



The Black Bourn



An Advisory Visit by the Wild Trout Trust January 2016

1. Introduction

This report is the output of a site visit to the Black Bourn, also known as the River Sapiston.

The Black Bourn is a headwater tributary of the Little Ouse River in Suffolk and the reach inspected runs through land that has been recently acquired by the Suffolk Wildlife Trust (SWT). The SWT are keen to manage the land and river for the benefit of nature conservation and are currently looking at options for enhancing the site as a whole.

The request for the visit came from Penny Hemphill, who is the Water For Wildlife Advisor for SWT. Comments in this report are based on observations on the day of the site visit and discussions with Ms. Hemphill and Mr. Julian Roughton, who is the SWT Chief Executive.

Approximately 500m of water course was inspected, including the main river channel, as well as flood plain ditch and non-connected backwater. The reach inspected runs for Nation Grid Ref: TL 955649 down to TL 950657.

The Black Bourn is designated as a Heavily Modified Waterbody of moderate ecological potential under the Water Framework Directive (ID No: GB105033043280). The river is currently assessed as being in poor condition due to high phosphate levels.



Map.1 Black Bourn Valley SWT Nature Reserve

Throughout the report, normal convention is followed with respect to bank identification, i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

2. Fishery background.

Fishery survey data collected by the Environment Agency (EA) from the Bailey Bridge Pool site, located approximately 4km downstream of Black Bourn Valley Reserve, indicate that the river there supports gravel spawning fish species including:

Dace *Leuciscus leuciscus*, chub *Leuciscus cephalus*, bullhead *Cottus gobio*, gudgeon *Gobio gobio*, stoneloach *Barbatula barbatula* and minnow *Phoxinus phoxinus*. Substantial numbers of pike *Esox lucius* were also recorded, in addition to roach *Rutilus rutilus* and ten-spined stickleback *Pungitius pungitius*.

The true picture on the status of the local fish community has been clouded by a substantial fish stocking programme which was instigated following a pollution incident and subsequent fish mortality. It is not clear which species were most affected, or which ones were re-introduced, however it is most likely that dace and chub were available from the EA's own fish farm facility at Calverton and would have featured heavily in any post-pollution restocking programme.

The diversity found in the different types of waterbody represented on the Black Bourn Valley site should ensure that a wide range of native fish species are represented. Although one of the linear backwaters does not appear to be hydraulically connected to the river, it is in the flood plain and it would be very surprising if it didn't support a fish population. Both pike and roach utilise weed beds or root systems as a spawning medium and would probably flourish in the linear backwater habitat. Stickleback are also highly likely to be present in the backwater as well as the various wet ditch systems found on the site.

It was noted that brown trout *Salmo trutta* were absent from the survey but they have been recorded as being present in samples at a site on the lower Sapiston at Euston in 2009 and again in 2012. It is not known if the trout population found in the lower Sapiston migrates up from the Little Ouse, is resident, or drops downstream from favourable habitat found upstream. Weirs and structures are cited in the EA survey report as a major obstacle to upstream migration.

The Fishery Survey was commissioned as part of a WFD investigation into the possible impact of alien signal crayfish *Pacifastacus leniusculus* on local fish populations. The bullhead population in particular is thought to be impacted by large numbers of non-native crayfish present in the system. Ref: (Guan, R and Wiles, P 1997).

3. Habitat Assessment.

The Black Bourn Valley site includes a length of semi-natural meandering channel (cover photo and photo 1), flowing down from the upstream boundary, followed by a section of heavily modified and straightened river channel. In addition, an old relict channel not currently connected to the main river but located in the flood plain on the eastern side of the valley, forms what is in effect a long linear pond.

A further section of channel (photo 2), which picks up a small amount of flow from connected ditch systems appears to have once been connected to the old

backwater channel described above and flows north before turning a dog-leg left and joining the main river near the northern (downstream) border of the site.



Photo 1. Upstream reach where the river has a healthy gradient and more varied topography enhanced by the low, scrubby marginal cover and occasional tree shading.



Photo 2. The downstream "dog-leg" channel which picks up flow from various ditch systems and is connected to the main river at its downstream end.

The top 200m of natural channel potentially provides the best opportunities for flow loving, gravel spawning fish species. Although not apparently rich in gravel, some small outcrops could be seen on the tail several pools. These areas will be critically important spawning sites and will be used in succession by a range of fish species, with potentially trout spawning in the November to January period, followed by dace in April and chub in May or June.

Gravel quality could be enhanced further by allowing, or even promoting woody material to fall into the channel to generate local bed scour and loosen, sort and clean coarse river bed sediments. There is a wealth of information about the benefits of woody material in river channels on the WTT web site www.wildtrout.org. The WTT regularly provides training and guidance on how to utilise local woody material to create improved spawning conditions and to provide enhanced cover for both fish fry and adult fish alike.

Habitat quality in the lower section of the main channel is generally considered to be poor. The channel has been straightened, dredged and widened. The whole reach is a sink for settling soft sediment and is dominated by emergent plants such as Norfolk reed *Phragmites australis*, sweet grass *Glyceria maxima*, reed canary grass *Phalaris arundinacea*, burr reed *Sparganium sp* and rush *Schoenoplectus lacustris*.

Many of the plants are growing vigorously in mid-channel locations, indicating an environment rich in fine sediment and one of comparatively low-flow. These conditions are indicative of a channel that is too wide for the average flow discharge. Some clumps of dense tree cover provide sufficient shading to restrict emergent plant growth and facilitate some open water habitats.

A variety of river side trees are present including willow *Salix sp*, alder *Alnus glutinosa* and hawthorn *Crataegus monogyna*. The low bushy species, such as goat willow and thorns, are particularly important in providing low, overhead cover for fish species in river margins.

A superb example of a root plate from a fallen tree was noted (photo 3). Trees that fall away from the river channel often create critically important nesting opportunities for kingfishers, as well as often providing an undercut refuge for fish species.

Unfortunately I do not have any photographs of the non-connected linear still-water channel. There was some discussion as to whether or not this channel should be reconnected to the main flowing channel. A cursory inspection of the channel revealed a rich and diverse macrophyte community and perhaps a habitat that also supports a very different invertebrate community to that found in the main river.

It is highly likely that this backwater does support a fish population, due to its proximity with the river. However, this should be confirmed via a survey to establish what species are present. Eels were not mentioned in the EA river survey results but flood plain still waters often provide important habitat for eels and the birds and animals that thrive on eating them.

Even if it were not possible for fish to be regularly flushed over the bank and into the backwater, it is likely that lacustrine fish species will be well established.



Photo 3. Root wad providing habitat both above and below the water line.

4. Conclusions

The combination of shallow natural channel, modified channel, connected backwater and non-connected backwater provides a wide range of differing habitats which will complement objectives for the site as a nature reserve.

The natural section of channel at the upstream end of the reserve provides spawning opportunities for a range of rheophilic species, including brown trout. Habitat on this upper section could be improved further by installing large woody material to help improve gravel quality and provide in-channel habitat for fish and invertebrate communities.

If the site is to be regularly grazed, then some protection from excessive bank poaching pressures may well be required. Fencing off 20 to 50-m sections to exclude cattle will help to provide more diversity and sections of intense cover and shade. These areas will also help to keep the channel cool during hot weather and following prolonged periods of low flow.

It is understood from the EA report that low flow is an issue for this particular stream, particularly in the upper reaches above Ixsworth. As a stream fed from chalk groundwater, the water quality should be good and the stream productive. Investigating whether or not there are any local abstraction pressures that might exacerbate low flow following drought conditions is strongly recommended.

Many chalkstream plants, invertebrates and fish are well adapted to the river shrinking following a drier than average winter and spring. If the channel does periodically dry up in places then a recovery in the local river ecology will be severely hampered by the presence of any weirs and structures, both downstream and upstream of the Black Bourn Valley site. It is recommended to engage in the WFD River Basin Planning Process to ensure that issues associated with longitudinal connectivity are flagged up and addressed wherever possible.

To ensure the site delivers for a wide range of plants, invertebrates and fish, it is recommended to divide the site into management zones.

The upper natural channel should be managed as a shallow flowing stream habitat where a variation in bed topography and a narrow channel is maintained. Priority species here should be mainly submerged macrophytes and marginal chalkstream herbs rather than emergent reeds, sedges, grasses and rushes. Maintaining areas of clean gravel over shallow glides will help to support spawning opportunities for a range of fish species.

The middle and lower sections of main channel should be managed to support plenty of shading to reduce emergent weed/reed growth and maintain some open water habitats. As much woody material as possible should be retained within the channel as habitat for invertebrates and cover for fish.

The top unconnected linear backwater should remain unconnected and managed with a regime of dappled light and shade. Provided the fish population is small, this habitat will be very important for certain species of invertebrate and perhaps amphibians, which often struggle in still waters where a high fish density persists.

The lower, silted up backwater near the northern end of the site could be very important as a refuge for fish in high flow conditions. This channel requires some heavy maintenance to remove settled sediment and win back water depth. Digging out the sediments with a tracked 360 excavator from the bottom end up will ensure that the channel remains in continuity with the flowing main river and will help to provide valuable alternative habitat. Research has shown that connected backwater channels, such as relict oxbows, provide critically important refuge during both summer and winter flood events.

5. Recommendations

- Ensure there are clear objectives for prioritising water level in the backwaters and water velocities in the flowing sections of river channel.
- Connected backwater habitat will require regular maintenance on a rolling programme to maintain the hydraulic connection.
- Commission a suite of invertebrate and fishery surveys to look at the lower river, upper river, connected backwater and un-connected backwater as four distinct habitat zones.

- Engage in the WFD planning process to highlight any offending river structures and weirs which might be responsible for restricting access to certain fish species such as trout and eels.
- Organise a training workshop for Black Bourn Valley Conservation Volunteers to ensure that critically important woody material is managed in a way that protects the river channel and maximises conservation objectives. The WTT can help with River Habitat Workshops.
- Consider the use of stock fencing to allow blocks of scrubby cover to develop. Aim for a regime of dappled light and shade to avoid rampant reed growth and maintain cool water conditions.
- Train some of the staff and/or volunteers to undertake regular invertebrate monitoring of key sites. If the river has a history of pollution events then this type of self-monitoring is critically important to give the EA any early warning of problems associated with poor water quality. More information is available at www.riverflies.org

6.0 Reference

Guan, Rui-zhang and Wiles, Peter Roy, 1997. Ecological Impact of Introduced Crayfish on Benthic Fishes in a British Lowland River. Conservation Biology Volume 11, 641 – 647.

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