

SSwan

Sustainable Solutions
for Water And Nature



A new approach

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SSwan

Sustainable Solutions for Water And Nature

SSWAN is a partnership of organisations who share the same goal: to find sustainable solutions for water and nature. We have drawn up proposals for regulatory reform of the water industry, based on a catchment-wide approach focusing on nature-based and low carbon solutions.

We all seek to restore and protect nature and to find sustainable solutions to ensure our waterways continue to sustain the health and wellbeing of people, as we as the natural habitats we all value and enjoy.

This alternative approach to managing and protecting the natural environment put forward by SSWAN sets out what is and isn't working, what can be improved and what needs to be fixed. The proposals contained in this document are the result of months of discussions and roundtables. They are not the final answer but are intended to act as a catalyst for further discussion to find a new way of working – putting nature first.

This report is a summary of the SSWAN Discussion Paper which can be found on our website: sswan.co.uk

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CIWEM



Sustainability
first





The need for change

The current framework does not work

The water network and the environment are at breaking point and change is needed. We must seize the opportunity to align economic and environmental regulation across sectors and make the biggest structural reform of our water system in a generation. Facing the challenge head on, we can be ambitious and innovative and drive impactful and meaningful change. We need to invest in our future: for the health of our waterways, and the natural environment, and for society.

The current system of water and environmental regulation no longer delivers the outcomes that society expects and needs. Though the original water regulatory model delivered productivity gains of around 70% and improvements to services, it did not give due consideration to the environment and ultimately led to underinvestment in infrastructure which is now unable to keep up with the demands placed on it, including climate change and population growth. There are visible signs of decline: leaks, sewage pollution and water bodies in poor health.

Regulation needs to require companies to step up and invest in the improvements needed, but the regulatory regime must also evolve.

Water regulation has become complex and prescriptive and is divorced from the needs of society and the environment. Different regulators pull the sector in different directions and at huge expense – the current regulatory system costs £25 per customer per year. It also incentivises water companies to spend significant resource on compliance over consumer and nature outcomes.

A new approach

It does not have to be this way. The SSWAN project was set up to explore sustainable solutions for water and nature. The Advisory Panel made up of the The Wildlife Trusts, Wiltshire Wildlife Trust, RSPB, The Rivers Trust, Sustainability First, Green Alliance, CIWEM and Wessex Water, in consultation with a number of other interested bodies, put forward options for a new regulatory system focused on a clear vision of the outcomes a well-functioning water sector should deliver to improve the natural environment and wider societal benefits.

The proposed approach is rooted in the needs and preferences of local areas and aims to create a system of accountability that spans multiple sectors, encourages locally appropriate innovation and limits trade-offs as much as possible.

We explain how national targets would be set, apportioned, and incentivised as well as how they could be pulled together, distributed between organisations, and the results monitored to ensure transparency. The proposed regulatory regime would also accelerate delivery of the government's existing national targets established under the Environment Act 2021.

The design and implementation of a new model would need political buy-in and a significant investment of resources from policy makers and regulators. We do not intend our proposals to be comprehensive or to provide all the answers. This report's sole purpose is to illustrate how such a new regulatory model could work.

The proposal builds on a large body of work, including but not limited to Water UK's "Water 2050" Vision, CIWEM's "A Fresh Water Future" project, work by Defra and the Rivers Trust work on catchment governance, and the Rivers Trust-led Ofwat Innovation Fund project on establishing an evidence base for nature based solutions.

This is in addition to work by Indepen and Sustainability First's Fair for the Future project, work conducted by Frontier Economics for Wessex Water and independently peer-reviewed on Outcome-based Environmental Regulation (OBER).





Call to action

We face water, climate, and nature emergencies. We need the biggest structural shift in generations to rethink how we finance, regulate, and reform our water system to deliver better societal outcomes.

A new parliament should initiate regulatory reform to:

- 1** Set water health targets at a national and catchment scale, ensuring the policy levers and incentives are in place to reduce pollutants and deliver targets locally.
- 2** Link investment and targets across water quality, flooding, nature recovery, carbon, and climate to create new sources of funding.
- 3** Ensure pollution is accurately apportioned to those responsible with detailed and transparent monitoring carried out by public bodies.
- 4** Establish independent Catchment Advisory Boards to facilitate local decision making and deliver targets efficiently.
- 5** Resource the regulators to drive compliance and sufficient investment in the water system, using existing enforcement tools.
- 6** Set a framework to deliver long-term resilience, established by an independent body, and requiring water companies and regulators to deliver against the framework.

Supported by:

Alastair Chisholm, CIWEM; Shaun Spiers (Chair), Green Alliance; Nik Perepelov, RSPB; Martin Hurst, Sustainability First; Mark Lloyd, The Rivers Trust; Ali Morse, The Wildlife Trusts; Guy Thompson and Matt Greenfield, Wessex Water; Joanna Lewis, Wiltshire Wildlife Trust.

A blueprint for reform

What's proposed in project SSWAN would ensure regulation works across sectors to transform the health of our rivers in a way that considers other environmental and societal outcomes, delivered as efficiently as possible.

There's no doubt our water system needs greater investment. What's up for discussion is how best to do that alongside (among other areas) climate, biodiversity and food production, how best to pay for this, and who should be responsible. There are too many variables to suggest a specific figure for what customer bills should be, or by how much nature-based solutions and catchment partnerships could lower bill increases. However, this regulatory reform is about ensuring society benefits from improved nature health, more cost-effective solutions, and better management and collaboration.

Water quality regulation, environmental protection, conservation and economic regulation are currently split across the Drinking Water Inspectorate (DWI), the Environment Agency (EA), Natural England (NE) and Ofwat. This split pulls the sector in different directions, ultimately failing to enable the water sector and others to deliver the outcomes customers want and our environment needs. The water environment is significantly influenced by policies and practices in other sectors such as farming, planning and development control. Radical improvements can be achieved by aligning these regulatory functions to deliver environmental, social and economic outcomes within a common overall context.

We see regulation being reformed into a four-tier approach:

Government: sets out top-level national targets and policy establishing the overall context for the regulators' work. These might include, for example, the following requirements:

- all rivers, lakes and coastal waters achieve Good Ecological Status (or a more appropriate future equivalent metric) or better by 2050 at the latest, with interim five-year intervals to provide confidence that action is progressing
- all waterbodies are sustainably abstracted, with all rivers meeting the 'Environmental Flow Indicator' or better by 2050 at the latest
- total (100%) compliance with drinking water standards at point of use.

Regulators: accountable for the delivery of these high-level outcomes – both through their application of regulation to the water sector and through extension to other sectors. This could be achieved most rapidly through reform of the water Strategic Policy Statement (SPS) into a framework that places obligations on regulators to enable the delivery of the government's national outcomes.

The regulators will define interim outcome targets and will act as the overall regulators of water companies and other entities that have an impact on outcomes – most obviously but not only water and sewerage companies, farmers and developers.

They will be responsible for enforcement to ensure compliance with target outcomes and for monitoring. They will have a strong transparency duty and make sure that all data is publicly available.



In some catchments it will be possible and desirable to go further and faster than the national baseline. The national targets should therefore represent the minimum that must be achieved. In each of the 100 catchments across England and Wales, the regulators will be able to set tougher targets that reflect local considerations, preferences and circumstances.

Joint Area Teams: each responsible for around ten catchments, these Teams will determine catchment-specific short and long-term outcomes. They will set legally binding targets for all of the entities affecting the environmental health of each catchment. They will also define the monitoring requirements for each catchment and determine responsibilities for carrying out the monitoring. The Joint Area Teams will have a duty to take account of the advice of Catchment Advisory Boards.

Catchment Advisory Boards: There will be a Board for each catchment representing local stakeholders – including, for example, environmental groups, the local water and sewerage company/companies, local authorities, farmers, developers and residents. The Catchment Advisory Boards will provide advice to the regulators on desired outcomes based on local priorities, taking account of what is achievable and at what cost. They will also provide an ongoing monitoring role, reviewing data on outcomes to update their advice over time.

Who can take action and when

A strengthened SPS would contain interim outcome targets as milestones on the route to the long-term targets set out on each area of focus. It would also set out a robust accountability framework that explicitly

holds regulators to account for delivering against their targets. The National Audit Office could assess regulators' decisions against the outcomes defined in the SPS, supported by annual parliamentary hearings. These changes could be made at any time and, in any case, should enable changes to be in place for the next water price review.

With this national steer in place, the regulators would shift their focus to regulate outcomes in individual water catchments, rather than prescriptive inputs and outputs delivered by water companies. Granular targets will be tailored to catchments and sub-catchments, ensuring they reflect local needs, preferences and geographies.

There is a range of approaches that could be taken with regard to the institutional arrangements and the roles and responsibilities of the various oversight bodies. In any scenario, government will set the minimum standards for the sector as a whole and the regulators will translate them into local objectives.

To ensure the local objectives reflect local priorities, we propose establishing Catchment Advisory Boards (CABs), empowering local communities to provide tailored guidance to the regulators. The CABs would consider how the national standards should apply in each of the river catchments and sub-catchments in England and Wales¹ and advise the regulators on proposed outcomes for each catchment and the allocation of targets to different types of organisation (eg, water companies, land managers, local authorities and developers).

It may then also be appropriate for the regulators collectively to set up Joint Area Teams, each covering around ten catchments, to translate the advice of the CABs into legally binding targets within each catchment. In this way, the country will work towards a

collective ambition for the water environment, but local areas will have the ability to go faster and potentially further if appropriate to reflect local preferences and circumstances.

Ensuring complementary government policies

The proposed model would need policies to recognise that meeting the national environmental targets relies on their integrated delivery on the ground. Policies would also reflect the need for delivery of environmental targets being rewarded alongside other societal goals, including but not limited to food production, reducing flood risk, 30% of land and water designated for nature by 2030, species abundance targets, mitigating climate change and enhancing amenity and recreational value.

In particular, Environmental Land Management Schemes (ELMS) must achieve the right incentives for farmers and land managers by:

- facilitating the transition to agricultural systems that recognise that tackling climate change and restoring nature are essential to underpinning food production in the long term
- providing a system of incentives that rewards delivery of environmental public goods in combination with private benefits delivered through a well-regulated market in environmental services.

By strengthening accountability and establishing mechanisms to develop obligations on the private sector for local delivery, this architecture would accelerate delivery of the national statutory targets under the Environment Act 2021, as already set out by the government in its Environmental Improvement Plan.

¹ We have not sought at this stage to reflect fully the differences in existing institutional arrangements in England and Wales, but the principles set out in this paper could readily be applied in both nations with coordination mechanisms to address cross-border issues.

By establishing interim milestones and catchment targets, the proposed regulatory regime would create a policy framework that, over time, would harmonise economic and environmental regulation across all sectors of the economy to incentivise more efficient delivery of environmental outcomes.

Delivering results

Outcomes drive flexible delivery

As regulated entities will be held to account for delivering their share of outcomes – such as a healthy, biodiverse rivers, secure supplies of drinking water, net zero carbon – rather than inputs and outputs, they will have significant flexibility in how they operate. They will be able to pursue more innovative and sustainable solutions which are more cost-effective and deliver better environmental outcomes.

The job of the regulators will be to determine the desired outcomes, set cost allowances for achieving them and monitor and enforce their delivery. They will not seek to regulate **how** the outcomes are delivered. Once entities within the catchment have their own targets, they will have the flexibility to innovate as they see fit, taking risks to achieve cost efficiency and better long-term outcomes.

This will end the era of regulatory micro-management and liberate all those within each catchment area to do what makes sense for them. This could be through use of nature-based solutions, investments in technology, new equipment, or collaborative working with others in the catchment.

As trust builds between entities in a catchment, and as they unlock new ways of doing things collaboratively, individual organisations may decide to deliver their own outcomes through others. This would be a form of trading obligations. For example, a water company may realise that it is more efficient to pay a farmer to change their farming techniques, rather than reduce pollution itself further down the line. Outcome-based delivery would unlock new ways of working that were previously unachievable.



The opportunity to align systems (land management, water, transport etc) to maximise delivery opportunities through developing this locally based, collaborative delivery model is significant. And the potential to further integrate policy development by more effective local delivery is also possible. Alignment of land management/energy/biodiversity and transport policy has been largely constrained through the lack of an effective, local, integrated delivery means. Across future asset investment cycles, it is possible to conceive of more expansive SPSs that integrate delivery planning through the mechanisms this paper proposes.

Transparency and monitoring

This approach can only work if there is widespread trust in the measurement of the required outcomes, grounded in a robust, practical and manageable monitoring framework, recognising that the ability to monitor will improve over time.

- The regulators should set an overall framework for monitoring, with an agreed set of monitoring solutions tailored to each outcome area.
- The responsibility for monitoring will no longer belong to any individual organisation, but will instead be overseen by the regulators' Joint Area Teams, who will decide the specific monitoring solution for an individual catchment (potentially on the advice of Catchment Advisory Boards).
- While widespread use of physical monitors will be necessary, technological solutions (satellite imagery, AI and modelling) should be used to reduce the burden of monitoring.

This approach can work even more effectively if there is widespread understanding of the targets allocated to each entity and the steps needed to achieve those targets – this will enable different organisations to identify options to deliver outcomes through others if it is more efficient to do so.

We would suggest the following information is made public:

- all targets allocated to individual entities within each catchment
- to the extent practical, the specific actions being taken by those entities to deliver their targets over the short (five-year) and long-term (25-year) – while always reflecting the basic principle that each entity is held to account for the outcomes achieved rather than actions taken
- performance against the specific metrics set by the regulators to monitor progress against each outcome.

Incentives and performance

Our proposed approach will also need to be underpinned by significant reputational and financial consequences for non-compliance. Penalties should be set to capture the full impact of missing a target on the wider environment – consistent with the principle that polluters should pay for the pollution they cause. As monitoring capabilities improve and performance can be assessed in real time, there is scope to improve public confidence by applying penalties and driving remedial action more rapidly.

Finally, the model needs to align with the broader principles of incentive-based regulation. The model described builds on the fundamental tenet of the UK's approach to economic regulation – namely that organisations should be incentivised to deliver outcomes in the most efficient and effective way. That means those organisations should benefit when they deliver better outcomes and face commercial consequences when they fail.

Regulators will continue to need to set cost allowances for water companies recognising that the companies continue to operate as licensed monopolies. In determining the level of those allowances, their approach will need to evolve. The solutions for different catchments will vary significantly and the scope for comparative regulation to provide a sound basis for efficient cost levels is likely to diminish. They will instead need to rely more on company-specific information and develop new tools to assess that information – but the basic principle of setting company-specific cost allowances that companies can out-perform is likely to remain.

Concluding remarks

The new model described here is a radical departure from today's narrow and fragmented regulatory model. It would refocus the regulation of the water and sewerage sector on transforming the condition of the UK's waterways and coastal areas. It would shift regulation towards catchment-based approaches to support cheaper, more innovative, more collaborative projects that more accurately reflect local priorities. It would also enable all entities that contribute to river, lake and sea health to adopt innovative approaches and cooperate effectively with the shared goal of delivering positive environmental outcomes.

Working in partnership, we have a real opportunity to make transformational change to ensure the future health of our waterbodies and drive nature recovery: change that will reap rewards for generations.

Advisory Panel: Alastair Chisholm, CIWEM; Shaun Spiers (Chair), Green Alliance; Nik Perepelov, RSPB; Martin Hurst, Sustainability First; Mark Lloyd, The Rivers Trust; Ali Morse, The Wildlife Trusts; Guy Thompson and Matt Greenfield, Wessex Water; Joanna Lewis, Wiltshire Wildlife Trust.

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We have created two theoretical catchments – one urban and one rural.

Urban catchment management

On the left bank the illustrations show what the catchment would look like if we continue with business as usual. The right hand side of the river shows how things could be if we take a more holistic, catchment-wide approach, working in partnership.





Business as usual

- 1. Housing on flood plain:** building on floodplains means that the water has nowhere to go when the rivers or coastal waters flood.
River or sea water can no longer spread across the built-up land, which puts pressure elsewhere in the catchment, causing greater flood risk.
- 2. Factory and car park:** certain hard surfaces we use to build infrastructure create impermeable surfaces. This means rainwater can't drain back into the ground, which creates more surface water run-off and can lead to problems, including localised flooding. To reduce the risk of flooding, surface water is often connected into combined sewerage systems which reduces the sewer systems capacity and leads to the operation of storm overflows. Surface water run-off can also transfer chemicals, animal waste and other road pollution into rivers.
 - 2a. Supermarket and car:** hard paving – no sustainable drainage.
 - 2b. School:** hard paving – no sustainable drainage.
 - 2c. Sports centre and car park:** impermeable ground and poor drainage.
 - 2d. Home and tower block:** hard paving and poor drainage.
- 3. Rubbish in rivers:** rubbish is pollution.
Throwing rubbish into the river has an impact on the water quality and can be dangerous for wildlife.
- 4. Built up river bank and no or inadequate drainage:** inadequate drainage can lead to localised flooding and standing water on roads and pavements which can be both dangerous and inconvenient.
Lack of capacity in road drains or gullies, whether because of size or a lack of maintenance, means rainwater can cause flooding.
Highway drains can also transfer pollutants from cars and roads, such as oils, chemicals and particles from tyre and break wear, directly into rivers.
Appropriately sized and maintained drainage systems can improve this situation. Alternatively, the use of sustainable drainage systems, such as swales and soakaways can improve localised drainage alongside capturing some pollutants, while also enhancing the look and feel of an area and improving wildlife.
- 5. Dog mess:** cleaning up after your dog prevents dog waste getting into the drains and polluting rivers.
- 6. Sports pitch:** impermeable ground and poor drainage. Certain materials like those used to build some sports pitches make the ground impermeable. This acts as a barrier to water draining back into the ground.
- 7. Storm overflows:** during heavy rainfall storm overflows operate to protect homes and land from flooding. Improved rainwater management will help reduce their operation.

sswan approach

1. **Flood plain allowed to do its thing:** natural drainage, prevents flooding downstream and into homes. Understanding the natural character of watercourses and preserving a natural floodplain allows space for water and reduces the risk to communities and buildings. By adopting Natural Flood Management and re-naturalising watercourses the environment can act as a store and sponge for flood waters, while also boosting biodiversity.

2. **WRC and outflow into river/sea:** water recycling centres treat the foul and storm water from the sewerage system so that it can be returned to the environment.

The Environment Agency (EA) sets conditions which specify the level of treatment required to ensure that the treated water does not have an environmental impact.

The EA works with water companies to identify sites needing improvement and companies seek approval from Ofwat to expand or improve treatment systems. Nature-based solutions such as reed beds are an additional solution for treating final effluent.

3. **Supermarket with SuDs:** separation at source is good rainwater management and supports biodiversity. It also reduces the risk of storm overflows operating during heavy rainfall as less water enters the sewers.

Reeds, grassed banks/slopes and nearby trees can be planted around these features to create SuDs, improving biodiversity and aiding water drainage.

In addition, these can be amenity features, providing an improved view, enhancing access to nature and providing wellness opportunities for local communities.

SuDs – sustainable drainage systems are designed to manage stormwater locally, to mimic natural drainage.

Swale – a shallow drainage channel where rainwater run-off from roads or car parks can collect and soak away.



4. Town hall with SuDs and water gardens:

separation at source is good rainwater management and supports biodiversity.

Sustainable drainage systems (SuDs) such as soakaways can come in different shapes and sizes, from linear swales to grass plots or ponds. Rainwater is separated before entering the sewer system and instead piped to a soakaway, pond or swale to facilitate the water to drain through the grass and media, such as gravel (where included) into the groundwater below to help recharge the underlying aquifer.

They also slow rainwater runoff into rivers and combined sewer systems to reduce flooding and storm overflow operation.

SuDs also provide filtration to help remove suspended solids and particulate contaminants from entering the groundwater.

Reeds, grassed banks/slopes and nearby trees can be planted around these features to improve biodiversity and aid water drainage.

In addition, these can be amenity features, providing an improved environment, enhancing access to nature and providing wellness space for local communities.

5. Biodiversity: creating and nurturing places for native plants to flourish encourages biodiversity and brings nature into our towns and cities. This is good for wildlife and wellbeing.

6. School with water garden: including sustainable drainage and water gardens in playgrounds and schools can reduce surface water runoff, allow rainwater to drain naturally through the soil and improve the environment by boosting wildlife.

7. Grass sports pitch: a grass or permeable ground enables good rainwater management.

8. Grassed playground: natural drainage/permeable – good rainwater management.

Including sustainable drainage and permeable natural surfaces in playgrounds and schools can reduce surface water runoff, allow rainwater to drain naturally through the soil into groundwater aquifers while also improving the environment by boosting wildlife.

9. Soakaway: separation at source is good rainwater management and encourages biodiversity.

Soakaways can come in different shapes and sizes, from linear swales to grass plots. Rainwater from buildings and hard surfaces is piped to a soakaway to allow the water to drain through the grass and ground surface, such as gravel, into the groundwater below to help refill the underlying aquifer.

Soakaways also provide some filtration to help remove tiny polluting and chemical particles from entering the groundwater.

Reeds, grassed banks/slopes and nearby trees can be planted around these features to improve biodiversity and aid water drainage.

10. Park with pond/SuD: separation at source – good rainwater management and biodiversity.

Soakaways also slow down rainwater runoff into rivers and combined sewer systems to reduce flooding and storm overflow operation. Better options for good rainwater management include the use of porous paving to enable rainwater to drain into the ground, soakaways and the use of water butts or rain gardens. Soakaways and rain gardens can improve local areas, encourage more wildlife, improve urban cooling during very hot weather and offer greater environmental resilience.

11. House with garden: natural drainage/permeable ground.

Gardens provide not only an excellent place for wildlife, but an excellent opportunity to improve the local environment. Gardens with grass, trees, hedges and flower beds use rainwater and the excess (not taken up by the plants) can drain naturally through the soil and underlying geology into groundwater aquifers.

12. Water butt: saving water and separation at source is good rainwater management.

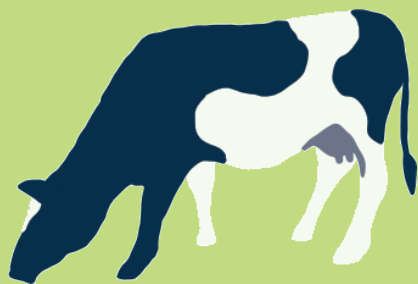
Water butts are a great way to capture rainwater falling on roofs. They provide two functions: 1) to provide an alternative to tap water when watering the garden and thereby saving water and 2) to accommodate rainwater and separate it at source rather than it flowing directly into a combined sewer and increasing storm overflow discharges.

Did you know?

During a one-hour rain storm, the amount of rain draining from one roof has the same volume as the foul waste from 100 properties? Reducing or removing this rainwater from the combined sewer will reduce the frequency of storm overflow operation. Allowing the water butt to slowly drain after it's been raining means that there is capacity to store more water when it next rains, reducing the impact of rainwater flows on combined sewers and the frequency with which storm overflows operate.

Rural catchment management

On the left bank the illustrations show what the catchment would look like if we continue with business as usual. The right hand side of the river shows how things could be if we take a more holistic, catchment-wide approach, working in partnership.



Business as usual

- 1. Barrier in river:** river barriers such as dams and weirs can impede fish and eel movement, impacting their spawning and leading to declines in numbers and harm to wider river ecosystems. In many cases there may be opportunities to install fish or eel passes, bypass channels or grassy slopes to enable easier movement upstream to spawning grounds. Many barriers may have been installed to address flooding issues. Others were constructed as part of historical water level management or irrigation systems and may now be redundant. Many river groups have identified removal of these structures as a key action to improve fish populations.
- 2. Trees planted to farm/harvest:** non-native species can damage biodiversity. Harvesting means damage to habitats and ability for life to flourish. While plantations are important for forestry and wood production, non-native plantations and monocultures can impact the wider diversity of wildlife within the countryside. A lack of diversity means lower environmental resilience and susceptibility to disease or climatic pressure, as well as contributing to decline in certain species.
- 3. Slurry:** manures and slurries from farm animals can be a sustainable way of providing nutrients to crops. However, excessive use of slurry, or applying it during the wrong weather conditions such as heavy rainfall, can cause increased levels of nutrients to be washed off the land into rivers, contributing to eutrophication and damaging habitats.
- 4. Poorly maintained agricultural sites:** risk of pollution into water course. Poor management of fuels and agricultural chemicals can lead to soil and water contamination. While this is rare, it can still happen and can harm both groundwater and river water, and also affect water supply sources such as boreholes or reservoirs. Fuels and chemicals should be appropriately used, securely captured and stored away from surface water drainage or watercourses.
- 5. Road with poor drainage:** acting as run-off pathways where there is poor drainage infrastructure. Where there is poor or badly maintained road drainage this can lead to greater run-off straight into the water environment. Road drains can contain a wide range of contaminants including rubber, microplastics and metals from car wear and tear; hydrocarbons and antifreeze from vehicle movements; and soil and litter from rural and urban runoff.
- 6. Crops right up to river's edge:** grazing and cropping right up to the riverbank can increase the risk of run-off from these fields creating pollution in the river. Surface water running across fields can transport sediment, excess nutrients (from manure or fertilisers) and pathogens (from animals) into river channels. This can cause eutrophication, affect water quality and sediments can smother river habitats causing harm to fish and species living in the river.
- 7a. Livestock:** although it is illegal to allow livestock to enter a river, it does sometimes happen. If farm animals enter rivers it can cause environmental problems from bankside erosion leading to sediment pollution in rivers, to the introduction of pathogens and nutrient contamination that compromise water quality for people and wildlife. It can also harm the animals themselves as they may come in contact with pathogens in the watercourse, or slip and harm themselves.
- 7b. Eroding riverbank allowing run off:** there are many reasons why riverbanks erode. Some are natural and due to normal river processes, but in many cases this is exacerbated by poor field, bankside and upper catchment management. Erosion of riverbanks not only loses soil which is essential for growing crops, but also releases sediment into rivers which can transport pollutants such as nutrients or pathogens. It can also increase flooding issues downstream. Where natural river forms are replaced by concrete, metal or clay lined channels the flow can increase. This can lead to greater scouring of river channels, undermining riverbanks causing them to collapse, and creating higher levels of sediment pollution which affects fish habitats and water quality.

Eutrophication – pollutants such as phosphorus and nitrogen can cause algal blooms which can kill plants and result in the reduction of oxygen in the water, killing fish and other organisms.

swan approach

1. Reservoir: sustainable abstraction.

Reservoirs are a vital source of drinking water. They are also an important habitat for many species and host recreational activities including fishing and walking which are often highly valued by local communities. Water quality in reservoirs is influenced by land uses surrounding the reservoirs themselves and the rivers and streams feeding into them. Improving land management and pollution controls around these areas is important, but also provides an opportunity to enhance habitats for wildlife and other factors. For example, reversion of agricultural land to woodland, wetland creation or natural flood management in these areas can both improve water quality by filtering water, create new wildlife rich habitats and also retain water for longer, reducing peaks and troughs associated with a changing climate.

2. Reedbeds by treatment works: storm overflow management to minimise pollution.

Water recycling centres treat the foul and stormwater received from the sewerage system in order that it can be safely returned to the environment. The Environment Agency set permit conditions which specify the level of treatment required to ensure that the treated water does not have an environmental impact.

Many settlements have traditional combined drainage systems where both sewage and rainwater from houses and businesses enter the same system. This can be made worse by groundwater infiltration into privately owned and water company owned sewers. Combined sewers often have to include storm overflows, which automatically operate during heavy rainstorms to protect properties from flooding and prevent sewage from overflowing into streets and homes. Water companies are working to significantly reduce the number of times storm overflows operate, but this can be helped by changes in the way rainwater is managed or by separation of rainwater away from combined sewers.

Reedbeds are a form of nature-based treatment solution which can help to reduce levels of contaminants in storm water by naturally filtering out substances and reducing pathogens. They can also enhance wildlife by providing additional habitat for insects, birds and other species. Compared



to 'traditional' treatment solutions, they have a generally lower energy, chemical and carbon impact.

- 3. Alternative route for fish to swim upriver:** allows natural solution for fish spawning.

Providing fish and eel passage around barriers in rivers such as dams can avoid blocking fish and eel movement which impacts their spawning, leading to declines in their numbers and harm to wider river ecosystems. Fish and eel passes enable easier movement upstream to spawning grounds.

- 4. Wetlands:** natural flood plain.

Wetlands can help protect us from extreme weather events by storing rain like a sponge, which reduces flooding but can also help lessen drought by slowly releasing water back into rivers, lakes and groundwater. They can also reduce air temperatures and help to control erosion. They play an important role in improving water quality, are a crucial habitat for many species and provide opportunities for recreation and connection to nature. Wetlands can be reintroduced into more naturalised floodplains or included in new developments as a form of sustainable drainage.

- 5. Natural woodlands and hedgerows:** increased biodiversity/long term natural habitats.

Woodlands and hedgerows are an important part of our landscape and an integral part of our natural environment. Natural woodlands can sustain an immense range of wildlife, support human health and wellbeing, improve air quality, offer shade for crops and livestock, prevent nutrient loss and soil

erosion, improve water quality, and reduce the risk of flooding.

Hedgerows are an important habitat in their own right, supporting a rich variety of species, and act as a link between habitats. They reduce the amount of fertilisers, pesticides and sediment that reach watercourses by acting as a physical barrier in or around fields, increase infiltration to the soil, and recycle nutrients through the trees, shrubs and other plants they contain. Expanding existing, or creating new, woodlands and hedgerows to link them up is an important step towards recovering species populations.

- 6. Well maintained/tidy farm:** agricultural activities are one of the largest sources of pollutants to rivers, lakes and estuaries according to the Environment Agency. Adopting a range of pollution reduction measures across farms and rural industry to reduce soil erosion, pollution from nutrients, chemicals and fuels, will help to protect and improve our rivers and groundwaters.

- 7. Buffer strips along river bank:** protects from run off.

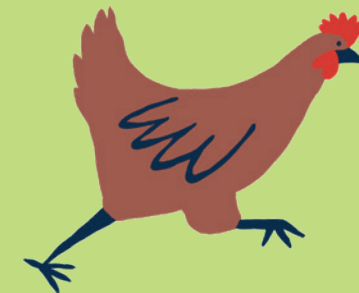
Buffer strips provide river bank protection to reduce levels of erosion and prevent agricultural/animal contaminants running into the watercourse, improving water quality.

There is also the potential to encourage wild riverbank plants to flourish between the fence and river, increasing biodiversity and providing further resilience and bank protection.

- 8. Bathing water:** rivers and lakes are increasingly used for recreation, with associated health benefits and a more direct connection to nature. Water quality is important to reduce the risk of harm to recreational users and is influenced by factors including water company discharges, agricultural practices, septic tanks, pathogens from wildlife and road drainage. Real-time monitoring of water quality allows recreational users to make informed choices about the safety of their activity while improvements to water company systems and reductions in pollution from agriculture and urban area will improve overall water quality.

- 9. Managed livestock:** protecting the riverbank from erosion and the river from pollution.

Fencing and buffer strips provide river bank protection to reduce levels of erosion and prevent agricultural/animal contaminants running into the watercourse, improving water quality.



Case studies

Across England and Wales there are already many examples of partnerships working together to take a catchment approach to protecting nature and our watercourses.

Organisations mentioned in the following case studies who are not signed up members of the SSWAN Advisory Panel may not endorse the SSWAN proposals.





Water treatment wetlands, Ingoldisthorpe

Norfolk Rivers Trust in partnership with Anglian Water



Background

The Norfolk Rivers Trust and the Environment Agency have been working in partnership with Anglian Water as part of their Get River Positive commitment to restore river habitats across the region.

Together, they have created a wetland near Ingoldisthorpe, operating as a natural treatment plant for millions of litres of water, a wildlife haven, and a beauty spot. Additionally, it has improved resilience by harnessing nature without the need for carbon-heavy infrastructure and additional chemical usage.

Challenge

East Anglia has a growing population and there is pressure to improve water quality whilst providing space for nature, local amenity, and reducing carbon emissions. Nature-based solutions are key to this, providing vital services to customers and meeting these demands, in a way that benefits wildlife, the environment and local communities too.

Chemicals and pollution in a growing region poses a major challenge. With pollutants such as phosphates and ammonia coming from urban runoff and domestic products like detergents, as well as human and animal waste. With a growing region, there is a need to increase natural solutions rather than focusing on chemical treatment processes or carbon intensive solutions that are unsustainably and costly.

Solution

A one-hectare wetland was created next to the water treatment works, taking used but treated water and passing it through a series of interconnected ponds planted with native wetland species such as iris, sedges, rush, marsh marigold and watercress.

Despite already meeting the permit thresholds the wetland plants provide further treatment, naturally cleaning the water, removing extra ammonia and phosphate before it re-enters the river, removing the

need for costly carbon-intensive solutions.

The wetlands are also a huge biodiversity asset. A local primary school survey found over 200 species of plants, animals and insects including a large variety of butterflies, dragonflies and other aquatic invertebrates, yellowhammers and spotted flycatchers. Footage of a water vole was also recorded using remote cameras.

Outcome

As the habitat becomes more established, the site will be valuable for wildlife. A section of the river Ingol has been re-meandered to allow space for the wetland. The new stretch contains features including a narrower channel with a faster flow, and shallow and deeper sections. The result is a classic chalk stream with clear water and a gravel chalk bed.

Additionally, 1400 native trees including oak, holly, hawthorn, field maple and hazel hornbeam have been planted to keep the river cool – further encouraging biodiversity.

Lessons learned

Anglian Water's wetland programme at Ingoldisthorpe has provided a blueprint which can now be rolled out across the region.



Improving habitats and resilience, River Wylde

Wiltshire Wildlife Trust in partnership with Wessex Water



Background

The River Wylde is a revered chalkstream in Wiltshire. Famed for a diversity of aquatic flora and fauna, including iconic British species such as salmon, wild brown trout, otter and water vole. The river catchment is uniquely protected under national and international law (as part of the River Avon Special Area of Conservation).

The Wider Wylde strategy is led by Wessex Rivers Trust and Wiltshire Wildlife Trust and delivered through diverse stakeholder groups and partners, including the Hampshire Avon Catchment Partnership (HACP) and Wessex Water. The site is significant as the health of the natural environment directly underpins the regional economy and community wellbeing.

Challenge

The long-term health of the river is at great risk due to issues including water quality and quantity, degradation of the river channel, invasive non-native species and the broader effects of climate change.

Solution

The 2020-2025 Wider Wylde Strategy is both people and nature focused and includes:

Restoring natural processes in our rivers and floodplain

Restoration will bring back natural processes to some of the most physically degraded reaches of the river and its floodplain, helping to repair the natural environment and restore its ecosystem.

Education and engagement in the local community

The HACP recognises the value of nature connectivity, embedding volunteer-focused events, guided river walks and school education projects at the heart of the project to improve the communities' connection to the Wylde catchment.

Collaboration with land managers and wider stakeholders

There is a desire among local land managers to adopt regenerative farming practices that better protect water

quality and biodiversity. HACP delivers community-focused activity, delivering learning and engagement events covering new environmental schemes and surveys to identify new opportunities for restoration.

Outcomes

The project's overall outcomes have created bigger, better connected and natural functioning habitats, providing an array of benefits including flood reduction, water purifying and carbon capture.

Natural processes have been restored, enhancing at least 5km of river and 10ha of floodplain. Engagement with the local community has increased, with hundreds of children and adults having built awareness to protect this chalk stream. A climate resilient future has developed, with land managers and stakeholders working together in partnership.

Lessons learned

1. Collaboration is key as it unlocks expertise, knowledge and funding. Local communities and stakeholders must sit at the heart of activity to build a strong foundation for future work.
2. Local farmers are a critical part of cross-sector working relationships, especially in delivering natural capital benefits via new Environmental Land Management Scheme (ELMS) and Biodiversity Net Gain principles.
3. Early investment prior to the onset of ELMS will place the HACP and the farming community in a strong position to deliver natural capital benefits and ecosystem services.





Smarter water catchments, Thames river basin

Thames Water in partnership with
Greater London Authority (GLA)
and Waltham Forest Borough



Background

Thames Water have 27 catchments within the Thames River Basin. These catchments are highly varied, ranging from primarily rural catchments with nutrient issues to extensively urban catchments with rainwater runoff contributing to river pollution.

Challenge

In urban catchments, Thames Water need to remove or attenuate 7,000 ha of impermeable area from draining to London's sewers by 2050; the equivalent of more than 50 Hyde Parks. London's highways are congested with services and disruption from street works a major issue in the Capital. This makes network solutions expensive and challenging. Solutions require extensive collaboration with London's communities to change the way rainwater is managed.

Solution

The Smarter Water Catchment initiative aims to have all 27 catchments operating under

collaborative partnerships to identify and act on issues and opportunities to deliver healthy and sustainable rivers. Thames Water and their London-based communities explored opportunities through two pilots:

Project Capture

A collaboration to garner community support to adopt leaky butts on domestic properties, Thames Water and Waltham Forest Borough Council identified that within certain communities, attitudes towards adoption of water butts changed once it became clear they offered a low cost and rapid contribution to addressing concerns around flooding. Engagement on this basis resulted a stated preference of around 90% willingness to adopt within two key early adopter communities.

Delivery of SuDs through Streetworks

Between April 2022 – April 2023 there were 435,825 streetworks

permits issued across London. These could allow works from multiple utilities to take place at the same time. In a flagship pilot collaboration with Cadent Gas, SuDs were installed alongside other works. The project benefits included reduced use of concrete and construction materials, cost savings, reduced disruption for local road users and improved green space, attenuation capacity and pedestrian crossings.

Lessons learned

The early pilots in Project Capture have been sufficiently encouraging to lead to work on the co-creation of scaled up trials with GLA/LAs investing in 1,000+ water butts to test the opportunity to increase rates of adoption beyond the early adopters.

Streetworks provides a new method for delivering SuDs across London. The high-level feasibility study has suggested there appears to be sufficient supply of SuDs projects (via

streetworks) and demand for SuDs to introduce a market mechanism into this process that would help the practice scale. The GLA are considering innovation investment opportunities to finance a SuDs-Streetworks trial.



Reviving rivers in England

The Rivers Trust in partnership with Coca Cola



Background

The Rivers Trust and the Coca Cola Foundation have been working in partnership for the past decade to develop a deeper understanding of freshwater environments across England. In 2020, a new three-year programme was launched to help clean some of England's most polluted rivers, reduce flood risk and create new wetland habitats in rural and urban locations.

Challenge

The UK's rivers are under stress. Extreme weather events that cause flooding and drought, coupled with pollution and poor land management have had a huge effect on natural habitats and biodiversity.

Solution

The 2020 project was launched to help businesses become more water efficient and improve water quality, reduce flood risk, store carbon, improve habitats and biodiversity,

and enhance the health and wellbeing of local communities. The project encompasses six distinct water management, environmental restoration and conservation projects. For example, its 'green infrastructure' initiative will improve water quality and sequester carbon in the Thames and South East. Work is also taking place in the North East of England addressing rural land management as well as peatland restoration in Kent.

Project aims:

- Demonstrate how businesses can lead in driving water-efficiency measures.
- Replenish more than 1.6 billion litres of water to the natural environment.
- Capture or absorb 10 tonnes of carbon per year.
- Create four new, large urban wetlands and a further 20 settling wetlands.
- Restore 66 hectares of ancient coastal fen in Kent.

- Improve biodiversity and restore habitats for wildlife.
- Work with farmers, landowners and other businesses to improve land management and reduce run-off.
- Plant 9,000 new trees near Morpeth in Northumberland to lock in carbon, alleviate pollution and reduce local flood risk.

Outcome

By working with local landowners and communities, river health is improving. The creation of new urban wetlands and settling wetlands enables the capture of pollutants, and there is improved biodiversity through habitat restoration of ancient fen in Kent for more than 30 bird, animal and rare plant species.

Restoring and creating freshwater habitats has provided a natural environment for communities to enjoy, improving wellbeing and demonstrating the business case for action.

Lessons learned

1. Hard engineering alone is not enough to revive our rivers: nature-based solutions like tree planting and wetlands are fundamental for climate resilience.
2. Partnerships have enabled the successful delivery of nature-based solutions through local collaboration that have improved the quality and resilience of catchments.



Nature-based solutions for flood alleviation, Mansfield

Severn Trent Water in partnership with Mansfield District Council and Nottinghamshire County Council



Background

Mansfield is surrounded by vestiges of Sherwood Forest. The River Maun flows through Mansfield town centre and later joins the River Idle. Tributaries to the River Maun include Caudwell Brook, Vicar Water, Rainworth Water and Foul Evil Brook.

Challenge

Historically, flooding has been the prominent issue from both the main river and ordinary watercourses. There is also an increasing risk from flash surface water run-off flooding and sewer flooding.

The flood hazard and risk maps for Mansfield show that there are approximately 30,600 people living in the Mansfield surface water flood risk area, with 863 in the high-risk category.

Solution

In 2022, Severn Trent Water, Mansfield District Council and Nottinghamshire County Council launched a £76-million Green Recovery Project, the largest flood alleviation project of its kind in England.

The project will use nature-based solutions such as:

- 20,000 sustainable drainage systems (SuDs) to divert surface water away from sewers, slowing it down and helping drains to cope. SuDs combine some of the latest water drainage technology with natural resources, reducing flood risk while cutting pollution and enticing more plant and animal species.
- Basins, planters and swales – swales are shallow channels with sloping sides, which store the water and release it more slowly into the ground.

- Rain garden areas around the Market Place and Old Town Hall – using plants and soil to retain and slow the flow of rainwater from surrounding hard surfaces. They also cool urban areas in the summer, helping to make a positive difference even when it is not raining.
- A pocket park with a slide for children in the existing green space on the corner of Walkden Street/Quaker Way, to make the town more flood resilient. Adding more trees shrubs helps to capture rainwater and allows it to infiltrate.
- Permeable paving – used for car parks, walkways, and other hard surfaces. These contains tiny holes allowing water to pass and soak slowly into the ground beneath.

Outcome

By harnessing nature, the project will reduce flood risk for 90,000 people and create 390 local jobs. The aim is for the project to become the blueprint for how we manage flooding in the future. It also makes Mansfield an even fresher, greener place to live for communities and nature.

When complete, the scheme will be able to store 58 million litres of surface water – the equivalent of 23 Olympic-sized swimming pools.

Lessons learned

The project is not complete, however we will update this case study once we have been able to fully assess the outcomes.





Improving water quality and biodiversity

Eden Rivers Trust in partnership with United Utilities



Background

The River Eden in Cumbria is an internationally important river for biodiversity and geology known as a Special Area for Conservation. The landscape is dominated by small, predominantly livestock farms and woodland, and farming and tourism are essential to the local economy. There are a number of small wastewater treatment works across the catchment.

Challenge

None of the River Eden's 86 official water bodies have a 'high' water quality status and 21% are classed as 'poor' or 'bad'. There are numerous sites designated for wildlife, landscape and heritage value, however nearly half of these Sites of Special Scientific Interest (SSIs) are in unfavourable condition. Pollution from excess nutrients and agricultural run-off threaten the water quality.

Solution

In 2019 the UK's first Catchment Nutrient Balancing (CNB) trial was

initiated. The project initially aimed to remove 150kg of phosphorus load through integrated catchment and treatment works solutions.

Wider catchment measures included hedges, buffer strips and sediment ponds delivered at farm level to reduce agriculture's contributions to water pollution – going beyond regulatory obligations.

United Utilities worked together with the Eden Rivers Trust, Carlisle City Council, Cumbria County Council, Lancaster University, Natural England's Catchment Sensitive Farming, The National Farmers Union, the Environment Agency, and Nestle and their fellow stakeholders, making joint decisions through co-creation and co-delivery of interventions.

Outcome

The trial exceeded expectations, achieving a 63% reduction in phosphorus. The trial saw that an improved process at treatment

works, combined with catchment interventions, delivered significant additional ecological benefits through the reduction of nitrate, sediments, nitrous oxide, and bacterial load. They have also delivered wider biodiversity benefit and overall soil quality enhancement.

The CNB trial will be expanded across three further wastewater treatment works in the Petteril catchment – Greystoke, Motherby and Southwaite.

Lessons learned

Catchment-based solutions need to be bespoke – "one size fits all" does not work. Working in partnership is more efficient and more effective. Engaging with agriculture is likely to yield improved performance and better compliance which provides increased river quality benefit.

Innovation is key – and the freedom and incentives to take risks will encourage further innovation.





Reducing the use of storm overflows, Hampshire and Isle of Wight

Southern Water in partnership with the EA and parish councils



Background

Southern Water is working with partnerships to reduce the impact of storm overflows launching a 'Pathfinder' programme to further work through a targeted approach.

Challenge

The ambition to reduce the use of storm overflows - caused by a combination of historical infrastructure not fit for needs of the 21st century, and the impacts of climate change - is hampered by legislative and regulatory constraints that do not incentivise the most effective, efficient and sustainable solutions. Viewing rainwater as 'a resource to be reused' is not possible with current drainage infrastructure, because it mixes rainwater with sewage rather than harnessing its benefits.

Solution

The Pathfinder project started with the assumption that the most efficient, cost-effective, and environmentally beneficial

approach was to reduce, or slow, the amount of water entering sewers. The following examples show this approach in action:

Swalecliffe

Spills were reduced by over 30% by working with the EA to increase the usage of storm tank storage, investing £750,000 in new chambers and pipework and redirecting 450l of storm water per second during a heavy rainfall.

Appley and Fairlee, Isle of Wight

Owing to a new small pumping station and better use of storage, this has reduced releases to Appley to 30 per year with Fairlee seeing a 95% reduction in annual releases.

Lower Church Road, Isle of Wight

A flood risk assessment was submitted to the EA to redirect the flow of stormwater and install a flow restriction device from a development of 50 properties. The work will reduce spills by 30%.

Pan Parishes, Hampshire

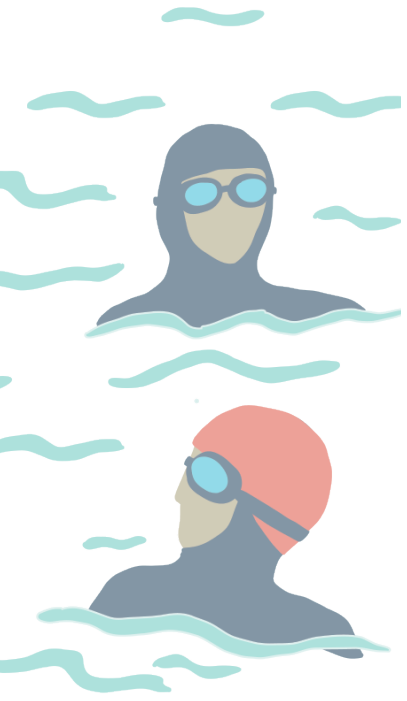
Partnership work has started with Pan Parish councillors and customers in the area to encourage them to take part in their Pathfinder trial. 559 connectivity surveys were conducted at private properties resulting in an offer to seal leaking pipes for free. Over 100 properties have had pipes sealed for free, reporting positive outcomes. This will help mitigate against excess water from private networks entering public sewers and help prevent local flooding, which is worsened by high groundwater volumes.

Outcome

Although the project is ongoing, initial schemes demonstrate the value of water storage and other initiatives to prevent sewer systems being overwhelmed.

Lessons learned

The above initiatives are focussed on built environment rather than natural environment ways of stopping water flow at source because of the current legislative and regulatory constraints to nature based solutions.





Nature restoration, Haweswater

RSPB and United Utilities partnership



Background

Haweswater sits within a landscape of mountains, moorland, streams, bog and woodland. The area is a vital source of water for the Haweswater reservoir, which provides two million homes and business with drinking water. The RSPB manages two farms on the catchment, which together with their associated common land, cover about 3,000 hectares. Working in partnership with United Utilities, RSPB manages the land to demonstrate how ecological restoration can work alongside sustainable upland farming.

Challenge

The area faces huge challenges:

- shifts in the land economy – how will farmers be paid; where might future markets be. Many upland farms are not financially viable without subsidy and grants
- shifts in the climate – storms and droughts are the new normal
- shifts in what society needs and expects from its landscapes.

Solution

RSPB set out four responsibilities to ensure catchment resilience.

1. Putting the land enterprises at Haweswater on a viable financial footing.
2. Matching the management at Haweswater to the needs of society.
3. Securing the natural fabric of Haweswater for future generations.
4. Making sure the landscape remains unmistakably Haweswater.

RPSB's work includes:

- restoring watercourses – Swindale Beck had been artificially straightened and had its riverbanks raised over the years. By restoring its natural meandering course and removing raised banks, the water is now better connected with its floodplain, reducing flooding downstream and improving conditions for wildlife
- blocking artificial drains and restoring peat bogs – working with Natural England,

Cumbria Wildlife Trust and other partners, over 50km of artificial drains have been blocked, raising the water table to increase the abundance of peat-forming bog mosses, increasing carbon sequestration, reducing flood risk and boosting biodiversity

- changes to livestock grazing and transparent financing – reducing stocking rates of livestock improves soil and water quality, encourages regeneration of vegetation, and can improve farm profitability through reduced input costs
- tree planting and woodland restoration – more than 100,000 trees have been planted at Haweswater since 2011, using locally-sourced saplings, many of which were grown in the RSPB's on site nursery. Together, these approaches reduce damage to soils and limit runoff, improving river water quality.

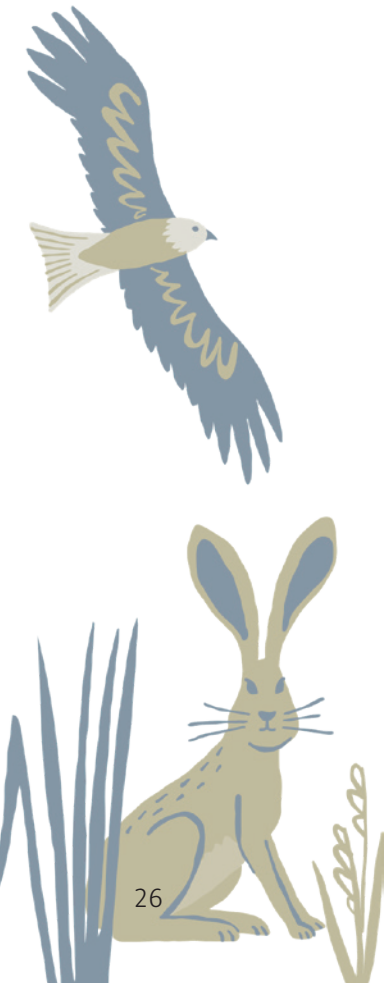
Outcome

The work is leading to the development of a richer, more complex patchwork of ground

cover with a combination of wet, wooded and open areas. The management of site is focused in restoring and replicating natural processes, such as naturalistic grazing, natural succession and natural flooding patterns. Given time, this will lead to the recovery of diverse habitat mosaic, providing huge benefits to water, wildlife and people.

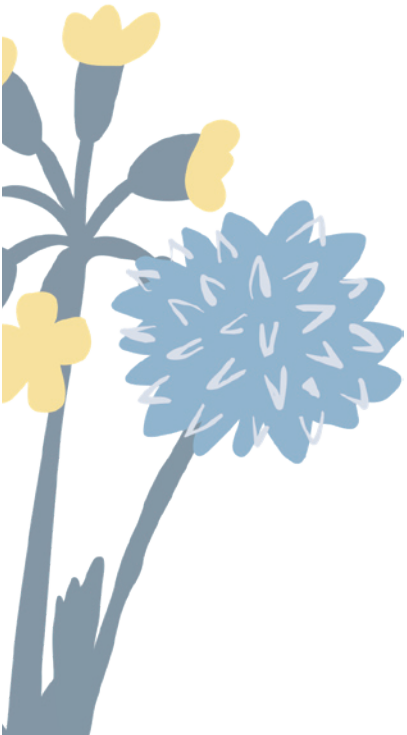
Lessons learned

The new approach to land management as Haweswater is as good for natural environment as it is for the local economy. Employment has risen from four full-time staff in 2012 to 18 today. This has been achieved by diversifying income streams, focusing not just on livestock production, but also on ecotourism and leaning into grants for nature recovery. This approach could be applied far more widely in the UK uplands, but support is needed to help farmers make the transition.



Addressing pharmaceutical effects on water quality, Cam and Wellow

Bristol Avon Catchment Partnership



Background

Bristol Avon Catchment Partnership (BACP) was formed by Wessex Water, University of Bath, Bristol Avon Rivers Trust, Bath & NE Somerset Council, the Environment Agency and Natural England. It was launched to better understand the main drivers of pollution and support landowners to successfully target and deliver measures to restore nature.

The Cam and Wellow brooks are a partial SSSI and the valley experiences flooding and low/sluggish summer flows. With multiple users of the river system in the area, the project provided an opportunity for researchers to look at different contributors to water quality within the catchment and assess their impact.

Challenge

Using water quality data, researchers identified pharmaceutical traces in the river system. There was an opportunity to better understand (and potentially treat) health outcomes of the community by analysing wastewater – a globally recognised method for addressing the interdependencies around human and environmental health.

Solution

BACP introduced the OneHealth initiative, which involved specific analysis from the water recycling centres in the catchment using sewage as an indicator for community health. It allowed medical professionals to tailor social prescribing to reduce reliance on meds and therefore improve water quality.

Outcome

The OneHealth data is used to inform health prescriptions – typically nature or socially-based – to address non-communicable diseases (anxiety, depression, cardiovascular disease etc) via different interventions to reduce the volume of pharmaceutical traces in the water system.

The work has seen improved water quality and improved fish habitats.

Lessons learned

Linking the healthcare system and water/environmental sectors could provide alternative funding streams to enable a greater level of green and social prescribing but it needs a longer-term vision alongside enabling action in order to be sustained.

Nature-based solution for flooding alleviation, Hanging Langford

Wessex Water in partnership with Wiltshire Wildlife Trust



Background

Hanging Langford is in the Cranbourne Chase and West Wiltshire Downs National Landscape. Wiltshire Wildlife Trust owns the Langford Lakes Nature Reserve which is made up of meadows and three lakes, with the River Wylye forming part of its border. The lakes and surrounding river host wildlife such as gadwall, tufted duck, kingfishers and the endangered bittern, and salmon, brown trout and grayling as well as otters and water voles.

Wessex Water has a sewage pumping station next to the site.

Challenge

Lying in a chalk valley and straddling the River Wylye, the water table at Hanging Langford fluctuates throughout the seasons, causing localised flooding. Residents have been forced to direct surface water down manholes to protect properties

from this flooding, effectively transforming the sewer system to a land drainage network.

To provide a drainage system for residents, Wessex Water pumped the diluted effluent from the sewerage system under emergency powers from the Environment Agency (EA) into the river. However, this was not a permanent solution, being both unsightly and risking the downstream nature reserve. Solutions such as a new drainage scheme expanding the network would have been both costly and carbon intensive.

Solution

An innovative nature-based solution was created by Wiltshire Wildlife Trust and Wessex Water involving the construction of a reed bed within the nature reserve to naturally treat the effluent, removing chemicals and pollutants prior to the water being discharged to river. The sewerage

system was sealed to manage volumes and the EA agreed to a pumped, screened overflow when necessary to avert a flood risk. A new wildlife habitat has been created and no untreated effluent now discharges into the river.

Outcome

Wessex Water is working with the EA to develop the first ever biologically treated storm overflow permit at this site, using numerical standards to ensure that the quality of the discharge has no environmental impact to the river.

River sampling since January 2023 has shown no adverse impact on the watercourse from these pumping operations and the risk of homes flooding has been alleviated. The reedbed removes 72% of suspended solids found in the arriving water, as well as 88% removal of E-Coli. There is no impact on the river in terms of phosphorus or ammonia

concentrations and there's been a slight improvement in terms of E-Coli.

The reedbed also provides a valuable habitat for species including dragonflies and warblers.

Lessons learned

1. Flexibility was key to allow an innovative and unique permitting arrangement, which has permanently reduced the flood risk and improved water quality.
2. Partnership working between the EA, Wessex Water and Wiltshire Wildlife Trust enabled the success of this project.





Upstream Thinking

The South West Peatland Partnership, Cornwall Wildlife Trust, Devon Wildlife Trust, Westcountry Rivers Trust, FWAG, South West Lakes Trust in partnership with South West Water

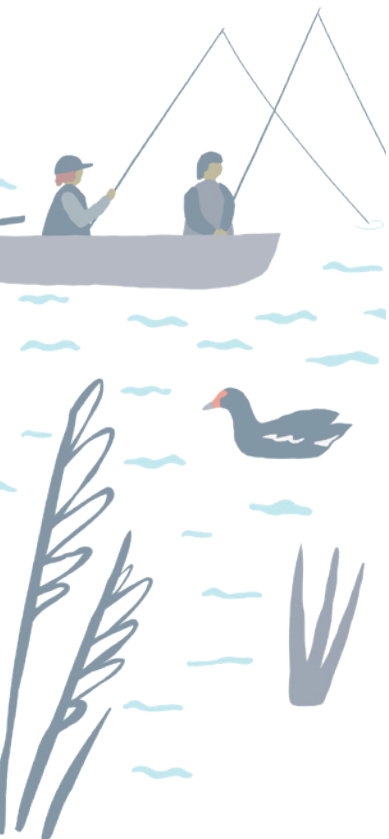


Background

Upstream Thinking works with trusted, local delivery partners to employ local experts who support farmers to manage their land in ways which are better for water quality and wildlife, by reducing pollutants and keeping more water in the landscape using nature-based solutions.

Our delivery partners have developed trusted relationships with farms across the region which helps build confidence in their advice and increases the opportunity to change.

A partnership comprising South West Water, the South West Peatland Partnership, Cornwall Wildlife Trust, Devon Wildlife Trust, Westcountry Rivers Trust, FWAG and South West Lakes Trust, has been set up to reduce river pollution and enhance biodiversity.



Challenge

Farmyard manure, artificial fertilisers, herbicides and pesticides used on the land can end up in rivers. This not only damages biodiversity, but bad raw-water quality means more intensive, expensive treatment is required to get it to drinking-water standards.

Solution

Our multi-award-winning catchment-management scheme, Upstream Thinking, applies natural solutions to reduce agricultural impact while supporting farmers and the rural economy, by providing long-term resilience to climate change.

Working together, our activities include:

- Installing waterside fencing
- Building ponds
- Improving farm tracks

- Increasing slurry storage
- Planting trees and buffer strips to catch and filter water
- Restoring peatland and improving soil management

Outcomes

- Lower costs: by the time water reaches streams, rivers and reservoirs, it is much cleaner. This makes treatment more efficient, using less energy and carbon.
- Better homes for wildlife: improved soil quality, more trees and plant species, and cleaner water mean many species have returned to the waterways that we have helped clean up.
- More confidence for farmers: it is only with the support of farmers that we have been able to enjoy the benefits of this programme. Farmers who have engaged with Upstream Thinking have seen many benefits, including more

nutrients left in the soil due to less run-off, healthier pastures, and sponsored upgrades to their farms like fencing and silage storage.

- Recovering nature for wildlife: the partnerships have committed to improving biodiversity across our sites through improvements in ground management.

Lessons learned

Working together is the only way to achieve long-lasting change; The willingness of local landowners, farmers and volunteers to do the right thing for the land and water has made all this possible.

Our delivery partners have developed trusted relationships with farms across the region which helps build confidence in their advice and increases the opportunity to change.



The Rivers Trust

Water for Tomorrow participatory model



Background

Water for Tomorrow (WfT) was a partnership of five organisations across France and England, which aimed to improve the management of water resources to increase environmental, economic and societal resilience to water scarcity and drought.

The partners included The Rivers Trust (lead partner), Water Resources East, the Environment Agency, Bureau des Recherche Géologique et Minière, and Communauté d'Agglomération Béthune Bruay Artois Lys Romane.

Challenge

Water scarcity is a recurring problem with serious economic, social and environmental costs for the Channel area. WfT aimed to address these challenges and increase local resilience by bringing together stakeholders to co-design innovative management tools and systems. The goal was to achieve this for waterways in the Cam

and Ely Ouse, East Suffolk and Broadland catchments, to find the best solutions for sectors to adapt to water shortages.

Solution

Working across all concerned sectors, WfT supported the development and implementation of new and innovative operational management tools and processes to enable more responsive short-term management, and better long-term planning and investment, at a local scale.

Specifically, WfT aimed to deliver:

- New data collection methods, hydro-economic models and new software to improve water allocation and early warning of water scarcity.
- Multi-sector collaboration that supported the uptake and roll-out of these systems and use of smart technologies in the management of water resources across the FCE area.

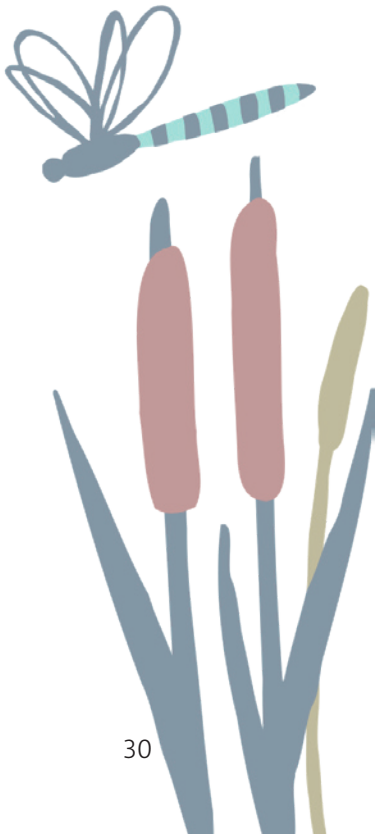
Lessons learned

No one person can have a complete picture of the hydrological, environmental, political, legal, economic and social processes that are all relevant to solving water problems. The use of a participatory model helped to map out how things work in the real world, based on the views of different people.

The models revealed several findings across the agriculture, ecology and water industries. These include:

- Water stress affects agricultural productivity and profitability but can be reduced by improved access to, and more efficient use of, water.
- Diverse and high-quality habitats support diverse and thriving ecological communities but require the right conditions to thrive. Climate change impacts on the characteristics of water can alter the habitats, causing decline or loss altogether.

- Water scarcity can impact industry by reducing revenues and production, which may lead to business closures or relocation. Changes in production can also have knock-on effects on other sectors in the local area.
- Water companies must manage supply and demand through effective management, such as investment in supply infrastructure and reducing leakage. Water supply is also determined by abstraction, which must be carefully regulated to ensure water is left for the environment.



Your comments and ideas:



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