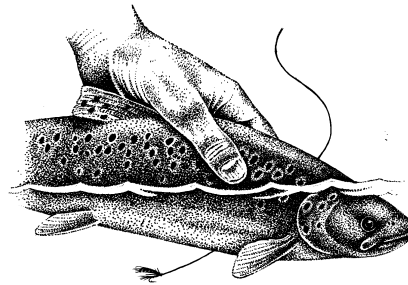


Dr Nick Giles & Associates,  
50 Lake Road,  
Verwood,  
Dorset,  
BH31 6BX.  
Telephone 01202 824245  
Fax 01202 828056  
email nickgiles@cix.co.UK



Consultants : Freshwater Fisheries, Conservation & Wetland Ecology

May 13, 2003

## River Bourne

### Winterbourne Gunner

### Recommendations for habitat improvement



© Copyright of text and diagrams Nick Giles.

## Introduction

On May 7<sup>th</sup> 2003 Nick Giles carried out an advisory visit to the River Bourne at Winterbourne Gunner, Wilts to provide outline habitat improvement advice. The stretch of stream is around 400 metres long, out-with the SSSI and is owned (left hand bank) by Mr P. Prater and (right hand bank) by Mr R. Bruce-White. The adjacent wet meadow, like the river, has considerable conservation interest and both could be enhanced with carefully designed habitat improvement work.

The Bourne along the stretch under consideration is a typical chalk stream; influenced by hatches and sluices, periodic low summer flows, a lack of in-stream habitat diversity and substantial sediment input which has led to a generally silty bed with a clean-looking gravel surface. There are resident populations of wild brown trout, grayling, stone loach, bullhead, eels and brook/river lampreys. *Ranunculus* (water crowfoot) growth varies in extent between years, probably largely in response to variable flows and attendant ripping out in spates and/or blanketing with algae during warm sunny springs. Crowfoot grows best from a strong root stock in early springs with good flows, good water quality and moderate sunlight levels.

The right hand bank along the lower section has nice mature willow carr habitat providing nesting habitat for songbirds and excellent potential cover for otters. Both water voles and otters may be present along this stretch.

*Before any further habitat work is undertaken, it is recommended that the stretch is surveyed professionally for water voles as it is illegal to disturb their burrow systems without specific consent from English Nature. JW can provide details of aquatic mammal surveyors.*

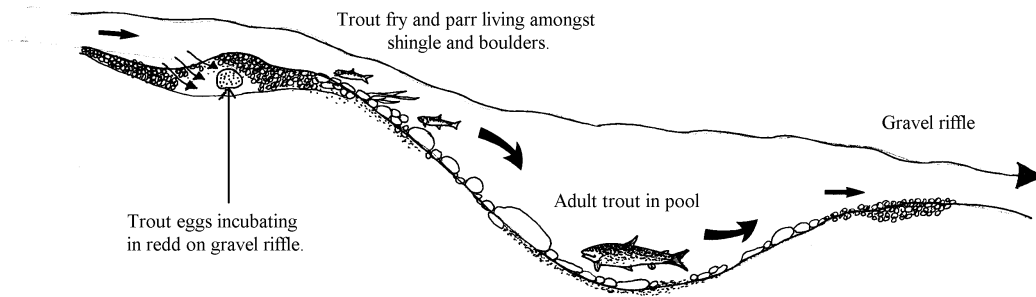
There is excellent scope for a habitat improvement project, which would greatly improve the quality of the environment for aquatic and river bank mammals, birds, fish, invertebrates and plants. Key objectives would be:

- Produce a detailed plan with time scales, accurate costings and *modus operandi*; obtain necessary consents from the Environment Agency,
- Secure the services of an experienced 360 degree digger driver and machine,
- Remove existing excavated pools by replacing gravel with a suitable wide-tracked hydraulic machine,
- De-silt stretches of stream bed with high-pressure water jets to improve habitat quality for trout, grayling, bullheads, lampreys, *Ranunculus* and varied benthic macroinvertebrates.
- Introduce clean gravel to the stream bed to create new riffle areas,
- Build low-profile current deflectors to scour new small pools in stream bed,
- Improve physical (dead wood) in-stream cover for fish,
- Move the fence line back to increase the width of the un-grazed river bank,
- Carefully consider, in consultation with all interested parties (including neighbouring farmers), the pros and cons of reinstating some of the channels in the wet meadow so as to increase the extent and quality of the wetland habitats along the left hand river bank.

A key driver for this potential project is the angling interest for brown trout and grayling. The following section briefly describes some key habitat requirements of wild brown trout.

### Wild trout habitat

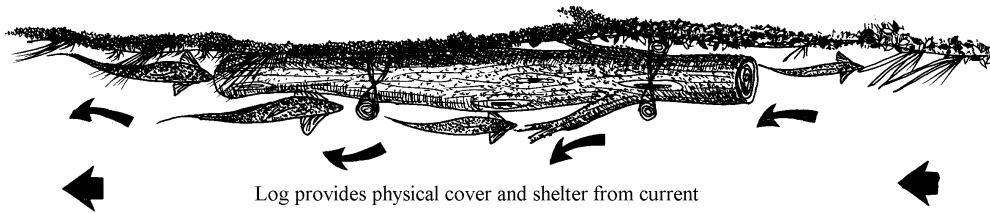
Wild trout need good, clean flows, relatively silt-free gravel for spawning, abundant cover from predators and a nice varied sequence of shallow riffles, glides and deeper pools. The diagram below shows how a short section of good habitat can provide everything a wild trout needs throughout its life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



© Nick Giles

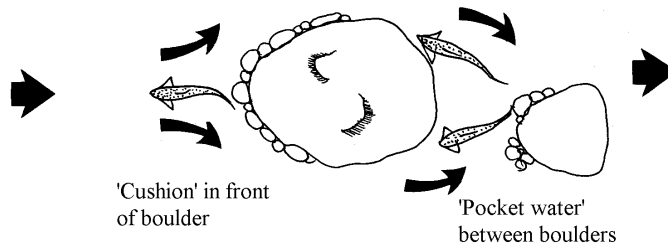
The gradient of the river bed in the above diagram is greatly exaggerated - riffles and pools tend to be spaced fairly regularly down a natural fishery and there may be a pool every 6-10 stream widths on streams with fairly easily-eroded banks. Trout use all available cover to reduce energy expenditure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



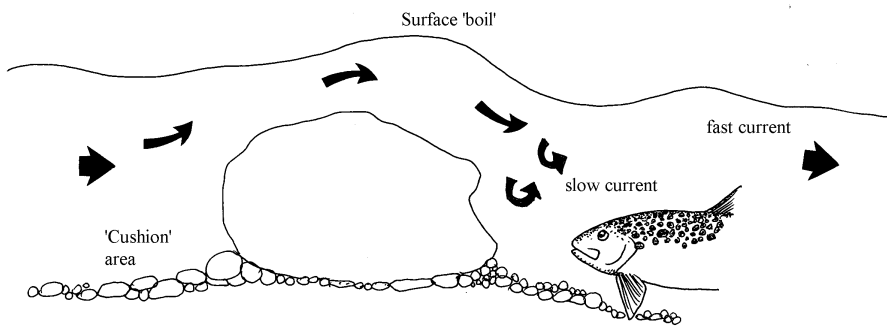
© Nick Giles

Use of rocky cover by trout



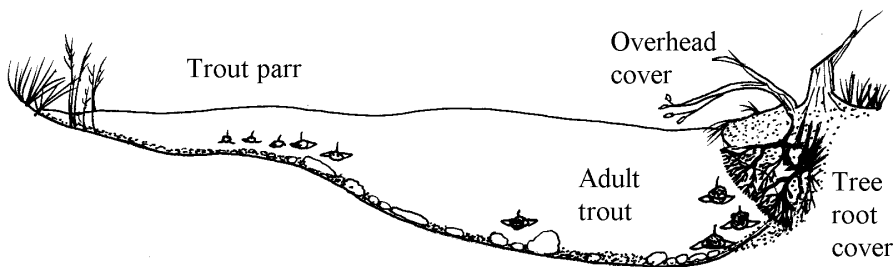
© Nick Giles

Trout use of 'dead spot' behind boulder



© Nick Giles

Trout use of a well covered pool



© Nick Giles

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

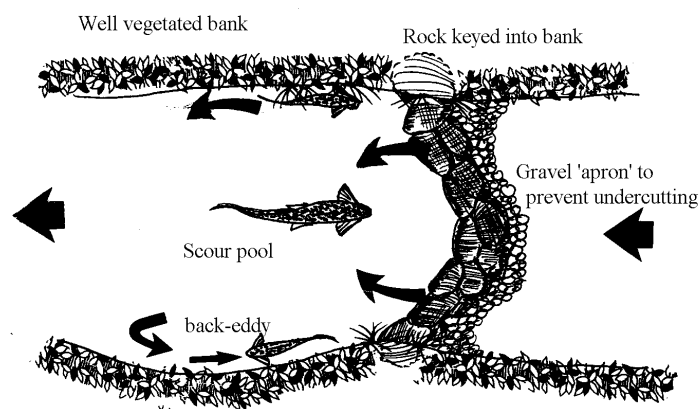
The River Bourne has many of the above key components of good wild trout habitat but there are some areas where further management could greatly improve both the stream ecology and the fishery. These are discussed briefly below:

## Key findings from river walk

### 1/. Physical structure

Along much of the upper stretch the Bourne lacks pools deep enough to provide adequate habitat for adult trout and grayling under late summer low-flow conditions. This could readily be remedied via the construction of a small number of suitably designed, low-profile, timber or rock, upstream 'V' weirs such as that sketched below:

Small stream boulder weir



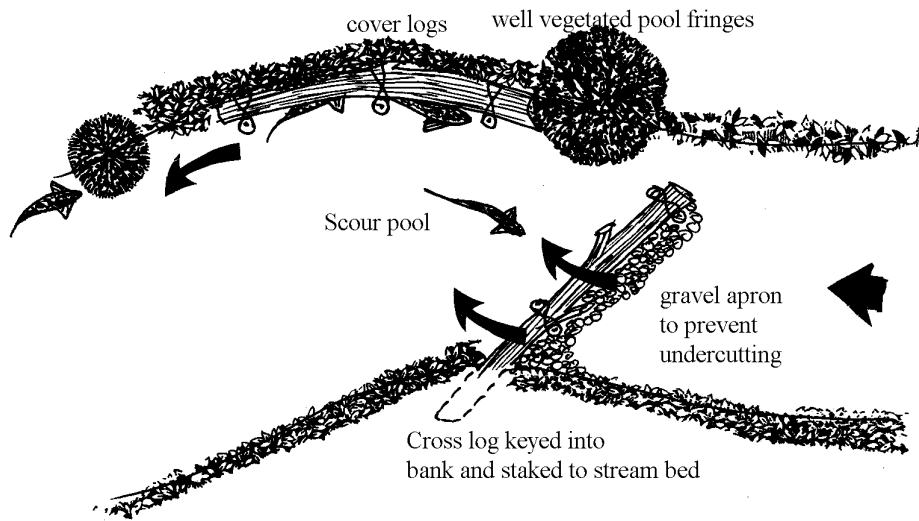
In small streams deep water adult trout habitat can readily be created by building upstream - curved weirs which concentrate flows in the centre of the channel. Cover logs along edges improve holding capacity.

© Nick Giles

On the Bourne it is suggested that the most appropriate material for building current-deflectors is ash cut from nearby trees owned by Mr Prater. Timber dead wood cover would also be appropriate as would cobbles for smaller fish (trout, bullheads).

Where smaller pools and undercuts need to be developed timber current-deflectors similar to the sketch on the next page can be employed. These are especially useful close to natural bends and meanders:

### Small stream cross log current-deflector



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. Your local contact is Mike Holm at Blandford (tel. 01258 456080)
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 the driving of stakes into the bed. Contact all relevant Companies and ensure that the proposed works do not threaten any of their structures.
3. All in-stream work should use suitable materials, be designed so as to provide better habitat for the maximum number of target species (maximise biodiversity) and be sustainable and cost-effective. JW can give guidance on preferred options.
4. Everything built in-stream must be 'staked down' very securely and re-visited annually to check its security. It is the responsibility of the riparian owner to maintain in-river structures in future years.

### 2/. Siltation of spawning habitat

The bed of the River Bourne is very silty and gravel riffles are bunged-up with fine sediment. Much of this silt has probably arisen from the upstream agricultural land. Soil from eroded stream banks will also have contributed to the problem, especially where

over-shading has removed the protective roots of bank side grasses and herbs or where cattle have had unrestricted access to soft-banked drinking areas.

### **De-silting - 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 September or early October before trout look for spawning habitats and after other species have hatched out and left the area. EA consent should be obtained prior to gravel-jetting and downstream 'neighbours' should be informed. Jetting should be confined to upstream riffle heads. Disturbed silt will settle downstream in slack water areas where it provides habitat for burrowing species (eg lamprey larvae and many invertebrates).

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

It is important to do such work in areas where trout naturally spawn:

- 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 River Bourne should be able to clean four riffles in a full day's work.

### **New riffles**

It is recommended that clean, 20-30mm, rounded gravel is imported on to site and used to construct two new low-profile spawning riffles. There is also scope for adding gravel to existing natural riffles, using the existing bed to hold the gravel in place. Note: farmer on right hand bank will need to be happy with increased flood risk to riparian meadow land.

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

### **3/. Shading**

Much of this section of the Bourne is open and really requires extra shade and cover. The stretch immediately upstream and the lower right hand bank of this section would, however, benefit from some small-scale tree pruning. A varied mosaic of light and shade along a fishery increases its aesthetic appeal and diversifies in-stream and river bank habitats. This is good for fish, wild flowers, other wildlife and for fishing.

Nick Giles Associates are able to design a coppicing plan and carry it out along stream banks, using timber liberated for in-stream construction work (physical cover, current deflectors, bank protection).

## Notes: Shading & tree cover

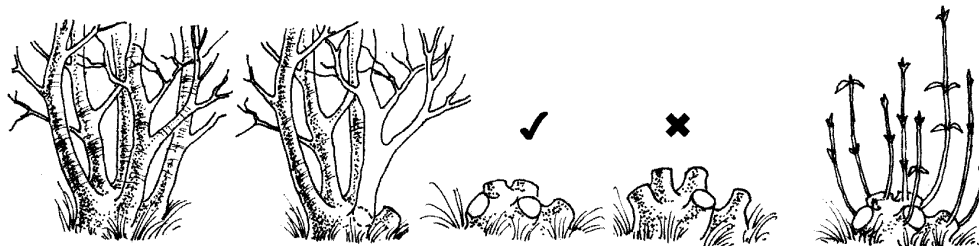
Over-shading of a river has the following adverse effects :

- Inhibiting growth or 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 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 submerged macrophyte, 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.

### Good coppicing practice:



**Old growth**

**Correct coppice**

**Spurs too long**

**Useful re-growth**

© The Wildlife Trusts

It is worth remembering that the best managed streams have a varied mosaic of well-lit, partially shaded and densely shaded sections.

### 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



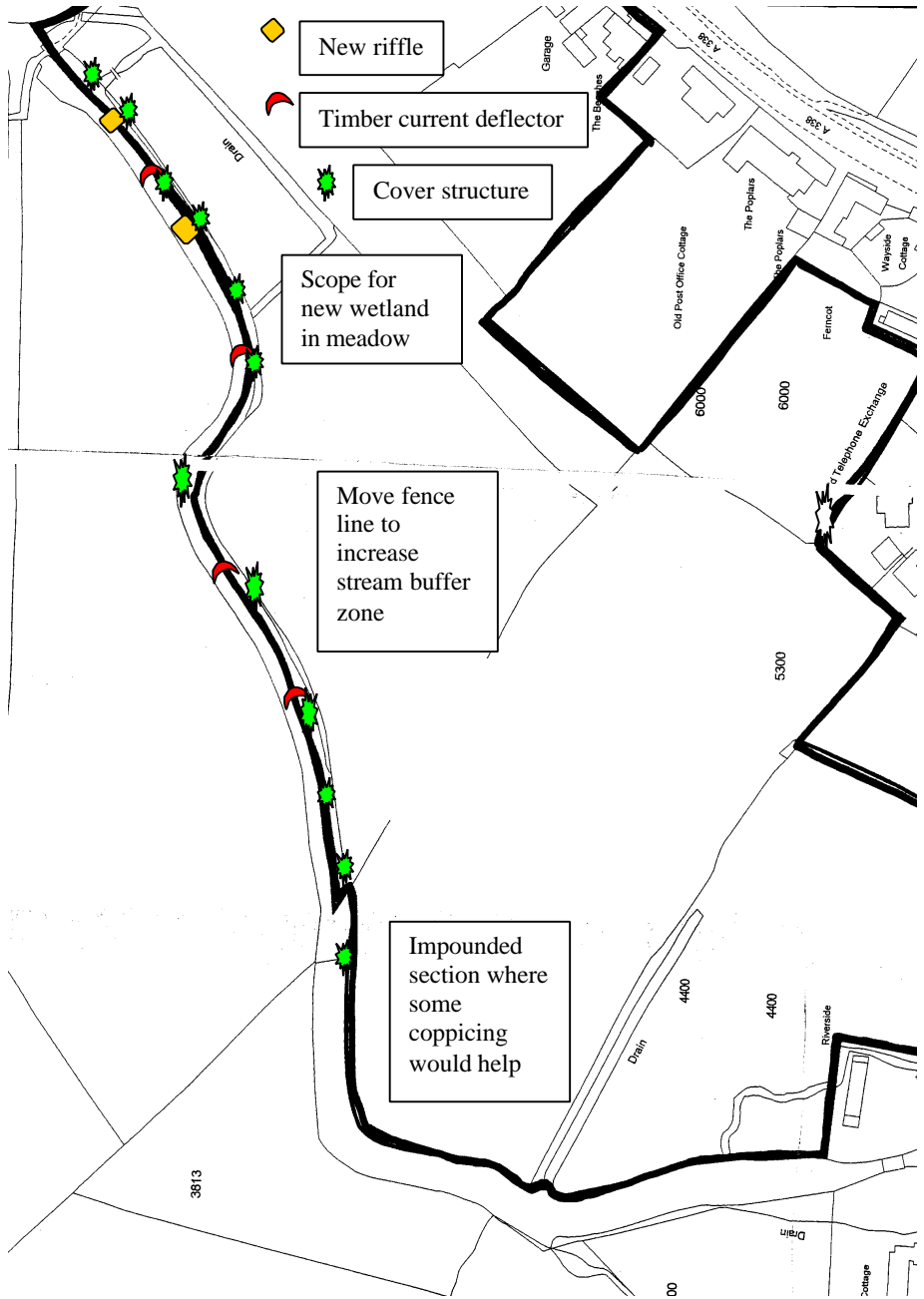
backing of hessian or coir membrane is needed to produce extra protection until the willow becomes established. A simpler approach, which may be adequate, is simply to stake the bank with goat willow (sallow) stakes, allowing new bushes to grow. Other species can be used, too. Shrub growth will require future management.

Nick Giles Associates will be pleased to quote for this work.

### 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'.

### River Bourne habitat improvement plan - sketch plan



Estimated costs - (based on NG Associates rates)

The following costs are broad estimates for project feasibility purposes:

1. Detailed planning, obtaining EA consent - **£450 + VAT**
2. Gravel jetting - 1 day, two man team - **£450 + VAT**
3. Replace excavated gravel - Digger + driver 1/2 day - **£150 + VAT**
4. Supply and place two new gravel riffles - gravel (£300) + Digger (£250 + VAT) + overseeing ( £300 + VAT) = **£850 + VAT**
5. Construct 4 timber current deflectors using ash supplied on site - **£900 + VAT**
6. Construct 12 dead wood cover structures using ash supplied on site - **£1300 + VAT**
7. Move fence line to agreed location Digger + driver, 2 days - **£ 500 + VAT & materials (new posts / wire)**
8. Clear out ditches, create scrapes to enhance wetland habitats Digger + driver (£250 + VAT) + overseeing (£300 + VAT) - **£550 + VAT**
9. Selective revetment with willow / alder and coppicing - **£800 + VAT**

Total 'ball park' estimate of costs: **£ 5950 + VAT**

Nick Giles Associates will be pleased to help with any of the above actions.

(NG May 13, 2003).