

Evidence

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Field evaluation of combined gauging weir and fish passes

Project summary SC070013

Scientists have carried out trials to see if structures that assist upstream movement of fish can be installed alongside devices that measure river flow without affecting reliability of measurements.

Under the Water Resources Act (1991) it is the Environment Agency's responsibility to manage water resources and monitor river flows. Traditionally, river flows have been measured using purpose-built structures within the river. However, there is evidence that these structures change conditions in the river, affecting fish habitat and preventing them from accessing spawning, feeding, and over-wintering areas.

As the Environment Agency is also responsible for protecting the water environment, including fish, there can be a compromise between flow monitoring requirements and the need to protect fish populations in rivers. This project assessed two types of fish pass built at flow gauging weirs to establish whether they aid fish movement without significantly impacting upon the accuracy and precision of flow measurement.

The study involved field-based evaluations of a low-cost baffle solution at Brimpton weir on the River Enborne in Berkshire, where slotted wooden baffles are placed across the weir face to redirect and dissipate flows. At Louds Mill weir on the River Frome in Dorset, a Larinier 'super active baffle' fish pass was evaluated. Here, the fish pass is contained in a separate channel which reduces water velocity, thus aiding fish passage.

Flow monitoring performance was assessed and movement of individual fish was studied by tagging fish with small electronic chips and tracking them as they attempted to negotiate the fish passes.

At Louds Mill, the Larinier 'super active baffle' fish pass was found to comply with International Standards (ISO 26906) and matched laboratory-based performance expectations. However, it was prone to debris becoming caught on the baffles and would therefore need regular cleaning and maintenance.

In terms of fish migration, 54 per cent of the tagged grayling and 71 per cent of the tagged trout were able

to successfully ascend via the pass. The vast majority of fish that ascended did so within a few hours of being tagged and released. However, there was some evidence that small grayling were less able to successfully negotiate the pass than small brown trout.

The low-cost baffle solution installed at Brimpton weir did not significantly affect the performance of the weir, though this was based on a limited number of readings and the authors recommend that further research is carried out to confirm these findings. The baffles increased the risk of debris collecting on the weir, and seemed to encourage weeds and algae to grow on the weir-face which could affect flow measurement accuracy. Regular weir maintenance is therefore especially important where baffle fish passes are installed.

In terms of fish migration, species such as chub, dace and roach were able to ascend the Brimpton low-cost baffle pass. The fish were most active in their attempts to ascend the weir during warmer temperatures and moderate flows, but these attempts were most successful at higher river flows. Fifty-four per cent of chub attempting to ascend the pass were successful. There is some suggestion that fish may have used the pass in different ways according to varying flow, to negotiate what had previously been a barrier to upstream movement.

This summary relates to information from the following project:

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November 2013

External Status: Publicly available

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This project was funded by the Environment Agency's Evidence Directorate, which provides scientific knowledge, tools and techniques to enable us to protect and manage the environment as effectively as possible.

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