and Cirencester Town Council by the Kate Winstone Trust.

6.4 We aim to engage the wider community, particularly young people, to encourage their involvement in understanding, appreciating and improving the water environment of the Churn catchment. The development of a sustainable cohort of citizen scientists will be at the heart of this and will include engagement with the RAU, Cirencester College and local secondary schools.

6.5 Funding options have been explored and project ideas developed towards preparing this Final Report with formal recommendations.

6.6 We are currently in a position where we can fund additional resources and establish a co-ordinating partnership under the umbrella of the Town Council for project delivery across Cirencester and the Upper Churn Catchment.

6.7 This is just the beginning and we hope you will partner with us and support the recommendations in making a difference for the people and place of Cirencester and the parishes across the catchment area.

7. Recommendations

7.1 Careful consideration has been given to the recommendations, which map and outline in more detail the next steps.

7.2 The Town Council's Finance and Audit Committee has approved 'in principle' funding for 2025-26 of up to £25k towards delivery of the recommendations, and we are actively exploring other grant funding opportunities.

7.3 If other partners and stakeholders are in a position to contribute 'in kind' or directly with a grant, or if Parish Councils are able to precept up to £2,500 towards this initiative in 2025-26, that would ensure we are able to deliver across each of the recommendations and start to make a real difference locally.

7.4 It is envisaged that a work programme for the delivery of the recommendations would be prepared by the proposed Cirencester and Churn Waterways and Environment Partnership. This programme will initially cover 2025-26, but is recognised as the start of a multi-year programme of works, during which the scope and cost will evolve, not least through monitoring of the responses to both NBS and infrastructure interventions. It is also important to note that some of the estimated, recommendation, costs may need funding beyond 2025-26.

7.5 If you have any queries about the report or would like to be involved and are able to assist with contributory funding or 'in kind' support please contact Andrew Tubb, CEO of Cirencester Town Council via andrew@cirencester.gov.uk

7.6 The recommendations, with estimated costings, are outlined as follows:

Recommendation 1: (Estimated Cost £8,000 including administrative support based on one day per week)

To establish 'The Cirencester and Churn Waterways and Environment Partnership'.

Terms of reference to be drafted including membership, meeting frequency, role and remit, administration, funding, establishing task and finish working groups, appointment of a Chair and advisors, responsibility for developing and overseeing delivery of the various recommendations and projects and establishing a work programme and applying for/support funding bids.

The partnership would comprise of representatives from Cirencester Town Council, CCDT Ltd, Cotswold District Council, Gloucestershire County Council, Environment Agency, Thames Water, FWAG, Cirencester Wildlife Group, Friends of Gumstool Brook, and representatives of land owners, Flood Wardens, and neighbouring parish areas.

Image: Partnership Governance and Administration

Recommendation 2: (Estimated Cost £2,500, including quarterly fee of £500, plus mileage and other associated costs)

Consultancy Support: To procure professional support and advice through Dr Mike Jones

Recommendation 3: (Estimated Cost £1,500, single portal and point of information/reference for the Partnership)

FOGB: Web development

Recommendation 4: (Estimated Cost £5,000)

To procure specialist technical advice to support the development of nature-based solution projects

Recommendation 5: (Estimated Cost £7,500)

To prepare feasibility studies and outline designs for nature-based solution projects, including preparation of grant funding applications

Recommendation 6: (Estimated Cost £5,000)

To prepare and publish a Cirencester and Churn Waterways and Environment Nature Based Solutions Plan

Recommendation 7: (Estimated Cost £5,000)

To deliver minor nature-based solution projects along the Churn catchment

Recommendation 8: (Estimated Cost £5,000)

To undertake catchment and infrastructure mapping drawing on citizen science, and other sources of data such as the Thames RFCC, FWAG and CTC including historical structures installed during drought in the 1970s and earlier

Recommendation 9: (Estimated Cost £2,500)

To assess and prepare a works programme with costings for the maintenance, repair and upgrade of infrastructure including sluice gates and bridges, with consideration being given to establishing any shared responsibility for infrastructure upgrade, including the sharing of costs

Recommendation 10: (Estimated Cost £10,000)

To maintain, repair and upgrade infrastructure including sluice gates and bridges and undertake other works along various water courses connected within the Churn catchment including modification of historical structures that disrupt natural drought and flood functioning, the scope of works and actual costs to be prepared through Recommendation 9

Recommendation 11: (Estimated Cost £2,500)

To undertake a low flow pilot of the sluice gate operation at Gloucester Street, including the re-commissioning of the two side gates

Recommendation 12: (Estimated Cost £500)

To identify land availability along the Churn catchment for establishing flood meadows, as a guide if there was an opportunity to purchase land for a flood meadow the cost could be circa £50k

Recommendation 13: (Estimated Cost £10,000)

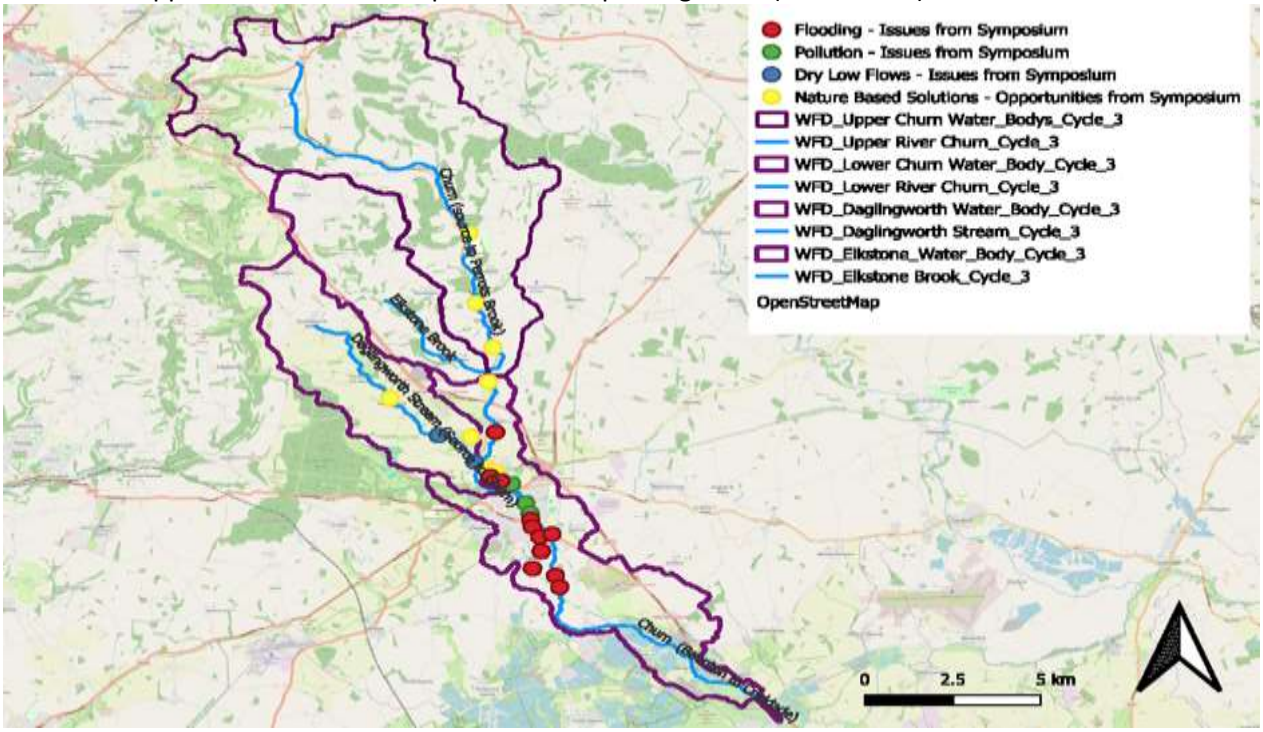
To develop and pilot projects which address the issues of roof to foul water and other soakaway issues which cause flooding

Recommendation 14: (Estimated Cost £5,000)

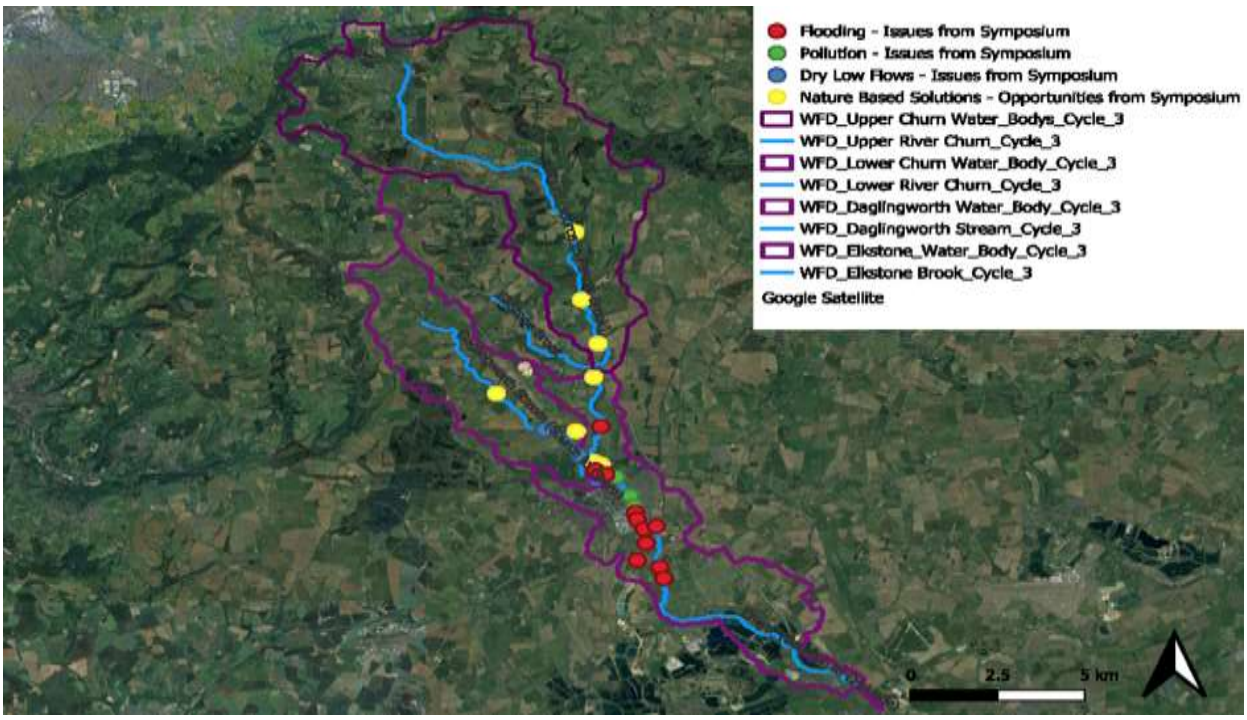
To maintain and develop effective communication and engagement with partners, stakeholders and local communities towards achieving the aims and aspirations of the waterway's environment and people symposium including workshops, outdoor activities, increased use and management of website & social media channels, supporting citizen science monitoring (e.g. sampling equipment, online platform for data collation & visualisation), as well as the practical steps of how young people are engaged and educated

8. Appendix

Issues and Opportunities with the Open Street Map background (5.2.1 refers)



Issues and Opportunities with a satellite image background (5.2.2 refers)



Issues and Opportunities with Open Street Map background plus locations of current citizen science monitoring (5.2.3 refers)