Habitat Advisory visit to the Tolka River, Dublin, Eire

Undertaken on behalf of the Tolka River Environmental Alliance and Fingal County Council by Vaughan Lewis, Windrush AEC Ltd

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1.0 Introduction

This report forms the output of a site visit to the Tolka River, Dublin, Eire on 19th November 2005 on behalf of the Tolka River Environmental Alliance (TREA) and Fingal County Council. Information in the report is based on observations on the day of the visit and additional comments provided by Hans Visser, Biodiversity officer for the council and members of TREA.

Members of TREA

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

2.0 Habitat Assessment

The reach of river walked was near to Blanchardstown, on the north west outskirts of Dublin. Due to flooding concerns related to the redevelopment of the surrounding area for housing, the upper section of the river had recently been realigned. A meandering low level channel had been excavated along the right hand edge of the flood plain, creating an island between itself and the original left bank channel. The new channel was some 2m-4m wide and had a relatively steep gradient, with a series of stone weirs and chutes installed to create pool habitat. Despite the good habitat and relatively strong flow, it is understood that flows during the summer period can be very low with an extensive growth of benthic algae.

Stone weir creating pool habitat

Recent electrofishing surveys had revealed low numbers of adult trout, with few juvenile fish present. Subsequent to this survey, a major pollution incident had taken place on the river, with a discharge of ammonia resulting in the loss of much of the river's fish stock.

The alliance stocks each year with approximately 1,000 10" – 12" hatchery reared brown trout at the start of the season, with another 500 later in the year. Members are encouraged to return trout to the water. However, it is understood that there are a significant number of anglers who do not respect this request.

There was some Large Woody Debris (LWD) within the channel resulting from both natural and man-made sources (planks, construction timber etc). Where LWD was present, there was evidence of scouring and sorting of the substrate. However, there was a general lack of bankside trees, limiting both the amount of LWD present, and the presence of tree roots valuable for cover and for protecting the banks from erosion.

LWD derived from construction timber. Note change in flow pattern, resulting in localised bed scour

A brief examination of the invertebrate fauna was undertaken by stone turning in shallow areas. Families identified included cases caddis, leeches, freshwater limpet, hog louse and mayflies suggesting moderate water quality. A dipper *Cinclus cinclus* was noted during the advisory visit, reinforcing the impression of generally healthy water quality in the river.

Realigned channel showing steep gradient and high water velocity

A left bank channel was discharging heavily turbid water into the main river, with the origin of the colouration believed to be a nearby construction site.

Below the main road bridge, land use on the RB was managed urban parkland. The grass was heavily cut, with a fringe of ruderal vegetation (nettles, docks etc) left

uncut. The LB was dominated by a dense fringe of deciduous trees. These were casting shade over the channel, and had resulted in an increased amount of LWD in the channel. Further downstream, parkland was present on both banks of the river with heavy grass cutting undertaken on both banks.

Managed parkland on RB, with dense tree fringe on the LB

In addition to the LWD, there was a large amount of rubbish in the channel, including big individual items such as shopping trolleys.

A relief channel had been cut through a wide meander loop upstream of a bridge in the park during the last 10 years, in an effort to reduce flood risk. This had deprived the existing channel of water. The alliance had an aspiration to restore flow to the original channel, which had previously provided a length of good habitat and fishing.

Newly formed cut (RB) with entrance to old meander loop visible on the LB

Short sections of the LB of the river within the park had been reveted with stone. This had created an ugly and unnatural profile to the bank.

Section of pitched stone revetment

Towards Blanchardstown, there was a section of very heavily engineered channel. This was constructed to allow development of houses close to the river. The channel was heavily incised, with a steep gradient and a series of stone weirs creating cascades and chutes. The bed and banks of the channel were heavily dressed with stone and large gravel.

Engineered section of the Tolka upstream on Blanchardstown

As a consequence of the weir installation, the upstream section of the river was very flat and uniform, with a severely reduced gradient.

Downstream of the bridge by the hospital, a RB culvert was discharging into the river. There was evidence of sewage fungus in the river at this point, indicative of poorly treated sewage effluent.

Effluent discharging into the Tolka downstream of the hospital bridge

Mink *Mustela vison* were present in the Tolka catchment, with an active control programme undertaken by the TREA.

3.0 Recommendations for habitat management

- There was a general paucity of suitable sites for trout spawning throughout the river reach walked. It would thus be of great benefit to create some additional sections of gravel dominated riffle. These would provide additional lengths of habitat, not only for spawning and juvenile trout, but also for a range of species of macroinvertebrates and aquatic plants. Sites that would be particularly worth considering for riffle installation include directly downstream of the constructed weirs on the newly created river channel. The head difference resulting from these weirs could be run-out over the length of the riffle with no impact on flood risk.

In general, it is recommended that riffles should be constructed to be a minimum of 15m in length. Each riffle will increase the retained head, probably by between 15cm-30cm, with the extent of this backwater effect being assessed as part of the detailed design process. Optimum conservation benefit is obtained if the depth of gravel in each riffle exceeds 50cm, with a range of macroinvertebrate species requiring an intra-gravel zone of this depth in order to reproduce successfully. In order to optimise spawning conditions for brown trout, water velocity should be between 25cm/sec – 75cm/sec, with a water depth of between 25cm and 60cm. Gravel and stone will need to be imported onto the site from the nearest quarry for construction of the riffles.

- The quality of the existing sections of gravel could be improved by establishing a regime of cleaning each September. This can be achieved by either manual raking, or by the use of high-pressure water jets. Working downstream, any imbedded gravel should be loosened and fine sediment washed out. Care must be taken to clean riffles rotationally, with only short sections being treated annually.

- The establishment of brown trout stocks in the river could also be promoted by the use of deep substrate incubation boxes. These are gravel filled boxes, approximately 0.6m in each dimension that are filled with suitably sized gravel and seeded with 10,000 - 20,000 trout eggs. A water feed at the bottom of the box allows the eggs to incubate and hatch. Once they reach the swim-up fry stage, they leave the box via the overspill pipes, stocking themselves into the river. Alternatively, fry can be captured in a small trap box as they leave the incubator and subsequently distributed into areas of suitable juvenile habitat around the fishery.

In effect, these are naturally reared fish without the unhelpful behavioural modifications associated with hatcheries. Such a system could be established using the existing impoundments within the fishery. In addition to their benefits for stock enhancement, the incubation boxes have a valuable social role, giving a focus to groups, with the benefits clearly visible in the form of fry produced. On the negative side, incubation boxes can be a magnet for vandalism. Their siting is therefore of some importance. More details on incubation boxes can be found on the Wild Trout Trust web site www.wildtrout.org or in Volume 2 of the Trust's magazine, *Salmo trutta*.

- The accumulation of stable LWD in the channel should be encouraged. Measures to increase LWD should focus on the provision of cover logs in marginal areas by the simple expedient of trimming small to medium sized trees to an acceptable size and then felling them into the river channel. They can then be pinned into position using driven wooden stakes. Simple paired upstream facing timber groynes are of great value in sorting the gravel in shallow riffle areas, improving spawning conditions for brown trout.

Upstream facing timber groynes showing increased downstream water velocity and scour of spawning gravel

Stable LWD 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 will eventually be colonised by emergent vegetation, helping to narrow the river channel. Weed raft/ fallen tree complexes also provides excellent cover for adult fish.

It is also recommended that there should be a presumption against the removal of any naturally fallen timber. Such material can be pinned in place as described above with all the associated advantages stated. Advice relating to the management of LWD in the channel is predicated on the assumption that its retention does not cause any increased risk of damaging flooding. This risk should be assessed in conjunction with the development control and flood risk management departments of Fingal County Council.

- In addition to the use of timber groynes, large boulders gathered locally could be used to create small, upstream facing groynes. These should be located so as to promote scouring and sorting of currently uniform areas of silty gravel.

- There was a lack of bankside trees, particularly in the upper section of the reach. It is recommended that strategic planting of trees be undertaken. Tree species should represent those found locally, with plants purchased from a supplier who can guarantee locally provenance of his stock. Alternatively, most willow *Salix* species grow well from cuttings. Willow stakes (<2m x 25mm-50mm diameter) could be cut from existing trees within the Tolka valley and planted adjacent to the river. This is an ideal community based project, with a job for all ages and abilities, and rapid results. It is recommended that trees are planted in clumps of 30-50 on the outside of bends in order to control the rate of erosion.

- Management of the river banks through the urban park areas could be improved. The frequency of grass cutting should be reduced to once a year alongside the river, allowing the development of a rough grass buffer strip of >10m width alongside both banks. This would have a number of benefits including:
  - The development of valuable fringing cover for juvenile trout
  - Increased protection against rapid and damaging erosion
  - Attenuation of surface water run-off and associated nutrients/sediment
  - A small but significant reduction in maintenance costs for the parks

- The section of pitched stone revetment within the park could be replaced by removing the stone, and cutting a wide low level berm on the outside of the bend. The bank behind the low level berm should then be reprofiled at a shallow gradient, promoting further stability. Once vegetated, the low level shelf would provide a high degree of erosion protection to the line of the new bank behind. The stone resulting from the removal of the revetment could be used to construct small, strategically located groynes, or placed as individual boulders in shallow riffle areas, in order to increase habitat diversity.

- The redundant meander loop could be brought back on line by a combination of the careful raising of the height of the riffle in the main channel and removal of the accumulated sediment at the mouth of the loop. This would create an additional length of valuable habitat for arrange of species, with water flow possible all year

round, or during higher flow periods only. A simple level survey would indicate the extent of the necessary modification to the bed topography to effect these changes.

- A reduction in the height of the weirs installed as part of the channel modification neat to Blanchardstown would allow the development of more features in the section upstream. This river length had little gradient or variation in habitat as a result of the backwater effect exercised by the newly constructed weirs.

- The source of the effluent entering the river below the hospital bridge should be identified. Pressure should be exerted on the statutory authorities to improve the quality of the discharge. In addition, it may possible to alter the bed profile locally in order to create a shallow riffle area, improving aeration of the effluent.

- The control of mink on the Tolka river could be improved by the utilisation of mink rafts designed by the Game Conservancy Trust in the UK. These are floating rafts with pads of damp clay within them. By checking the raft regularly, usage by mink can be detected due to the presence of their footprints. A live trap can then be placed within the raft, the mink caught and humanely killed. The use of the rafts reduces the amount of effort required to trap mink and also helps to prevent accidental capture of non-target species. Full details can be obtained from http://www.gct.org.uk/uploads/minkraftleaflet.pdf#

- The issues faced by the TREA (water quality, rubbish, habitat degradation) are very similar to those faced in other urban rivers in Britain and Ireland. One of the foremost urban conservation groups is the JETSET, an organisation originally concerned with the protection and rehabilitation of the River Wandle in south London. JETSET have subsequently expanded their range of interests, in particular championing the 'Trout in the Classroom' project. This provides school children with simple, easy to operate hatchery systems that allow them to incubate trout eggs and raise the fry for subsequent introduction into target rivers. This 'ownership' of the fish engenders strong links between the children and the receiving watercourse. (see JETSET website www.jetsetclub.co.uk I would strongly recommend that TREA establish contact with the Chief Executive of JETSET, Alan Suttie (email: mail@jetsetclub.co.uk) with a view to collaborating on a range of issues and opportunities.

- All works to the bed or banks of the river may require written consent from the statutory authority. It is imperative that all relevant consents are obtained by the club prior to the commencement of any works. A Flood Risk Assessment may be required as part of any consent application. No Flood Risk Assessment has been undertaken as part of this design package. Accordingly, no liability or responsibility for any loss or damage due to consequent flooding can be accepted by Windrush AEC Ltd as a result of any person, company or other organisation acting, or refraining from acting, upon comments made in this report

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