Habitat Advisory Visit

Longford Hall Waters, Derbyshire

On behalf of the Longford Hall Fishing Syndicate

June 2006

Sponsored By

1.0 Introduction

This report is the output of a site visit undertaken by the Wild Trout Trust on the streams within the Longford Hall Estate, Derbyshire on 5th June 2006. The estate lake opposite the hall was also included in the visit.

Comments in this report are based on observations on the day of the site visit and discussions with Mr Paul Mottershead and Brian Ashbey of the Longford Hall Fishing Syndicate.

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 Fishery Overview

The Longford Hall Fishing Syndicate (LHFS) lease the fishing rights on the two streams, the Shirley Brook and the Longford Hall Brook within the boundaries of the Estate.

The streams on the estate flow into the Sutton Brook that form part of the part of the Dove catchment.

Both brooks are currently managed as wild trout fisheries and operate on a catch and release basis. The syndicate is limited to ten members and has a ten year lease. The LHFS would like to continue to develop the wild characteristics of the fishery. No formal catch returns were available for inspection and the status of the brown trout population is un-quantified. The sections visited do not fall into the Environment Agency's routine fisheries monitoring programme. During the visit brown trout were observed, albeit in low numbers. There are also coarse fish present (chub, roach, pike) a few escapee rainbow trout and possibly grayling in very low numbers. Coarse fish have been periodically removed by the Environment Agency. Further downstream of the estate there are fishing interests that rely on supplementary stockings of domesticated brown trout.

Water quality is thought to be good with no recent major pollution events, however diffuse silt pollution from agricultural sources is thought to be a major factor limiting the fishery.

There is thought to be a good population of native crayfish in both streams. This population is extremely important in conservation terms, especially in light of outbreaks of crayfish plague in the main River Dove.

During the visit there was a constant hatch of mayfly (emphemeridae) on both brooks.

3.0 Fishery Description

Three sites were visited during the inspection:

- Longford Hall Lake
- Longford Hall Brook upstream and downstream of the lake
- Shirley Brook

3.1 Longford Hall Lake

The lake opposite Longford Hall is in an advance state of siltation. Average water depth is around 0.5m. There are currently plans being drawn-up to de-silt the lake later in 2006. The channel entering the lake is silted and shallow. A build-up of woody trash has also built-up on the central bridge support. There are several land drains entering the stream at this point, one of which appears to be a point source of silt, which could be seen exiting the end of the pipe.

Field Drain entering brook above lake: Note silt in pipe

At the outlet of the lake there is a large weir that represents a Barrier to the movement of fish upstream.

3.2 Longford Brook

Immediately above the hall bridge the channel appears to have been subjected to historical land drainage works. The channel is very straight with evidence of gravel spoil on the RHB. Despite this the channel still has a gravel bottom with a pool; riffle sequence. Although there is a good mixture of gravel sizes, there is high silt loading on all riffle areas. This significantly impacts on the quality and availability of suitable habitat for spawning brown trout. There is considerable potential to enhance the brook as an important spawning headwater in the Dove catchment.

In places tree cover is approaching 100%. This severely limits the amount of light penetrating the brook which in-turn is suppressing in-bankside fringing and stream vegetation such as water crowfoot and startwort.

A) B)

A) Straight, uniform and shaded channel
B) High silt loading within gravels

There is an almost complete absence of Large Woody Debris (LWD), e.g. fallen trees and branches in the channel. The presence of LWD has been shown to be extremely important in several respects.

- An increase in mean flow depths and velocities.
- Development of high in-channel physical habitat diversity
- LWD can have significant benefits to the control of run-off at the catchment scale.

Removal of LWD reduces both habitat quality and availability for juvenile and adult brown trout. LWD is extremely important habitat for native crayfish.

There are also a number of weirs along the brook. These represent significant barriers to trout wishing to gain access to this potentially important headwater stream for spawning.

C) One of a number of weirs inhibiting fish migration

Deeper pool habitat is lacking along the whole reach, apart from the areas immediately upstream of weirs where the brook is impounded.

Towards Carr Wood, Longford Brook meanders through an area of arable land where crops and game cover come to within two meters to the channel. With only a top of bank strip of herbaceous vegetation present between the field and river there is a potential risk that fines may wash into the channel through run-off during periods of high rainfall. This could exacerbate the problems of siltation observed further downstream.

D) Arable / game cover within 2 metres of Longford Brook

Downstream of Longford Hall Lake the upstream section of the brook is effectively cut off to migrating trout by the dam wall. On the LHB there is an areas that is used for the deposit of garden waste. This is very close to the bank and as a result the nutrient rich products of decaying vegetation are draining into the brook.

Moving downstream there is a series of three further weirs with drops ranging from 2-5ft. Again these represent serious barriers to spawning trout. In places tree cover is heavy leading to over shading. Further upstream there is a general lack of deeper pool habitat other than that associated with impounded sections above each of the weirs.

E) Pump House Weir

As the river runs down to the confluence with the Shirley Brook the landuse is characterised by maize fields. There appears to be little in the way of provision of buffer strips. Excessive sediment entering the brook can cause a variety of impacts on the aquatic environment, including; silting of riverbed gravels damaging salmonid spawning, invertebrate and plant habitats.

3.3 Shirley Brook

Moving upstream from the confluence with the Longford Hall Brook Hall weir is the first of five significant structures affecting the fishery. With a drop of 3-4 feet the next structure upstream ‘House Weir’ has created an impounded section of around 20metres wide with a silt-dominated substrate stretching 100m+ to Hall Bridge.

F)

G)

F) House weir
G) Impounded and over-wide section u/s House Weir

Upstream of the bridge the brook starts to narrow but is suffering from almost 100% encroachment with branched bur-reed. There is little evidence of gravel substrate in this section.

Very quickly the river takes on a more narrow and sinuous planform with a good pool; riffle sequence. There is a very good range of gravel sizes (coble to pea), however these are suffering from the effects of siltation. Several small trout were observed in this reach indicating that some successful spawning is occurring. The river then meets a significant structure 'Wet Feet Weir'

As the brook reaches Hall Farm marginal berms and point bars and associated pools have formed, indicating that this section of river escaped the worst of the dredging programme that occurred historically in the Dove catchment. This can be classified is high quality 'semi-natural' in-stream habitat.

Upstream of the farm there is another weir impassable structure 'Farm Weir'.

Along the reach maize has been planted in close proximity to the river with a field margin in places of less than 1m.

H) Good Pool: Riffle Sequence and marginal vegetation

I) Poor field margins at Hall Farm

Upstream of Hall Farm the reach is characterised by being fairly straight in its nature and comprises an almost uniform shallow gravel glide, before entering ‘Crap Wood’ where again a pool: riffle sequence becomes evident. As the stream runs through the wood it becomes over-shaded, with very little in-stream and marginal plant growth.

J)

J) Pool: riffle sequence through ‘Crap Wood’. Overhanging trees will be a future source of LWD.

4.0 Recommendations

The Longford and Shirley Brooks that run through the Estate have a great deal of potential to be developed as wild trout fisheries. However there are several issues affecting the fishery that need to be addressed in both the short and long term.

The following are generic recommendations aimed at promoting improved wild trout populations and biodiversity in general.

It is a legal requirement that all the works to the river and /or the on-line lake require written Environment Agency consent prior to undertaking any works, either in-channel or within 8 metres of the bank.

Local EA Fisheries and Development Control staff should be contacted at the earliest opportunity to discuss any recommendations arising from this report the syndicate / landowners may wish to pursue.

4.1 Short to Medium Term Actions

4.1.1 – Spawning Habitat Improvements

Throughout both reaches ingress of silt appears to be seriously affecting the quality of spawning riffle habitat.

It is suggested that the gravels are 'jetted' using a high pressure pump to purge the gravel matrix of fine silts to provide suitable conditions for trout eggs and alevins to develop to 'swim-up' fry stages. Riffles should be cleaned on a rotational basis and care should be applied to 'clean' less than 25% of each riffle each year. Large stones and cobbles should be left on riffles, as these are important habitat for native crayfish and invertebrates.

A suggested equipment specification, including approximate costs is listed below:

Pump - Honda WH20X water pump - **£475**
15m length 1" clear braided hose (outlet) - **£45**
2m length 22" green PVC suction hose (inlet) - **£25**
1.5m length 25mm steel pipe (attached to outlet and flattened at end to increase pressure) - **£10**
Adaptors 2" BSP swivel x 1" BSP male (to attach pump to outlet) - **£45**
Hose fitting 1" BSP female swivel x 1" tail (to attach outlet to pump) - **£15**

K) Jetting riffles

After costing many forms of gravel cleaning, pumps have been found to be the most effective way of cleaning gravel. They are easily transported, relatively light, and efficient.

Gravels need to be cleaned in September, prior to spawning (Dec-Jan) to an approximate depth of 20-30cm. Concreted gravels need to be broken up, by bashing away at them with the steel pipe, they do break up to leave loose gravel, it's just hard work!

It has been found that trout use cleaned areas preferentially over un-cleaned areas, with the trout frequently cutting on an area in the afternoon that has been cleaned in the morning.

To reduce impacts of silts moving downstream the use of 'Sedimats' in conjunction with cleaning is recommended. These are pinned to the riverbed downstream of the cleaning and collect the silt blown up by the pumps. Being made of hessian they can then be removed from the river planted up and used for any bank work. They cost approximately £42 each.

Local Environment Agency Fisheries staff may own such equipment and be willing to loan it.

4.1.2 Introduction of Large Woody Debris (LWD)

Woody debris in rivers can provide habitat for a variety of animals. Brown trout numbers increase significantly with the presence of woody debris along the banks and in the river as they provide refuge and cover. They may offer lies for otters or perches for kingfishers. Woody debris in the river may also create pools and riffles in sections of the river that would otherwise have a dearth of aquatic habitats. They also retain leaf litter and act as an energy reservoir for the river section.

Fallen timber can be used to create flow deflectors. Deflectors need to be; 1) keyed into the bank to avoid localised erosion and; 2) staked and wired to the bed of the river to avoid being washed-away. During winter flows the deflectors will scour out pools and naturally sort and clean gravels suitable for trout spawning. As a very rough guide deflectors should be set at approximately 30 degrees to the bank with a length of between 40-50% of channel width. Scour pools have been shown to be very important habitat for all life stages of brown trout. Deflectors could be particularly useful if placed silted riffle areas.

The Environment Agency should be consulted prior to any introductions of LWD.

4.1.3 Tree Management

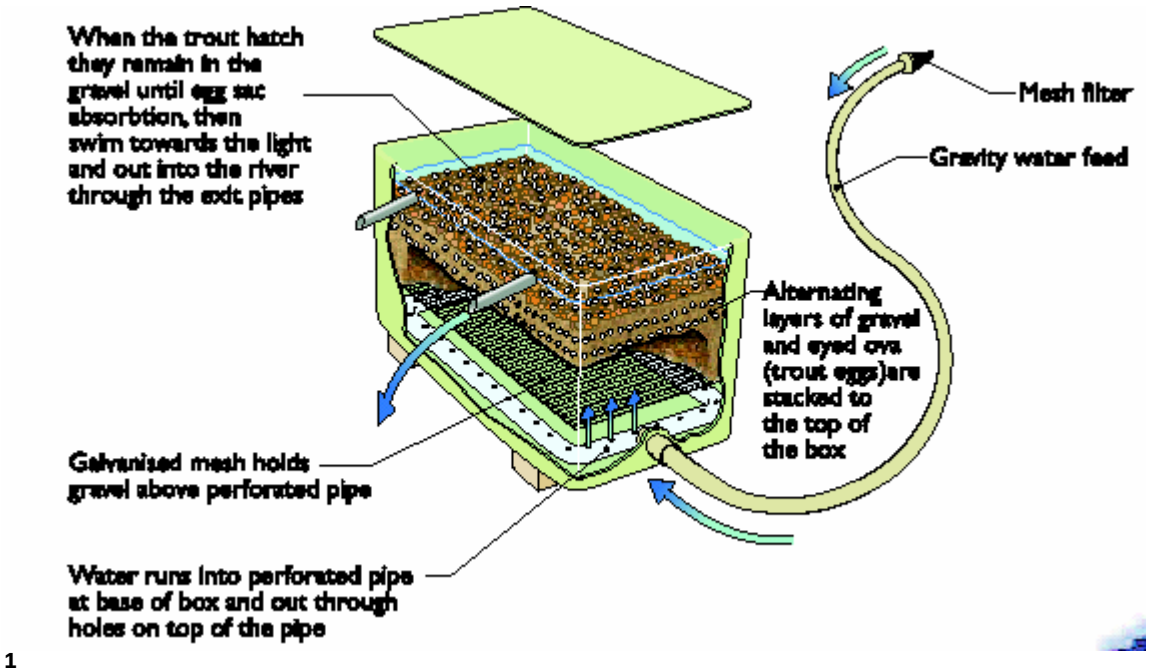
In several sections of both brooks over-shading by mature trees is a significant problem. It is recommended that the syndicate undertake a 7-10 year rotational coppicing and pollarding programme. This will create a mosaic of light and shade allowing the development of fringing riparian vegetation and in-stream macrophytes, such as starwort. The resulting timber or LWD as we now know it!, can be used for the creation of flow deflectors. Habitat created will be particularly useful for trout parr that are highly territorial and require good cover.

4.1.4 – Deep Substrate Incubation Box's

The use of deep substrate incubation boxes on both brooks could potentially be a useful short to medium term measure to address the apparent lack of spawning bottleneck. These are gravel filled boxes, approximately 60cm 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. It is vital however that good quality marginal habitat is available for fry to seek cover and develop into parr. Section 30 Consent, under the Salmon & Freshwater

Fisheries Act, 1975, is required from the Environment Agency prior to the introduction, of fish, fry or ova into inland waters. A good head of water is required to get water to feed through the boxes. Suitable sites would be in the various weir pools located at the top of each brook allowing the downstream migration of parr.



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4.1.5 Buffer Strips & Fencing

It is recommended that all fields running adjacent to both brooks have buffer strips (5-9m) created to reduce the risk of fine sediment run-off from arable fields. This is of particular importance where maize is planted. Further to this it is also recommended that fences be installed in areas where stock may gain access to the stream.

Buffer strips adjacent to a watercourse can be treated as non-rotational set aside. The same rules apply as strips adjacent to hedges and woodland edges, further information can be obtained from: - http://www.defra.gov.uk/farm/capreform/pubs/pdf/Setaside2006.pdf

Grass buffer strips can be included as part of an Entry Level Scheme in the Defra environmental stewardship package.
Rules and points for grass margins are detailed in the ELS handbook - http://www.defra.gov.uk/erdp/pdfs/es/els-handbook.pdf
For capital works such as fencing, this would have to be part of a higher level scheme in environmental stewardship or, if there is already a Countryside Stewardship Scheme or an Environmentally

[1] **From The Wild Trout Survival Guide – Wild Trout Trust 2006.**

Sensitive Area agreement in place this may be able to be added to any existing agreement. Entry to HLS is only available once an ELS scheme has been agreed. Further info on HLS can be found at - http://www.defra.gov.uk/erdp/pdfs/es/hls-handbook.pdf

Where stock has been excluded form the riverbank special drinking areas should be created with a gravel bottom and post and rail fencing. This will allow stock to gain safe access to drinking water and will reduce ingress of silt caused by poaching to enter the river. (see below)

L) Example of stock watering area

4.2 Long Term Actions

4.2.1 – Removing barriers to trout migration.

There are many impassable structures on the Longford and Shirley Brooks. These represent a considerable bottleneck limiting the natural production of the fishery. Where possible structures should either be removed or modified to allow the free passage of salmonids from within and outside the catchment to the upper reaches for spawning. Further consideration should also be given to establishing a bypass channel around Longford Hall Lake to allow free passage of trout into the potentially important spawning headwaters of the brook. This option would also effectively cut-off the problem of silt accumulating in lake, which has to be periodically dredged at great cost to the owner.

Removing barriers to migration is both costly and technically demanding. However the formation of the Dove Fisheries Action Plan Group may prove to be a catalyst to address this considerable problem. This Plan is administered by the Environment Agency in consultation with local fisheries and conservation interests. Further information can be obtained from:

Dr Tim Jacklin
Dove Fisheries Action Plan
Environment Agency
Sentinel House
Wellington Crescent
Fradley Park
Lichfield
WS13 8RR

Below is an excerpt from the Environment Agency guidance on the fish pass options.

There are many types of fish pass in use in the UK today but most fish passes are of the following types.

Pool and weir passes
These passes consist of a series of pools, which divide the large fall of water at the structure into several smaller falls. These pools perform the dual function of dissipating the energy of the falling water and providing resting areas for ascending fish. Typically the gradients achievable with these passes are of the order 10-15 per cent.

Baffled or steep passes
Fish passes of this type generally use a rectangular channel with a series of precisely positioned and shaped plates or 'baffles'. These baffles redirect the water flowing down the fish pass channel, thus reducing the

average water velocity dramatically. These fish passes can operate at gradients of 20 or even 25 per cent and are typically very efficient in terms of the amount of water required for efficient fish passage.

Pre-barrages

In many cases, fish passage at small obstructions, in terms of the vertical height which has to be traversed, can be helped by provision of a small weir or weirs downstream of the main obstruction. These have the effect of splitting the distance to be traversed into smaller leaps or traverses. Such weirs can often be made of local materials and can look much more natural than some of the 'technical' civil engineering structures.

Artificial channels and informal solutions

Some of the most efficient fish passes have been found to be man-made substitutes for river channels. Such artificial river channels normally have a low gradient and extend from below the obstruction to a considerable distance upstream. Typical gradients range from 1 to 3 per cent making them particularly suitable for the passage of species that are difficult to accommodate with other types of fish pass (such as juvenile and smaller coarse fish). The gradient of the channel may be increased to nearer 4 per cent if energy-dissipating characteristics are built into the channel. These might include rock sills or deflectors, or sometimes a random arrangement of large boulders.

There are many modern solutions to fish passage problems but expert advice should be sought as simple mistakes at the design stage can incur substantial costs to rectify at a later stage.

The Trust has an advisory panel of which civil engineering and fish pass professional Dr Tony Woolnough of Fishways Ltd is a member. WTT members can contact Fishways Ltd for informal advice and site visits.

Contact details:

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e-mail: Tony@fishways.com
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Tel: and Fax: +44 (0)1273 513484
e-mail: Dick.Roberts@fishways.com

Fishway Engineering Ltd
6 Lockitt Way, Kingston, Nr. Lewes
East Sussex, BN7 3LG, England

4.2.2 - Establishing a partnership with the Environment Agency

It is strongly recommended that Longford Hall Fishing Syndicate contact the EA to discuss this report. The EA may be willing to initiate a partnership with LHFS to restore and enhance the fishery. Partnership with the EA could come in the form of ‘in-kind’ technical assistance with fisheries surveys and scheme design through to direct financial assistance.

5.0 – What next? -Making it all happen

The Wild Trout Trust is often able to provide further technical assistance and grants for recipients of Advisory Visits wishing to initiate projects. Visit the Practical Advice section of our website www.wildtrout.org for further information.

6.0 Disclaimer

This report is produced for guidance only and should not be used as a substitute for full professional advice. Accordingly, no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon comments made in this report.