



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

Rhondda trial case study

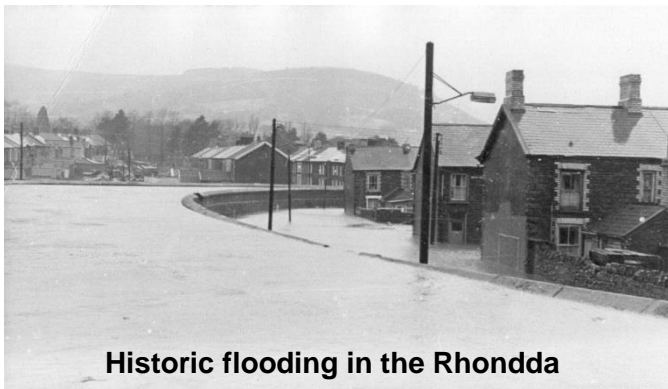
Nature based solutions

Summary of the project

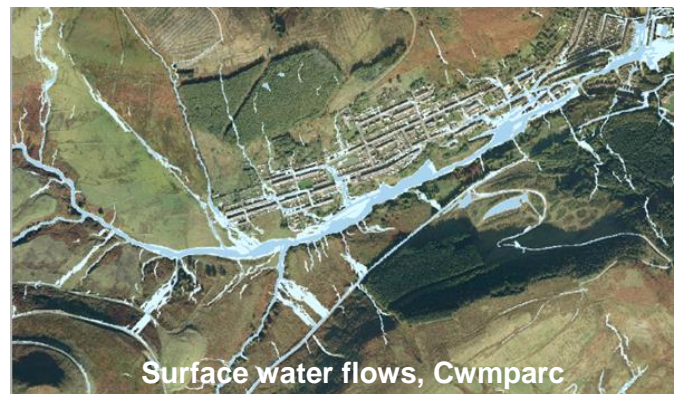
Cwmparc is a typical sub-catchment in the Rhondda where, as part of historic land reclamation schemes, stone lined channels were constructed to ensure the rapid run-off of water for land stability.

In periods of high rainfall the concrete channels rapidly drain the water and this can cause localised flooding and contribute to increased flows in the catchment as a whole. The stone lined watercourses are also devoid of life with no in-channel habitat and therefore no biodiversity potential.

By working with nature, the aim of this project was to mimic natural processes to help reduce flood risk, create resilience to climate change, and provide benefits to biodiversity. This was achieved by restoring an area of degraded peatland above Cwmparc, and installing in-channel woody debris to the stone lined channels.



Historic flooding in the Rhondda



Surface water flows, Cwmparc

There are 5,865 properties in the Rhondda currently at risk of significant flooding. Flood risk in the Rhondda is high and expected to increase in the future.



Large woody debris in stone-lined channels



Brushwood fascines, trapping sediment and holding water

Working with natural processes in Cwmparc



Degraded peatland



Restoring peatland via dams

Restoration of degraded peatland in the uplands above Cwmparc on Welsh Government Woodland Estate (approx. 10Ha site) to increase carbon storage, enhance habitat for wildlife, and reduce flooding by slowing water run-off at its source.



Stone-lined channel



Large woody debris

Installation of woody debris along stone-lined channels to help slow the travel time for normal and peak flows, contribute to more stable flows through the year, reduce in-channel debris downstream, and improve riverbed habitat for invertebrates, nursery areas for fish (migratory or local populations) and iconic upland species such as the dipper.



Monitoring in rivers, channels and peatland to build evidence base and monitor the impact of interventions. This also includes a monitoring point in a comparison catchment where no interventions have taken place.










What we learnt about sustainable management of natural resources

Key learning points

- Nature based solutions can help build resilience and the meet the challenges facing Wales.
- They provide sustainable, cost-effective and multi-purpose solutions, e.g. restoring peatland can help improve water quality, increase carbon storage, store more water (flood attenuation) and enhance biodiversity.
- Quantifying the benefits of nature based solutions is challenging and there are uncertainties in relation to evidence.

- Nature based solutions provide sustainable, cost-effective and multi-purpose solutions, and can help build resilience and meet the challenges facing Wales.
- Measuring the benefits of nature based solutions is challenging, and there are uncertainties in relation to evidence.
- Flood Risk Management advise on a 3-5 year bank of evidence prior to works being undertaken, to give confidence in considering these new methods as a flood risk solution. In the current financial climate, NRW's monitoring network (and capabilities) are likely to be scaled back so capturing this level of data could be increasingly difficult in the future.
- Despite the uncertainties with available evidence, these solutions provide wide-ranging benefits.
- There is enthusiasm for these new approaches and NRW's teams and officers will need support and reassurance to pursue them.

How did this project meet the principles of sustainable management of natural resources?

Principle		How we met this principle
	Collaboration and engagement	Partners include: NRW, RCT, Aberystwyth University, Cynefin, local landowner. Local authority permission was required and granted for the woody debris, and they were keen to support the innovative approach. A PhD (via Aberystwyth University) is studying the effectiveness of interventions at Cwmparc.
	Evidence	Groundwater and river monitoring equipment in place but quantifying the benefits of nature based solutions is not straightforward, and there are uncertainties. Flood Risk Management typically require 3-5 years of back data to assess benefits of interventions. This is rarely possible.
	Long term	New, innovative approaches where scale and scope can develop over time. Restoring natural processes can help create greater resilience to threats such as climate change, and provide wider benefits.
	Scale	Cwmparc, a sub-catchment area of the Rhondda, is an appropriate scale to plan and deliver nature based solutions. If successful, these methods can be rolled out across the wider catchment.
	Multiple benefits	Provide sustainable, cost-effective and multi-purpose solutions, e.g. restoring peatland can help improve water quality, increase carbon storage, store more water (flood attenuation) and enhance biodiversity.
	Public participation	Community workshop held in February 2015 prior to works. Worked with Cynefin to ensure community input. Community engagement requires time, specific skills and aptitude, and Cynefin's input was invaluable. Most community attendees were positive about nature based solutions.
	Preventative action	Holding/slowing the flow of water in the upper reaches of catchments can help minimise flood risk downstream. Communities want reassurance in relation to flood risk, but measuring the benefits is challenging.
	Building resilience	Restored peatland and riverbeds enhances local environment and helps build resilience to climate change, but measuring these benefits is challenging.
	Adaptive management	Flexibility was required but all planned works successfully delivered. On the ground delivery provided valuable learning with regard to approach, planning, permissions, costs, understanding, evidence.

How did this project meet the well-being goals within the Well-being of Future Generations Act?

Well-being goal	How does this project deliver against the goals?
A prosperous Wales	Nature based solutions provide sustainable, cost-effective and multi-purpose solutions to help meet the challenges facing Wales.
A resilient Wales	By working with natural process, these solutions can help build resilience by holding water in the upper reaches of catchments, improving water quality, storing carbon, enhancing biodiversity and better connecting habitats.
A healthier Wales	Innovative approaches generate interest and enthusiasm from community members, but difficult to measure any tangible contribution. An aspiration of the work at Cwmparc is to build on the work that's been undertaken and incorporate a walking route alongside the river.
A more equal Wales	Natural interventions can improve areas for communities, and help minimise the risk to people from flood risk.
A Wales of cohesive communities	Preventative measures and awareness raising will help make communities safer places to live and work. Project undertaken alongside NRW colleagues working with Rhondda communities to raise awareness of flooding and the Flood Warnings Direct service.
A Wales of vibrant culture and thriving Welsh language	Engagement materials and press releases in English and Welsh. Restoring habitats in the South Wales valleys helps improve their natural function, heritage and beauty for future generations.
A globally responsible Wales	Delivering nature based solutions on the ground showcases how they can be delivered elsewhere, providing a wide range of benefits and enhancing natural ecosystems.