

Afon Tywi - dealing with the impact of acid rain

Background

The River Towy (Afon Tywi) is one of the best salmon and sea trout rivers in Wales. In the 1980s it was found to be under threat from acid rain caused by air pollution. The local geology and conifer forests make this area especially vulnerable to the effects of acid rain. From 1984 to 1991, the Government funded research into the link between land use and the impact of acid rain in the upper Tywi catchment. This included liming some of the headwaters upstream of Llyn Brianne.

Surveys showed that 17km of the Tywi downstream of Llyn Brianne was also impacted. To deal with this problem 500 tonnes of powdered limestone was applied by boat to the reservoir every six months from 1991 to 1996. This improved water quality and fish populations downstream of the reservoir.

In 1996 improvements were made to change the way the powdered limestone was applied. Two lime dosing silos were installed on the Tywi and the Camddwr above Llyn Brianne. This was a more efficient and safe method of liming, which proved effective in maintaining the water quality improvements which have benefited the salmon, trout and overall ecology downstream of the reservoir.

Working with others

Dwr Cymru Welsh Water, who own and operate the reservoir, Carmarthenshire Fishermen's Federation and Carmarthenshire Rivers Trust have supported this work over the years.

We trialled an alternative liming method, using granular "limestone sand", in the Tywi and Teifi catchments between 2004 and 2007. The trials were funded through the Fishing Wales Project (European Regional Development Fund) and they demonstrated that this method could effectively reduce the impact of acid episodes during high flows. Carmarthenshire Rivers Trust (more recently West Wales Rivers Trust) then received European Fisheries Funding and Welsh Government match funding to use the limestone sand method in the Afon Doethie, a tributary of the Tywi downstream of Llyn Brianne. We are supporting these trials and carrying out surveys to assess the ecological benefits.

Recent improvements

In 2008 we started work to upgrade the lime dosers and increase their efficiency. This was a challenge as the dosers are located in a very remote area. Financial support was received from the Environment Agency's Carbon Reduction Fund and also from the European Union and Welsh Government.

The dosers were initially powered by solar panels and backup petrol generators, later supplemented by wind turbines. A hydro-generator installed in 2009 provided sufficient energy for dosing when it was most needed, under high flows. Installing vibrator mechanisms has reduced "caking" of limestone powder and improved reliability. Telemetry systems have also been installed to reduce site visits.

These developments have ensured a steady improvement in water quality in the upper Tywi. Maintenance visits have become less frequent and the backup petrol generators have been replaced with more efficient methanol fuel cells. These efficiencies should reduce the carbon footprint of the operation by about 3 tonnes



per year. This project was cited in the Sunday Times as one of the achievements that led to the Environment Agency winning an award in the paper's 2009 Green List.

The hydro-generator was stolen in 2010, but the installation of more efficient solar panels has since made it possible to rely on solar power with only occasional use of the methanol fuel cells.

The future

Lower industrial emissions of nitrogen and sulphur have led to a reduction in acid rain in recent years, but the recovery of upland streams in mid-Wales has been slow. More sustainable forestry management and further reductions in industrial and vehicle emissions will help the process. Liming is therefore a crucial medium-term solution to ensure No Deterioration of Ecological Potential in the Tywi, as required by the Water Framework Directive, before the expected natural recovery over the next 10 to 20 years.

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