

River of Life II

A demonstration of creating
riverside wetlands on
farmed agricultural
floodplains

2022 construction casestudy

Photo credit: Burst Design
Breaking ground



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“River of Life has significant impact beyond the project, namely exploring what re-wilding means for wetlands. We’re demonstrating the creative thinking and action needed as we face up to the climate change challenges ahead. We need to radically rethink our approach to managing the Earth’s resources, such as water and soil, and accelerate projects that are going to sustain life on Earth.”

Jayne Manley, Earth Trust CEO

Introduction

In 2019, Earth Trust, Church Farm Partnership and Hurst Water Meadow Trust embarked on a large-scale wetland creation project called River of Life II.

The project created backwater channels, wet woodland, ponds and scrapes at three locations on the banks of the rivers Thames and Thame. The aim of these new habitats was to keep ecosystems healthy and functioning by attracting a diversity of species, improving water quality by slowing and filtering the water, capturing and storing carbon from the atmosphere and acting as a natural flood defence by absorbing water. One of the four project locations is within Little Wittenham Wood, a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC), and home to an important large population of great crested newts. New ponds were constructed to create a more resilient and future-proof environment for amphibians which are under threat due to climate change.

The River Thames in particular has been channelled for navigation, affecting the water flow, waterscape features and hydrology. Pressures on the second longest river in the UK include significant building developments along its banks, human recreation activities and half a century of escalating agricultural impacts. The River of Life II project aimed to demonstrate what can be done to improve other stretches of a canalised river, and how similar projects

can benefit the environment and people without damaging farming models. It shows the huge positive impact that specific land management techniques can have on riverside ecosystems, and how strong partnerships between land owners and managers can achieve the scale of transformational change for nature that the UK government calls for through its Environment Bill.

River of Life II is the largest wetland habitat creation project of its kind on the banks of the River Thames and Thame, adding 46,000m of new features into the landscape – an area equivalent to six football pitches.

It is also the first project like this to research the carbon-absorbing potential of floodplain wetlands and demonstrate how farming and wildlife can thrive hand in hand, while also being financially sustainable.

The project is building research partnerships and generating data on the biodiversity recovery for new habitats and the carbon capture potential of wetlands. In addition to these benefits, these new wetland areas are magical places for visitors to explore.

This paper provides an overview of the construction and initial post-construction period including practical and logistical requirements; the impacts of embarking on a project of this scale within a farmed landscape; lessons learnt and key recommendations for landowners and partners working on similar projects.

Photo credit: Burst Design



The River of Life II Project

Background

To date, River of Life II is the biggest project undertaken as part of Earth Trust's Water & Wetlands programme, which aims to demonstrate landscape management of water and wetlands as part of an integrated ecosystem, and the importance and value of water as a scarce natural resource for nature and people.

Building on our learning from a previous smaller-scale wetland creation project (River of Life I, which is situated a short distance down-river), the project has a lifespan and potential legacy that will tackle a number of environmental challenges.

The first wetland habitat creation project was delivered in partnership with the Environment Agency in 2013-14, following the acquisition of 35 hectares of land on the banks of the Thames, near Shillingford. As well as adding 2.5km of Thames frontage to the Earth Trust portfolio, this land provided a golden opportunity to create a unique wetland landscape, and subsequently a continuous area of high quality wildlife habitat from the Thames basin up to the top of the Wittenham Clumps – an area covering 150 ha.

In June 2014, River of Life I was the joint winner of the Best Practice Award for Practical Nature Conservation at the Chartered Institute of Ecology and Environmental Management (CIEEM) Awards. The site continues to be a fantastic demonstration of successful wetland habitat creation, integrated within a grazing floodplain system.

Photo credit: Gemma Warr



Partnerships

River of Life II was a major collaboration involving three neighbouring land owners: Earth Trust, Church Farm Partnership and Hurst Water Meadow Partnership. This created a landowner partnership that blended education, environmental and community interest charities, and private commercial farming.

The project was conceived and managed by staff at Earth Trust, and delivered in partnership with the Environment Agency, multiple independent consultants (designers, ecologists, hydrologists and others) and Land and Water Services (contractors for excavations and construction). The project was managed through a project board which involved all parties, with Earth Trust leading on all aspects of governance, finance, contracting, stakeholder management, communications and reporting.

In addition, the project involved a large and dynamic group of Earth Trust volunteers, who prepared sites by clearing brash, conserving existing habitats for wildlife and implementing new features, including planting nearly 4,000 trees in the new wet woodland. In total we estimate over 100 people were involved over the seven month period it took to complete the works



Photo credit: Nick Warner

Objectives

The creation of this new floodplain wetland habitat was intended to provide a nature-based solution to key environmental challenges.

1. Improving Water Quality

According to data from the [Environment Agency](#) 86% of UK rivers don't meet Good Ecological Status, and this sadly includes the UK's second longest river, the Thames. The new ponds, backwaters and wet woodland will act as filters by slowing down water flow from the land, altering flow within the river itself and temporarily capturing water within the features. Here the sediment will be trapped and pollutants removed, before the water is discharged back into the river. Once fully vegetated, the wetlands will reduce nutrient (particularly phosphate) levels of agricultural runoff by intercepting it before it enters the River Thames.

2. Supporting biodiversity

In common with many rivers, the Thames has been adapted to make navigation easier, and the land adjacent to the river has been developed for agriculture and construction. Many of its backwaters that were once home to huge numbers of insects, amphibians, birds, fish and aquatic plant life have been replaced or destroyed. The restoration of backwater channels and wet woodland, mirroring how the landscape would have functioned many years ago, will create, restore and improve vital habitats for wildlife such as tufted ducks, herons, kingfishers, geese, kestrels and otters, and will become refuges for juvenile fish to bolster populations in the river.

The ponds created at Little Wittenham Wood, a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC), are close to the existing breeding sites of one of the country's most significant populations of great crested newts. The ponds are essential for breeding newts, so the scale and design of these new ponds will ensure that they are less susceptible to drying out in the hot summers anticipated as a result of climate change. The planting and woodland management around these ponds (which provides critical ground cover and substrate) will also be more resilient to protect these populations in the future.

3. Tackling climate change and increasing flood storage capacity within the floodplain

As the impacts of climate change intensify and extreme weather conditions become 'normal', the risk of more severe and regular flooding events is more likely. Long, dry and hot periods mean floodplains dry out excessively and are then unable to absorb or filter water as effectively after heavy rain. It is expected that these wetland features will significantly improve the land's ability to cope with and respond to extreme weather conditions, and the surrounding floodplain will be able to act more efficiently as a natural flood management solution.

Wetlands vary greatly in their function, capacity and landscape context, but all are being increasingly recognised for their important role in the management of naturally occurring greenhouse gases. Floodplains have naturally managed these gas flows for centuries as the wetting, drying and re-wetting of floodplains creates changes in the flux of gases from the land, and

remaining wetter for longer helps to reduce the escape of greenhouse gases. Early signs indicate that, if designed and managed well, they are also capable of capturing carbon from the atmosphere.

Combined with their ability to act as natural flood defences, these habitats can have far-reaching effects.

4. Public access and engagement in wetland

The proximity of River of Life II to the Thames Path, the Wittenham Clumps, towns and villages, and the river itself, means it is ideally placed to engage people in greater discovery about wildlife, farming, water, wetlands, our impact on these environments and the living history of the Thames.

Some of the wetland habitats have been left as havens for wildlife, but there are many areas for the local community, river users, walkers and visitors to explore. To enable people to easily access wetland ecosystems, both within the original River of Life I project area and in some of the newly created wetland features of River of Life II, the project was designed with structures such as boardwalks and directional way markers.

5. Demonstrating the potential of partnership working

Environmentally sensitive and sustainable land management. Connecting and sharing our learning with other charities, businesses, and local and national governments is essential if we are to achieve climate action targets. We need to inspire others by showing

that land management can be environmentally sensitive and financially sustainable in order to solve the health and biodiversity crises. This project – and the partnership behind it – was carefully designed to demonstrate how nature-based solutions can benefit the environment and people without impacting a farm's economics.

Working with multiple landowners. We aimed to create a demonstration of how landowners can make a difference through such initiatives and partnership working. If replicated on an even larger scale (for example at many more places along the River Thames) then the impact would be even more significant. If more landowners felt able to collaborate and work across landscapes in order to achieve the scale of change that's needed, this same approach could be applied to other schemes such as tree planting, too.

Funding and costings

River of Life II was funded by a Water Environment Grant (WEG) through the European Agricultural Fund for Rural Development, administered by the Environment Agency.

Pre-funding

Funding was secured in February 2019, prior to the initiation of the contract award for the main project delivery team. However, prior to this point, extensive work (estimated at an equivalent cost of around **£58,500**) had already been completed to develop the concept for the project, undertake an outline design of the main wetland features and to write and submit the funding application.

The Environment Agency contributed £8,000 to the development phase of the River of Life project which helped fund background research, landowner engagement and development of outline designs.

Project budget

The original budget was agreed at the outset of the project in March 2019. This forecast required works on the basis of the WEG funding submission and any additional available quotations that were available. Throughout the project, as scopes of work were developed and quotations/tenders received, the forecast was updated and aligned to the WEG funded budget throughout.

The original total budget was £1,620,860. The project funded total increased by just over 13% as a result of

re-forecasts, and the final WEG funded budget was **£1,826,536**.

In addition to the WEG funding, the project also relied upon a degree of self-funding from the project partners, which amounted to a total of **£45,000**. This self-funded element was required for those aspects of the project that were not eligible for funding under the terms of the WEG and included costs such as:

- Consent application fees (eg. planning or waste permit fees), which accounted for about 40% of the self-funded element.
- Additional costs where invoiced actual costs exceeded allowable costs for works that are funded under the Government's Countryside Stewardship Rates such as fencing, tree felling and planting. This accounted for about 35% of the self-funded element.
- Partner company staff time and overheads above the eligible limit, which accounted for about 25% of the self-funded element.

Project design

River of Life II created 46,000m² of wetland – the size of six football pitches – spanning three sections of habitats along the River Thames and River Thame.

- 15,657m² at Clifton Meadow, on the south bank of the River Thames (owned by Earth Trust)
- 28,634m² at Church Farm, north of Days Lock (owned by the Church Farm Partnership)
- 2,355m² at Overy Mead, on the banks of the River Thame (owned by The Hurst Water Meadow Trust)

The geographical location, with the natural convergence of rivers and floodplains, made the partnership ideally placed to create these valuable wetland habitats.

The sites were chosen carefully to enable the extension of natural features. This included the creation of 16 ponds, seven backwater channels and 1.6 hectares of wet woodland.

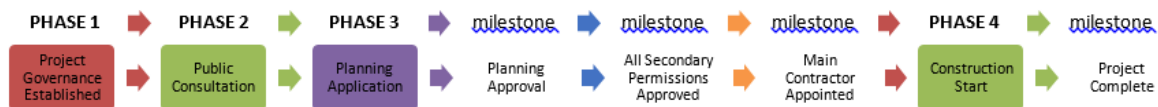
The project also supported the creation of several new ponds in Little Wittenham Wood, a Site of Special Scientific Interest (SSSI) and home to one of the country's largest populations of great crested newts, further enhancing the natural and scientific value of this internationally significant landscape.

Timeline of project approach and delivery

The project delivery programme was designed around **four key phases and eight milestones**, with an original timeline of 19 months.

The project very successfully delivered the intended outcomes safely, and with minimal change to agreed budgets. The project managed to prevail, despite a major programme delay in 2020 due to the Covid-19 pandemic and the resultant financial, partnering and supply issues this generated.

The critical lessons learnt from River of Life I – largely timing the works for the summer period, contract structure and detailed work specification – were applied very successfully and formed the cornerstone of River of Life II's success.



Original timeline



Final timeline



Phase 1: Project governance established

A key objective of the project was to showcase the landscape-scale environmental benefits that can be achieved through strong collaborative partnership, so establishing a framework for the partnership was an important phase for its successful delivery.

The project was overseen by a Project Steering Board and a Project Manager was appointed. In addition to representatives from each of the three main landowners (Earth Trust, Church Farm Partners and Hurst Water Meadow Trust), the board included carefully selected individuals and suppliers, who each had vested (but different) interests in the success of the project. This included Shammy Puri (representing Hurst Water Meadow Trust), and a global expert hydrologist Curt Lamberth who was critical in designing the morphology of the features so that the completed structures function and move the water in the right way in relation to the landscape.

To ensure effective governance, the Project Steering Board established clear documentation setting out overall ownership of the project, as well as detailing specific ownership and authority over the management of project finances.

“The project is an excellent example of how when creating partnerships with like-minded organisations, we can work together to create long lasting environmental change which also benefits society”

Rebecca Chiazzese, Hydro-Logic

Site surveys

Wildlife: Wildlife surveys were undertaken to make sure that we had complete understanding of which species are using the area. This allowed us to plan the work accordingly to avoid any potential damage. These were led by Earth Trust’s Head of Land Management, who had held responsibility for biodiversity management across the farm for over 15 years and knew the site and its populations well. In addition, the Trust sought advice from local wildlife experts and consulted Natural England, who licensed and approved works relating to wildlife protection. Under licence, we temporarily moved great crested newts (a protected species), carried out all tree and scrub work outside of bird nesting season, and timed other works to avoid bat roosting periods. The only trees removed throughout the project were to create the ponds in Little Wittenham Woods, and the new wet woodland more than replaced the number removed.

We also hosted a site visit with South Oxfordshire District Council (SODC) Planning Officer David Millinship and Ecologist Dr. Dominic Lamb to further advance design discussions on how the project will benefit both the environment and the people that use these green spaces.

Archaeology: Extensive archaeological trial trenches were explored in July 2019 at Church Farm, Clifton Meadow and Overy Mead, in order to gain a good understanding of the nature, location and significance of any buried archaeology within the landscape.

This involved an excavator digging a series of 2m wide trenches between 20m and 50m long, and 1m to 1.5m deep. The trenches were cleaned by hand, photographed and recorded by a team of archaeologists from DigVentures, before being reinstated. One significant find, recorded at Clifton Meadow, was a piece of worked wood. An archaeological watching brief was a condition of the planning application, meaning that an archaeologist was present during excavation of specific ponds and backwaters. Throughout the vital construction phases, no further finds were discovered (perhaps giving context to the historical reluctance of human settlements to form within naturally occurring floodplains).



Photo credit: Burst Design

Phase 2: Public Consultation

The project team consulted with a wide range of stakeholders such as Parish Councils, the planning authority (South Oxfordshire District Council), Oxfordshire County Council and statutory and non-statutory consultees.

During October 2019, the partnership invited local residents to attend four public consultation events to find out more about the project. Project visuals were displayed and consultations attended by Earth Trust and partner staff to talk through the project, its background and its importance. Practical elements around local impact – particularly in terms of heavy machinery and potential disruption during the construction phase – were also discussion points during these meetings. Attendees were encouraged to provide feedback before we submitted the planning applications.

Throughout the consultation, all attendees strongly agreed that this stretch of river and the surrounding countryside was extremely important to the community, and protecting and enhancing wildlife here was vital.

Due to the delays presented by Covid in early 2020 and the re-scheduling of construction into 2021, the Trust was duty bound to continue a public engagement and communications strategy to explain the shifting plans, timings and impacts locally. With social interaction, public space use and methods of communicating restricted at this time, we informed and updated

stakeholders via email, online meetings and filmed descriptions of the ongoing project.

Phase 3 Planning application

Planning applications were split into two components – minor (to create additional great crested newt ponds near existing breeding ponds within the SSSI, Little Wittenham Woods) and major (all other sites) – to spread risk.

Thanks to huge engagement from the public and support from local people, businesses and charities, we received planning permission from South Oxfordshire District Council and were given permission to proceed.

Environmental consents and permits

Alongside the commitments made in the planning application and conditions attached to the planning permissions, a series of additional consents and permits were required.

The table below shows the schedule that was pertinent to the River of Life II project, though this will vary by project type, location and other specific consents needed (eg. for spreading spoil locally) and should be used for reference only.

Type	Consenting Authority	Scale of complexity	Scale of cost	Trigger for requirement specific to the project
Planning Permission	South Oxfordshire District Council	High	Medium	Works do not constitute permitted development
Flood Risk Activity Permit (FRAP)	Environment Agency	Medium	Low	The need for works on and close to a main river.
Great Crested Newt (GCN) Licence	Natural England	Medium	Low	The need to work in areas close to known habitat of Great Crested Newts.
Land spreading permit ¹	Environment Agency	High	High	The need to deposit soil excavated from the wetland features outside of the floodplain on arable land.
Temporary Traffic Regulation Order (TTRO)	Oxfordshire County Council	Low	Low	The need to divert a public right of way for the construction of Backwater 1.
Felling Licence	Forestry Commission	Low	Low	The need to fell trees in Little Wittenham Wood to create the ponds.
Consent for site of special scientific interest (SSSI)²	Natural England	Medium	Low	The need to carry out works in Little Wittenham Wood listed as requiring notification to Natural England.
Permit for work to trees within a Conservation Area (CA)	South Oxfordshire District Council	Low	Low	The need to carry out tree works at Overy Mead which is within the Overy Conservation Area.

1. *Bespoke waste management permit*

2. *Notice required of any proposal to cause, carry out or permit an operation requiring Natural England's consent on a site of special scientific interest (SSSI)*

	Low	Medium	High
Scale of complexity	Simple form, no prior knowledge required	Complex forms, professional advice likely to be required	Multiple complex forms / supporting documents; professional advice necessary
Scale of cost	£0 - £2k	£2 – 10k	>£10k

Phase 4: Construction

In our original timeline, construction was intended to begin in June 2020. However, the Covid-19 pandemic earlier that year caused a major delay. The pandemic led to competing priorities, and a decision was taken by the board in June 2020 to defer the construction phase for 12 months.

The project re-started in January 2021, enabling the contract to be awarded by mid-March 2021 and for site works to begin by early May 2021. As well as giving us time to navigate complexities from Covid-19, the delay meant construction could start earlier in the summer than would have been possible had we continued with our original 2020 schedule. Overall this deferral contributed to the successful delivery of the project.

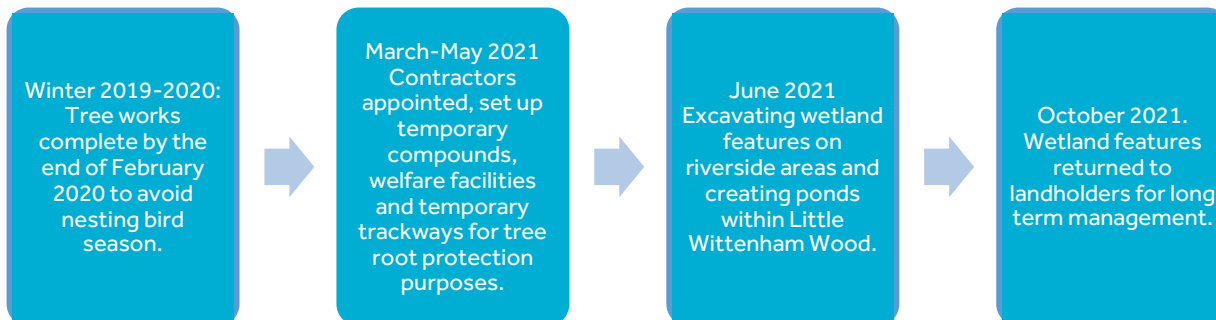
Protecting the environment during works

Re-establishing plant cover: The grazed meadows at Clifton Meadow and Church Farm contain areas of wildflowers and wetland plants. Where appropriate, the topsoil which contains the seedbank was retained and spread back over the banks and margins of the new ponds and backwaters to help quickly establish plant communities. Based on advice from the Environment Agency and others, the decision was taken not to

actively plant or establish new plant populations, but to allow plants that were already present to re-establish naturally. A watching brief was to be maintained to observe populations and coverage, and further planting interventions could follow if cover was not successfully re-established.

Preserving trees and woodland habitat: In order to make way for the new ponds in Little Wittenham Wood we needed to fell approximately 150 trees. The ponds were located in areas of predominantly secondary woodland (that don't contain veteran trees or ancient woodland) and which therefore supported a lower abundance and diversity of species than other parts of the wood.

The design at Overy Mead was adapted to allow mature willows within the northern backwater to be retained. Willows are resilient to root impacts and excavating near the trees was carefully managed in agreement with the council's Tree Officer. Mature willow trees were pollarded during winter 2019-20 to enable access during excavation.



Little Wittenham Wood is a designated site, so special permission was required to create the ponds. We worked under licence from Natural England to minimise any potential impacts on great crested newts during excavation.

We carried out tree work during the winter to avoid disturbing nesting birds. Effects on bats were prevented through careful design informed by surveys, alongside the appropriate method and timing of work.

We avoided the root protection areas of retained trees to minimise impact. Where this was not possible (for example, due to a pinch point for access) temporary trackways were used to spread the weight of vehicles.

Maintaining water quality: To minimise soil and sediment being transferred to the river and temporarily affecting water quality, the backwaters at Church Farm and Clifton Meadow were excavated fully prior to digging the channels and culverts that connected them to the river. Small bunds were used on the river side of the culverts during construction of the backwaters at Clifton Meadow, and then removed at the end of construction. Silt traps were also used to minimise the sediment getting into the river.

[Managing flood risk and spoil removal](#)

A Flood Risk Activity Permit was required by the Environment Agency to protect the floodplain during the excavation of the backwaters and ponds. The Environment Agency stated that the excavated soil could only be spread outside of the flood zone – the area that will flood once in 100 years, plus a 35%

allowance for climate change. The aim of this restriction was to avoid reducing flood storage capacity elsewhere. In the long term, the new ponds and backwater channels will create new flood water storage in the floodplain of the River Thames and Thame.

Soil excavated from the newly created ponds and backwater channels in the floodplain was moved using tractors and trailers and distributed onto arable fields owned by the Church Farm Partnership. Using GPS, bulldozers spread the soil to an even thickness of 15cm before it was ploughed in. To minimise compaction, the specification of some vehicles was re-negotiated, and the deposition area was sub-soiled to break up any compaction. This approach aimed to allow Church Farm to return the land to arable production, as was successfully done on Earth Trust fields for River of Life I. Some fields experienced increased wetness due to the new features altering water interaction and behaviour within the landscape. Despite these challenges, the soil management approach allowed the spoil to be kept on-site, reducing the need for fuel-intensive transportation and landfill disposal.

[Habitat restoration and tree planting](#)

In Little Wittenham Wood, 625 trees were planted around the new ponds to provide scrub habitat that would support amphibians like frogs, toads and newts, as well as dragonflies, damselflies and bats.

At the Church Farm backwater, a new woodland was created with the planting of 3,210 trees. Sitting near to both open water and grazed grassland, this woodland will add a layer of diversity that will support wildlife even

further, including providing shelter and food for small birds, invertebrates and amphibians.

More than 11 different tree species have been chosen including alder, aspen, blackthorn, black poplar, dog rose, oak and willow. Each of these will do well in wet ground and will be able to cope with annual flooding, ensuring that the woodland is able to mature and support wildlife for many generations to come.

“We have already seen stonechat flying from tree guard to tree guard today, a kestrel hovering overhead and kingfishers on the edge of the backwater.”

Tim Read, Earth Trust Senior Ranger,
December 2022

Photo credit: Burst Design



Outcomes of the project

1. Improving Water Quality

The creation of new wetland habitats was expected to improve water quality in the River Thames by intercepting and filtering agricultural runoff. As these habitats establish, they should slow water flow, allowing sediment to settle and pollutants to be absorbed or broken down. The wetlands were designed to reduce nutrients, such as phosphates, entering the river, acting as a buffer. Restricting cattle access to the river at Clifton Meadow while allowing them to use the wetlands should help prevent riverbank erosion.

2. Supporting biodiversity

In the months following construction, the new wetland habitats were already attracting birds such as tufted ducks, herons, kingfishers, geese, kestrels, golden plover, snipe and redshank. Otters have been sighted, while backwaters and ponds have provided breeding areas for fish, frogs and toads.

In Spring 2023, we worked with the Environment Agency to 'net' some of the major backwaters, to see, one year on, how they were being used by fish as nurseries and refuges from the fast-flowing Thames. The backwaters provide particularly valuable areas for fish and other species to take refuge from the strong flow of the Thames, with rich sources of invertebrate and plant life to feed on, attach their eggs to, and create calmer environments for fry (young fish) to thrive before returning to the Thames, and thus re-stocking the river.

We've also partnered with [UK Centre for Ecology & Hydrology](#) (UKCEH) to install a biodiversity monitoring

station which records bird calls and bat echolocation (ultrasound), and photographs small mammals and moths, enabling us to see which wildlife species are using the area. It also records the rainfall, wind speed and humidity, so we can track the meteorological impacts on wildlife, too.

As part of an ongoing ecological research project, data from the monitoring station will help us learn about the impacts of creating wetland on a floodplain, as well as the potential changes in species richness and diversity of life.

Biodiversity covers all aspects of animal and plant life, including underground and within the water itself. As such, it is incredibly difficult to capture the changes and impacts on biodiversity as a whole directly as a result of this project. However, we are trying to capture the breadth of wildlife that returns to and establishes new populations within the wetland as it settles. The combination of the CEH Monitoring station, Environment Agency fisheries report, volunteer reporting and public engagement tells us that nature is finding a home here, and visibly flourishing in numbers and diversity.

3. Tackling climate change and increasing flood storage capacity within the floodplain

Flood Alleviation

The River of Life II project created new wetland habitats, including backwaters and ponds, with a total volume of 55,054 m³ (32,666 m³ above summer retention level). These features are expected to contribute to flood alleviation by providing temporary storage for floodwater during high rainfall and river flow

events. By slowing down and holding back water, the wetlands may help reduce peak flood levels and support a more gradual release of water back into the river system. However, quantifying the precise impact on flood alleviation would require further study and monitoring over time.

Carbon capture

There are significant knowledge gaps regarding greenhouse gas exchange in wetlands. To address this, a collaboration between the Environment Agency, Land & Water Services, and Bangor University has begun monitoring carbon dioxide, methane, and nitrous oxide at the River of Life II site. The aim is to investigate initial gas fluxes following wetland construction and anticipate a gradual reduction in emissions over time, ultimately identifying when the wetland begins to sequester carbon.

Monitoring equipment was installed in September 2021 at specific backwaters and ponds, with students from Bangor and Oxford Universities collecting monthly data. The project, led by Bangor University, compares gas exchanges across three wetland types: River of Life's ponds and backwaters on an agricultural floodplain; Blenheim Estate's enhanced water meadows on the River Dorn; and BBOWT's Chimney Meadows Nature Reserve Wetland Restoration and fish passage creation. This comparison will provide insights into the carbon sequestration potential of different wetland types.

At River of Life II, the initial results have been promising, showing no large methane flush or negative effects on

carbon or methane release. Non-wetland areas are emitting five times more carbon than the new wetlands, with wetter areas demonstrating slower CO₂ release from soils. These early findings are encouraging, and further data analysis will shed light on the role of wetlands in mitigating climate change impacts.

4. Public access and engagement in wetland ecosystems improve physical access to wetland ecosystems

To improve public access and engagement with the newly created wetland ecosystems, a 170-meter boardwalk has been constructed at Clifton Meadow, crossing Backwater 1. This boardwalk allows visitors to immerse themselves in the wetland environment and observe the thriving wildlife up close.

In other areas, the focus has been on enhancing interpretation signage rather than installing new access routes and boardwalk jetties. This approach aims to engage and educate visitors about the wetland habitats while preserving the conservation value of this sensitive site.

Guided tours were conducted, during the construction phase of River of Life II, providing an opportunity for the public to witness the wetland creation process firsthand and learn about the project's objectives. Earth Trust plans to schedule additional tours in the future, enabling more people to experience and appreciate these unique wetland ecosystems.

5. Demonstrating the potential of partnership working

Environmentally sensitive and sustainable land management

In February 2022, the project partnership won the social enterprise category of High Sheriff of Oxfordshire's Climate Action Awards Ceremony. Connecting and sharing learning with other charities, businesses, and local and national government is essential if we are to achieve Oxfordshire's climate action targets. Recognising and celebrating success – of all kinds and scales – has an important role to play in raising the visibility of important work that is happening across the region and bringing like-minded people and organisations together.

Working with multiple landowners

Shortly after the completion of River of Life II works, a local environmental action group got in touch with Earth Trust to ask for advice and support around a wetland construction programme. Based in South Stoke, just a few miles down river, the group had identified an area of land within the heart of their local community. It sat within the floodplain, but delivered very few benefits for nature, and was widely used by the public for walking and bathing in the river. The land area is under private ownership, but not actively managed. Over the period of 12-18 months, inspired by River of Life II, the group liaised with Earth Trust around ideas, practicalities, lessons learned and advice from

stakeholder partners, in order to get to a position where they could propose a full-scale wetland creation project. They have been supported to develop relationships, identify funding, consider their own charity status and engage key players. The discussion now sits with the landowner for agreement to proceed.

A second environmental action group, linked to the group in South Stoke, got in touch to discuss their aspirations to create a similar project a few miles further down the river at Goring. Earth Trust has had less involvement in the progress of this project and concept, but is engaging with the group to draw together synergies, opportunities and create a partnership that stretches from Burcot in the north to Goring in the south.

“Recognition of our small, local charity and our ability to partner effectively with local landowners has given us the confidence to tackle large-scale, collaborative projects in the future. We’ve been extremely pleased to be able to rejuvenate historical backwaters on the River Thames and re-establish them for the enjoyment of the local community.”

**Chris Smith, Honourable Secretary of Hurst
Water Meadow Trust**

Photo credit: Thames Path



Lessons learnt and recommendations for future partnerships

Partnership management: invite early involvement

The project benefited from carefully selected individuals and suppliers, each with vested (but different) interests in the project's success. Strong relationships were built across the team from the start, allowing issues to be discussed and resolved quickly and efficiently throughout. The use of Early Contractor Involvement (ECI) in the team structure successfully reduced construction phase risks for all parties.

Partnership management: establish leadership, roles and responsibilities

The Project Board was conceptualised as a governance structure where all project partners were equal, but it was important to think about ways of working and the split of ownership, risk and responsibility between partners. For example, in this case our partners didn't carry any direct financial risk or human resource responsibilities. Project governance could have been improved through better defined Terms of Reference for the Project Board, the development of more formal partnering agreements at the project outset, and with recourse to independent mediation to oversee critical shared decisions.

Partnership management: create a shared vision from the start

A more holistic, shared and long-term vision for the use of the wetlands would have benefitted the communications strategy. This would ideally have defined the need for the project and the benefits it aimed to deliver in the context of UK and global environmental challenges and legislation. Creating this vision and establishing the Project Board well before project funding was secured may have provided more of a long-term governance structure over the project, and allowed us to have greater insight into the impacts of River of Life II once work had been completed.

It would have been useful for the Project Board to have better visibility of where the project was positioned within the funder's programme of works and the context of the scheme in global, national, regional and local environmental challenges and priorities. Understanding how the project's outcomes and benefits contributed to the funder's overall programme would have been useful to establish the project vision and context.

Planning: approval requires expert navigation

The UK's planning and environmental process can be challenging for small-scale conservation projects like River of Life II. Including the Environment Agency in both the Project Board governance and as an advisor to the Project Management team was highly successful in resolving complex consenting and funding issues. However, this may act as a barrier to entry for many potential future project partnerships.

Certain elements of the scheme, if delivered in isolation, may not require separate consent or planning permission. These elements could provide a less complex and more cost-effective way of recreating natural floodplains and creating biodiverse wetlands, without lengthy application processes. Such elements include:

- Impeding ditches to hinder free drainage of floodplain areas, keeping the floodplain wetter for longer
- Creating simple water level control structures using clay bunds and flexi pipes across key drainage ditches
- Creating shallow 'scrapes' in the floodplain to form local wetland areas, using a rotary ditcher
- Clearing and maintaining culverts linking the main river to floodplain ditches to encourage floodplain inundation

Construction Delivery: optimise scheduling and utilise precision technology

One of the key lessons learned from the River of Life II project is the importance of strategic timing and the use of advanced technology in construction delivery. By scheduling major earthworks during the summer period, aiming for April mobilisation and May 'start on site,' projects could minimise the impact of poor ground conditions on productivity and costs. Additionally, the use of 3D models and GPS-based 'dig systems' in excavators could lead to highly accurate excavation, minimised safety risks, better integration between design and construction, and reduced uncertainty regarding design volumes and work areas. Furthermore, employing GPS-based 'dig systems' for

excavators could result in faster construction, more accurate results, and safer conditions with fewer people on foot. Incorporating these strategies into future projects could help optimise construction delivery, improve outcomes, and reduce risks.

Monitoring and measuring: secure funding beyond construction

The funding of multiple partners and projects through a centrally managed fund (WEG) has delivered significantly greater environmental benefit than could have been achieved by one party working alone. However, there may be better funding and delivery models for a conservation project such as this, making better use of Permitted Development powers.

The funding model used did not include post-construction monitoring. The funding of long-term monitoring, to ensure the measurement of progress against stated outcomes, would have been useful and would help build up an evidence base regarding whether the project has been successful.

The project was also not able to secure the funding required for all critical engagement activity post-construction. Future funding models should include these critical elements more explicitly along with funding for post-construction monitoring, to help secure the long-term benefits and objectives of such schemes. This may be easier to achieve if these elements are included in the long-term vision for the project.

Wider impacts: use risk assessments to help manage expectations

Some landowner partner fields became wetter, changing their ability to graze and grow arable. This is due to the new features changing how water interacts and behaves within it, which is an inherent risk with this kind of project. A more detailed hydrological risk assessment during the design phase, potentially informed by additional ground investigation data, would help to better inform project partners of the expected impacts on neighbouring areas so that risks can be assessed, and where possible, mitigated. Managing expectations and choosing the right sites is of the greatest importance as a hydrological risk assessment will only ever be an estimate of the final outcomes achieved.

Photo credit: Burst Design



What the future holds

The success of the River of Life II project has opened up exciting possibilities for further research, conservation, and public engagement. As the UK's environmental policy landscape evolves, with a growing emphasis on nature recovery and sustainable, nature-friendly farming practices, projects like River of Life II serve as powerful demonstrations of what can be achieved through collaborative, landscape-scale initiatives.

Biodiversity measuring

In partnership with the Centre for Ecology & Hydrology (CEH) and the Environment Agency (EA), we will continue to monitor and share the findings of our project, documenting how nature establishes itself within the newly created wetlands. As part of this effort, a dedicated volunteer is now collecting data from the CEH biodiversity monitoring unit installed at the site, providing valuable insights into the wetland's ecological development. With additional funding, we could conduct detailed surveys of habitats and species, comparing our results with other similar sites to gain deeper insights into the biodiversity outcomes of wetland creation projects.

Carbon and greenhouse gases (GHGs)

The outcomes and potential for learning here are much longer-term, but will require funding and support to enable this to happen with Bangor University and the EA. The initial results are very positive, but what we don't know yet is how the wetland behaves in relation to GHGs longer-term, and in particular whether it is capable of and performs well at actively sequestering

carbon. If it is, the next development may likely be developing protocols, framework and metrics for the government and other bodies to incentivise and promote the creation of more similar wetlands – including through the **Environmental Land Management Scheme**, and establishing a carbon code and credits system for wetlands. This will be work done by academics and others, but will involve us as one of the critical sites where the study and information is being gathered.

Visitors and engagement

There is a lot more potential here for visitor engagement. For example, we may want and need to revisit the waymarkers and the information they relay via QR codes. Building on the success of our current volunteer who collects data from the CEH biodiversity monitoring unit, we could involve more volunteers in various aspects of site monitoring, surveying, and research. This will not only enhance our understanding of the wetland's ecology but also provide valuable opportunities for public participation and learning. We could also choose to install a bird hide or similar structure for walkers and visitors to build up engagement opportunities.

New projects and partners

The River of Life II project has yielded valuable insights into creating and managing wetland habitats in agricultural landscapes. We are keen to share our experiences and collaborate with interested landowners, environmental organisations, and community groups to support the development of thriving wetland ecosystems. As the River of Life II wetlands mature, we are committed to documenting and sharing our ongoing learning, engaging with others to inspire the adoption of nature-based solutions at a landscape scale

Photo credit: Burst Design



Appendix 1

Additional Lessons learnt

Construction Delivery

Consider undertaking major earthworks predominantly during the summer period - aiming for April mobilisation and May 'start on site' - to minimise the impact of poor ground conditions on productivity and costs.

Utilising 3D models and GPS-based 'dig systems' in excavators can lead to highly accurate excavation, minimised safety risks, better integration between design and construction, and reduced uncertainty regarding design volumes and work areas.

Employing GPS-based 'dig systems' for excavators can result in faster construction, more accurate results, and safer conditions with fewer people on foot.

Contracts

When passing on risk to the Principal Contractor, be aware that this may result in increased contract costs if let as a lump sum contract. Consider using NEC4 contract terms with additional 'Z' clauses for major risks and to better define allowable Compensation Events.

Develop a detailed written specification for all Contractors to ensure clarity of work required, minimise the potential for future conflicts or issues, and reduce the likelihood of contract changes and unforeseen costs.

Environmental

Engaging competent field-based archaeological support, with early definition of shared methodology, can help reduce issues during construction and enable faster, more efficient work.

Partnership Working

Engaging environmental mitigation specialists early in the project process and integrating required methods of working into the Contractor specification pre-tender can help ensure alignment of expectations, avoid unforeseen costs, and minimise environmental risks.

For wetland projects, involving and seeking approval from environmental regulators, such as the Environment Agency (EA), can help avoid delays at the

consenting stage and disagreements on the effectiveness of the delivered project.

Project Structure

Considering Early Contractor Involvement (ECI) in the project can help reduce the risk of the scheme design being undeliverable within the available budget.

Selecting team members who are committed, have strong relationships, and are invested in the outcome can foster shared ownership and a willingness to go 'the extra mile'.

Communications

Developing a shared project vision at the start of the project, which explains the rationale behind the project and its wider context, can enable all project communications to be set in this context and help deliver more 'big picture' clarity for stakeholders.

Creating a shared vision for the future use and operations of the project assets at the concept stage, and building it into an independent communication plan, can be undertaken at the Project Board level while keeping it separate from the delivery team who are focused on construction.

Design

Appointing a single Principal Designer responsible for all scheme elements can help ensure integration between design concepts, construction practicality, and clarity of responsibilities.

Specifying that all designers must visit the site prior to completing the design can help them gain a detailed understanding of the site context and setting, and reduce errors on drawings that would otherwise require Project Manager time to review and resolve.

Financial

When creating a project vision, considering the inclusion of critical engagement elements can help 'sell' the overall project to funding parties.

Seeking funding for long-term monitoring as part of the funding request can help ensure the project has the means to measure whether stated outcomes are being achieved.

Governance

Developing specific Terms of Reference at the project outset can provide a framework for the Project Board to manage complex decisions, particularly when risk-sharing among partners is not equal.

Glossary

BBOWT: Berks, Bucks & Oxon Wildlife Trust

Biodiversity: The variety of plant and animal life in a particular habitat or ecosystem.

CA: Conservation Area - an area of notable environmental or historical interest or importance which is protected by law against undesirable changes.

Carbon sequestration: The process of capturing and storing atmospheric carbon dioxide, often with the aim of reducing the impacts of climate change.

CEH: UK Centre for Ecology & Hydrology

Culvert: A tunnel carrying a stream or open drain under a road or railway.

EA: Environment Agency

ECI: Early Contractor Involvement - a procurement method whereby the contractor is appointed at an early stage to collaborate with the design team.

Fry: Young fish, especially recently hatched or juvenile fish.

GHG: Greenhouse Gas - a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect which leads to global warming.

GPS: Global Positioning System

Hydrology: The branch of science concerned with the properties of the earth's water, especially its movement in relation to land.

NEC4: New Engineering Contract, version 4 - a suite of construction contracts created by the Institution of Civil Engineers.

Permitted Development: A national grant of planning permission which allows certain building works and changes of use to be carried out without having to make a planning application.

Pollarding: A method of pruning that keeps trees and shrubs smaller than they would naturally grow.

SSSI: Site of Special Scientific Interest - a conservation designation denoting an area of particular ecological or geological importance.

TTRO: Temporary Traffic Regulation Order - a legal document to allow a local authority or other organisations, like utility companies, to temporarily restrict traffic on a road.

WEG: Water Environment Grant - a grant scheme funded by the European Agricultural Fund for Rural Development (EAFRD).

Wet woodland: Woodland growing on poorly drained or seasonally wet soils.



Dragonfly



Lapwing



Perch

River of Life: creating habitats where humans and nature can thrive

The backwater channels and ponds you can see here were created by Earth Trust. The Thames, England's longest river, has been managed as a trade and transport route which limits the ability of nature to thrive. These new habitats enable wildlife to flourish, provide refuges for breeding fish, and capture carbon.

Wildflower rich grasslands are found across the Earth Trust Farm. We manage the flood plain meadows alongside the Thames through hay cutting and grazing with cattle, creating the perfect conditions for wildflowers to thrive. This in turn provides habitats for invertebrates, birds and other wildlife.



Find out more



Europe Investing in rural areas

Photo credit: Thames Path