Advisory Visit

Dibney River, Co. Down

2nd July, 2010

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin and Shaun Leonard of the Wild Trout Trust to the Dibney River near Killyleagh, Co. Down, Northern Ireland on 2nd July, 2010. Comments in this report are based on observations on the day of the site visit and discussions with Stephen Kennedy and other members of the Dibney River Conservation Trust (www.irishinternationalflyfair.com/dibneyrivertrust/dibneyrivertrust.html) and other attendees at the Irish International Fly Fair (3-4th July, 2010) including Dr. Robert Rosell of the Agri-Food and Biosciences Institute, Northern Ireland (AFBI) and Prof. Ken Whelan (Marine Institute, Ireland and Atlantic Salmon Trust).

Normal convention is applied throughout the report with respect to bank identification, i.e. the banks are designated left hand bank (LHB) or right hand bank (RHB) whilst looking downstream.

2.0 Catchment / Fishery Overview

The Dibney River is a tributary of Strangford Lough, a 150 km^2 shallow sea lough on the east cost of County Down. The lough is connected to the open sea by an 8-km long channel called The Narrows at its southern end. There is a large tidal range in the lough causing approximately one-third of its area to be intertidal.

Strangford Lough is internationally important for wildlife and this is recognised by its European designation as a Special Area of Conservation (SAC) and Specially Protected Area (SPA). The SAC designation is based upon the lough being a large shallow inlet and bay with varied and abundant habitats and communities; the SPA is for its overwintering bird population including brent geese, redshank, knot and breeding terns. The lough also has other conservation designations including UK Marine Nature Reserve, Ramsar site and adjoins a number of National Nature Reserves and Sites of Special Scientific Interest.

The Lough supports a fishery for sea trout and these are dependent upon freshwater tributary streams of the lough for spawning and nursery habitat. It is therefore extremely important that these tributaries have good water quality, good habitat and are accessible to sea trout in order to sustain

stocks that support the fishery. The larger tributaries of the Lough (for example the Quoile and the Comber) probably provide the bulk of the production of sea trout, but smaller tributaries such as the Dibney are likely to make a significant contribution.

Dr. Rosell (AFBI) gave an estimate of the production of sea trout smolts from Strangford tributaries, both as they stand now and their potential following habitat restoration. This approach is a sensible one for targeting cost-effective river restoration and should form the basis for prioritising a programme of works. However, the planning, funding co-ordination and delivery of a lough-wide programme of improvements will require a lot of work and the involvement of the local community is absolutely vital.

There have been recent proposals to start a hatchery programme for sea trout, the aim of which is to increase stocks in the lough to enhance sport fishing and boost tourism. A similar scheme is operated in Funen, Denmark and this has been cited as a model which could be followed. Transferring the Funen model to the British Isles has been considered before (e.g. in Scotland, www.marlab.ac.uk/FRS.Web/Uploads/Documents/Coll0997.pdf).

The hatchery proposal needs very careful consideration and most importantly a full assessment of its potential impact upon the environment of Strangford Lough. The full cost of any environmental impact needs to be taken into account during any cost-benefit analysis. There are several key concerns that would need to be taken into account including the potential impact upon the genetic integrity of existing sea trout, and the ongoing expense of the hatchery in relation to the economic benefits.

By contrast, investment in the improvement of Strangford Lough's tributary streams would bring sustainable benefit to sea trout stocks. Habitat improvement works would permanently increase the ability of these streams to produce more young sea trout. There is also a great opportunity to involve the local community in delivering these improvements and adopting their local rivers as important assets to their environment.

The Dibney River Conservation Trust (DRCT) is an excellent example of a local initiative aiming to achieve such improvements. DRCT was formed in 2007 with the aim of improving the Dibney River and encouraging a sense of ownership and better stewardship from the local community in Killyleagh.

The Dibney River is a small catchment on the south-western side of Strangford Lough. It drains a rolling landscape (glacial drumlins) with mixed agricultural land use, then flows through Killyleagh and into the lough. The river was formerly heavily polluted by a tannery just upstream of Killyleagh, but this is no longer a problem since its closure. Sea trout are known to run the river and approximately 100 redds were counted by DRCT last winter.

3.0 Habitat Assessment

A walkover survey of the river was carried out, starting at the estuary with Strangford Lough and working upstream:

Killyleagh

The river enters Strangford Lough through the old coal dock which has recently been re-developed as a residential area (cover picture); the river is tidal for a short distance upstream of this point. There are no obstructions to the free passage of sea trout into or out of the river at this point (Photos 1, 2).

In Killyleagh, the river flows through a riverside park close to the Bridge Community Centre and some playing fields. A chain-link fence and railings prevent close access to the river here and throughout the riverside walk prominent health and safety notices are displayed (Photos 3,4). There is a considerable amount of fly-tipping within the river channel (Photo 5).

The river channel has previously been straightened or its course altered, leaving a predominantly homogenous, canal-like, slow-flowing section of river (Photo 6). The channel is relatively low gradient and where bridges are present, these form high points on the river bed impounding water upstream and creating short areas of faster flows downstream (Photo 7). In these latter areas, the river bed tends to be comprised of cobbles and gravel and some flow-loving plants such as water crowfoot (*Ranunculus* sp.) are present. In the slower flowing areas fine sediments dominate the river bed and floating sweet grass (*Glyceria* sp.) is present. Marginal vegetation is very good along this section, probably because of the limited access to the river, and is comprised of long grasses, meadowsweet, dock and bindweed interspersed with the occasional young alder, willow and ash. This lush,

overhanging marginal vegetation provides excellent cover for trout and a number of 6 – 12-inch fish were observed.

On the right bank near the castle, the field was lightly grazed by cattle. A fence and cattle drinking area were present here, preserving the good river margins described above. Upstream of the bridge carrying the cycle path (to the school), the river banks become more densely vegetated with trees and bushes increasing the shading of the channel. The river bed here is mixed sizes of gravel and is unsorted making it poor quality for spawning. Turning stones in the river here revealed a variety of invertebrates including blue-winged olives (*Serratella ignita*), hog louse (*Asellus aquaticus*), cased caddis, snails, leeches, flatworms and freshwater sponge. Juvenile trout were also observed here.

Overall the in-stream habitat here is moderate to poor. The channel lacks variety in that there is no pool-and-riffle sequence, and the depth is very similar throughout the reach; the depth is however suitable for holding trout beyond the juvenile stages and this is complemented by the good marginal vegetation. The river bed contains some gravel, but this is unsorted and unsuitable for spawning.

Photo 1 Outflow of Dibney River

Photo 2 Tidal section of Dibney River

Photo 3 Riverside Park, Killyleagh. Access to the river is discouraged by fencing and...

Photo 4 ....signs.

Photo 5 Fly tipping is common in the river here – a sign it is not valued.

Photo 6 Straight, slow-flowing section of river alongside the playing fields. Poor in-stream habitat but a good "shaggy" marginal fringe of vegetation.

Photo 7 Short sections of faster flowing water are present downstream of bridges.

Broad Meadows Lane (Skip hire access and public footpath)

The river here remains straight and slow-flowing and is lined by poplars on the left bank. The two bridges present again form high points in the river bed, impounding water behind and creating faster flows downstream; trout were observed holding station alongside the faster flowing areas. A large eel was also observed in this area.

A small tributary enters the river on the left bank here; there is a good flow and reasonable gradient although the channel is straightened (alongside the public footpath). Water quality appears to be good with freshwater shrimp (*Gammarus pulex*), olive nymphs (Baetidae) and caddis present. There is a reasonable amount of gravel on the bed, although some fine sediment is accumulated in places (upstream of debris blockages). This stream could be used by sea trout for spawning and it would be worth walking its length, removing any blockages to access and enhancing spawning potential by introducing structures to scour and sort the river bed. These might include paired boulders and log deflectors (see recommendations).

Shrigley

The river runs through a culvert under the main road here, and through an industrial estate; there is also a culvert under a back road alongside some houses. These culverts are potential obstacles to the free passage of sea trout and worthy of further investigation and assessment; it was not possible to gain access during this visit. DCRT report sea trout redds upstream of here, so fish are able to pass this point. It is however worth checking whether access is possible under the full range of flow conditions when sea trout would be expected to run. Further guidance on culverts and fish passage is published by the Scottish Executive (see references).

Photo 8 River upstream of Broad Meadows Lane

Photo 9 View downstream from public footpath near Broad Meadows Lane

Photo 10 Services are present along the right bank here – appropriate checks need to be made before any works are carried out.

Photo 11 Small trout downstream of the footbridge

Photo 12 Small tributary alongside footpath

Photo 13 Covered culvert through the industrial area

Shrigley – Crossgar Bridge

This section of river flows through a wooded area. The river has a meandering planform which contrasts with the straightened channel downstream. The river bed substrate is good quality for trout spawning, comprising approximately 10% boulder, 40% cobble, 40% gravel and 10% sand. Invertebrates present include blue-winged olive, olive nymphs, freshwater shrimp, caddis and prolific growths of freshwater sponge.

With progress upstream it becomes evident that the river channel has been modified at some point in the past. The left bank is embanked and the channel is wide and very shallow – largely ankle deep and totally lacking in deeper pool habitat. The substrate also becomes finer (10-40 mm gravel dominated), but remains reasonably good quality for spawning.

The presence of mature trees on the embankments indicates that the channel modification took place some decades ago; however the effects are still evident today. There are some exposed areas of bedrock within the channel and in places there have been some attempts at building small dams and groynes from stone. DRCT indicate the latter may have been constructed to facilitate the poaching of adult sea trout, but it again highlights the lack of deeper water habitats along this section.

Deeper water is necessary for holding adult fish when they run to spawn and for juvenile stages to grow to a size when they can become smolts and head down to the sea. Very few small trout were seen in this section, and most of those were young-of-the-year (0+) fish. This begs the question whether there is sufficient juvenile habitat available to allow trout to grow to a size and age when they can become smolts.

Many studies suggest that sea trout are at least one-year olds (and often two or three) before they leave freshwater. However recent evidence suggests that in some cases very young stages (0+) may drop downstream into estuary areas during their first autumn. Certainly small trout are caught in the lough around the mouths of tributaries and a similar situation is found in Orkney, where the small streams appear to be used for only a short period before fish drop down to the sea. It can only be speculated whether migration to the sea at an early life stage is a natural adaptation of Dibney sea trout (if indeed this occurs), or whether it has arisen as a result of the extensive modification of the river.

This section of the river has great potential for habitat improvement to create deeper holding areas and to improve the quality of gravel available for spawning – see recommendations.

Photo 14 The river has a steeper gradient and better bed substrate composition upstream of Shrigley

Photo 15 With progress upstream it is evident the channel has been modified; it is overwide, shallow and embanked (left bank – picture taken looking upstream).

Photo 16 Wide, shallow channel – no pool habitat.

Photo 17 Typical section of river in the wooded area – ripe for the creation of pools.

Photo 18 But not like this! A dam probably constructed to assist poaching.

Crossgar Road Bridge

Upstream of the road bridge the river channel has been dredged and is straight and slow-flowing. The channel is open (few trees or bushes) and aquatic plants typical of still or slow flows are present (Canadian pondweed *Elodea canadensis* and duckweed *Lemna minor*). The river bed is composed of fine sediments until the farm track which runs parallel to the channel on the left bank ends; beyond this point gravel substrate becomes evident. It appears the river bed has been dug out and the gravels used to surface the track. This is very damaging to in-stream habitat, but fortunately has been carried out over only a short length of river.

It was not possible to progress further upstream here because of the proximity of crops to the river bank. The landscape here is rolling countryside (drumlins) with mixed agriculture including wheat, barley and beef cattle. The map shows that the channel between here and the next road bridge is very straight indicating drainage works have taken place in the past. In-stream habitat is likely to be compromised here and it is recommended that this section is inspected when access is possible (after harvest).

Photo 19 Upstream of Crossgar Road – the bed has been dredged from the river here.

Jericho Road Bridge

The river channel here has a moderate gradient with a gravel dominated river bed and water crowfoot (*Ranunculus* sp.) present. However, the gravel layer is a thin, armoured layer on the surface and a quick scrape revealed fine sediments underneath (Photo 21). This is not good quality spawning habitat because the gravel layer is too thin; a depth of at least 30 cm of gravel is recommended for trout spawning (more for larger sea trout).

The left bank of the channel downstream of the bridge is a built stone wall, and the channel is predominantly shallow and lacking pool habitat (Photo 20). Some 0+ trout fry were observed but no larger fish.

Photo 20 Downstream of Jericho Road – channel is walled on the left bank and generally shallow.

Photo 21 The gravel substrate is thin here and overlays fine sediment– not good for spawning.

Ardigon Road Bridge and Sunday Well Road Bridge

Access to the river here was difficult so only short sections were inspected close to the road bridges. The channel here is heavily shaded by trees and bushes (hawthorn, ash, gorse – Photo 23) along both banks; beyond this strip are fields mostly with beef cattle or mowing grass. The bridge culverts have very shallow water depths flowing over them; this could be a barrier to fish movement at low flows (see Scottish Executive guidance on culverts – references). The river bed comprises large cobbles and gravel (Photo 22), but the channel is quite incised suggesting the bed may have been lowered for drainage in the past; lack of pool habitat may again be a limiting factor for trout populations here (juvenile habitat bottleneck).

Photo 22

Photo 23 River channel is to the right of the tree line

4.0 Conclusions and Recommendations

The Dibney River seems to be accessible to adult sea trout running up from Strangford Lough as demonstrated by the numerous redds seen by DRCT volunteers. There may however be obstacles to migration that were not spotted during this visit.

- Walk the river channel fully at low water to identify potential obstacles. Particular attention should be given to bridges and culverts and the depths of water flowing through these.
- Investigate the possibility of opening the culvert at the industrial estate (Shrigley) to reduce the length dark tunnel that fish have to run through and highlight potential blockages. If fully opening the culvert is not possible, installing grills or grates would help to increase light levels and could act as access points for installing flow baffles if the culvert is smooth and shallow.

There is a dearth of deeper pool habitat throughout the Dibney River because of past channel modifications. The river would benefit from the creation of deeper pool areas to accommodate adult spawners and allow more juvenile trout to grow to a size when they can smolt and migrate down to the lough.

- On the meandering sections of river, for example in the wood upstream of Shrigley, re-create lateral scour pools by the re-distribution of material from the riverbed and embankments (see Photo 24). Lateral scour pools are the deeper areas which occur naturally on the outside of meander bends.
- On straight sections of river, pools could be created by building channel constrictors or specialised weir structures. It should be emphasised that the idea of these is to create depth **not** by impounding water upstream, but by focussing flows downstream of the structure to create scour. Guidelines for construction of these structures are given in O'Grady (2006). Figures 1 – 3 show some examples.

  Less formal but sometimes equally effective is the introduction of large woody debris (LWD). The introduction of tree trunks and root masses creates a diversity of flows and scour patterns that promotes the

formation of a variety of depths and the sorts and cleans gravel for spawning. Figure 4 shows the effects of differently aligned LWD structures.

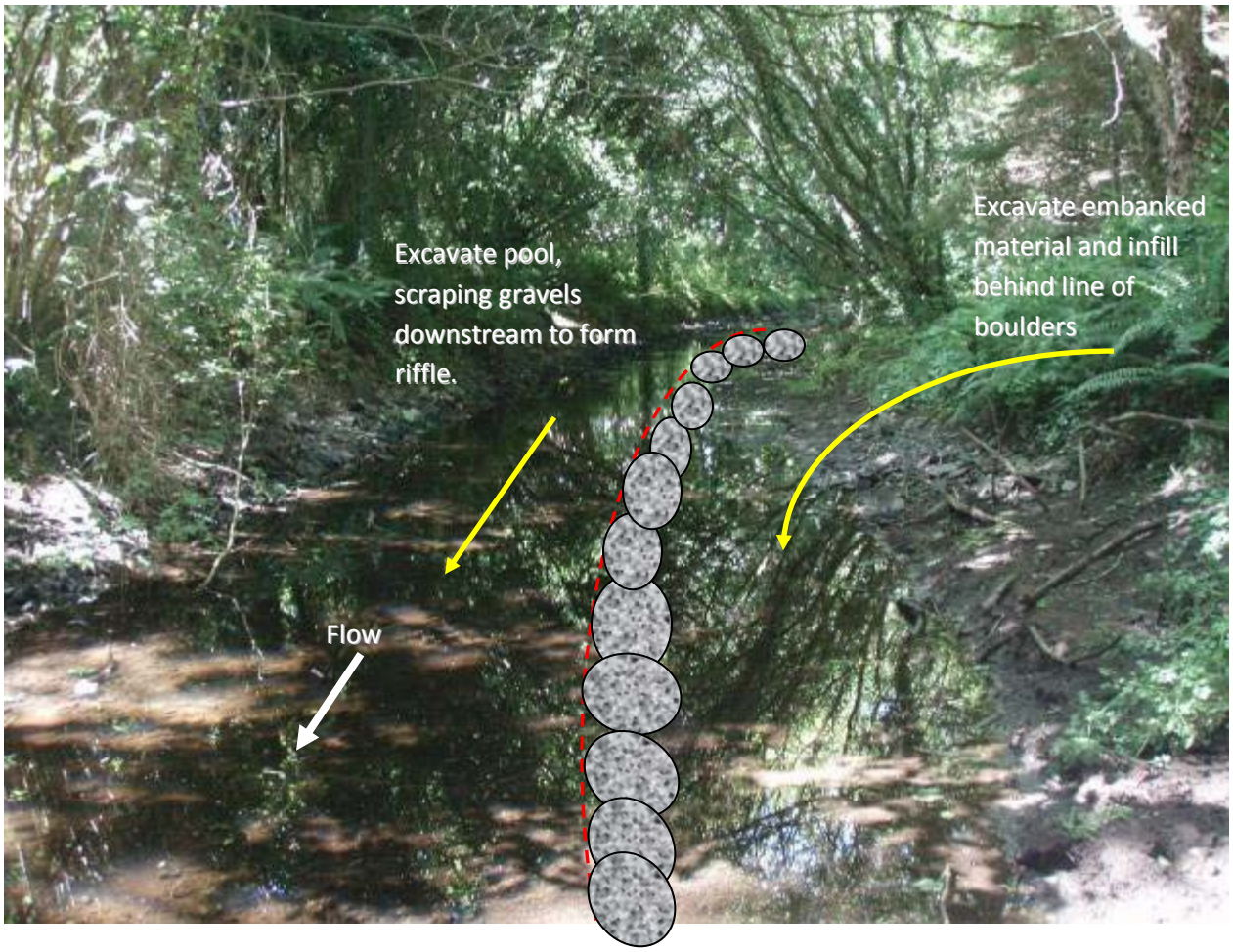

Photo 24 Creation of lateral scour pool on the outside of a bend

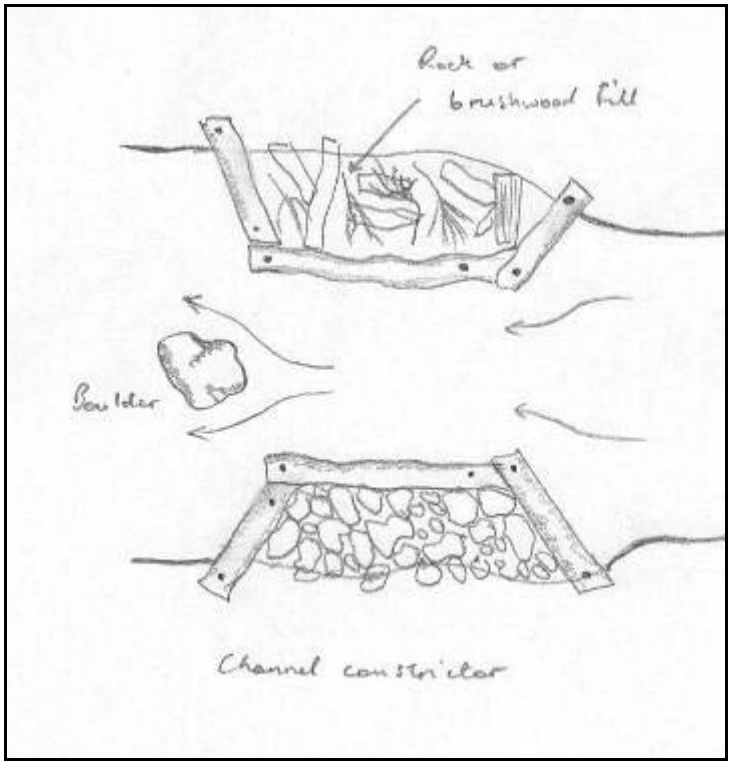

Figure 1

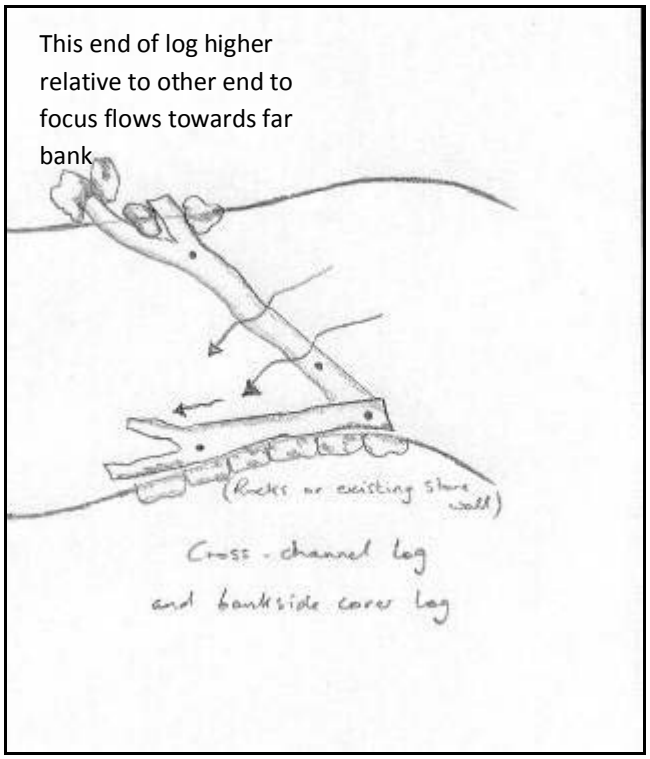

Figure 2

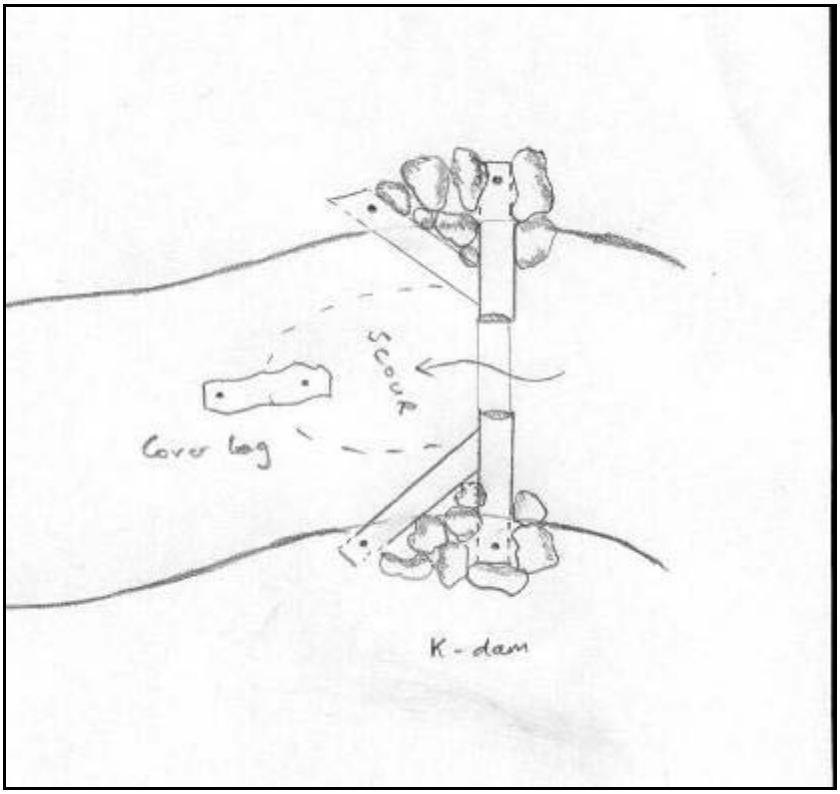

Figure 3 Cover log can be substituted with a boulder

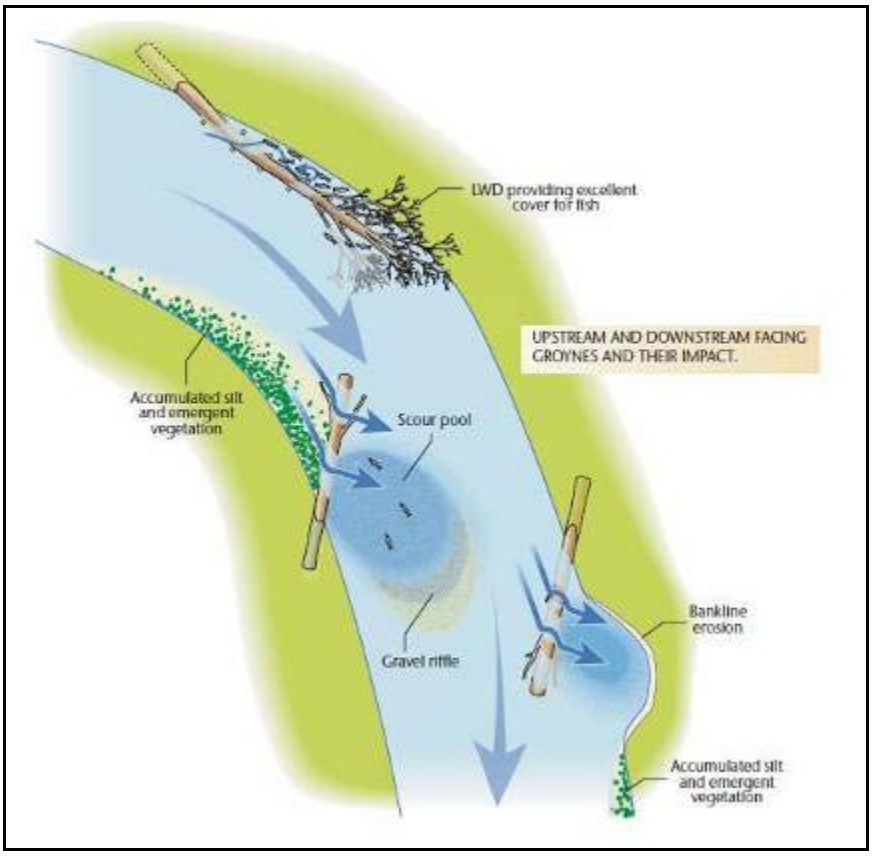

Figure 4

Photo 25 Naturally occurring LWD – this tree has fallen across the channel but remains fixed by its roots and wedged against a tree on the opposite bank. Scour under the trunk has created a deep pool.

Photo 26 Trees can be partially cut and hinged over into the river channel

Photo 27 Steel cable used to secure felled trees to their stumps

Photos 25-27 show the effects of LWD and some methods of fixing it in place. Felling of trees in the wooded section of the Dibney River would provide material for in-stream structures and thin out the dense shading of the channel at this point. Structures like the one in Photo 25 could be mimicked by exposing the roots of trees growing in the embankment, cutting through the roots on the side facing away from the river, then winching the tree over the channel and wedging it against trees on the opposite bank.

Also, simply fixing whole trees parallel to the river bank (Figure 4, top structure) by cabling or hinging them would assist in narrowing the channel and promoting local scour.

The section of river in Killyleagh would benefit from more community engagement to inspire better stewardship of the watercourse. DRCT have already held river clean-up events and these should be continued. The act of clearing litter and dumped materials from the river demonstrates that someone cares for the river and does reduce the incidence of tipping;

involving the local community as widely as possible in these activities increases the benefits.

Activities to educate and inform people about the river are also very effective. The Wild Trout Trust's Mayfly in the Classroom initiative has been used successfully in many schools and helped children to gain an understanding of the relationships between water quality, river habitats, wildlife and our dependence upon water. More details on Mayfly in the Classroom can be found at www.wildtrout.org/index.php?option=com_content&task=view&id=340&Itemid=318

Currently the river is disconnected from the community in Killyleagh by fencing and an impression that it is a dangerous place. This probably contributes to the occurrence of fly-tipping, in that the river is perceived as somewhere "over the fence" which is out of sight and out of mind. Improved access to and visibility of the river would go a long way to changing such attitudes. Urban river restoration projects can be designed to benefit both local residents and wildlife, and a safe environment created without the need for fencing. Examples of such projects include the River Quaggy in London (www.therrc.co.uk/rrc_case_studies4.php)

- Continue river clean-up activities and involve the local community as widely as possible. Putting the schedule of planned trash clean-ups and other events (nature trails for kids and their families with a ticklist of wildlife species) on the BBC Breathing Places website is a great way to get new volunteers and as a useful reminder of dates and times for existing volunteers (www.breathingplaces.org/public/search?hasjs=1&location=strangford&search_filter=All)

  Regular trash clean ups tackle the problem on two levels – firstly the simple benefit of rubbish removal, but secondly (probably more importantly) the visible presence of working volunteers is a deterrent to future fly tipping. Sending out a public message of this sort also helps to secure future volunteers and to introduce local communities to the value of healthy rivers.

- Consider promoting a Mayfly in the Classroom project in local schools

- Discuss options for improving the river in Riverside Park, both for the local community and wildlife, with Down District Council and seek advice from bodies such as the River Restoration Centre.
- Consider making a more formalised riverside walk - perhaps using low wooden fencing to delimit pathways. The route should encompass both sections that run close to the riverbank and sections some yards away from the river and could also include cheap, easily replaced interpretative signage.
- Incorporate robust barriers to traffic at any access points to the walkways (using materials that have no scrap value – e.g. boulder placements) to prevent fly tipping from vehicles

Please note: it is a legal requirement that all the works to the river require written consent from the responsible authorities (DCAL and the River Authority) prior to undertaking any works. Checks should also be carried out to ensure that works will not affect the features of interest of any conservation designated sites, and consents sought from the appropriate authorities.

5.0 Making it Happen

The Wild Trout Trust can provide further assistance to develop detailed project proposals for habitat improvement works and assist in preparation of consents. Small bursaries may be available (up to £1500 for use as matched funding) to assist with fund-raising for projects. Practical demonstrations of habitat improvement techniques are also available through our Practical Visit programme. Please note that there is currently a high demand for these services; please enquire via projects@wildtrout.org. More details can be found on our website at www.wildtrout.org.

6.0 Disclaimer

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References

O'Grady, M.F. (2006) *Channels and Challenges – Enhancing Salmonid Rivers*. Irish Freshwater Fisheries Ecology & Management Series: No.4, Central Fisheries Board, Dublin.

Scottish Executive (2000) River Crossings and Migratory Fish: *Design Guidance.* April 2000. ISBN 0-7480-9343-5. Copies available from The Stationary Office Bookshop, 71 Lothian Road, Edinburgh, EH3 9AZ, Scotland, UK. Also on the web site http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp