

CASE STUDY: WEST CUMBRIA RIVERS TRUST WATER STORAGE AREA

This project was delivered by West Cumbria Rivers Trust as part of their DEFRA funded Glenderamackin Natural Flood Management (NFM) Project, in partnership with the Environment Agency and landowners. The project includes a large, bunded pond situated above Naddle Beck's floodplain, to provide flood water storage, slow the flow of water and reduce flood risk downstream.

Background

The Glenderamackin Natural Flood Management Project aims to work with landowners to deliver an array of features to slow the flow of water, and temporarily store water in the Glenderamackin Catchment.

The landowner in this area was keen to create a permanent water storage area with additional freeboard (extra capacity to store flood water) using a bund and appropriately sized outflow pipes to temporarily store more water during a large storm event.

The landowner offered 3.7 hectares of wet and species poor grassland that only provided low quality grazing land.

Storage area details

A large, elongated pond was dug into the field, fed by high level over flow from an agricultural ditch. The base flow in this ditch will be maintained, with flows only above 15cm being directed into the pond/bunded area.

The final bund created is crescent shaped and extends up to the field boundary either side of the field. It is 370m long x 8-12m wide x 1m high with the outflow set so there is an additional 0.5m of freeboard. **The bund provides an estimated 3,500-4,000m³ of additional flood water storage.**

Outflow of the pond consists of a buried 4inch diameter pipe with a stone lined high level overflow on top. There is a 3inch metal 'T' piece outflow attached to the pipe to control the outflow of the pond during low flows and allow for maintenance access. This is an example of **buried engineering**.

Challenges

- When creating the pond, once the vegetation layer was broken through, at least 6 foot of peat was found before boulder clay. The design was amended to make the bund wider and more stable.
- There were some access issues due to COVID-19 lockdown and risks during post-construction and monitoring.



Image: West Cumbria Rivers Trust

Additional benefits

- The bund is wide and well landscaped into the surrounding slopes to improve aesthetics and add strength.
- The pond has 1 large island for nesting birds.
- Extra clean gravels at 2 sites around the pond provide breeding sites for lapwing and oyster catchers.
- The whole area has been seeded with an approved wildflower mix, with a meadow mix used on a key section of the bund for additional strength.
- After construction, the site has provided habitat and freshwater for lots of species including bees and house martins.
- Red deer stag, roe deer, fox, brown hare, toads, dragon flies and damsel flies have been spotted.

Future work and monitoring

Additional tree planting is expected to be carried out in winter 2020/21, with tree species are to include Rowan, Hawthorn, Crab Apple and Field Maple.

Future monitoring will be carried out to determine storage capacity during different sized storm events.

Longer term monitoring will be done to ensure seeding is effective, and to look at wildlife colonisation of the site.

Find out more about the Glenderamackin NFM Project here:
<https://westcumbriariverstrust.org/projects/glenderamackin>

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Work carried out so far

Work has now taken place at numerous sites. By April 2021 WCRT had installed:

- 104 leaky dams
- New ponds to hold over 8 million litres of water
- Embankments around ponds to temporarily hold back a further 12.6 million litres after storms
- Improvements to existing ponds and scrapes so they hold more water
- 5 km of fencing along becks and associated tree planting in places
- 7.5 km of hedgerow planting and restoration
- Several hectares of tree planting
- 20 in-field trees



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Future work and monitoring

Additional tree and hedgerow planting, further fencing off of riverbanks, new ponds on a similar scale to those built in 2021, and additional leaky dams. WCRT will also be working with farmers and landowners on soil management best practice.

Future monitoring will be carried out to determine storage capacity during different sized storm events, to ensure seeding is effective, and to look at wildlife colonisation of the site.

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