Guidance for stakeholders on adding river/stream and lake and associated wetland restoration priorities for meeting priority habitat objectives

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Purpose

This guidance is intended to help partners and stakeholders add their local priorities for restoring natural ecosystem function to national maps of river/stream and lake restoration priorities. Importantly, it also enables the highlighting of wetland restoration priorities where these are associated with rivers/streams and lakes, as part of integrated restoration of more naturally functioning habitat mosaics. These maps will feed into national and local delivery strategies for biodiversity and water and help garner support for implementation.

How does the process work?

- *Simple information on priority sites for restoring natural function is added to the data portal on the FBA priority habitats website – www.priorityhabitats.org.*
- *Natural England and Environment Agency staff, as well as invited experts, can add priorities directly.*
- *Groups and partnerships can set up a shared workspace, coordinating input using this guidance.*
- *The data portal stores priorities and displays them on the 'Display data' facility of the FBA priority habitats website.*
- *The information will be used to assemble habitat restoration priorities for the Defra 2020-2030 Nature Strategy that is currently being developed (which succeeds 'Biodiversity 2020'_.*
- *The maps will form part of the Nature Recovery Network (NRN) toolkit and the targeting process for Defra's Future Farming Schemes currently being developed, which will include a range of measures for restoring natural ecosystem function.*
- *Data on catchment partnership workspaces is live-linked through to the CaBA data platform and will be available for inclusion in RBMP3 Catchment Partnership pages.*

1. Background

The UK Biodiversity Action Plan (BAP) definitions of priority river and lake habitats effectively encompass all river/stream and lake habitats across England, meaning that all rivers and lakes are a priority in England at some level. The definitions therefore provide no basis for strategic targeting of restoration action. The priority habitat maps created in 2014/2015 are intended to capture our most naturally functioning rivers/streams and lakes, which need to be protected from declines in natural function (which may be physical, hydrological, chemical, biological, or more commonly a combination of these). Associated maps of restoration priorities are intended to capture other sites where opportunities for restoring natural function are greatest. The FBA priority habitat website provides further background explanation, including details of map development to date.

Whilst stakeholder-based processes have been put in place to refine the priority habitat maps to make them as locally accurate as possible (particularly in respect of headwater streams and small lakes), there has to date been no equivalent process for refining the restoration priorities maps so that they accurately reflect local priorities for restoring natural function to our rivers/streams and lakes. This guidance document supports a new process for doing that, using the data portal on the FBA priority habitat website.

2. What is a restoration priority?

A restoration priority is a site where partners/stakeholders would like to see action to benefit biodiversity by restoring higher levels of natural function. Natural function relates to the ability of a river or lake to shape and sustain natural habitat mosaics free from constraints imposed by physical, hydrological, chemical or direct biological modifications. Further explanation is provided in Natural England Report NERR064 ('the freshwater and wetland habitat narrative'), on the FBA priority habitats website and in the advice pack on biodiversity produced for the Catchment-Based Approach (CaBA) initiative.

A restoration priority should be highlighted where action is considered to be important. This is not a commitment by the proposer to undertake the envisaged restoration activity, but a way to highlight where opportunities to restore natural function exist. However, it should be more than a wish-list and should be guided by what is practically achievable, using a long-term perspective to tackling constraints if required. Section 4 provides detailed explanation of relevant restoration actions for each component of naturalness (physical, hydrological, chemical and biological).

There is no expectation that feasibility studies have been undertaken, but a site should not be included if there are obvious and immovable local constraints preventing the required restoration. For example, restoring a natural water level regime to a water supply reservoir has obvious constraints, as does restoring riverbed levels and natural flooding to a river with a large and highly developed floodplain.

There are no limits to the number of priorities that can be identified, but you are encouraged to think about large and small lakes, rivers and streams in your area, including wetland habitats that would be associated with them when functioning naturally - for instance, headwater mire-stream habitat mosaics, spring-fed flushes, floodplain wetland mosaics (including fen, swamp, alluvial woodland, raised bog etc.) and lake hydroseres (including in-

flowing sediment fans). Note that opportunities for restoring natural ecosystem function are often far greater in streams and small lakes with their associated small catchments, because of the potential to restore the whole catchment to naturally functioning habitat mosaics and the more limited consequences of restoration on adjacent land uses and management.

Many of our rivers, streams and lakes are very modified and there are major constraints to restoring more natural function. This is particularly true in some urban situations, where surrounding development limits what is possible or where for instance artificial lakes have been created with concrete aprons. Such sites can still support wildlife, even rare species. Whilst their situation makes it more difficult for them to be included as restoration priorities in this exercise, there are still plenty of measures that can be taken to improve the natural functioning of the habitat, such as reducing the management intensity of submerged and marginal vegetation, establishing some marginal vegetation and improving water quality. Documents such as the 'Chalk rivers handbook' provide pointers on what can be achieved in such circumstances.

3. Using the restoration priorities forms on the FBA priority habitat data portal

3.1 Registering for access

Natural England/Environment Agency staff and invited experts/organisations

It is important that the knowledge of NE and EA staff, recognised experts and key organisations is properly captured by the mapping process. In these cases there are options for direct data entry once registered with the data portal. If this is relevant to you please go to the Contribute Data webpage and fill in the registration form. If you wish to input data as a group/organisation, where the group's input is moderated by a co-ordinator, this is also possible. In this situation you should contact the Cartographer team at hello@cartographer.io to get set up with a username and password.

Local partnerships

Data entry is overseen by nominated coordinators from participating local partnerships. This is to ensure that data entry is coordinated within each local area and added restoration priorities are in accordance with this guidance.

Each partnership controls a dedicated online workspace that allows them to manage local data on restoration priorities and share them with colleagues and volunteers. If you are the nominated lead for this mapping exercise within a partnership you need to request a workspace by e-mailing the Cartographer team at hello@cartographer.io. The cartographer team will talk you through setting up a workspace and providing usernames and passwords to others.

3.2 Adding data

Start on the Contribute Data webpage on the FBA priority habitats website (www.priorityhabitats.org). Click on *Log in to input data*, which takes you to the Cartographer sign-in page. Enter the email address and password associated with your account. If the website prompts you to "Select a Workspace", click on the option for your local partnership

(if appropriate) or ‘Restoration priorities’. Then click *Add a Survey* and choose the *River restoration priorities* or *Lake restoration priorities* option.

The forms for rivers and lakes are similar. The map embedded in each form allows a site to be digitally located on a base layer – simply zoom in and select the appropriate location. Basic site details can be automatically filled in once the site is located and selected. Data entry for rivers/streams has now been expanded to include a facility for highlighting groups of river and stream sections based on WFD waterbody catchments. Each waterbody catchment has been divided into two zones, headwaters and larger rivers, so that priority action specifically in headwater areas can still be discriminated from action in the lower reaches of a waterbody. The original form, based on highlighting individual river/stream reaches, is still available in case this is more useful in specific cases – you can choose the form that suits your needs best.

The rest of the form content (for both rivers/streams and lakes) allows a site to be flagged as a restoration priority in relation to the four main components of naturalness – physical, hydrological, chemical and biological. The site can be flagged for one or more components, and there is an option to record ‘Don’t know’ for any components that you are unsure about. If you tick ‘yes’ to any component, a list of key restoration measures will appear for you to select to help describe the nature of the envisaged restoration. There is also a general free text box in which to record other information, such as the stage of restoration thinking at the site (which might be anything from a basic idea through to detailed costed and funded plans).

The most critical issue is making sure that the proposed/intended restoration measures are relevant for inclusion on the restoration priorities maps. Section 4 provides guidance on relevance.

Mapping restoration priorities is an on-going activity and there is no planned deadline for data input. However, the quicker data are added the more likely it is that they will influence biodiversity and water planning processes.

4. Nature of restoration and relevance of measures

4.1 General

In accordance with priority river and lake habitat objectives, this guidance promotes restoration of natural ecosystem function; however, full restoration of natural function is often not possible because of local practical constraints (e.g. essential infrastructure that is immovable even in the long-term). Consequently mitigation measures that make the best of constrained situations for biodiversity often have to be employed. *If these measures do not contribute to restoration of natural function they are not considered relevant as restoration priorities for achieving priority habitat objectives.*

Sub-sections 4.2 and 4.3 provide detailed guidance on relevant measures for rivers/streams and lakes respectively. The detailed approach to identifying restoration priorities differs somewhat between rivers/streams and lakes because of their different circumstances. Many river-related measures are in place or planned to achieve Water Framework Directive (WFD) ecological status/potential objectives or water objectives more generally (such as flood risk management), but many of these do not relate to restoring natural ecosystem function or to

our vast network of headwater streams. In contrast, there are very few measures in place to restore WFD ecological status/potential to lakes (including the larger ones), even though many measures are available including a wide range that restore natural function. Considerably more screening of existing and planned measures is thus required to generate a focused map of priorities for restoring natural function in the river/stream habitat resource than the lake habitat resource.

Participants need to judge the relevance of measures in relation to this guidance. There will not be rigorous national scrutiny of individual proposals, and therefore participants need to ensure that their proposals reflect the most important, genuine opportunities to restore natural function, drawing on the indicative guidance in Tables 1 and 2.

Further information on the natural functioning of freshwater and wetland habitats, and on locating sites in the landscape where opportunities for restoring natural ecosystem function tend to be greater, are provided in A narrative for conserving freshwater and wetland habitats in England' (Report NERR064) and Generating more integrated biodiversity objectives – rationale, principles and practice' (Report NERR071).

4.2 Rivers/streams

Priorities for restoring natural function to help meet priority habitat objectives can be identified anywhere in the river network, from the smallest temporary headwater streams to the largest tidal river sections upstream of estuaries. Table 1 lists key restoration measures for restoring natural river/stream function, as well as other example measures that are not considered to be relevant to this mapping exercise.

Restoration of water quality and related aspects of biology are central to ecological status objectives under the Water Framework Directive. There are therefore already many priorities under the WFD for reducing pollution of rivers. Whilst any measures seeking to reduce pollution loads represent progress towards restoring the chemical component of natural river function, these cannot all be included as restoration priorities for priority habitat objectives since they would swamp the resulting map. In addition, measures to reduce pollution that are based on natural function should involve the whole catchment and be focused on tackling problems at source – pollution control plans are typically diverse and complex, particularly for larger river sections with large catchments, meaning that characterising the relationship between restoration action and natural function becomes difficult. Similar issues of scale and complexity apply to initiatives to control non-native species (i.e. control action may not be targeted at off-site colonising populations of non-native species)

For these reasons, *the focus of this exercise for rivers is to identify priorities for restoring* ***physical and hydrological*** *natural function*. Relevant measures for restoring chemical and biological natural function should generally be seen as supporting context that adds further weight to the priority given to a site, rather than primary reasons to be included on the restoration priorities map. They should still be added where a site is being identified as a priority on physical or hydrological grounds, but should generally not be seen as a reason for making a site a priority. This said, exceptions can be made for pollution measures that focus heavily on controlling pollution at source, particularly through changing land-use in the catchment from developed land (typically intensive agriculture of forestry) to naturally

functioning semi-natural habitat mosaics within the catchment – this is easier to judge for smaller headwater catchments.

Natural physical river/stream function can often be restored by removing artificial physical constraints and allowing natural processes to recover by themselves; such measures are clearly relevant and warrant inclusion on the restoration priorities map. In systems with naturally low energy, further active intervention measures are more likely to be needed to trigger natural function because the river cannot do this itself. This may involve the active reintroduction of coarse substrates that have been historically removed by engineering and dredging works, which cannot be restored by sediment delivery from upstream. As long as proper planning has been done to make sure such measures form part of wider works that lead to restoration of natural function, they can be included as a restoration priority. But if they introduce 'habitat features' whilst not addressing fundamental issues of natural function they should not be included.

Table 1. Relevance of restoration measures for inclusion of sites on the river/stream restoration priorities map. (Note measures for restoring chemical and biological naturalness in rivers/streams are generally for additional context only – see main text.)

Component of natural function	Relevant measures	*Non-relevant measures*
Physical	Establish a riparian corridor of semi-natural wetland/terrestrial vegetation, in a mosaic including at least patchy cover of trees that interact strongly with the channel	*Fence off narrow 'buffer zones' to intercept diffuse pollution before it reaches the channel*
	Allow natural delivery and retention of woody material within the channel to generate complex and dynamic habitat mosaics	*Install fixed and managed wooden structures that mimic or enhance the natural water storage capacity of the channel but do not restore natural habitat mosaics*
	Restore natural headwater mire-stream transition zones through in-filling of drains and artificial channels, and (where appropriate) tree establishment to stabilise restored mire habitats	*Install mini-weirs in runnels and rivulets, unless there is a long-term plan to restore natural mire-stream transition zone*
	Allow the channel free lateral movement, at least within a sizeable erodible corridor bounded by woodland (Note that in low energy systems or channels with natural bed-rock control the scale of movement will be modest)	*Use green engineering measures to prevent any channel movement.*
	Remove in-channel structures (weirs/dams/sluices) to eliminate impoundment, water-level stabilisation, siltation and restrictions to species movements. This includes sluices and tidal flaps around the saline limit, to restore natural saline transition zones	*Install fish pass*
	Restore natural channel bed levels and channel widths to restore natural hydrological contact with riparian zones and floodplain and restore naturally functioning floodplain wetland mosaics.	*Engineer a more natural low-flow channel within an artificially over-widened/over-deepened channel (i.e. a 'two-stage' channel)*
	Remove engineered floodbanks to restore natural flooding regime and promote natural river/stream movement and restoration of naturally functioning floodplain wetland mosaics.	*Allow engineered floodbanks to deteriorate (creates substantial artificial movement of fine sediments and problems with return of*

Component of natural function	Relevant measures	*Non-relevant measures*
		floodwaters/animals to the channel following spate flows).
	Restore natural delivery and retention of coarse bed substrates.	
Hydrological	Restore natural flow regimes including both low and high flows and natural dry phases in temporary streams, through reductions in or cessation of abstraction and water transfers	*Artificially augment flows, or line the bed of the channel*
	Restore natural groundwater levels to renaturalise springflows and naturally temporary and perennial stream sections	*Shrink the channel size to suit artificially reduced flows*
	Remove artificial drainage from the catchment, riparian zone or wider floodplain	*Create artificial flood storage by fixed dams in channels or bunds across floodplains*
Chemical	Address pollution at source, by a combination of taking vulnerable land out of intensive production and in-field soil and nutrient conservation measures.	*Use the riparian zone as a pollution buffer*
	Restore naturally functioning mosaics of semi-natural vegetation in critical pollution source areas	*Create wetlands specifically to intercept pollution before it reaches the river*
Biological	Control non-native invasive species through strategic management plans	*Harvest non-native species for human consumption.*
	Reduce the intensity of or halt fish stocking (other than when addressing fish kill incidents) and focus on natural recruitment from restored natural habitat mosaics	
	Halt fishery-driven removal of non-target native fish species	
	Reduce/halt in-channel and marginal weed-cutting	
	Eliminate heavy grazing of riparian vegetation	

4.3 Lakes

A range of measures can restore natural lake function (Table 2), and (unlike with rivers above) **any** opportunities to progress these measures justify the site being recorded as a restoration priority. This is because far less work has been undertaken on lakes than rivers, and recording all measures will not swamp the lake map (as it would for rivers).

Water quality problems are generally considered the biggest issue for restoring lakes. This can seem an insurmountable challenge beyond the ability of voluntary groups alone. However, any improvements to water quality will improve the lake habitat, so there is value in undertaking any measures that can contribute to this.

Regardless of water quality, improving structural diversity in both the emergent vegetation of the shallow littoral zone and the vegetation in the drier riparian zone can benefit biodiversity, so is worth undertaking. Whilst such marginal habitat should not be seen as a sink for

pollutants (which cause damage to this habitat), structurally diverse semi-natural vegetation surrounding waterbodies does have the potential to improve water quality.

Natural water-level fluctuations create exposed habitats in summer, which support characteristic biological assemblages. The species that occur in this habitat often escape the worst impacts of poor water quality as they are out of the water during the summer, so such measures can be applied to any lake irrespective of water quality.

Fish can also heavily impact water quality, particularly fish that feed on bottom dwelling organisms, such as common carp and fish that feed on zooplankton, such as roach. Measures involving the removal of a significant proportion of such fish has resulted in clear water conditions able to support submerged plants in the shallower Norfolk Broads, the deeper West Midland Meres, and many other places within and outside of the UK.

Table 2 below lists a range of measures that help restore naturally functioning lakes, and they all count towards deciding that a site is a restoration priority. Measures that are insufficient to restore natural functioning are also highlighted in the table.

4.4 Integration with fens, bogs and other terrestrial wetlands

In naturally-functioning freshwater wetland ecosystems, the 'wetlands', i.e. the wet areas colonised by emergent plants, including peatlands, marshlands, swamps and all the other names for these habitats, are inextricably linked and very often continuous with rivers/streams and lakes/standing waters. Depending upon the system, 'wetlands' may form part of the water supply to an 'open' water body, e.g. spring-fed and seepage fens, raised and blanket bogs, or they may be receivers of water from the water body, e.g. alluvial woodlands and floodplain fens, or may function as both, depending on the season or as a result of autogenic change and other dynamic processes. The enormity of the modification of freshwater ecosystems in England has removed or degraded many of these relationships, with the loss of much habitat and many species. This has also tended to mean that the 'water body' and the 'wetland' are generally dealt with as separate entities.

Many of the listed restoration measures for rivers and lakes should lead to the re-establishment of the links between wetlands and open water, and the development of much more extensive and resilient wetlands. Some particularly important measures include removal of drainage infrastructure from headwaters, leading to re-instatement of mires and shallow sinuous runnels, rather than piped or ditched channels; lake basin restoration activity including restoring natural outflows from previously deepened channels raising water levels through the whole basin; bed raising and floodbank removal along stretches of larger rivers increasing overbank flows and floodplain/channel continuity.

Table 2. Relevance of restoration measures for inclusion of sites on the lake restoration priorities map. (Note: any of these measure justify inclusion of a site on the map.)

Component of natural function	Relevant measures	Reason
Physical	Establish/restore riparian zone of semi-natural wetland/terrestrial vegetation mosaic adjacent to lakes, which can include a range of woody and herbaceous plants. A narrow fenced off strip would be insufficient.	Riparian habitat has intrinsic conservation value as part of the lake habitat, supporting a range of characteristic species. Riparian vegetation has been lost and reduced through drainage of riparian land and alternative land use in land adjacent to lakes. Riparian trees have a role to play in providing habitat and a food source for in-lake assemblages.
	Restore natural lake shorelines which are not reinforced and which have a natural profile.	An artificial shoreline may act as a barrier between the lake and the riparian zone and prevents the development of a natural transition from wet to dry habitats and can prevent the movement of species
	Restore littoral margins and any vegetation they would naturally support.	Some littoral margins have been dug out or straightened either for resource extraction purposes or to better enable use of the lake. Such steep sided shores often result in a loss of marginal emergent vegetation as well as a loss of shallow open shores preferred by some invertebrates and fish. Loss of emergent fringing vegetation can be for other reasons too, such as water quality, disturbance by boats, grazing, tree shading and water level changes all of which may need to be addressed to restore littoral margins entirely. Loss of emergent fringing vegetation has major implications for biodiversity and also impacts water quality and can lead to increased erosion.
	Remove outflow structures (weirs/dams/sluices) where these do not result in the loss of the water body. Installation of a fish pass does not restore natural lake functioning in the same way as removing outflow structures, as they are not used by all species and they do not restore natural hydrology.	This allows movement of all species to complete their life cycles (e.g. migration and spawning in inflows and outflows), and dispersal of all species to maintain resilience to change. This also ensures the natural residence times, flushing rates, and water level fluctuations, which enables the natural movement of substances through the system.
Hydrological	Restore natural water-level fluctuations or manage water-level regimes to reflect natural water level fluctuations being higher in winter than summer, but not extreme.	Natural hydrological regimes are fundamental to healthy lake ecosystems. Both extreme fluctuations and loss of fluctuations can cause the loss of species. Water residence times and flushing rates also influence water quality. Lakes with structures on their outflow which maintain the lake can be managed in such a way as to provide water level fluctuations which would mimic a natural hydrological regime.
	Remove artificial drainage from the riparian zone, wider floodplain or catchment	Artificial drainage impacts the habitats they drain. It can also result in the loss of the functions wetland habitats provide. Drainage is often achieved by draining water into the lake via ditches. This exacerbates water quality problems by creating an efficient conduit to transport pollution to the lake.
	Restore natural inflows	Some lake inflows have been modified (often straightened and increased in size) or created to quickly carry water from the catchment to the lake. This quickly carries nutrients to the lake too. Restoring natural inflows or blocking them where they did not naturally occur can reduce nutrient loads and increase the biodiversity of inflowing rivers, streams and wetlands.

Component of natural function	Relevant measures	Reason
	Restore natural outflows.	Some lake levels have been lowered by increasing the capacity of the outflow and others have been raised by adding structures. Restoring outflows and natural lake levels can enable reconnection of the lake with its natural riparian zone.
Chemical	Address both point and diffuse pollution inputs by dealing with polluting discharges and/or changing land management practices in the catchment. Pollution should be dealt with at source rather than when it enters riparian land.	High water quality is a critical requirement for protecting and restoring characteristic biological communities. Nutrient status is a key factor, and nutrient enrichment is implicated in a range of ecosystem effects. Other water quality issues include acidification, and toxic pollution.
	Remove nutrient-rich sediments created by anthropogenic enrichment.	Sediment removal has been used as a technique to restore lakes which have accumulated nutrients in their sediment, to the point where these are now a significant source of nutrients to the lake water. Sediments which accumulate under high nutrient conditions are also often lose and sloppy and do not provide a good substrate for plants to grow in. Sediment removal can reveal a past propagule bank and a more suitable substrate for plant growth. It may also reduce nutrient inputs from the sediment. Sediment removal is generally only relevant to shallow lakes. Sediment will accumulate again if external nutrient and sediment loads have not been reduced.
Biological	Control non-native invasive species.	Non-native plants and animals can directly alter characteristic assemblages to a considerable degree. Invasive plants can have strong influence on the condition of the riparian zone as well as the open water.
	Reduce the intensity of or halt fish stocking (other than when addressing fish kill incidents).	High fish biomass can alter the biological assemblage in lakes. Benthivorous species such as common carp can resuspend sediments and uproot vegetation leading to murky unvegetated lakes. High densities of zooplanktivorous fish such as roach can either create or reinforce algal dominated states as they eat the zooplankton which would otherwise consume the algae. The objective is to have good habitat that enables natural recruitment to a mixed, balanced, native fish assemblage. Anglers can then enjoy fishing for a natural fish assemblage with minimal impacts on the natural functioning of the lake.
	Restore natural biological assemblages e.g. through biomanipulation.	Biomanipulation is when the biological assemblage (usually the fish) is altered to make lake conditions more conducive to clear water and plant growth rather than algae. This usually involves reducing the number of zooplankitvorous and benthivorous fish.

If you are undertaking these actions primarily for wetland restoration do be aware of the benefits to the rivers and lakes as well, and consider carefully how best to optimise for all components of the water environment. While all such activity has the potential to be beneficial, in some places, maybe those where restoration of very rare habitat is feasible, e.g. alkaline fen, then make sure that you are maximising the likelihood of achieving the most beneficial outcome.

5. Data display

Priority locations added via the data portal will (following approval by the local workspace coordinator if relevant) be visible on the Display data section of the FBA priority habitat website. If you navigate to the restoration priorities sub-section you will find the live versions of the river and lake maps. The map facility allows you to interrogate the underlying data to a certain extent – this includes display of priorities for individual components of natural function, and individual types of envisaged restoration measure within each component. Analysis of information on spatial clusters of priorities is also possible (grouped by the field of view on the display map). More functionality will be added in due course to enable further interrogation.

To view the complete data entry form for a site (including site photos), go on to your Cartographer workspace, click on river or lake restoration priorities in 'Browse surveys', and use the search facility to identify sites of interest. To look at the details of sites anywhere in England, select 'All workspaces' in the options along the top.

Regular updates to the maps will be automatically routed through to the CaBA Open Data Hub, from where they can be added to the Catchment Partnerships' Catchment Plans, storymaps or webpages as part of the third cycle of WFD river basin management planning (RBMP3). The Catchment Pages included within the RBMP3 process will link through to these plans and storymaps via the CaBA website.

6. Links to naturalness assessment

Whilst it is desirable to provide naturalness data on the restoration priorities that you add to the data portal, it is not essential. It would provde useful context but equally (because it would be a considerable increase in the work required) it may potentially generate a disincentive to adding restoration priorities. Such data can always be added at a later date as opportunities arise. If you are in a position to provide information on naturalness, please use the separate 'Contribute data' page for naturalness data.

7. Links to SSSI priorities

SSSI designation and associated mechanisms provides the principal driver for securing all restoration actions on river and lake SSSIs. This operates through a separate system of evaluation and reporting administered by Natural England, which is independent of the process of identifying restoration priorities to address priority habitat objectives that is outlined in this guidance. This said, any river section, stream or lake can be included as a restoration priority for priority habitat objectives, whether inside or outside of the SSSI series.

Whilst objectives for river and lake SSSIs strongly relate to restoring natural ecosystem function, some restoration actions on them have to recognise immovable constraints and fall too far short of restoring natural function to be included as restoration priorities for priority habitat objectives. To be eligible for inclusion in this prioritisation exercise, restoration actions on river and lake SSSIs therefore have to be justified by reference to Section 4 of this guidance, just like any other site.

8. Links to tools and datasets for targeting biodiversity action

A new Nature Recovery Network (NRN) toolkit is being developed for identifying restoration priorities under the forthcoming Defra Nature Strategy for England (which succeeds Biodiversity 2020). This will link into datasets that will be used for targeting restoration measures available in Defra's Future Farming Schemes (which will succeed the current Stewardship scheme). The restoration priorities maps being developed under this guidance will be added to other datasets that will feed into targeting under the Nature Strategy and ELMS, including SSSI priorities, new 'Habitat Network Maps', and additional datasets under development.

'Habitat network maps' have been developed for a range of priority habitats including rivers and lakes.

- The river network map identifies 'restorable habitat' where restoration action around and between sites on the river priority habitat maps might have important connectivity benefits for biodiversity. It is unclear how much practical potential there is for restoring natural function at these locations compared to others that are further from sites on the existing priority habitat map.
- The lake network map identifies 'restorable habitat' as SSSI lakes in unfavourable condition and lakes that are located with other (terrestrial) priority habitats, so there is an increased likelihood of clean water from less intensively managed surroundings. However, lake water may still be polluted form point sources or from pollution coming from further afield. There may also be impacts upon other elements of natural functioning.

The process of identifying restoration priorities for addressing priority river and lake habitat objectives, as outlined in this guidance document, seeks to capture the best opportunities for restoring natural function to rivers and lakes anywhere in England, and will therefore be an important supplement to habitat network maps and other datasets to be used in targeting nature recovery activity.

9. Landowners

Priorities identified through this process only need to be ambitions, not necessarily coherent and established restoration plans (although choice should be guided by what is practically achievable, using a long-term perspective if required). Ideally there will have been prior discussions with landowners to agree the nature of restoration in principle, but there is no requirement for this. Landowner dialogue will inevitably be required as and when thinking develops to a point where feasibility assessment is required to proceed.