

EA Southwest 197-7



Hurn Weir after construction

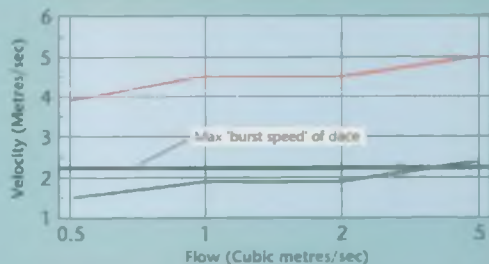
Costs and performance

The baffles were designed and installed in December 1997 at a cost of £8,000 and in the following March, dace were observed passing the baffles successfully. The weir will be monitored in October, the main migration month, using video surveillance to find out how dace use the baffles and whether any minor on-site modifications need to be made to improve performance.

The project was designed and managed by the Environment Agency's Regional Capital Works. The final project costs were £30,000, of which, £22,000 were 'one-off' research and development costs and £8,000, design and construction costs. The design can be modified for similar 'flat-vee' weirs throughout the Country, if the need arises, at an estimated cost of £6,000.

Hurn Weir Fish Pass

Comparison of water velocities - before and after



For further information contact Bill Stebbing, Regional Capital Works on 01392 444000

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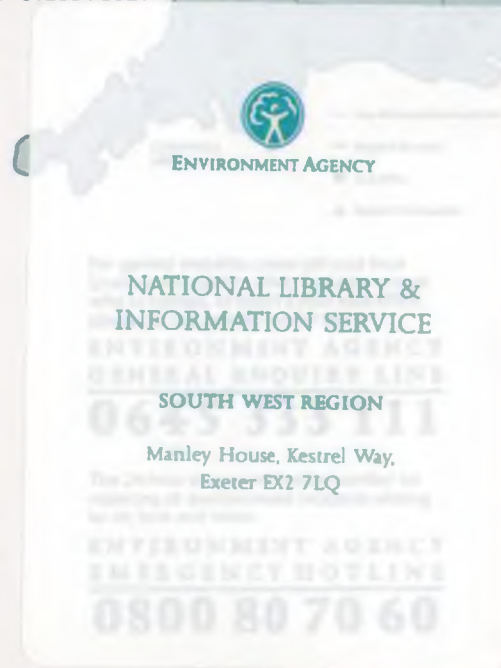
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Hurn Weir Fish Pass



ENVIRONMENT AGENCY

Hurn Weir Fish Pass



Hurn Weir was constructed in 1987 to measure flows on the Moors River, a major tributary in the River Stour catchment. It is a 'flat-vee' type gauging station designed to measure low to medium flows. The term 'flat-vee' refers to the way the crest of the weir is depressed at the centre. The measurement of water flow provides valuable information that can be used in Local Environmental Action Plans (LEAPS) and projects to improve the environment. The Moors River catchment also has two main heath and bog sites of special scientific interest (SSSI's) situated immediately upstream of the weir.

Problem

Soon after it was built, the weir was found to be an obstruction to coarse fish, mainly dace, which were attempting to migrate upstream. Game fish, such as salmon and sea trout which use the Moors River and its tributaries to spawn, had no problem in passing over the weir as they are stronger swimmers.



1:13 scale model of Hurn Weir

used on the weir because, for one reason or another, they would affect flow measurement.

First attempt

After consideration, an adaption of a 'Denil' type fish pass was thought to be the best solution to the problem as it would reduce water velocities down to levels suitable for dace to pass and not affect the flow measurement on the weir. The Denil was installed in 1992

but unfortunately was not very successful. Some larger dace were observed successfully negotiating the Denil but the vast majority did not succeed. It was evident that a better solution had to be found.

Back to the drawing board

A re-appraisal of options was carried out in 1995 which resulted in a proposed solution thought to be unique in fish pass

design. The design entailed a series of baffles fixed horizontally to the downstream sloping face of the weir forming a cascade. As this design had not been used before, the University of Exeter's Engineering Department was asked to construct a 1:13 scale model of the weir so that tests could be carried out to determine the suitability of the design.

Eureka!

The University's report (April 1996) confirmed that the design met the requirements of the two main criteria, namely:

- 1 to reduce velocities to enable dace to pass upstream, and
- 2 to ensure that flow measurement was not affected.

Further model tests were carried out to find out the most appropriate baffle spacing. Various alignments of grooves and notches, cut into baffles to control water flow and velocities, were also tested.

Once the design was 'fine tuned' a contract was prepared to construct the baffle cascades.

Materials

The choice of material used for the baffles would have traditionally have been hardwood, typically a tropical hardwood such as Greenheart or Ekki, but with the Agency's commitment to the environment and sustainable resources an alternative must always be considered. The material had to be durable, workable and able to withstand repeated wetting and drying. Recycled plastic met all the criteria with the added benefits of being longer lasting, cheaper and using a product that had been re-cycled.

The upstream migration of dace (which occurs in March and October), posed a unique problem as very little research had been done on fish passing 'flat-vee' weirs and most traditional fish pass designs could not be

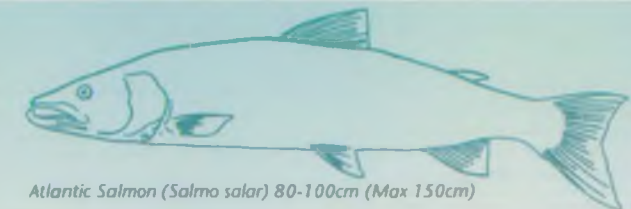
Denil Fish Pass under construction



Dace (*Leuciscus leuciscus*)
20-25cm (Max 30cm)



Sea Trout (*Salmo trutta*) 50-100cm (Max 140cm)



Atlantic Salmon (*Salmo salar*) 80-100cm (Max 150cm)

