



NORFOLK RIVERS TRUST



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RIVERS TRUST



Restoring, protecting and enhancing the water environments
of Norfolk for the benefit of people and wildlife



We are dedicated to restoring, protecting and enhancing the water environments of Norfolk, to benefit people and wildlife.

We strive to achieve healthy, diverse river and wetland habitats that are rich in biodiversity and resilient to a changing climate, while providing wider benefits including food security, clean water and improvements to human wellbeing.

Our key work areas include:

- ➡ Aquatic habitat creation
- ➡ Conservation and restoration
- ➡ Education and engagement
- ➡ Land management and farm advice



As an independent and trusted charity, our team of experienced ecologists and advisors work at a river-catchment scale to develop practical, cost-effective and integrated long-term solutions, centred on comprehensive ecological and scientific principles.

Operating across Norfolk and the Cam and Ely Ouse (CamEO) catchments, we believe that partnership working is fundamental to achieving our mission. This includes farmers, landowners, communities, businesses, statutory organisations and eNGOs.

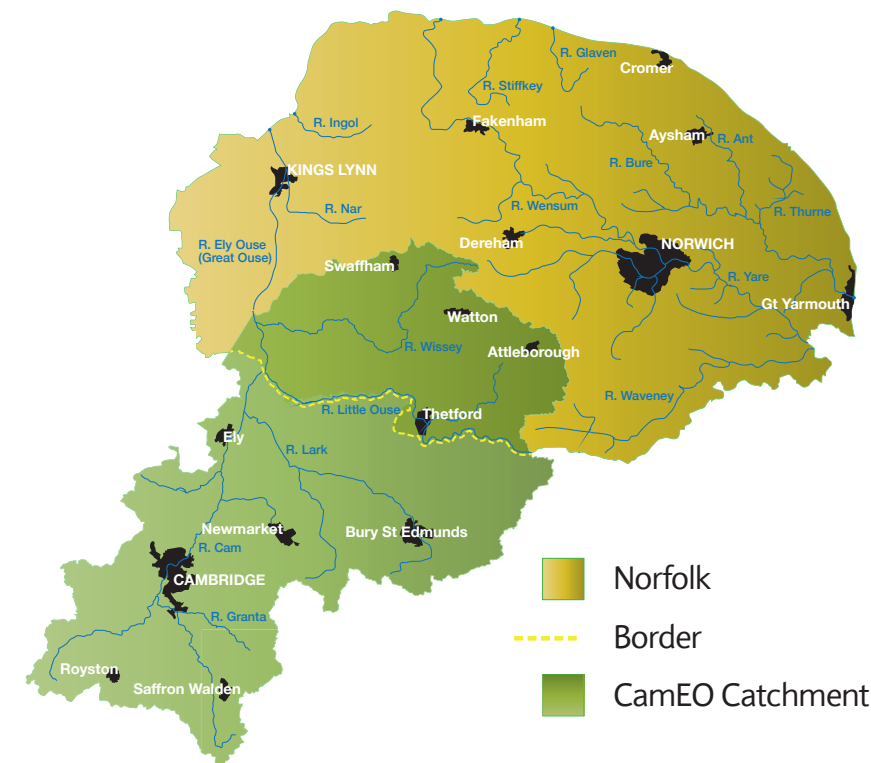
 <p>OVER 100 WATER QUALITY IMPROVEMENT PROJECTS</p>	 <p>RIVER RESTORATION ACROSS 38 KMS</p>
 <p>FARM ADVICE & SUPPORT FOR OVER 300 FARMERS</p>	 <p>3500 HECTARES OF LAND USE IMPROVEMENTS</p>
 <p>2.86 BIL. LITRES OF WATER REPLENISHED - EQUIV. TO OVER 917 OLYMPIC- SIZED POOLS!</p>	 <p>WORKED WITH OVER 1500 CHILDREN</p>

Our funders include government bodies, private corporations, charities and independent donors.

In Norfolk, we are incredibly fortunate to be home to many internationally rare chalk-fed rivers (there are just over 210 across the world). These

exceptional ecosystems provide a habitat haven for a large variety of fauna and flora to thrive including the otter, starwort, brown trout and the

iconic white-clawed crayfish. Delicate underground chalk aquifers and springs supply clear, mineral-rich water to these precious watercourses.



Key ISSUES

*facing our
freshwater
environments*



WATER QUALITY

Norfolk is an important county for food production, particularly wheat, barley and sugar beet. These crops are mainly farmed intensively, which is a cause for concern when managed ineffectively. Agrichemicals can percolate through the ground and contaminate valuable groundwater reserves.

In addition, damaging pollutants (fertilisers, pesticides, manure and sediment) can run-off farms and into watercourses. These pollutants can degrade

the quality of water and cause algal blooms that lead to oxygen depletion. Furthermore, sediment loading can result in turbid waters and the smothering of gravel spawning areas for fish.

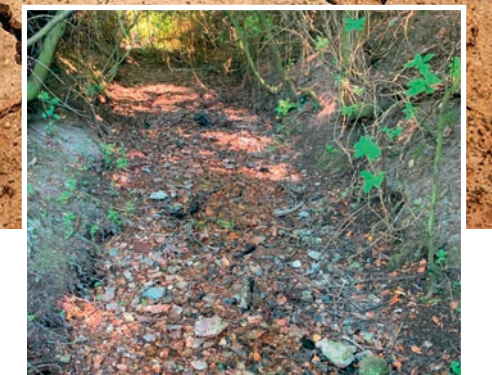
Roads and urban infrastructure provide another source of pollutants. For example, water recycling centre discharges can contain ammonia and phosphate (although water is treated to legal standards, the levels of treatment are not always adequate to protect river health).

IMAGE: JOSEPH GRAY WWF-UK



WATER QUANTITY

The impacts of climate breakdown, coupled with an increasing population and growing demand for water, presents a challenge for the county. The aquatic environment is being increasingly threatened by the over-abstraction of water; too much water is removed for public supply, industry and irrigation, from a region that is already one of the driest in the UK. This can result in lower flows and reduced water levels, which, in turn, may limit ecological health. For example, fish can become stranded in small pockets of water when the rest of the river is dried up.



PHYSICAL MODIFICATIONS

Over the centuries, many of Norfolk's rivers were modified to make way for agriculture and industry; rivers were straightened, drained, dredged and embanked. This change of land use has led to a decline in the quality and resilience of aquatic habitats; rivers are silted, disconnected from their floodplains, and lack morphological features that are essential for wildlife. Moreover, in-river barriers (weirs, sluices and culverts) can prevent fish migration and movement, while changes to riparian habitats have also had negative impacts.

Our WORK



AQUATIC HABITAT CREATION

The creation of new habitats is used to provide integrated, 'nature-based solutions' that address water quality issues, mitigate flood risk, boost biodiversity and improve climate resilience.

LAND MANAGEMENT & FARM ADVICE

Through our Water Sensitive Farming initiative, our trusted farm advisors work closely with farmers to improve soil health and water quality and quantity, while delivering a range of wider benefits, including flood risk management, carbon storage, groundwater protection, business resilience and improved habitats for biodiversity.

CONSERVATION & RESTORATION

By restoring the aquatic environment to a natural state, we work to enhance the value of the aquatic landscape and reinstate the self-regulating function of these systems. In a river restoration context, this involves improving the habitat, both in-river and along the riparian margins. For example, narrowing and meandering widened and straightened river channels, creating morphological features such as gravel riffles, revegetating river margins and reconnecting floodplains.

EDUCATION & ENGAGEMENT

An important area of our work is to connect people of all ages and backgrounds with their local water environment. We achieve this by celebrating the value of our rivers by hosting river walks and talks, attending community events and providing 'hands-on' practical sessions. In addition, the team share the Trust's achievements to inspire further action and share knowledge.



TOP IMAGE: JOSEPH GRAY WWF-UK

Case STUDY: Aquatic habitat creation



INGOL WETLAND CREATION; NATURE'S OWN WATER TREATMENT

A pioneering and innovative wetland-creation project to provide a natural, low-cost and sustainable water treatment method.

The Environment Agency (EA) sets standards for the quality of the final effluent discharged from Water Recycling Centres (WRCs). At Ingoldisthorpe WRC, which discharges into the chalk-fed River Ingol, more ammonia and phosphate needed to be removed to improve river health. Following a feasibility assessment, conducted by Norfolk Rivers Trust (NRT), the creation of an integrated constructed wetland was given the go-ahead.

➔ **One-hectare in size**, the site consists of four interlinked shallow cells, the first of which receives the newly directed treatment outflow. The cells were filled with 25,000 native wetland plants, such as veronica, watercress and iris. These plants filter the remaining ammonia and

phosphate from the water as it drains through each cell, before the 'cleaned' water is released from the fourth cell and into the River Ingol.

➔ **A new meandering section of the River Ingol was created** to allow space for the wetland. The stretch contains new features, including a narrower channel with a faster flow, shallow riffles and deep pools. The result is a classic chalk-fed stream, with clear water and gravel beds.

➔ **1400 native trees**, including oak, holly, hawthorn, field maple and hazel hornbeam, were planted to keep the river cool and provide a habitat corridor.

➔ **The site demonstrates** how wetland habitats can both improve water management and deliver a valuable habitat haven for a diverse variety of wildlife – sandpipers, gadwall, pied and grey wagtails, chiffchaffs, oystercatchers, water voles and toads have already arrived. ➔ **The success of this ground-breaking system** provides

a case study example for replication of this project at other prospective sites. Joff Edevane, Environmental Regulation Manager at Anglian Water Services, said: "The wetland treatment system at Ingoldisthorpe has provided a cost-effective solution in terms of carbon and cash delivered through a collaborative approach, which is how our regulators would like to see us deliver investment in the future. Traditional approaches typically deliver a targeted water quality benefit for a specific substance; a wetland delivers improvements for a number of substances, plus benefits for local biodiversity and the nation's natural capital stock."

This project was funded by Anglian Water, delivered in partnership by Norfolk Rivers Trust and the Environment Agency, and constructed by William Morfoot Ltd.

Case STUDY: Conservation & restoration



THE GLAVEN AT BAYFIELD ESTATE

The creation of a new channel to restore the River Glaven.

The River Glaven's natural course was moved over 120 years ago to bypass the lake at Bayfield Estate, to prevent silt deposition and an associated loss in the lake's water quality; the river was diverted and enclosed for 1km by a long brick tunnel.

➡ **To restore the Glaven to its former glory**, a new sinuous channel was created that bypasses the lake. This new section, which has been connected to the rest of the river, will provide a rich and complex habitat for

fauna and flora – particularly those which are associated with rare chalk streams such as starwort and white-clawed crayfish.

➡ **At 1.2km in length**, the new channel is one of the longest manmade stretches of river in the UK! The channel's design is based on the untouched remnants of natural chalk streams and contains over 30 gravel riffles and many deep pools, where the areas of faster flow provide an ideal habitat for spawning trout and invertebrates. In addition, the channel was sharpened and a series of berms (ledges) were formed to promote rush growth.

➡ **Two controlled cattle crossing points were created** using a bed of chalk material for summer grazing, while preventing the risk of bank erosion.

➡ **The 'hidden' stretch** (enclosed in the brick culvert) was returned to the meadow surface and reconnected to the floodplain, which will naturally 'slow the flow' of water and reduce flood risk.

This work was completed as part of the 'Nine Chalk Rivers' project. A huge thanks goes out to the Wild Trout Trust, River Glaven Conservation Group, Professor Richard Hey and the Environment Agency.

Case STUDY: Education & engagement



GLAVEN EEL PROJECT

Reconnecting people with the critically endangered European eel.

NRT delivered a two-year Heritage Lottery Fund project, working with European eels on the River Glaven in north Norfolk. The overall aim was to reconnect people with the eel, its folklore and traditions, as well as to improve this critically endangered species' habitat.

Since 2013, there has been a legal requirement which states that 60% of elvers caught should be used for restocking and educational purposes. Consequently, we received a number of elvers

from the River Severn to support the project.

➡ **Elvers were distributed around local schools** for the summer. As well as caring for these elvers in the classroom, the children were involved in the elvers' release process – setting the elvers on their way to complete their mysterious lifecycles.

➡ **Half-day workshops were conducted on the river bank**, where children learned about eel conservation, lifecycles, water quality and river restoration through a series of educational games and activities.

➡ **Eel trails were set up** for the local community and tourists; leaflets were

produced to guide users to points of 'eel' interest within the Glaven valley, and eel inspired artwork was placed in different locations.

➡ **Habitat restoration took place** to reconnect backwaters and ponds and install fish passes, thereby increasing the eels' passage through the Glaven river system. At Thornage Common, non-native and unhealthy trees were used as woody debris, creating deep pools and refuge areas for eels and invertebrates.

This project was delivered in partnership with the Norfolk Coast Partnership, as well as other organisations.

Case STUDY:

Land management & farm advice



WATER SENSITIVE FARMING

Protecting the River Wensum using sediment traps.

Run-off had been occurring from damaged road verges, eroded field entrances and agricultural topsoil from a sugar beet pad, at the Salle Estate in Norfolk.

The farmer was aware of these run-off issues and had already carried out important steps to trap the sediment and associated phosphorus and nitrogen on the farmland. Having heard about the farm advice and support provided by NRT, the farm manager

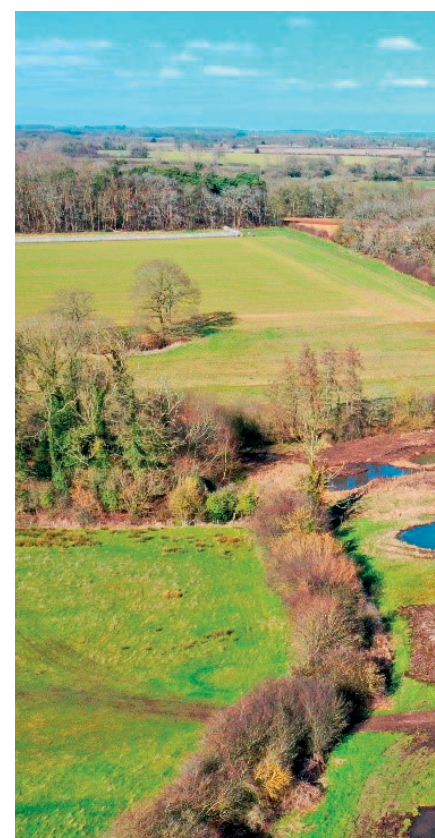
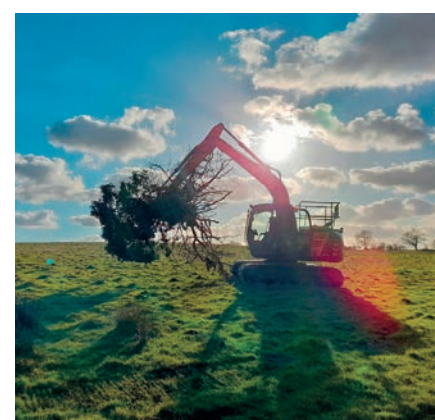
agreed for a farm advisor to come and visit the site.

- ➡ **An assessment of the site** – using surface flow mapping, a walkover and farmer knowledge – was conducted to identify locations which posed the greatest risk; high sediment supply, high soil moisture content, proximity to river channels and connectivity to the rest of the catchment (via roads, tramlines and drains).
- ➡ **It was decided that three silt traps would be installed** alongside the road on land belonging to the Salle Estate.

The traps were constructed, and work by capturing and slowing down polluted run-off, which enables the sediment and suspended solids to settle out before the water discharges to the Blackwater Drain. This eventually feeds the River Wensum, a designated Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC).

This project was completed as part of NRT's 'Water Sensitive Farming' initiative, funded by the Coca-Cola and WWF Freshwater Partnership.

Rivers ECOLOGY



Rivers Ecology is an ecological consultancy offering aquatic-based restoration and conservation across Norfolk and the UK. Seeking the best ecological outcomes for our clients, the environment and the wider water ecosphere, our team are highly experienced in delivering:

Surveys and monitoring

- ➡ Water vole, otter and white-clawed crayfish surveys
- ➡ Freshwater, saline and estuarine fish species surveys, including electrofishing

Biodiversity Net Gain (BNG)

- ➡ Identify the current habitat type and condition for riverine and terrestrial environments, to identify how many biodiversity credits could be gained.
- ➡ Design mitigation schemes for development and calculate the uplift in BNG points.

Nutrient neutrality/ Wetland feasibility

We have worked nationally with councils, housing developers, conservation organisations and the

Ministry of Defence on a variety of nutrient neutrality projects. Services include:

- ➡ Assessing the feasibility, designing and building integrated constructed wetlands.
- ➡ Calculating the nutrient burden of developments.

River restoration

We provide project management for river restoration projects, including:

- ➡ Applying for permits, including EA permits and planning permission.
- ➡ Detailed design of projects.
- ➡ Surveys.
- ➡ Site management/ liaison.
- ➡ Delivery and implementation.
- ➡ Post project monitoring and evaluation.

Rivers Ecology is a wholly-owned subsidiary of Norfolk Rivers Trust. All profits received are passed straight to the charity to support NRT's core work; to restore, protect and enhance the water environments of Norfolk. Please contact us (riversecology.co.uk) for more information and to discuss your requirements.

WITH THANKS TO OUR KEY PARTNERS AND FUNDERS:

Statutory organisations:

Environment Agency,
Natural England,
Internal Drainage Boards,
local authorities,
Broads Authority,
Highways England,
Rural Payments Agency.

Regulated industry:

Water Companies
– Anglian Water.

Universities:

University of East Anglia,
University of Warwick,
University College London.

Partnership organisations and initiatives:

Water Resources East,
Norfolk AONB,
Catchment Partnerships,
Courtauld 2030.

Commercial enterprises:

Developers, land
managers and estates,
housing associations.

Civil society:

Fishing community,
Farming community
– NFU, CLA, Farm Cluster
Groups, Landowners,
local communities, schools,
groups including the
Glaven and Lark
Conservation Groups.

NGOs:

The Rivers Trust,
WWF, National Trust,
Norfolk Wildlife Trust,
Angling Trust,
AONB North Norfolk,
RSPB, Norfolk FWAG,
Hawk and Owl Trust,
Beavers Trust,
Zoological Society
of East Anglia.



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