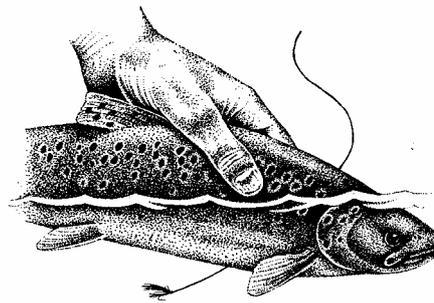


Dr Nick Giles & Associates,
50 Lake Road,
Verwood,
Dorset,
BH31 6BX.
Telephone 01202 824245
Fax 01202 828056
email nickgiles@cix.co.UK



Consultants : Freshwater Fisheries, Conservation & Wetland Ecology

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River Bourne

Hurdcott

Recommendations for habitat improvement



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Introduction

On June 4th 2003 Nick Giles carried out an advisory visit to the River Bourne at Hurdcott, Wilts to provide outline habitat improvement advice. The stretch of stream could (with side streams & ditches) amount to around 500 metres long, out-with the Avon & tributaries SSSI and is owned largely by Mr Benson (both banks) and by Mr Lovering (Left hand bank of side stream. Aspects of the adjacent meadows and ditches, like the river, have considerable conservation interest (eg water voles) 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 is an STW outflow towards the top of the stretch. The stretch has been dredged in several places. A large scientific investigation into the impact of abstractions in the Bourne catchment is underway. Care must be taken to ensure that associated monitoring is not jeopardised by any habitat improvement works.

Resident populations of wild brown trout, grayling, stone loach, bullhead, eels and brook/river lampreys are present. Grayling appear to be quite abundant whilst wild brown trout are scarce. *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.

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 is organising appropriate surveys. If water voles are present, the design of the project can readily be modified so as not to impact upon them.

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

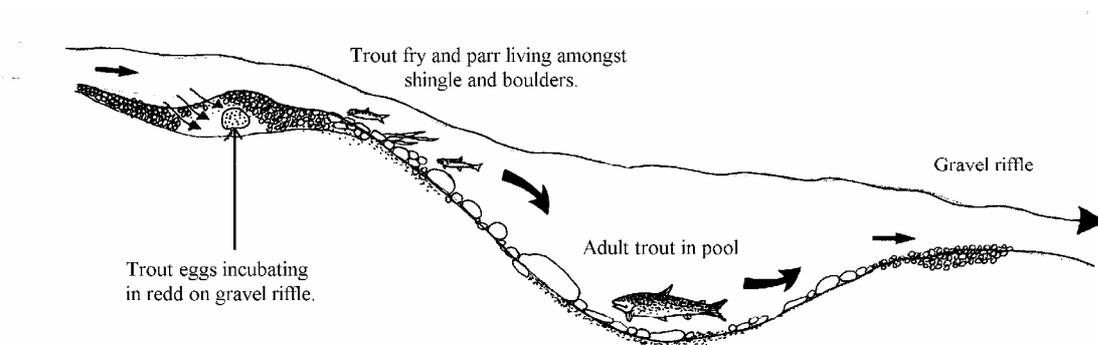
- Produce a detailed plan with time scales, accurate costings and *modus operandi*; obtain necessary consents from the Environment Agency & English Nature (voles),
- Secure the services of an experienced 360 degree digger driver and machine,
- Section 1: Modify existing excavated pools and rock groynes by re-placing gravel and rocks with a suitable wide-tracked hydraulic machine,
- Section 1: 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.
- Sections 1,2,3: Introduce clean gravel to the stream bed to create new riffle areas,
- Sections 2,3: Narrow the stream summer channel with a low-profile two-stage design, using existing bank materials and fringing vegetation. Protect toe of new bank with hazel faggotting ensuring adequate layer of top-soil for water vole burrowing.
- Sections 1,2,3: Build a mix of low-profile current deflectors to scour new small pools in stream bed,

- Section 1,2,3: Improve physical (dead wood) in-stream cover for fish,
- Whole fishery, probably in phases: Move the fence line back to increase the width of the un-grazed river bank (buffer zone).

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

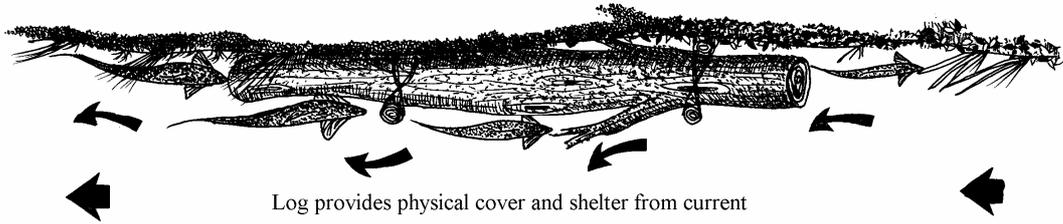
Wild trout need good, clean flows, relatively silt-free gravel for spawning, abundant cover from predators and a nice varied sequence of shallow riffles, glides and deeper pools. The diagram below shows how a short section of good habitat can provide everything a wild trout needs throughout its life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

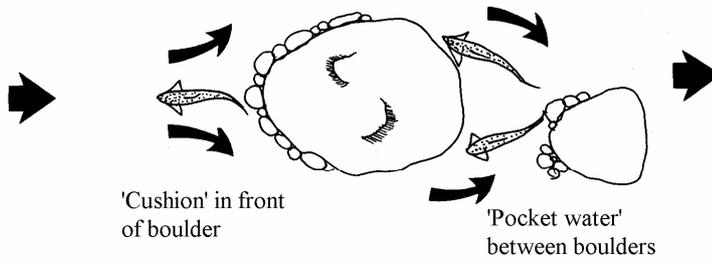
Trout using dead wood cover feature - staked close to well vegetated bank.



Log provides physical cover and shelter from current

© Nick Giles

Use of rocky cover by trout

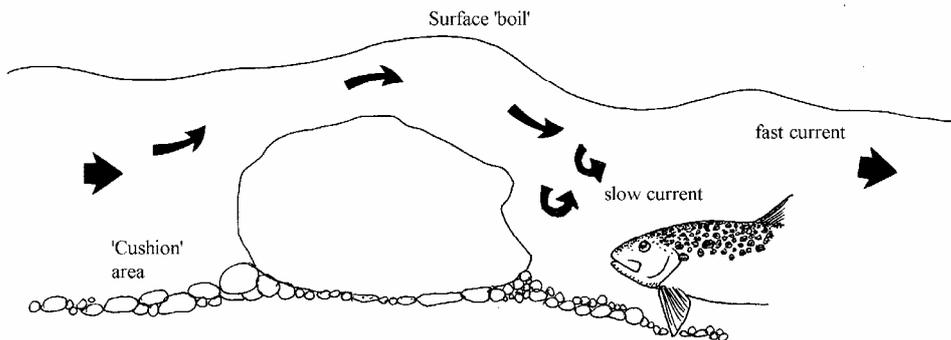


'Cushion' in front of boulder

'Pocket water' between boulders

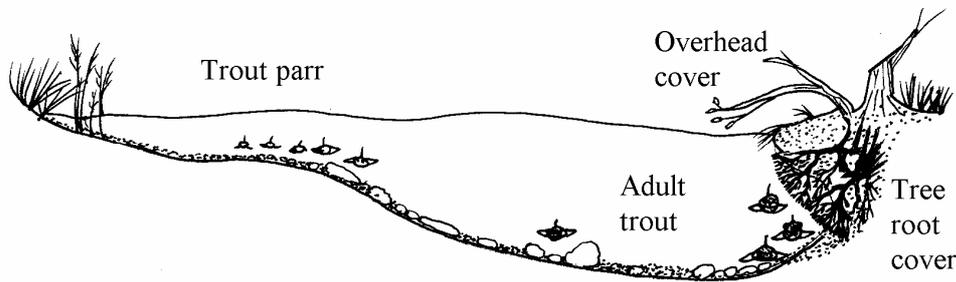
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Trout use of 'dead spot' behind boulder



© 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 at Hurdcott 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

The whole fishery currently has a very narrow un-grazed river bank strip which would benefit from widening to around 3 metres, on average. The chosen fence line would, most economically, run along relatively straight sections leading to varying sized riparian enclosures.

Task 1: Re-positioning fencing along river bank. This task might most economically be carried out by the fishery managers in conjunction with Estate staff / machinery. This aspect of the work could be viewed as a financial contribution to the overall costs of river habitat improvement at Hurdcott. Fencing costs could be £3-5 + VAT per running metre, depending on who does it and exactly how it is done.

The re-fenced riverside areas would benefit from the establishment of carefully planted goat willow, alder, elder, ash, hazel, hawthorn and blackthorn. This new riparian woodland fringe should be sparse, allow the entry of machinery in future years and should be managed in the long-term so as to maximise habitat benefits and avoid trees falling into the river and causing flood defence problems.

Task 2: Buy and plant suitable trees (local provenance) to improve river bank habitats through fishery. Costs require further information. EA consent is required.

The section of the Bourne at Hurdcott is around 7-8 metres wide at the top of the stretch and varies in width downstream. The fishery under consideration can be split into:

1. **Section 1**, a 60-70metre stretch starting below the bridge behind the Black Horse Pub and running down to the first fence on the right hand bank.
2. **Section 2**, a 35 metre section running from this fence down to the next bend.
3. **Section 3**, a 55 metre section running from this bend down to the next bend.
4. **Section 4**, the side stream bordering Mr Lovering's land.
5. **Section 5**, the main channel down to the lower boundary of the fishery.

Considering each of these in turn and including broad costings:

Section 1

This upper stretch of around 70 metres tends to be relatively shallow, gravel-bedded and with fairly rapid current speeds. *Ranunculus* growth was healthy at the time of the visit but the gravel bed is silty. There is very little dead wood cover in the river margins. Previous excavation works have left a series of steep-sided deep pools, which have been dug in areas where the stream would not naturally scour its bed. Also, there are various rock current deflectors which need re-working (the smaller rocks would provide good cover for trout parr and bullheads on gravel shallows). The excavation works require change so as to naturalise their appearance and blend them in with new work recommended below.

At two points on Section 1, new low-profile gravel riffles (two at 8m x 8m x 0.2m = 26 cubic metres = around 36 tonnes) could be built with clean imported 20-40mm rounded river gravel.

Task 1 Re-shape river bed and re-distribute rocks from groynes with 360 degree digger. Import around 36 cubic metres of suitable gravel and build two low-profile carefully shaped riffles.

Costs: 2 days machine & dumper truck + driver, 2 days overseeing by Nick Giles - overall, **around £1200 + VAT**. (Note that a hydraulic machine + driver may be made available through the Estate as a contribution to project costs). Gravel costs vary widely - need best quote on 36 tonnes delivered added to above figure - likely to be **in region of £900**. (Note - further gravel required down stream.)

So, with gravel = around £2100 + VAT, overall.

Task 2 In order to provide crucial dead wood cover in margins (just away from banks so as not to hamper vole burrowing) around 30 natural wood cover structures could be built. Six small log current deflectors could also be used at suitable points to encourage modest localised scouring and increase physical habitat diversity.

Costs would be **around £2500 + VAT** (including stakes, etc) for construction by a two-man Nick Giles Associates team. The fishery managers may be able to provide suitable cut timber from the Ebbles Valley as a further contribution to project costs; this quote assumes that appropriate timber will be supplied by the fishery managers.

Task 3 Spawning gravels along Section 1 are badly silted. Pressure-washing at the end of the summer would greatly improve them for spawning trout, grayling, lampreys, bullheads and would open out the river bed, providing better invertebrate habitats. The silt will naturally re-settle in the slower sections downstream. EA consent is required.

Costs for two-man Nick Giles Associates team = **£450 + VAT**.

Section 2

This 35 metre section would benefit from the building of a summer lower flow channel within the existing broader and deeper winter flow channel. This could be achieved by surveying for voles and, if all clear, pushing down the existing left hand river bank into a gently meandering 1.5 metre wide (average) low profile bund, retaining the natural reed and rush fringe.

The underwater toe of the new bank edge should be protected with securely staked hazel faggotting with the careful retention of vegetated soil above to allow easy future water vole burrowing.

If voles are present this design and the one for Section 3 below can readily be modified so as not to impact this protected species.

Bare soil areas away from the new bank edge should be seeded with a natural mixed rough grass and wild flower mix and planted with a few selected native trees.

This section needs dead wood cover close to the margins - at least six natural timber cover structures should be built (timber to be supplied by fishery managers).

One new imported gravel low-profile riffle using 18 tonnes of material could be built to great advantage. Three small log current deflectors could be built to provide modest localised scouring and depth variation.

Costs - Stakes, faggots, sundries £350 + VAT. Two man Nick Giles Associates team £1800 + VAT, Digger + driver + dumper £1000 + VAT. Gravel costs to be added - requires best quote, probably around £450 + VAT, delivered.

Overall, as stated, **around £3600 + VAT.**

Section 3

This 55 metre section would also benefit from the building of a summer lower flow channel within the existing broader and deeper winter flow channel. This could be achieved by surveying for voles and, if all clear, pushing down the existing right hand river bank into a gently meandering 1.5 metre wide (average) low profile bund, retaining the natural reed and rush fringe.

As along Section 2, the underwater toe of the new bank edge should be protected with securely staked hazel faggotting with the careful retention of vegetated soil above to allow easy future water vole burrowing.

Bare soil areas away from the new bank edge should be seeded with a natural mixed rough grass and wild flower mix and planted with a few selected native trees.

This section needs dead wood cover close to the margins - at least ten natural timber cover structures should be built (timber to be supplied). Five small log or woven hazel current deflectors placed to induce localised scour would further improve habitat diversity.

Two new imported gravel low-profile riffles using around 40 tonnes of material could be built to great advantage.

Costs - Stakes, faggots, sundries £450 + VAT. Two man Nick Giles Associates team £3000 + VAT, Digger + driver + dumper = £1500 + VAT. Gravel costs to be added - requires best quote, probably around £1000 + VAT, delivered.

Overall, as stated, **around £6000 + VAT.**

Note: each of the above Sections requires detailed planning, with scale sketch plans for EA consenting purposes. Nick Giles Associates are happy to do this work but plenty of time (3 months) should be allowed for the consenting process prior to the planned date of starting field work.

Section 4

The side stream adjoining Mr Lovering's property would benefit from better linkage to the main river channel, perhaps via a new sluice. This should be considered as part of the forthcoming River Bourne Water Level Management Plans (WLMP). In-stream micro-habitat management could be improved so as to produce an excellent wild trout spawning and nursery area.

Section 5

This lowermost section of the fishery is impounded by sluices and may be amenable to successful habitat management if the WLMP allows reduced impoundment.

Important over-arching issue - Flood-risk.

The Bourne experiences wide fluctuations in flow, low in summer/ early autumn and high in winter. The EA may, quite rightly, insist on simple hydraulic modelling studies to ensure that all recommended river works comply with required flood water conveyance.

Appendix 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.

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 willing and able to do this work, if required.