A 'CINDERELLA CHALKSTREAM' HABITAT ADVISORY VISIT TO THE NINE MILE RIVER, WILTSHIRE

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1.0 Introduction

This report is the output of a site visit undertaken by Vaughan Lewis, Windrush AEC Ltd to the Nine Mile River on 21 July 2006. The visit was undertaken on behalf of the Wild Trout Trust.

Comments in the report are based on observations on the day of the site visit, and discussions with the owner Dr. Charles Goodson-Wickes. 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.

The Nine Mile River is a chalkstream tributary of the River Avon. The river's perennial head has generally been located at Sheep's Bridge, upstream of Bulford village. However, on the day of the site visit, the river was dry at this location, apparently the first time this had happened during the last 21 years. The former course of the river was marked by damp earth, suggesting that the groundwater level remained relatively close to the ground's surface. Some hand digging and excavation had taken place at the site. It was unclear what the purpose of this work was.

Approximately 1 km downstream, a water company pumping station was located near to Bulford. This is apparently one of three similar abstractions near to the Nine Mile River. Recent studies by the Environment Agency including the Catchment Management Abstraction strategy (CAMS), have attempted to evaluate the impact of these abstractions on the river. Any impacts of abstraction on the river's flow and its ecology, will have been exacerbated by the recent drought in the south of England. The river at this location did have water in it, but had no discernable flow, with a series of pools connected by stationary shallow water. Despite this, instream gravel quality was excellent, with numbers of brown trout *Salmo trutta* previously known to use the site for spawning. Small numbers of fish (probably sticklebacks) were seen in the channel. The lack of flow had almost certainly prevented survival of any brown trout parr in this reach, with any fish either having either migrated downstream or died. Bankside trees were present along the length of the channel, resulting in localised overshading.

River bed showing excellent spawning gravel and lack of any flow

At Bulford village bridge, there was a low flow of water in the river, with continuity of habitat maintained between pools and shallower areas. This section represented the effective head of the river on the day of the advisory visit. There were stands of starwort *Callitriche* Spp.and abundant sections of gravel riffle present.

River at Bulford village bridge. Note low but continuous water flow in the river

Within the grounds of Watergate House, there was a feed from the RB of the Nine Mile River into a small mill leat. The volume of water passing into the leat was controlled by a sluice in the main river. The gate of the sluice is maintained at a constant height. During the winter 2005/06, there was no flow into the leat. This was the first time in 21 years that this had happened.

The main channel of the river was some 1.5m in width, with a fine gravel substrate. Much of the channel was heavily shaded by riparian trees. Many of these were mature parkland trees, including some large beech *Fagus sylvatica*. As a consequence of the low flows and overshading of the channel, there was a large amount of sediment present on the bed of the river. What little gravel was visible was poorly sorted, resulting in sub-optimal conditions for spawning and juvenile trout.

Water depth was very shallow, generally no more than 10cm. In the open sections of the channel where shading was less, there were stands of starwort, hemlock water dropwort *Oenanthe* Spp. reed canary grass *Phalaris arundinacea*, yellow flag *Iris pseudacorus* and meadowsweet *Filipendula ulmaria* present. A small impoundment was present in the river. This had been constructed from logs in order to create a head of 40 cm to feed water into an ornamental pond in the gardens of the house.

Further downstream, a number of similar wooden impoundments had been installed. Each one retained a head of perhaps 20cm of water. Significant volumes of fine sediment had accumulated upstream, with associated growth of emergent vegetation occluding the channel. As a consequence, all potential habitat for spawning and juvenile trout had been lost in these sections.

Emergent growing behind wooden impoundments

In contrast, the un-impounded sections of the river retained open areas of clear gravel substrate and a marginal growth of water cress *Rorippa nasturtium-aquaticum.* As such, despite their narrow width, the free running sections of channel did provide an element of potential trout spawning habitat.

The Nine Mile River entered the main River Avon within the grounds of the house. The Avon was almost devoid of instream vegetation, with mute swans *Cygnus olor* having apparently grazed much of the water crowfoot *Ranunculus* spp during the earlier part of the season. As a consequence, water depth was very uniform across the channel, with a coating of fine filamentous algae and diatoms present. There was also an almost total lack of water cress in the channel, a species that generally grows quickly to compensate for the natural die back of water crowfoot in the latter part of the season.

A small spring fed carrier was present between the Nine Mile River and River Avon. This had apparently not dried up during the last 21 years and was indeed flowing relatively strongly on the day of the advisory visit.

Small spring fed channel lying between Nine Mile River and Avon

2.0 Fish stocks

Nine Mile River is a noted spawning stream for brown trout, with fish presumably entering from the River Avon during the autumn and winter period. However, no information was available regarding any quantified fishery surveys undertaken in the river.

3.0 Recommendations:

- Whilst it is outwith the remit of the Wild Trout Trust to investigate the impact of the nearby groundwater abstractions on the flow and ecology of the Nine Mile River, it is important that pressure is maintained on the Environment Agency to quantify this, and if appropriate, act to reduce the extent of any damaging abstractions. The regular asset management plan process offers an opportunity for the Agency to discuss making changes to damaging abstractions and discharges with Ofwat and the water companies. The next period for such changes runs until 2009 (so called PRO9).

- It would be of some interest to monitor flows in the Nine Mile River and adjacent spring fed watercourse during 2006. In the event of a differential drying out of the two channels, information should be sought from the Environment Agency regarding flows in the channels and abstraction from their groundwater catchments.

- Coppicing or pollarding of riparian trees in sections of heavily shaded channel can be of great benefit. Coppicing and pollarding of trees are traditional and potentially valuable methods of managing trees. Wildlife associated with coppiced trees depends on maintaining a diversity of light and shade, so blocks of trees should be cut in rotation. Fringing marginal vegetation resulting from coppicing is of great importance to the survival of juvenile salmonids. However, some caution should be exercised in the cutting of trees as too much light falling on the channel may encourage the development of excessive emergent vegetation, particularly where the gradient is shallow. Ideally, coppicing should be restricted to those sections of the river where water velocity exceeds $20 cmsec^{-1}$, effectively limiting the growth of emergent plants.

The length of the coppicing cycle can vary between six and fifteen years, with a short cycle preventing development of mature trees, encouraging vigorous root growth and the dappled shade required by some specialist flora and fauna. This regime may well be suited to reaches of river where fishing is practised, allowing maximum room for casting. Species that can be successfully coppiced include hazel *Corylus avellan),* alder *Alnus glutinosa* and ash *Fraxinus excelsior*

The presence of large, mature specimen trees means that some overshading of the channel is inevitable and will have to be accepted until their natural demise or unless they are felled for timber.

- The series of impoundments present within the stream have significantly reduced the available habitat for both spawning and juvenile salmonids. It is recommended that they should be removed as a matter of some urgency, ideally prior to the winter period. This will allow higher flows to remove some of the accumulated sediment. Due to the dense growth of emergent vegetation present, it may be necessary to dig it out or perhaps herbicide it in the central section of the river, thus creating a clear channel perhaps 0.5m-0.75m in width. Selective chemical control with the herbicide glyphosate when the plants are actively growing in early spring should be effective. Note that the use of glyphosate or any other herbicide on or near water requires the consent in writing of the Environment Agency.

- The addition of a simple control structure on the inflow to the pond would be of benefit. This could take the form of a movable elbow on a 100mm diameter plastic pipe. When elevated, the elbow would prevent flow entering the pond, whilst lowering the pipe would increase flow into the pond. A general rule of thumb is that water flow should be minimised into the pond, thereby minimising the input of fine sediment and nutrients. Note that up to 20 m^3/day of water can be abstracted without the need for an abstraction licence.

- The introduction of mixed 10-30mm diameter washed gravel into the channel would further enhance spawning habitat. Gravel should be spread so as to create shallow water areas, ideally 10m-15m in length. It is recommended that detailed professional advice should be obtained from the Environment Agency prior to undertaking any such works. Dr Allan Frake who is the fisheries technical specialist based at the Agency's Blandford office would be a good initial contact.

- It is recommended that Large Woody Debris (LWD) should be introduced and stabilised in the River Avon in order to promote controlled bed scouring. The benefits for retaining LWD are clearly laid out in the recent EA 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.

Practical management options to increase LWD include making use of fallen timber in order to create simple flow deflectors by wiring/staking these to the bank or by the construction of upstream facing 'v' groynes in the channel. These can be used to scour relatively homogeneous riffle areas in order to create deeper pools used by adult fish, and offer an effective and natural alternative to constructed gabion groynes. The resultant small pools can provide shelter areas adjacent to riffles during spawning periods, increasing the numbers of spawning fish.

Paired upstream facing groynes

It is important that the Environment Agency is made aware of any adopted policy to retain LWD in the channel, in order to prevent its removal during routine management operations undertaken by the Agency.

- Note that all works to bed or banks of the river or within 8m of its banks requires the written consent from the Environment Agency under the Land Drainage legislation. The introduction of any fish or eggs into any inland water requires the consent of the EA under the Salmon and Freshwater Fisheries Act, 1975. It is imperative that all relevant consents are obtained by the club.

- 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 Windrush AEC Ltd as a result of any person, company or other organisation acting, or refraining from acting, upon comments made in this report.