

Introduction

2 How to use The Manual

The Manual is aimed at all river restoration and river enhancement project practitioners who might include river engineers and managers, environmental practitioners, planners and river trusts. It is an aid to identifying potential techniques for use in river restoration projects or for ensuring that river management works comply with ecological or geomorphological requirements. In many of the examples the primary driver has been to achieve a required degree of river restoration.

However, other examples demonstrate how environmental features and natural fluvial processes have been incorporated into projects whose primary purpose is, for example, flood risk management or urban development.

Within each of these sections, different techniques are illustrated through the examples. For example, in *Part 1 - Restoring meanders to straightened rivers*, eleven different techniques are shown: e.g. (1.1) New meandering channel through open fields; (1.9) Reconnecting a remnant meander; etc. See [Table of Contents](#) for the full list.

In this updated edition of the Manual, the river site in each example has been given a generic classification (*see below*) to help the user understand the type of river in which the technique is used. With due consideration, the user might conclude that the technique, or elements of it, can be used successfully in other types of river.

The techniques are divided into sections of broadly similar restoration or management objectives

- 1 – Restoring meanders to straightened rivers
- 2 – Enhancing redundant river channels
- 3 – Enhancing straightened river channels
- 4 – Revetting and supporting river banks
- 5 – Modifying river bed levels, water levels & flows
- 6 – Managing overland floodwaters
- 7 – Creating floodplain wetland features
- 8 – Providing public, private and livestock access
- 9 – Enhancing outfalls to rivers
- 10 – Utilising spoil excavated from rivers
- 11 – River diversions
- 12 – Removing or passing barriers

The generic classification describes

(a) the natural substrate in the locality, expressed as:

- Silt/clay
- Gravel
- Chalk
- Sand
- Estuarine

And (b) the stream energy, for which mean longitudinal slope of the river is used as a surrogate:

• High energy	slope above 1%	(steeper than 1 in 100)
• Medium energy	0.125% to 1%	(1 in 800 to 1 in 100)
• Low energy	slopes below 0.125%	(gentler than 1 in 800)

Therefore an upland river with large gravel substrate in a steep catchment would be classified as 'High energy, gravel' and a small lowland chalk stream would be classified at 'Low energy, chalk'.

Each case example has a drop down box that identifies which Water Framework Directive (WFD) mitigation measure(s) the technique might deliver. These measures are different for England and Wales, Scotland and Northern Ireland - [see reference list](#)). Each example also indicates whether the river has any designation for nature conservation. For example, the site may be a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar or a Local Nature Reserve (LNR).

When using the Manual, the planner or designer must consider whether the use of any single technique or combination of techniques, or some element of one or more techniques, is appropriate to the overall restoration or management objectives and to the type of river at their site. In most cases, such consideration will be part of the investigation, planning and design work associated with a project as described in *Section 4*.

