

# Restoring Rivers in Cumbria

## Online Story Map of a case study on the River Lyvennet

### Summary

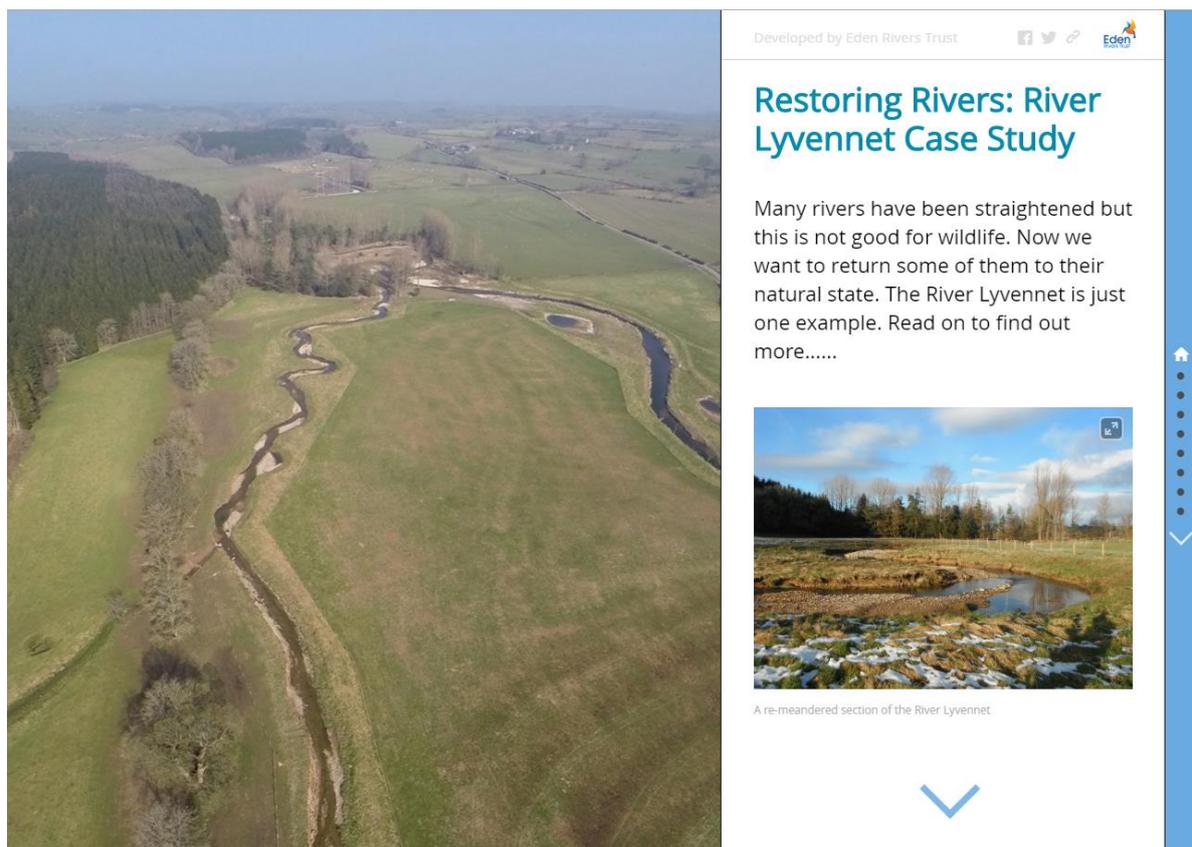
This Story Map presents a river restoration case study for the River Eden Catchment, Cumbria.

Students can learn about the problems associated with managed rivers and the benefits to people and nature of restoring rivers to a more natural state.

The case study supports topics including: rural landscape management, river habitats and processes, managing biodiversity, upstream solutions to flood risk, natural flood risk management, and incorporating ecosystem service benefits within river restoration schemes.

The Story Map can be accessed at <http://arcg.is/2e3C7DN>

Additional resources included in the case study comprise: aerial film footage of the re-meandering of a river, time-lapse film footage of a section of the River Lyvennet re-meandering works, local news reports about the project, and a film about the local primary school's involvement in the project.



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### Restoring Rivers: River Lyvennet Case Study

Many rivers have been straightened but this is not good for wildlife. Now we want to return some of them to their natural state. The River Lyvennet is just one example. Read on to find out more.....



A re-meandered section of the River Lyvennet

## Using the Story Map

The Story Map is split into a number of sections. A selection of questions and topics for further discussion are suggested below in orange for each section.

### 1. Restoring rivers

This section explains the background to river restoration at a national level, driven by European Directives. It also explains why many rivers were historically straightened, the problems this has caused, and gives an overview of river restoration techniques.

Q1. Why were rivers straightened in the past? What effect did this have on the river?

Q2. Describe the different ways in which rivers can be restored to a more natural state.

### 2. Cumbria River Restoration Strategy

This section explains how river restoration in Cumbria is coordinated through a partnership process between the three Cumbrian Rivers Trusts and other local agencies. It outlines the aim of the strategy and the various beneficial outcomes, highlighting both the benefits of natural rivers and the problems associated with managed rivers.

Q1. Look at the Marvellous Meanders poster. Other than straightening the channel, what other features or practices negatively affect the river?

Extended Question:

Q2. Think about and describe what the longer term effects of an engineered river channel might be on the habitat, wildlife and local community.

### 3. Re-meandering the river

This section describes the process of re-meandering the river and includes aerial photos showing the old and new river channels, and time-lapse photography of a section of the channel excavation.

Q1. Re-meandering a river is a lengthy process. Explain, step by step, what was involved in restoring the River Lyvennet to its natural meandering state and how this was helped by the use of aerial photography.

Q2. By what length did the River Lyvennet increase following the re-meandering of the channel?

Q3. Using the aerial photo, compare the old straightened channel with the new meandering channel. What is different about the new meandered channel? What benefits might these changes bring to the river habitat?

## 4. Improving the habitat

This section illustrates how re-meandering the river helps to improve the habitat. It also includes a short news report containing further facts and figures about the project.

Q1. How has the river habitat improved as a result of re-meandering the river? (Give examples and explain further)

Q2. Describe any additional work (other than re-meandering) that was carried out to improve the habitat.

Listen to the short news report at the bottom of this section of the Story Map before answering the following questions:

Q3. How much longer is the new re-meandered river than the old straightened river? (in %)

Q4. How many tonnes of earth were moved to uncover the original river bed?

Q5. How much did the project cost?

## 5. Benefits for wildlife

This section explains how re-meandering the river benefits wildlife and includes a news report on benefits to wildlife, with a specific focus on the native white clawed crayfish.

*(Note: the short news report at the bottom of this section gives more information).*

Q1. Pick three habitat improvements and explain how each of these improvements benefit wildlife.

Q2. What is the threat to the White-clawed crayfish?

Extended Question:

Q3. Discuss the range of habitat improvements that were included in this restoration project and how these have benefitted wildlife. Can you think of any additional habitat improvements that could have been carried out?

## 6. Benefits for people

This section explains the other positive effects that have occurred as a result of restoring the river (e.g. flood risk management, amenity and recreation, improvements to water quality, and animal management and health).

Q1. How does river restoration benefit the farming community and the wider community? Try to explain your answer in as much detail as possible.

Extended Question:

Q2. A project such as this provides a range of ecosystem services. Explain how you might ensure that the right balance of these services is achieved.

## 7. Community involvement

This section looks at how the local community was involved in the project. It describes how local people helped with some of the habitat improvements, and how the local primary school used the project as a focus for their learning.

The short digital journalist news report by pupils at Crosby Ravensworth Primary School asks: How did you restore the river? What sorts of animals might you find here? What fish might you see here? What was your favourite part of the project? To find the answers, watch the film which interviews Joanne Backshall, who was the River Eden Restoration Strategy Programme Manager at the time.

Q1. What are the benefits of involving the local community in the project? Discuss.

## 8. River restoration tour

This section allows you to take a virtual tour of the river restoration project site and compare how it is today with how it was before the restoration work took place.

If the map in the main frame does not view particularly well on your screen, you can open it in a separate window using this link: <https://goo.gl/ZYw37G>

Q1. Using the map tour identify the different elements that contribute to improving the habitat on the River Lyvennet/Howe Beck (meandering channel, river bank fencing etc.).

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Snap2Map Tour

Restoring Rivers: River Lyvennet Case Study

This is the Howe Beck, a tributary of the River Lyvennet. This section of the beck has also been re-meandered into its original channel. If you look at the OS map on the main screen you should be able to see the outline of the original channel (as this map is pre-restoration). The straightened channel can be seen to the left, marked by the line of trees.

1 Restoring Rivers: River Lyvennet Case Study  
2 The original gravel bed  
3 Meanders are good  
4 The old river channel  
5 A refuge for crayfish  
6 Confluence of the two rivers  
7 Deep pools  
8 Gravel bar

## Field trip opportunities

### River restoration:

There is a short circular walking route around part of the river restoration site which is fully accessible to the general public. From here you can see and discuss many of the landscape management features e.g. meandered channel, erosion control measures and wetland areas.

If you would like a guided tour of the whole site then contact our Learning Coordinator at [learning@edenrt.org](mailto:learning@edenrt.org) and we can arrange this for you.

### Freshwater ecology:

The river restoration site also offers an excellent location for finding a number of different freshwater habitats within one small, contained area e.g. river, stream, pond, wetland.

A field trip could be undertaken to assess the water quality and biodiversity value of the different freshwater habitats at the site. Students could undertake water quality sampling, invertebrate sampling, vegetation surveys and river habitat surveys.

If you would like to access the site to carry out fieldwork then contact our Learning Coordinator at [learning@edenrt.org](mailto:learning@edenrt.org) and we can arrange access permission for you.

## Additional resources

The Eddleston Natural Flood Management Project has a number of good videos and technical reports about a natural flood risk management project on a tributary of the River Tweed, showing how catchment management can help reduce flooding downstream in Peebles:

<http://www.tweedforum.org/projects/current-projects/eddeleston>

**You can download more free ArcGIS resources to use in the classroom  
from the Eden Rivers Trust website,**

**[www.edenrivertrust.org.uk/arcgis-resources-secondary-schools](http://www.edenrivertrust.org.uk/arcgis-resources-secondary-schools)**



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