

# The physical character of rivers and streams in the UK and Isle of Man

## SUMMARY FACT-SHEET: MAY 1998

### ABOUT THIS FACT-SHEET

This summary fact-sheet contains selected information derived from a major baseline survey of rivers and streams throughout the UK and the Isle of Man carried out during 1994–1997. Data were collected using the River Habitat Survey (RHS), a new method for assessing the physical character and quality of river habitats and the modifications affecting them. The development of this method and the main findings of the survey are described in *"River Habitat Quality: the physical character of rivers and streams in the UK and Isle of Man"*, published in May 1998 by the Environment Agency, in collaboration with the Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service, Northern Ireland.

Information is based on field observations made during a baseline survey of RHS reference sites which forms a geographically representative sample of the 85,000km of rivers and streams classified for water quality purposes. Sample sites were randomly selected within Ordnance Survey 10km grid squares, and more than 100 different sorts of information recorded. The number of RHS reference sites per 10km square and the period of survey are shown below.

This fact-sheet presents information on a selection of the attributes recorded. The percentage of RHS reference sites with each attribute is presented for the complete network of UK and Isle of Man RHS reference sites, and

also for three subsets of sites: England and Wales, Scotland and Northern Ireland. For more meaningful comparison between these subsets, the percentage occurrence of attributes in upland sites is presented separately from that in lowland sites. The small number of upland sites surveyed in Northern Ireland means that these have been omitted from the Northern Ireland column, because meaningful comparison would be difficult - but they have been included in the total (UK and Isle of Man) column. Upland and lowland data for sites in the Isle of Man appear only in the total (UK and Isle of Man) column for similar reasons.

The results in the main Report and this summary fact-sheet need to be viewed with two sources of uncertainty in mind: (i) the observational accuracy of different RHS surveyors, and (ii) the current verification limitations of the RHS database, containing information from the baseline survey. The first uncertainty has been minimised by training and accreditation controls. Secondly, the process of validating the database has involved double-entry and cross checking for errors. Inevitably, some errors will have been missed, but continuing checks will help to ensure that it is fully validated and updated. If results in this summary fact-sheet are to be used for other than broad reporting purposes, the data should be checked with the Environment Agency, SEPA or the Environment and Heritage Service, as appropriate.

|                  | Number of reference sites per 10km grid square | Period of survey | Number of baseline reference sites surveyed |            |             |
|------------------|--|------------------|---|------------|-------------|
|                  |  |                  | Total                                       | Upland     | Lowland     |
| England & Wales  | 3  | 1994–1996        | 4559  | 404        | 4155        |
| Scotland         | 1  | 1995–1996        | 769   | 181        | 588         |
| Northern Ireland | 2  | 1995–1996        | 266   | 4          | 262         |
| Isle of Man      | 3  | 1997             | 18  | 4          | 14          |
| <b>Total</b>     |  |                  | <b>5612</b>                                 | <b>593</b> | <b>5019</b> |

| Attribute                               | Percentage of RHS reference sites   |         |                 |         |          |         |                  |      |      |
|---|---|---------|-----------------|---------|----------|---------|------------------|------|------|
|   | UK & Isle of Man  |         | England & Wales |         | Scotland |         | Northern Ireland |      |      |
|   | Upland  | Lowland | Upland          | Lowland | Upland   | Lowland | Lowland          |      |      |
| <b>Size and predominant valley form</b> |   |         |                 |         |          |         |                  |      |      |
| 1                                       | Water width of 5m or narrower   |         | 65.0            | 54.1    | 67.6     | 55.2    | 57.7             | 50.8 | 42.6 |
| 2                                       | Water width of 5–10m  |         | 23.1            | 22.8    | 25.0     | 22.5    | 19.8             | 23.9 | 26.0 |
| 3                                       | Water width of 10–20m   |         | 8.9             | 13.2    | 5.9      | 12.4    | 15.9             | 15.6 | 21.3 |
| 4                                       | Water width greater than 20m  |         | 2.5             | 9.0     | 1.0      | 8.9     | 6.0              | 9.5  | 10.1 |
| 5                                       | Gorge   |         | 3.2             | 1.7     | 3.0      | 1.2     | 3.8              | 5.8  | 0.0  |
| 6                                       | Vee-shaped valley   |         | 46.6            | 27.4    | 46.3     | 21.4    | 45.1             | 49.7 | 72.9 |
| 7                                       | Concave/bowl-shaped valley  |         | 22.9            | 10.8    | 22.0     | 10.5    | 25.8             | 14.8 | 6.2  |
| 8                                       | Symmetrical (flat) floodplain   |         | 7.9             | 45.8    | 8.2      | 51.8    | 7.7              | 15.3 | 19.4 |
| 9                                       | Asymmetrical floodplain   |         | 13.1            | 11.1    | 13.6     | 11.6    | 12.6             | 11.9 | 1.6  |
| <b>Channel features</b>                 |   |         |                 |         |          |         |                  |      |      |
| 10                                      | 1–2 flow types (1995 and 1996 data only)                                  |         | 9.0             | 43.6    | 10.8     | 50.4    | 4.9              | 16.1 | 33.7 |
| 11                                      | 3–4 flow types (1995 and 1996 data only)                                  |         | 67.2            | 48.3    | 68.7     | 43.6    | 66.5             | 65.5 | 57.8 |
| 12                                      | 5 or more flow types (1995 and 1996 data only)                            |         | 22.5            | 6.4     | 19.0     | 3.7     | 27.5             | 18.0 | 8.5  |
| 13                                      | Waterfalls or cascades  |         | 68.5            | 21.4    | 65.3     | 16.3    | 74.7             | 56.0 | 21.3 |
| 14                                      | Rapids  |         | 51.3            | 14.6    | 48.8     | 12.0    | 58.2             | 38.7 | 1.6  |
| 15                                      | Riffles (1996 data only)  |         | 86.2            | 64.8    | 85.3     | 59.0    | 87.4             | 84.7 | 83.1 |
| 16                                      | Riffles and pools (1996 data only)  |         | 52.6            | 32.2    | 52.9     | 27.2    | 50.5             | 51.8 | 39.8 |
| 17                                      | Exposed boulders  |         | 87.4            | 31.6    | 86.1     | 23.7    | 89.6             | 77.2 | 51.9 |
| 18                                      | Point bars  |         | 49.5            | 32.6    | 47.3     | 31.0    | 54.4             | 36.2 | 51.9 |
| 19                                      | Mid-channel bars  |         | 50.5            | 29.6    | 48.8     | 26.8    | 54.9             | 46.0 | 38.8 |
| 20                                      | Coarse woody debris   |         | 35.7            | 51.6    | 42.3     | 52.7    | 22.5             | 43.8 | 52.3 |
| 21                                      | Extensive coarse woody debris   |         | 1.9             | 3.1     | 2.0      | 3.4     | 1.6              | 2.7  | 0.4  |
| 22                                      | Debris dam(s) (1995 and 1996 data only)                                   |         | 17.0            | 18.6    | 22.0     | 21.0    | 9.9              | 11.0 | 12.0 |
| 23                                      | Fallen trees  |         | 31.1            | 36.8    | 34.4     | 36.8    | 24.7             | 37.2 | 35.7 |
| 24                                      | Extensive fallen trees  |         | 1.5             | 1.3     | 1.2      | 1.3     | 2.2              | 1.5  | 0.0  |
| 25                                      | No in-stream channel vegetation, or none visible                          |         | 26.4            | 30.8    | 19.6     | 30.3    | 39.6             | 32.3 | 31.8 |
| 26                                      | 1 or 2 types of in-stream channel vegetation                              |         | 30.5            | 21.5    | 28.7     | 20.4    | 35.2             | 30.2 | 19.4 |
| 27                                      | 3 or 4 types of in-stream channel vegetation                              |         | 28.3            | 26.6    | 32.7     | 26.8    | 19.2             | 23.6 | 31.0 |
| 28                                      | 5 or more types of in-stream channel vegetation                           |         | 14.8            | 21.2    | 19.1     | 22.5    | 6.0              | 13.9 | 17.8 |
| 29                                      | Channel choked with in-stream vegetation                                  |         | 2.4             | 10.9    | 2.0      | 11.8    | 3.3              | 7.6  | 2.7  |
| 30                                      | Extensive eroding earth cliffs on one or both banks                       |         | 8.4             | 3.5     | 9.4      | 3.2     | 6.6              | 6.8  | 1.2  |
| <b>Trees</b>                            |   |         |                 |         |          |         |                  |      |      |
| 31                                      | No trees on either bank   |         | 32.5            | 8.8     | 29.0     | 6.7     | 39.0             | 21.9 | 11.6 |
| 32                                      | Continuous or semi-continuous trees on:<br>one bank<br>both banks         |         | 7.2             | 19.1    | 8.2      | 20.3    | 5.5              | 10.5 | 20.2 |
| 33                                      |   |         | 26.8            | 36.5    | 30.9     | 36.8    | 18.1             | 41.3 | 20.5 |
| 34                                      | Exposed bankside roots  |         | 38.0            | 49.7    | 42.3     | 50.4    | 30.2             | 46.5 | 48.8 |
| 35                                      | Underwater tree roots   |         | 23.4            | 24.8    | 30.2     | 56.5    | 9.3              | 25.1 | 32.9 |
| 36                                      | Alders (1996 data only)   |         | 24.1            | 48.3    | 32.4     | 51.2    | 15.3             | 32.0 | 64.4 |
| 37                                      | Alders suspected of having Phytophthora disease (1995 and 1996 data only) |         | 1.5             | 1.9     | 2.6      | 2.3     | 0.0              | 0.5  | 0.4  |

| Attribute   | Percentage of RHS reference sites  |            |                 |         |          |         |                  |      |      |
|---|--|------------|-----------------|---------|----------|---------|------------------|------|------|
|   | UK & Isle of Man   |            | England & Wales |         | Scotland |         | Northern Ireland |      |      |
|   | Upland   | Lowland    | Upland          | Lowland | Upland   | Lowland | Lowland          |      |      |
| <b>Land use (within 50m of the river channel)</b> |  |            |                 |         |          |         |                  |      |      |
| 38  | Extensive broadleaf woodland along:                                      | one bank   | 9.1             | 15.8    | 10.4     | 16.9    | 6.0              | 12.1 | 7.4  |
| 39  |  | both banks | 7.1             | 11.9    | 8.7      | 10.5    | 3.8              | 24.4 | 5.8  |
| 40  | Extensive wetland along:   | one bank   | 3.4             | 2.4     | 4.5      | 2.6     | 1.1              | 2.0  | 0.8  |
| 41  |  | both banks | 4.0             | 1.5     | 4.2      | 1.0     | 3.8              | 5.6  | 0.0  |
| 42  | Extensive moorland/heath along:  | one bank   | 4.0             | 0.6     | 2.2      | 0.2     | 7.7              | 3.1  | 0.4  |
| 43  |  | both banks | 27.3            | 2.1     | 24.8     | 0.3     | 31.9             | 15.4 | 0.4  |
| 44  | Extensive pasture along:   | one bank   | 9.4             | 23.0    | 11.9     | 24.8    | 4.4              | 14.8 | 12.8 |
| 45  |  | both banks | 18.2            | 33.4    | 23.5     | 34.1    | 6.6              | 14.3 | 67.4 |
| 46  | Extensive tilled land along:   | one bank   | 9.4             | 8.1     | 6.7      | 7.5     | 15.4             | 11.0 | 11.2 |
| 47  |  | both banks | 27.9            | 7.1     | 22.5     | 4.5     | 41.2             | 25.0 | 9.3  |
| 48  | Extensive coniferous plantation along:                                   | one bank   | 6.2             | 2.5     | 5.4      | 1.6     | 8.2              | 8.8  | 1.9  |
| 49  |  | both banks | 7.1             | 1.3     | 3.7      | 0.9     | 13.7             | 4.1  | 0.8  |
| 50  | Extensive suburban or urban land along:                                  | one bank   | 3.5             | 10.0    | 4.5      | 11.1    | 1.6              | 5.3  | 3.9  |
| 51  |  | both banks | 1.3             | 6.2     | 1.5      | 7.2     | 1.1              | 1.2  | 0.8  |
| <b>Habitat modification category</b>              |  |            |                 |         |          |         |                  |      |      |
| 52  | <i>"Pristine" channel structure (HMS = 0)</i>                            |            | 41.8            | 15.1    | 38.9     | 13.6    | 47.3             | 28.0 | 10.1 |
| 53  | <i>"Semi-natural" channel structure (HMS 0-2)</i>                        |            | 61.4            | 29.7    | 56.9     | 28.2    | 70.9             | 44.3 | 20.9 |
| 54  | <i>Channel predominantly unmodified (HMS 3-8)</i>                        |            | 22.9            | 21.3    | 26.0     | 20.9    | 16.5             | 23.8 | 20.9 |
| 55  | <i>Channel obviously modified (HMS 9-20)</i>                             |            | 11.6            | 20.6    | 12.1     | 21.3    | 10.4             | 15.1 | 20.5 |
| 56  | <i>Channel significantly modified (HMS 21-44)</i>                        |            | 3.2             | 24.8    | 4.0      | 25.7    | 1.6              | 14.9 | 32.6 |
| 57  | <i>Channel severely modified (HMS 45+)</i>                               |            | 0.7             | 3.5     | 1.0      | 3.7     | 0.0              | 1.7  | 5.0  |
| <b>Modifying factors</b>                          |  |            |                 |         |          |         |                  |      |      |
| 58  | Straightened channels  |            | 0.0             | 6.2     | 0.0      | 7.3     | 0.0              | 0.5  | 0.4  |
| 59  | One or both banks extensively reinforced                                 |            | 4.9             | 11.2    | 6.2      | 11.3    | 2.2              | 7.1  | 18.6 |
| 60  | One or both banks extensively resectioned                                |            | 4.9             | 31.8    | 3.7      | 33.2    | 7.7              | 19.4 | 36.8 |
| 61  | Weir(s)  |            | 8.4             | 15.0    | 10.6     | 15.6    | 3.3              | 8.5  | 19.8 |
| 62  | Channel extensively embanked on one or both banks                        |            | 2.7             | 10.7    | 2.7      | 11.0    | 2.7              | 7.6  | 11.2 |
| 63  | Culvert(s)   |            | 3.5             | 9.3     | 5.2      | 10.5    | 0.0              | 4.8  | 3.1  |
| 64  | Bridge(s)  |            | 27.8            | 43.3    | 28.2     | 45.1    | 27.5             | 37.0 | 29.1 |
| 65  | One or both banks extensively poached                                    |            | 1.7             | 2.7     | 2.0      | 3.0     | 1.1              | 1.7  | 12.8 |
| <b>Invasive alien bankside plants</b>             |  |            |                 |         |          |         |                  |      |      |
| 66  | Giant hogweed  |            | 0.3             | 4.4     | 0.5      | 4.2     | 0.0              | 4.9  | 6.6  |
| 67  | Himalayan balsam   |            | 0.3             | 14.4    | 0.2      | 15.8    | 0.5              | 4.4  | 14.0 |
| 68  | Japanese knotweed  |            | 2.4             | 8.4     | 3.2      | 9.2     | 0.5              | 3.1  | 6.6  |
| 69  | At least one of the invasive alien bankside plants listed in facts 66-68 |            | 2.9             | 23.0    | 3.7      | 24.1    | 1.1              | 10.4 | 22.9 |

## TERMINOLOGY

A full technical glossary can be found in the main Report. Key terms used in this fact-sheet are explained below.

**Channel** A term used collectively in the Report and this fact-sheet, meaning the course of a river or stream, including the bed and banks. RHS data can, however, be split into channel (in-stream) and bank features.

**Extensive** The occurrence of a feature or modification along at least one third of an RHS site. This term can be applied to the in-stream channel or to individual banks as required.

**HMS (Habitat Modification Score)** Modification to the channel, expressed as a score based upon the type and extent of artificial features. The greater the degree of modification and/or level of impact, the higher the score.

**Mid-channel bar** An exposed river deposit in mid-channel.

**Point bar** A distinctive exposed river deposit on the inside of a meander bend. Can be unvegetated or vegetated. An important habitat for riverside beetles and other invertebrates.

**Rapid** An area of broken (white-water) waves associated with steep channels.

**Reinforced bank** A bank strengthened with concrete, brick or other material to protect it against erosion.

**Resectioned bank** A bank whose slope has been mechanically reprofiled to enlarge or alter the river channel, thereby increasing flood flow capacity.

**Riffle** Shallow, fast-flowing water with a distinctly disturbed surface, forming upstream-facing unbroken standing waves, usually over a gravel substrate.

**Upland and lowland** For the purposes of the main Report and this fact-sheet, **upland** is defined as land over 200m, west of a line between Start Point and Flamborough Head. **Lowland** is defined as land below 200m, including all land east of the Start Point and Flamborough Head line.

*Further copies of this fact-sheet are available from the Environment Agency.*

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