

Fish passage

National/international issues

Specialists have always distinguished between ‘fishing’ and ‘fisheries’; the issue of fish passage touches on both.

It is also essential to distinguish between habitat issues for sport fish, such as salmonids, and fish species in their role as important components of the freshwater ecosystem, contributing to biodiversity.

Many of our human uses of rivers, from the Roman period onwards, have impacted on a vital property of river habitat: its connectivity, both up- and downstream in one channel and between channels of the network. This essential mobility concept allows fishes to, for example, seek refuge from predators, from extremes of flow and to freely seek the optimum conditions for an appropriate life-stage (spawning, hatching, etc.). Salmonids have the extra dimension of need because they spend part of their lives at sea and yet travel upstream to the extremities of the network to seek optimum conditions for their freshwater juvenile stages.

Amongst the ‘obstructions’ to fish movement we can list dams, weirs (mill works generally), bridge foundations and very large log- or boulder-jams after storms or floods. Whilst we may have the initial impression that they mainly obstruct upstream fish movements (and those mainly of salmon and sea-trout), in fact downstream migrations are equally vital and movement in both directions is vital to almost all river fish species. A current ‘official’ EU preoccupation is with eels, an endangered species, whose survival may well depend on successfully navigating all parts of the channel network.

It must also be emphasised that only relatively large (high, wide, long) ‘obstructions’ form a barrier at all flows, something to remember when designing fish passes or ‘easements’ (see below). Even a ‘natural’ gravel bar may constitute a barrier to fish migration during drought flows or in channels from which too much water has been removed for human use, power or industry. Waterfalls too are often obstructions to upstream migration: genetically isolated populations of fish may live upstream from them.

Evidence of ‘disconnected rivers’

In England and Wales the Environment Agency and the Rivers Trusts have set up databases of obstructions, generously helped by anglers’ observations. “If you see a fish jumping, there’s an obstruction” is a popular view. Careful observations at ‘jumping’ sites is one of our lines of evidence; at Hexham Bridge recently, during the autumn (upstream) ‘run’, careful logging of jumping fish revealed a very large proportion were either washed back downstream or damaged their bellies by squirming on the concrete. The Tyne does not have bears waiting for their free meal of fish but predation by birds can be raised above background natural levels at obstructions.

The recent popularity of renewable energy sources has seen the database on all channel obstructions grow as they are recorded as candidate sites for hydropower generation. The vast majority have no economically feasible chance of development for power but, in checking each site, TRT has become more aware of the spectrum of issues in designing and building remedial fisheries projects: fish passes or easements. TRT have also made it clear that, where economically-viable hydropower equipment is installed to utilise a fall of water, fish passage must be improved; this is national law.

Improving connectivity

Fisheries scientists identify seven distinct forms of fish migration which can be obstructed by natural or artificial features. We seek evidence for impacts on all these movements from electrofishing surveys, from observations of fish abundance or attempts at migration and from numerous theoretical views on the height of barrier, velocity of water etc.

We then seek remedies which require a lot more planning and preparation than a traditional anglers' remedy: dynamite! It is a legitimate view that 'fish passage can only be improved if the obstruction is removed', but this can be a dangerous view in terms of the geomorphological adjustment which channels experience, both upstream and downstream of an obstruction when it is removed.

Fortunately, we have received funding from Defra to secure improved fish migration by engineering works on barriers. The advantage gained by a Rivers Trust is then that a range of ancillary works, such as physical habitat improvement (through management of the impacts of weir removal, or in the approach to a fish pass) can be funded, as can a wider involvement for the local community. For this reason, we are focusing our works on historical structures in communities with an angling or conservation interest and where local groups, for example schools and angling clubs, can join as volunteers to add value to minor, but significant, changes in the local river landscape. At present TRT has completed fish passage easements at Newbrough, Stocksfield and Riding Mill. We are now turning our attention to Derwent High Dam and Hexham Bridge.

Through our own monitoring of fish numbers and habitat quality we will measure the cost-effectiveness of improved connectivity; angling success, in terms of fish caught, cannot be our only guide, although in the case of major, critically-located obstructions such as Hexham Tyne Bridge and Derwenthaugh Weir, the economic benefits of fish passes will clearly have major significance.