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ADVISORY VISIT TO THE TADNOLL BROOK, DORSET.
UNDERTAKEN BY VAUGHAN LEWIS, WINDRUSH AEC ON BEHALF OF WINDRUSH AEC LTD

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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 Tadnoll Brook, near Winfrith, Dorset on 10 February 2006. This visit was funded by English Nature as part of their commitment to the protection and enhancement of chalkstream fish populations and their habitat.

Comments in the report are based on observations on the day of the site visit, discussion with the conservation staff at the Dorset Wildlife Trust (DWT) and further information supplied by the Trust. 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.

2.0 Habitat Assessment

The Tadnoll Brook is a tributary of the River Frome. Rising near West Knighton, the brook runs in a roughly easterly direction before flowing into the River Frome upstream of East Burton, a total length of 7 km.[1]

The DWT's reach of the Tadnoll Brook flowed through the Winfrith Heath Site of Special Scientific Interest (SSSI), which is a component part of the larger Dorset heathlands. Despite running through the sand and clay dominated geology of the Bagshot Beds, the brook maintained the water quality and ecology of a typical small chalk stream.

The brook flowed into the upper end of the DWT reserve from an area of wet woodland. Within the reserve the banks of the brook, and land surrounding it were subject to light, controlled summer grazing pressure by agricultural stock and wild deer. The LB of the stream was unfenced. There were short sections of lightly stock poached banks. The remainder of the banks were generally well-vegetated with rush *Juncus* Spp. and sedge *Carex* spp. the predominant marginal vegetation.

Upper section of the Tadnoll brook. Note lightly grazed banks

However, despite being fenced, sections of the RB were locally overgrazed where the fencing was poor. There was a consequent loss of coarse, binding vegetation that had resulted in block failure of the bank and a large input of damaging fine sediment to the river.

Sections of clean, well sorted gravel and associated beds of water crowfoot *Ranunculus* spp were present where the river gradient was relatively steep and the channel width narrowed by the presence of beds of marginal emergent vegetation or Large Woody Debris (LWD). Despite the presence of short sections of riffle, this habitat type was generally under-represented, with an abundance of deep glide predominating.

Bed of water crowfoot in section of steeper gradient

In the slower sections, starwort *Callitriche* Spp. was the predominant submerged weed species.

The channel width varied between 4m and 6m. Where the gradient reduced and the bed width was at the upper end of this range, there was a significant coating of fine sediment over the bed, with thick layers of sand and silt dominant in some sections.

There was a general lack of riparian trees along both banks of the river, with an associated lack of LWD in the channel. Where LWD was present in the channel there was evidence of effective downstream scouring and sorting of the substrate.

LWD showing evidence of downstream scour - note the clean gravel riffle and associated water crowfoot.

Further downstream, the gradient of the river decreased. Habitat was uniformly deep glide, with the substrate dominated by fine sediment and sand. As a consequence, opportunities for spawning or juvenile salmonids were strictly limited. The poor quality of this central section of the Trust's reach of the brook may reflect not only a reduction in the gradient, but also perhaps a localised change in geology, damage resulting from past dredging activity.

The quality of the instream habitat improved towards the downstream limit of the fishery, with extensive banks of well-sorted flint gravel and stands of water crowfoot indicative of the increased gradient and water velocity. The water crowfoot had, in some locations, accumulated significant amounts of fine bed material, encouraging the formation of small, mid-channel islands. The channel had a strongly meandering planform throughout this lower reach.

3.0 Fish Stocks

Fish stocks in the Tadnoll Brook have been regularly surveyed by the EA and its predecessors. Sea trout *Salmo trutta*, brown trout *Salmo trutta* and Atlantic salmon *Salmo salar* are known to regularly spawn in the brook, with its importance as a nursery stream for salmonid species acknowledged in the EA's Salmon Action Plan (SAP)[1]. During the site visit, juvenile salmonids were spotted throughout the fishery. A number of freshly cut redds were also noted. Their size suggested that these were likely to have been cut by either salmon or large sea trout. The SAP notes that there is significant overlap in spawning habitat for these two species within the Frome catchment.

The SAP also notes that 31% of the brook's length provided good quality juvenile habitat, with a further 36% providing habitat of moderate quality.

Probable salmon/large sea trout redd

4.0 Recommendations

- Short sections of the banks (particularly the RB) of the brook were overgrazed, leading to some localised erosion and input of fine sediment. Increasing sediment loading has been identified by the EA as a likely reason for the declining importance of the Tadnoll Brook as a salmonid spawning and nursery stream It is recommended that where the Trust has control of the banks, they should move back the existing fence line. Ideally, this should create a wide (>20m) buffer strip that would be subject to only to occasional light grazing or cutting compatible with management of the terrestrial habitat. If this option were pursued, it would be necessary either to provide properly fenced drinking areas for the cattle, or to install Pasture pumps for stock watering. If alterations to the present fencing are not acceptable, an alternative strategy would be to reduce the grazing pressure along the whole of the affected section in order to allow sustainable regeneration of the riparian plants.

Pasture pump

Notwithstanding these recommendations, a study by Exeter University on the nearby River Piddle noted that fine sediment mantling the river bed was largely derived from sources outwith the channel. There is thus a need for the Trust to consider land management of the whole of the reserve in order to minimise possible sources for excessive run-off of sediment.

- In order to encourage sorting of the substrate and heterogeneity of the bed profile in this section of the channel, a number of measures are recommended. A series of small, upstream facing 'v' groynes could be installed, in order to help scour and sort the substrate, improving the quality and availability of habitat for spawning and juvenile salmonids. These are simple to construct from timber derived from coppicing of local trees.

Wooden ‘v’ groyne. Note deeper hole scoured downstream of the structure

- In addition, use could be made of small faggot islands with overall dimensions approximately 2m (w) by 4m (long) in order to ‘braid’ the existing single channel into a series of smaller channels. These could be installed in the wider, more uniform central section of the fishery. They would increase the abundance of habitat for juvenile brown trout (by increasing visual isolation), increase water velocity locally, encouraging the growth and development of water crowfoot, and would provide an extensive areas of marginal vegetation suitable for juvenile trout.

The islands should be arranged in a staggered line down the channel, in order to create a mosaic of channels with increased velocity, and optimising conditions for the growth of water crowfoot. The islands should be constructed from deadwood faggot bundles, secured to cleft chestnut stakes, driven at 0.6m centres. The central core of the islands should be infilled with woody brashings, tied down in order to prevent washout by high discharge events. The upstream ‘toe’ of the islands should be protected by stone rip-rap to reduce the risk of erosion. Locally derived emergent vegetation should be planted into the brashings in order to rapidly enhance the structural integrity of the islands. The top level of all islands should be set approximately 100mm-150mm above mean summer water level as defined on site. During high flow periods, the islands would become submerged, reducing the risk of accumulation of debris and minimising their impact on flow conveyance. Several examples of small, mid-stream islands were already present in the channel.

Existing mid-channel island. Note increased velocity has encouraged water crowfoot growth on the outside of the bend.

- The energy of chalkstreams is not generally sufficient to create scour and sorting of the substrate. In natural river systems, fallen trees and branches create increased localised velocity and hence scour. The more managed river systems common to lowland rivers in the UK often lack this LWD element. The Tadnoll Brook is no exception. In many reaches of the brook, this lack of sorting has lead to uniform substrate, with significantly reduced habitat quality and availability for all lifestages of a range of fish species.

The introduction of LWD would be of great benefit to the river. 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. Stable LWD of this sort 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 EA's Development Control and Flood Risk Management departments.

- The paucity of LWD could also be addressed longer term by the planting of trees along both banks. Suitable species include goat willow *Salix caprea*, alder *Alnus glutinosa*, and ash *Fraxinus excelsior*. Mixed stands of these species should be planted in small groups, securely fenced against grazing stock. It would be prudent to

plant the trees at least 5m from the existing bankline in order to allow for erosion prior to their establishment.

- Both water vole *Arvicola terrestris* and white-clawed crayfish *Austropotomobius pallipes* were present in the Tadnoll Brook. The management prescriptions recommended in this report, particularly the use of LWD and faggot bundles, will help to enhance the availability and quality of habitat for these two increasingly rare and iconic species.

- Note that all works to bed or banks of the river or within 8m of its banks require the written consent from the Environment Agency under the Land Drainage legislation.

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5.0 References

1. River Frome Salmon Action Plan Environment Agency, South-west region