Habitat Advisory visit to the Killrow Stream, Headford, Co.Galway, Eire Undertaken on behalf of Headford and Corrib Anglers by Vaughan Lewis, Windrush AEC Ltd
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1.0 Introduction

This report forms the output of a site visit to the Killrow Stream, Co. Galway, Eire on 22nd August 2004 on behalf of Headford and Corrib Anglers Association (HCAA). Information in the report is based on observations on the day of the visit and additional comments provided by Dennis Moss, Fishery Development Officer of the club.

Throughout the report, normal convention is followed, with right bank (RB) and left bank (LB) of the river identified when looking downstream.

The Killrow Stream is an important brown trout spawning tributary stream of Lough Corrib, a 20,000 ha limestone lake in the west of Ireland. Lough Corrib has been designated as a candidate Special Area of Conservation (cSAC) under the EU Habitats Directive. As a consequence of a number of factors including water quality perturbations, habitat degradation and heavy angling pressure, brown trout stocks in the lough are under continued pressure. In an effort to address some of these problems, HCAA in conjunction with Western Region Fisheries Board (WRFB) and other angling groups, has embarked on a series of habitat restoration schemes on a number of tributary streams.

2.0 Habitat Assessment

The reach of the Killrow Stream visited for this report ran from the main Headford to Galway road to its confluence with Lough Corrib some 4 km downstream.

The channel at the upper limit of the reach had a wetted width of between 2m-4m, with a depth of between 20cm and 1m. Some enhancement work had already been undertaken by the HCA and WRFB, with small gravel riffles introduced to encourage spawning of brown trout and subsequent recruitment of juvenile fish. The gravel remained relative poorly sorted, with large stands of starwort having colonised some sections.

Introduced gravel riffle

Where the channel was open, there was a strong growth of water mint *Mentha aquatica*, fool's water cress *Apium nodiflorum* and water cress *Rorippa nasturtium-aquaticum* , with the channel totally occluded in places. However, over much of the upper section, the channel was heavily shaded by riparian trees (alder and ash dominant), particularly on the RB (north) reducing marginal growth significantly.

Small shoals of brown trout of between 12cm and 20cm were visible in the few deeper, tree shaded pools present, highlighting the importance of short sections of cover in conjunction with areas of deeper water.

Some 500-600m downstream of the main road were the remains of an old mill. There was a minimal head loss across the invert of the associated bridge structure, with access for fish possible at all normal discharges. Gradient of the stream was good, with large stands of lesser water-parsnip *Berula erecta* and hemlock water dropwort *Oenanthe crocata* present below the old mill. Significant numbers of alder trees were present on the RB. Several large adult fish (>30cm length) were noted in this reach.

Strong growth of lesser water parsnip and hemlock water dropwort downstream of the old mill

Elevated spoil heaps on left bank of the Killrow stream. Note height difference between water level and bank top.

There was clear evidence of past dredging of this reach, with large bunds of stony bed material piled on both banks, particularly the LB, leaving the elevated bank level significantly higher than the water level in the incised channel.

Further down the reach, the gradient of the channel reduced. The bed profile was relatively uniform, with the substrate dominated by silt covered, unsorted gravel, offering limited habitat for adult trout. Most of the stream was <0.4m deep with only a few deeper pools present where stone constrictions and gravel riffles (introduced during past enhancement schemes?) had increased velocity locally causing scour.

Pool and riffle formed by increased velocity caused by boulder constriction

Much of the channel was over-wide (5m-6m) with respect to the flow in the stream. As a consequence, extensive beds of mixed emergent vegetation had grown across the channel. Exposed sections of bank clearly showed extensive deposits of stone and gravel that would provide a supply of hard bed material through the process of erosion.

Significant numbers of mixed year classes of brown trout, dominated by 0+ and 1+fish were observed, particularly in the few pools present.

Overwide channel, occluded with mixed emergent species. Note exposed gravel strata on far bank providing a ready source of potential bed material

There were some sections of bank erosion caused by agricultural stock, resulting in the release of increased volumes of fine sediment, the further over-widening of the channel and a heavy local growth of emergent vegetation, including yellow flag *Iris pseudacorus*.

Bank overgrazed by agricultural stock at lower end of reach

Downstream of the confluence with a major LB drainage stream, the water level was controlled by the backwater effect of Lough Corrib. As a consequence, opportunity for management work was minimal from this point to the stream's confluence with the lough in Ballindiff Bay, a distance of approximately 1km.

Lower section of reach. Note reduced gradient, with water level controlled by Lough Corrib, and extensive growth of emergent vegetation

3.0 Recommendations for habitat management

Killrow Stream is an important brown trout spawning stream on the south east side of Lough Corrib. A number of key habitat elements could usefully be improved in order to optimise recruitment. Recommendations for management action are:

- **Availability and quality of suitable spawning and juvenile habitat**

Largely as a result of past land drainage activity, there is inadequate availability of suitable gravel dominated spawning and juvenile habitat throughout the reach. Where gravel has been introduced during previous schemes, it remains relatively unsorted, with little variation in bed morphology, reducing not only recruitment areas but also adjacent pool habitat vital as refuge for adult fish during spawning activity. This poor sorting is a direct consequence of the limited energy typically found in limestone streams such as the Killrow.

In order to improve the sorting of the hard bed material, and hence improve both the quality of the spawning gravel and the availability of deeper pool areas for adult fish below gravel shallows, a series of strategically located groynes should be constructed in order to increase energy locally.

Groynes should be designed to minimise upstream impoundment of water, both to reduce any potential flood risk and to prevent build up of silt over the whole width of the channel. This can reduce substrate diversity, impair salmonid spawning success and lead to excessive growth of emergent vegetation. Triangular shaped groynes generally cause less downstream erosion than simple wing deflectors.

Choice of materials is important. Natural, locally occurring materials should ideally be used. Blockstone groynes provide hard, stable substrates for colonisation by algae, mosses and associated specialised invertebrate communities. Wooden deflectors

constructed from locally felled timber have been found to provide ideal habitat for a range of invertebrate taxa. In addition, the thinning of the canopy resulting from the coppicing/pollarding of trees, reduces shading of the channel, encouraging growth of marginal and instream vegetation.

Brief examination of bank sections in the Killrow stream clearly showed the presence of extensive gravel seams. Careful construction of groynes would allow the controlled release of this valuable material via the process of erosion. In the event that this is not acceptable to local landowners, then it is recommended that the sections of channel between the groynes should be seeded with local gravel of between 10mm-40mm diameter. The increased velocity resulting from the introduced groynes will aid sorting of this material.

- **Introduction of Large Woody Debris (LWD)**

The relative lack of Large Woody Debris (LWD) in the channel was noted during the site visit.

Where possible Large Woody Debris (LWD) should be retained in the channel. Large woody debris (LWD) is an integral component of stream ecology. The benefits for retaining it are clearly laid out in the recent Environment Agency (England and Wales) R&D document, "Large Woody Debris in British Headwater Rivers". Key conclusions of the report include:

- An increase in both mean flow depth and velocity and variability of both parameters.
- The development of high physical habitat diversity both in-channel and in the floodplain. Removal of LWD reduces both habitat quality and availability for juvenile and adult brown trout.
- Although active LWD dams may impair upstream migration of fish at low flows, they rarely do so at high flows.
- LWD have significant benefits to the control of run-off at the catchment scale.
- River and riparian management has important effects on the distribution and character of dead wood accumulation within the river system.

The report also provides recommendations for the management of LWD, the most important of which is "although there are certain situations that may require wood removal to eliminate stream blockage, the wisest management is no management". Building on this simple truism, it is recommended that before any future work to remove LWD from river channels is undertaken, the wider implications of the proposal on the whole river system are considered, rather than just the potential (in many cases unproven) benefits to salmonid populations. In addition, the impact of planned riparian tree work on the supply of LWD to the river should be considered. In some circumstances, it may be beneficial to allow trees to fall into the channel, provided the risk of increased flooding is acceptable.

Measures to increase LWD have focused on the provision of cover logs in marginal areas. More LWD cover can be provided by the simple expedient of trimming small to medium sized trees to an acceptable size and the felling them into the river channel. They can then be pinned into position using driven wooden stakes in order to create

wooden groynes (see above). Stable LWD of this sort is of particular long term value, allowing the build up of weed/debris rafts and associated beneficial macroinvertebrates that are vital components of the energy cycle of river systems. Sediment accreting within and downstream of LWD tangles will eventually be colonised by emergent vegetation, helping to narrow the river channel. The weed raft/ fallen tree complex also provides excellent cover for adult fish.

- **Bank erosion due to agricultural stock**

Some bank erosion caused by trampling and grazing by agricultural stock was apparent at the lower end of the study reach. In order to prevent the excessive erosion, mobilisation of sediment and loss of marginal habitat associated with this damage, it is recommended that the affected areas should be securely stock fenced ideally leaving a buffer strip of >10m to reduce the impact of any sediment laden run-off on the stream.

- Whilst the proposals above are not predicted to have any significant impact on flooding of surrounding land, it should be noted that no Flood Risk Assessment has been undertaken as part of this report.