Improving river habitats to support wildlife during low flows
Project summary SC120050

Physical modification is one of the top reasons why many rivers do not support thriving wildlife. Engineering and other changes to natural river forms have damaged habitats, reducing populations of plants and animals and reducing their ability to cope with extreme low and high river flows. A particular concern is the effect of low flows during extended dry weather, which may occur more frequently as the climate changes.

To allow wildlife to recover and be resilient to a range of river conditions we need to understand how to restore the natural river processes and habitats that species depend on. This study started by reviewing the results from previous river restoration work. The evidence was limited, so we also chose 5 measures for further investigation using computer models:

- assisted natural recovery (such as not replacing bank protection)
- embankment removal
- weir removal
- re-meandering
- reconnection of the river to its historical course (palaeochannel)

Models of river flows at 5 case study sites were created using ground height data from remote sensing and aerial photography. The sites were classified into different river types so that the results could be applied to other similar stretches of river.

The models showed that identifying river type is essential when selecting measures that will work in a wide range of flows and be self-sustaining in the long term. For example if we stop repairing bank protection where we no longer need them we can restore river processes in active rivers. This will increase the presence of faster flowing water refuges and improve habitat diversity under low flow conditions.

The study showed that the models can help to target restoration schemes and equally importantly avoid costly measures that are unlikely to succeed. Modelling is a cost-effective alternative to field studies on large sections of river, although surveys will still be needed to check the results work in practice.

Habitat diversity under low flow conditions: assisted natural recovery (left) provides a wider range of flow conditions that would support more diverse wildlife compared to an unrestored section which has artificial bank protection (right).

Study reach modelled under low flows   Control reach modelled under low flows

Broken standing wave	Chute	Run	Pool	Glide	Unbroken standing wave

Key: Colours show the different types of flow conditions

To help river managers and interested people we have summarised the conclusions in a guide which covers a range of restoration options and how well they are likely to work for different types of river. There are still many uncertainties so we need to continue to learn by doing, monitoring the response of rivers and ecology to improvement schemes. As more evidence is gathered, confidence in the evidence will improve and we will update the guide.