Case Study

SOUTH DOWNS NATIONAL PARK

Experiences of River Restoration

Background

Rivers, lakes and coastal waters are vital natural resources: they provide drinking water, crucial habitats for many different types of wildlife, and are an important resource for industry and recreation. A significant proportion of them are environmentally damaged or under threat.

Protecting and improving the environment is an important part of achieving sustainable development and is vital for the long term health, well being and prosperity of everyone.

The purpose of the European Commission Water Framework Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. It will ensure that all aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands meet 'good status' by 2015.

Locally, the River Rother is failing the Water Framework Directive (WFD) standards due to the lack of suitable spawning habitat for coarse fish.

In recognition of this, in 2013 the Arun & Rother Rivers Trust was awarded a grant from the Defra Catchment Restoration Fund to undertake river restoration to improve habitat availability.

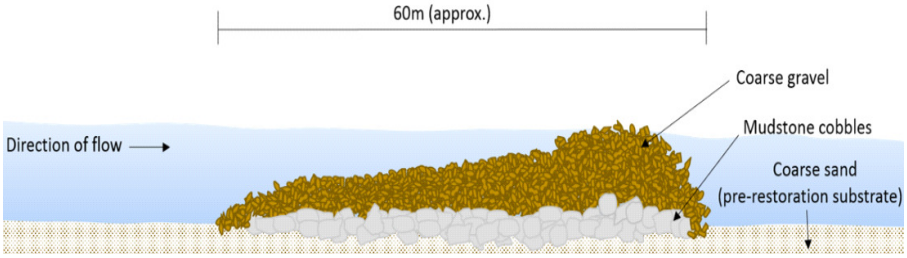
The project

The restoration scheme included the constuction of a 60m riffle-glide downstream of Shopham Bridge, near Petworth. A riffle is a short, relatively shallow and coarse-bedded length of stream over which turbulence increases, and at the downstream end, velocity.

It is these 'variable flow conditions' that create a diversity of habitat – including condiitons attractive to fish for spawning. The riffle was constructed with a mudstone base overlain with a coarse gravel substrate. Its impact on river flow can clearly be seen in the images above – the once uniform flow (August 2013) now appears to be 'broken' (August 2014) reflecting more natural flow variability.

The University of Portsmouth, in partnership with the South Downs National Park Authority (SDNPA), monitored the performance of the riffle through the purchase an Acoustic Doppler Current Profiler (ADCP). This equipment was used to monitor changes in channel form and 3D velocity patterns over the feature.

A Riffle-Glide



"River restoration works! This Riffle is now establishing itself as a good spawning area for all varieties of fish."

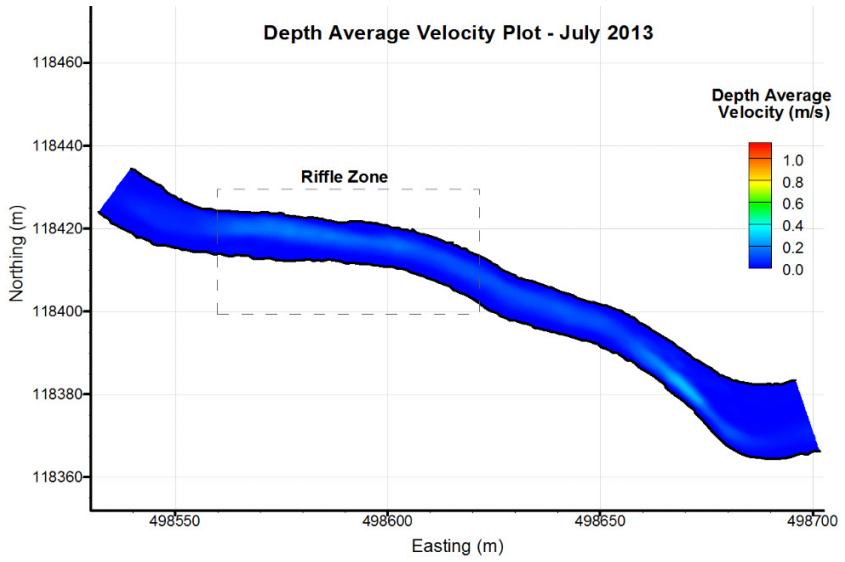
Andy Thomas, Wild Trout Trust

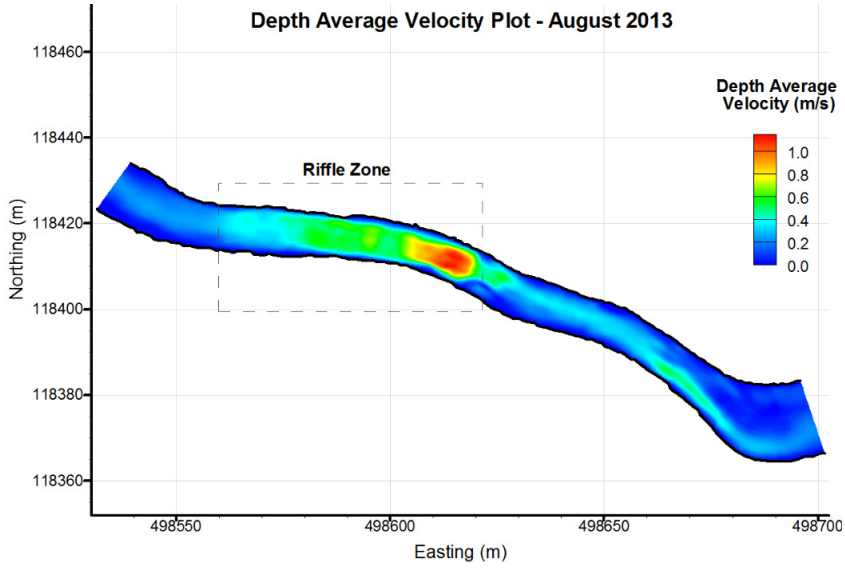
The outcome

The results from the ADCP show that the riffle is performing in the way that was intended. The feature is associated with an increased range of flow velocity; increased velocity over the riffle crest and channel bed scour immediately downstream.

This means that the river is performing in a much more natural way - a marked difference to the pre-August 2014 form when it represented a 'featureless canal'.

The ADCP results pre-restoration, and post-restoration





The future

The study has demonstrated how river restoration can successfully recreate more natural flow conditions that are known to support increased river biodiversity, including coarse fish.

The SDNPA can now apply this compelling evidence to inspire partners in the undertaking of more river restoration schemes thereby improving aquatic ecology across the National Park.

The SDNPA's technical and financial assistance to this project has supported a programme of PhD research for Jennifer Cox (University of Portsmouth Post-Graduate Student).

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