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SE08,3036/F1



# Pennoxstone Farm, Kings Caple

## River Corridor Survey.

For: NJ Cockburn
Report No. DLA1310/ECO/Watercourse/rpt.1/May '09

| Checked by: KL | # |
|---|---|

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# PENNOXSTONE FARM
# WATERCOURSE REPORT

Dr. Alison Strange MIEEM, MIBiol, CBiol

Dr Fergus Mould

May 2009

# CONTENTS

# 1.0 INTRODUCTION

Pennoxstone Farm is situated in the Wye Valley just west of Ross-on-Wye and about 10 miles south of Hereford. The main output from the farm is soft fruit, together with some arable. The soft fruit is predominantly strawberries and raspberries with some blueberries, all of which require the use of polytunnels to improve crop husbandry conditions, specifically with respect to harvesting and extension of the productive season. Site location is identified in Figure 1.

## 1.1 *Brief*

Dr Alison Strange and Dr Fergus Mould were commissioned by N J Cockburn to carry out an ecological survey of the stream that runs through the farm. This entailed a River corridor survey and a detailed investigation of the stream to ascertain the presence of any protected species i.e. otter, watervole and crayfish. This report sets out the results of survey work undertaken and assesses the importance of the resource.

## 2.0 NATURE CONSERVATION DESIGNATIONS

### 2.1 *Protected Species*

In this report "protected species" are defined as species that are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and also the Conservation (Natural Habitats) Regulations 1994. The survey includes otters, water vole and crayfish

### 2.2 *Protected Fish Species*

Bullhead *Cottus gobio* is cited under Annex II of the Habitats Directive 1992.

## 3.0 METHODOLOGY

### 3.1 *Introduction*

The survey was carried out by Dr Alison Strange and Dr Fergus Mould on 17 April 2009, in good weather conditions, following a period of rain a few days earlier.

### 3.2 *River Corridor Survey (RCS) and River Habitat Survey (RHS)*

River Corridor Survey is principally a map-based system of surveying 500m lengths of river and the adjacent vegetation 50m either side of the channel. It provides information about the location of habitats and plant assemblages within river channels, margins, banks and corridor and is undertaken on a regular 5 year cycle. The Pennoxstone Farm Stream was surveyed using the River Corridor Methodology as set out in *River Corridor Surveys, Methods and Procedures* (NRA, 1992). Photographs were taken of representative stretches. The more detailed survey technique of River Habitat Survey involves a spot check at 10m intervals along a stretch. This process gives detailed information on the morphology of a watercourse.

### 3.3 *Water vole*

As with the majority of mammals the sighting of Water voles is not always possible therefore their presence is largely determined by characteristic field signs. The site was searched for any of the following signs: droppings, footprints, burrows, feeding stations and latrines as per the methodology in the *Water Vole Conservation Handbook* (Strachan, 1998).

- *Droppings.* These are the most distinctive field sign. They are cylindrical with blunt ends and a symmetrical shape and are generally 8-12mm long and 4-5mm wide. The colour tends to be variable ranging from black to green, and they are generally odourless.

- *Footprints.* These may be hard to distinguish from those of brown rats and cannot always be considered reliable indicators in the absence of other signs.

- *Burrows.* Water vole burrows are distinctive, typically wider than high with a diameter of 4-8 cm and often with a well grazed lawn immediately adjacent where the voles have chewed the vegetation short.

- F*eeding stations*. Voles often bring pieces of cut vegetation to favoured stations close to the waters edge and leave remains in neat piles sometimes accompanied by droppings.

- *Latrines*. During the summer, breeding water voles use regular latrine sites along the water side where accumulations of droppings are used to mark territorial boundaries or favoured spots near to the burrows. Latrines are generally maintained between February and November and often consist of a flattened mass of old droppings topped with fresh ones.

Such signs might be found anywhere in suitable habitat.

3.4 *Otters*

As noted above the sighting of otters is not always possible therefore their presence is largely determined by characteristic field signs. The site was carefully searched for any of the characteristic signs of otters which are: droppings or "spraints", footprints; otter holts or dens. Holts are not a reliable sign of presence without spraints or footprints as they can be used by other animals such as fox.

3.5 *Crayfish*

The survey methodology recommended by Natural England is a manual survey of selected habitat refuges within a site. Five habitat patches are selected that appear suitable for crayfish and a search is made of ten potential refuges in each habitat patch, Table 1 below shows the types of habitat crayfish prefer. The aim is to find relatively stable individual refuges that have the highest probability of being used by crayfish. In this survey the stream was searched with a net (0.3mm mesh) up to a depth of 0.5m in line with Environment Agency specifications. All equipment, including waders, had been disinfected with an iodine based product such as iodophore, prior to the start of the survey to reduce any risk of transferring crayfish plague.

Table 1 Crayfish habitat preferences

| **Most preferable** | **Less preferable** | **Least preferred or avoided** |
|---|---|---|
| Boulders (>25 cm), stone or other material | large cobbles (15–25 cm) | small cobble (6–15 cm) |
| Slow-flowing glides and pools (provided there are refuges) | riffles | high-energy areas such as rapids (avoided). |
| Localised velocity of 0.1m s-1 or less | less than 0.2m sec-1 | more than 0.2 m sec-1 (avoided). |
| Boulders or large cobbles in groups with crevices between them | isolated large stones on smaller substrate such as pebble and gravel | a lot of small stone (small cobble and pebble). |
| Deep crevices in bedrock (cannot usually search) | partly flattened boulders and large cobbles | high-sided, rounded cobbles (more easily rolled in spates). |
| Underlying substrate of fine gravel/sand with some pebbles | pebble and coarse gravel | clay. |
| Loose boulders | | deeply bedded boulders in a compacted bed (not accessible to crayfish). |
| Submerged refuges in stable banks (e.g. natural crevices, stone block reinforcement or stable, slightly undercut banks with overhanging vegetation, large tree roots, etc.) | refuges in the slow-flowing margins | refuges in mid-channel (especially if flow is a run or higher energy). |
| Margins next to favourable bank-side habitat | margins where adjacent banks have no scope for refuges (e.g. shallow slopes) | margins where adjacent earth banks are slumped and actively eroding |

*After Peay S. 2003.*

# 4.0 SURVEY RESULTS

## 4.1 *Site Description*

The stream at Pennoxstone Farm is spring fed and flows through a clay earth catchment. It flows in a south westerly direction, with no other notable streams or ditches voiding into it, before joining the River Wye.

## 4.2 *Water vole,*

No droppings, footprints, burrows, feeding stations or latrines were found.

## 4.3 *Otter*

No spraints, footprints or holts were found.

## 4.4 *Crayfish*

No signs of crayfish were found.

4.5 *River Corridor Survey*

**RIVER**: Pennoxstone Stream

**Section No**: Pennoxstone A

**Grid Ref**: u/s SO55987 28943

d/s SO55230 28837

**Date** 17.04.09

**Surveyor**: A Strange

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**CONDITIONS**:
Dry and sunny, 25% cloud, rather low water table. Surveyed from both banks.

**NATURE**:
The stream represents a small lowland stream with a gentle glide. Section A has a gently meandering channel that appears to have formed a field boundary along the bottom of a narrow valley for many years. The stream is spring fed and runs through a strip of willow carr approximately 6m wide which then grades into a wet meadow pasture. The channel is not clearly defined for some 200m due to the properties of the willow carr, it then develops a shallow channel with definable bank sides. The flood plain is narrow and restricted by the steep slops on either side of the stream. As the stream develops and the channel becomes more defined, it reaches the end of the pasture and is channelled into a roadside ditch with steep artificial banks. It is culverted under the road and continues for about 100 m as a road-ditch taking any road runoff. The land dips to the lowest point in the valley and the stream then cuts into an area of woodland with hazel, a variety of conifers, oak, goat willow and poplar where it forms a small pond damed by an embanked track way. The overflow to the pond drains away underground and the stream re-appears at the bottom of an orchard some 300m away. In general, the stream follows a relatively straight course with few debris dams and there is little variation or dynamism in the flow. It is heavily over shaded by broad leaved woodland.

**SUBSTRATE**:
Overall the substrate is a silty-clay that appears to be of an alluvial nature with some fine gravels within. Within the woodland the substrate developed into a silty loam clay due to the regular deposition of leaves forming an organic soil layer.

**DIMENSIONS**:

The section is 615m long and water depth is a relatively constant 10cm along its length. Channel width is variable due to the ramifications through the willow carr but at its narrowest it is 30cm.

**BANK TYPE**:

Mainly shallow earth cliffs, with a flat top sloping away slightly towards the adjacent land. The height varies between 5-10cm; in general they are bare faced made of a silty clay alluvium with few fine gravels. The section that acts as a road ditch has steep artificial banks 30cm high with tarmac and road foundations on one side and silty loam clay on the other.

**ADJACENT LAND USE**:

**LB** (left bank): Initially a strip of wet willow carr which then becomes a rough, wet, semi-improved grassland that steeply rises towards Kings Caple. The grassland is horse grazed and is dominated by *Agrostis stolonifera* with *Dactylis glomerata* and *Cynosurus cristatus*. The lowest section of the field appears not to dry out to any degree and is heavily poached. It supports species such as *Veronica becca-bunga, Cardamine pratensis, Berula erecta, Juncus inflexus, Glyceria fluitans, Filipendula ulmaria, Epilobium hirsutum.* The stream then becomes a roadside ditch before cutting into an area of woodland. The ground flora is limited due to the heavy shading from the broad-leaved trees, but tends to be mainly a ruderal community with frequent *Urtica dioica* and *Galium aparine*, this indicates that the land has been previously disturbed and is nutrient rich.

**RB** (right bank): As the willow carr section of the opposite bank, however, towards the downstream end of the section, the field has polytunnels on it rather than grassland.

**BANK VEGETATION**:

**LB**: Mainly bare earth, due to shading by the willow carr, but able to support bryophytes such as *Mnium hornum* and *Eurhynchium praelongum,* with occasional patches of *Marchantia* sp.

**RB**: Much as the left bank, but with slightly less disturbance due to the lack of grazing animals.

**ALIEN/INVASIVE SPECIES**:

None noted.

**MARGINAL VEGETATION**:

Very restricted with some *Berula erecta* and rare *Veronica becca-bunga*.

**CHANNEL VEGETATION**:

None due to heavy shading.

**RECREATION**:

None.

**WILDLIFE**:

Birds: Robin, blackbird, long tailed tits, crow, buzzard.

Fish: None in the stream, the pond was not sampled due to uncertainty over depth.

Mammals: Grey squirrel, roe deer, fox.

**FEATURES AND HABITATS TO BE RETAINED**:

The long narrow section of wet pasture is a habitat of great importance for insects and specialist wetland vegetation.

**EXISTING MANAGEMENT**:

None apparent.

**MANAGEMENT RECOMMENDATIONS**:

Thinning the woodland canopy of the willow carr would encourage the development of a floral mosaic both on the bank-sides and in the channel through increasing ambient light penetration, and as a consequence generate additional invertebrate habitat.

Seeding the rough pasture to develop a wild flower meadow and using a light grazing regime would enhance the available habitat for invertebrates, odonates small mammals and birds.

**CONSERVATION EVALUATION**:

Channel and banks:. Minor

Adjacent habitats: Moderate

Overall: Moderate

**JUSTIFICATION**:

The channel has the ability to support a far greater range of macrophytes and invertebrates than at present and there is great potential for improvement. There is a low hydrological variance between the channel and the adjacent pasture edge that could support a variety of important invertebrates and a specialised flora. The bank-side habitats are varied and provide general wildlife interest but equally could be improved through trimming and thinning the woodland canopy.

**RIVER**: Pennoxstone Stream

**Section No**: Pennoxstone B

**Grid Ref**: u/s SO54994

d/s SO28628

**Date** 17.04.09

**Surveyor**: A Strange

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**CONDITIONS**:

Dry and sunny, 25% cloud, rather low water table. Surveyed from both banks.

**NATURE**:

Section B has poorly defined banks for the first 144m then becomes confined between gradually steeper earth banks that vary between 1.0-1.5m high. Although the nature of the stream appears to be spatey due to the evidence of debris on the banks and it would also have to accommodate the spates of the River Wye, there does not appear to be any erosive slumping. There is no evidence of any earth deposition forming bars or islands in the stream. There are relatively few mature trees that edge the survey length but a variety of saplings have been allowed to grow which form a scrubby edge to the bank that over shadows the channel. Many of the trees have mats of interfering roots. The character of the stream is variable with a variety of pools and a few glides throughout the reach whilst the vegetation on either side is relatively uniform. There are a number of incidences where fallen branches and woody rubbish along the channel have the potential to cause debris dams.

**SUBSTRATE**:

Overall the substrate is a silty clay that appears to be of an alluvial nature with some fine gravels within.

**DIMENSIONS**:

The section is 425m long and the water depth varies between 5-30cm. Channel width is also variable being 3m at its widest point and 1m at its narrowest.

**BANK TYPE**:

Mainly vertical earth cliffs with a flat top sloping away slightly towards the fields. The height varies between 0.3 - 1.75m and they have a dense vegetation cover.

**ADJACENT LAND USE**:

**LB**: Improved grassland, a *Lolium perenne* ley with occasional *Poa pratensis.*

**RB**: As the opposite bank, however, on the upstream end of the section the land use is an old orchard that is extensively grazed by sheep.

**BANK VEGETATION**:

**LB**: The bank is not as heavily shaded as the right bank and so able to support frequent *Urtica dioica, Rubus fruticosus, Glyceria fluitans,* and *Phalaris aruninacea with* occasional *Silene dioica, Cardamine pratensis, Oenanthe crocata* and *Epilobium hirsutum.*

**RB**: Much as the left bank but the vegetation is limited due to shading by *Fraxinus excelsior, Acer pseudoplatanus, Sambucus nigra, Crataegus monogyna* and *Prunus spinosa.*

**ALIEN/INVASIVE SPECIES**:

Frequent *Impatiens glandulifera*.

**MARGINAL VEGETATION**:

Very restricted with mainly *Glyceria fluitans,* and *Phalaris aruninacea* and occasional *Berula erecta.*

**CHANNEL VEGETATION**:

Limited due to heavy shading occasional *Berula erecta.*

**RECREATION**:

None.

**WILDLIFE**:

Birds: Robin, blackbird, long tailed tits, crow, buzzard, mallard.

Fish: Stickleback, minnow

Mammal: Badger

Insecta: Pondskater, beetle larvae, freshwater shrimp.

**FEATURES AND HABITATS TO BE RETAINED**:

The orchard with its extensive grazing is of high importance for lichens and invertebrates.

**EXISTING MANAGEMENT**:

None apparent.

**MANAGEMENT RECOMMENDATIONS**:

Thinning the scrub would encourage the development of a floral mosaic both on the bank-sides and in the channel through increasing ambient light penetration and through this would also create more invertebrate habitat.

**CONSERVATION EVALUATION**:

Channel and banks: Minor

Adjacent habitats: Orchard - important, improved grassland - minor

Overall: Moderate

**JUSTIFICATION**:

The channel has the potential to support a far greater range of macrophytes and invertebrates than at present and there is much room for improvement. The bank-side habitats are varied and provide general wildlife interest but equally could be improved through trimming and thinning the woodland canopy.

## 5.0 SUMMARY

The survey found a thriving population of *Gammarus*, but could find no trace of water vole, otter or crayfish. The habitat did not look suitable for watervole due to the spatey nature of the river, the overshading by trees and the lack of channel and emergent vegetation. Otters could use the stream as a movement corridor but there were few places that were suitable for use for lying up and there was little, if any, food available that could support a large mammal. The habitat does look suitable for crayfish although none were found. The National Biodiversity Network has no current records of white clawed crayfish in the 10km square that includes Kings Caple and also no records of signal crayfish in the area. Whilst searching for crayfish a number of sticklebacks were found at various sizes indicating that there is a thriving population with reproducing adults and juveniles.

The results of the survey show that the Pennoxstone Farm stream displays many of the typical features of a farmland stream. It is slow flowing with occasional runs and glides and composed of an earthy substrate. Bank-side trees and associated bank and underwater tree roots are also characteristic. Channel vegetation is often suppressed by the heavy bank-side shading. Most of these features are represented within the stream. The underwater tree roots are clearly an important habitat in this stream as many freshwater shrimp were found there as well as sticklebacks and diving beetle larvae.

The channel has the potential to support a far greater range of macrophytes and invertebrates than at present and there is much room for improvement. With seeding and light grazing, the pasture near the spring section of the stream could support a variety of important invertebrates and a specialised wet meadow flora. The bank-side habitats are varied and provide general wildlife interest but equally could be improved through trimming and thinning the woodland canopy.

## References

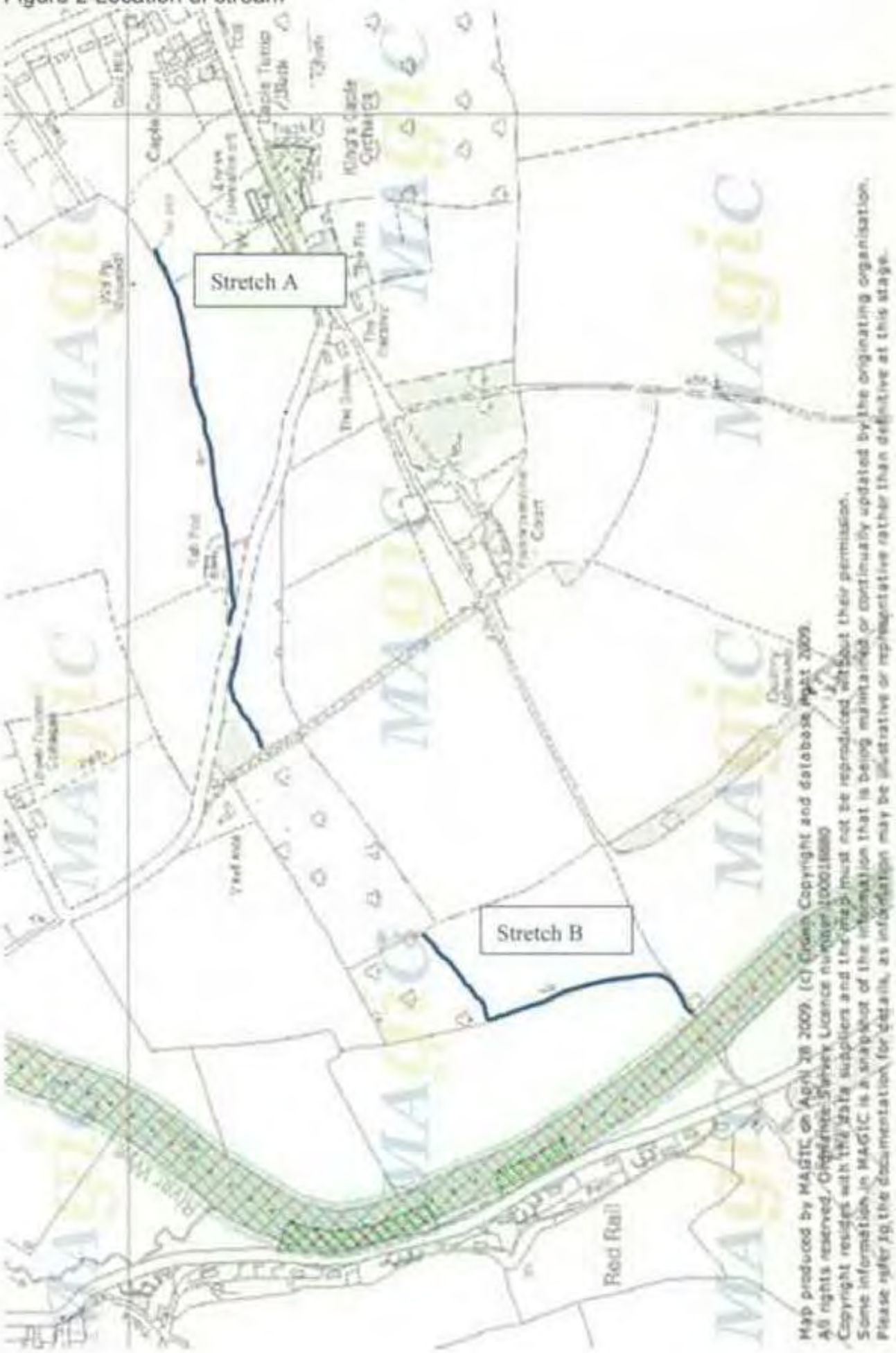
Peay S 2003. *Monitoring the White-clawed Crayfish* Austropotamobius pallipes. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough.

Strachan R, 1998 *Water Vole Conservation Handbook,* WildCRU, UK

NRA 1992, *River Corridor Surveys, Methods and Procedures.*

Figure 1. Site location

Figure 2 Location of stream



**Appendix 1**

PENNOXSTONE STREAM PENNOXSTONE A A.STRANGE 17·5·09

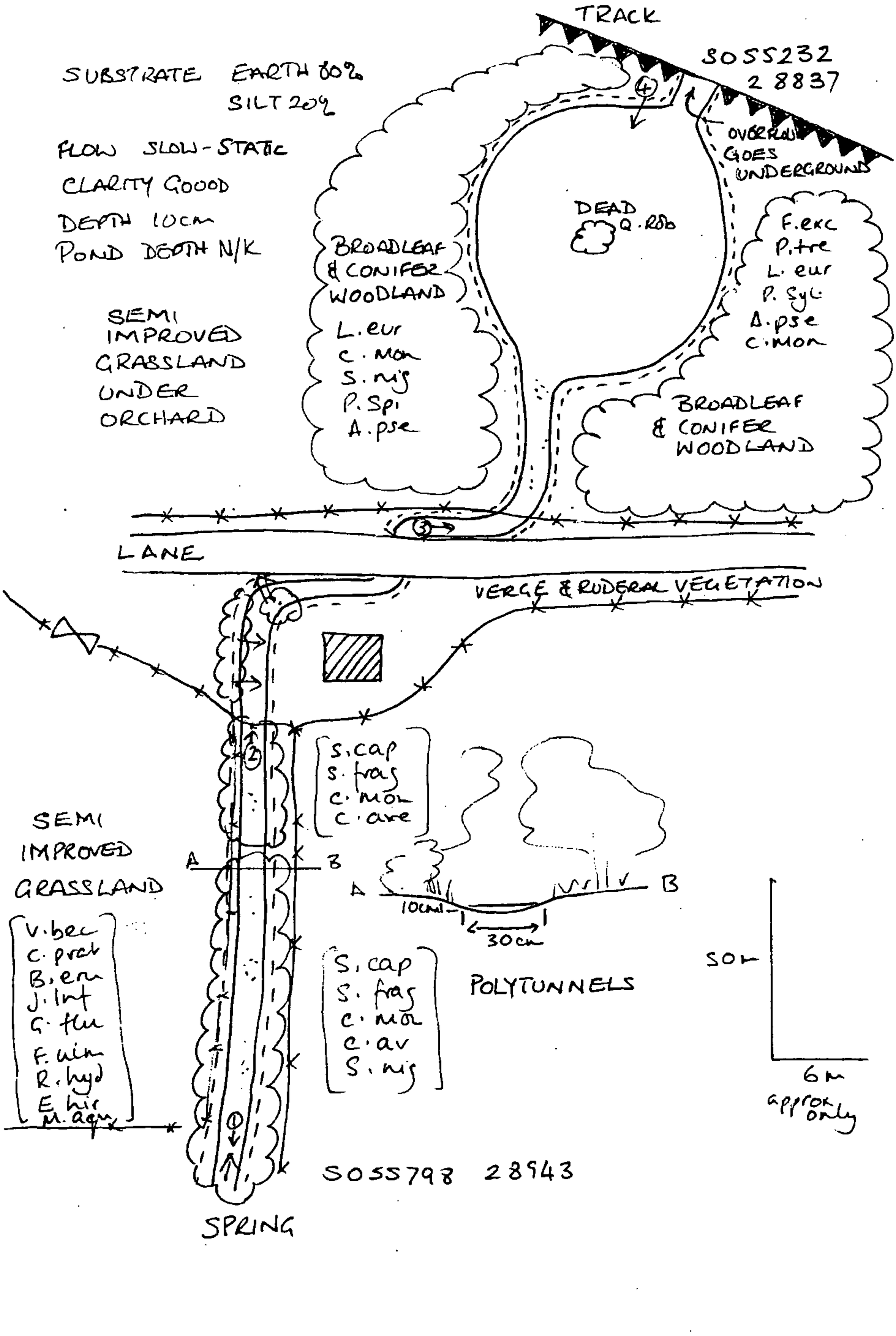
SUBSTRATE EARTH 80%
SILT 20%

FLOW SLOW-STATIC

CLARITY GOOOD

DEPTH 10cm

POND DEPTH N/K



| PENNOXSTONE STREAM | PENNOXSTONE B | A. STRANGE 17·5·09 |
|---|---|---|

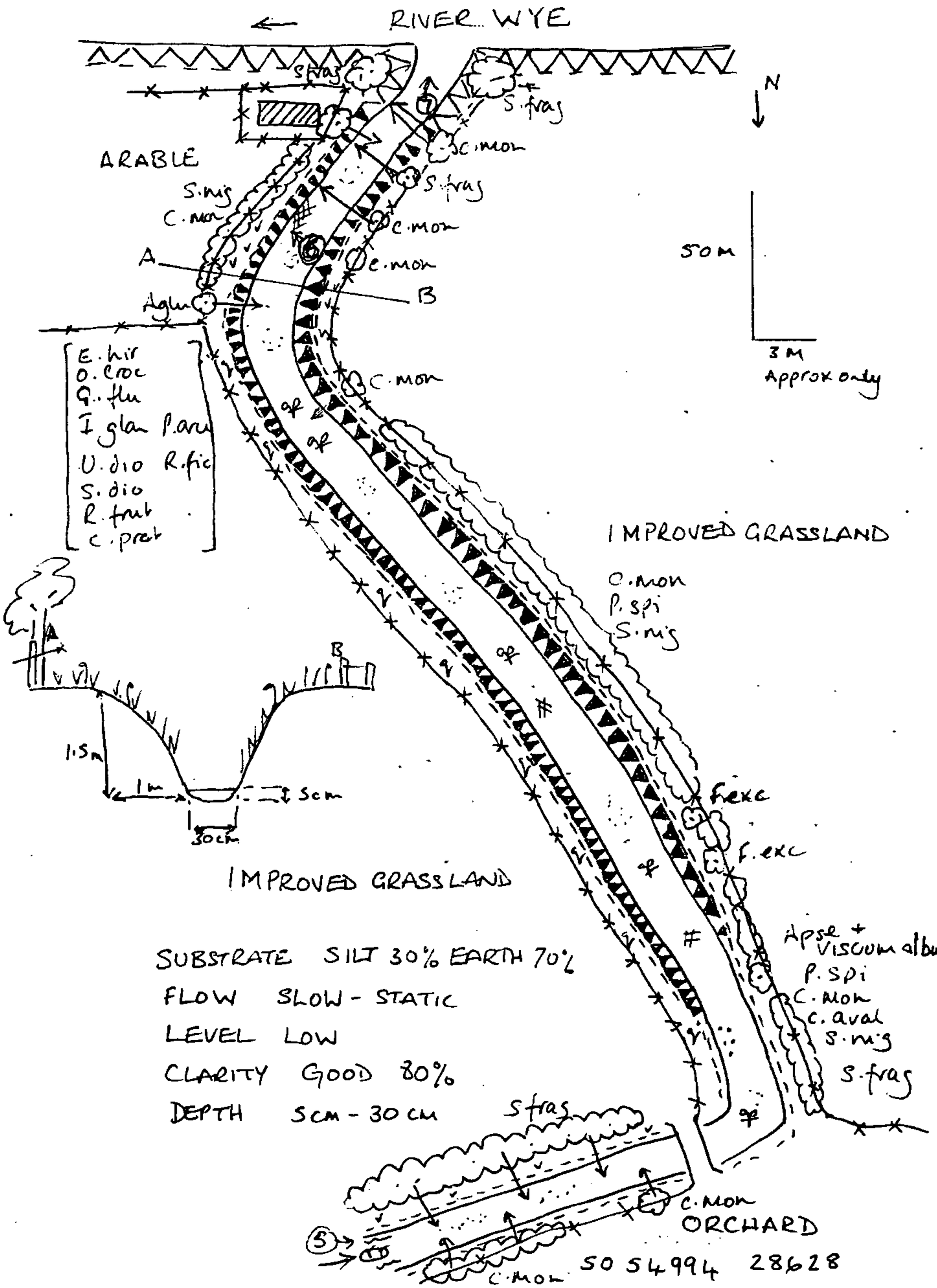


Photo 1 Spring flowing into willow carr

Photo 2 Showing the water depth

Photo 3 Roadside ditch

Photo 4 Pond

Photo 5 Entry into section B

Photo 6 Showing the flood debris and the bank height

Photo 7. Venting into the River Wye

# Appendix 2

## RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT

| | | | |
|---|---|---|---|
| Site Number[1]: Hereford 2 | Site Ref: Pennoxstone A | River Name: | Date: 10/04/2009 |
| Grid References/Co-ordinates: | Spot 1[2]: SO55833 28966 | Mid-site: | End of site[2]: SO55231 28780 |
| Surveyor Name: Alison Strange | | Accredited Surveyor Code: | |

[1] Leave blank if new site. [2] Optional

Weather Conditions: Overcast

Flow Conditions:

| **Site details:** (enter comments or circle if applicable and give details) | **Risk Level (Low/Mod/High)** |
|---|---|
| Access and Parking: (entry & exit) | Low, Farm gate |
| Conditions: comment on ground stability, footing, exposure/remoteness | Low |
| Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank | Low, fencing |
| Occupied/Unoccupied: people, livestock, animals | Low, livestock |
| Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational | Low, agriculture |
| Risk if lone-working | Low |

**IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS DO NOT CONTINUE WITH THE SURVEY.**

**Weil's Disease (*Leptospirosis*)**

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

**Lyme Disease**

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

# RIVER HABITAT SURVEY 2003 VERSION: SPOT-CHECK KEY 

## PHYSICAL ATTRIBUTES (SECTION E)

### BANKS

#### Predominant bank material

**NV** = not visible

**BE** = bedrock
**BO** = boulder
**CO** = cobble
**GS** = gravel/sand
**EA** = earth (crumbly)
**PE** = peat
**CL** = sticky clay

**CC** = concrete
**SP** = sheet piling
**WP** = wood piling
**GA** = gabion
**BR** = brick/laid stone
**RR** = rip-rap
**TD** = tipped debris
**FA** = fabric
**BI** = bio-engineering materials

#### Bank modifications

**NK** = not known
**NO** = none

**RS** = resectioned (reprofiled)
**RI** = reinforced
**PC** = poached
**PC(B)** = poached (bare)
**BM** = artificial berm
**EM** = embanked

#### Marginal and bank features

**NV** = not visible (e.g. far bank)
**NO** = none

**EC** = eroding cliff (EC if sandy substrate)
**SC** = stable cliff (SC if sandy substrate)

**PB** = unvegetated point bar
**VP** = vegetated point bar

**SB** = unvegetated side bar
**VS** = vegetated side bar

**NB** = natural berm

### CHANNEL

#### Predominant substrate

**NV** = not visible

**BE** = bedrock
**BO** = boulder
**CO** = cobble
**GP** = gravel/pebble (G or P if predominant)
**SA** = sand
**SI** = silt
**CL** = clay
**PE** = peat
**EA** = earth
**AR** = artificial

#### Predominant flow-type

**NV** = not visible
**FF** = free fall
**CH** = chute
**BW** = broken standing waves (white water)
**UW** = unbroken standing waves
**CF** = chaotic flow
**RP** = rippled
**UP** = upwelling
**SM** = smooth
**NP** = no perceptible flow
**DR** = no flow (dry)

#### Channel modifications

**NK** = not known
**NO** = none

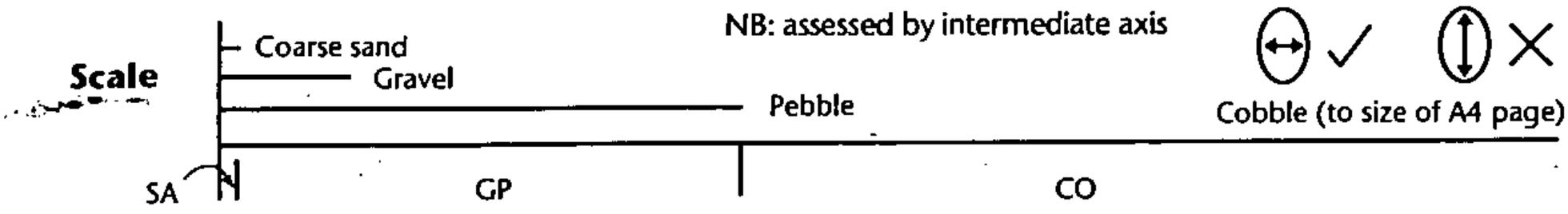
**CV** = culverted
**RS** = resectioned
**RI** = reinforced
**DA** = dam/weir/sluice
**FO** = ford (man-made)

#### Channel features

**NV** = not visible
**NO** = none

**EB** = exposed bedrock
**RO** = exposed boulders
**VR** = vegetated rock
**MB** = unvegetated mid-channel bar
**VB** = vegetated mid-channel bar
**MI** = mature island
**TR** = Trash (urban debris)

| FLOW-TYPES | DESCRIPTION |
|---|---|
| **FF: Free fall** | clearly separates from back-wall of vertical feature ~associated with waterfalls |
| **CH: Chute** | low curving fall in contact with substrate ~ often associated with cascades |
| **BW: Broken standing waves** | white-water tumbling waves must be present ~ mostly associated with rapids |
| **UW: Unbroken standing waves** | upstream facing wavelets which are not broken ~mostly associated with riffles |
| **CF: Chaotic flow** | a chaotic mixture of three or more of the four fast flow-types with no predominant one obvious |
| **RP: Rippled** | no waves, but general flow direction is downstream with disturbed rippled surface ~ mostly associated with runs |
| **UP: Upwelling** | heaving water as upwellings break the surface ~associated with boils. |
| **SM: Smooth** | perceptible downstream movement is smooth (no eddies) ~mostly associated with glides |
| **NP: No perceptible flow** | no net downstream flow ~associated with pools, ponded reaches and marginal deadwater |
| **DR: No flow (dry)** | dry river bed |



**LEFT** **Banks are determined by looking downstream** **RIGHT**

## CHANNEL MODIFICATION INDICATORS

One or more of the following may be indicative of resectioning:

1. Uniform bank profile
2. Straightened planform
3. Bankfull width/bankfull height ratio <4:1
4. Uniform/low energy flow-types
5. No trees/uniformly-aged trees along bank
6. Intensive/urban land-use

## LAND-USE WITHIN 5m OF BANKTOP (SECTION F) & 50m (SECTION H)

**BL** = Broadleaf/mixed woodland (semi-natural)
**BP** = Broadleaf/mixed plantation
**CW** = Coniferous woodland (semi-natural)
**CP** = Coniferous plantation
**SH** = Scrub & shrubs
**OR** = Orchard
**WL** = Wetland (e.g. bog, marsh, fen)
**MH** = Moorland/heath
**AW** = Artificial open water
**OW** = Natural open water
**RP** = Rough unimproved grassland/pasture
**IG** = Improved/semi-improved grassland
**TH** = Tall herb/rank vegetation
**RD** = Rock, scree or sand dunes
**SU** = Suburban/urban development
**TL** = Tilled land
**IL** = Irrigated land
**PG** = Parkland or gardens
**NV** = Not visible

## BANKTOP AND BANKFACE VEGETATION STRUCTURE To be assessed within a 10m wide transect (SECTION F)

| | | |
|---|---|---|
| bare | B | bare earth/rock etc. |
| uniform  | U | predominantly one type (no scrub or trees) |
| simple  | S | two or three vegetation types |
| complex  | C | four or more types |

vegetation types

 bryophytes

 short/creeping herbs or grasses

 tall herbs/ grasses

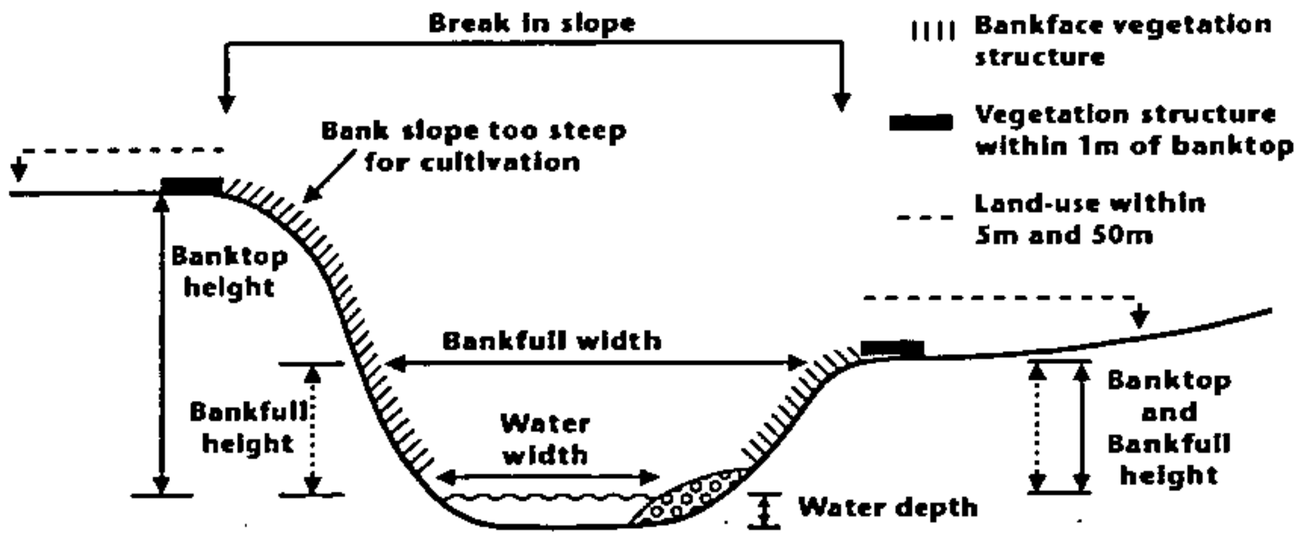
 scrub or shrubs

 saplings and trees

## Channel dimensions guidance (Section L)

- Select location on uniform section.
- If riffle is present, measure there. If not, measure at straightest and shallowest point.
- **Banktop** = first major break in slope above which cultivation or development is possible.
- **Bankfull** = point where river first spills on to floodplain.

**Cross-section of channel showing definitions used to define where spot-check recording and channel dimensions measured**




ENVIRONMENT AGENCY

**EMERGENCY HOTLINE 0800 80 70 60**

24 hour free emergency telephone line for reporting all environmental incidents relating to air, land and water.

## A FIELD SURVEY DETAILS

Site Number: (leave blank if new site) Hereford 2

Site Reference: Pennoxstone A

Spot-check 1 Grid Ref: SO54892 28295

Spot-check 6 Grid Ref:

End of site Grid Ref: SO55833 28966

Reach Reference: A

River name:

Date 10 / 04 /20 09 Time: 10.30

Surveyor name: Alison Strange

Accredited Surveyor code:

Is the site part of a river or an artificial channel? River [X] Artificial [ ]

Are adverse conditions affecting survey? No [X] Yes [ ]

If yes, state .....

Is bed of river visible? barely or not [ ] partially [ ] ±entirely [X]

Is health and safety assessment form attached? Yes [X] No [ ]

Number of photographs taken: [ ]

Photo references:

Site surveyed from: left bank [■] right bank [ ] channel [ ]

[ ] When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream RIGHT

## B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)


[ ] shallow vee

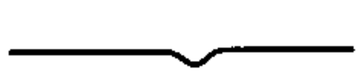

[ ] deep vee


[ ] gorge


[ ] concave/bowl


[X] asymmetrical valley


[ ] U-shape valley


[ ] no obvious valley sides

Distinct flat valley bottom? No [ ] Yes [X]

Natural terraces? No [X] Yes [ ]

## C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

| | | | |
|---|---|---|---|
| Riffle(s) | | Unvegetated point bar(s) | |
| Pool(s) | | Vegetated point bar(s) | |

## D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box [ ]

| | Major | Intermediate | Minor | | Major | Intermediate | Minor |
|---|---|---|---|---|---|---|---|
| Weirs/sluices | | | | Outfalls/ intakes | | | |
| Culverts | 1 | | | Fords | | | |
| Bridges | | | 1 | Deflectors/ groynes/croys | | | |
| Other - state | | | | | | | |

**Is channel obviously realigned?** No [ ] Yes, <33% of site [X] ≥33% of site [ ]

**Is channel obviously over-deepened?** No [X] Yes, <33% of site [ ] ≥33% of site [ ]

**Is water impounded by weir/dam?** No [ ] Yes, <33% of site [X] ≥33% of site [ ]

SITE REF. Pennoxstone A | **RIVER HABITAT SURVEY: TEN SPOT-CHECKS** | **Page 2 of 4**

Spot-check 1 is at: upstream end (●) downstream end ( ) of site (tick one box)

## E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)

| When boxes 'bordered', only one entry allowed | 1 GPS | 2 | 3 | 4 | 5 | 6 GPS | 7 | 8 | 9 | 10 | GPS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LEFT BANK** | Ring EC or SC if composed of sandy substrate | | | | | | | | | | |
| Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI | EA | EA | EA | EA | EA | EA | EA | CC | CC | EA | |
| Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM | NO | NO | NO | NO | NO | NO | RS | RS | RS | NO | |
| Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **CHANNEL** | GP- ring either G or P if predominant | | | | | | | | | | |
| Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | |
| Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR | SM | SM | SM | SM | NP | NP | NP | SM | NP | SM | |
| Channel modification(s) NK, NO, CV, RS, RI, DA, FO | NO | NO | NO | NO | NO | NO | RS | RS | CV | NO | |
| Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR | VB | VB | VB | VB | VB | VB | NO | NO | NO | NO | |
| For braided rivers only: number of sub-channels | | | | | | | | | | | |
| **RIGHT BANK** | Ring EC or SC if composed of sandy substrate | | | | | | | | | | |
| Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI | EA | EA | EA | EA | EA | EA | EA | EA | CC | EA | |
| Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM | NO | NO | NO | NO | NO | NO | NO | RS | RS | NO | |
| Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |

## F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)

**Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LAND-USE WITHIN 5m OF LEFT BANKTOP | | RP | RP | RP | RP | RP | RP | SU | SU | SH | SH | |
| LEFT BANKTOP (structure within 1m) | B/U/S/C/NV | C | C | C | C | C | C | U | U | U | S | |
| LEFT BANK-FACE (structure) | B/U/S/C/NV | C | C | C | C | C | C | U | U | U | S | |
| RIGHT BANK-FACE (structure) | B/U/S/C/NV | C | C | C | C | C | C | U | U | U | S | |
| RIGHT BANKTOP (structure within 1m) | B/U/S/C/NV | C | C | C | C | C | C | U | U | U | S | |
| LAND-USE WITHIN 5m OF RIGHT BANKTOP | | TL | TL | TL | TL | TL | TL | IG | IG | SU | SH | |

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

## G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E ( ≥ 33% area), ✓(present) or NV (not visible)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None (✓) or Not Visible (NV) | E | E | E | E | E | E | E | E | E | E | |
| Liverworts/mosses/lichens | X | X | X | X | X | X | X | X | X | X | |
| Emergent broad-leaved herbs | X | X | X | X | X | X | X | X | X | X | |
| Emergent reeds/sedges/rushes/grasses/horsetails | | | | | | | | | | | |
| Floating-leaved (rooted) | | | | | | | | | | | |
| Free-floating | | | | | | | | | | | |
| Amphibious | | | | | | | | | | | |
| Submerged broad-leaved | | | | | | | | | | | |
| Submerged linear-leaved | | | | | | | | | | | |
| Submerged fine-leaved | | | | | | | | | | | |
| Filamentous algae | | | | | | | | | | | |

Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ——→

## H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)

| | L | R | | L | R |
|---|---|---|---|---|---|
| Broadleaf/mixed woodland (semi-natural) (BL) | X | X | Natural open water (OW) | | |
| Broadleaf/mixed plantation (BP) | | | Rough/unimproved grassland/pasture (RP) | E | |
| Coniferous woodland (semi-natural) (CW) | | | Improved/semi-improved grassland (IG) | | |
| Coniferous plantation (CP) | | | Tall herb/rank vegetation (TH) | | |
| Scrub & shrubs (SH) | | | Rock, scree or sand dunes (RD) | | |
| Orchard (OR) | | | Suburban/urban development (SU) | X | X |
| Wetland (e.g. bog, marsh, fen) (WL) | | | Tilled land (TL) | | E |
| Moorland/heath (MH) | | | Irrigated land (IL) | | |
| Artificial open water (AW) | | | Parkland or gardens (PG) | | |
| | | | Not visible (NV) | | |

## I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)

| **Natural/unmodified** | L | R | **Artificial/modified** | L | R |
|---|---|---|---|---|---|
| Vertical/undercut | | | Resectioned (reprofiled) | | |
| Vertical with toe | | | Reinforced - whole | | |
| Steep (>45°) | | | Reinforced - top only | X | X |
| Gentle | E | E | Reinforced - toe only | | |
| Composite | | | Artificial two-stage | | |
| Natural berm | | | Poached bank | | |
| | | | Embanked | | |
| | | | Set-back embankment | | |

## J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%

**TREES** (tick one box per bank)

| | Left | Right |
|---|---|---|
| None | ☐ | ☐ |
| Isolated/scattered | ☐ | ☐ |
| Regularly spaced, single | ☐ | ☐ |
| Occasional clumps | ☐ | ☐ |
| Semi-continuous | ☒ | ☒ |
| Continuous | ☐ | ☐ |

**ASSOCIATED FEATURES** (tick one box per feature)

| | None | Present | E (≥33%) |
|---|---|---|---|
| Shading of channel | ☐ | ☐ | ☒ |
| *Overhanging boughs | ☐ | ☐ | ☒ |
| *Exposed bankside roots | ☐ | ☐ | ☒ |
| *Underwater tree roots | ☐ | ☐ | ☒ |
| Fallen trees | ☐ | ☐ | ☒ |
| Large woody debris | ☐ | ☐ | ☒ |

## K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%

| | None | Present | E(≥33%) | | None | Present | E (≥33%) |
|---|---|---|---|---|---|---|---|
| *Free fall flow | ☐ | ☐ | ☐ | Exposed bedrock | ☐ | ☐ | ☐ |
| Chute flow | ☐ | ☐ | ☐ | Exposed boulders | ☐ | ☐ | ☐ |
| Broken standing waves | ☐ | ☐ | ☐ | Vegetated bedrock/boulders | ☐ | ☐ | ☐ |
| Unbroken standing waves | ☐ | ☐ | ☐ | Unvegetated mid-channel bar(s) | ☐ | ☐ | ☐ |
| Rippled flow | ☐ | ☐ | ☐ | Vegetated mid-channel bar(s) | ☐ | ☒ | ☐ |
| *Upwelling | ☐ | ☐ | ☐ | Mature island(s) | ☐ | ☐ | ☐ |
| Smooth flow | ☐ | ☒ | ☐ | Unvegetated side bar(s) | ☐ | ☐ | ☐ |
| No perceptible flow | ☐ | ☐ | ☒ | Vegetated side bar(s) | ☐ | ☐ | ☐ |
| No flow (dry) | ☐ | ☐ | ☐ | Unvegetated point bar(s) | ☐ | ☐ | ☐ |
| Marginal deadwater | ☐ | ☐ | ☐ | Vegetated point bar(s) | ☐ | ☐ | ☐ |
| Eroding cliff(s) | ☐ | ☐ | ☐ | *Unvegetated silt deposit(s) | ☐ | ☐ | ☐ |
| Stable cliff(s) | ☐ | ☐ | ☐ | *Discrete unvegetated sand deposit(s) | ☐ | ☒ | |
| | | | | *Discrete unvegetated gravel deposit(s) | ☐ | ☐ | |

| SITE REF. Pennoxstone A | **RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES** | **Page 4 of 4** |
|---|---|---|

## L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)

| LEFT BANK | | CHANNEL | | RIGHT BANK | |
|---|---|---|---|---|---|
| Banktop height (m) | 10 CM | Bankfull width (m) | 2M | Banktop height (m) | 10 CM |
| Is banktop height also bankfull height? (Y or N) | Y | Water width (m) | 2 M | Is banktop height also bankfull height? (Y or N) | Y |
| Embanked height (m) | | Water depth (m) | 2CM | Embanked height (m) | |

If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =

Bed material at site is: consolidated ( ) unconsolidated (loose) (•) unknown ( )

Location of measurements is: riffle ( ) other (•) (state)

## M FEATURES OF SPECIAL INTEREST Use ✓ or E (≥ 33% length) *record even if <1%

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| None | | Very large boulders (>1m) | | Backwater(s) | | Marsh(es) | |
| Braided channels | | *Debris dam(s) | | Floodplain boulder deposits | | Flush(es) | |
| Side channel(s) | | *Leafy debris | | Water meadow(s) | | Natural open water | |
| *Natural waterfall(s) > 5m high | | Fringing reed-bank(s) | | Fen(s) | | Others (state) | |
| *Natural waterfall(s) < 5m high | | Quaking bank(s) | | Bog(s) | | | |
| Natural cascade(s) | | *Sink hole(s) | | Wet woodland(s) | x | | |

## N CHOKED CHANNEL (tick one box)

Is 33% or more of the channel choked with vegetation? No [x] Yes [ ]

## O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (≥ 33% length) *record even if <1%

| | | bankface | banktop to 50m | | bankface | banktop to 50m |
|---|---|---|---|---|---|---|
| None | ■ | | | *Himalayan balsam | | |
| | *Giant hogweed | | | | | |
| | *Japanese knotweed | | | *Other (state)..... | | |

## P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)

**Major impacts:** landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power

**Evidence of recent management:** dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)

**Animals:** otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies

**Other significant observations:** if necessary use separate sheet to describe overall characteristics and relevant observations

## Q ALDERS (tick one box in each of the two categories ) *record even if <1%

| *Alders? None | Present | Extensive | *Diseased Alders? None | Present | Extensive |
|---|---|---|---|---|---|
| | ✓ | | ✓ | | |

## R FIELD SURVEY QUALITY CONTROL ( ✓ boxes to confirm checks)

- Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? ☐
- Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? ☐
- Have you completed column 11 of section G (and E if appropriate) on page 2? ☐
- Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? ☐
- Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? ☐
- Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? ☐
- Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? ☐

## RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT

| | | | |
|---|---|---|---|
| Site Number[1]: Hereford 2 | Site Ref: Pennoxstone B | River Name: | Date: 10/04/2009 |
| Grid References/Co-ordinates: | Spot 1[2]: SO55231 28780 | Mid-site: | End of site[2]: SO 54892 2829 |
| Surveyor Name: Alison Strange | | Accredited Surveyor Code: | |

[1] Leave blank if new site. [2] Optional

Weather Conditions: Overcast

Flow Conditions:

| **Site details:** (enter comments or circle if applicable and give details) | **Risk Level (Low/Mod/High)** |
|---|---|
| Access and Parking: (entry & exit) | Low, Farm gate |
| Conditions: comment on ground stability, footing, exposure/remoteness | Low |
| Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank | Low, fencing |
| Occupied/Unoccupied: people, livestock, animals | Low |
| Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational | Low, agriculture |
| Risk if lone-working | Low |

**IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS DO NOT CONTINUE WITH THE SURVEY.**

**Weil's Disease (*Leptospirosis*)**

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

**Lyme Disease**

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

# RIVER HABITAT SURVEY 2003 VERSION: SPOT-CHECK KEY 

## PHYSICAL ATTRIBUTES (SECTION E)

### BANKS

**Predominant bank material**

**NV** = not visible

**BE** = bedrock
**BO** = boulder
**CO** = cobble
**GS** = gravel/sand
**EA** = earth (crumbly)
**PE** = peat
**CL** = sticky clay

**CC** = concrete
**SP** = sheet piling
**WP** = wood piling
**GA** = gabion
**BR** = brick/laid stone
**RR** = rip-rap
**TD** = tipped debris
**FA** = fabric
**BI** = bio-engineering materials

**Bank modifications**

**NK** = not known
**NO** = none

**RS** = resectioned (reprofiled)
**RI** = reinforced
**PC** = poached
**PC(B)** = poached (bare)
**BM** = artificial berm
**EM** = embanked

**Marginal and bank features**

**NV** = not visible (e.g. far bank)
**NO** = none

**EC** = eroding cliff (**EC** if sandy substrate)
**SC** = stable cliff (**SC** if sandy substrate)

**PB** = unvegetated point bar
**VP** = vegetated point bar

**SB** = unvegetated side bar
**VS** = vegetated side bar

**NB** = natural berm

### CHANNEL

**Predominant substrate**

**NV** = not visible

**BE** = bedrock
**BO** = boulder
**CO** = cobble
**GP** = gravel/pebble (**G** or **P** if predominant)
**SA** = sand
**SI** = silt
**CL** = clay
**PE** = peat
**EA** = earth
**AR** = artificial

**Predominant flow-type**

**NV** = not visible
**FF** = free fall
**CH** = chute
**BW** = broken standing waves (white water)
**UW** = unbroken standing waves
**CF** = chaotic flow
**RP** = rippled
**UP** = upwelling
**SM** = smooth
**NP** = no perceptible flow
**DR** = no flow (dry)

**Channel modifications**

**NK** = not known
**NO** = none

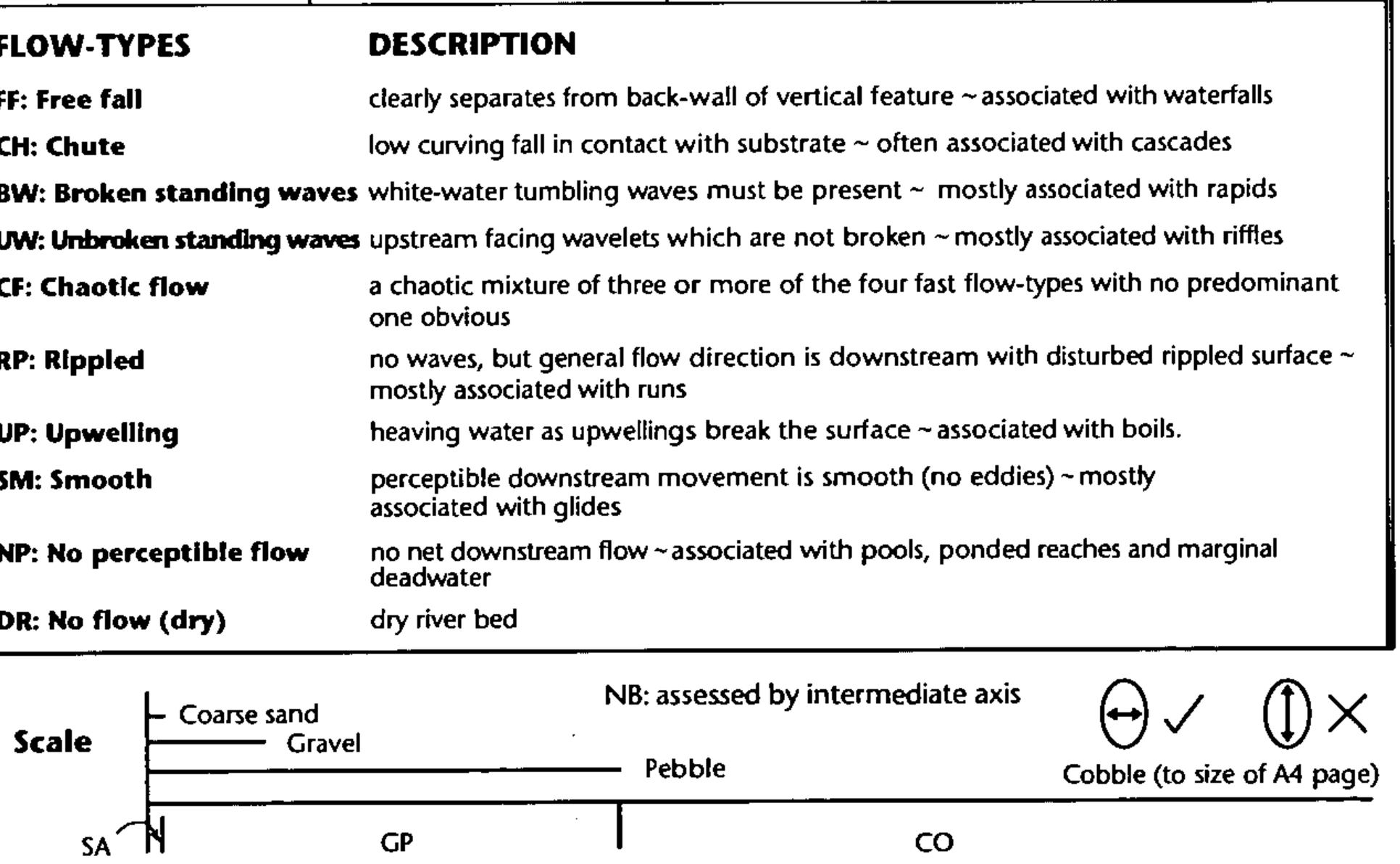
**CV** = culverted
**RS** = resectioned
**RI** = reinforced
**DA** = dam/weir/sluice
**FO** = ford (man-made)

**Channel features**

**NV** = not visible
**NO** = none

**EB** = exposed bedrock
**RO** = exposed boulders
**VR** = vegetated rock
**MB** = unvegetated mid-channel bar
**VB** = vegetated mid-channel bar
**MI** = mature island
**TR** = Trash (urban debris)

| FLOW-TYPES | DESCRIPTION |
|---|---|
| **FF: Free fall** | clearly separates from back-wall of vertical feature ~ associated with waterfalls |
| **CH: Chute** | low curving fall in contact with substrate ~ often associated with cascades |
| **BW: Broken standing waves** | white-water tumbling waves must be present ~ mostly associated with rapids |
| **UW: Unbroken standing waves** | upstream facing wavelets which are not broken ~ mostly associated with riffles |
| **CF: Chaotic flow** | a chaotic mixture of three or more of the four fast flow-types with no predominant one obvious |
| **RP: Rippled** | no waves, but general flow direction is downstream with disturbed rippled surface ~ mostly associated with runs |
| **UP: Upwelling** | heaving water as upwellings break the surface ~ associated with boils. |
| **SM: Smooth** | perceptible downstream movement is smooth (no eddies) ~ mostly associated with glides |
| **NP: No perceptible flow** | no net downstream flow ~ associated with pools, ponded reaches and marginal deadwater |
| **DR: No flow (dry)** | dry river bed |



**LEFT** **Banks are determined by looking downstream** **RIGHT**

## CHANNEL MODIFICATION INDICATORS

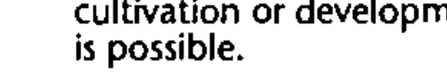
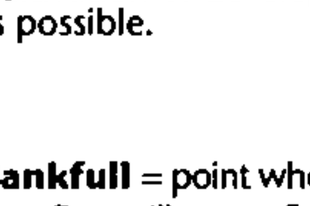
One or more of the following may be indicative of resectioning:

1. Uniform bank profile
2. Straightened planform
3. Bankfull width/bankfull height ratio <4:1
4. Uniform/low energy flow-types
5. No trees/uniformly-aged trees along bank
6. Intensive/urban land-use

## LAND-USE WITHIN 5m OF BANKTOP (SECTION F) & 50m (SECTION H)

**BL** = Broadleaf/mixed woodland (semi-natural)
**BP** = Broadleaf/mixed plantation
**CW** = Coniferous woodland (semi-natural)
**CP** = Coniferous plantation
**SH** = Scrub & shrubs
**OR** = Orchard
**WL** = Wetland (e.g. bog, marsh, fen)
**MH** = Moorland/heath
**AW** = Artificial open water
**OW** = Natural open water
**RP** = Rough unimproved grassland/pasture
**IG** = Improved/semi-improved grassland
**TH** = Tall herb/rank vegetation
**RD** = Rock, scree or sand dunes
**SU** = Suburban/urban development
**TL** = Tilled land
**IL** = Irrigated land
**PG** = Parkland or gardens
**NV** = Not visible

## BANKTOP AND BANKFACE VEGETATION STRUCTURE To be assessed within a 10m wide transect (SECTION F)

| | | |
|---|---|---|
| bare | B | bare earth/rock etc. |
| uniform  | U | predominantly one type (no scrub or trees) |
| simple  | S | two or three vegetation types |
| complex  | C | four or more types |

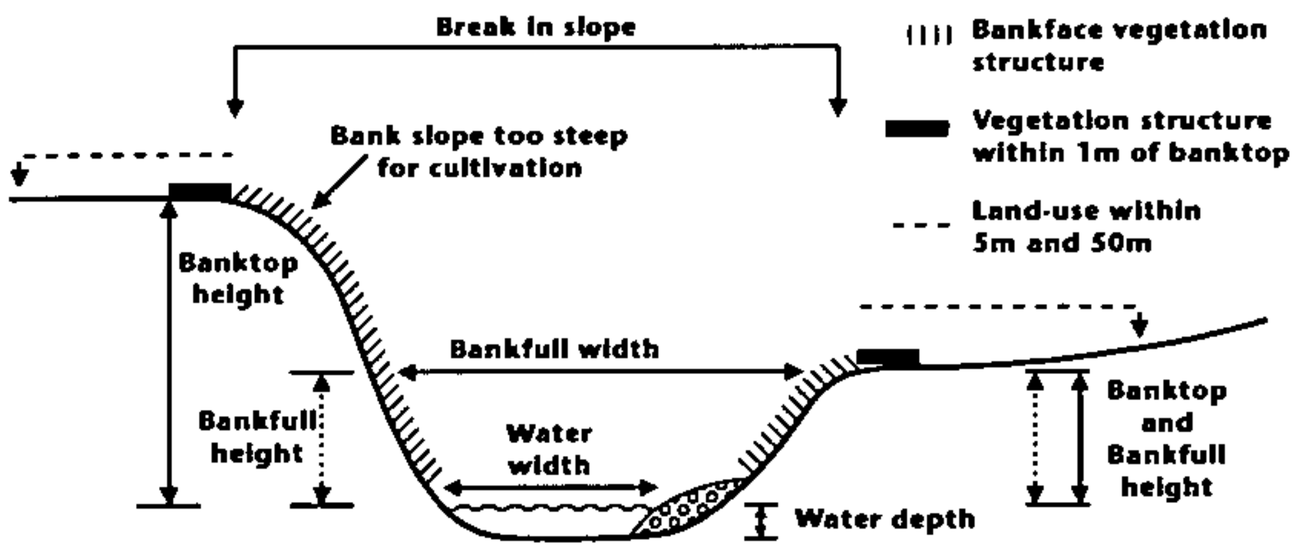
vegetation types

- bryophytes
- short/creeping herbs or grasses
- tall herbs/ grasses
- scrub or shrubs
- saplings and trees

### Channel dimensions guidance (Section L)

- Select location on uniform section.
- If riffle is present, measure there. If not, measure at straightest and shallowest point.
- **Banktop** = first major break in slope above which cultivation or development is possible.
- **Bankfull** = point where river first spills on to floodplain.

**Cross-section of channel showing definitions used to define where spot-check recording and channel dimensions measured**




ENVIRONMENT AGENCY

**EMERGENCY HOTLINE 0800 80 70 60**

24 hour free emergency telephone line for reporting all environmental incidents relating to air, land and water.

## A FIELD SURVEY DETAILS

leave blank if new site

Site Number: Hereford 2

Site Reference: Pennoxstone B

Spot-check 1 Grid Ref: SO55833 28966

Spot-check 6 Grid Ref:

End of site Grid Ref: SO54892 28295

Reach Reference: B

River name:

Date 10 / 04 /20 09 Time: 12.30

Surveyor name: Alison Strange

Accredited Surveyor code:

Is the site part of a river or an artificial channel? River [X] Artificial [ ]

Are adverse conditions affecting survey? No [X] Yes [ ]

If yes, state .....

Is bed of river visible? barely or not [ ] partially [ ] ±entirely [X]

Is health and safety assessment form attached? Yes [X] No [ ]

Number of photographs taken: [ ]

Photo references:

Site surveyed from: left bank [■] right bank [ ] channel [■]

[ ] When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream RIGHT

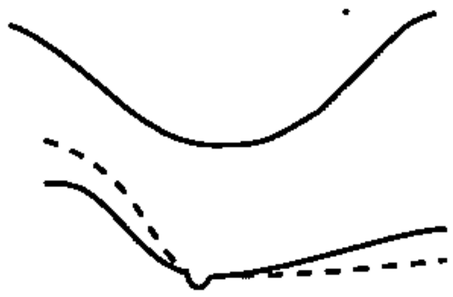
## B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

[ ] shallow vee

[ ] deep vee

[ ] gorge



[ ] concave/bowl

[X] asymmetrical valley

[ ] U-shape valley

[ ] no obvious valley sides

Distinct flat valley bottom? No [ ] Yes [X]

Natural terraces? No [X] Yes [ ]

## C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

| | | | |
|---|---|---|---|
| Riffle(s) | | Unvegetated point bar(s) | |
| Pool(s) | | Vegetated point bar(s) | |

## D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box [ ]

| | Major | Intermediate | Minor | | Major | Intermediate | Minor |
|---|---|---|---|---|---|---|---|
| Weirs/sluices | | | | Outfalls/ intakes | | | |
| Culverts | | | | Fords | | | |
| Bridges | | | 1 | Deflectors/ groynes/croys | | | |
| Other - state | | | | | | | |

**Is channel obviously realigned?** No [X] Yes, <33% of site [ ] ≥33% of site [ ]

**Is channel obviously over-deepened?** No [X] Yes, <33% of site [ ] ≥33% of site [ ]

**Is water impounded by weir/dam?** No [X] Yes, <33% of site [ ] ≥33% of site [ ]

SITE REF. Pennoxstone B | **RIVER HABITAT SURVEY: TEN SPOT-CHECKS** | **Page 2 of 4**

Spot-check 1 is at: upstream end (●) downstream end ( ) of site (tick one box)

**E PHYSICAL ATTRIBUTES** (to be assessed across channel within 1m wide transect)

| When boxes 'bordered', only one entry allowed | 1 GPS | 2 | 3 | 4 | 5 | 6 GPS | 7 | 8 | 9 | 10 | GPS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LEFT BANK** | Ring EC or SC if composed of sandy substrate | | | | | | | | | | |
| **Material** NV, BE, BO, CO, CS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | |
| **Bank modification(s)** NK, NO, RS, RI, PC(B), BM, EM | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **Marginal & bank feature(s)** NV, NO, EC, SC, PB, VP, SB, VS, NB | SC | SC | SC | SC | SC | SC | SC | SC | NO | NO | |
| **CHANNEL** | GP- ring either G or P if predominant | | | | | | | | | | |
| **Channel substrate** NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | |
| **Flow-type** NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR | SM | SM | SM | SM | NP | NP | NP | SM | NP | SM | |
| **Channel modification(s)** NK, NO, CV, RS, RI, DA, FO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **Channel feature(s)** NV, NO, EB, RO, VR, MB, VB, MI, TR | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **For braided rivers only: number of sub-channels** | | | | | | | | | | | |
| **RIGHT BANK** | Ring EC or SC if composed of sandy substrate | | | | | | | | | | |
| **Material** NV, BE, BO, CO, CS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | |
| **Bank modification(s)** NK, NO, RS, RI, PC(B), BM, EM | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | |
| **Marginal & bank feature(s)** NV, NO, EC, SC, PB, VP, SB, VS, NB | SC | SC | SC | SC | SC | SC | SC | SC | NO | NO | |

**F BANKTOP LAND-USE AND VEGETATION STRUCTURE** (to be assessed over a 10m wide transect)

**Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LAND-USE WITHIN 5m OF LEFT BANKTOP | IG | IG | IG | IG | IG | IG | IG | IG | IG | IG | |
| LEFT BANKTOP (structure within 1m) B/U/S/C/NV | C | C | S | C | S | C | S | C | C | C | |
| LEFT BANK-FACE (structure) B/U/S/C/NV | S | S | S | S | S | S | S | S | S | S | |
| RIGHT BANK-FACE (structure) B/U/S/C/NV | S | S | S | S | S | S | S | S | S | S | |
| RIGHT BANKTOP (structure within 1m) B/U/S/C/NV | S | C | S | C | S | C | S | C | C | C | |
| LAND-USE WITHIN 5m OF RIGHT BANKTOP | IG | IG | IG | IG | IG | IG | IG | IG | OR | OR | |

← Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

**G CHANNEL VEGETATION TYPES** (to be assessed over a 10m wide transect: use E ( ≥ 33% area), ✓ (present) or NV (not visible))

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None (✓) or Not Visible (NV) | NV | NV | NV | | NV | | | E | E | E | |
| Liverworts/mosses/lichens | | | | | | | | | | | |
| Emergent broad-leaved herbs | | | | X | | X | X | X | X | X | |
| Emergent reeds/sedges/rushes/grasses/horsetails | | | | | | | | | | | |
| Floating-leaved (rooted) | | | | | | | | | | | |
| Free-floating | | | | | | | | | | | |
| Amphibious | | | | | | | | | | | |
| Submerged broad-leaved | | | | | | | | | | | |
| Submerged linear-leaved | | | | | | | | | | | |
| Submerged fine-leaved | | | | | | | | | | | |
| Filamentous algae | | | | | | | | | | | |

Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ——→

## H LAND-USE WITHIN 50m OF BANKTOP

Use ✓ (present) or E (≥ 33% banklength)

| | L | R | | L | R |
|---|---|---|---|---|---|
| Broadleaf/mixed woodland (semi-natural) (BL) | | | Natural open water (OW) | | |
| Broadleaf/mixed plantation (BP) | | | Rough/unimproved grassland/pasture (RP) | | |
| Coniferous woodland (semi-natural) (CW) | | | Improved/semi-improved grassland (IG) | E | E |
| Coniferous plantation (CP) | | | Tall herb/rank vegetation (TH) | | |
| Scrub & shrubs (SH) | | | Rock, scree or sand dunes (RD) | | |
| Orchard (OR) | | x | Suburban/urban development (SU) | | |
| Wetland (e.g. bog, marsh, fen) (WL) | | | Tilled land (TL) | | |
| Moorland/heath (MH) | | | Irrigated land (IL) | | |
| Artificial open water (AW) | | | Parkland or gardens (PG) | | |
| | | | Not visible (NV) | | |

## I BANK PROFILES

Use ✓ (present) or E (≥ 33% banklength)

| **Natural/unmodified** | L | R | **Artificial/modified** | L | R |
|---|---|---|---|---|---|
| Vertical/undercut | | | Resectioned (reprofiled) | | |
| Vertical with toe | | | Reinforced - whole | | |
| Steep (>45°) | E | E | Reinforced - top only | | |
| Gentle | X | X | Reinforced - toe only | | |
| Composite | | | Artificial two-stage | | |
| Natural berm | | | Poached bank | | |
| | | | Embanked | | |
| | | | Set-back embankment | | |

## J EXTENT OF TREES AND ASSOCIATED FEATURES

*record even if <1%

**TREES** (tick one box per bank)

| | Left | Right |
|---|---|---|
| None | ☐ | ☐ |
| Isolated/scattered | ☐ | ☐ |
| Regularly spaced, single | ☐ | ☐ |
| Occasional clumps | ☒ | ☐ |
| Semi-continuous | ☐ | ☒ |
| Continuous | ☐ | ☐ |

**ASSOCIATED FEATURES** (tick one box per feature)

| | None | Present | E (≥33%) |
|---|---|---|---|
| Shading of channel | ☐ | ☐ | ☒ |
| *Overhanging boughs | ☐ | ☐ | ☒ |
| *Exposed bankside roots | ☐ | ☐ | ☒ |
| *Underwater tree roots | ☐ | ☐ | ☒ |
| Fallen trees | ☐ | ☐ | ☒ |
| Large woody debris | ☐ | ☐ | ☒ |

## K EXTENT OF CHANNEL AND BANK FEATURES

(tick one box for each feature) *record even if <1%

| | None | Present | E(≥33%) |
|---|---|---|---|
| *Free fall flow | ☐ | ☐ | ☐ |
| Chute flow | ☐ | ☐ | ☐ |
| Broken standing waves | ☐ | ☐ | ☐ |
| Unbroken standing waves | ☐ | ☐ | ☐ |
| Rippled flow | ☐ | ☐ | ☐ |
| *Upwelling | ☐ | ☐ | ☐ |
| Smooth flow | ☐ | ☒ | ☐ |
| No perceptible flow | ☐ | ☐ | ☒ |
| No flow (dry) | ☐ | ☐ | ☐ |
| Marginal deadwater | ☐ | ☐ | ☐ |
| Eroding cliff(s) | ☐ | ☐ | ☐ |
| Stable cliff(s) | ☐ | ☐ | ☐ |

| | None | Present | E(≥33%) |
|---|---|---|---|
| Exposed bedrock | ☐ | ☐ | ☐ |
| Exposed boulders | ☐ | ☐ | ☐ |
| Vegetated bedrock/boulders | ☐ | ☐ | ☐ |
| Unvegetated mid-channel bar(s) | ☐ | ☐ | ☐ |
| Vegetated mid-channel bar(s) | ☐ | ☒ | ☐ |
| Mature island(s) | ☐ | ☐ | ☐ |
| Unvegetated side bar(s) | ☐ | ☐ | ☐ |
| Vegetated side bar(s) | ☐ | ☐ | ☐ |
| Unvegetated point bar(s) | ☐ | ☐ | ☐ |
| Vegetated point bar(s) | ☐ | ☐ | ☐ |
| *Unvegetated silt deposit(s) | ☐ | ☐ | ☐ |
| *Discrete unvegetated sand deposit(s) | ☐ | ☒ | |
| *Discrete unvegetated gravel deposit(s) | ☐ | ☐ | |

SITE REF. Pennoxstone B

# RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES



## L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)

| LEFT BANK | | CHANNEL | | RIGHT BANK | |
|---|---|---|---|---|---|
| Banktop height (m) | 2M | Bankfull width (m) | 2M | Banktop height (m) | 2M |
| Is banktop height also bankfull height? (Y or N) | N | Water width (m) | 50CM | Is banktop height also bankfull height? (Y or N) | N |
| Embanked height (m) | | Water depth (m) | 30CM | Embanked height (m) | |

If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =

Bed material at site is: consolidated ( ) unconsolidated (loose) (•) unknown ( )

Location of measurements is: riffle ( ) other (•) (state)

## M FEATURES OF SPECIAL INTEREST Use ✓ or E (≥ 33% length) *record even if <1%

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| None | ☐ | Very large boulders (>1m) | ☐ | Backwater(s) | ☐ | Marsh(es) | ☐ |
| Braided channels | ☐ | *Debris dam(s) | ☐ | Floodplain boulder deposits | ☐ | Flush(es) | ☐ |
| Side channel(s) | ☐ | *Leafy debris | ■ | Water meadow(s) | ☐ | Natural open water | ☐ |
| *Natural waterfall(s) > 5m high | ☐ | Fringing reed-bank(s) | ☐ | Fen(s) | ☐ | Others (state) | ☐ |
| *Natural waterfall(s) < 5m high | ☐ | Quaking bank(s) | ☐ | Bog(s) | ☐ | | |
| Natural cascade(s) | ☐ | *Sink hole(s) | ☐ | Wet woodland(s) | ☐ | | |

## N CHOKED CHANNEL (tick one box)

Is 33% or more of the channel choked with vegetation? No [x] Yes [ ]

## O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (≥ 33% length) *record even if <1%

| | bankface | banktop to 50m | | bankface | banktop to 50m |
|---|---|---|---|---|---|
| None ☐ | | | *Himalayan balsam | [x] | |
| *Giant hogweed | | | | | |
| *Japanese knotweed | | | *Other (state)..... | | |

## P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)

**Major impacts:** landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power

**Evidence of recent management:** dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)

**Animals:** otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies

**Other significant observations:** if necessary use separate sheet to describe overall characteristics and relevant observations

## Q ALDERS (tick one box in each of the two categories ) *record even if <1%

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Alders? None | ☐ | Present | ✓ | Extensive | ☐ | *Diseased Alders? None | ✓ | Present ☐ Extensive ☐ |

## R FIELD SURVEY QUALITY CONTROL ( ✓ boxes to confirm checks)

- Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? ☐
- Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? ☐
- Have you completed column 11 of section G (and E if appropriate) on page 2? ☐
- Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? ☐
- Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? ☐
- Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? ☐
- Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? ☐