Guidance for stakeholders on proposing local refinements to the BAP map of chalk rivers

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Acknowledgements

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Purpose

This guidance is intended to help stakeholders contribute their local knowledge of chalk rivers (including streams of all sizes, perennial and intermittent) to the process of refining the national map of chalk rivers in England. This will help the chalk river habitat resource receive the level of attention they deserve, as one of the key river types listed in the UK Biodiversity Action Plan definition of priority river habitat.

How does it work?

- *An updated map based on nationally-led review work was published on the NE open data site in March 2022 – partners and stakeholders can contribute to a further update of the map by proposing local additions and deletions.*
- *Local partnerships may choose to propose refinements collectively via local GIS analysis but the data portal facility on the Discovering priority habitats website provides a readily accessible means for any stakeholder to make proposals.*
- *The data portal stores all added proposals and displays them on the 'Display data' facility of the Discovering priority habitats website.*
- *Stakeholder proposals will be reviewed nationally and refinements made to the published chalk rivers map.*
- *The revised map will be republished, incorporating refinements into relevant regulatory and planning processes as well as processes for targeting restoration effort.*

1. Background

The recent national review of the BAP chalk rivers map is explained on the Discovering priority habitats website here. The review process has extended the original map into the smaller stream network. Collectively these smaller chalk streams, including seasonally flowing 'winterbournes', are of great importance to biodiversity, and it is critical that they are properly recognised, protected and restored along with larger chalk streams and rivers. Efforts were made to make the published map as accurate as possible but further local

refinement is known to be required since there is still considerable uncertainty within the smaller stream network..

Further refinements to the BAP chalk rivers map are important for ensuring all chalk rivers receive sufficient attention within the broader context of priority river habitat objectives and the measures put in place to implement the Water Framework Directive. Since 2008 the UK BAP definition of priority river habitat has been much broader than chalk rivers, which has necessitated a shift in strategic focus towards protecting and restoring high levels of natural river and stream function across all river/stream types (further explanation of this is provided here on the Discovering priority habitats website). The important thing to remember is that all chalk rivers are a biodiversity priority for protection and restoration at one level, along with all other river types included in the UK BAP definition. The national map of chalk rivers allows strategic assessment and management of the chalk river resource, in terms of its condition and the levels of activity directed at its protection and restoration.

It is important to note that parallel work on mapping restoration priorities, which emphasises measures that restore natural habitat function, poses particular challenges in parts of the chalk river habitat resource. This is because of the cultural and socioeconomic significance of some (particularly physical) modifications in chalk rivers, and the often greater difficulties of removing those modifications to restore more natural function. The chalk rivers map allows a strong focus to be maintained on the whole chalk river habitat resource, supporting whatever habitat improvements are possible in any given watercourse, and maintaining attention on our more urbanised chalk rivers which are so important to people's enjoyment of chalk rivers/streams.

It is worth adding that, even in more urbanised situations where there are immovable constraints to removing physical modifications, some of the key restoration measures that might be taken are still based on restoring more natural habitat function: for instance restoring natural flow regimes, reducing pollution levels, controlling non-native species and reducing the intensity of vegetation management (as far as is possible without affecting flood risk). However, physical habitat improvements in these situations are less likely to involve more fundamental naturalisation of physical habitat function, which typically requires restoring the ability of the channel to shape itself by measures such as actively restoring natural channel dimensions, restoring the full role of riparian trees (the influence of their root systems and the natural supply and retention of fallen wood), and re-establishing natural sediment erosion and deposition processes.

2. Which river/stream sections should be on the chalk rivers map?

An account of the inherent characteristics of chalk rivers is provided in the 1999 report: 'Chalk rivers: nature conservation and management'. In essence, any stream or river that has a flow regime dominated by natural discharges from a chalk aquifer should be included on the map. These are baseflow-dominated watercourses with high alkalinities (very 'hard' water), and these characteristics are fundamental in shaping their biodiversity.

There is however considerable variation in the habitats that chalk river systems provide from source to the sea, in terms of size, hydrology, natural physical character and alkalinity. They also vary hugely in terms of the level of human impact on natural habitat function. These differences are not material considerations in whether a watercourse is included on the chalk

rivers map, but they do have an important bearing on how individual rivers are protected, restored and managed.

Watercourses with strong baseflows supplied exclusively from the chalk aquifer are most obviously chalk rivers. These are the chalkstream headwaters (including winterbournes) and downstream 'classic chalkstreams', with minimal amounts of flow inputs from other geologies. At some point on the journey of chalk water from upstream springs to downstream alluvial sections, the influence of other geologies (which may be drift deposits or other aquifers) can affect the hydrological and hydrochemical character of the river so much that it can no longer be considered a chalk river. In some cases (such as the Rivers Test and Itchen) the chalk character remains sufficiently dominant to persist all the way to the saline transition zone at the coast, whilst in other cases (particularly in longer river systems like the Thames and Great Ouse) it peters out a long way before this.

In the development of the original BAP map published in 2006, no hard-and-fast quantitative rules were applied concerning the level of chalk river character required for watercourses to be included. Instead, rivers and streams were selected for inclusion by local subjective judgement of what was appropriate in each area. In updating the map there is no intention to make wholesale changes to the rivers and streams on the original map – the emphasis is on filling in gaps, particularly in relation to the network of smaller headwater chalkstreams that has received insufficient attention to date.

As a general principle, watercourses that should **not** be included on the map are those that are completely artificial, i.e. those not at least based on a pre-existing natural channel or hydrological pathway of some form (even if somewhat relocated from its natural position). The reason for not including such artificial watercourses is that actions to improve them can detract from restoring the natural functioning of the chalk river habitat resource. Key examples of such situations are where:

1) the surface drainage network has been extended upstream by creating drainage ditches through fens and flushes;
2) artificial 'carriers' have been dug to supply water mills or water meadows, which are often perched above the natural valley floor and which have sometimes wholly replaced the main channel over the course of history.

Unfortunately it is often difficult to identify sections of completely artificial watercourse, particularly at a detailed spatial level in headwaters where small natural channels may have been channelized to resemble drains, or completely artificial drains may have naturalised over time to resemble natural channels.

In larger river sections, carriers may have been created from pre-existing natural side channels (forming part of a natural multi-channel system), but these should be considered as degraded natural channels. Sometimes the main river channel itself has been relocated as a high-level carrier for a downstream mill – again this would generally be regarded as a degraded channel that should ideally (if practicable) be returned to its natural position in the valley floor (retaining a residual flow to the mill for aesthetic purposes as appropriate).

It is important to be pragmatic in considering artificial channels. Whilst updating the map provides an opportunity to ensure that peripheral artificial channels are not included, sections of main river that have effectively been relocated to artificial channels are best

considered as degraded chalk river habitat, where restoration of natural function would involve returning the channel to a more natural location in the valley. This avoids unnecessary fragmentation of the chalk rivers map. The caveats explained in Section 1 relating to the cultural and aesthetic importance of some heavily modified river sections are also relevant - if there is doubt as to the origin of a channel, particularly if it is of high cultural or aesthetic significance, it would best be included on the map but flagged as being of uncertain origin.

3. What is already on the updated published map?

The national review process sought to capture all of the named streams listed in the 2014 State of Chalk Rivers report.as well as all small chalkstreams in headwater areas of chalk catchments. The resulting published map (which can be inspected on the Display Data facility of the Discovering priority habitats website) is based on the Environment Agency's detailed Digital Rivers Network (DRN). This has allowed smaller streams to be captured, such that the updated map captures a much higher total length of watercourse than the original map.

The updated map nicely captures the little-known short streams of higher energy running off the steep scarp slopes of the outcropping chalk (for instance, around the northern fringes of the South Downs, such as Plates 1 and 2) as well as the better known lower-energy chalk streams and rivers running off the dip slopes (for instance, the watercourses running south off the South Downs, such as the Test and Itchen systems, such as Plate 3). The inclusion of short scarp-slope streams helps to capture the full variation of the chalk river 'type' – reports describing them in more detail can be found in the document store of the Discovering priority habitats website.

Plate 1. Strongly meandering winterbourne section running off the northern scarp slope of the South Downs. At this point the stream is running over outcropping greensand.

Plate 2. Energetic perennial stream section running off the northern scarp slope of the South Downs.

Plate 3. Classic chalk stream running southwards off the dip slope of the South Downs.

Channels that have been included in the published layer but where there is currently low confidence in their chalkstream character have been labelled as low certainty. Two key uncertainty issues are of particular note as you consider making proposals for additions and deletions.

- ***The influence of superficial geologies*** – The precise influence of different forms of drift geology overlying the chalk aquifer has been difficult to characterise and requires further local scrutiny.
- ***The influence of different aquifers*** – The relative contributions of water from the chalk and adjacent greensand aquifers, and the hydrogeochemical interactions between these aquifers prior to the appearance of water in spring and stream flows, cannot easily be captured nationally. The likelihood is that most streams are dominated by chalk influence, not least because water in the greensand aquifer has largely passed through the overlying chalk and will have acquired appreciable alkalinity from that. Again detailed local scrutiny would help improve the accuracy of the published map.

Note that, as with the original map, the updated map aims to include all natural channels irrespective of the extent to which they have been degraded by human activities (physical modifications, abstraction and water diversion, pollution or direction biological impacts such as non-native species and intensive fisheries management).

4. Links with calcareous fen

There is a very strong association between the spatial distributions of chalk rivers and lowland calcareous fens (peat-forming or tufa-forming vegetation sustained by waterlogging with calcareous water). Many remaining examples of calcareous fen in the lowlands occur within the catchments of chalk rivers, very often headwater catchments in association with small headwater streams. The presence of these fens in the vicinity of outcropping chalk is a good indication of chalk river character.

Unfortunately, we have lost much of our lowland calcareous fen resource, largely as a result of drainage and groundwater abstraction. Its historical presence is indicated by areas of peat or tufa in chalk river catchments - alongside streams and rivers, above the natural headwater stream network in valleyheads, and along floodplain margins below valleyside springlines. These are the areas that should be targeted for fen restoration, integrated with action to restore natural function to the chalk river resource. The ultimate goal is restoration of naturally functioning fen and stream habitat mosaics, encompassing winterbourne and perennial stream sections, in both headwater catchments and along/below valleyside springlines. Opportunities for such restoration should be flagged in the parallel process of mapping river restoration priorities available on the Discovering priority habitats website.

5. Using the chalk rivers mapping form on the Discovering priority habitats data portal

5.1 Registering for access

Start on the 'Contribute Data' page. Click the image labelled '*Mapping river/stream types'* to reach the appropriate landing page.Then fill out the contact form to register for an account. You will then receive an e-mail with a password. If you are already registered on the data portal for another workspace (e.g. adding river and lake naturalness data), you will still need to register separately for the 'Mapping river/stream types' workspace.

5.2 Adding proposals and supplementary information

Start on the 'Contribute Data' page. Click the image labelled '*Mapping river/stream types'* to reach the appropriate landing page. Then, click the button '*Log in to input data*' - this will take you to a sign-in page (on the Cartographer website). Enter the email address and password associated with your account. If the web site prompts you to "*Select a Workspace*", click on the option '*Priority habitats workspace'*. Then click "*Add a Survey*" and choose the survey form entitled '*Chalk rivers mapping – proposing local refinements'*.

The map embedded in the form allows a river section to be located on the Environment Agency's detailed DRN, by simply zooming in and selecting the appropriate section. The published chalk rivers layer is shown as part of the backdrop to the map, so that you can check whether the watercourse in which you are interested is already included. You can also see if the watercourse is included at low or high certainty. Once you click on the map, basic details of the nearest river/stream section are automatically filled in.

The form then provides an option to propose the addition or deletion of the river/stream section. Note that if you propose the addition of a section that is already of low certainty, it will be assumed that the proposal is to reassign it to high certainty. There is a free-text box in which to justify your proposal. Any proposals you make, including the explanation for making them, should follow Section 2 of this guidance document and consider key issues explained in Section 3.

There is an optional series of data entry fields that help provide more specific information about chalk river character at the site. This will help paint a national picture of the variation in chalk river habitat, which will supplement map-based data sets (e.g. on river size, stream gradient, position in the river network, ancient woodland and calcareous fen inventories etc.). Some photos are provided in Appendix A to help identify certain features. There is also a facility for you to upload photos of the site, to provide a visual picture of chalk river character.

If the stream you are interested in is divided up into more than one digital section on the DRN, you can copy the contents of one survey form into a new survey form to save you time. The information can be edited subsequently to tailor it to the new section of stream.

You are encouraged to add information on the level of naturalness of the sites you propose – to do this you will need to fill in a separate naturalness data entry form. You can do this by visiting the 'Contribute river and lake naturalness data' page of the Discovering priority habitats website.

6. Displaying stakeholder proposals for additions and deletions

All proposals for additions and deletions added via the data portal will be visible on the 'Display data' tab of the FBA priority habitat website. Go to the '*Display river/stream types'* option to view the published map and all additional revisions proposed by stakeholders.

Appendix A – Photo illustrations of habitat features listed on the data entry form
(Unless otherwise stated photos are courtesy of Natural England)**.**

Figure A1. Winterbournes.

Figure A2 Upwelling in river bed.

Figure A3. Knuckerholes (courtesy of Mike Tristram and Fran Southgate).

Figure A4. Tufa formation – from top left clockwise: a) encrustation on twig fragments and snail shells (courtesy of Fran Southgate); b) in tufa beds with mosses and liverworts; c) tufa steps; d) a tufa mound.

Figure A5. Encroaching marginal vegetation.

Figure A6. Channel with gravel bed (courtesy of Iain Diack).

Figure A7. Water crowfoot.

Figure A8. Tall fen vegetation (Courtesy of Iain Diack).

Figure A9. Fern/moss/liverwort-dominated ghyll chalkstream (steep incised valley).

Figure A10. Exposed coarse sediments.