



## **Position statement**

### **RIVER HABITAT IMPROVEMENT**

#### **ISSUE**

Human activities have modified the form and function of UK rivers over many centuries. As a result, many of them depart from their original condition, particularly in their lower reaches. These modifications have changed the ecology of the rivers, suppressing fish breeding substrates, reducing the diversity of channel and bankside habitats, inhibiting the flooding of riparian wetlands, and fragmenting flow patterns of river channels with dams and weirs. These structures also interrupt connectivity within a river and its tributaries. Because of these changes existing fish populations are often less than optimal in both species composition and abundance, and frequently require management by interventions such as stocking for their maintenance. Furthermore, the fishery itself is often adversely affected in that the environment is monotonous and lacks appeal to fishermen.

Projects to mitigate for these detrimental effects or to rehabilitate parts of rivers are becoming more common. These often aim at improving habitat conditions for a particular life stage of a particular species that is perceived to be threatened. However, such projects are pursued against a background of heavy costs and difficulties of securing the land necessary for their implementation. For this reason individual interventions tend to be relatively small scale, and conducted in isolation. Furthermore their objectives with regard to the fishery are often not clear and their effectiveness is rarely evaluated.

#### **POSITION**

The Institute encourages and supports measures to mitigate the effects of damaging human practices on fish populations and projects to rehabilitate damaged reaches. Mitigation and rehabilitation projects should be carefully planned and the techniques adopted should be appropriate to the type of stream and the fish species concerned. An Environmental Assessment should be carried out at an early stage to cover the whole ecology of the watercourse. This should cover other issues such as water quality and current or proposed abstractions (see position on *environmental flows*). Habitat restoration should be compatible with the needs of any associated fisheries. Larger schemes should be consistent with the needs of the river basin as a whole.

Once the Environmental Assessment has established any constraints within the project area, or the watercourse as a whole, the restoration project should be carried out to agreed ecological and engineering standards and post-project monitoring must be carried out to evaluate the success or otherwise of the measures adopted.

## **SUPPORTING INFORMATION**

### **1. In upstream reaches**

2. Damage is caused to pool-riffle structures by sedimentation, excavation of the river bed, gravel abstraction or submergence by flow control structures. The pool-riffle structure is the basis of salmonid reproduction and productivity. Damage at this level should be reversed and the diversity of structure in the channel restored.

### **3. In all reaches**

4. Cross channel flow-regulation structures such as weirs or dams, that impede fish migrations and isolated fish communities in the resulting river sectors, should be eliminated or replaced with fish-friendly structures (see position on *fish passes*)

### **5. In lowland rivers**

6. Lowland rivers have generally been affected by channel straightening, bank protection and dredging activities that have, in many cases, turned rich and variable habitats into featureless canals. This historical trend has influenced species diversity, spawning efficiency and survival of the fish. The main actions required to rectify this situation are:
  - a. The restoration of main channel diversity: Projects should aim at restoring structural diversity, natural spawning substrates and refuge areas by the creation of deeps within the channel, bank overhangs and riparian vegetation cover. Wherever possible meanders should be reintroduced with natural shallows and deeps including point bars.
  - b. Restoration of connections to former or new backwaters and introduction of main channel deep pools.
  - c. Connection of the main channel to floodplains, off channel water bodies such as former oxbows, marinas or gravel pits and to riparian wetlands.

### **7. Planning**

- a. Habitat improvement projects should be clearly inserted into basin management plans and should take into account the needs of all other users of the river. Reciprocally other users should be required to make allowances for the needs of fish and fisheries habitat.
- b. It is recognised that habitat improvement projects, especially in lowland rivers, can be extremely costly. Larger scale projects such as re-

meandering, construction of off-channel features and reconnection of riparian wetlands are likely to affect riparian land owners. Therefore agreements need to be reached at local level as to the availability of the land necessary for the improvement work.

## **8. Environmental considerations**

- a. All habitat restoration projects should be the subject of an environmental impact study before approval
- b. Habitats should be improved in such a way that all other groupings of living organisms, including wildlife, birds, invertebrates and vegetation, should benefit.

## **9. Engineering solutions**

- a. Many engineering solutions are available for mitigating impacts of other users on and rehabilitation of river habitats (see further reading). These should be appropriate to the local conditions.
- b. Wherever possible solutions should use natural materials from the catchment, including vegetation, rock and wood. Where this is not possible natural material from outside the catchment should be preferred to artificial materials.

## **10. Social considerations**

- a. Habitat improvements should make provision for the needs of fishermen, both in terms of access and the creation of an agreeable fishing environment.
- b. Habitat improvement projects should not compromise other recognised users of the river, such as boating or wildlife interests.

## **FURTHER READING**

Armstrong, J.D., Kemp, P.S., Kennedy, G.J.A., Ladle, M. & Milner N.J. (2003). Habitat requirements of Atlantic salmon and brown trout in rivers and streams. *Fisheries Research* 62, 143-170.

Cowx I.G. (1994). *Rehabilitation of Freshwater Fisheries*, Fishing News Books

Cowx, I.G. & Welcomme, R.L. (1998). *Rehabilitation of Rivers for Fish*. European Inland Fisheries Advisory Commission, FAO, Rome

Giles, N. & Summers, D.W. (1996). *Helping Fish in Lowland Streams*. The Game Conservancy Trust.

Giles, N. (1998). *Freshwater Fisheries & Wildlife Conservation; a good practice guide*. Environment Agency.

Habitats Directive: Work Instruction: (Appendix 1) Further Guidance applying the Habitats Regulations to Fisheries Permissions and Activities.

Hendry, K. & Cragg-Hine, D. (1997). *Restoration of Riverine Salmon Habitats – A Guidance Manual*. Environment Agency Fisheries Technical Manual 4 (R&D Technical Report W44).

Hendry, K., Cragg-Hine, D., O’Grady, M., Sambrook, H. & Stephen, A. (2003). Management of habitat for rehabilitation and enhancement of salmonid stocks. *Fisheries Research* 62, 171-192.

Lewis G. and Williams G. (1984). *Rivers and wildlife handbook: A guide to practices which further the conservation of wildlife on rivers*. Royal Society for the Protection of Birds/Royal Society for Nature Conservation, Sandy, Bedfordshire.

Manual of River Restoration Techniques. The River Restoration Centre.  
<http://www.therrc.co.uk/manual.php>

River Habitat Survey in Britain and Ireland, Field Survey Guidance Manual (2003) Version. Environment Agency. (Also available on CD)

Roni, P.; Hanson, K.; Beechie, T; Pess, G.; Pollock, M.; Bartley, D.M. (2005). Habitat rehabilitation for inland fisheries. Global review of effectiveness and guidance for rehabilitation of freshwater ecosystems. *FAO Fisheries Technical Paper*. No. 484. Rome, FAO.: 116p.

Summers, D.W., Giles, N. & Willis, D.J. (1996). *Restoration of Riverine Trout Habitats – A Guidance Manual*. Environment Agency Fisheries Technical Manual 1 (R&D Technical Report W18).

Petts, G. & Calow, P. (1996). *River Restoration*. Blackwell Science.

## **CONTACTS**

For further information on this topic or the position paper please contact:  
[welcomme@dsl.pipex.com](mailto:welcomme@dsl.pipex.com); [brian.shields@environment-agency.gov.uk](mailto:brian.shields@environment-agency.gov.uk);  
[I.G.Cowx@Hull.ac.uk](mailto:I.G.Cowx@Hull.ac.uk).