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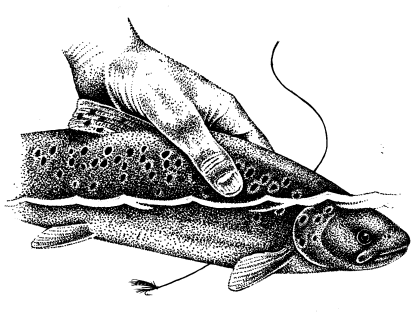

Consultants : Freshwater Fisheries, Conservation & Wetland Ecology

April 11th, 2003

Whatley Brook

The Chantry

Recommendations for habitat improvement

Introduction

On April 2nd 2003 Nick Giles carried out an advisory visit to the Whatley Brook, Somerset in order to provide outline habitat improvement advice. The stretch of stream is 3-4 miles long, close to Chantry, west of Frome. John Bennett and Fred Scourse (Director, Wild Trout Trust) kindly came along during the river walk, adding greatly to the enjoyment and usefulness of the visit. A report was produced outlining the potential for a habitat improvement scheme along the Whatley Wood section downstream of the Chantry. This additional short report has been produced for the owners of the private Chantry section of the stream.

The Whatley Brook

This stream is a typical clay-banked, limestone-fed water, draining an area of extensive limestone quarry - Asham Quarry (upstream) is disused but Whatley Quarry (downstream) is still active. Debris from the industrial past (old tyres, etc) litters areas of the stream bed and silt arising from quarry surfaces and other land run-off has seriously blanketed much of the stream bed. Clay and silt eroded from the stream banks has added to excessive sedimentation of the system. This sediment probably kills most brown trout eggs each winter as it clogs the gravels where the eggs are deposited in the late autumn.

Despite these problems of an upstream industrial site, invertebrate surveys indicate good water quality. Taxa noted included diverse mayfly, caddis fly and stone flies, abundant shrimps and signal crayfish (established in Chantry Lake). Where the steam is sky-lit, algae and mosses grow well. There is extensive physical cover for fish in the form of bank undercuts, tree roots and dead wood. Physical habitat quality, excepting the gravel bed, is, therefore, generally in good condition although there is great scope to create more pools to hold adult fish.

The banks are in good condition with very little livestock trampling but over-shading has led to many areas of excessive erosion. Mature trees line most of the fishery and these tunnel much of the water, leading to lower productivity of aquatic plants, invertebrates and wild trout than would be the case if some key trees were pruned.
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Key problems affecting the Chantry stretch of the brook are:

- Industrial litter and thick silt on the stream bed,
- Over-shading of the stream by trees,
- Bank erosion due to the shading-out of bank side grasses which would otherwise hold the banks together with their roots,
- Possible summer low-flow problems in the brook,
- Reduced access to and reduced quality of trout breeding and nursery habitats.

Along the Chantry stretch of the stream many of the above problems could be addressed with a habitat improvement project. This could be small-scale with manual work or, if access is feasible, on a larger-scale using a small hydraulic digger. The lake could be de-silted with appropriate equipment.

There is additional scope to improve the access to the Chantry Lake for trout from the stream and to remove sediment deposits, improving the lake habitat for wild brown trout.

Whether de-silting is a viable proposition and just how it could be done would require a full costed survey with accompanying assessment of any environmental impacts. Also, it is critical to ensure that stream flows are adequate, through the year, to support the stream-based juvenile wild brown trout stock upstream of the lake. This could be assessed via access to Environment Agency information.

If de-silting of the lake is possible and flows and habitat quality of the stream cab be assured, then there is the distinct possibility of developing a fine still water wild brown trout fishery on Chantry Lake.

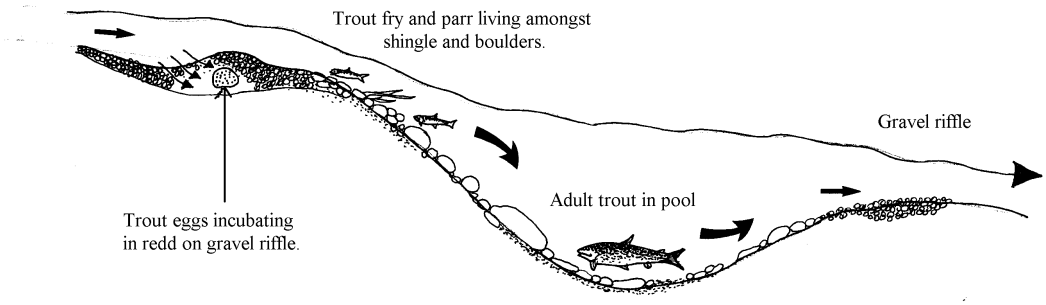
It is worth noting that the coarse fish population in the lake may not mix well with wild trout. Carp, in particular, are likely to stir up the bed, making the water cloudy and turbid. It may be best to net out the carp so as to promote the best possible conditions for the wild trout.

Nick Giles Associates would be pleased to help with any aspects of the above work.

The section below provides some notes on wild trout habitat management.

Wild trout habitat

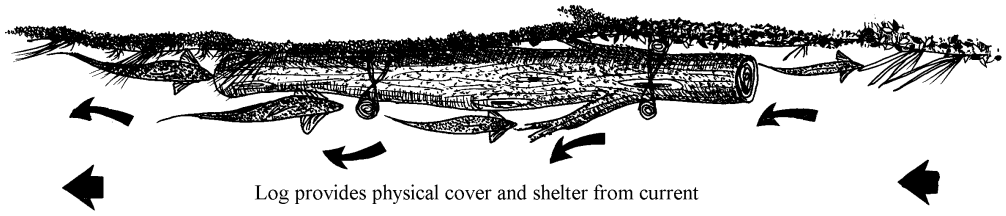
Wild trout need good, clean flows, relatively silt-free gravel for spawning, abundant cover from predators and a nice varied sequence of shallow riffles, glides and deeper pools. The diagram below shows how a short section of good habitat can provide everything a wild trout needs throughout its life cycle:



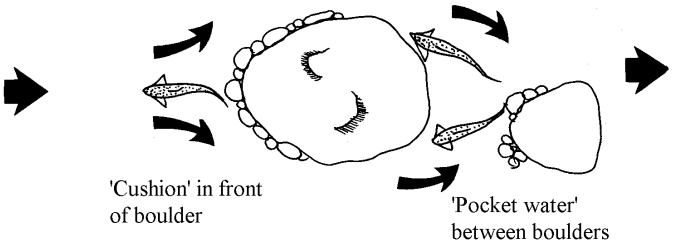
The gradient of the river bed in the above diagram is greatly exaggerated - riffles and pools tend to be spaced fairly regularly down a fishery and there may be a pool every 6-10 stream widths on streams with fairly easily-eroded banks. Trout use all available cover to reduce energy expenditure fighting the force of the current and to avoid predators.

Cover can be provided by boulders, by deadwood in the margins or by undercut banks bound by tree roots (especially alder and willow).

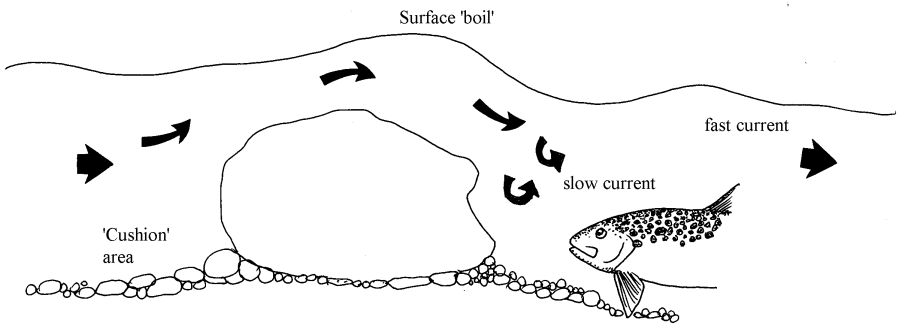
Trout using dead wood cover feature - staked close to well vegetated bank.



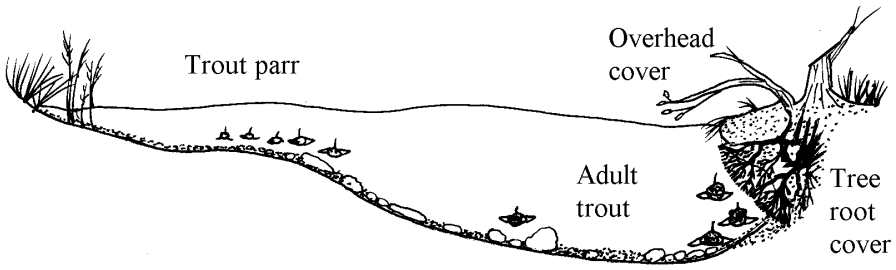
Use of rocky cover by trout



'Trout use of 'dead spot' behind boulder



Trout use of a well covered pool



A good pool for trout provides adequate depth, cover, current speeds and food supply (insects from upstream riffles, bank side vegetation, etc).

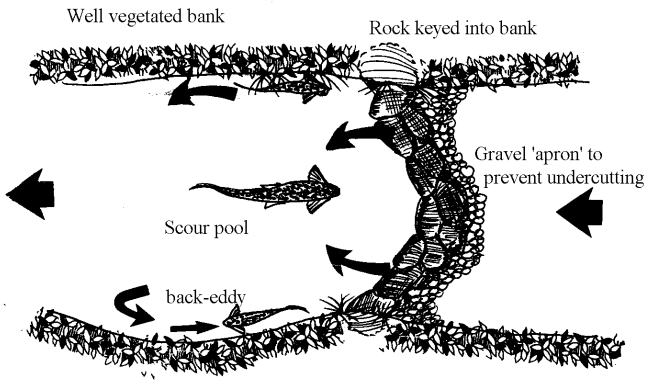
The Whatley Brook has many of the above key components of good wild trout habitat but there are some areas where further management could greatly improve the fishery. These are discussed briefly below:

Key findings from river walk

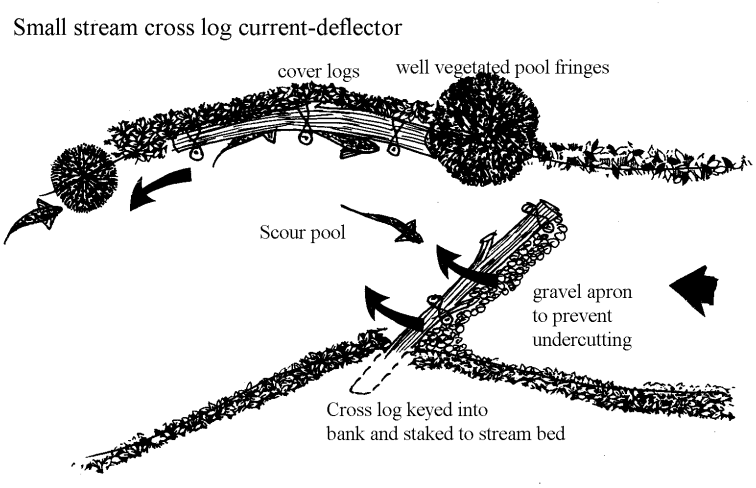
1/. Physical structure

Along many stretches the Brook lacks pools. This could readily be remedied via the construction of suitably designed current deflectors such as those sketched out below:

Small stream boulder weir



In small streams deep water adult trout habitat can readily be created by building upstream - curved weirs which concentrate flows in the centre of the channel. Cover logs along edges improve holding capacity.



Nick Giles Associates are able to provide a design and build service for this work.

Notes: Building in-stream structures

1. Environment Agency permission is required for in-stream works prior to construction.
2. After consent is gained you should follow the 'Dial before you dig' principle, ie. Obtain from the Environment Agency the numbers of all utilities companies (water, gas, electricity, sewerage, telecommunications, etc) which may have cables, pipes, mains or any other infrastructure which could be damaged by excavation of the river bed or driving stakes into the bed.
3. The Whatley brook is a high-energy system whilst in spate. This means that everything built in-stream must be staked down very securely and re-visited annually to check its security.

2/. Siltation of spawning habitat

The bed of the Whatley Brook is very silty and gravel riffles are bunged-up with silt. Much of this silt has probably arisen from the old Quarry site at Asham. Clay from the stream banks will also have contributed to the problem, especially where over shading has removed the protective roots of bank side grasses and herbs.

De-silting

If access is feasible, extensive stretches of the Whatley Brook need de-silting with a small hydraulic machine, carefully supervised so that maximum environmental benefits are achieved.

Gravel-jetting.

Wild trout must have relatively clean gravels to spawn in - their eggs need a clean water supply whilst buried deep in the gravel over-winter. Ideally, excess sediments should be kept out of streams but, in the real world, this seldom happens. Spawning gravels (usually found in a bar diagonally across the stream at the tails of pools - a 'riffle') can be de-silted by high-pressure water-jetting. A small, portable petrol-driven water pump can readily be rigged up with a hose ending in a tubular metal probe which has been hammered flat to produce a high pressure jet. This probe should be inserted in the gravel at the head of the riffle and worked thoroughly through the gravel working across and downstream to create a de-silted area. Stop before you reach the crest of the riffle. This should be done in early October before trout look for spawning habitats.

Nick Giles Associates are able to do this work, if required.

It is important to do such work in areas where trout naturally spawn. This may be well-upstream on the Whatley brook system so the following recommendations are important:

- Look for trout redds in winter to target where future work should be done,
- Carry out an electric fishing survey to establish where small trout are living,
- A two-man team on a stream the size of the Whatley Brook should be able to clean four riffles in a full day's work.

Current deflectors could be constructed to uncover and de-silt existing gravels. This could be achieved by using simple removable deflectors left in for just one spate. These could be made from cheap, short fence panels, securely staked to the bed. There is also scope for adding gravel to existing natural riffles, using the existing bed to hold the gravel in place.

Nick Giles Associates are able to design and install new spawning riffles.

3/. Shading

Whilst this stretch of the Whatley Brook needs adequate shading of the pools, extensive and carefully-targeted trimming back of tree boughs and trunks is recommended to produce a varied mosaic of light and shade along the fishery. This is good for fish, wildlife and for fishing. Concentrating on the south bank, trees which currently shade-out riffles and glides should be pruned / coppiced in winter over the next few years.

Notes: Shading & tree cover

Over-shading of a river has the following adverse effects :

- Killing of bank side grasses, sedges, rushes and reeds which bind the banks with their roots. This can lead to bank erosion under the trees and to an over-wide, shallow, silty river channel.
- Reduced in-stream aquatic plant growth, providing poor summer cover for fish.

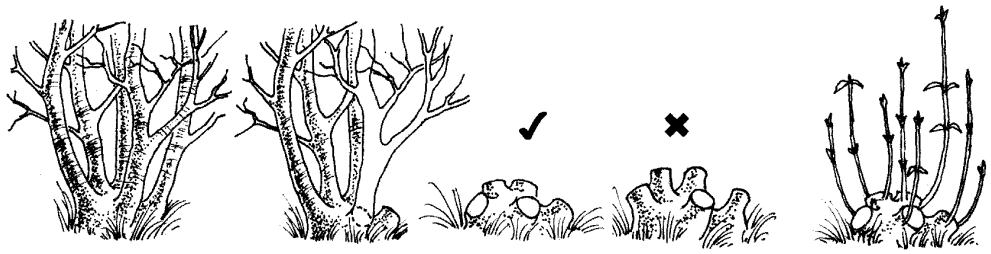
- Reduced production of aquatic invertebrates including insects essential for feeding wild trout, bullheads, stone loach, other fish and birds.

Cutting back carefully-selected trees in winter (removing some and thinning others) stimulates plant growth both on the banks and in-stream. This will have the following benefits :

- Better resistance to bank erosion and better bank side habitats for mammals, birds, insects and marginal cover for fish.
- Better marginal grass and rush growth and better moss and algal growth.
- More aquatic invertebrates including better fly hatches.
- A natural re-narrowing of the channel as marginal vegetation grows back along the edges of the channel. This optimises the use of available flows.

Some of the timber produced during the tree management work could be used to improve marginal cover for trout and for bank protection.

Good coppicing practice:



Old growth **Correct coppice** **Spurs too long** **Useful re-growth**

In winter, when the sap has dropped and trees have stored most of the mobile energy reserves in the lower trunk and root systems, the following species should tolerate coppicing: Ash, Hazel, Alder, Goat willows (Sallows). Coppicing lets light into the stream, prolongs the life of the tree, maintains bank protection through strong root growth and provides raw timber materials for habitat improvement projects.

Willow bank revetment

At a few locations, especially on the outside of bends, rapid river bank erosion has developed. It is recommended that this erosion is slowed down or stopped by 'spiling' the banks with live willow. This involves staking the bank and weaving live withies between the stakes against the soil, so as to promote rapid root growth. The roots stabilise the bank and the living willow armours the bank from direct erosion by the current. Sometimes a backing of hessian or coir membrane is needed to produce extra protection until the willow becomes established. A simpler approach, which may be adequate, is simply to stake the bank with goat willow (sallow) stakes, allowing new bushes to grow.

Notes on bank erosion

1/. Bank erosion is a natural process important for the dynamics of rivers.
2/. Unless carefully thought out, erosion control can be expensive, ineffective, reduce fishery and conservation values, create problems downstream and be an eyesore.
3/. 'Green' approaches, using natural materials are always preferable, as long as they will be effective in a given situation.
4/. Take advice before 'going it alone'.

(NG 11.04.03).