

The Importance of Understanding Channel Adjustments Following Intervention: 36 Years of River Channel Restoration Examples from the UK and Denmark

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Drawing upon examples from nearly five decades of combined experience of river channel restoration in the UK and Denmark, this paper demonstrates the importance of understanding and pre-empting channel change in its catchment context. Inevitably due to lack of historical information, multiple man-made pressures arising from land and water resource uses lead to changed flow and sediment regimes combined with hard-to-predict climatic conditions. Hence the majority of project designs have to be imaginative, pre-emptive and often intuitive, the final result (as they say) can be more of an art, and inevitably involves some form of creation.

In terms of planning river channel restoration projects there are many different river types within a single country, all of them requiring bespoke approaches to feasibility, options appraisals and detailed/ outline designs. Overwriting the river type, to varying degrees, channel modifications have imposed additional controlling or influencing factors such as concrete boundaries (previously only imposed by bedrock) or sediment supply (releasing or withholding fine or coarse materials along the historic conveyor belt system). Over time, following channel restoration or rehabilitation works, in the ‘operation phase’ then other forms of channel change need to be considered:

- Short term (1-5 years) morphological effects and adjustments in equilibria to typical annual seasonal flow variations can be anticipated to a degree and embedded in design (e.g. fine silt can be accommodated)
- Medium term (5-25 years) – with the more likely occurrence of less frequent meteorological events, the application of an adaptive management plan should perhaps be advisable, and put in place to cover this period.
- Long term (25 years +) climatic and morphological effects are less certain, as adjustment may follow unexpected trajectories or with the increasing likelihood of large scale events occurring outside of the design specifications – does this mean the end of design life ? Or is it time to refresh the design?

The paper develops a number of practical checklists/tools for river managers to use when considering evolving channel change at sites of historic interventions.