

## **Historic changes in the Upper River Ehen Catchment**

**A Report for  
United Utilities**

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## **Research Contractor**

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## **VI. Summary of project findings**

The River Ehen holds the best viable FWPM population in Cumbria and England. Historically FWPM distribution included areas upstream of the lake and downstream of the Keekle confluence and the adjoining Rivers Irt, Mite and Esk. In the Ehen they are now restricted to the SSSI area due to the combination of industrial, mining, agricultural, domestic and forestry pressures. The migratory populations of salmon, brown trout (and arctic charr) and their part in the pearl mussel life cycle have been severely damaged by the presence of the weir at Ennerdale and the other man-made barriers over the last hundred and sixty years. Attempts to measure, ameliorate and reverse these changes have been piecemeal.

Ennerdale and the River Liza represent almost a third of the catchment area and almost half of the total rainfall of the Ehen catchment. This part of the catchment has a large proportion of afforested land. This can produce pH changes as well as other physical and chemical changes in the water regime.

This situation is compounded by the abstraction associated with the weir some of which is exported out of the catchment: this changes the river from a high quality to a heavily modified waterbody. This creates unnatural changes in the flow downstream of Ennerdale (e.g. lower residual flows in summer and higher flows in winter).

The historic, physical changes to the river downstream of the lake to the River Keekle confluence (13.5km) have been assessed and 37% of its length has been found to be altered by mill-weirs, leats, embankments and retaining walls. The Ehen below the confluence with the River Keekle to the sea (11.5km) has 62% of its length changed in a similar way.

The influence of the Keekle (one fifth of the total catchment area) and its associated industrial development on the Lower Ehen has been significant in terms of historic pollution creating chemical barriers to fish movements and a less favourable environment for pearl mussels. Although the overall condition of the Keekle is now improved it is still unsuitable for salmonids.

The development and intensification of agriculture over the last 150 years resulted in two thirds of the Ehen catchment being more suitable for intensive agriculture. Drainage, now with plastic pipes, is replacing the old tile drains and so rapid drainage is more common entraining more effectively pesticides, herbicides, fertilisers and settleable solids.



The most surprising finding of the study is the amount of industrialisation that occurred from the early 19<sup>th</sup> century. Attracted by the availability of coal, iron, lead, copper and limestone an 'industrialisation' rush was followed by a legacy of disturbed and contaminated land, the extent of which is unknown. Details given in the mining section may assist in identifying these areas. Many of the mills built in the 19<sup>th</sup> century were for industrial processes and part of their legacy may be land contaminated with the by-products of spade forges, tanneries, oil and paint mills. These areas should be assessed and disturbance and development minimised.





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