WATERWAYS FOR THE FUTURE



INVESTING IN THE RESILIENCE OF BRITAIN'S WATERWAYS FOR A CHANGING CLIMATE

INLAND WATERWAYS ASSOCIATION

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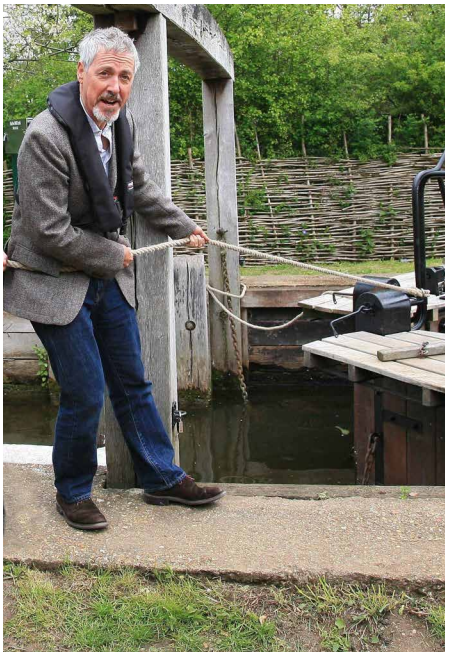
FOREWORD

"Our inland waterways - rivers, canals, fens and lakes – are the essence of Britain's historic, cultural heritage, but they are also part of today.

Water is the life-blood of the country. I find it incredible that now, here, in the twenty first century we seem unable to look after what is our own cross-country cardio-vascular system. It's surely time to sort priorities. We love our waterways. They have a future. They are a viable low-carbon alternative to yet more road traffic. They are also incredibly beautiful. And in this readily, apparently green-conscious age how can we licence continuous, direct and disgusting pollution of our water.

This report needs to be read and put into the hands of those in government. We really need action."

GRIFF RHYS JONES OBE – ACTOR,
VICE PRESIDENT OF THE RIVER STOUR TRUST,
PRESIDENT OF THE VICTORIAN SOCIETY
AND PRESIDENT OF CIVIC VOICE

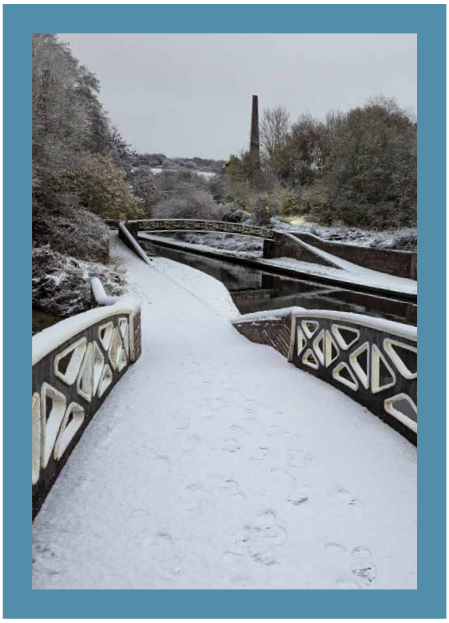


Griff Rhys Jones opens Flatford Lock.
© Emrhys Barrell

Former industry and dereliction on the BCN New Main Line near Smethwick.
© Alison Smedley

ABOUT THIS REPORT

THIS REPORT USES A FUTURES THINKING[1] APPROACH TO EXAMINE HOW RENEWED AND BETTER DIRECTED INVESTMENT IN BRITAIN'S HISTORIC INLAND WATERWAYS COULD STRENGTHEN THEIR CONTRIBUTION TO NATIONAL POLICY GOALS AND THE UK'S JOURNEY TO NET ZERO.



Windmill End, Netherton, in the snow.
© Alison Smedley



Clyde Puffer VIC32 on the Crinan Canal.
© Alison Smedley

This vision looks beyond the immediate operational challenges being faced by the waterways and the organisations responsible for their management, and instead examines the established, emerging and innovative ways in which canals and navigable rivers can contribute to a more sustainable, economic and socially valuable future.

The intended audience includes UK and devolved governments, their departments and agencies, local authorities, strategic authorities and elected mayors, navigation authorities and all partner organisations with a role in shaping the future of the inland waterways. The report concludes with a number of key recommendations and actions for policy makers and senior decision-takers across UK and devolved governments.

This report accompanies The Inland Waterways Association's earlier publication *Waterways for Today*.[2] While Waterways for Today set out the economic, social and environmental benefits of the inland waterways and why governments and local authorities should be funding them today, this new report looks further ahead. It outlines why those organisations, and others with a stake in the network's long term future, should be investing now to secure a more resilient, valuable and future ready inland waterway system for the benefit of wider society.

At the time of its publication in 2022, *Waterways for Today* described a network already under pressure but still broadly operating within long-established parameters. Four years on, that world has changed. Climate impacts are now immediate and visible, droughts and navigation restrictions are becoming normal, extreme rainfall and infrastructure failures are rising, while public funding pressures have increased.

The conditions shaping the future of Britain's inland waterways have shifted faster, further and more fundamentally than anyone responsible for their management could reasonably have anticipated. It's time to rethink how we understand and manage our inland waterways. The world has changed, and our approach needs to change with it. This report is about exploring what that means in practice, and how we can create a better future for our waterways and the people who use them.

BACKGROUND

BRITAIN'S 18TH CENTURY CANALS AND EARLIER NAVIGABLE RIVERS PROVIDED A CLEAN, LOW CARBON TRANSPORT SYSTEM, ENABLING THE MOVEMENT OF RAW MATERIALS AND GOODS LONG BEFORE RAIL AND ROAD RESHAPED NATIONAL INFRASTRUCTURE. OF THE 7,000 MILES ORIGINALLY BUILT, AROUND 5,000 MILES REMAIN NAVIGABLE ACROSS ENGLAND, SCOTLAND AND WALES, PROVIDING LIVING HERITAGE THAT SUPPORTS LEISURE, TOURISM AND LOCAL ECONOMIES AND IS ACCESSIBLE BY EVERYONE.

Today, this historic network is increasingly exposed to the impacts of climate change. The Met Office's UK Climate Projections[3] finds that the country is experiencing warmer, wetter winters; hotter, drier summers; and more frequent extreme events such as heatwaves and storms. The Climate Change Committee's fourth independent assessment of UK climate risk[4] confirms that climate change is already reshaping conditions nationwide, with escalating threats from extreme heat, flooding and drought.

In recent years, climate impacts on the inland waterways have become unmistakable and unavoidable. Droughts and navigation restrictions now recur each summer, no longer rare events but structural features of a warming climate. Extreme rainfall has intensified and infrastructure failures have increased. Public funding pressures have intensified, forcing navigation authorities to make harder choices about maintenance, resilience and service levels.

Water scarcity has moved decisively up the national agenda, reshaping water resource planning and accelerating interest in inter catchment transfers. Heat adaptation has become a mainstream policy issue, with water source heating and cooling technologies developing rapidly and beginning to influence local energy strategies. At the same time, interest in low carbon freight has grown, positioning larger waterways as potential corridors for cleaner logistics.

Environmental expectations have also shifted, with biodiversity, ecological connectivity and blue green infrastructure now sitting even more firmly at the heart of planning policy. The way we use the waterways themselves is also changing, with more people than ever living on boats, and towpaths and waterways supporting a wider mix of activities, communities and wellbeing benefits than ever before.

Against this backdrop, inland waterways can play a significant role in national resilience, mitigation and adaptation. They offer routes for water transfer, opportunities for renewable energy generation, controlled capacity for flood management and potential for low carbon heating and cooling in urban areas.

Realising this potential will require coordinated policy support and sustained investment from both the public and private sectors.



Chesterfield Canal.
© Jan Warsop

ABOUT THE INLAND WATERWAYS ASSOCIATION

THE INLAND WATERWAYS ASSOCIATION (IWA) IS THE ONLY INDEPENDENT, NATIONAL CHARITY DEDICATED TO SUPPORTING AND REGENERATING BRITAIN'S NAVIGABLE RIVERS AND CANALS AS PLACES FOR LEISURE, LIVING AND BUSINESS.

INLAND WATERWAYS ASSOCIATION

IWA has a network of volunteers and branches who deploy their expertise and knowledge to work constructively with navigation authorities, national and local government and a wide range of voluntary, private and public sector organisations for the benefit of the waterways and their users. The Association provides practical and technical support to restoration projects through its Restoration Delivery Group, Restoration Panel and Waterway Recovery Group.

There are 5,000 miles of navigable canals and rivers in mainland Britain, and a further 2,000 miles that are derelict and abandoned. IWA campaigns for the protection and improvement of all navigable waterways and supports restoring former navigations where projects are feasible, beneficial and well supported by local communities. IWA advocates that the routes of waterways not currently under restoration be protected wherever possible to allow for their regeneration in the future.

In November 2025, prompted by the Climate Change Committee's warning to government to prepare for 2°C warming by 2050, IWA launched its Risk Index[5] to demonstrate the perfect storm of underinvestment and damage from climate change being faced by Britain's waterways today. This interactive online map, available on IWA's website, shows navigation authorities grappling with deep financial uncertainty just as they face heavier winter rainfall, more frequent flooding and rising summer drought risk after years of chronic underinvestment.

SOME TERMS USED IN THIS REPORT

Waterway/Inland Waterway – are used interchangeably to refer to a stretch of water such as a river or canal that boats can travel along, as opposed to the common wider use of "waterways" which can also refer to other types of water courses and water bodies.

Britain – IWA's remit and charitable purpose is to campaign for all waterways in the British Isles, but in practice it leaves all waterways on the island of Ireland to the Inland Waterways Association of Ireland and just concentrates on the waterways of England, Scotland and Wales. Throughout this report, "Britain" is therefore used to refer to the three nations of the island of Great Britain collectively.

UK – is used when referring to UK government policy or research that is UK wide.

CURRENT NAVIGABLE MILEAGE BY NAVIGATION AUTHORITY

NAVIGATION AUTHORITY	ENGLAND	WALES	SCOTLAND
Canal & River Trust	1729.5	69.5	
Environment Agency	628		
Scottish Canals			139
Broads Authority	124		
Associated British Ports (Humber)	112		
Port of London Authority	98.5		
Middle Level Commissioners	95		
Peel Group (Bridgewater Canal and Manchester Ship Canal)	58.5		
Avon Navigation Trust	45.5		
Witham 4th District Internal Drainage Board	36.5		
Basingstoke Canal Authority	31		
Lake District National Park Authority	26.5		
The National Trust (River Wey)	20		
Other navigation authorities	1,172	150.5	514
TOTALS (MILES)	4,177	220	653



BRITAIN'S NAVIGABLE INLAND WATERWAYS

7,003 MILES
waterways built or made navigable in England, Scotland and Wales

5,050 MILES
currently navigable[6]

MORE THAN 60 NAVIGATION AUTHORITIES
managing those 5050 miles

500 MILES
restored to full navigation since the 1960s

516 MILES
under restoration now or could be restored in the future

48 RESTORATION PROJECTS
to restore those 516 miles, supported by IWA

50 MILES
of brand new waterway proposed in 5 projects[7]

FUTURES THINKING AND THE FUTURES TRIANGLE

"Uncertainty is inevitable and while this makes it impossible to know exactly what the future might hold, foresight methods can help us navigate that uncertainty and identify threats and opportunities. The future is open to change; it can be shaped to achieve better outcomes."

HM GOVERNMENT, GUIDE TO FUTURES THINKING AND FORESIGHT, OCTOBER 2025[8]

Organisations, governments and decision-makers around the world are using Futures Thinking studies and methods to imagine what possible futures exist, and to implement policy, actions and investment to influence the future they want to realise rather than just letting an undesirable future happen.

This report has been written using a Futures Thinking approach using the Futures Triangle method[9] to examine the pull of the future, the push of the present and the weight of the past to create a desired or preferred vision of the future.

FUTURES THINKING IS...

Futures Thinking, also known as Responsible Foresight, or Futures Studies, is the systematic, interdisciplinary study of possible, probable and preferable futures to explore alternatives and inform decision-making. It aims to enhance decision-making, foster innovation and improve resilience by exploring alternative futures. As the rate of technology changes in unpredictable and unforeseen ways, it looks at how we can better adapt to create the future we wish to see, rather than just letting an undesired future happen.

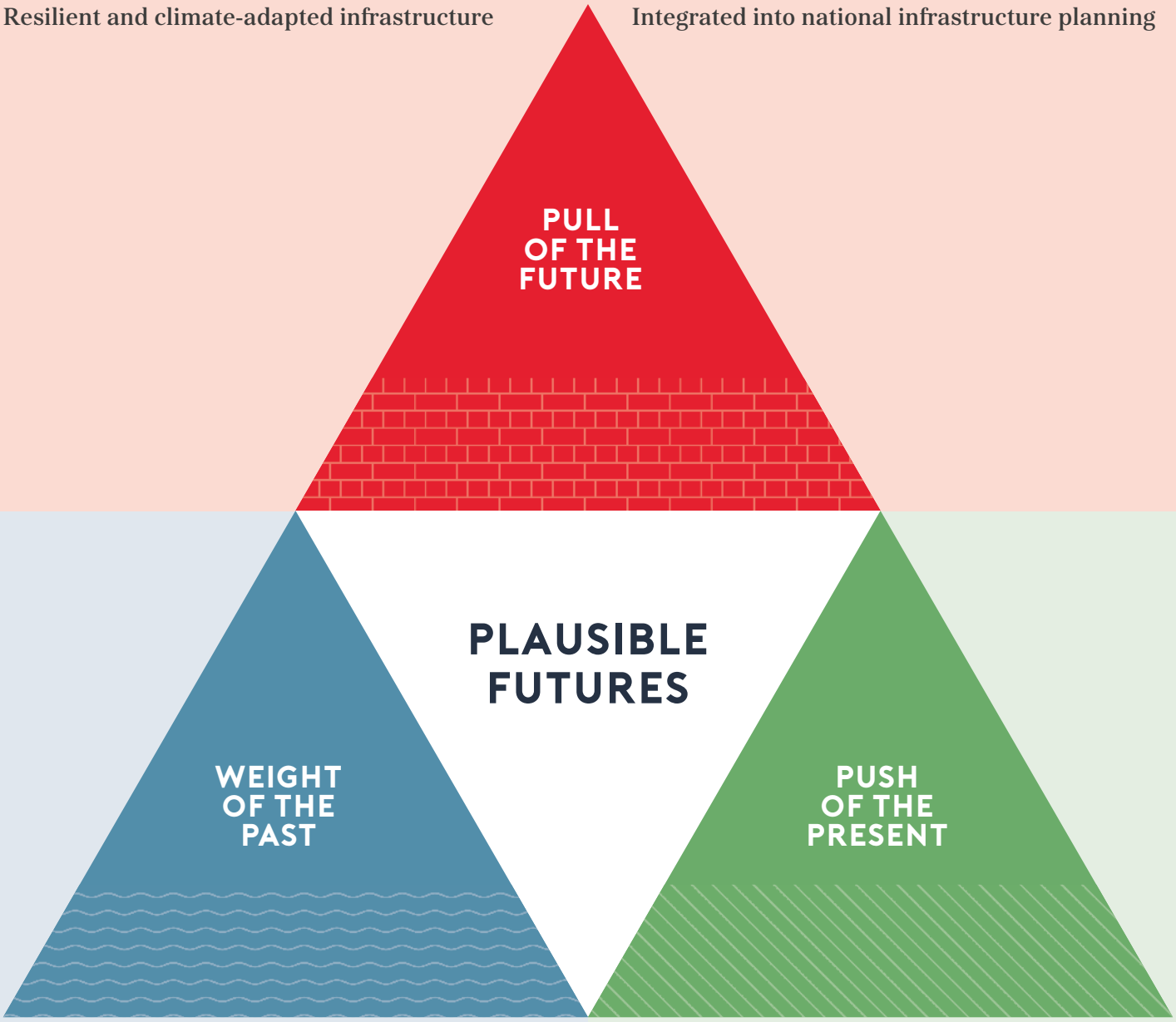
THE FUTURES TRIANGLE IS...

The Futures Triangle is a futures studies tool used by the United Nations, governments and decision-makers around the world, to visually map the three primary forces shaping any change process: the Weight of the Past (barriers, history, social norms, existing infrastructure), the Push of the Present (external drivers and trends shaping the current environment) and the Pull of the Future (goals, values, emerging possibilities), to create a desired or preferred vision of the future.

It identifies the kind of future we are aiming for, and what needs to happen to make that future a reality.

PREFERRED FUTURE VISION TO INSPIRE ACTION AND INVESTMENT:

Well-funded, well-maintained, resilient network
Recognised as national strategic infrastructure
Accessible waterways for all
Resilient and climate-adapted infrastructure
Financial sustainability
Healthy ecosystems and improved water quality
Strong economic contribution
Integrated into national infrastructure planning



HISTORIC CONSTRAINTS LIMITING POSSIBLE FUTURES:

250-year-old, deteriorating infrastructure
Industrial origins and legacy profit-driven models
Now largely public/third-sector managed
Long term and worsening underfunding
Persistent pollution from historic industry

CURRENT PRESSURES DRIVING CHANGE:

Poor water quality from sewage and agriculture
Shifting patterns of waterway use
Rising compliance and operational costs
Higher expectations from users and communities
Declining trust in some navigation authorities
Continuing funding shortfalls

THE WEIGHT OF THE PAST

"Heritage can act as a catalyst for integrated climate action."

UK NATIONAL COMMISSION FOR UNESCO[10]



Stourport-on-Severn was designated as a Heritage Inland Port in 2023. This formal recognition is stimulating tourism and regeneration around the canal basins and within the town.
© Alison Smedley

***THE WEIGHT OF THE PAST* IN THE FUTURES TRIANGLE HIGHLIGHTS THE HISTORICAL SYSTEMS, ASSUMPTIONS AND INSTITUTIONAL BEHAVIOURS THAT SHAPE THE CHALLENGES BEING FACED BY THE INLAND WATERWAYS TODAY. IT RECOGNISES THAT THE CURRENT PROBLEMS OF CLOSURES, STRUCTURAL FAILURES AND WATER SHORTAGES ARE NOT ONLY THE RESULT OF CLIMATE CHANGE, BUT ALSO OF LONG STANDING CULTURAL NORMS AND CHRONIC UNDER FUNDING.**

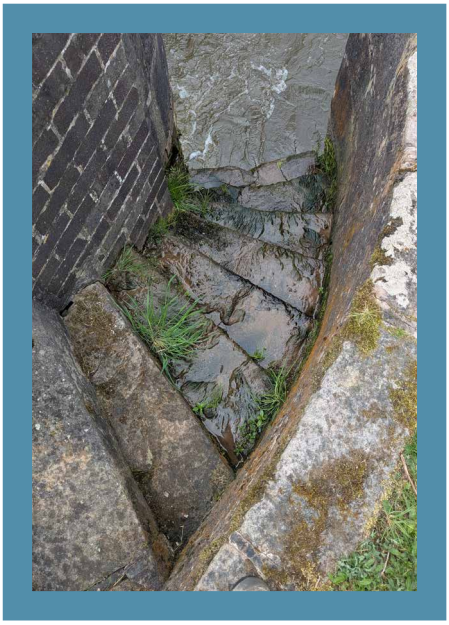
The canal era, which began in the 1750s, provided a clean transport system powered by horse drawn boats for over a century. Ironically, the industrialisation that followed, driving anthropogenic climate change, now threatens the very infrastructure that enabled it. Canal structures, most of which are over 200 years old, are becoming increasingly vulnerable to extreme weather, prolonged drought, intense rainfall, and subsidence due to their traditional materials and methods of construction.[11]

Recent years have seen multiple major asset failures, embankment breaches and accelerated deterioration of historic foundations.[12] Land surface air temperatures are rising nearly twice as fast as global averages, according to the IPCC,[13] affecting soil stability and the integrity of embankments, cuttings and historic buildings across the waterway network.

Institutional history also weighs heavily. Rivers were made navigable and canals were built as profit-making exercises by private investors. The 1947 Transport Act saw 2,000 miles of river and canal nationalised as part of the British Transport Commission, bringing together railways, canals, docks and long distance road haulage. The management of those waterways was transferred into the third sector in 2012 with the creation of Canal & River Trust.[14] Today, 770 miles remain fully in public ownership, managed by the Environment Agency on behalf of the UK Government and by Scottish Canals on behalf of the Scottish Government. The remaining 2,230 miles are owned and managed by a mix of charities, local authorities and private owners.[15]

Reductions in public funding mean that these navigation authorities are struggling to maintain essential infrastructure, intensifying the strain on an ageing asset base.

IWA's Risk Index (2025)[16] highlights the risks posed to the network by the combination of rising maintenance costs, climate-driven damage, and reduced funding. This perfect storm threatens heritage, navigation, tourism, wildlife, utilities, homes, communities and businesses.



These steps, designed to allow a boater to step easily between boat and lock-side, have now become a slippery cascade – a pattern repeated across the system due to decades of underfunding. © Alison Smedley

Old infrastructure, new pressures

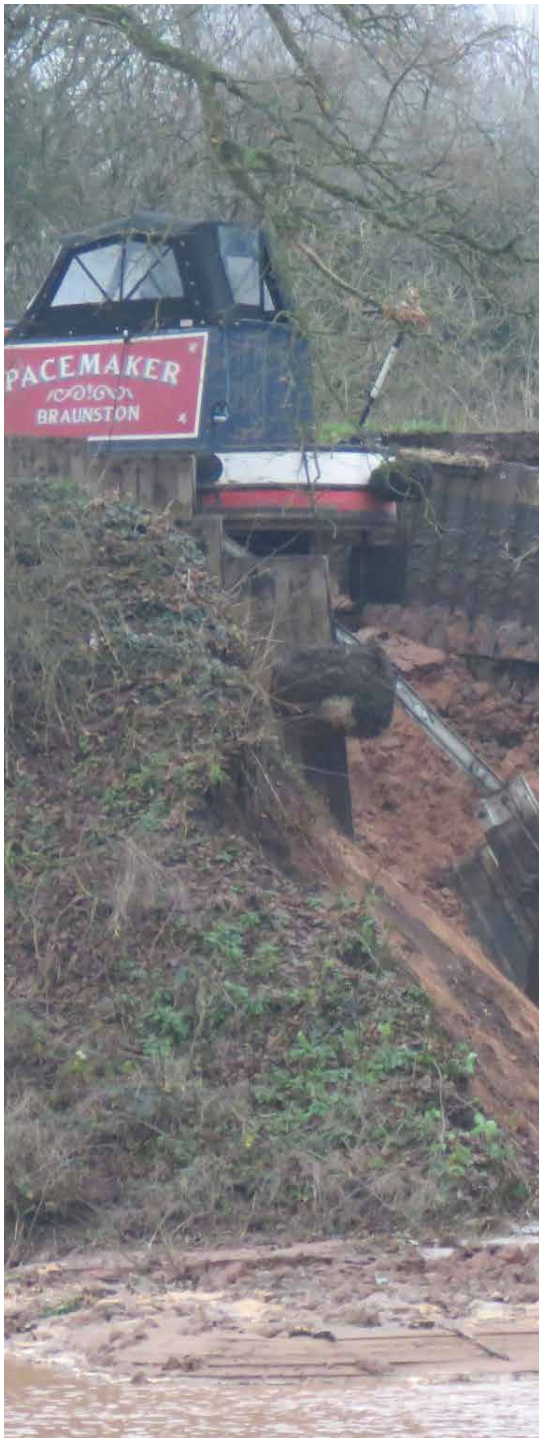
THE COST OF MAINTAINING AGEING WATERWAY INFRASTRUCTURE, MOST OF WHICH WAS BUILT 250 YEARS AGO USING SIMPLE TECHNIQUES, IS A SIGNIFICANT BURDEN ON THE NAVIGATION AUTHORITIES RESPONSIBLE FOR THEIR MAINTENANCE. CANAL EMBANKMENTS HAVE BEEN IDENTIFIED BY CANAL & RIVER TRUST AS THE TOP RISK IN ITS CLIMATE CHANGE RISK ASSESSMENT WITH "SEVERE" OUTCOME (LOSS OF LIFE) LIKELY AGAINST A GLOBAL TEMPERATURE RISE OF 2°C BY THE MIDDLE OF THIS CENTURY.[17]

Reservoirs are another top risk. The narrowly-avoided collapse at Toddbrook Reservoir in August 2019, when the dam's auxiliary spillway was damaged after a period of intense rainfall, led to the Reservoir Safety Reform Programme which is modernising and strengthening reservoir regulation across England and Wales, as set out in the Independent Reservoir Safety Review Report.[18]

Rising winter rainfall is already causing major damage with a number of major embankment breaches in recent years. On New Year's Day 2025 the Bridgewater Canal in Cheshire suffered a major embankment breach following heavy rain. It took 12 months for stabilisation works to be complete, with construction works yet to commence 18 months after the breach – leaving this key waterway route between Manchester and the south closed for the duration.[19]

Similar incidents occurred on the Huddersfield Narrow Canal and the Calder & Hebble Navigation over the same winter, while in the south, the River Thames was closed to navigation for nearly five months over the winter of 2024/2025 due to flooding. All of these closures affect local businesses and leisure users alike.

Investment is urgently required to safeguard these historic assets so that they can continue realising the benefits they bring to the UK economy, population and environment and to protect local communities from further damage.



CASE STUDY:

LLANGOLLEN CANAL BREACH, WHITCHURCH

On 22 December 2025, a catastrophic breach occurred on the Llangollen Canal near Whitchurch, Shropshire.[20] In the early hours of the morning, a section of high embankment collapsed, creating a large void into which two moored boats were washed, leaving their owners suddenly homeless. Two further boats were left precariously suspended over the breach, requiring specialist recovery operations. Shropshire Fire & Rescue Service declared it a major incident.

Initial findings published by Canal & River Trust indicate that the breach was caused by a long term, deep seated leak beneath the canal bed, undetectable under the Trust's existing inspection regime. Engineers concluded that slow, low volume leakage had eroded material beneath the canal bed over many years, creating a hidden void. This interacted with a steep sided embankment constructed predominantly of sand, making the structure particularly vulnerable once the void reached a critical size. The embankment ultimately collapsed, releasing a large volume of water and destabilising the canal channel.

The consequences extended far beyond navigation. The Llangollen Canal is a strategic water supply asset, feeding treated water into the wider regional network. Maintaining water transfer across the breach site became an immediate priority, requiring temporary engineering solutions to sustain supply while the canal was drained, stabilised and made safe.

Recovery has required complex, multi stage engineering. A detailed plan was drawn up to rebuild the collapsed embankment in layers, incorporating geogrid reinforcement to increase long term structural strength. The canal channel itself is being reconstructed in concrete and, wherever possible, material recovered from the site is being reused to reduce cost and environmental impact. Ground investigations, structural surveys and controlled reprofiling of the breach edges have been necessary to safely remove the stranded boats and prepare the site for full reconstruction.

The Whitchurch breach demonstrates how ageing canal infrastructure, climate driven hydrological pressures and multi functional waterway roles intersect. It highlights the need for enhanced monitoring technologies, predictive leak detection systems, long term embankment reinforcement programmes, and investment frameworks that recognise canals as critical national infrastructure, not solely heritage assets.



Pollution and water quality



Polluted water on the Paddington Arm, London. © Alison Smedley

GOVERNMENT MONITORING SHOWS THAT MANY INLAND WATERWAYS CONTINUE TO SUFFER FROM POOR WATER QUALITY, DRIVEN BY NUTRIENT POLLUTION, SEWAGE DISCHARGES AND AGRICULTURAL RUNOFF.

Environment Agency data highlights persistent exceedances of phosphates, nitrates, ammonia and biochemical oxygen demand, all of which reduce ecological resilience and increase the frequency of algal blooms and low oxygen events.[21]

The Agency notes that "*nutrient pressures remain widespread across monitored rivers*", with storm overflows and wastewater treatment works contributing significant pollutant loads. These pressures are compounded by climate related extremes, such as prolonged low flows, intense rainfall and higher temperatures, which amplify pollutant concentration and ecological stress.

Some of this pollution is historic. Sediment surveys undertaken by Canal & River Trust show elevated concentrations of heavy metals and hydrocarbons in several reaches of the Lancaster Canal, reflecting more than two centuries of industrial activity along the corridor.[22] Contaminants including lead, zinc, cadmium and polycyclic aromatic hydrocarbons are embedded within canal sediments, particularly in areas adjacent to former mills, foundries and engineering works. These contaminants pose ongoing ecological risks when disturbed during dredging or floods.

Today, these historic pollutants are being compounded by modern urban pressures. Investigations by Leeds City Council found that misconnected pipes, road runoff, surface water drainage and urban pollution contribute nutrients, hydrocarbons, microplastics and other contaminants to the city's waterways, including the Leeds & Liverpool canal.[23] During heavy rainfall, runoff from densely built areas enters the canal via surface water outfalls, adding new pollutant loads to an already stressed system.[24]

This example demonstrates how historic contamination, modern urban pressures and climate driven hydrological change converge to shape the long term resilience of inland waterways. It highlights the need for integrated sediment management strategies, urban runoff controls, nature based drainage solutions and regeneration frameworks that recognise the canal's complex environmental legacy.

Waterborne freight

ADAPTIVE REUSE OF HISTORIC WATERWAYS FOR FREIGHT IS EMERGING AS A SIGNIFICANT OPPORTUNITY FOR CLIMATE RESILIENCE AND LOW CARBON LOGISTICS.

Canals and navigable rivers were originally built to move goods efficiently across the country; today, they offer a ready made, low emission transport network at a time when cities are seeking alternatives to congested roads and carbon intensive haulage. Modern freight by water can be greener, cheaper and safer compared with road-based freight.[25]

Interest in waterborne freight is accelerating in some parts of the country, with major projects demonstrating the viability of freight movements by water, cutting thousands of HGV journeys and significantly reducing carbon emissions.[26] The Port of London Authority's Light Freight Design Solutions programme extends this potential further, showing how small scale, high frequency deliveries can be moved by river using modular wharves, electric vessels and micro distribution hubs. These "light freight" models are particularly suited to dense urban areas where last mile emissions, congestion and air quality impacts are acute.[27]

New forms of freight are also emerging around waste management and energy generation. On the River Medway, waterborne transport has been used to move waste to energy from waste plants, enabling low carbon logistics for materials that would otherwise travel long distances by road.

Together, these developments signal a shift back towards the original purpose of the waterways, but with contemporary environmental and economic benefits. Freight by water offers a practical, scalable route to reducing CO_2 emissions, supporting Net Zero goals and revitalising historic infrastructure through adaptive commercial use.

As climate pressures intensify, expanding freight capacity will be central to unlocking the full value of Britain's inland waterways. Around 100 miles of England's inland waterways were classified as commercial waterways in the 1968 Transport Act.[28] Today these, along with the Caledonian Canal, the Manchester Ship Canal and the River Thames, are among the waterways that could be developed as priority freight routes – given the right investment in infrastructure and dredging, and new planning policies to protect existing wharves.



Manchester Ship Canal traffic.
© IWA

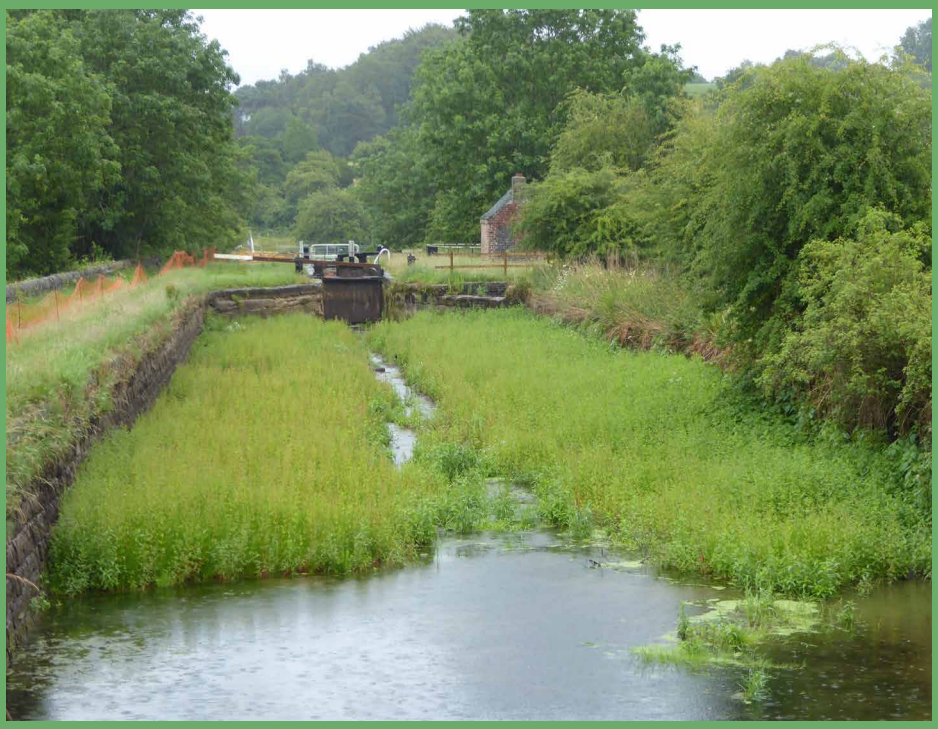


London Aggregate Traffic.
© John Pomfret

THE PUSH OF THE PRESENT

"For decades we have not been able to prioritise the most important things the network needed at the same time as responding to the urgent things, such as reservoir safety measures. That is hurting us all right now – even before we add in changing patterns of use, the decline in our government funding, hugely increasing costs of civil engineering projects and the big one: climate change."

CAMPBELL ROBB, CHIEF EXECUTIVE OF CANAL & RIVER TRUST, IN AN OPEN LETTER TO LICENCE HOLDERS, AUGUST 2026[29]



This photo of Hazelhurst Locks on the Caldon Canal, taken during the Covid Pandemic in 2020, shows how quickly a navigable waterway can return to nature when navigation is prohibited.
© Alison Smedley

THE PUSH OF THE PRESENT **IN THE FUTURES TRIANGLE CAPTURES THE TRENDS, PRESSURES AND EXTERNAL DRIVERS SHAPING THE INLAND WATERWAYS TODAY. IT REFLECTS THE IMMEDIATE FORCES ACTING ON THE SYSTEM, SUCH AS CLIMATE IMPACTS, SOCIAL CHANGE, INSTITUTIONAL STRAIN AND SHIFTING PUBLIC EXPECTATIONS, THAT ARE ALREADY INFLUENCING THE FUTURES AVAILABLE.**

Inland waterways are experiencing the daily realities of climate change, including more frequent flooding, prolonged drought, accelerated deterioration of historic structures and rising maintenance costs for ageing infrastructure. At the same time, patterns of use are changing. Increasing numbers of people are choosing to live afloat, which is changing demand for moorings and facilities. Navigation authorities are also facing a decline in public trust, even as expectations from boaters, towpath users and local communities continue to rise.

Navigation authorities responsible for maintaining Britain's inland waterways are starting to assess the cost of adapting the network for a future climate. In their first Climate Adaptation Report, Canal & River Trust calculates that £15m per year of additional expenditure is required for the rest of the century just to future-proof critical assets on their waterways[30] while the Environment Agency announced in its report on the Impact of Climate Change on Asset Deterioration[31] that an increase of 30% to 80% in maintenance budgets is required for the waterways it manages.

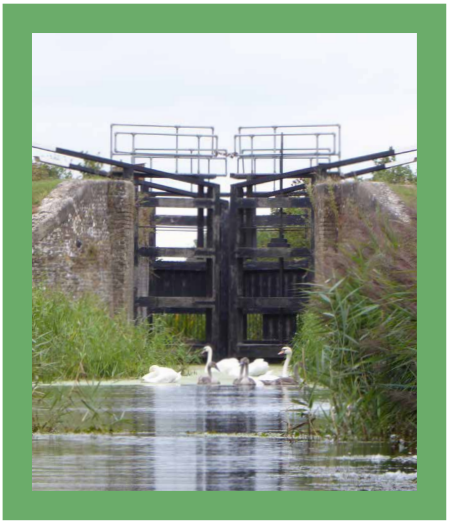
At the same time, legislative changes are becoming more onerous and costly for navigation authorities, not least the requirement for navigation authorities to apply for, and pay for, formal abstraction licences for historic connections between bodies of water.

These pressures are converging on a system that is already underfunded, and without intervention, the combined effects of climate-driven damage, escalating maintenance costs, and limited financial capacity could result in the closure of some waterways. This will not only restrict navigation, it would also reduce towpath access and diminish opportunities for leisure, tourism and community wellbeing. Such closures would represent not only a loss of built and intangible heritage, but also carry direct economic consequences. The 2,000 miles managed by the Canal & River Trust alone contribute an estimated £6.1 billion annually to the UK economy through boating, wider water-based tourism and wider social value.[32]

Across all navigation authorities there are currently (as at October 2026) 30 waterway structures that are closed to navigation, where there is no reopening date announced.[33] Canal & River Trust has been warning for a number of years that difficult decisions may be necessary about which canals to keep open, in the light of its reduced funding from Government.[34]

Adequate funding for Britain's inland waterways has been an issue ever since they were nationalised, along with the threat of closures, but it has also long been acknowledged that there is an ongoing cost associated with maintaining a closed waterway which should not be underestimated.[35]

IWA believes that closing any waterway to navigation is unacceptable and a false economy. Instead better investment is required to keep all waterways open and fully contributing the benefits they bring to individuals, environment, communities and the economy.



Horseferry Lock on the Middle Level Navigations has been unusable for many years following the closure of Welches Dam Lock by the Environment Agency in 2006.
© Alison Smedley

Drought

DROUGHTS AND WATER SHORTAGES ARE BECOMING MORE WIDESPREAD ACROSS THE UK[36] AND ARE NOW ONE OF THE MOST SIGNIFICANT OPERATIONAL PRESSURES ON THE INLAND WATERWAYS. A LONG TERM LACK OF INVESTMENT IN RESERVOIRS AND FEEDER CHANNELS, COMBINED WITH CLIMATE DRIVEN WEATHER EXTREMES, HAS RESULTED IN MAJOR LEISURE WATERWAYS BEING CLOSED DURING PEAK SUMMER MONTHS IN FOUR OF THE LAST TEN YEARS.

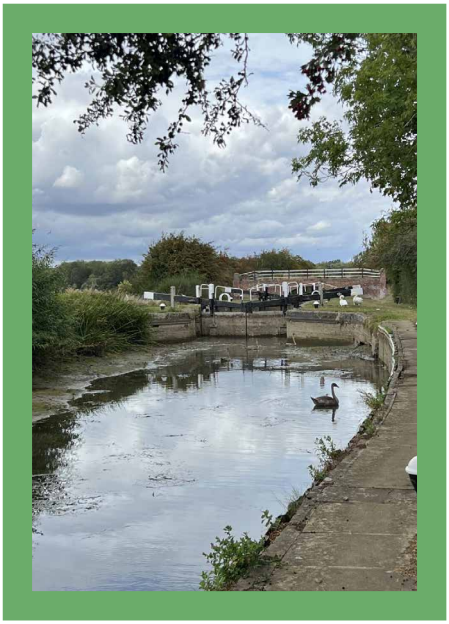
Recent drought years show a clear pattern.[37] In 2018, a prolonged dry spring and summer rapidly depleted reservoirs across the North West and trans Pennine routes, forcing long closures on the Rochdale, Huddersfield Narrow, Leeds & Liverpool, Macclesfield and Peak Forest canals. 2022 brought a national drought declaration, with very low water levels again prompting extensive closures and reduced operating hours, particularly across northern England.

By 2025, shortages extended further south following a dry winter and spring, with restrictions affecting waterways from the North West down to the Oxford Canal and the Kennet & Avon. Although 2026 began more favourably, many canals across the Midlands and the North West were closed by late July, and across the whole country by mid-August, in what was described as the third “once in 200 years” drought in five years.

These repeated closures, and the uncertainty surrounding future ones, are having a substantial impact on waterway dependent businesses. Hire boat operators report lost bookings, disrupted holiday routes and rising refund costs when drought conditions force last minute cancellations. Canalside pubs, cafés and tourism businesses also experienced falling footfall as boating traffic declined.

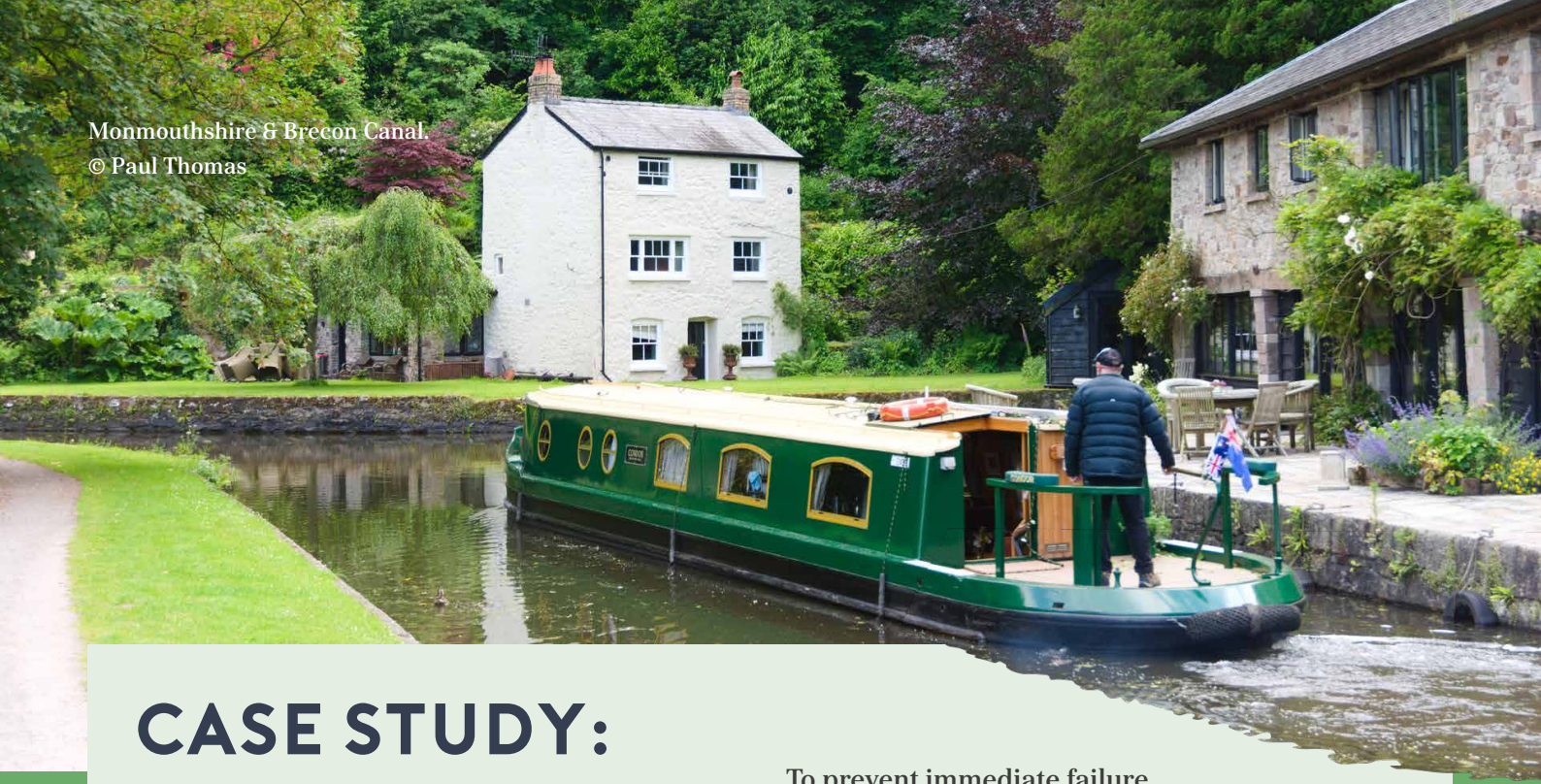
Canal & River Trust’s 2026 Annual Boaters’ Survey[38] highlights the scale of disruption: in 2025, 70% of boaters were unable to navigate as planned, with stoppages the most frequently cited factor. As water level volatility increases, the canal based economy (from hire fleets and marinas to hospitality and repair services) faces a future of chronic uncertainty.

The Grand Union Canal Leicester Section during a recent drought and water shortage.
© David Ball



Hot summers with lack of rainfall can also result in wildfires, with the UK experiencing an unprecedented number over the summer of 2026. Canals and rivers can provide essential water for firefighting in emergency situations, demonstrated by the fire at Holme Fen in Cambridgeshire in August 2026. Burning for over 14 days, Cambridgeshire Fire & Rescue worked with the Middle Level Commissioners, the Internal Drainage Board and the Environment Agency to utilise water from local waterways, resulting in the River Nene being closed to navigation due to low water levels.

Given the likely increase in demand on water resources for this purpose in future years, there needs to be sufficient resilience in waterway infrastructure for enough water to be available without endangering those using the waterways for other means such as recreation, work and living. This is another example of waterways being able to provide a solution to an increasing problem, but this can only be realised with the right investment to provide long term resilience in water supply.



Monmouthshire & Brecon Canal.
© Paul Thomas

CASE STUDY:

WATER ABSTRACTION ON THE MONMOUTHSHIRE & BRECON CANAL

The Monmouthshire & Brecon Canal in South Wales faces a growing water supply crisis driven by legislative change, environmental pressures and competing demands for drinking water.[39] The canal is fed from the River Usk, a designated Special Area of Conservation (SAC) whose flows are increasingly required to support downstream public water supply. Historically, the canal's abstraction was permitted under legacy arrangements dating back to the 19th century, but recent changes in water abstraction legislation now require Canal & River Trust to hold a formal abstraction licence, which is subject to strict limits designed to protect river ecology and ensure sufficient flows for drinking water abstraction by Welsh Water.

These new constraints have placed the canal and the river in direct conflict. During dry periods, the River Usk cannot sustain both the statutory environmental flows and the volume of water needed to keep the canal navigable. As a result, the Trust has warned that without intervention, long stretches of the Monmouthshire & Brecon Canal could become unnavigable for significant periods of the year, with some sections at risk of closure. This would have major consequences for boating, tourism, local businesses and the wider visitor economy, as well as having an adverse environmental impact on the wildlife in the canal. The canal and river provide diverse habitats and the two should be viewed as a complete system.

To prevent immediate failure, and after a coalition-led campaign, the Welsh Government provided £5 million for a short term engineering solution: a temporary pumping system that transfers water from the Usk to the canal under tightly controlled conditions. This emergency measure stabilises the water supply in the short term, but it does not resolve the underlying problem of the canal's long term water supply under the new abstraction regime.

The Trust's investigations show that more sustainable options exist, but they require significant investment and long term planning. Several historic feeders, once used to supply the canal further upstream, could be reinstated to provide additional water and reduce pressure on the Usk. Other potential solutions include new storage reservoirs, improved back pumping systems and modernised water management infrastructure along the canal's length.

This case highlights a wider futures challenge for the inland waterway network: the growing tension between environmental protection, drinking water security and recreational navigation. As climate change increases hydrological volatility, rivers like the Usk will face tighter abstraction controls, and canals that rely on them will become more vulnerable. The Monmouthshire & Brecon Canal demonstrates how legislative change can expose long standing infrastructure dependencies and how short term emergency funding, while essential, cannot substitute for strategic investment in resilient water supply systems.

Havens of biodiversity

INLAND WATERWAYS SERVE AS VITAL BLUE–GREEN ECOLOGICAL CORRIDORS, PROVIDING A NETWORK OF HABITATS THAT CONNECT URBAN AND RURAL AREAS AND LINK FRAGMENTED WILDLIFE HABITATS.

These corridors enable species to migrate, disperse and interact, promoting biodiversity and ecosystem resilience. By conserving and enhancing these waterways, we can help mitigate the impacts of habitat fragmentation, climate change and urbanisation on wildlife populations.

Urban and inner-city canals, in particular, have undergone significant transformations, with hard edges being replaced by soft banks, reedbeds and wetland pockets. These interventions not only boost fish, bird and invertebrate habitats but also improve water quality, enhance aesthetic values and provide ecosystem services such as flood regulation, water filtration and carbon sequestration. These blue-green interventions also double as climate resilience measures, slowing stormwater runoff, reducing urban heat island effects and cooling dense urban districts.

The incorporation of biodiversity requirements into planning agreements, as mandated by the Environment Act 2021, represents a significant step forward in ensuring that developers deliver ecological gains alongside new developments. By integrating biodiversity considerations into the planning process, functional ecological corridors can be created that benefit both nature and people. This approach not only enhances the ecological value of our waterways but also contributes to the wellbeing of local communities, providing opportunities for recreation, education and community engagement.

By adopting a holistic and integrated approach to waterway management, we can push for thriving, resilient ecosystems that support a wide range of plant and animal species, while also delivering numerous benefits for people and the environment.



CASE STUDY:

ROCHDALE CANAL URBAN ECOLOGICAL CORRIDOR

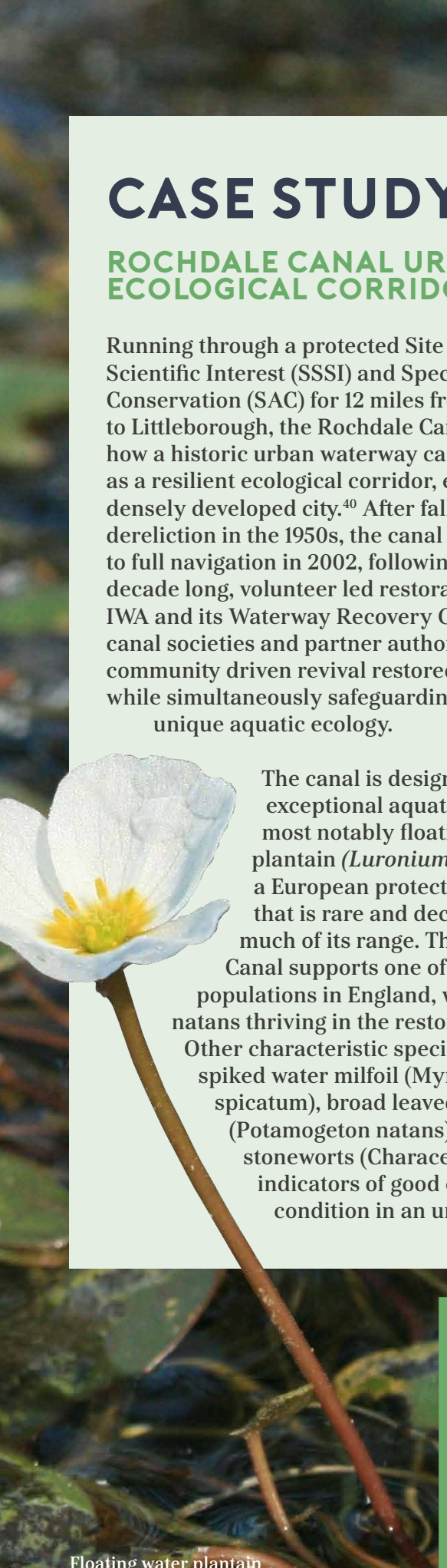
Running through a protected Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) for 12 miles from Failsworth to Littleborough, the Rochdale Canal shows how a historic urban waterway can function as a resilient ecological corridor, even in a densely developed city.[40] After falling into dereliction in the 1950s, the canal was restored to full navigation in 2002, following a three decade long, volunteer led restoration involving IWA and its Waterway Recovery Group, local canal societies and partner authorities. This community driven revival restored navigation while simultaneously safeguarding the canal's unique aquatic ecology.

The canal is designated for its exceptional aquatic plants, most notably floating water plantain *(Luronium natans)*, a European protected species that is rare and declining across much of its range. The Rochdale Canal supports one of the strongest populations in England, with Luronium natans thriving in the restored waterway. Other characteristic species include spiked water milfoil (Myriophyllum spicatum), broad leaved pondweed (Potamogeton natans) and stoneworts (Characeae) - all indicators of good ecological condition in an urban canal.

It is significant that Luronium natans and boats have cohabited successfully for more than two decades since the canal's reopening. Sensitive vegetation management, targeted habitat restoration, monitoring of boat movements and improved water quality controls have ensured that navigation does not compromise the canal's ecological integrity. Towpath use, mooring patterns and maintenance regimes are carefully managed to avoid shading, turbidity and bank disturbance, allowing protected plant communities to persist alongside recreational boating.[41]

As a designated SAC/SSSI site, the Rochdale Canal is subject to stringent environmental protections, and the Environment Act 2021's biodiversity requirements further emphasise the need for regeneration schemes along its corridor to embed biodiversity into their design, prioritising habitat creation, restoration and enhancement to achieve a net gain for biodiversity.

The Rochdale Canal demonstrates how historic waterways can become critical ecological infrastructure, supporting biodiversity, climate adaptation and sustainable urban development. It shows that with the right governance, investment and long term ecological management, even heavily engineered canals can function as resilient nature recovery networks within dense urban environments.



Floating water plantain *(Luronium natans)*.
© Shutterstock



Rochdale Canal.
© Tim Green Wikicommons

Changing use of the waterways

BRITAIN'S INLAND WATERWAYS ARE EXPERIENCING SIGNIFICANT CHANGES IN HOW THEY ARE BEING USED.

Built in the 18th and 19th centuries for transporting coal, raw materials and manufactured goods, canals remained part of the country's freight network until the mid 20th century, when most carrying companies either closed or shifted to road transport. Public interest in leisure boating and tourism grew rapidly, forming the basis of today's £2.1 billion marine leisure sector and supporting an estimated 670,000 jobs across boating and watersports.[42] Many more jobs are created in the wider tourism and leisure sector, with all these industries providing thousands of apprenticeships and youth training opportunities.

In the 21st century, use is changing again. Increasing numbers of people are choosing to live afloat, particularly in urban areas where housing pressures are acute. This brings new communities and new forms of stewardship to the waterways, but also creates challenges around congestion, mooring availability, regulation and service provision. Navigation authorities must now balance the needs of residential boaters, leisure users, towpath visitors and commercial operators within a finite and increasingly climate stressed network.

The leisure marine industry itself is also evolving. Demand for hybrid and electric propulsion is rising and campaigning by IWA has helped make sustainable fuels such as HVO (Hydrotreated Vegetable Oil, a second generation biodiesel) more affordable, although issues remain around its availability. Boatbuilders are beginning to redesign narrowboat hulls and systems with future propulsion, energy efficiency and environmental performance in mind. These changes align with the UK's Maritime Decarbonisation Strategy,[43] which commits to reducing maritime greenhouse gas emissions – including on the inland waterways – to net zero by 2050. Electric boats, charging infrastructure, biofuels and emerging technologies will all play a role in meeting this target.

Beyond boating, waterways continue to shape local identity and regeneration. They provide a strong sense of place and support regeneration initiatives, with over half of locations receiving Government Pride in Place funding being on or near an inland waterway.[44] Nearly 80% of local authorities have a navigable waterway or a waterway under restoration, often in areas facing higher levels of deprivation, highlighting the continued social value of this historic network as its uses evolve.



There has been a significant increase in people taking part in watersports in the last few years, but just 4% of English waterways current have uncontested access for paddle sports. (British Canoeing (2018). Access & Environment Charter.) © Angela Acott

AT A GLANCE

PLACEMAKING

- **ALL 14 MAYORAL AUTHORITIES** include inland waterways
- **1 IN 4** Greater Manchester residents live within 1km of a canal or river[45]
- **OVER HALF OF PRIDE IN PLACE** funding locations sit on or near a waterway
- **80% OF LOCAL AUTHORITIES** have a navigable or restorable waterway

CONTRIBUTION TO THE UK ECONOMY

- **£2.1BN GENERATED ANNUALLY** by boating and watersports[46]
- **670,000 FULL TIME JOBS** supported across boating and marine leisure[47]

HEALTH AND WELLBEING BENEFITS

- **3.1M MORE PEOPLE** now take part in outdoor recreation, such as paddle boarding and open water swimming, than a decade ago[48]
- Inland waterways deliver £ **£3.8BN IN SOCIAL WELLBEING VALUE**[49]
- **9 NEW RIVER WALKS PLANNED** to support 15 minute access to blue/green space[50]
- Yet **44%** of constituencies still have low access to nature[51]

DRINKING WATER SUPPLY

- **377 MILES** of river and canal already support drinking water supply[52]
- **A FURTHER 482 MILES** could more than double capacity, with the right investment[53]

LIVING AFLOAT

- **85,000 BOATS** registered across the network according to the Boat Safety Scheme
- On Canal and River Trust waterways, up to **A THIRD OF BOATERS** describe their boat as their permanent residence[54]
- **65% INCREASE** reported in live¬aboard vessels since the Covid pandemic and rising costs of living[55]

DECARBONISATION

- Waterborne freight emits **76% LESS CO_2** per tonne than road[56]
- **ONE 1,500 TONNE BARGE** removes up to 75 HGVs from the road[57]

RESTORATION

- Of 7,000 miles built, **72% REMAIN NAVIGABLE;** 28% are derelict or lost[58]
- **455 MILES** identified as feasible for restoration[59]
- **3 MILLION PEOPLE** live within 1km of a derelict waterway[60]

Water sports and recreation

PARTICIPATION IN PADDLE SPORTS HAS ACCELERATED RAPIDLY SINCE THE COVID 19 PANDEMIC, INDICATING A LONG TERM BEHAVIOURAL SHIFT TOWARDS BLUE SPACE RECREATION. WITH AROUND 7.5 MILLION PEOPLE NOW PADDLING ANNUALLY ACROSS THE UK,[61] WATERWAYS ARE ESSENTIAL INFRASTRUCTURE FOR FUTURE LEISURE, WELLBEING AND CLIMATE RESILIENT TOURISM.

This growth is part of a wider societal trend: over one million more people now engage in outdoor recreation than a decade ago, reflecting rising demand for accessible, nature based activity as urban populations expand and public health priorities evolve. The outdoor recreation sector already contributes £22 billion a year to the UK economy,[62] and its importance is likely to increase. Analysis by the Sport and Recreation Alliance suggests that participation and volunteering in outdoor recreation generate over £5 billion in avoided health and social care costs, a figure expected to grow as active travel, preventative health and social prescribing become more mainstream.

Commitment 86 in the UK Government's Environmental Improvement Plan 2025 is for everyone to have access to green or blue spaces within a 15-minute walk from home – including the creation of 9 new river walks and exploring the feasibility of increased access onto unregulated waterways.[63]

As participation in outdoor recreation continues to rise, canals and rivers will become increasingly important in shaping how communities adapt, connect and thrive in the decades ahead.



Pinkston Watersports, Glasgow.
© Scottish Canals





CASE STUDY:

WATERSPORTS IN NORTH GLASGOW

Over the past decade, the Glasgow Arm of the Forth & Clyde Canal in North Glasgow has become one of Scotland's strongest examples of how historic waterways can support modern outdoor recreation, community wellbeing and climate resilient regeneration. Once characterised by post industrial decline, the canal has been transformed into a vibrant blue green space that anchors sport, community activity and volunteering across the city's northern neighbourhoods.

A major catalyst for this transformation has been Pinkston Watersports, Scotland's first artificial white water course.[64] The facility, which was opened in 2015, offers a range of activities and programs for people of all ages and abilities, from beginner lessons to advanced coaching and training.

Pinkston Watersports has been successful in engaging with the local community and promoting paddleboarding and canoeing as a recreational activity. The facility offers community programmes and activities aimed at schools, youth groups and community organisations. It also offers volunteer opportunities for people to get involved in the facility and help with events, maintenance and other activities.

The facility has generated new economic opportunities for the local area, including jobs, tourism and investment. Pinkston Watersports has helped to build a sense of community among paddlers and has provided opportunities for people to get involved in a new recreational activity. The facility has also raised awareness about the importance of water quality and conservation, and has helped to promote the Forth and Clyde Canal as a valuable recreational resource.

The project demonstrates how a disused industrial canal can be transformed into a thriving destination for paddleboarding and canoeing, made possible through a partnership between Glasgow City Council, Scottish Canals and the Glasgow Canal Regeneration Partnership, with funding from the Scottish Government and other sources.

THE PULL OF THE FUTURE

"The canals in our cities were a product of the Industrial Revolution, a time of great innovation... Bringing together our industrial heritage with new technologies and cutting-edge research ... can help us create urban areas where people and nature thrive in a more sustainable future."

DR JOANNE TIPPETT, UNIVERSITY OF MANCHESTER[65]



Active travel routes using the Nottingham Canal.
© Paul Dennan

IN THE FUTURES TRIANGLE, *THE PULL OF THE FUTURE* REPRESENTS THE ASPIRATIONS, VALUES AND EMERGING POSSIBILITIES THAT SHAPE A PREFERRED FUTURE. IT ASKS WHAT KIND OF FUTURE WE WANT TO CREATE, AND WHAT NARRATIVES, AMBITIONS AND COLLECTIVE GOALS CAN INSPIRE ACTION TODAY.

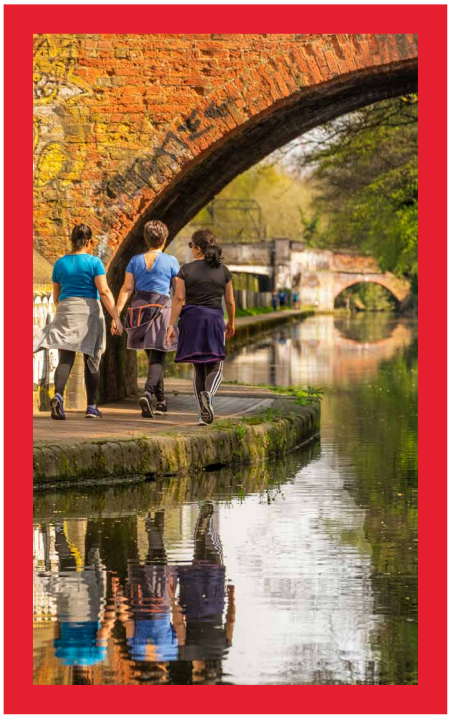
Without sustained investment, the probable future is bleak, with the inland waterway network becoming increasingly overgrown, structurally fragile, inaccessible and ultimately abandoned. Such a scenario would represent a profound missed opportunity, sacrificing the social, environmental and economic value that waterways already provide, and which could be significantly increased in the decades ahead.

With the right policy choices, long term funding and coordinated action, the waterways can evolve into environmentally healthy and vibrant blue green corridors that enhance quality of life, strengthen local and regional economies and help the UK adapt to the accelerating impacts of climate change.

In this ideal future scenario, Britain's inland waterways will be financially stable, resilient to a changing climate and maintained in good navigational order. Valuing the network as vital infrastructure, which should be fully integrated into national planning policy, will enable economic benefits to be realised for local communities as well as the country as a whole. The network will be accessible to everyone, providing active travel routes between towns and cities and connecting people living in urban areas with countryside.

Achieving this future requires a clear commitment to emerging possibilities that are already visible today. Water transfer schemes can move drinking water efficiently to the places that need it most, reducing pressure on overstressed river systems. Freight can return to the waterways, cutting carbon emissions and easing congestion on the road network. Hydropower and tidal energy schemes can harness the natural movement of water to generate clean energy. And more cities can adopt water source heat transfer systems, using canals to heat and cool homes, workplaces and public buildings in ways that reduce carbon emissions and improve urban resilience.

Together, these developments form a compelling vision of what the waterways could and should become: a modern, multi functional national asset that supports climate adaptation, public wellbeing, economic vitality and environmental recovery. An aspirational future worth pulling towards.



Enjoying the sunshine on the Worcester & Birmingham Canal, Edgbaston.
© Nigel Essery

Water security

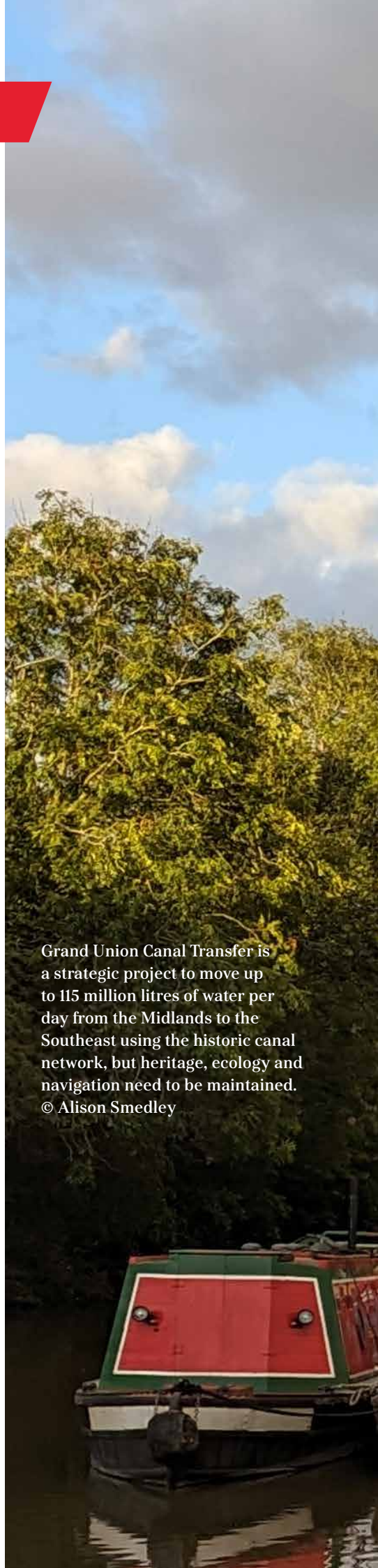
WATER SECURITY HAS BECOME ONE OF THE UK'S MOST PRESSING RESILIENCE CHALLENGES.

Rising demand, intensifying droughts, more volatile rainfall patterns and growing pressure on river ecosystems mean the country can no longer rely on historic assumptions about water availability. Ensuring secure, sustainable supplies now requires a whole-system approach that combines reduced consumption, smarter storage, diversified sources and more flexible movement of water.

Water transfer schemes are becoming increasingly important as long term water resource strategy, and the inland waterways network offers a low carbon infrastructure that can be adapted for moving water between catchments. Canals have been used as a route for transferring water from one region to another in a number of locations over several decades, such as the Gloucester & Sharpness Canal providing drinking water for Bristol and the Bridgwater and Taunton Canal in Somerset providing water for Wessex Water.[66] As climate change drives more frequent periods of water scarcity and more intense rainfall, the ability to shift water efficiently, safely and with minimal environmental impact will become a critical future function of the inland waterway network. This requires coordinated investment, modern monitoring systems and cross sector governance to realise its full potential.



An example of an existing water transfer using historic canal infrastructure - water from the River Dee in North Wales is taken via the Horseshoe Falls to Hurleston Water Treatment Works, at the other end of the Llangollen Canal. After being treated, it supplies water to around 330,000 people. © Sue O'Hare



Grand Union Canal Transfer is a strategic project to move up to 115 million litres of water per day from the Midlands to the Southeast using the historic canal network, but heritage, ecology and navigation need to be maintained. © Alison Smedley

CASE STUDY:

THE GRAND UNION CANAL WATER TRANSFER SCHEME

The Grand Union Canal Transfer scheme is an ambitious proposal to use historic canal infrastructure to address modern water security challenges. The project aims to move up to 115 million litres of water per day from the relatively water secure West Midlands to the increasingly water stressed South East, along 60 miles of the Coventry, Oxford and Grand Union canals.[67] By using existing navigation infrastructure rather than constructing a new pipeline, the scheme offers a lower carbon, lower impact alternative to traditional water transfer engineering.

However, the proposal raises significant concerns around heritage, navigation and operational resilience. The Grand Union Canal was formed in 1929 following the amalgamation of a number of historic waterways, with locks, embankments and bridges that were not designed for high volume water transfer. The challenge is to ensure that the canal's historic fabric and navigational function are not compromised by its new strategic role.

According to IWA's analysis,[68] several key risks have been identified, including water level fluctuations that may affect boat movement, lock operation, and mooring safety, as well as structural stress on heritage assets due to higher or more variable flows.

IWA has called for robust safeguards to ensure the protection of navigation and heritage. This should include: maintaining minimum navigable water levels throughout the transfer route; ensuring that any new infrastructure is sympathetic to heritage character, using design approaches that minimise visual and physical impact; ensuring that boaters, volunteers and canal users are fully consulted during design and construction; and embedding monitoring and adaptive management to ensure that water transfer does not degrade ecological or navigational conditions.

Lessons also need to be learnt from existing water transfer schemes to ensure that dredging and maintaining water supply following infrastructure failures do not place unrealistic burdens on navigation authorities.

Despite these concerns, the scheme offers significant strategic benefits. By using the canal network rather than constructing a new pipeline, the transfer avoids major land acquisition and reduces carbon emissions by utilising existing linear infrastructure. It also aligns with long term water resource planning for the South East, where population growth and climate change are driving increasing pressure on rivers and groundwater.

The Grand Union Canal Transfer scheme will be the first new scheme to transfer water over a long distance since the 1970s, and will stand as a new test case for how historic waterways can support national water resilience in the 21st Century, provided that navigation, ecology and heritage remain central to the project's design and operation.



Harnessing the power of water

THE INLAND WATERWAYS HAVE LONG BEEN RECOGNISED FOR THEIR HISTORIC AND CULTURAL SIGNIFICANCE, AND THEY ALSO HOLD A SECRET TO MITIGATING THE EFFECTS OF CLIMATE CHANGE: THE POWER OF WATER ITSELF.

By harnessing the energy of flowing water, the inland waterways can be transformed into a reliable source of low-carbon energy, reducing reliance on fossil fuels and decreasing greenhouse gas emissions. One way to achieve this is through the adaptive reuse of heritage infrastructure, such as old weirs and locks, to support new hydropower schemes. By integrating hydropower schemes directly into existing weirs, it is possible to generate electricity without disrupting the natural flow of the river or impacting navigation.

Hydropower schemes currently contribute only 2% of annual UK generation,[69] but there is huge untapped potential for small river-based hydropower to contribute to local energy resilience through small-scale installations as well as larger, more complex projects. By working within established navigation and heritage settings, it is possible to develop new energy infrastructure that not only generates renewable energy but also respects the cultural and historical significance of the inland waterways.[70]

The benefits of harnessing the power of water go beyond just energy generation. It can also help to support local economies, create new job opportunities and enhance the overall resilience of our communities.



Linton Lock hydropower scheme on the River Ouse in Yorkshire demonstrates how modern renewable engineering can be integrated sensitively into a historic navigation landscape. Commissioned in 2012, the project centres on a 2.6 metre diameter Archimedes screw turbine, one of the largest of its type in the UK. © Elspeth Williams

Canals as thermal infrastructure

INLAND WATERWAYS ARE INCREASINGLY BEING RECOGNISED AS VALUABLE THERMAL ASSETS, BOTH FOR PASSIVE URBAN COOLING AND FOR ACTIVE LOW CARBON HEAT TRANSFER SYSTEMS.

Research shows that canal corridors can be 1°C to 3°C cooler than surrounding built up areas during summer heatwaves.[71] Water surfaces provide evaporative cooling, canal side vegetation enhances shading and towpaths offer cooler active travel routes at times when streets and paved areas become uncomfortable or unsafe. These cooling benefits extend beyond the water's edge, reducing temperatures up to 50 metres from the bank and supporting public health during extreme heat.[72]

Historically canal water was used to cool machinery in adjacent factories. With the decline of heavy industry this has declined, but stable water temperatures make canals ideal for new low carbon heat transfer systems, enabling the use of water source heat pumps to heat homes, offices and public buildings or to provide cooling during extreme heat.[73]

Water source cooling systems are more efficient than air-based systems, reducing electricity demand and lowering operational emissions. A study by the UK's Building Research Establishment found that water source cooling systems can achieve energy savings of up to 50% compared to air-based systems.[74] Canals also provide safeguarded linear routes that reduce the need for disruptive excavation in densely built areas and allow cooling and heat transfer systems to be located within existing waterway, towpath and utility corridors.

The concept of using canals as thermal infrastructure is gaining traction, with several projects already underway in the UK, including a thermal energy network being developed by Canal & River Trust working with the University of Sheffield.[75]

Canals also have the potential to allow large scale developments, such as data centres, to integrate water source cooling or heat recovery systems, reducing pressure on competing water needs, electricity grids and lowering operational emissions.

An early example of how inland waterways can be an integral part of next generation digital infrastructure is happening in Salford, Manchester, where one of the UK's first canal-cooled AI data centres is being built. The 2 Megawatt facility is being engineered specifically for high density AI workloads and will draw water from the adjacent canal through a closed loop heat-exchange system.[76] This approach enables efficient, low carbon cooling while avoiding consumptive water use, demonstrating how historic waterways can support emerging technologies.[77]

With the water industry warning that the UK will not have enough water for future data centres,[78] closed loop cooling using rivers and canals offers a ready made solution, provided the right policy and planning changes are in place.



Research undertaken through the Canal & River Trust's "Urban Wellbeing" programme, in partnership with the University of Birmingham, shows that the cooling effect is strongest along the Worcester & Birmingham Canal and the New Main Line, where dense built environment amplifies heat-island conditions and makes microclimate regulation particularly valuable.
© Angela Acott

Flood resilience

BRITAIN IS FACING A GROWING THREAT FROM FLOODING, WITH NEARLY 7 MILLION PROPERTIES IN ENGLAND, SCOTLAND AND WALES EXPECTED TO BE AT RISK BY 2050, ASSUMING GLOBAL TEMPERATURES REACH 2°C ABOVE PRE-INDUSTRIAL LEVELS.[79]

This alarming projection highlights the urgent need for effective flood resilience measures to protect communities, buildings and infrastructure.

Inland waterways, including canals and reservoirs, can play a crucial role in mitigating flood risk. Dredging and maintaining these waterways can increase their capacity to hold excess water, reducing the pressure on drainage systems and minimising the risk of flooding.

Increasing the depth of water in canals and reservoirs, as well as providing enhanced flood storage, also supports a wider range of aquatic species, enhancing biodiversity and ecosystem health. Deeper waterways can reduce the amount of energy required to propel boats, as they can travel more efficiently and with less resistance, and they can provide better or increased opportunities for water sports, tourism and recreation, supporting local economies and promoting community engagement.

However, realising these benefits requires significant investment in inland waterway infrastructure. Navigation authorities need adequate funding to maintain, dredge and enhance canal systems, ensuring they can continue to play a vital role in flood risk management. With the right investment, cities can incorporate their local waterways into their strategic responses to rising flood risk and ageing drainage systems, creating more resilient and sustainable communities.

Overall, inland waterways have the potential to play a critical role in flood resilience, and with the right investment, cities can unlock their full potential, creating more sustainable, resilient and thriving communities.



Spring tide takes people unawares at Richmond-on-Thames – rising sea levels driven by climate change will make this an increasingly occurring event.
© Alison Smedley

CASE STUDY:

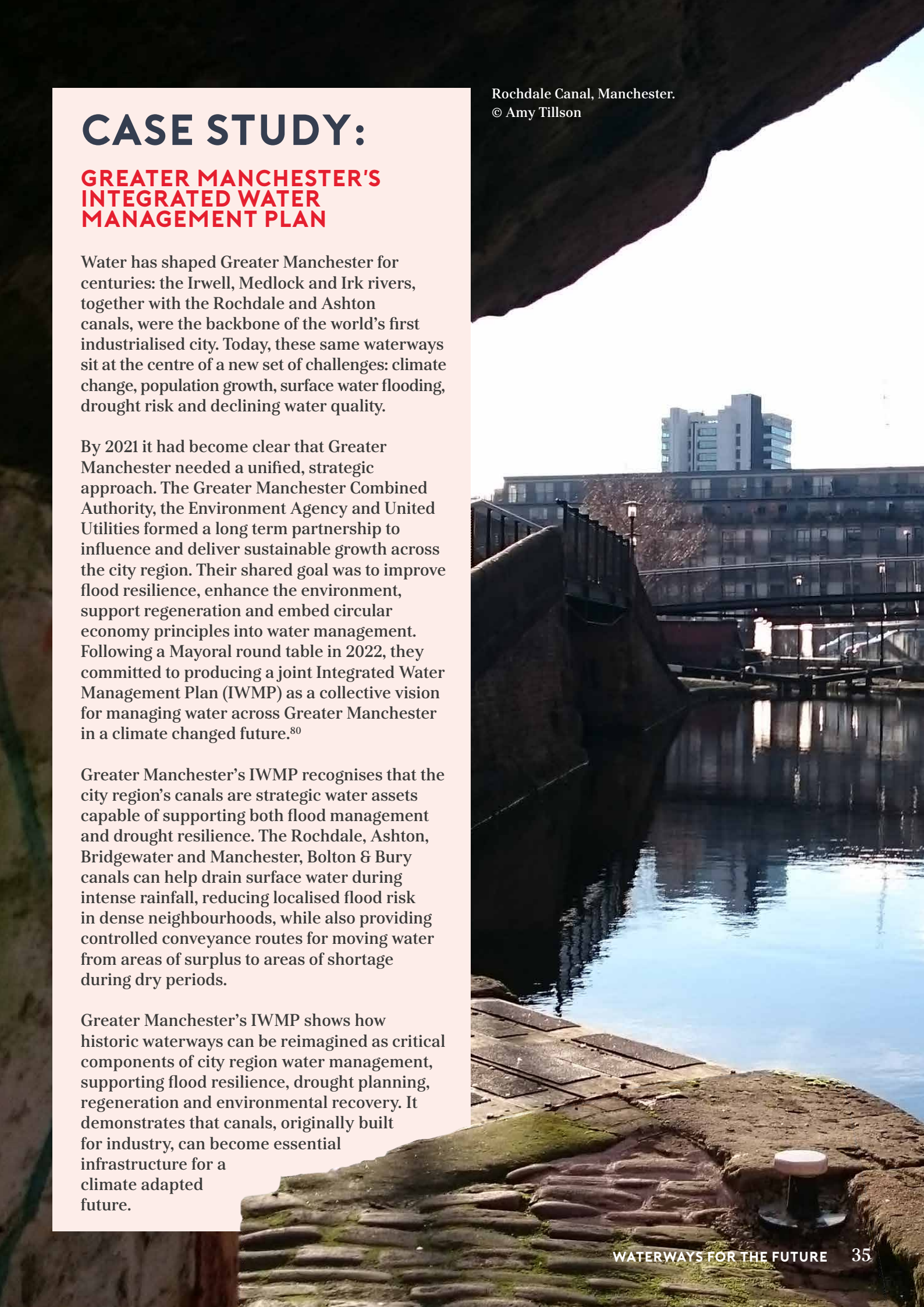
GREATER MANCHESTER'S INTEGRATED WATER MANAGEMENT PLAN

Water has shaped Greater Manchester for centuries: the Irwell, Medlock and Irk rivers, together with the Rochdale and Ashton canals, were the backbone of the world's first industrialised city. Today, these same waterways sit at the centre of a new set of challenges: climate change, population growth, surface water flooding, drought risk and declining water quality.

By 2021 it had become clear that Greater Manchester needed a unified, strategic approach. The Greater Manchester Combined Authority, the Environment Agency and United Utilities formed a long term partnership to influence and deliver sustainable growth across the city region. Their shared goal was to improve flood resilience, enhance the environment, support regeneration and embed circular economy principles into water management. Following a Mayoral round table in 2022, they committed to producing a joint Integrated Water Management Plan (IWMP) as a collective vision for managing water across Greater Manchester in a climate changed future.[80]

Greater Manchester's IWMP recognises that the city region's canals are strategic water assets capable of supporting both flood management and drought resilience. The Rochdale, Ashton, Bridgewater and Manchester, Bolton & Bury canals can help drain surface water during intense rainfall, reducing localised flood risk in dense neighbourhoods, while also providing controlled conveyance routes for moving water from areas of surplus to areas of shortage during dry periods.

Greater Manchester's IWMP shows how historic waterways can be reimagined as critical components of city region water management, supporting flood resilience, drought planning, regeneration and environmental recovery. It demonstrates that canals, originally built for industry, can become essential infrastructure for a climate adapted future.



Rochdale Canal, Manchester.
© Amy Tillson

IWA RECOMMENDS

A BETTER WATERWAY FUTURE IS ONE WHERE THE NETWORK IS WELL-FUNDED, WELL-MAINTAINED, AND RESILIENT, WITH CANALS AND RIVERS THAT ARE ACCESSIBLE AND WELCOMING TO EVERYONE, AND WHERE THE SYSTEM CONTRIBUTES SIGNIFICANTLY TO NATIONAL NET ZERO GOALS THROUGH INNOVATIVE TECHNOLOGIES AND CLIMATE ADAPTATION FUNCTIONS.

This report demonstrates that Britain's inland waterways can help deliver water security, clean energy, low-carbon transport, climate resilience, digital-infrastructure support and public wellbeing. Much of this could be carried out with modest levels of investment when compared to other major infrastructure projects and government department budgets.

To unlock the potential outlined in this report, governments must recognise canals and navigable rivers as strategic national infrastructure.



The Mersey Heat network provides low-carbon, cost-effective heat and hot water utilising heat from the Leeds and Liverpool Canal.
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UK AND DEVOLVED GOVERNMENTS, ALONG WITH RELEVANT AGENCIES AND DEPARTMENTS, SHOULD IMPLEMENT THE FOLLOWING RECOMMENDATIONS TO MAKE THIS VISION FOR A PLAUSIBLE, BETTER, FUTURE A REALITY:

1 COMMISSION A REVIEW OF BRITAIN'S INLAND WATERWAYS

The Department for Environment, Food and Rural Affairs should lead an urgent review of the inland waterways of England and Wales, with the goal of creating a long term investment plan by 2028. This review should be cross-departmental, with co-ordinated input from Department for Transport, Department for Digital, Culture, Media and Sport, Ministry of Housing, Communities and Local Government, Department of Health, Department for Energy Security and Net Zero and Department for Business, Innovation, Science and Trade. Likewise, Scottish Government should initiate a similar review of its navigable waterways. With relatively modest investment, governments can secure huge returns in public health, economic growth, climate resilience and regional renewal. Improved infrastructure will attract new businesses, boost tourism and create jobs.

2 SUPPORT HYDROPOWER AND WATER–ENERGY INNOVATION

The Environment Agency, Natural Resources Wales and the Scottish Environmental Protection Agency should each create a clear policy pathway for small-scale hydropower and water-source energy systems by streamlining planning and licensing requirements by 2030. Simplified and more efficient permit processes will encourage and expedite targeted capital funding for community-scale schemes that will contribute to Net Zero goals.

3 ENABLE WATER–SOURCE HEAT–TRANSFER NETWORKS

The Department for Energy Security and Net Zero and the Department for Business, Innovation, Science and Trade, along with equivalent departments of Scottish and Welsh governments, should integrate canal-based heat pumps into national heat-network policy and local energy planning from 2027. Funding for feasibility studies and pilot networks should be made available, and technical standards should be established, to ensure ecological protection and system reliability. National planning and energy policy should explicitly allow for canal-based thermal solutions, supported by streamlined permitting and integration into local energy strategies.

Continued overleaf

IWA RECOMMENDS

4 EMBED WATERWAYS IN CLIMATE ADAPTATION POLICY FOR FLOOD RESILIENCE

The Department for Environment, Food and Rural Affairs, the National Infrastructure Commission for Wales and the Scottish Environment Protection Agency should each invest in more canal-based flood-management schemes, including controlled storage areas and improved water-level infrastructure, by 2030. Cross-agency partnerships should be supported, along with long-term funding for embankments, culverts and reservoirs to fulfil the full potential for flood resilience.

5 INCREASE RESILIENCE OF CANAL RESERVOIRS

The Department for Environment, Food and Rural Affairs should increase its investment in water supply for canals in England and Wales to ensure that all reservoirs and feeder channels are fully repaired by 2030 and continue to be well maintained thereafter. This is essential not only for the economic benefits that waterway tourism brings to the UK economy, which is currently impacted by closures due to lack of water supply, but also to assist the Ministry of Housing, Communities and Local Government in providing firefighting capacity for tackling wildfires in the future.

6 DEVOLVE POWERS TO METRO MAYORS FOR WATERWAY-LED RENEWAL

The Ministry of Housing, Communities and Local Government should extend devolution deals, by 2028 for existing strategic authorities and from the outset for new deals, giving metro mayors clear responsibility and flexible funding to treat waterways as strategic local infrastructure. With multi-year investment powers, mayors can integrate canals and river navigations into transport, climate adaptation, housing and economic plans. Devolved authorities should take an innovative approach and incorporate local waterways into housing strategies to include purpose built residential marinas and facilities for people living on boats.

7 INCORPORATE CANALS INTO NATIONAL DRINKING WATER RESOURCE PLANNING

The Department for Environment, Food and Rural Affairs should recognise inland waterways in England and Wales as assets for moving water between catchments during drought and periods of scarcity. From 2027, funding should be made available for feasibility studies, pilot schemes and modern monitoring systems to support safe, efficient water transfers as well as the creation of more reservoirs to increase capacity for both drinking water and recreation.

8 DEVELOP A NATIONAL STRATEGY FOR WATERBORNE FREIGHT

The Department for Transport should establish a national inland freight strategy for commercial waterways in England by 2028, including expansion of the Modal Shift Revenue Support grant to make waterborne freight more cost-competitive. Working with HM Treasury, the strategy should encourage policies to make sustainable drop-in fuels like HVO affordable and available across the network, helping existing diesel-powered craft cut emissions. The new National Planning Policy Framework announced by the Ministry of Housing, Communities and Local Government should be amended to protect existing wharves and require all major developments within defined distances of navigable waterways to assess the feasibility of waterborne construction logistics, in order to realise the substantial environmental and economic benefits of moving more freight on to the water.

9 PROTECT AND INVEST IN THE CULTURAL AND RECREATIONAL HERITAGE OF THE INLAND WATERWAYS

By 2030, the Department for Environment, Food and Rural Affairs should work with the Department for Digital, Culture, Media and Sport (or their successor government departments), and with equivalent departments in Scotland and Wales to create a cross-department national programme to protect and enhance the built, natural and intangible heritage of Britain's waterways, while investing in safe, accessible recreation and watersports.

Recognising the economic value generated by heritage assets, volunteering, tourism, canoeing, paddleboarding, rowing and other activities, will strengthen local economies, widen participation and secure the long-term cultural and recreational value of the waterways, including proposed new waterways and those under restoration.

10 ENFORCE WATER QUALITY IMPROVEMENT MEASURES

The Environment Agency, Natural Resources Wales and the Scottish Environmental Protection Agency should review their enforcement of current water environment regulations by 2028. EU standards for surface water quality and wastewater treatment should be matched, to prevent the ongoing pollution of our inland waterways.



CONCLUSION

BRITAIN'S INLAND WATERWAYS ARE UNIQUELY POSITIONED TO SUPPORT NATIONAL RESILIENCE, CLIMATE ADAPTATION AND THE TRANSITION TO A LOW CARBON ECONOMY. WITH THE RIGHT POLICY CHOICES AND INVESTMENT, CANALS AND NAVIGABLE RIVERS CAN BECOME STRATEGIC ASSETS FOR WATER SECURITY, CLEAN ENERGY GENERATION, LOW CARBON FREIGHT, URBAN COOLING AND HEATING AND FLOOD RISK MANAGEMENT.

They offer ready made infrastructure that can move water between catchments during drought, generate renewable energy through hydropower, support waterborne freight to reduce road congestion and emissions, and provide stable water temperatures for heat transfer systems that heat and cool buildings. As digital infrastructure expands, waterways can also cool data centres, reducing pressure on electricity grids and enabling waste heat recovery for nearby communities. These functions position the waterways as critical components of a climate resilient, energy efficient and digitally enabled future.

By protecting historic assets, reducing carbon emissions and supporting low carbon technologies, the waterways can contribute meaningfully to the UK Government's goal of reaching Net Zero by 2050, ensuring that this heritage continues to serve future generations.

Realising this future requires government to recognise inland waterways as multi functional national infrastructure and to invest accordingly. This means embedding canals within long term water resource planning, supporting small scale hydropower and water energy innovation, developing a national strategy for waterborne freight, facilitating water source heat transfer networks and integrating waterways into climate adaptation frameworks. It also requires planning and energy policy that enables canal based cooling and heat recovery systems for data centre developments. These actions will unlock the full potential of the inland waterway network – creating blue green corridors that strengthen communities, support economic vitality, reduce carbon emissions and enhance the country's resilience to climate change. With coordinated investment and policy support, the waterways can become one of the country's most valuable assets for a sustainable and prosperous future.

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WATERWAYS FOR THE FUTURE

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