Searching for clarity

Does habitat enhancement work?

River have many guises. They are inherently alluring, a source of food and they act as navigation routes. However, rivers are also conduits for waste and pollution and they have long been over-exploited and degraded. In fact, rivers have been manipulated to such an extent, the natural and the man-made have become entwined, making these new hybrid environments hard to define. Despite this, over recent decades we have become increasingly concerned with restoring rivers.

One current vogue in river management is to attempt to restore large woody debris, a feature previously seen as an obstruction and has thus been routinely removed. We aim to investigate the effect of this type of restoration on fish and their diets, riverfly populations and the ecosystems they live in. It is important to understand our influence upon rivers, both positive and negative.

The impacts of climate change and the effects of pollution have been the subject of intense investigation, yet we know little about the effects habitat enhancement have upon river fauna and flora. This may be disrupted by same but the fact remains that where ecological impacts have been monitored many restoration schemes reveal equivocal results. Furthermore, methods of assessment often lack before and after monitoring and may be based upon a single site and a particular species or group of interest providing little reliable information to progress river restoration science. This is not to say all restoration is failing, but rather, evidence is not collected in a coherent manner hindering our ability to demonstrate or interpret success.

Although each river is to some extent unique, there are sufficient similarities among them (e.g. chalk rivers contain distinctive and recognisable species) to identify general characteristics, enabling us to measure their responses to restoration using scientific methods.

In our investigation we sampled algal, insect and fish abundance and diversity, and fish diet together with river characteristics including water chemistry, velocity, alluvial gravel, wood and plant volume. These measurements were taken before and after restoration in five chalk streams including the Test in Hampshire and Bure in Norfolk. On each river at least two sites were sampled: a control site without woody debris and an impact site into which, after initial monitoring, complete trees were felled mimicking natural tree-fall. On four of the rivers there was natural woody debris nearby which meant we were also able to study well-established reference sites. This experimental design will enable us to deduce what biological effects can be ascribed to woody debris, the habitat changes it brings, and whether woody debris introduced as a management tool recreates the effects of natural tree-fall.

Our analysis will provide unique insights into the longstanding concerns of fishermen that riverfly populations are in decline and what might be causing this. To address this issue we will employ a novel approach to monitoring and measure the body-size of the sampled organisms. It may seem ridiculous to measure microscopic algae or midge larvae, but the size of an organism relates to its abundance and thus, typically, as species get larger they become rarer. This relationship can be used to test whether a species or group of species, like riverflies, are less abundant than we might expect. In turn such information will help to elucidate the mechanisms underpinning population sizes of the species we encounter.

Our findings will be presented in a future edition of Salmo Trutta.