Making Space for Water: Integrating beavers with natural flood management to reduce downstream flood risk

Photo: Alan Puttock (University of Exeter)

Devon Wildlife Trust

University of Exeter

TERRANOMICS

Project summary

Title: Making Space for Water: Integrating beavers with natural flood management to reduce downstream flood risk.

Location: Devon, SW England: River Otter, focused on sub-catchments: Colaton Raleigh Stream, Back Brook, and Budleigh Brook.

Revenue model: Sale of ecosystem services to private and public beneficiaries, blended with philanthropic funds and public payments.

Financing needs (approximate): £2.5 million to cover upfront and ongoing costs over 30 years, of which £390,000 has already been secured.

Planned environmental and social outcomes

- Increased flood resilience for communities in 3 flood-prone villages in East Devon: Storm peak flow reduction of 23% during a 1 in 50-year flood event and water storage of over 42,000 cubic metres. By attenuating peak flows and increasing water storage the project will improve flood resilience for 116 at-risk buildings, including 82 residences spread across the villages of Newton Poppleford, Colaton Raleigh, and East Budleigh. 69 properties have flooded in these villages within the last 2 years.
- Drought resilience: By increasing the average baseflow by 8%, the project will enhance the availability of water during dry periods. The area lies within a critical drinking water supply catchment.
- Biodiversity: The project will generate 25 Biodiversity Area Units and 2 Biodiversity Watercourse Units and restore over 9 kilometres of watercourses.
- Carbon sequestration: Generation of up to 710 Woodland Carbon Code Pending Issuance Units (tCO2e) (not expected for sale in the short-term – see page 5).

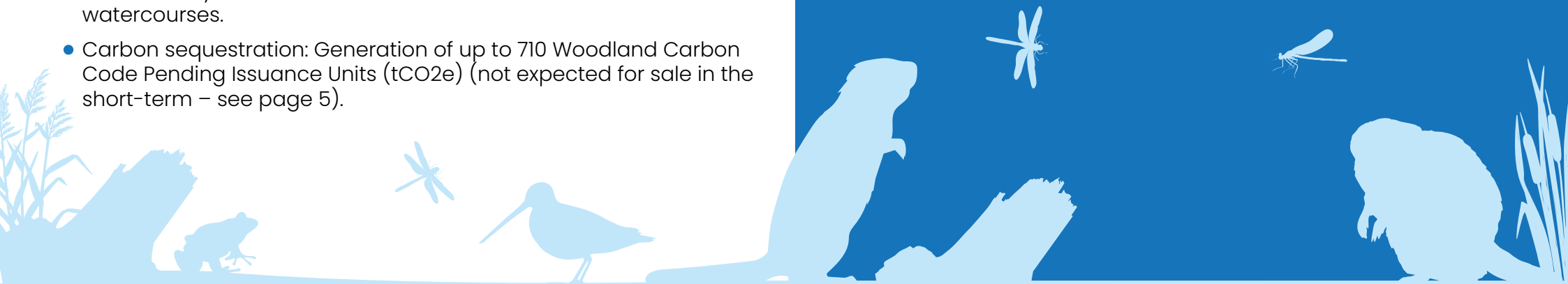
Background context

This brief outlines the opportunities for buyers of ecosystem services, funders, and investors to engage in a pioneering nature-based solution that delivers measurable environmental and societal benefits in targeted locations.

Making Space for Water is a first of its kind programme developed by Devon Wildlife Trust and the University of Exeter which focuses on delivering environmental benefits to local communities using a combination of wild-living beavers and man-made river restoration methods. In doing so, the Making Space for Water programme will support biodiversity, mitigate flood and drought risks and improve water quality in priority locations in Southwest England.

Our aim is to combine beaver-created habitats with man-made interventions across three tributaries of the River Otter catchment in order to maximise the ecosystem service benefits and deliver a sustainable source of revenue for land managers who provide space for wild beavers.

For further information on the benefits of wild-living beavers visit www.devonwildlifetrust.org/making-space-beavers.



Key parties involved

Devon Wildlife Trust (DWT): Leading the project with over a decade of working with beavers and delivering habitat creation and natural flood management projects in partnership with landowners and local communities. DWT are experts in beaver ecology, habitat management and creating optimum habitat for wild-living beavers. DWT are the only organisation in the UK who are developing the integration of man-made nature-based solutions with wild beavers as an innovative and cost-effective strategy for the targeted delivery of ecosystem services such as flood resilience.

University of Exeter: Providing scientific expertise, monitoring ecosystem service delivery, and conducting independent research to monitor the project's outcomes. Since 2013 University of Exeter researchers have undertaken a broad suite of beaver and natural flood management research, undertaking monitoring, modelling and geospatial analysis nationally and publishing more than 15 peer reviewed scientific papers. The Centre for Resilience in Environment, Water and Waste is the first purpose-built transdisciplinary research centre in the water sector, tackling the most pressing environmental issues of our time.

Local landowners: Support the project design and targeted outcomes, helping to ensure long-term sustainability and local community involvement in the project.

Environment Agency: Leading the delivery of flood alleviation – including natural flood management – in the catchment.

Devon County Council: Local lead flood authority and leading the Local Nature Recovery Strategy for Devon.

Other local partners: Local organisations delivering natural flood management solutions, including the Farming and Wildlife Advisory Group Southwest and Westcountry Rivers Trust, who will lead on fisheries monitoring in addition to project delivery.

Photo: DWT

Location and proposed nature-based solutions interventions

Our aim is to **create six new wetlands and expand one existing wetland** where beavers are resident and able to maintain the downstream flood resilience benefits over multiple decades.

The project interventions are designed to slow the downstream flow of water and increase upstream water storage. Critically, they will establish the perfect 'beaver ready' conditions so that beavers can move in, expand and maintain the wetlands. These beaver-engineered wetlands will enhance local biodiversity, reduce flood risk, improve water quality, and store carbon, all while strengthening ecosystem resilience.

Key interventions we will use to deliver these nature-based solutions include:

Floodplain reconnection

Using the natural ecological engineering capabilities of wild beavers this project will **create 15 ha of floodplain wetland habitats** which store water, slow downstream storm flows and provide important habitats for wildlife.

Leaky dams and flow spreaders

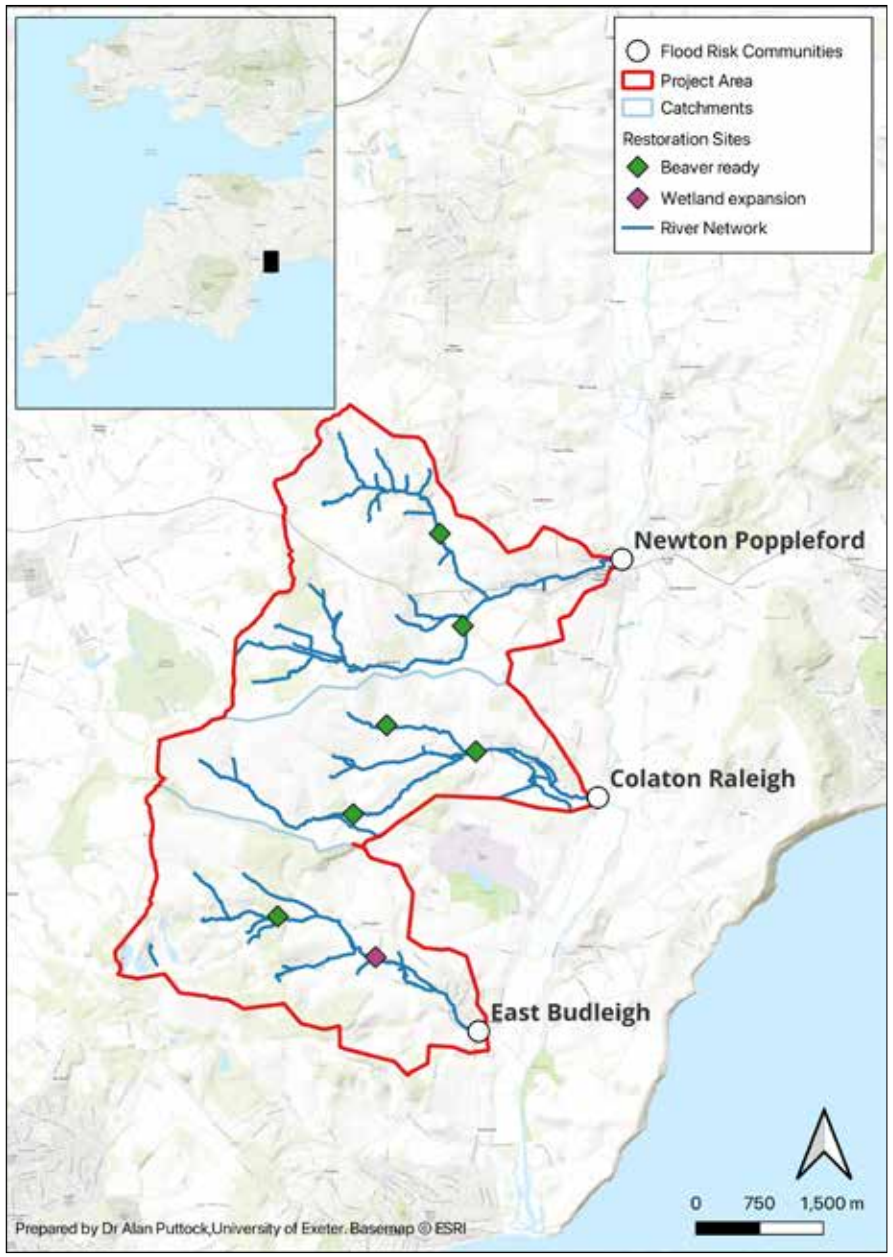
503 leaky dams and flow spreaders will act as beaver dam analogues, encouraging beavers to build new dams and create wetlands in optimal locations for reducing downstream flood risk.

Ponds and scrapes

17 ponds and scrapes will store water and provide habitat for beavers and other wildlife as well as increasing flood and drought resilience.

Woodland creation

12 hectares of woodland will be created along watercourses, providing food and materials for beavers to build their dams and lodges as well as storing carbon and creating nature-rich river corridors.



Ecosystem services and social benefits the project will create

This project addresses the increasing demand for **ecosystem services**, such as **BNG** and **NFM**, while delivering significant climate resilience benefits. As funders or investors, you can leverage these nature-based solutions to meet regulatory requirements, enhance your corporate social responsibility (CSR) profile, or reduce operational risks.

- **Increased flood resilience:** The project will significantly reduce peak storm flows, with a **modelled reduction of 23% for 50-year storms**, 28% for 10-year storms, and 36% for 2-year storms. These reductions will improve flood resilience for local communities, including 116 at-risk buildings in the villages of Newton Poppleford, Colaton Raleigh and East Budleigh.
- **Increased water storage in headwaters:** The project will deliver **42,000m^3 of water storage in beaver wetlands**, alleviating downstream flooding and contributing to sustainable water resource management.
- **Biodiversity uplift:** Creation of **25 biodiversity area units** and 2 **biodiversity watercourse units** will deliver measurable biodiversity enhancement within the landscape.
- **Increase carbon sequestration: 710 Woodland Carbon Code** Pending Issuance Units (PIUs) are expected to be generated through woodland creation. Although landowners expect to withhold the sale of these units the volumes demonstrate the contribution of this project to climate mitigation.
- **Increased drought resilience:** The project is expected to **increase average baseflows by 8%**, enhancing the availability of water during dry periods. Higher baseflows help to ensure water availability for agriculture, ecosystems and human consumption. With droughts becoming more frequent and intense due to climate change, projects like this are increasingly important for water security.

Photo: DWT

Photo: David White

Funding model

The delivery costs over the 30-year project period are approximately **£2.5 million**. £500,000 in upfront delivery costs and £62,000 average cost per year for ongoing costs.

The project has already secured or is in the advanced stages of securing, significant funding to cover a portion of its costs. This includes:

- **Climate Resilient Otter Catchment (CROC)** which can help to cover £270,000, largely through upfront costs.
- **Environmental Land Management Schemes (ELMS)** funding which is expected to fund over £70,000 of upfront capital costs.
- **England Woodland Creation Offer (EWCO)** can provide funding of at least £50,000 for capital interventions focused on woodland creation.

The secured funding total is £390,000. To bridge the remaining funding gap, the project proposes a diverse funding model as follows:

Biodiversity Net Gain (BNG) Units:

- **Target:** from £560,000
- **Details:** Sale of 25 Biodiversity Area Units and 2 Watercourse Units to developers meeting off-site BNG obligations. These credits provide long-term maintenance funding and appeal to developers under increasing regulatory pressures. Forward-thinking investors and property developers may be keen to make early-stage purchase commitments for high-integrity Biodiversity Units.

Natural Flood Management (NFM) outcomes:

- **Target:** £1,100,000
  - **Public** (Countryside Stewardship Higher Tier agreements): £350,000
  - **Private** (payments for NFM outcomes from buyers): £750,000
- **Details:** Large businesses, particularly those operating near the project sites, could benefit from reduced flood risks. For example, insurance companies, infrastructure developers and utilities could use the project as a cost-effective means to lower exposure to water damage or flood-related risks. Hydrological modelling of the proposed interventions suggests a substantial reduction in peak flood flows (up to 30%) following heavy rainfall events, reducing large insurance payouts and operational costs. Organisations could pay for these verified flood reduction outcomes.

Companies aiming for a net positive impact on nature and the climate emergency:

- **Target:** £360,000
- **Details:** Large corporates and local businesses in the surrounding catchments may want to align themselves with nature-based solutions that demonstrate their commitment to protecting natural resources and local communities. They can collaborate on this project to help fund the long-term sustainability of these nature-based solutions based on their specific interests. Organisations with Environmental Social Governance (ESG) goals or Corporate Social Responsibility (CSR) initiatives would benefit from the employee and public engagement opportunities of a beaver-focused environmental project.

Crowdfunding campaigns:

- **Target:** £100,000
- **Details:** To facilitate fundraising the project might also use crowdfunding platforms to raise smaller amounts with the option to 'sponsor a beaver wetland'. For example:
  - £450 creates a pond, providing a home for beavers and other wildlife while £400 funds a leaky dam which could be adopted by beavers when they move into the site.

Delivery model

The delivery model is built around a **collaborative approach**, bringing together expertise from Devon Wildlife Trust, the University of Exeter, and private landowners. There are plans to explore the establishment of a Community Interest Company (CIC) or similar Special Purpose Vehicle (SPV) to support project governance and long-term management. A phased intervention plan will ensure that each action, from floodplain reconnection to woodland creation, is delivered efficiently, monitored rigorously, and adjusted as needed. Leveraging local expertise and community involvement will be key to long-term success.

Revenue from ecosystem services (e.g., **BNG, NFM** units) will be distributed across project partners and landowners based on their contribution to achieving project outcomes. A portion of the revenue will be reinvested into ongoing long-term management. Discussions with private funders and buyers will help to refine this distribution model, with the flexibility to adapt based on the evolving market for ecosystem services. The sale of BNG units could provide **upfront capital**, while NFM services could deliver **annual revenues**.

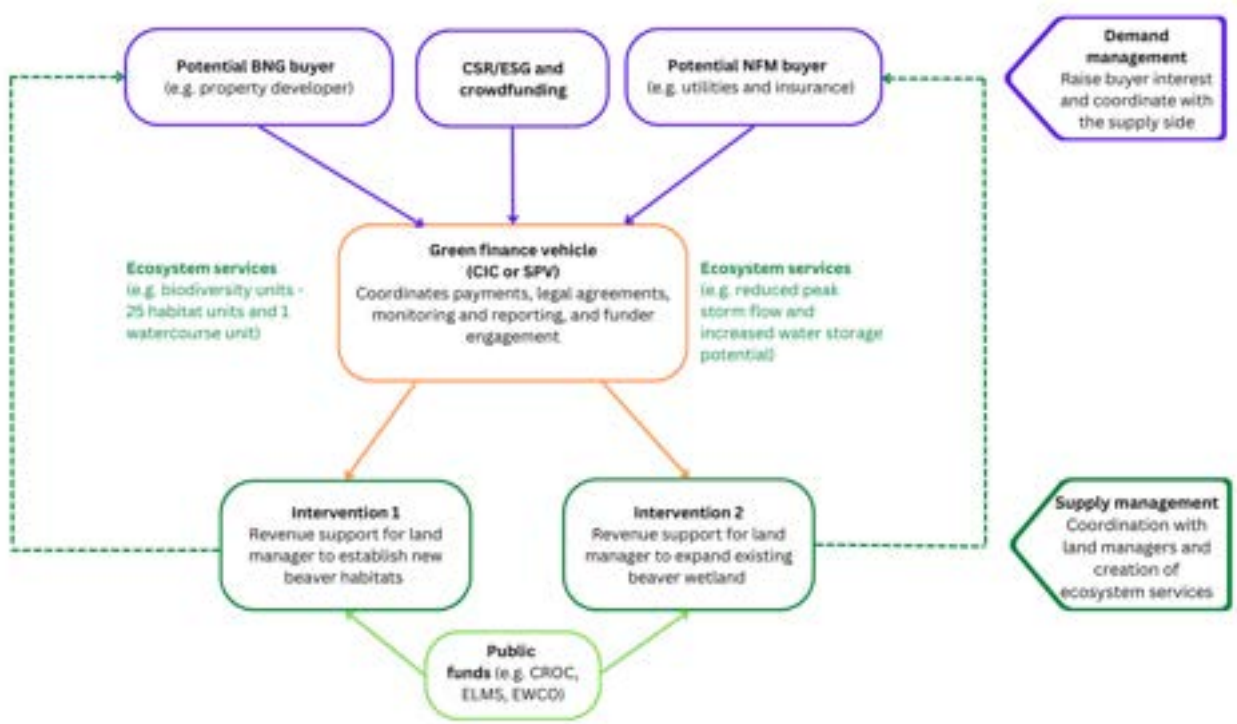


Figure 1: Proposed governance structure for combining public and private funding for project delivery.

Next steps

We are seeking expressions of interest from potential early-stage funders and those interested in supporting our project. We will be hosting a series of buyer and funder engagement sessions with potential project partners.

For more information please contact **Holly Barclay** at **beavers@devonwildlifetrust.org.**

Further information available on request

- The 'Making Space for Water: Investing in nature-based solutions with beavers' booklet outlines the programme in more detail, including the project partners and the objectives.
- A detailed cost model showing the costs and potential income for the three sites modelled over 30 years.
- A hydrological model showing how these wetlands in the target sites can enhance low flows, reduce peak flows during flood events, and improve overall water storage capacity within river catchments.

Photo: Mike Symes

This report was prepared by Devon Wildlife Trust, University of Exeter and nature-based consultancy Terranomics.

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