Connecting the Culm is a 3-year partnership project working to tackle some significant challenges faced by the River Culm.

It is part of the wider EU Interreg 2 Seas funded 'Co-Adapt' programme, with allied projects being run in Somerset, the Netherlands, Belgium and France. This wider partnership demonstrate how communities can come together to implement nature-based solutions to climate-change related issues.

The £1million Connecting the Culm project started in January 2019 and will run until June 2022, funded partly by a 60% contribution from Interreg and the remainder by partners.

The Challenge **Along the Culm's 40km length, from its headwaters in the Blackdown Hills in Somerset to its confluence with the Exe in Devon, the river generates several linked problems:**

- There are hundreds of properties at risk from flooding along the length of the river; the Culm's flood peak also magnifies the flood peak of the river Exe as it enters Exeter, increasing the risk to properties in the city and also affecting the national rail network
- The whole length of the river Culm is failing water quality targets because of diffuse and point source pollution and high sediment loads. The river also flows directly into and affects the quality of the Exe Estuary (an SAC/ SPA/ Ramsar Site)
- The river and its floodplain run through major development areas proposed in the Greater Exeter Strategic Plan (that also includes the planned 5,000-home Culm Garden Village); and planners and local communities must try to create flood-resilient developments
- Initiatives such as *Catchment Sensitive Farming* and *Upstream Thinking*, that work with landowners and communities to secure improvements to rivers and riparian land, have not been applied on the Culm.
- The headwaters of the catchment support important but degraded priority wetland mosaic habitats including spring line mires; these could act as natural sponges, but their function has been reduced by changes in agricultural practice
- The headwaters also support endangered populations of protected and priority species, including the white-clawed crayfish, which are threatened by poor water quality and the invasive American signal crayfish.
- Much of the central part of the catchment lacks areas of priority habitat, meaning ecological connectivity is lost through the catchment apart from the core river itself.
- The river is rich in heritage value, notably a chain of historic water mills with their associated leats, but these are under threat and little understood.
- Engaging the public on issues of pollution and wildlife loss in their communities can be difficult, especially when damage may have been over a long period and as a result of activity by members of that community

Many of these problems have arisen because the river has often been treated by policy-makers, land managers and individual residents as a series of disconnected units with disparate functions, leading to poor decision-making and land management.

Our partnership **Our partnership, which sits within the East Devon Catchment Partnership, consists of the following organisations:**

Environment Agency · Devon County Council · Mid Devon District Council · National Trust

The Opportunities **These problems need to be tackled, and the Culm has some positive features that make this feasible:**

- Its compact scale means that an integrated, whole-river approach can be readily adopted
- Previous projects working with communities in the Blackdown Hills have created a strong foundation of engaged volunteers and a good sense of connection to the river Culm
- The urban development of the Culm Garden Village requires imaginative solutions to avoid exacerbating existing problems and create a desirable green settlement, and the developers are keen to adopt a catchment-wide approach
- A key landowner on the floodplain – the National Trust – is keen to naturalise its landholding along the river and work with stakeholders to achieve this
- Collectively, residents, land managers and planners need a better understanding of the river as a single ecosystem that depends upon multiple inter-related decisions and influences by people in the catchment
- Innovative nature-based solutions and techniques are being developed to help resolve the problems of flooding, water pollution, soil erosion and biodiversity loss

The Project **Connecting the Culm has formed a partnership to take a coordinated approach to these problems. The project aims are to:**

- Make the Culm river and its floodplain more resilient to flood and drought, using nature-based systems and approaches
- Improve water quality and biodiversity on the Culm (and consequently in the Exe and its estuary)
- Encourage people living in the catchment to feel more involved in decision-making and support the use of nature-based solutions to manage water

We will do this by:

- Improving local people's **understanding** of water management techniques and the function of the river / catchment ecosystem as an integrated whole
- Creating new opportunities for people to **collaborate** in addressing water management, leading to communities cooperating more effectively to address the challenges created by climate change
- Installing tangible **demonstrations** of appropriate nature-based solutions to build confidence, encourage cooperation and raise aspirations – these will be replicable and provide solutions that can be rolled out by the community
- Developing a *Blueprint for the Culm* that will be the masterplan for the whole catchment for the next 25 years, **co-created** by the people that live and work within the catchment and the organisations that have a role in the area.

Our approach **Our approach is to work throughout the catchment, engaging with people affected by, or playing a role in, the river and its tributaries.**

A multi-agency team will deliver the project, comprising specialists in natural flood management, community engagement and biodiversity. We will:

- use **scenario-forecasting** to explore the potential impacts of climate change on the catchment; ecological network mapping overlaid onto hydrological studies will highlight key areas of multiple benefit and best added value
- show how innovative **nature-based** techniques can help mitigate impacts and adapt to the new circumstances;
- **involve** people in shaping a new governance solution for the catchment –the Blueprint for the Culm
- We will create three **Demonstration Zones** where the new techniques will be tested and demonstrated:

The Headwaters Zone	restoring the mires where the river and its tributaries arise whilst conserving the remnant population of white clawed crayfish
The Culm Garden Village Zone	where the first steps in developing a new town will be to construct flood management infrastructure on surrounding land, shaped by a catchment-wide hydrological study
The Floodplain Zone	rewilding the floodplain, working alongside land managers and creating new trails and ecotourism facilities

Each zone will test a range of nature-based interventions, shaped by its landscape, its communities and their aspirations. Examples include:

- Restoring hydrological function to spring-line and valley mires, providing a range of ecosystem service benefits including flood attenuation and carbon storage in peat rich soils
- Damming streams and drainage channels using natural woody debris to create attenuation ponds and silt traps, reducing flood peaks and reducing downstream sedimentation

- Innovative flood alleviation features on land associated with new, large developments, showing how multi-use green infrastructure is deliverable, unlocking significant added benefits
- Planning resilience into new developments including allowing for the spread of beavers from the neighboring River Otter catchment
- Coppicing and laying bank-side trees to imitate beaver activity, improve water oxygen levels and reduce livestock disturbance of the river bed

- Reconnecting the river to its floodplain and restoring more natural floodplain function on intensive agricultural land, by re-creating floodplain attenuation features, restoring wetland habitat and unlock other ecosystem service benefits including enhanced access and recreation
- Restoring agricultural soils to enable them to achieve their natural hydrological function
- Restoring historic leat systems and ponds that hold flood-peak waters and generating renewable electricity at their outlets
- Adopting community based and driven solutions to tackle the challenges faced by the river and its floodplain including supporting community land trusts, collaborations of small-scale landowners and community focused interventions

Connecting the Culm through Natural Flood Management

The problems

- 650 homes on the Culm, and 5,000 homes downstream in Exeter are **at risk of flooding**, as well as the strategic rail network into the South-West
- **Drought conditions** damage agriculture and domestic water supplies
- **Water quality** is failing due to high levels of pollution and soil erosion
- **Wildlife and fish stocks** are being damaged, including salmon, trout and nationally rare native crayfish
- **Spring-line mires** in the headwaters are degraded and have lost their water storage function
- **Decision-making** is often fragmented and short-term
- Many communities and key stakeholders lack information and are **fearful of change**

The solutions

- Create **leaky dams** on streams to form ponds that store water and trap silt
- **Coppice bank-side trees** to allow more light to reach the water and raise oxygen levels
- **Restore natural features** in intensively farmed areas, eg wetland habitats , historic leats and ponds, wildflower field edges
- **Plant trees** and create new hedge-banks as buffers alongside watercourses
- Adapt old drainage systems to **rehydrate spring-line mires**
- **Demonstrate Natural Flood Management** techniques so that people can see how they work
- **Develop scenarios** to communicate how climate change is going to affect local communities
- **Involve local people** in the planning process to create solutions that will work for their communities in the long term and win their support

The benefits

- **Water is retained** for longer upstream, reducing the risk of flooding and damage to property, and sustaining supplies during drought conditions
- **Pollution and soil loss** reduce and water quality improves
- **Natural habitats** regenerate, improving conditions for native wildlife
- **People enjoy** a more diverse and productive environment
- **People understand** the challenges that climate change poses and how we can address them
- People feel a **sense of ownership** of a long-term plan and give it their support
- **Agencies cooperate** in delivering a coherent long-term plan linked to other key investments

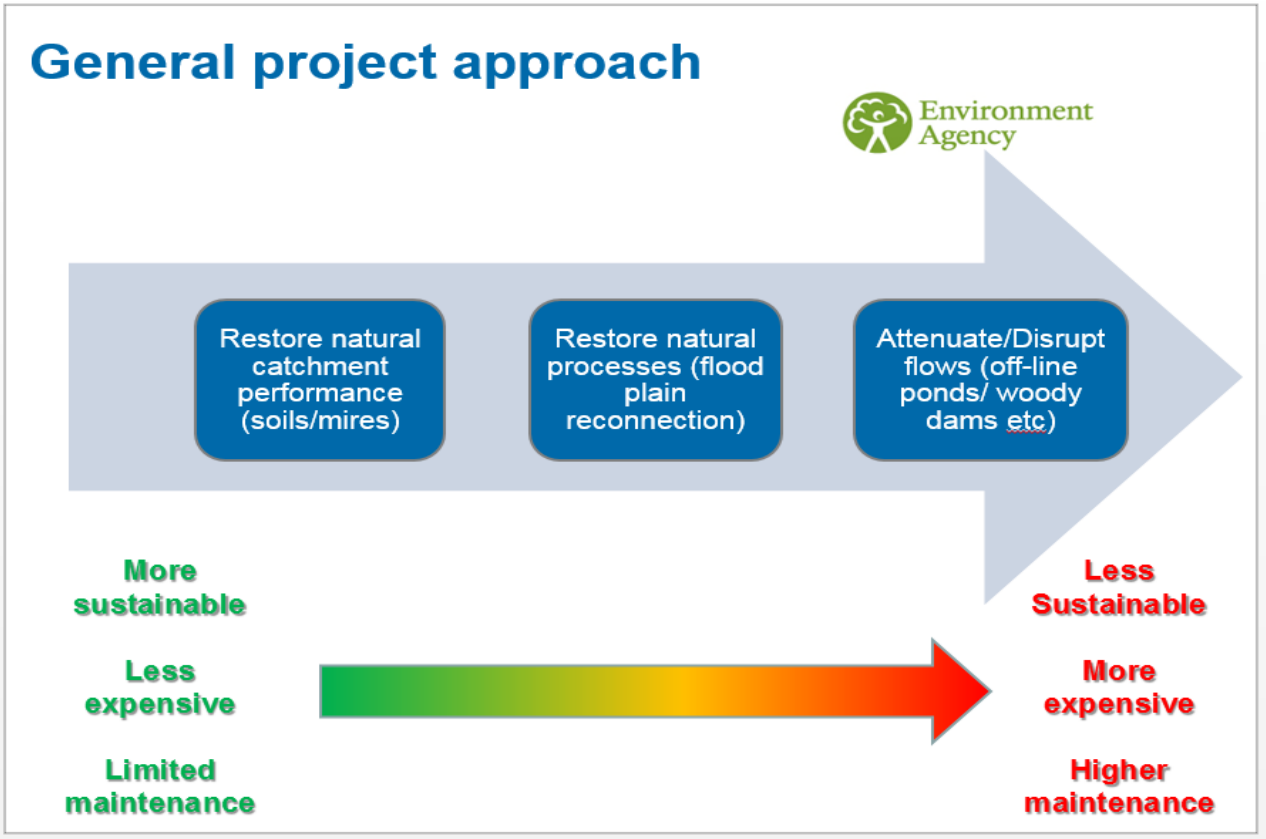
Reducing flood-risk | **Improving water quality** | **Protecting wildlife** | **Providing recreation** | **Involving communities**

Blackdown Hills
Area of Outstanding Natural Beauty

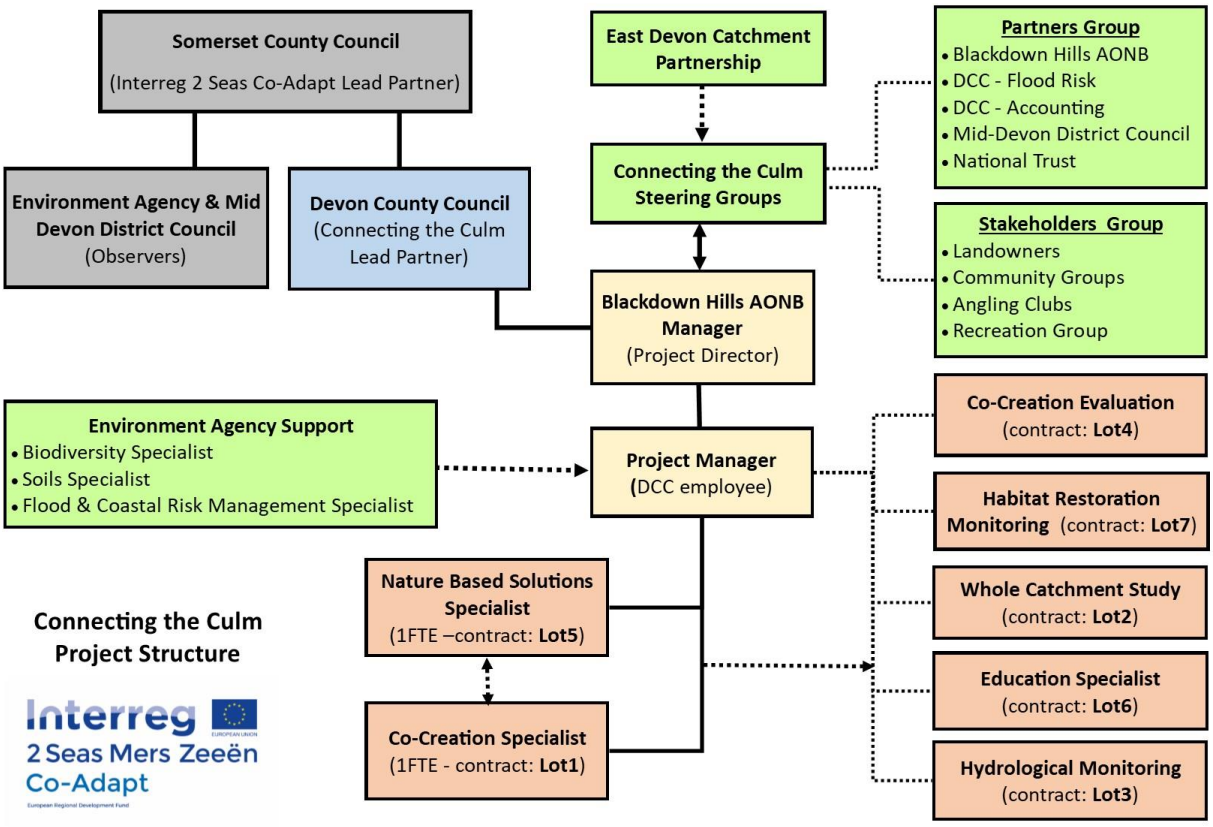
To find out more please contact the Blackdown Hills AONB Partnership. Tel: 07890 615840 or email tim.youngs@devon.gov.uk

Areas of discussion for the Killerton site visit (Culm catchment) on 16 May 2019

1. How would adaptive pathways apply in this landscape? for example in the context of the West Coast mainline and the M5 motorway
2. At what granular scale could scenario planning be applied?
3. Our local interpretation of a transition roadmap and local spatial vision is a co-created 25 year Blueprint for the river Culm catchment, underpinned by a Whole Catchment Study (hydrological model). We are trying to ascertain ways of making sure this is 'adopted' by decision makers and stakeholders.
4. Top tips for co-creating with diverse stakeholders - from local community/ interest groups to Network Rail.
5. Evidence gathering and showing change in people's perceptions
6. How to follow the 'general project approach' (see below) for delivering nature-based solutions
7. Historic Landscape Characterisation- a co-creation and nature based solution tool



Project structure



Connecting the Culm

A programme to tackle the effects of climate change through co-creation

The problem: 650 homes on the Culm, and 5,000 homes downstream in Exeter and the strategic rail network into the South-West are **at risk of flooding.**

Why is this? The reasons are complex. It's partly because climate change is bringing more and heavier rainfall —and partly because natural systems that should slow the water down aren't working properly.

What are these natural systems?

Healthy soils absorb lots of the water that falls on them.

Healthy streams store water in pools, marshes and bogs.

Healthy rivers on the floodplain have space to spill out onto farmland before the water reaches people's homes.

Connecting the Culm is a project that aims to get these natural systems working better—using **Natural Flood Management** (NFM) techniques

NFM includes changing the way farmers manage land, planting more trees, creating marshland and building leaky dams.

Key to our project is the principle of **"Co-creation".** This means people work together to design solutions that are right for their community.

We'll bring **landowners, farmers, homeowners, community groups, statutory organisations and specialists** together to make long-term plans to restore natural systems that reduce flood risk.

Each community's plan will connect with the plans that others make, both upstream and downstream; together these will make a **25-year Blueprint for the Culm.**

The results:

- Reduced flood risk along the Culm and downstream
- Farmland soils are protected
- Cost savings for everyone
- Better water quality
- A better environment for wildlife and fish stocks
- A more enjoyable and attractive place to live

EAST DEVON CATCHMENT PARTNERSHIP C22