



UK Biodiversity Action Plan Priority Habitat Descriptions

Rivers

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Rivers

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Correspondence with existing habitats

- UK BAP broad habitat: Rivers and streams
- Phase 1: G2 Running water
- NVC: Various, including A2, A8–9, A11–20, S4–9, S11–14, S16–19, S22 and others
- Annex I: H3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
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Description

This habitat type includes a very wide range of types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in ‘natural’ systems). These range from torrential mountain streams to meandering lowland rivers.

Numerous factors influence the ecological characteristics of a watercourse, for example geology, topography, substrate, gradient, flow rate, altitude, channel profile, climate, catchment features (soil, land use, vegetation, etc.). Human activities add to this complexity. In addition most river systems change greatly in character as they flow from source to sea or lake. Although various classifications and typologies for rivers exist, none is considered adequate for identifying a discrete but comprehensive series of specific priority types against the criteria. Consequently a broad ‘rivers’ priority habitat has been adopted by the UK BAP, which includes the existing priority habitat, chalk rivers. Work to refine the criteria to identify the priority habitat was carried out by a partnership group, including representatives from the conservation and environment agencies, and Buglife, which proposed the following criteria. These were agreed by the UK BAP Biodiversity Reporting and Information Group (BRIG) on 19 July 2010.

Criteria for identification of BAP priority rivers

Units of assessment

The nature of rivers is typically one of continuous downstream change, with no clear boundaries and with localised physical and biological variability. Because of the physical, chemical and biological changes that occur from source to mouth, a single assessment of river ‘quality’ cannot be made for the entire watercourse (unless it is very short and uniform), but rather in shorter assessment sections. In SERCON (System for Evaluating Rivers for Conservation), rivers are divided into ECSs (Evaluated Corridor Sections) which are considered to constitute ecologically relevant units for evaluation (http://jncc.defra.gov.uk/pdf/CSM_archived_200503_rivers.pdf Appendix 1). An ECS is usually 10–30 km and comprises part of a single river (i.e. the main stem or a

tributary) which shows predominantly uniform characteristics such as underlying geology, slope or size.

Although a national dataset of river ECS divisions has been developed, this covers only about 30% of the UK river network and is still subject to validation and amendment. In time it is desirable that BAP priority habitat should be defined with reference to ECSs as these have greater ecological relevance than divisions based on administrative or other boundaries drawn for practical rather than scientific reasons. However, until a comprehensive set of ECSs is available for the UK, the unit for assessment of BAP priority river habitat will be the individual river 'water bodies' defined for use in the EC Water Framework Directive (WFD). The environment agencies in the UK identified WFD water bodies soon after the directive came into force. Boundaries between water bodies often lie at the confluence of two watercourses; they do not necessarily comprise single rivers but may also include several streams within the catchment or sub-catchment. For BAP purposes, lower parts of the river within the freshwater tidal zone can also be included. Headwaters, because of the small size of their catchments, are often not classified as water bodies under the WFD; these should be included separately when identifying BAP priority habitat.

Features qualifying BAP priority river habitat

River water bodies will qualify as BAP priority habitat either because they are considered to be near-natural, or because they fulfil one or more specific criteria relating to BAP priority species or to particular habitat types. BAP actions and targets will be part of local biodiversity strategies. Where a stretch of river is near-natural, the aim will be to maintain this quality and, where possible, to increase the naturalness of other parts of the river system. There are various ways of defining what is meant by 'near-natural' but, to increase consistency, only the relatively few river water bodies defined as being at 'high status' under the WFD are included in this category. Where a river qualifies on grounds other than naturalness, improvements in habitat quality may also form part of the objectives for maintaining the interest of its BAP features. As a significant proportion of the running water resource in the UK is likely to qualify, achievable priorities will need to be set for action, to improve the extent, habitat connectivity or quality of BAP priority rivers.

The list of qualifying criteria is as follows. There is more detail in the background section.

- 1. Riverine water bodies of high hydromorphological/ecological status.** The Environment Agency, the Northern Ireland Environment Agency and the Scottish Environmental Protection Agency have developed criteria and rules to identify such water bodies (<http://www.wfduk.org/resources%20/river-morphology-high-status-features-and-criteria>).
- 2. Headwaters.** To qualify as a priority habitat for 'Rivers' under the criterion of 'headwaters' a stream must be:
a watercourse within 2.5km of its furthest source as marked with a blue line on Ordnance Survey (OS) maps at a scale of 1:50,000. Note that each tributary of a river will have its own headwater, so there will be more than one (sometimes many more) per catchment. Headwaters which have been significantly altered from their natural state are however not included.
- 3. Occurrence of the EC Habitat Directive Annex I habitat (H3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation).** The definition will include (but not be confined to) all river SACs designated for the feature.
- 4. Chalk Rivers** as given in the existing BAP definition.
- 5. Active shingle rivers.** Data for this can come from River Habitat Surveys (Environment Agency 2003) or indicator species of invertebrate (see criterion 7).
- 6. A/SSSIs (Areas/Sites of Special Scientific Interest)** designated for river species, riverine features or fluvial geomorphology.
- 7. Species** including:
 - i. Annex II Habitats Directive species

- ii. BAP priority species
- iii. Invertebrate species which are strongly indicative of river shingle

See the list of qualifying species, Annex 1. To qualify, an ECS or WFD water body needs to have either:

- records of any one species from criterion levels A (BAP priority species strongly dependent on river habitat quality) or C (non-BAP priority species, indicative of shingle rivers), or
- from criterion level B (widespread BAP priority species which are less dependent on river habitat quality alone), records of six or more species. This threshold has been selected by looking at available records for all criteria and identifying a level which returns a manageable proportion of the rivers network.

Where the English, Northern Irish, Scottish or Welsh country biodiversity groups have signed off their own lists of BAP priority species, including species which are not in the UK list, then rivers can qualify for these species using criteria agreed at country level.

A UK working group has collated data available at UK level about criteria 1 to 7 and used it to make an initial list of proposed BAP rivers, to support local BAP decisions. Local BAP practitioners may have access to better local data which can be used to refine the proposed list. The list will be posted on the UK BAP website (<http://jncc.defra.gov.uk/page-5155>), along with background papers explaining the data and methods used.

The following are excluded from this priority habitat:

- Canals;
- Ditches;

As a minimum the rivers priority habitat would be defined as extending to the top of the adjacent banks, recognising that (a) it may be desirable to restore a river to a previous course, and (b) a river's floodplain (present or historical) may be essential to its ecological functioning. Significant areas of adjoining priority habitats (such as fen, woodland, grassland and heathland types) may form an integral component of river systems for the purposes of conservation and management, but would be excluded from the formal definition of the Rivers priority habitat. This would also apply to areas of metalliferous river shingle supporting Calaminarian grassland (part of a separate proposed priority habitat). Adjacent ponds would be included within the River habitat if they have been formed as a result of river dynamics (e.g. oxbows), but not if they are artificial or formed by an unrelated process (e.g. pingos).

The plant and animal assemblages of rivers and streams vary according to their geographical area, underlying geology and water quality. Swiftly-flowing upland, nutrient-poor rivers support a wide range of mosses and liverworts and relatively few species of higher plants. The invertebrate fauna of upland rivers is dominated by stoneflies, mayflies and caddisflies, while fish such as salmon *Salmo salar* and brown trout *Salmo trutta* will almost certainly be present. In contrast, lowland nutrient-rich systems are dominated by higher plants, and coarse fish such as chub *Leuciscus cephalus*, dace *Leuciscus leuciscus* and roach *Rutilus rutilus*. Exposed sediments such as shingle beds and sand bars are important for a range of invertebrates, notably ground beetles, spiders and craneflies. Marginal and bankside vegetation is an integral part of a river, supporting a range of river processes, as well as acting as habitat in its own right for a diverse flora and fauna, and as a migration corridor.

Background Information

The information in this section comes from the submission to the BAP species and Habitats review in 2006–07 (http://jncc.defra.gov.uk/pdf/UKBAP_Species-HabitatsReview-2007.pdf), unless stated otherwise.

Headwaters

Based on submission to priority habitats review dated 2/11/05.

The definition of 'headwater' as given by Furse (1995) is 'a watercourse within 2.5km of its furthest source as marked with a blue line on Ordnance Survey (OS) Landranger maps with a scale of 1:50,000.' In Britain, headwaters probably represent >70% of the total length of flowing waters. This implies a total length >146,000km.

Physical and chemical characteristics of headwaters vary greatly according to their location, altitude, geology, and surrounding land-use. By definition, headwaters form the uppermost segments of rivers, and as such play an important role in the overall functioning of river ecosystems downstream. Although some headwaters, either deliberately or incidentally, are included within protected areas such as SACs and SSSIs/ASSIs most are not, and the total length of headwaters receiving some form of special protection is a very small percentage of all headwaters in the UK.

Rivers with *Ranuncion fluitantis* and *Callitricho-Batrachion* vegetation

Extracted from McLeod and others (2005) *Selection of SACs in the UK: habitat accounts*; see: <http://www.jncc.gov.uk/ProtectedSites/SACselection/habitat.asp?FeatureIntCode=H3260>. A fuller description and classification of this habitat type in the UK, together with details of threats and impacts, are given in *Life in UK Rivers* (2003).

This habitat type is characterised by the abundance of water-crowfoots *Ranunculus* spp., subgenus *Batrachium* (*Ranunculus fluitans*, *R. penicillatus* sap. *penicillatus*, *R. penicillatus* sap. *pseudofluitans*, and *R. peltatus* and its hybrids). Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They may modify water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

There are several variants of this habitat in the UK, depending on geology and river type. In each, *Ranunculus* species are associated with a different assemblage of other aquatic plants [but see sub-type 3], such as water-cress *Rorippa nasturtium-aquaticum*, water-starworts *Callitriche* spp., water-parsnips *Sium latifolium* and *Berula erecta*, water-milfoils *Myriophyllum* spp. and water forget-me-not *Myosotis scorpioides*. In some rivers, the cover of these species may exceed that of *Ranunculus* species. Three main sub-types are defined by substrate and the dominant species within the *Ranunculus* community.

Sub-type 1: This variant is found on rivers on chalk substrates. The community is characterised by pond water-crowfoot *Ranunculus peltatus* in spring-fed headwater streams (winterbournes), stream water-crowfoot *R. penicillatus* sap. *pseudofluitans* in the middle reaches, and river water-crowfoot *R. fluitans* in the downstream sections. *Ranunculus* is typically associated in the upper and middle reaches with *Callitriche obtusangula* and *C. platycarpa*.

Sub-type 2: This variant is found on other substrates, ranging from lime-rich substrates such as oolite, through soft sandstone and clay to more mesotrophic and oligotrophic rocks. There is considerable geographic and ecological variation in this sub-type. Faster-flowing western rivers on harder rocks, for example in Wales and south-west England, support stream water-crowfoot *Ranunculus penicillatus* sap. *penicillatus*, while western and northern rivers on sandstone or alluvial substrates often support both *R. penicillatus* sap. *penicillatus* and river water-crowfoot *R. fluitans*. Sub-type 2 rivers elsewhere in the UK contain a mixture of species, and often hybrids, but rarely support *R. penicillatus* sap. *penicillatus* or *R. fluitans*. Associated species which may be present include lesser water-parsnip *Berula erecta*, blunt-fruited water-starwort *Callitriche obtusangula*, and, in more polluted rivers, curled pondweed *Potamogeton crispus*, fennel pondweed *P. pectinatus* and horned pondweed *Zannichellia palustris*. Flowering-rush *Butomus umbellatus* is an occasional bank-side associate.

Sub-type 3: This variant is a mesotrophic to oligotrophic community found on hard rocks in the north and west. Rivers in Wales, Northern Ireland and south-west England are significant for the occurrence of stream water-crowfoot *Ranunculus penicillatus* ssp. *penicillatus*. Other typical species include the aquatic moss *Fontinalis squamosa*, alternate water-milfoil *Myriophyllum alterniflorum* and intermediate water-starwort *Callitriche hamulata*. More oligotrophic examples of this community lack *Ranunculus* spp. and are dominated by *M. alterniflorum*, *C. hamulata* and bog pondweed *Potamogeton polygonifolius*.

Chalk Rivers

Extracted from the UK HAP for chalk rivers (<https://webarchive.nationalarchives.gov.uk/20110303150026/http://www.ukbap.org.uk/UKPlans.aspx?ID=25>). Further, updated information is given in *The state of England's chalk rivers* (2004).

There are approximately 35 chalk rivers and major tributaries ranging from 20km to 90km in length. They are located in south and east England – from the Frome in Dorset to the Hull in Humberside.

Chalk rivers have a characteristic plant community, often dominated in mid-channel by river water crowfoot *Ranunculus penicillatus* var. *pseudofluitans* and starworts *Callitriche obtusangula* and *C. platycarpa*, and along the edges by watercress *Rorippa nasturtium-aquaticum* and lesser water-parsnip *Berula erecta*. They have low banks which support a range of water-loving plants. This plan considers action required for the river channel and banks but not for the whole catchment or floodplain.

All chalk rivers are fed from groundwater aquifers, producing clear waters and a generally stable flow and temperature regime. These are conditions which support a rich diversity of invertebrate life and important game fisheries, notably for brown trout *Salmo trutta*, brook lamprey *Lampetra planeri*, salmon *Salmo salar*, crayfish *Austropotamobius pallipes* and otter *Lutra lutra* are among the species listed on Annex II of the EC Habitats Directive which chalk rivers support.

Most chalk rivers have 'winterbourne' stretches in their headwaters. These often run dry, or partially dry, in late summer because of lack of rainfall recharging the aquifer. A characteristic range of invertebrates has adapted to these conditions, as is the brook water crowfoot *Ranunculus peltatus*.

Where the river corridor (approximately 50m either side of the river) is not affected by intensive agriculture, fisheries or urban development, rich fen vegetation has developed. This is maintained by extensive cattle grazing or naturally progresses to carr woodland. These areas are particularly rich in insect life and breeding birds.

Active Shingle Rivers

Based on submission to priority habitats review dated 2/11/05.

This habitat comprises those rivers which have significant reaches composed of a gravel or pebble bed material (with grain sizes in the range 2–256mm), sometimes with discrete sandy reaches or deposits (0.064–2mm diameter) in areas of lower slope, and having characteristic suites of features generated by the processes of erosion, sediment transport, deposition, and storage. Their headwaters are usually in upland areas which generate high-energy discharges, resulting in intermittent sediment movement. Average bed sediment size usually declines downstream (with the downstream reduction in underlying gradient and stream power) generating a commensurate change in habitat.

Typically, these rivers have extensive reaches of gravel, pebble and sand bed material in their middle reaches and in the piedmont zone, these shingle deposits being associated with a wandering, dynamic, meandering or divided channel and active erosion and sediment deposition features. The gravel-bed reaches exhibit characteristic macro-scale bed form morphology with

features including point bars and eroding cliffs, side- and mid-channel bars, and pool–riffle sequences. These features are typically unvegetated, reflecting their dynamic nature. Sediment transport and the formation of the characteristic habitat features typically occur only at high flows, when bedload may comprise up to 50% of the total sediment load in transit. Many of the macro-scale features are exposed in the channel as shingle during low-flow conditions. Sand bed reaches or deposits typically exhibit micro-scale bed form morphology with features such as ripples, dunes and plane beds. The transport and deposition of sand-sized material occurs across a wide range of discharges.

References

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UK BAP Steering Group for Chalk Rivers (2004) *The state of England's chalk rivers*. Environment Agency, Bristol. Available from: <http://adlib.everysite.co.uk/adlib/defra/content.aspx?doc=57246&id=57247> [Accessed 20 July 2010].

Updated December 2011.

Annex 1: qualifying species

Criterion level	NBN current scientific name	Common name	Classification level 2	Annex II	BAP priority species	Active river shingle species	limits to criterion/notes
A	<i>Acipenser sturio</i>	common sturgeon	bony fish		√		There are few sites
A	<i>Alosa alosa</i>	allis shad	bony fish	Ann II	√		There are few sites
A	<i>Alosa fallax</i>	twaite shad	bony fish	Ann II	√		There are few sites
A	<i>Cobitis taenia</i>	spined loach	bony fish	Ann II	√		There are few sites
A	<i>Osmerus eperlanus</i>	smelt (sparling)	bony fish		√		Only 6, ephemeral populations left
A	<i>Salvelinus alpinus</i>	Arctic charr	bony fish		√		Only records where breeding in rivers
A	<i>Collema dichotomum</i>	river jelly lichen	lichen		√		There are few sites
A	<i>Endocarpon adscendens</i>	a lichen	lichen		√		There are few sites
A	<i>Peltigera lepidophora</i>	ear-lobed dog-lichen	lichen		√		There are few sites
A	<i>Phaeophyscia endococcina</i>	a lichen	lichen		√		There are few sites
A	<i>Andreaea nivalis</i>	snow rock-moss	bryophyte		√		There are few sites
A	<i>Bryum gemmiparum</i>	Welsh thread-moss	bryophyte		√		There are few sites
A	<i>Bryum schleicheri</i>	Schleicher's thread-moss	bryophyte		√		There are few sites
A	<i>Bryum uliginosum</i>	cernuous bryum	bryophyte		√		There are few sites
A	<i>Cryphaea lamyana</i>	multi-fruited river moss	bryophyte		√		There are few sites
A	<i>Dumortiera hirsuta</i>	Dumortier's liverwort	bryophyte		√		There are few sites
A	<i>Fissidens serrulatus</i>	large Atlantic pocket-moss	bryophyte		√		There are few sites
A	<i>Pohlia scotica</i>	Scottish pohlia	bryophyte		√		There are few sites

Criterion level	NBN current scientific name	Common name	Classification level 2	Annex II	BAP priority species	Active river shingle species	limits to criterion/notes
A	<i>Rhytidiadelphus subpinnatus</i>	scarce turf-moss	bryophyte		√		River-bank records only
A	<i>Seligeria carniolica</i>	water rock-bristle	bryophyte		√		There are few sites
A	<i>Thamnobryum angustifolium</i>	Derbyshire feather-moss	bryophyte		√		There are few sites
A	<i>Thamnobryum cataractarum</i>	Yorkshire feather-moss	bryophyte		√		There are few sites
A	<i>Agabus brunneus</i>	Sharp's diving beetle	beetle		√		There are few sites
A	<i>Bembidion testaceum</i>	pale pin-palp	beetle		√	√	
A	<i>Bidessus minutissimus</i>	minutest diving beetle	beetle		√	√	
A	<i>Donacia bicolora</i>	two-tone reed beetle	beetle		√		There are few sites
A	<i>Hydrochus nitidicollis</i>	brass necked beetle	beetle		√	√	
A	<i>Meotica anglica</i>	shingle rove beetle	beetle		√	√	
A	<i>Thinobius newberyi</i>	Newbery's rove beetle	beetle		√	√	
A	<i>Lophopus crystallinus</i>	a bryozoan	bryozoan		√		There are few sites
A	<i>Glossosoma intermedium</i>	small grey sedge	caddisfly		√		There are few sites
A	<i>Hydropsyche bulgaromanorum</i>	scarce grey flag	caddisfly		√		There are few sites
A	<i>Ironoquia dubia</i>	scarce brown sedge	caddisfly		√		There are few sites
A	<i>Austropotamobius pallipes</i>	white-clawed crayfish	crustacean	Ann II	√		recent records only
A	<i>Coenagrion mercuriale</i>	southern damselfly	damselfly	Ann II	√		Restricted & threatened

Criterion level	NBN current scientific name	Common name	Classification level 2	Annex II	BAP priority species	Active river shingle species	limits to criterion/notes
A	<i>Clorismia rustica</i>	southern silver stiletto-fly	fly		√		
A	<i>Empis limata</i>	the borders dance-fly	fly		√		There are few sites
A	<i>Lipsothrix ecucullata</i>	Scottish yellow splinter	fly		√		There are few sites
A	<i>Lipsothrix nigristigma</i> (<i>L. nobilis</i>)	scarce yellow splinter	fly		√		There are few sites
A	<i>Rhabdomastix japonica</i>	river-shore crane-fly	fly		√	√	
A	<i>Nigrobaetis niger</i>	southern iron blue mayfly	mayfly		√		
A	<i>Potamanthus luteus</i>	yellow mayfly	mayfly		√		There are few sites
A	<i>Gyraulus acronicus</i>	Thames ram's-horn snail	mollusc		√		There are few sites
A	<i>Margaritifera margaritifera</i>	freshwater pearl mussel	mollusc	Ann II	√	√	
A	<i>Myxas glutinosa</i>	glutinous snail	mollusc		√		There are few sites
A	<i>Pisidium tenuilineatum</i>	fine-lined pea mussel	mollusc		√		Intermediate between 'few sites' and widespread
A	<i>Sphaerium solidum</i>	Witham orb mussel	mollusc		√		There are few sites
A	<i>Brachyptera putata</i>	northern february red	stonefly		√	√	
A	<i>Isogenus nubecula</i>	scarce yellow sally	stonefly		√		There are few sites
A	<i>Illecebrum verticillatum</i>	coral-necklace	vascular plant		√		River records only (ie probably only Cornish records)

Criterion level	NBN current scientific name	Common name	Classification level 2	Annex II	BAP priority species	Active river shingle species	limits to criterion/notes
A	<i>Luronium natans</i>	floating water plantain	vascular plant	Ann II	√		River records only (probably only two rivers, in Gwynedd and Ceredigion)
A	<i>Potamogeton compressus</i>	grass-wrack pondweed	vascular plant		√		River records only
A	<i>Schoenoplectus triqueter</i>	triangular club-rush	vascular plant		√		There are few sites
B	<i>Anguilla anguilla</i>	European eel	bony fish		√		
B	<i>Cottus gobio</i>	bullhead	bony fish	Ann II	√		English or Welsh records only
B	<i>Salmo salar</i>	Atlantic salmon	bony fish	Ann II	√		
B	<i>Salmo trutta</i>	brown/sea trout	bony fish		√		
B	<i>Lampetra fluviatilis</i>	river lamprey	jawless fish	Ann II	√		widespread
B	<i>Lampetra planeri</i>	brook lamprey	jawless fish	Ann II	√		widespread
B	<i>Petromyzon marinus</i>	sea lamprey	jawless fish	Ann II	√		
B	<i>Lipsothrix errans</i>	northern yellow splinter	fly		√		
B	<i>Pseudanodonta complanata</i>	depressed (or compressed) river mussel	mollusc		√		Fairly widespread, may be under-recorded
B	<i>Arvicola terrestris</i>	water vole	terrestrial mammal		√		
B	<i>Lutra lutra</i>	otter	terrestrial mammal	Ann II	√		

Criterion level	NBN current scientific name	Common name	Classification level 2	Annex II	BAP priority species	Active river shingle species	limits to criterion/notes
B	<i>Pipistrellus pygmaeus</i>	soprano pipistrelle	terrestrial mammal		√		River records only
B	<i>Oenanthe fistulosa</i>	tubular water-dropwort	vascular plant		√		River records only
B	<i>Sium latifolium</i>	Greater Water Parsnip	vascular plant		√		River records only
B	<i>Stellaria palustris</i>	marsh stitchwort	vascular plant		√		River-bank records only
B	<i>Emberiza schoeniclus</i> *	reed bunting	bird		√		only records of breeding near rivers
C	<i>Dyschirius angustatus</i>		beetle			√	
C	<i>Lionychus quadrum</i>		beetle			√	
C	<i>Perileptus areolatus</i>		beetle			√	

* Note that when the revised definition was first agreed and published (July 2010), reed bunting (*Emberiza schoeniclus*) was classified as a category 'A' species (a BAP priority species strongly dependent on river habitat quality). A review of evidence was subsequently commissioned from the British Trust for Ornithology, and can be found here (http://jncc.defra.gov.uk/pdf/UKBAP_ReedBunting-2010.pdf). The review supports the inclusion of records of breeding reed bunting as a category B species, and therefore the table above has been amended accordingly.

The previous rivers' definition, published in July 2010, can be found at: http://jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-45-Rivers2010.doc