

Evidence

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Assessment of the impact of hydropower on weir pool features

Project summary SC120077

Run-of-river hydropower schemes are often installed on existing weir structures. To evaluate how such installations can affect the weir pool habitats found immediately downstream of weirs, a study was undertaken by JBA Consulting on behalf of the Environment Agency.

A literature review conducted for this study found no specific studies on weir pools as ecosystems. Consequently, a modelling study to predict how the characteristics of these locations may change was undertaken. A framework for evaluating the potential value of weir pools to help assess the impact of proposed hydropower developments on weir pool habitats was also produced.

Two-dimensional hydraulic models were used as they can show changes in the pattern of velocity and flow depth which are likely to be modified by a hydropower scheme. Their data requirements are also relatively simple to gather. The study considered how flow and depth changes might affect aquatic plants and animals by considering known species preferences and expert judgement. Gravel deposits in shallow water around weir pool margins, and in particular tail riffles, can be important for spawning fish and invertebrates, particularly if these gravels are free of fine sediment. Larger fish may also congregate in pools where there is highly oxygenated water. However, the importance of such features is dependent on the frequency and distribution of similar habitats in a catchment or reach.

The study also proposed a qualitative process for assessing the ecological and hydromorphological quality of a weir pool using readily available information to consider responses to the following questions:

- Is the weir pool within a site designated for its established national or international ecological importance?
- Are fish species present that are known to be at low frequencies or densities throughout the rest of the catchment?
- Are the morphological features present of good quality?
- Are the morphological features rare?

The modelling and quality assessment techniques were tested at three lowland river locations in England where hydropower schemes have been developed or proposed.

We found that there was limited impact from on-weir hydropower installations on weir pool habitats. Patterns of velocity and water depth are likely to change but the overall available habitat remains similar at high, medium and low flows. The affect of changing flows on downstream shallow riffles at the weir pool exit was also shown to be limited.

Weir pool habitats might be valuable because they provide rare or good quality habitat that is being used by plants and animals with limited access to alternative habitats. However, evaluation can be complex because rare habitats can still be resilient to environmental disturbance. Where weir pools are considered important habitats the report suggests a staged process for assessing potential impacts.

This summary relates to information from project SC0120077, reported in detail in the following outputs:

Report: SC0120077/R1 and SC0120077/R2

Title: Assessment of the impact of hydropower on weir pool features (main report and appendix)

July 2015

Internal Status: Released to all regions

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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