RIVER LUGG
INTERNAL DRAINAGE BOARD

BIODIVERSITY ACTION PLAN

2019

The 2010 River Lugg Internal Drainage Board (RLIDB) Biodiversity Action Plan was prepared in accordance with the commitment outlined in the Implementation Plan of the DEFRA Internal Drainage Board Review for IDBs to produce their own Biodiversity Action Plans by April 2010. This Biodiversity Action Plan (2019) updates the 2010 document and demonstrates the Board's commitment to fulfilling its duty as a public body under the Natural Environment and Rural Communities Act 2006 to conserve biodiversity.

Many of the Board's activities have benefits for biodiversity, not least its water level management and ditch maintenance work. It is hoped that this Biodiversity Action Plan will help the Board to maximise the biodiversity benefits from its activities and demonstrate its contribution to the UK Government's commitment to the *UK Post-2010 Biodiversity Framework*, published in July 2012, and which succeeded the UK BAP.

Following the establishment of devolved governments in the four UK countries, responsibility for biodiversity is primarily at a country level. In England, the biodiversity strategy is outlined in *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (2011). However, the UK list of priority habitats and species remains relevant as an important reference source for local Biodiversity Action Plans, and was used to draw up statutory lists of priority habitats and species as required under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

The Board has adopted the Biodiversity Action Plan as one of its policies and is committed to its implementation. It will review the plan periodically and update it as appropriate.

…….. Date 18th April 2019

Charles Pudge
Chairman of the Board

This Biodiversity Action Plan is a public statement by the Board of its biodiversity objectives and the methods by which it intends to achieve them.

We would welcome appropriate involvement in the delivery of the Plan from interested organisations, companies, and individuals.

You can contact us about this Biodiversity Action Plan by writing to the following address:

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Further information is available on the Board's website: www.riverlugg.org.uk

CONTENTS

1 BIODIVERSITY ACTION PLAN - SUMMARY

- The 2019 Biodiversity Action Plan (2019 BAP) updates the 2010 BAP adopted by the River Lugg Internal Drainage Board (RLIDB). The BAP is a result of international obligations to conserve biodiversity, and is guided by Government policy and associated legislation.

- The 2019 BAP includes an updated audit, to encompass both the River Lugg and Lower Wye drainage districts which the Board now maintains, and sets out the habitat and species BAPs with high-level targets, actions for implementing those targets, the relevant partners with which to work in order to achieve those targets, outcomes and indicators to measures the success of the targets, and start/review dates for implementation and monitoring of the BAP.

- The BAP contains four habitat actions plans and eight species action plans, with several changes from the 2010 BAP. These have been chosen to complement the updated Herefordshire Biodiversity Action Plans as set out by the Herefordshire Local Nature Partnership, and which replace the previous Herefordshire BAP produced in 2005.

- The RLIDB BAPs for habitats include: Rivers and Streams; Grassland; Wetland; and Woodland, Wet Woodland. As a whole, the RLIDB Habitat Action Plans (HABs) contain 12 broad targets, with 21 accompanying actions. The BAP also includes a map of important watercourses for each of the four habitat action plans, which shows at a glance where habitat improvements should be focussed.

- The RLIDB BAPs for species include: Water Vole; Otter; Bats; Barn Owl; Fishes; White-clawed Crayfish; Black Poplar; and Invasive Non-native Species. As a whole, the RLIDB Species Action Plans (SABs) contain 21 broad targets, with 39 accompanying actions.

- The BAP also contains a Procedural Action Plan, intended to integrate biodiversity considerations into IDB practices and procedures during their annual works programme.

- Implementation of the RLIDB BAPs will require extensive partnership working with other statutory bodies, including the Environment Agency and Natural England, as well as with key stakeholder groups within the county, including the Herefordshire Wildlife Trust, the Wye and Usk Foundation, the Monnow Rivers Association, and several species or taxa focussed groups.

- The 2019 BAP requires ongoing monitoring of outcomes and indicators in order to assess the success of the BAP. This should be undertaken by the acting IDB Ecologist, in liaison with the Board engineer, resulting in annual reporting to the Board, and a full review and evaluation of the 2019 BAP in 2025.

2 IDB BIODIVERSITY – AN INTRODUCTION

2.1 Introduction

The River Lugg IDB has revised and updated its 2010 biodiversity audit of its district and identified those habitats and species that would benefit from particular management or actions by the RLIDB. Using this information, which is presented in later sections, the RLIDB's Biodiversity Action Plan has been developed.

The Plan identifies objectives for the conservation and enhancement of biodiversity within the drainage district, and goes on to describe targets and actions that will hopefully deliver these objectives. The intention is to integrate, as appropriate, biodiversity into the Board's activities, such as annual maintenance programmes and capital works projects.

The action plan will help to safeguard the biodiversity of the drainage district now and for future generations. In particular, it is hoped that implementing the plan will contribute to the achievement of local and national targets for priority species and habitats. Species and habitats which are not listed as priority habitats/species but may be locally significant for a variety of reasons have also been considered.

The Plan is an evolving document that will be reviewed and updated on a regular basis. It covers the entire drainage district of the RLIDB, as shown by the map in Appendix 1. This now incorporates an area (England only) of the Lower Wye, formerly maintained by the Lower Wye IDB.

Decisions on implementation of proposals in this plan will always be made following flood risk assessments. The flood risk is illustrated in Appendix 2. The whole district is in a flood risk area, but within it are differing levels of risk. The 'flood prone areas' are based on IDB experience and show where there is a history of flooding that affects property within the more general EA flood risk zones.

2.2 What is Biodiversity?

The Convention on Biodiversity agreed at the Earth Summit in Rio de Janeiro in 1992 defined biodiversity as:

"The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

Biodiversity can be defined simply as "the variety of life" and encompasses the whole spectrum of living organisms, including plants, birds, mammals, and insects. It includes both common and rare species, as well as the genetic diversity within species. Biodiversity also refers to the habitats and ecosystems that support these species.

2.3 The Importance of Conserving Biodiversity

Biodiversity is a vital resource and it is essential to acknowledge its importance to our lives along with the range of benefits that it produces:

- Supply of ecosystem services – water, nutrients, climate change mitigation, pollination
- Life resources – food, medicine, energy and raw materials
- Improved health and well-being
- Landscape and cultural distinctiveness

- Direct economic benefits from biodiversity resources and 'added value' through local economic activity and tourism
- Educational, recreational and amenity resources

2.4 The Biodiversity Action Planning Framework

This River Lugg IDB Biodiversity Action Plan is part of a much larger biodiversity framework that encompasses international, national and local levels of biodiversity action planning and conservation.

2.5 Biodiversity – The International Context

The international commitment to halt the worldwide loss of habitats and species and their genetic resources was agreed in 1992 at United Nations Conference on the Environment and Development, commonly known as the Rio Earth Summit. Over 150 countries, including the United Kingdom, signed the Convention on Biological Diversity (CBD), pledging to contribute to the conservation of biodiversity at the global level. These states made a commitment to draw up national strategies to address the losses to global biodiversity and to resolve how economic development could go hand in hand with the maintenance of biodiversity.

The Rio Convention included a global commitment to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level (www.biodiv.org/convention/default.html). The 2002 World Summit in Johannesburg on Sustainable Development subsequently endorsed this target.

In 2010 the CBD Conference of the Parties (CoP) held a tenth meeting in Nagoya, Japan. The result was *The Strategic Plan for Biodiversity 2011-2020* and the creation of the 20 '*Aichi Biodiversity Targets*' for 2020.

2.6 Biodiversity – The National Context

The UK Biodiversity Action Plan (UK BAP), published in 1994, was the UK commitment to Article 6A of the Rio Convention on Biological Diversity. It described the UK's priority species and habitats, and sought to benefit 65 priority habitats and 1149 species in total. It identified other key areas for action such as the building of partnerships for conserving biodiversity and gathering vital biodiversity data.

Following devolution in 1998, responsibility for implementation of the UK's biodiversity strategy fell to each of the four devolved countries, with a shared vision for UK biodiversity conservation adopted by each of the devolved administrations. *Conserving Biodiversity – The UK Approach* was published in 2007 and described the requirements for future work at a UK level.

In 2012 the *UK Post-2010 Biodiversity Framework* was published as the UK Government's commitment to biodiversity conservation, following the launch of the EU Biodiversity Strategy resulting from the CoP10 meeting in Japan. The *UK Post-2010 Biodiversity Framework* succeeded both the UK BAP and *Conserving Biodiversity – The UK Approach* and outlines the actions required by the devolved administrations.

In England, the current strategy underpinning the *UK Post-2010 Biodiversity Framework* is provided in *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (2011). This builds on the *Natural England White Paper for England – 'The Natural Choice'* (2011) and sets out how England is to deliver on its international and EU commitments. The England Biodiversity Group, chaired by DEFRA, overseas the implementation of the strategy, which emphasises delivery of biodiversity conservation at a local or regional level.

Although the National lists of BAP habitats and species have been superseded, they remain relevant as an important reference source for local and regional biodiversity partnerships, and were used to draw up statutory lists of priority habitats and species as required under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

2.7 Local Biodiversity Action Plans

The Herefordshire Local Nature Partnership (LNP) was established under DEFRA guidance to deliver biodiversity conservation at a county level. The Herefordshire Wildlife Link[1] provides a forum for statutory bodies and conservation organisations across the county to connect, collaborate and deliver conservation objectives within Herefordshire, and in particular to deliver Herefordshire LNP Objective 5: Conserving and Enhancing Landscapes, Habitats and Green Infrastructure. To this end, partners of the Herefordshire Wildlife Link have collaborated to produce a series of Biodiversity Actions Plans for habitats and species relevant to the county.

2.8 Internal Drainage Boards and Biodiversity

The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on IDBs to conserve biodiversity. In particular, Section 40(1) of the Act requires that every IDB must have regard '*in exercising its functions, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity*' while Section 40(3) states that '*Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat*'. In so doing, an IDB should have regard to the list published by the Secretary of State of living organisms and types of habitat that are of principal importance for the purpose of conserving biodiversity, and which are listed under Section 41 of the Act.

In 2007, the Government's IDB Review Implementation Plan established a commitment that IDBs should produce their own Biodiversity Action Plans. The 2010 River Lugg IDB Biodiversity Action Plan was produced to help fulfil these requirements and sought to set out targets and actions that complemented the UK Biodiversity Action Plan and Local Biodiversity Action Plans.

In light of changes to the UK and England's strategies for biodiversity conservation, the River Lugg IDB 2019 Biodiversity Action Plan seeks to improve on the RLIDB's commitment towards conserving biodiversity and integrating biodiversity considerations into its annual works programme and capital works, to ensure that biodiversity is protected, restored and enhanced.

2.9 Review of the RLIDB Biodiversity Action Plan 2010

The 2010 BAP provided a good starting point for the RLIDB to consider biodiversity protection, restoration and enhancement within and across its district. The BAP process was set out, a biodiversity audit of the RLIDB district undertaken to help evaluate and prioritise habitats and species on which to focus, and conservation objectives, targets and indicators set to formulate a series of four habitat action plans and nine species actions plans, as well as a procedural action plan.

However, there has only been partial implementation and delivery of the 2010 BAP as a result of a A) not implementing the targeted actions set out to deliver the BAP, and B) not undertaking a rigorous monitoring programme, or a lack of recording such monitoring, of the indicators set out in the BAP in order to review the delivery of targets. As a consequence, the 2010 BAP has not been reviewed or updated since 2010, and thus its implementation and degree of success in achieving its aims have not been measured. This is

[1] https://herefordshirewildlifelink.wordpress.com/

partially due to a lack of financial resources, a lack of understanding of National biodiversity policy and the stratagem for its implementation at a local level, and a change in ecological advisor in 2016. Nonetheless, the 2010 BAP contains suitable aspirations regarding biodiversity conservation and enhancement, and thus provides an appropriate framework for production of this Biodiversity Action Plan.

2.10 The Aims of the RLIDB Biodiversity Action Plan 2019

The aims of the 2019 RLIDB BAP are:

- To review and update the 2010 biodiversity audit of Nature Conservation Sites, habitats and species;
- To review and update the evaluation of audited sites, habitats and species;
- To review and update, where necessary, the objectives, targets and indicators set out in the 2010 BAP;
- To update the process for implementation of the BAP;
- To update the process for undertaking and reporting of monitoring;
- To set out the future reporting and review process of the BAP.

In addition, several aims of the previous 2010 BAP remain valid, including:

- To develop effective local partnerships to ensure that programs for biodiversity conservation are maintained in the long term;
- To raise awareness within the RLIDB, and locally, of the need for biodiversity conservation, and to provide guidance to landowners, occupiers and their representatives on biodiversity and inland water management; and
- To ensure that opportunities for conservation and enhancement of biodiversity are fully considered throughout the IDB's operations.

3 THE IDB BAP PROCESS

3.1 The Biodiversity Audit

To produce this IDB Biodiversity Action Plan, information on the habitats and species present in the catchment was obtained. This "Biodiversity Audit" involved the collation of existing data held by the IDB and by other biodiversity partners, and set out in the 2010 BAP, and revision using up to date resources as set out in Section 4.

3.2 Evaluating and Prioritising Habitats and Species

The Biodiversity Audit identifies those priority habitats and species in the UK Biodiversity Action Plan and the Local Biodiversity Action Plan that can be found within the drainage district. Additional non-BAP habitats and species deemed to be important within the drainage district have also been identified.

Further habitats and species, together with additional targets and actions, may be added in the future, as knowledge is improved and delivery of the IDB BAP is reviewed.

A range of criteria has been used to select those species and habitats that are of particular importance to the IDB – that is to say, those habitats and species that could benefit from IDB actions. The criteria used include their national and local status, the opportunities for effective IDB action and the resources available.

3.3 Setting Objectives, Targets and Indicators

For each habitat and species identified as being important to the IDB, conservation targets have been drawn up and set out in the Plan. The targets express the IDB's broad aims for benefiting a particular habitat or species. The targets have been set to focus IDB programmes of action and to identify outcomes and indicators that can be monitored to measure achievement. For each target an outcome/indicator has been set – a measurable feature of the target that, when monitored over time, allows delivery to be assessed.

In order for this BAP to be as effective as possible the targets and actions have been devised to be SMART (Specific, Measurable, Achievable, Relevant and Time-limited). The targets are ambitious, but are also considered to be proportionate and practicable given the resources available.

Procedural targets and actions have also been considered. These are targets that the Board will use to measure the way in which it considers and incorporates biodiversity across the whole range of its operations. These may involve changes to administrative, management and operating procedures.

3.4 Implementation

Once targets have been set for habitats and species, it is important that the actions to deliver the Biodiversity Action Plan are described. The Plan sets out how the Board intends to implement the actions in the plan, often in partnership with other organisations and/or landowners.

3.5 Monitoring

Achievement of the Plan targets will be measured by a programme of monitoring which the Board will undertake, in some instances with assistance from its partners. The acting Ecologist for the Board should undertake and/or coordinate the monitoring programme.

3.6 Reporting and Reviewing Progress

It is important to review the implementation of the BAP, assess changes in the status of habitats and species and the overall feasibility of objectives and targets. In addition, it is vital that the successful achievement of targets is recorded and the gains for biodiversity registered in the public domain.

The Plan sets out the methods the RLIDB will be using to review the delivery of targets and to communicate progress to partner organisations and the public.

4 THE BIODIVERSITY AUDIT

4.1 Introduction

The following Sections 5, 6 and 7 summarise the results of the Biodiversity Audit. Section 5 provides information about the drainage district and a list of the nature conservation sites that occur within or bordering its boundaries. Sections 6 and 7 list respectively the habitats and species occurring within the district that are of potential importance to the IDB.

4.2 Local Nature Partnership Biodiversity Action Plans

The Herefordshire Wildlife Link Biodiversity Action Plans[2] cover the IDB's drainage district.

4.3 IDB Biodiversity Audit Boundary

The Biodiversity Audit covers the entire IDB drainage district of the Lugg and Lower Wye, as shown in Section 16, Appendix 1.

4.4 Sources of Data - Habitats

Information on habitats of relevance occurring within the drainage district was obtained from the following sources:

- RLIDB Biodiversity Action Plan 2010 and references therein;
- MAGIC (Multi-Agency Geographic Information for the Countryside);
- Natural England (NE) open source databases;
- JNCC online resource;
- Historic England open source databases;
- Herefordshire Biological Records Centre;
- Herefordshire Wildlife Trust (HWT);
- Herefordshire Council; and
- Herefordshire Wildlife Link.

4.5 Sources of Data - Species

Information on species of relevance occurring within the drainage district was obtained from the following sources:

- RLIDB Biodiversity Action Plan 2010 and references therein;
- RLIDB species records;
- Environment Agency (EA) open source databases;
- Herefordshire Biological Records Centre (HBRC);
- Herefordshire Wildlife Trust (HWT);
- Herefordshire Ornithological Club (HOC);
- National Biodiversity Network (NBN) Atlas (subject to the data licences);
- Natural England (NE) open source databases; and
- Herefordshire Wildlife Link.

[2] https://herefordshirewildlifelink.wordpress.com/biodiversity-action-plan/

5 RESULTS OF THE BIODIVERSITY AUDIT

5.1 The Drainage District and Flood Risk Zones

5.1.1 River Lugg Drainage District

The River Lugg drainage district covers an area of 12,035 hectares and contains approximately 220 km of IDB-maintained watercourses (Appendix 1). The Main Lugg catchment is located in the low-lying lands to the north of Hereford along sections of the floodplains of the Rivers Lugg, Arrow, Frome and Lodon. RLIDB-maintained watercourses within this district include eight Environment Agency adopted watercourses totalling 40 km.

5.1.2 Lower Wye Drainage District

The Lower Wye drainage district covers an area of 2,630 hectares and contains approximately nine RLIDB-maintained watercourses (Appendix 1) entering the Wormbrook, Allensmore and the Rivers Dore and Monnow; these total approximately 9 km of watercourse.

5.1.3 Flood Risk Zones

The majority of the River Lugg drainage district lies within Environment Agency Flood Risk Zones 2 and 3 (Appendix 2). Much of the Wormbrook and sections of the River Monnow also fall within EA Flood Risk Zone 2. Flood Risk Zone 2 is defined as '*areas shown to have between 0.1% – 1% chance of flooding from rivers in any year*'. Flood Risk Zone 3 is defined as '*areas shown to be at a 1% or greater probability of flooding from rivers in any year*'. The IDB has also identified *'flood prone areas'* within its district (Appendix 2), a result of extensive experience of working within the district over many years.

5.2 Geology

The Lower Old Red Sandstone of the low-lying land comprises beds of easily-eroded red and greenish-grey silts and locally calcareous mudstone, which give rise to the area's rich red soils. In some parts of the river valleys, the mudstone is overlain by equally fertile alluvium.

5.3 Landscape Designations and Character

5.3.1 Landscape Designations

There are no National Parks or Areas of Outstanding Natural Beauty (AONB) overlying the drainage district. The Wye Valley AONB starts to the south of Hereford and the Brecon Beacons National Park lies some way to the west (Appendix 3). Neither is likely to be influenced by the Drainage Board's operations.

The majority of the Lugg and Lower Wye drainage districts fall within Environment Agency Nitrate Vulnerable Zones for groundwater and surface water (Appendix 3), defined as areas being at risk from agricultural nitrate pollution. This designation is made in accordance with the Nitrate Pollution Prevention Regulations 2015. Some of the IDB's operations could potentially cause low levels of nitrates to enter watercourses; however, such effects are almost invariably temporary and localised; the IDB routinely undertakes operations to protect river banks and reduce bankside erosion, bank instability, livestock poaching, and associated silt loading of the water column, and thus positively contributes to reducing nitrate pollution of the river network.

5.3.2 Landscape Character

The bulk of the River Lugg drainage district is within Joint Character Assessment (JCA) 100 Herefordshire lowlands, with the most north easterly part of the district adjoining JCA 101, Herefordshire Plateau.

Key Characteristics of JCA 100:

- Wide river valleys;
- Intensive arable farming with low hedges;
- Undulating valley sides;
- Steep wooded hills;
- Frequent orchards and hop yards;
- Historic parks;
- Old Red Sandstone and timber-framed buildings; and
- Large farmsteads and frequent hamlets.

Key characteristics of JCA 101:

- Gently rolling plateau with small narrow valleys;
- Abrupt edges against Lugg Valley;
- Open arable cultivation on plateau;
- Hop fields;
- Enclosed pasture in valleys;
- Sparsely populated;
- Valley bottom meadows; and
- Orchards with old trees, particularly in west.

Much of the land is given over to intensive arable cultivation with low hedges and scattered hedgerow trees although there are also considerable areas of pasture. Smaller pasture fields and numerous hedgerow trees are to be found on the higher ground rising out of the lowlands and intermittently around the woodland of the 'cornstone' hills. Occasionally, there are poplar shelterbelts along the valley bottoms where the surviving permanent grassland is now found - survivors of the formerly much more extensive Lammas meadows on the floodplains of the Wye, Frome and Lugg. Today the main concentrations of undisturbed meadows are found to the north-east of Hereford: the Lugg and Hampton meadows retain their common land status.

The River Lugg corridor is under pressure from gravel working, water abstraction and land drainage, and river engineering requirements. These may conflict with landscape character and nature conservation management objectives.

Floodplain erosion is seen as a significant conservation issue. This has been partly caused by draining and intensively farming the floodplain for root cropping.

The Lower Wye Drainage District falls within the Garway Hills section of Landscape Character Area 104, South Herefordshire and Over Severn. The landscape is typified by rounded, old red sandstone hills with enclosed valleys. The steeper land is predominantly pasture with a strong hedge network, the less steep land tends to include more arable fields with lower hedges. Scattered farms and small hamlets with isolated churches are also typical of the landscape and there is a strong Welsh association clearly revealed in place names.

5.4 Historical

5.4.1 Sites and Monuments Records

The map in Appendix 4 shows Scheduled Ancient Monuments within the RLIDB district[3]. These monuments are unlikely to be affected by IDB operations.

5.5 Statutory Nature Conservation Sites

5.5.1 International Sites

Internationally-designated conservation sites found within the RLIDB district are listed in Table 1 and mapped in Appendix 5.

Table 1. International Designations. SAC - Special Area of Conservation.

Site name	Designation	Reasons for site selection[4]
River Wye/Afon Gwy	SAC	Annex I habitats and Annex II species that are a primary reason, or qualifying feature (QF), for selection of this site: Habitats: • Water courses of plain to montane levels with the *Ranunculion fluitans* and *Callitricho-Batrachion* vegetation • Transition mires and quaking bogs (QF) Species: • Sea lamprey *Petromyzon marinus* • Brook lamprey *Lampetra planeri* • River lamprey *Lampetra fluviatilis* • Twaite shad *Alosa fallax* • Allis shad *Alosa alosa* (QF) • Atlantic salmon *Salmo salar* • Bullhead *Cottus gobio* • White clawed crayfish *Austropotamobius pallipes* • Otter *Lutra lutra*

5.5.2 National Sites

Nationally-designated conservation sites found within the RLIDB district are listed in Table 2 and mapped in Appendix 5.

Table 2. National Designations. SSSI - Site of Special Scientific Interest.

Site name	Designation	Reason for Notification
River Lugg	SSSI	Rich river plant communities reflecting the transition from nutrient-poor to naturally nutrient-rich water chemistry.

[3] https://historicengland.org.uk/advice/hpg/has/scheduledmonuments

[4] http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012642

		Important otter *Lutra lutra* populations White-clawed (Atlantic stream) crayfish *Austropotamobius pallipes* Atlantic salmon *Salmo salar* Bullhead *Cottus gobio* Twaite shad *Alosa fallax*
River Lugg Meanders	SSSI	Important example of river management based on principles of fluvial geomorphology involving measures to work with, rather than against, natural fluvial processes.
Lugg & Hampton Meadows	SSSI	Nationally important for its species-rich neutral grassland, including NVC MG4, MG5 and MG4/MG5 transition communities. Supports populations of the nationally scarce and near-threatened narrow-leaved water-dropwort *Oenanthe silaifolia*, and the declining and vulnerable mousetail *Myosurus minimus*. Important for its population of snake's-head fritillary *Fritillaria meleagris*
Moseley Common	SSSI	One of the few examples of unimproved marshland remaining in Herefordshire, with uncommon and rare plant communities comprising abundant sedges and rushes. Supports rarer species such as bogbean *Menyanthes trifoliata* and marsh helleborine *Epipactis palustris*.
Dinmore Hill Woods	SSSI	Extensive area of mixed broadleaved woodlands overlying rocks of Old Red Sandstone. Supports a diverse ground flora, and a hazel, field maple and wild service tree understory beneath a sessile oak and ash canopy.
Wormbridge Common	SSSI	Area of acidic marshy grassland overlying peaty clay, supporting a rich flora, with several uncommon species.

Wormbridge Common SSSI and Dinmore Hill Woods SSSI lie outside the IDB drainage district, and thus are unlikely to be affected by the Board's operational activities.

There are no National Nature Reserves (NNR) within the RLIDB drainage district.

5.5.3 Local Nature Reserves

Local Nature Reserves, designated by local authorities under Section 21 of the National Parks and Access to the Countryside Act 1949, found within the RLIDB district are listed in Table 3 and mapped in Appendix 5.

Table 3. Local Designations. LNR - Local Nature Reserve.

Site name	Designation	Reason for Notification
Queenswood	LNR	Semi-natural ancient woodland and arboretum
Broadlands	LNR	An urban fringe nature reserve bordering the Lugg Rhea, comprising a mosaic of grassland, scrub and woodland.

Queenswood LNR lies outside the IDB drainage district, and thus is highly unlikely to be affected by the Board's operational activities. No Local Nature Reserves are found within the Lower Wye drainage district.

5.6 Non-statutory Local Sites

A number of sites have been identified locally as being important for wildlife (Table 4 and Appendix 6). Whilst these designations do not have statutory status, the sites themselves are important for their contribution to biodiversity and planning policy requires that they are given due consideration for their biodiversity value.

The following Local Wildlife Sites[5] (LWS) are found within or bordering the drainage district. These sites were designated over 25 years ago. The present condition of the features mentioned is unknown. Herefordshire Council is leading a partnership working to get a proportion of these sites under positive management.

Table 4. Non-Statutory Designations. Local Wildlife Sites.

Site name	Site No.	OS Grid Ref	HCC UPD ID	Reason for notification
Tippet's Brook	SO35/29	SO379581	163	A lowland stream with rich wetland flora. The margin is good in places and includes pollarded willows and coppiced alder.
Weobley Marsh Common	SO45/03	SO416514	262	A grazed area of grassland, wet in parts and with pollards along the edge. The flora includes meadowsweet and common knapweed.
Stretford Brook	SO45/07	SO439550	266	Stretford Brook supports a rich wetland flora, including yellow water-lily, water avens, and marsh speedwell. Black poplar occurs along the margins.
Monkland Common	SO45/08	SO452578	267	A wet pasture with a northern boundary formed by a stream margin of willow and alder, and with some scrub invasion round the edge. The flora is good and includes pignut, yellow rattle and common knapweed.
Pond near Bankfield House	SO45/10	SO483577	269	A large pond with a wooded margin.
Marsh Covert	SO46/02	SO409607	273	An ancient semi-natural woodland of various species, including oak, ash and alder.
Eyeton Common	SO46/21	SO474613	292	A damp permanent pasture with an area of scrub. The flora is good and includes some uncommon species such as trifid bur-marigold and ragged robin.
Fields East of Blackpole	SO46/22	SO499624	293	A series of small damp meadows with a good flora, including some uncommon species such as pepper-saxifrage and ragged robin.
Bodenham Lake	SO55/07	SO529513	389	A large expanse of water, with islands, on the site of disused gravel pits. The site is already good for waterfowl, and should get better as the marginal vegetation gets established. Great crested grebe, little ringed plover and six species of duck have been recorded.
Wellington Marsh	SO54/01	SO503472	374	An open marshland, invaded by scrub, and with a rich flora of uncommon and rare plants. Amongst the species present are ragged robin, orchids, sedges and

[5] These were formerly known as Special Wildlife Sites (SWS) or Sites of Importance for Nature Conservation (SINC).

				rushes: the round-fruited rush being of particular interest. The site is good for insects and amphibians. marshland with rich flora.
Old Canal at Burcot	SO54/02	SO524420	375	An area of marsh with a wooded margin of ash, willow and hawthorn. Yellow iris, brooklime, water figwort and sedges are present.
Field south of Sutton Rhea	SO54/04	SO537438	377	An unimproved hay meadow with abundant yellow rattle. Other species include pepper- saxifrage and goat's-beard.
Maund Common	SO54/08	SO562497	381	An unimproved, wet, hay meadow with excellent flora, including yellow rattle, common fleabane and abundant orchids.
Pond at Canon Frome Court	SO64/11	SO644436	470	A large pool with islands and good scrubby margins, which forms an excellent habitat for nesting birds.
River Frome	SO65/10	SO670505	499	A steep sided stream, with a thick wooded margin of alder, with hazel, cherry and pollarded willow. Freshwater mussels are present, and kingfishers are frequently noted.

5.7 Priority Habitats

A number of Priority Habitats[6], as listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, are found within the IDB drainage district (Appendix 7), including the following:

- Coastal and Floodplain Grazing Marsh: 26 entries
- Deciduous Woodland: 493 entries
- Semi-improved Grassland: 15 entries
- Lowland Meadow: 27 entries
- Purple Moor Grass and Rush Pasture: 3 entries
- Traditional Orchard: 205 entries

The majority of entries are small parcels of land less than 1 hectare but indicate the type and abundance of semi-natural habitats present within the IDB Lugg and Lower Wye drainage districts.

5.8 Priority River Habitats

Priority River Habitats[7] are rivers and streams that exhibit a high degree of naturalness according to hydrological, physical, physico-chemical and biological components. These watercourses represent the best examples of sustainable of river ecosystems.

A total of 15 IDB-maintained watercourses within the Lugg and Lower Wye Drainage Districts (Appendix 7) are listed within the Priority River Habitats database. These are listed in Section 6 below.

[6] https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england

[7] https://data.gov.uk/dataset/20019cdb-9fef-4024-81af-daf1d1b74762/priority-river-habitat-rivers

5.9 Ancient Woodland

In total, 28 Ancient Woodlands are located within the IDB Lugg and Lower Wye drainage districts, including 15 ancient and semi-natural woodlands (ASNW) and 13 ancient replanted woodlands (PAWS) (Appendix 8). The majority are not located adjacent to IDB-maintained watercourses, and thus are unlikely to be affected by IDB operations. However, several woodlands lie adjacent, or very close, to IDB-maintained watercourses; these are listed in Section 6 below.

5.10 Tree Preservation Orders

Tree Preservation Orders (TPOs) are in force at 91 locations within the Lugg Drainage District. Of these only three are of significance to the Board's operations. They are all on the Withington Lakes watercourse at New Court, Lugwardine. The first is an Alder somewhere within nine metres of SO5416141440; the second is a Willow, located at SO5412741395 and the third is recorded as "unknown species" within 25 metres of SO5410541329. There are no TPOs in the Lower Wye Drainage District.

6 HABITAT AUDIT

6.1 Habitat Audit Summary

The habitat audit summary lists the broad habitat types, designation, priority habitat and associated features that occur within the IDB Lugg and Lower Wye drainage districts as identified by the audit. Also listed are habitats deemed to be of local importance and/or featured in the county Local Biodiversity Action Plan that occur in the RLIDB district. Habitats that are of potential importance for the RLIDB, where IDB activities may be of benefit, are identified. Finally, brief notes are included on the potential for the RLIDB to maintain, restore or expand the important habitats.

Table 5. Habitat Audit Summary.

Broad Habitat Type	Statutory/non-statutory Designation and Associated Features, Priority Habitats (NERC 2006, s.41)	Local Biodiversity Action Plan Habitat	Habitat of Importance for IDB	Location of Habitat of Importance for IDB	IDB Potential for Maintaining, Restoring and/or Expanding Habitat
Rivers & Streams	River Wye SAC • White-clawed Crayfish • Fish, including Atlantic Salmon, lamprey sp., twaite shad, allis shad and bullhead • Otter	Rivers & Streams	Watercourses flowing into the Wye SAC	The River Wye SAC incorporates the River Lugg as far as Hampton Court Bridge. All IDB-maintained watercourses in the Lugg drainage district flow into the River Lugg	Reduction of intensity of channel and bank maintenance. Reduction of sediment transport, by limiting conveyance rates. Using channel maintenance techniques (e.g. pool-riffle sequences) to trap silt and reduce nitrate loading of water column. Undertake soft engineering techniques to reduce bank erosion and increase bank stability in order to reduce nitrate loading of water column. Undertake sensitive tree works to bankside trees to improve bank stability, manipulate shading and encourage macrophyte growth, and to ensure a wide range of
	River Lugg and River Lugg Meanders SSSI • White-clawed crayfish • Fish: including Atlantic salmon, twaite shad and bullhead • Otter		Watercourses flowing into the Lugg/Lugg Meanders SSSI	All IDB-maintained watercourses in the Lugg drainage district flow into the River Lugg. Aston brook, Aston Brook lateral No. 1 flow into the Lugg Meanders SSSI	
	Tippet's Brook LWS & Priority River Habitat • Lowland stream with rich wetland flora and willow and alder pollards		Watercourses and banks	Tippets Brook, Tippets Lateral No 1 & Dilwyn Ditch	
	Stretford Brook LWS & Priority River Habitat		Watercourses and banks	Stretford Brook	

Broad Habitat Type	Statutory/non-statutory Designation and Associated Features, Priority Habitats (NERC 2006, s.41)	Local Biodiversity Action Plan Habitat	Habitat of Importance for IDB	Location of Habitat of Importance for IDB	IDB Potential for Maintaining, Restoring and/or Expanding Habitat
Rivers & Streams	• Good aquatic flora including yellow water lily. Black poplar in places.	Rivers & Streams			microhabitats are available. Pollard bankside trees to prolong their life and prevent weakening and splitting of trunks and associated bank erosion. Tree management of dead and diseased trees.
	River Frome LWS • Wooded margins, Freshwater mussel.		Watercourses and banks	Hutt Back Brook, Hutt Back Lateral, Watery Lane Drain, Yarkhill Watercourse, Yarkhill Lateral, Claston Watercourse lateral No 1, Claston Watercourse, Lateral No 2, Bartestree Ditch	
	River Monnow Priority River Habitat		Watercourses and banks	River Monnow	
	Berrington Main Ditch Priority River Habitat			Berrington Main Ditch	
	Park Farm Ditch Priority River Habitat			Park Farm Ditch	
	Cheaton Brook Priority River Habitat			Cheaton Brook	
	Cogwell Brook Priority River Habitat			Cogwell Brook	
	Ridgemoor Brook Priority River Habitat			Ridgemoor Brook	
	Moor Brook Priority River Habitat			Moor Brook	
	Wellington Brook Priority River Habitat			Wellington Brook	
	Moreton Watercourse and Brook Priority River Habitat			Moreton Watercourse and Moreton Brook	
	Little Lugg Priority River Habitat			Little Lugg	
	Curl Brook Priority River Habitat			Curl Brook	Currently (2019) the Board does not maintain the Curl Brook, and thus has limited potential to restore or enhance this habitat.

Broad Habitat Type	Statutory/non-statutory Designation and Associated Features, Priority Habitats (NERC 2006, s.41)	Local Biodiversity Action Plan Habitat	Habitat of Importance for IDB	Location of Habitat of Importance for IDB	IDB Potential for Maintaining, Restoring and/or Expanding Habitat
Grassland	Lugg & Hampton Meadows SSSI • Species-rich neutral grassland and water meadows with high botanical interest	Wet Lowland Meadows & Pasture & Fens	Watercourses associated with grazing marshes and their banks.	Shelwick watercourse, Shelwick Outfall, Shelwick lateral No. 1, Lugg Rhea	Currently (2019) the Board does not maintain the Lugg Rhea, and thus has limited potential to restore or enhance this habitat. Improve habitat for flora & fauna by minimising bank maintenance of Shelwick watercourses.
	Field south of Sutton Rhea LWS • Unimproved species-rich hay meadow		Watercourses associated with damp meadow and their banks.	Sutton Rhea	Aid maintenance of pasture water levels by limiting conveyance rate in watercourses, which could affect drainage of site.
	Monkland Common LWS • Wet pasture		Watercourses associated with wet pasture and their banks.	Moor Brook & Moor Lateral	
	Weobley Marsh Common LWS • Grazed grassland, wet in parts with pollards on edge			Weobley Marsh Brook	
	Eyeton Common LWS • Damp pasture			Broad Brook & Broad Lateral No 1	
	Fields East of Blackpole LWS • Damp meadows		Watercourses/banks associated with wet meadows.	Blackpole Ditch & Eye Court Ditch	
	Maund Common LWS • Unimproved wet hay meadow		Watercourses associated with wet meadow and their banks.	Moor Brook (Bodenham), Moor Laterals 2 & 3	
	Broadlands LNR • Grassland, scrub and scattered trees	Wet Lowland Meadows & Pasture & Fens Green spaces & Corridors	Watercourses associated with grassland, scrub, scattered trees, and their banks	Lugg Rhea	Currently (2019) the Board does not maintain the Lugg Rhea, and thus has limited potential to restore or enhance this habitat.

Broad Habitat Type	Statutory/non-statutory Designation and Associated Features, Priority Habitats (NERC 2006, s.41)	Local Biodiversity Action Plan Habitat	Habitat of Importance for IDB	Location of Habitat of Importance for IDB	IDB Potential for Maintaining, Restoring and/or Expanding Habitat
Wetland	Mosely Common SSSI Unimproved fen/marshland with high botanical interest	Wet Lowland Meadows & Pasture & Fens	Watercourses associated with floodplain fens and their banks.	Curl Brook and Curl Brook laterals 1-4	Currently (2019) the Board does not maintain the Curl Brook and laterals, and thus has limited potential to restore or enhance this habitat.
	Wellington Marsh LWS Open marshland with rich flora.		Watercourses associated with grazing marshes and their banks.	Moreton Lateral No. 3	Aid maintenance of pasture water levels by limiting conveyance rate in watercourses, which affects drainage of site.
Woodland, Wet Woodland	Marsh Covert LWS • Ancient semi-natural woodland with some wet woodland species.	Mixed Deciduous Woodland	Watercourses associated with riparian woodland and their banks	Oxhouse Ditch No 2	The Board has limited potential to enhance adjacent woodland habitats, other than works to bankside trees (above) or focussed methods of species enhancement. Tree and shrub planting on suitable areas of land, such as meander loops, can enhance ecological connectivity of woodland semi-natural habitats via the riparian corridor. These areas also provide stepping stones for riparian and woodland species.
	Bodenham Lake LWS • Standing water and wet woodland			Dinmore Ditch	
	Woodland east of Stretford PAWS			Stretford Brook	
	Long Coppice ASNW			Moreton lateral No. 1	
	Withy Bed PAWS			Moreton watercourse	
	Pye Coppice ASNW			Little Lugg: Preston Marsh	
	Ashbed ASNW			Little Lugg: Wyatt	
	Sally Bed Coppice PAWS			River Frome	
	Wye Coppice PAWS			River Frome	
	Brainton Wood ASNW			Lugg Rhea	
	Wood near Newhouse ASNW			Newhouse Farm Brook	
	Gwern Snell Wood ASNW & PAWS			Pontrilas Side Streams	

6.2 Habitats of Importance for the IDB

The following section provides more information on the status of the habitats within the drainage district that are of importance for the IDB (see Table 5) and may benefit from water level management or other IDB activities.

6.2.1 Rivers and Streams

Description

Rivers and streams include natural and some semi-natural watercourses; (semi-natural here being those that are artificially managed for irrigation and/or flood risk management). Rivers are a Habitat of Principle Importance in England, as listed under section 41 of the NERC (2006) Act. They were also a UK Priority Habitat under the previous UK Biodiversity Action Plan (2011). Rivers and streams contain a variety of habitats within and along their length including in-channel features like boulder rapids, riffle-pool sequences, shoals, deep pools, etc. as well as a varied riparian habitat from overhanging woodland to open short grassland or rock. This variety and its spatial arrangement in the river system support complex ecosystems whose survival is often dependant on the maintenance of all stages in the system. Some species require the whole river system, including its tributaries, from source to sea to be intact for their survival, for example migratory fish species.

National status and local status:

The river system of Herefordshire is one of the most important in the UK. The River Wye is a European Special Area of Conservation for its populations of migratory fish, native crayfish and otter.

Status and locations within drainage district

The River Lugg and its tributaries are integral parts of the Wye system. Intensive agricultural development in the Wye and Lugg catchments since the 1950s have provided an increasing threat to the integrity of the Wye and Lugg ecosystems. This has come from increased diffuse water pollution originating in farming activities. This can take the form of pesticides arising from stock management in the uplands to agrochemicals used in arable farming in the lowlands. Direct runoff from farmyards and poultry farms form localised pollution sources, particularly of nitrates and phosphates. Cultivation of the floodplains and poaching, due to intensive or poor stock management, has led to an increase in soil run-off during rain resulting in silt deposition in rivers. This, for example, smothers in-channel gravels which are so important for salmonids. The apparent increase in heavy rainstorms due to climate change will exacerbate the soil erosion problem.

Increasing human development in the floodplain, especially in the latter half of 20th century, has increased the need to manage the flood risk from the main rivers by way of the Board's extensive watercourse system within the floodplain. Flood-risk management until recently relied heavily on personal local experience. However, the advent of new systems for assessing flood water conveyance means that there is increasing scope to reduce the intensity of watercourse management and yet still remain within safe flood conveyance levels. Unfortunately, some of the security afforded by this new knowledge is being offset by the current unpredictability of rainfall thought to result from climate change.

Potential improvements

Changes in watercourse management might be used to try to offset some of the adverse effects of agriculture on the river systems, particularly in sediment trapping closer to source and before it reaches the main rivers. There may be opportunities to modify channel management to increase fish and some invertebrate populations within the watercourse system, but the success of this would be limited by factors outside the Board's control, namely farming practices on the floodplain and their effect on water quality. Riparian management can be modified to benefit a wide variety of species associated with river systems.

6.2.2 Grassland

Description

This broad category encompasses grassland habitats including lowland meadows and rush pastures; both are Habitats of Principle Importance in England, as listed under section 41 of the NERC (2006) Act. Both were also listed as UK Priority Habitats under the previous UK Biodiversity Action Plan (2011). These habitats fall under *Wet Lowland Meadows & Pastures & Fens* in the Herefordshire LBAP.

They are described as periodically inundated grassland managed for grazing or fodder. It is usually divided up by a system of drainage ditches that affect the water levels on the marshes. In many floodplain grasslands water levels can be controlled by penning structures within the ditch system, but this is not the case in the Lugg grasslands.

Floodplain grassland usually has two major habitat components: the grasslands themselves and the aquatic habitat, usually ditches, within or adjacent to the grasslands. Watercourses are important for their aquatic plant and invertebrate populations, while the grasslands tend to support drier or marshy habitats. However, the juxtaposition of the ditches can be essential for supporting some of the transition habitats and associated species that inhabit the grasslands. For example breeding waders that nest in the grasslands may rely on the damp soil alongside ditches to provide them with food when the soil water table drops, and the grasslands dry up as summer progresses.

Though floodplain grazing marsh falls under "improved" grassland as a general habitat type, it is "unimproved" floodplain grassland that has the higher conservation value. Such grasslands are usually extensively managed for grazing and grass and often receive little or no fertilizer; nutrient inputs resulting from seasonal flooding.

National and Local Status

Unimproved grazing marsh is a continually diminishing resource in the UK. If flooding can be controlled, and particularly if the water table can be dropped, the land is particularly valuable for agricultural improvement. This is what has happened widely on the floodplains in Herefordshire.

Status and locations within drainage district

The main area of unimproved floodplain grassland within the Board's district is the Lugg and Hampton Meadows close to Hereford. Many other areas of grassland still occur on the floodplains, but have been agriculturally improved or become fragmented by arable farming and have lost much of their intrinsic conservation value.

The Lugg grassland habitat was once important for its bird populations, particularly for breeding waders like snipe *Gallinago gallinago*, curlew *Numenius arquata* and lapwing *Vanellus vanellus*, (now declining) as well as wintering wildfowl including whooper and Bewick Swans *Cygnus cygnus* and *C. bewickii*. It is also important for its plants, including snake's-head fritillary *Fritillaria meleagris*, and fine-leaved water dropwort *Oenanthe aquatica*.

Potential improvements:

Water levels in the Lugg and Hampton Meadows are dependent on main river levels, not controlled by internal sluices in the watercourse system. Therefore this limits the effects that watercourse management can have on the grasslands as a whole. Theoretically, channel management might be able to help by limiting conveyance rates of floodwater, thus reducing the speed at which the soil water levels fall after flooding. However, because of the short length of Board watercourses in the Lugg Meadows, any changes to the management of the Board's watercourses would have little or no effect; currently (2019) the Board does not manage the Lugg Rhea, the main watercourse adjacent to the Lugg Meadows. Several other of the Board's watercourses do not flow through the grasslands but are located at the upstream end of the

meadows, quickly emptying into the Lugg itself. Rotational watercourse management can help to maintain botanically rich areas of submerged and emergent vegetation and may be able to help support species like water vole (if reintroduced) and barn owl.

6.2.3 Wetland

Description

This broad habitat category encompasses floodplain grazing marsh and lowland fens; both are Habitats of Principle Importance in England, as listed under section 41 of the NERC (2006) Act. Both were also listed as UK Priority Habitats under the previous UK Biodiversity Action Plan (2011). These habitats fall under *Wet Lowland Meadows & Pastures & Fens* in the Herefordshire LBAP, and there is some crossover with the grassland habitats described above.

Fens are wetlands overlying peat. They receive their water, which usually also supplies their nutrients, from either lateral flow, such as in springs or seepages, or vertically from ground water or rainfall. Many fens have been drained for agriculture and their intrinsic conservation interest lost, but where they remain unimproved and their water levels maintained, they can be of high conservation value with species-rich plant communities. The key to maintaining the conservation condition of fens is the management of the water; its level and quality, and the limiting of the natural progression of the fen towards wet woodland. Often the vegetation is "self-limiting"; water levels being too high and nutrient levels too low to allow woodland establishment. However, following drainage the fen vegetation can be replaced with species poor communities, often of common species, and ultimately with woodland. The situation can be managed to an extent by controlled grazing, usually with cattle, but only if water levels can be restored.

National and Local Status

Lowland fens and marshland are uncommon in intensively farmed areas of the UK.

Status and locations within drainage district

Moseley Common in the Board's district is an important, if small fen site. It is also one of only a few in Herefordshire.

Potential improvements:

Management records for Moseley Common are scarce but it was thought to have been subject to agricultural improvement in the 1850s to support beef farming. In the 1950s the IDB straightened the Curl Brook upstream of the Common and removed a weir, which probably supplied a small ditch that provided water to the northern part of the site (the ditch would probably have served for drainage in winter). This channel is now dry. Since the 1950s only limited maintenance has taken place on the Curl Brook.

Moseley Common gets its water mostly from rainfall, the water levels in the watercourses generally being lower than the fen, except during spate. Also, the peat areas of Moseley Common are generally in basins underlain by clays. This precludes the inflow of water through the soils.

The Board does not currently (2019) maintain the Curl Brook and laterals; the watercourses associated with Moseley Common. Currently, the Wye Catchment Partnership hosts a ‘Go Wild in the Curl’ Facilitation group, comprising roughly 25 farms within the Curl catchment; the aim of the group is to improve both the water quality and wildlife of the Curl Brook catchment as a whole. Management of these watercourses is unlikely to affect the water level status of Moseley Common as long as the water levels in the Curl Brook and its laterals are not lowered. Raising the water level in these watercourses might be beneficial for the Common.

6.2.4 Woodland, Wet Woodland

Description

Woodlands of importance described here are either broadleaved Ancient Semi-Natural Woodlands (ASNW) or Plantations on Ancient Woodland Sites (PAW). Many of these woodlands are 'ancient' in origin; that is they have existed since the 1600s before planting of woodlands became more common. These woodlands tend to exhibit good structural diversity of trees (canopy), understorey (small trees and shrubs), herb and ground layers, with a high biodiversity value, including many rare and threatened species.

Many ancient woodlands were cut down in the 19th century for their timber, and replanted with commercial conifer species; however, these woodlands are still valuable as they often support important seedbanks within their soils, representing the former ancient woodland flora, and thus can be restored by replacing the coniferous varieties with native broadleaved species.

Wet woodland occurs on poorly drained and often water-logged soils, and is frequently found alongside rivers and streams, particularly in areas prone to flooding. This habitat contains characteristic tree species, often including alder and willow, with species like ash, birch and oak occurring on drier ground. Wet woodlands were often managed in the past, particularly as coppices, but nowadays tend not to be actively managed. Their wet or flooded soils mean they are rarely grazed, which allows them to become overgrown with a well-developed shrub layer under the trees. As a result they can become very important refuges for certain organisms, particularly those which exploit the abundance of dead and dying timber within these woods. Their structure, lack of disturbance and proximity to water also often make them important refuges for otters.

National and Local Status

Herefordshire is of National significance for wet woodland.

Status and locations within drainage district

There are a number of ancient woodlands (ASNW, PAWS) adjacent to or near to the Board's watercourses. Existing wet woodlands occur on the edges of the Board's district, notably at Bodenham Gravel Pits, a relatively newly established wet woodland and Wig Wood, a native wet woodland, slightly upstream of the Lugg.

Potential for improvement

Theoretically, the Board's management of its watercourses could affect woodland habitat by altering conveyance rates and thus affecting water tables, which is particularly important for wet woodlands. However, the distances between these sites and the Board's watercourses mean that this is not likely.

7 SPECIES AUDIT

7.1 Species Audit Summary

The species audit summary lists relevant National Priority (NERC 2006, Section 41) species that occur within the IDB district as identified by the audit. Also listed are species deemed to be of local importance and/or identified in the county Local Biodiversity Action Plan that occur within the IDB district. Species that are of potential importance for the RLIDB, where IDB activities may be of benefit, are identified. Finally, brief notes are included on the potential for the RLIDB to maintain or increase the population or distribution of the species of importance.

The 2010 IDB Biodiversity Action Plan included tree sparrow *Passer montanus*, with past records noted in OS squares to the east and south of Leominster, and a record from 2009 of birds in the same area, near Stoke prior. However, this species is extremely rare within Herefordshire, with only a dozen or so validated records within the county since 2009 (NBN Atlas); of these only one was within the RLIDB drainage District, a record from 2013 from a location at Wellington Sand and Gravel Works, near Wellington Brook, and thus the species is considered largely absent from the IDB district. In addition, because this species is not particularly associated with watercourses, it seems unlikely that the Board can successfully target this species above and beyond actions already planned for other habitats and focal species which are associated with riparian habitats; consequently, this species has been removed from the 2019 Biodiversity Action Plan.

Table 6. Species Audit Summary. # - Included within species assemblage LBAP for Rivers and Streams

Common Name	Scientific Name	UK Priority Species (NERC 2006, s.41)	Local BAP Species	Location of Species of Importance for IDB	IDB Potential for Maintaining or Increasing Species Population or Range
MAMMALS:					
Water Vole	*Arvicola amphibius*	Yes	Yes	The only known population of water voles in Herefordshire is located on the River Dore, in the south-west of the county, a result of a re-introduction programme undertaken in 2006 and 2007. The 2010 BAP mapped four records of water vole from 1990 and 1985; two from the Curl Brook system, and one from Pinsley and Moreton Brooks respectively. However, it is considered unlikely that	Work with the HWT in a possible future reintroduction scheme in site(s) yet to be chosen. The Board could contribute to such a scheme by undertaking appropriate habitat bankside management in advance of reintroduction, within IDB-maintained watercourses near to reintroductions sites.

Common Name	Scientific Name	UK Priority Species (NERC 2006, s.41)	Local BAP Species	Location of Species of Importance for IDB	IDB Potential for Maintaining or Increasing Species Population or Range
				viable populations of this species now occur anywhere other than along the River Dore, and there have been no validated records post-2000 within the IDB district.	
Otter	*Lutra lutra*	Yes	#Yes	Otter is now widespread throughout the county and could occur anywhere within the IDB drainage district.	Create or maintain safe linking routes between potential breeding/lying up sites and river system. This would include planting of trees and scrub in quiet areas, such as meander loops. Creation of artificial otter holts or large woodpiles in quiet areas to provide holt and lay-up opportunities. The Board should consider installing otter ledges within culverts at known or potential Road Traffic Accident (RTA) hot-spots for this species, for example where the Homend Flood Channel and Homend Back Brook pass beneath the A417 at Stretton Grandison.
Bats	At least 15 species of bat have been recorded in Herefordshire[1]	Yes	Yes	Several bat roosts have been identified in bankside trees.	Increase feeding opportunities and enhance associated flight lines by retaining tree cover on watercourses adjoining woodland or at known roost sites. Retain Potential Roost Features (PRF) in bankside trees (e.g. woodpecker holes, splits, cracks and other cavities)

Common Name	Scientific Name	UK Priority Species (NERC 2006, s.41)	Local BAP Species	Location of Species of Importance for IDB	IDB Potential for Maintaining or Increasing Species Population or Range
BIRDS:					
Barn owl	*Tyto alba*	No	Yes	Lugg Meadows, Moseley Common, sites with good quality foraging habitat (i.e. rough grassland).	Increase food availability by retaining long grass sward along banks. Install barn owl boxes on suitable trees close to good foraging habitat where lack of natural roost/nest cavities exist.
FISHES:					
Atlantic Salmon	*Salmo salar*	Yes	No	Widespread in IDB district. Records from Rivers Arrow, Lugg and Frome, Humber Brook, Pinsley Brook and Kenwater.	Reduce smothering of spawning gravels by reducing bank erosion and run-off, and by undertaking appropriate channel management where necessary to limit erosion, sediment loss into the water. column and eutrophication. Explore opportunities to install fencing along watercourse banks to reduce livestock poaching, erosion of the bank, and loss of soil/sediment into watercourses. Tree works to provide both shaded and unshaded areas, to enhance opportunities for refuge, fish nursery sites and to encourage macrophyte growth and improved foraging. Leave some in-channel woody debris for fish nurseries. Installation of shallow in-channel berms
Brown trout	*Salmo trutta*	Yes	#Yes	Widespread in IDB district. Records from Rivers Arrow, Lugg, Lodon and Frome, Tippet's Brook, Stretford Brook, Aston Brook, Cogwell Brook, Ridgemoor Brook, Humber Brook, Pinsley Brook, Wellington Brook and Kenwater. Also Dulas Brook, Worm Brook and River Monnow.	
Bullhead	*Cottus gobio*	No	#Yes	Widespread in IDB district. Records from Rivers Arrow, Lugg, Lodon and Frome, Cogwell Brook, Humber Brook, Pinsley Brook, Ridgemoor Brook, Wellington Brook and Kenwater. Also Dulas Brook, Worm Brook and River Monnow.	
Brook lamprey	*Lampetra planeri*	No	#Yes	Records of Brook Lamprey from Rivers Arrow, Lugg and Frome, and Pinsley Brook. One 1992 record of sea lamprey from	
River lamprey	*Lampetra fluviatilis*	Yes	#Yes		
Sea lamprey	*Petromyzon marinus*	Yes	#Yes		

Common Name	Scientific Name	UK Priority Species (NERC 2006, s.41)	Local BAP Species	Location of Species of Importance for IDB	IDB Potential for Maintaining or Increasing Species Population or Range
				Pinsley Brook. One 2011 record of river lamprey from the River Lugg.	to introduce pool-riffle sequences, which help to aerate the water column and result in a heterogeneous hydrological flow, and associated biodiversity benefits.
INVERTEBRATES:					
White clawed crayfish	*Austropotamobius pallipes*	Yes	Yes	Historic record in Dinmore Ditch.	Record presence within district whenever found.
PLANTS:					
Black poplar	*Populus nigra* SSP. *betulifolia*	No	Yes	Weobley Marsh Brook, More Brook, Moor Brook Lateral No. 3, Little Lugg Wyatt section and Kymin sections, River Lodon.	Ensure retention and careful management of black poplars where they occur and replant with appropriate genotype when threatened or lost. Pollard when necessary to prolong lifespan. Record species full distribution within IDB district.
INVASIVE NON-NATIVES:					
American mink	*Neovison vison*	No	No	Probably widespread but may be declining as a result of increased distribution of otter.	Record presence within IDB district.
Signal crayfish	*Pacifastacus leniusculus*			Probably relatively widespread in lower catchment.	Record presence within IDB district
New Zealand pygmyweed	*Crassula helmsii*			Claston Watercourse No. 1, Dilwyn Common Ditch, Mousenatch Ditch	Ensure no further spread as a result of working operations. Consider eradicating if feasible (i.e. isolated stands).
Himalayan balsam	*Impatiens glandulifera*			Widespread, especially in lower catchment.	
Japanese knotweed	*Fallopia japonica*				

Common Name	Scientific Name	UK Priority Species (NERC 2006, s.41)	Local BAP Species	Location of Species of Importance for IDB	IDB Potential for Maintaining or Increasing Species Population or Range
Parrot's feather	*Myriophyllum aquaticum*			Dinmore Ditch.	
Water fern	*Azolla filiculoides*			Localised in still waters (e.g. Shelwick Watercourse).	

1 – Herefordshire Bat Atlas 1960-2015. Herefordshire Mammal Group. Denise Foster & David Lee.

7.2 Species of Importance for the IDB

The following section provides more information on the status and location of the species within the drainage district that are of importance for the RLIDB and may benefit from IDB activities.

7.2.1 Water Vole *Arvicola amphibius*

Water voles were once widespread over the UK, though commonest in the lowlands. As their name suggests they have close associations with water, living in the banks of watercourses, feeding on bankside and emergent vegetation. They are found in natural and artificial habitats, from remote streams to rural canals.

Water voles have suffered a major population decline over the last three decades, being absent from 90% of their former sites over the UK. The 2010 BAP mapped four records of water vole from 1985 and 1990; two from the Curl Brook system, and one from Pinsley and Moreton Brooks respectively. However, it is considered this species is most likely absent from its former sites, with the only current population located along the River Dore, the result of a reintroduction programme undertaken in 2006 and 2007. There have been no validated records post-2000 within the RLIDB district. The national decline is thought to be the result of a variety of factors, but particularly mink predation and habitat destruction, including wetland drainage, arable cultivation and watercourse canalisation.

If a recolonisation programme were to be considered, the Board could be a valuable partner. A combination of predator management and habitat manipulation would be required to successfully re-establish colonies and the Board is obviously well placed to provide an element of habitat management.

7.2.2 Otter *Lutra lutra*

This mammal was once common throughout the British Isles. Though always closely associated with water they regularly travel considerable distances overland between watercourses. Their requirement is for good fish-stocks for food and riparian cover, particularly trees and shrubs, for lying up and breeding sites. Most otter signs are of spraints, (their droppings) which are used as a means of communication, but their widespread presence does not necessarily indicate the suitability of the habitat where they are found. However, the frequency with which sprainting sites are used and the density of these sites can be an indicator of otter activity. Though spraints are no guide to actual numbers of otters, their distribution and density could reflect population trends. The presence of signal crayfish remains in otter spraints near Bodenham Lake might have implications for the spread of crayfish plague and thus be of significance in native crayfish conservation.

The UK otter population suffered major declines in the 1970s and 80s, but the population is now showing signs of recovery. The Rivers Wye and Lugg were otter strongholds during the times of decline and, though these populations may have followed the national trends, Herefordshire still retained good numbers. Herefordshire records cover 87 1km OS squares and within the drainage district the Ecological Survey of 2002-6 showed the presence of otters over most of the area; the species has further expanded and could now occur anywhere within the drainage district. Most otter signs are of spraints, which only indicate the movement of otters, which travel widely to feed; the indication of their widespread presence does not necessarily indicate the suitability of the habitat where they were found for supporting otters.

The major factor leading to otter decline in the last century was attributed to organochlorine insecticides, first used in the late 1950s, and which led to a decline for several decades thereafter, until the 1970s and 80s. Following legislative control of substances, such as dieldrin, the national population has recovered

well, with an approximate 50% increase in the population since the previous estimate, in 1995[8]. Impacts upon the current population include insufficient prey associated with poor water quality; impoverished bankside habitat features for resting and breeding; and incidental mortality from roadside deaths.

The Board's watercourses are likely to provide feeding, travelling and resting opportunities for otters. Enhancement of this habitat could be achieved by undertaking appropriate works which would help to support good fish populations in watercourses, maintaining channel side trees, especially those with large root boles under which otters will lie up, planting new trees and shrubs in quiet areas on order to provide suitable lay-up sites, and creating artificial holts and large wood piles from cut tree material which would provide holt opportunities. The Board should also consider installing ledges, or otter walkways, within culverts under main roads, at known accident hot-spots for this species.

7.2.3 Bats

While some species of bats are UK priority species, others are not, but all are susceptible to similar pressures and have legal protection. Population declines have been observed in many species and common factors in the declines have included the destruction of roost and breeding sites, and fragmentation of feeding habitat. All bats are legally protected in the UK and, some are subject to special additional protection.

All UK bats are insectivorous and all to an extent depend on trees for their survival. Trees not only provide roosting and breeding sites, they provide cover from predators and shelter from the wind, and thus the availability of their insect prey. Many species of bats tend to keep close to trees while feeding or travelling to and from feeding sites and roost sites. Water supports large flying-insect populations and so the combination of trees and water is frequently exploited by bats.

The Board's watercourses can provide an extremely valuable habitat for bats. Watercourses with tree cover on one bank can make important feeding sites as well as providing corridors between feeding and roosting sites.

7.2.4 Barn Owl *Tyto alba*

Barn owl is not a UK priority species but is of local concern. In the 2010 BAP, the audit found that the population in Herefordshire had declined to a barely credible 16 birds. (NBN Gateway). Though not usually associated with watercourses, they are commonly found on low lying floodplains, especially in winter. Here they hunt for small mammals in areas of rough and rank grassland often found on unmown watercourse banks or ungrazed marshland.

UK barn owl populations declined severely in the 1970s, through factors including, pesticide poisoning, (especially from rodenticides), loss of nesting sites from farm building restoration or conversion, and from loss of trees due to Dutch Elm disease. Changes in farming practices were probably also hugely influential, with the loss of rough grassland through improved agricultural techniques and the "sterilisation" of grain stores and rickyards reducing food supplies.

The IDB could work in partnership with the Herefordshire Barn Owl Group and Hereford Ornithologists Club to enhance habitat where barn owls still occur within the Board's district. The requirement would

[8] Mathews *et al*., 2018. A Review of the Population and Conservation Status of British Mammals: Technical Summary.

be to increase small mammal populations by establishing bank maintenance regimes that would always leave some unmown grass during mowing operations. This ensures a continuation of small mammal habitat thus maintaining their populations. The retention of old trees with large natural holes, or providing suitable nest boxes near these banks would provide nest sites to help sustain the population. However, care would be needed in the selection of these. Encouraging barn owls to nest in sites that may need to be disturbed frequently for management purposes would not be beneficial to the birds.

7.2.5 Fishes

Historically some of the IDB's natural watercourses would have supported salmon, brown trout, bullhead and lamprey species. While agricultural development of the Lugg floodplain started before the 18th Century, agricultural intensification encouraged after the second World War and still continuing today has made conditions much less suitable for these species within the Board's watercourses. The conversion of grassland to arable and the intensification of grassland farming has resulted in significant sediment and chemical (especially nitrate and phosphate) runoff from fields. This produces unsatisfactory water conditions for salmonids and other species; oxygen depletion and silt deposition on shingle beds being just two of the side-effects of this runoff. Until this is controlled at source there is little likelihood of widespread restoration of historic fish populations. However, the upper parts of the Board's area are still important for brown trout and bullhead, particularly in the Arrow catchment and the upper Lodon.

7.2.6 White-clawed crayfish *Austropotamobius pallipes*

This small fresh water "lobster" is found in watercourses between 0.5 and 1.3 metres deep with mixed flow patterns, and often with riffles and boulders or cobbles. It is particularly associated with watercourses with undermined and overhanging banks, submerged logs, and often bankside tree roots.

The major threat to the native UK crayfish population is due to disease from the non-native signal crayfish *Pacifastacus leniusculus*. This species has been widely released into the wild to be harvested for food and is the host to a pathogenic fungus which transmits a lethal disease to the native species. The disease vector can be carried in any wet material (soils, vegetation, etc.) from infected sites to others.

The white clawed crayfish has not been recorded in the Board's watercourses, but does occur in the River Lugg. Signal crayfish have apparently been found by others in the Dinmore Ditch and Wellington Gravel Pits, but the records have not been lodged with the HBRC.

The Board's management for the native white-clawed Crayfish population will be in the form of help to restrict the spread of the alien species. The Board could use its contacts in the local community to encourage the establishment of a trapping programme in target ditches to try to limit the passage of signal crayfish into the Lugg. Board staff and contractors should be enabled to identify the signal crayfish in order to be able to report its occurrence.

7.2.7 Black poplar *Populus nigra* ssp. *betufolia*

Herefordshire is a stronghold for this species with 208 known individuals – roughly 3% of the UK population. These trees were once common on floodplains of the UK. Black poplars are dioecious, having separate male and female plants, but the UK population has a huge disparity in number between male and female trees; fewer than 10% are female. As the population declines and trees become more widely separated the chances of reproduction become reduced, accelerating the decline. Whilst vegetative propagation occurs, without assistance this is unlikely to maintain the distribution of an increasingly fragmented population.

The conservation policy in Herefordshire is to maintain the black poplar population by protecting existing trees and possibly carrying out pollarding to retain specimens, coupled with controlled planting of the correct genotype where necessary.

The Board must be aware of the presence of these trees and contractors must be able to identify them to avoid accidental damage. The Board's current tree planting policy could become a mechanism for executing part of the Biodiversity Action Plan planting plans.

Black Poplars are recorded in 29 locations within the Board's District. Of those 12 occur alongside or close to Board watercourses.

7.2.8 Invasive, non-native species

Invasive, non-native species occur widely in the UK, some with no apparent ill-effects on native ecosystems. However, others have the potential to cause, or are already causing, serious problems. Invasive aquatic species are particularly problematical since they can spread easily in flowing water. Many invasive non-native, aquatic or riparian plants reproduce vegetatively from fragments of parent plant which then re-root downstream. Invasive non-native aquatic plants are not just important for their conservation effects, but also for their economic impact, and even sometimes as threats to human safety. Invasive non-native aquatic weeds have caused deaths by drowning, and have the potential to block screens in drainage pumps.

Watercourses provide a very efficient transport system for the spread of invasives, and this can be clearly seen in the spread of species like Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* down the river banks of the Wye.

Elsewhere in this report invasive non-native species like American mink and signal crayfish have already identified as major factors in the demise of some UK native species, but there are other species whose effect is less well defined, but still very serious. New Zealand pygmyweed *Crassula helmsii*, curly pondweed *Lagarosiphon major* and parrot's feather *Myriophyllum aquaticum* are capable of dominating shallow waterbodies and destroying their native ecosystems. The density to which the populations can grow can pose a serious threat to flood water management.

The control of invasive species is sometimes very difficult and with the progressive restriction of herbicides approved for use in water, the control of some alien aquatic plants (e.g. *Lagarosiphon & Myriophyllum*) is impossible.

The Board's staff should be able to identify the locally occurring invasive non-native species and carry out what control is possible on watercourses. The Board should be a contributor to the recording of invasives within the county.

8 HABITAT AND SPECIES ACTION PLANS

8.1 Habitat and Species Action Plans

The following sections contain action plans for each of the habitats and species identified for potential action by the RLIDB. The plans set out the targets, actions for implementation, and outcomes/indicators to measure success that the RLIDB believes are appropriate for each BAP. These plans will be reviewed and updated periodically.

The species, habitats and management actions selected have been determined following the fulfilment of the following criteria:

- That the Board's normal operational management would be likely to affect the species or habitat;
- That the management proposed would produce measurable benefits to the target species or habitat;
- That the Board has the resources and expertise, or can obtain them, to carry out the work; and
- That the proposed management would not provide and adverse or unacceptable flood risk to life or property.

9 HABITAT ACTION PLANS

9.1 Rivers & Streams

Rivers are a Habitat of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Rivers and Streams are also a Local Biodiversity Action Plan Habitat in Herefordshire.

9.1.1 River Wye Catchment Partnership

The European Water Framework Directive (WFD) requires that all members states produce river basin management plans with the aim of all watercourses achieving 'good ecological status'; currently, all but two of the Board's maintained watercourses are classified as 'moderate' status (2015/16), with diffuse pollution from arable and livestock farming, point source pollution, and poor soil management identified as reasons for not achieving good status.

The River Wye Catchment Partnership (WCP) operates in England and Wales, jointly hosted by the Wye and Usk Foundation (WUF) and Natural Resources Wales (NRW). The River Lugg and River Monnow catchments are both priority areas for action. Key issues the partnership is trying to address include:

- Water quality impacted by excessive phosphate, pesticides, herbicides and acidity;
- Poor soil management resulting in overland flow and sediment loss to water; and
- Loss of Biodiversity.

In particular, the River Lugg suffers from fragmented habitats and increasing pollution levels, particularly phosphate, which caused eutrophication, algal blooms, reduced water oxygen and impacts upon water crowfoot populations. The Rivers Dore and lower Monnow are affected by excessive soil loss from adjacent farmland.

Flagship projects relevant to the RLIDB which the partnership is aiming to deliver include:

- HWT Lower Lugg Valley Living landscape project, with the key objective to improve water quality and biodiversity through landowner engagement; and
- Natural Flood Management projects, with the key objective to reduce flooding in six sub-catchments through natural flood management.

9.1.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP 'Rivers & Streams', led by the Environment Agency, describes the threats to Herefordshire's watercourses, and sets out seven main objectives with nine associated Actions. Objectives include; A) restore natural processes; B) increase natural fish recruitment and habitat for priority species; C) reduce diffuse and point source pollution; D) improve riparian management; E) ensure land drainage, flood defence and hydro-electric schemes are undertaken in

an ecologically sensitive manner; F) minimise impact of abstraction on the river; and G) manage invasive species. The Board, through its normal operations, could significantly contribute to several of these objectives, and help to achieve a net gain in condition of many of Herefordshire's semi-natural watercourses.

9.1.3 Local Status

The Herefordshire river system is of International significance, including as it does the Rivers Wye and Lugg. These river systems are of particular importance for their migratory fish populations, particularly Atlantic salmon, but also for their populations of brown trout, bullhead, river and brook lamprey, allis and twaite shad, European eel, white-clawed crayfish and otter; most of these species are listed within a separate Rivers & Streams Species Assemblage LBAP. Black poplar is also an important species within the catchment.

9.1.4 Status within the Drainage District

The Biodiversity Audit identified over 220 km of IDB-maintained rivers and streams in the drainage district. Some of the Board's water courses are of natural origin, but have been managed by man for many years; others are man-made. Most of the IDB watercourses are actively managed to a greater or lesser extent - to try to control the flood risk on developed or agricultural land on the floodplain.

In some areas water courses are heavily managed to help flood water conveyance. Water levels are ultimately determined by main river levels and there are no penning structures on the system. Channel bed inverts may be kept low to maximise freeboard against flood risk.

Due to the intensity of agricultural systems on and adjoining the Board's district there are serious problems with diffuse and point-source water pollution. Though these are not caused by the Board's activities, the Board's management of the watercourses can allow transmission of diffuse water pollution (dwp) downstream to the main rivers, adversely affecting their ecological systems.

Although all IDB-maintained watercourses are relevant to the status of the River Wye SAC and Lugg SSSI, Table 5 (Section 5) lists specific IDB-maintained watercourses designated either as a Local Wildlife Site or classified as a Priority River Habitat. These watercourses should form the focus of the Board's Biodiversity Action Plan for Rivers and Streams, and their locations are shown in Section 16.

9.1.5 IDB Objectives

The following broad objectives are further detailed in Table 7.

- Reduce the distribution and abundance of invasive non-native plant species in IDB-maintained watercourses;
- Reduce erosion and associated soil and sediment loss into IDB-maintained watercourses; and
- Restore natural flow regimes and enhance aquatic biodiversity of targeted watercourses.

Table 7. Habitat Action Plan: Streams and Rivers.

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Control / eradication of invasive non-native species	1.1	Undertake targeted survey to identify locations of invasive non-native aquatic plants	HBRC, HWT	2019-20	Database of locations and species, with target species/locations prioritised for control	End 2020
		1.2	Determine most appropriate method of eradication for target species	EA, NE, HWT	2019-20	Methods established	End 2020
		1.3	Initiate and undertake 5-year coordinated control of invasive species in partnership with others	EA, NE, HWT, HC, landowners	2021-25	Locations, species and quantity (e.g. length of reach) of eradication	2025
		1.4	Provide ID aids and train contractors/staff to recognise invasive non-native species.		2019-20	Number of new staff or contractors trained	End 2020
2	Control of erosion and soil and sediment loss into watercourses, particularly arising from agricultural operations.	2.1	Undertake targeted survey to identify watercourses where erosion and sediment control would be of most benefit	EA, NE, WUF, landowners	2019-20	Database of watercourse locations prioritised for intervention	End 2020
		2.2	Determine most appropriate methods of erosion control / silt trapping for specific locations	EA, NE	2019-20	Methods established	End 2020
		2.3	Undertake erosion control and establishment and operation of silt traps	Landowner	2019-25	Number and locations of specific interventions achieved.	2025
3	Undertake improved management of targeted watercourses to restore natural	3.1	Identify high priority watercourses for improved management, subject to flood risk assessment and legal agreements. Identify most appropriate management methods from best practice guidance,	EA, NE, WUF, HWT, HC, landowners	2019-20	Locations of targeted watercourses/reaches identified, with specific management objectives, actions and monitoring set.	End 2020

	flow regimes and enhance aquatic biodiversity		subject to resources, access, conditions, etc. Identify monitoring methods.				
		3.2	Work with and train contractors/staff in management methods		2021-25	Number of new staff or contractors trained	2025
		3.3	Undertake improved management of target watercourses		2021-25	Watercourse management and monitoring activities recorded and assessed.	2025

EA – Environment Agency; NE – Natural England; WUF – Wye & Usk Foundation; HWT – Herefordshire Wildlife Trust; HC – Herefordshire Council

9.2 Grassland

Lowland meadow and rush pasture grasslands are Habitats of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Wet Lowland Meadows & Pasture & Fens are also a Local Biodiversity Action Plan Habitat in Herefordshire.

9.2.1 Threats

Unimproved and biodiverse grasslands are threatened in Herefordshire, as they are nationally, by agricultural intensification leading to loss of hay making in favour of silage production; application of fertilisers, herbicides and pesticides; supplementary stock feeding and associated eutrophication; and conversion of grasslands to arable. In particular, phosphorus and nitrogen deposition onto grasslands results in eutrophication and a subsequent decline in species-richness. Grasslands are also subject to inappropriate management including neglect, over- or undergrazing, poaching and soil compaction. Additional pressures come from water abstraction, inappropriate flood control, watercourse engineering and mineral extraction.

9.2.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP 'Wet Lowland Meadows & Pastures & Fens', led by Natural England, describes the threats to Herefordshire's important grasslands, and sets out six main objectives with nine associated actions. Objectives include; A) locate and map existing habitat extent; B) maintain the total extent and distribution; C) assess condition of sites through surveys; D) ensure access to appropriate management advice; E) increase markets for hay, particularly for green hay as seed source; and F) increase availability of appropriate machinery. The Board has a limited capacity to contribute to these objectives but can work with partners and landowners to maintaining the habitat's extent and help manage the water levels of sites of conservation significance.

9.2.3 Local Status

The majority of important remaining grasslands within the county are floodplain meadows and pastures associated with the river valleys, and comprise National Vegetation Classification (NVC) communities of MG4, MG5 and MG8, on moist soils with a relatively high water table. As well as supporting a rich flora, including several rare vascular plants such as snake's-head fritillary *Fritillaria meleagris* and fine-leaved water dropwort *Oenanthe aquatica*, these grasslands support a wide variety of invertebrates, and can support breeding waders including curlew *Numenius arquata*, snipe *Gallinago gallinago* and lapwing *Vanellus vanellus*, although these are all declining as such grasslands are declining across the county. The total area of this habitat in Herefordshire was identified as 366 ha in 2009 (BARS, 2009) but that figure is probably much lower now.

9.2.4 Status within the Drainage District

The biodiversity audit identified several important grasslands within the drainage district (Table 5). By far the largest is the 155 ha Lugg and Hampton Meadows SSSI, a nationally important site for its species-rich neutral grassland. The site is one of the largest surviving Lammas meadows in Herefordshire, with management relatively unchanged for 900 years. The drainage district also includes several Local Wildlife Sites and a Local Nature Reserves, designated for their

unimproved status and species-rich flora, including Monkland Common LWS, Weobley Marsh Common LWS, Eyeton Common LWS, Maund Common LWS and Broadlands LNR.

Historically water meadows were actively managed in some areas of the floodplain. Remains of active water-meadow management can be seen at Eaton Court near Leominster, Luntley Court Farm north of Tippets Brook, The Grove near Pembridge and Broadward Hall near the confluence of the Lugg and the Arrow. However, these were water meadows, a rather specialised form of wet grassland, where water was actively allowed to flood the land by channels connected to rivers. The aim was to add fertility to the ground, but winter flooding also served to protect the grassland from frost and encourage growth earlier in the spring. This contrasts with floodplain grazing marsh, where water usually did not need to be channelled onto the land, but more often channelled off it to prevent the flooding which would otherwise occur. However, in conservation terms the habitats presented by water meadows and floodplain grazing marsh have many similarities and can support many species in common.

The high agricultural value of floodplain grassland within and adjoining the Board's district has led it to become more intensively drained and put under arable cropping. Hay-making has also declined in favour of silage production. As a result the land has lost its intrinsic conservation interest. At the same time, this intensified land use has led to several threats to species and habitats downstream. This includes lower water tables; increased flows; and diffuse water pollution in the form of sedimentation; and nutrient (fertiliser) enrichment and pesticide/herbicide pollution of the watercourses. In particular, phosphorus and nitrogen deposition onto grasslands results in eutrophication and a subsequent decline in species-richness. Floodplain grasslands are also subject to inappropriate management including neglect, over- or undergrazing, poaching and soil compaction, with additional pressures from building development, either through direct land-take or through increased drainage for the purposes of managing the flood risk to the developed land. The quality of the remaining habitat is also subject to damage by insensitive flood risk management, water abstraction, watercourse engineering, mineral extraction and other changes to land management.

The IDB does not currently (2019) maintain the Lugg Rhea, the main watercourse flowing along the border, and included within, the Lugg and Hampton Meadows SSSI. The Board only maintains three additional watercourses adjacent to or immediately upstream of the Lugg and Hampton Meadows floodplain grassland: the Shelwick Watercourse, Shelwick Outfall and Shelwick Lateral No. 1; however, changes to the management of these short watercourses are unlikely to affect the Lugg and Hampton Meadows SSSI.

Table 5 (Section 6) lists all IDB-maintained watercourses within, adjacent or near to important grasslands within the drainage district, and which should form the focus of the Board's Biodiversity Action Plan for Grassland. Important watercourses relevant to the RLIDB Grassland BAP are shown in Section 16.

9.2.5 IDB Objectives

The following broad objectives are further detailed in Table 8.

- Better information on location, size and condition of floodplain grazing marsh in RLIDB district to help prioritise conservation work;

- Appropriate water level and bankside management of RLIDB watercourses to enhance conditions on floodplain grazing marshes in the Board's area; and
- Contribute to future schemes that aim to restore floodplain grassland by managing watercourses to raise summer water levels.

Table 8. Habitat Action Plan: Grassland

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Establish location and status of grassland within IDB District	1.1	Undertake targeted survey to identify locations and condition of floodplain grassland within district	NE, EA, HWT, Landowners	2019-20	Database of locations and status of floodplain grazing marsh, with sites prioritised for conservation work	End 2020
2	Establish suitable water level targets and bankside management for watercourses important to floodplain grassland	2.1	Set realistic year-round water level targets, conveyance rates and associated management for important watercourses in order to support soil water levels in adjacent floodplain grassland, consistent with their conservation objectives	NE, HWT, landowners	2019-20	Levels and methods established and implemented. Bi-annual reporting on status of grassland to assess management.	2023, 2025
		2.2	On targeted watercourses either carry out flailing operations in two stages a few weeks apart, and/or set the flail to cut approx. 150mm above ground level. To encourage the establishment of a tussocky and more diverse sward on the banks.	NE, HWT, landowners	2019	Bank length (m)	Annual
3	Identify future sites for potential restoration	3.1	In partnership with others, identify potential sites for restoration, assess their condition and identify management actions needed for restoration to occur	NE, HWT, landowners	As occurs	Sites, status and location	As occurs

EA – Environment Agency; NE – Natural England; WUF – Wye & Usk Foundation; HWT – Herefordshire Wildlife Trust; HC – Herefordshire Council

9.3 Wetland

Lowland Fens and Coastal & Floodplain Grazing Marsh are Habitats of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Wet Lowland Meadows & Pasture & Fens are also a Local Biodiversity Action Plan Habitat in Herefordshire.

9.3.1 Threats

Threats to fenland and marsh habitats are similar to those for grasslands (see Section 9.2.1). In particular, any adverse changes to the hydrology of these habitats is likely to result in detrimental impacts upon the vegetation communities.

9.3.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP 'Wet Lowland Meadows & Pastures & Fens', led by Natural England, describes the threats to Herefordshire's remaining fens and marshes, and sets out six main objectives with nine associated actions. Objectives include; A) locate and map existing habitat extent; B) maintain the total extent and distribution; C) assess condition of sites through surveys; D) ensure access to appropriate management advice; E) increase markets for hay, particularly for green hay as seed source; and F) increase availability of appropriate machinery. The Board has a limited capacity to contribute to these objectives but can work with partners and landowners to maintaining the habitat's extent and help manage the water levels of sites of conservation significance.

9.3.3 Local Status

There are few fens left in Herefordshire, with those left being small and fragmented; however, they do support rich assemblages of plant species as well as several rare or uncommon species. Moseley Common SSSI is the largest (*c*. 5.6 ha) remaining examples of unimproved fen meadow and rush pasture in Herefordshire, supporting important sedge communities and a number of rare species in the county, including bog pimpernel *Anagallis tenella*, marsh arrowgrass *Triglochin palustris*, bogbean *Menyanthes trifoliata* and marsh helleborine *Epipactis palustris*.

9.3.4 Status within the Drainage District

Mosely Common SSSI and Wellington Marsh LWS are the only two examples of species-rich fen/marsh habitats within the district. The most recent (June 2016) condition assessment assigned Moseley Common SSSI as being in 'favourable' condition. Currently, the IDB does not maintain the Curl Brook and laterals, and thus has no influence on the status of Mosely Common SSSI. The Herefordshire Wildlife Trust advises on the management of Wellington Marsh, a small marshland with a rich flora. The Board maintains Moreton Lateral No. 3, which flows along the southern boundary of the LWS; consequently, the Board's activities could influence the status of the LWS, and thus should be undertaken in accordance with management objectives with a view to maintaining and enhancing its biodiversity. Important watercourses relevant to the RLIDB Wetland BAP are shown Section 16.

9.3.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 9.

- Undertake appropriate water level and bankside management of Moreton lateral No. 3 to enhance conditions on the adjoining Wellington Marsh Local Wildlife Site.

Table 9. Habitat Action Plan: Wetland

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Sympathetic management of Moreton lateral No. 3	1.1	Liaise with HWT to ensure that watercourse management of Moreton Lateral No. 3 does not adversely affect the drainage of Wellington Marsh LWS, and undertake management for enhancement of the site where they arise.	HWT	2019	Annual liaison with HWT to review status of the LWS	Annually

HWT – Herefordshire Wildlife Trust

9.4 Woodland, Wet Woodland

Lowland Mixed Deciduous Woodland and Wet Woodland are Habitats of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Mixed Deciduous Woodland is a Local Biodiversity Action Plan Habitat in Herefordshire.

9.4.1 Threats

There are numerous threats to the status of woodlands, many of which were historically managed more closely for their timber, but have become neglected, undermanaged, or inappropriately managed in modern times. Woodlands also suffer damage from increasing populations of squirrels, deer and wild boar, which have few natural predators, while non-native invasive plant species, such as rhododendron and Himalayan balsam, can outcompete other ground flora and reduce the woodland biodiversity. Fragmentation, isolation and effects of climate change also put pressures on remaining woodlands, particularly smaller woodlands, which are unable to sustain healthy populations or species assemblages. Disease, such as *Chalara* dieback of ash, chronic oak dieback and the *Phytopthera* group of diseases, can be locally significant; climate change may exacerbate this issue.

9.4.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP 'Mixed Deciduous Woodland', led by Herefordshire Wildlife Trust, describes the threats to Herefordshire's remaining deciduous woodlands, and sets out eight main objectives with ten associated actions. Objectives include; A) evaluate existing habitat extent including defining ASNW/PAWS/Recovering/Secondary woodland; B) maintain the total extent and distribution; C) target resources to restore 1,500 ha and create 50 ha focussing on linking habitats together; D) reduce the impacts of deer, grey squirrel and wild boar; E) increase age range and encourage diversity of stand structure; F) monitor and mitigate the impact of recreational woodland use; G) control non-native and invasive species; and H) improve resilience of woodlands to climate change and disease. The Board has capacity to contribute to several of these objectives working with partners and landowners to create new linking habitat along watercourses, control non-native invasive species and manage diseased trees along the riparian corridor.

9.4.3 Local Status

The majority of Herefordshire mixed deciduous woodland comprises lowland oak woodland, although there are good examples of wet woodland and lowland beech woodlands in places. Of the approximate 17,785 ha of woodland in the county, roughly 70% is classified as ancient woodland, with 6,375 ha of ASNW, and 6,144 ha of PAWS[9]. Herefordshire is of National significance for wet woodland.

[9] Figures from Herefordshire Wildlife Link Mixed Deciduous Woodland Habitat Action Plan.

9.4.4 Status within the Drainage District

The Biodiversity Audit identified several important woodlands, including 28 ancient woodland units, within the drainage district. Those located adjacent to, or near, IDB maintained watercourses are listed in Table 5, and include two Local Wildlife Sites (Marsh Covert and Bodenham Lake), six ASNW and five PAWS sites. The HWT manages Bodenham Lake LWS. Dinmore Hills Wood Site of Special Scientific Interest also lies close to the River Wye and Dinmore Ditch, the latter maintained by the Board; however, the Boards activities lie outside of this woodland, and thus have no influence on the status of the SSSI. Existing wet woodlands on the margins the Board's district, include woodlands at Bodenham Gravel Pits and at Wig Wood, upstream of the Lugg.

Although the Board has limited capacity to enhance the majority of these woodlands, its works to bankside trees and vegetation may help to prevent the spread of tree diseases and non-native invasive species respectively, while schemes of tree and shrub planting may help to improve ecological connectivity between isolated woodlands scattered along or near to the district's watercourses. The Board also creates piles of deadwood from its works on bankside trees; these provide cover for important faunal species, such as otter, nesting birds, amphibians and reptiles, while providing essential habitat for fungal and saproxylic invertebrate communities. It is thought unlikely that the Board's work on regulating water conveyance would have any impact on wet woodlands within the drainage district.

Important watercourses relevant to the RLIDB Woodland, Wet Woodland BAP are shown Section 16.

9.4.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 10.

- In liaison with HWT and landowners, undertake appropriate management of diseased trees, particularly those suffering from *Phytopthera* pathogen infections. *Phytopthera alni* is common in alder trees along Herefordshire's watercourses;
- In liaison with HWT and landowners, undertake eradication, where possible, of localised stands of non-native invasive species adjacent to sensitive woodland sites, particularly Himalayan balsam, which can rapidly spread into woodlands from nearby watercourses;
- Undertake tree and shrub planting in suitable locations in order to enhance the ecological connectivity of the riparian corridor within the landscape, and between woodlands;
- Create piles of brash and deadwood to provide new habitat for lichens, fungi, saproxylic invertebrates, nesting birds, reptiles, amphibians and mammals.
- Better information on locations of wet woodlands and effects that IDB watercourse management has on their condition to help determine future watercourse management; and
- Liaise with HWT regarding management opportunities for Dinmore Ditch, to help enhance any associated wet woodland.

Table 10. Habitat Action Plan: Woodland, Wet Woodland.

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Management of bankside trees and vegetation	1.1	Liaise with HWT and landowners to identify woodland areas with diseased trees, follow with action	HWT, landowners	2019	Locations established, methods selected for management of diseased trees, work undertaken	2025
		1.2	Liaise with HWT and landowners to identify woodland areas with non-native invasive plant species, follow with action	HWT, landowners	2019	Locations established, methods selected for management of non-native invasive species, work undertaken	2025
2	Tree and shrub planting	2.1	Identify opportunities in liaison with landowners for planting areas of native trees and shrubs along the riparian corridor	Landowners	2019	Record length of watercourse, numbers of whips and species planted. Follow up to assess success rate of planted trees/whips	Annually
3	Introduction of deadwood habitat	3.1	Identify locations suitable for introduction of permanent deadwood piles	Landowners	2019	Record locations of deadwood piles created during annual works programmes	Annually
4	Identify wet woodlands within the district that would benefit from IDB activities	4.1	Identify locations suitable for enhancement, and management methods required to enhance them	HWT, landowners	2019	Locations of wet woodlands established, and methods selected for management	End 2021
5	Support water regime associated with Bodenham Lake	5.1	Liaise with HWT to confirm any changes that might be required to management of Dinmore Ditch to aid development of wet woodland at Bodenham Lake. Integrate recommendations, if any, into management of Dinmore Ditch	HWT	2019	Locations of wet woodlands established, and methods selected for management .	2025

HWT – Herefordshire Wildlife Trust

10 SPECIES ACTION PLANS

10.1 Water Vole *Arvicola amphibius*

Water vole is a Species of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Water vole is also a Local Biodiversity Action Plan Species in Herefordshire. Water vole is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9, which means that it is an offence wilfully to take, kill or injure the animals or damage any place or structure used by them.

10.1.1 Threats

In most areas of the UK water vole populations have declined dramatically over the last 30 years, with the current British population estimate of 132,000, down from over 1.1 million animals in 1995 (Mathews *et al*., 2018). Drivers of change include predation by American mink *Neovison vison*, and changes in land management, including wetland drainage, arable cultivation and watercourse canalisation.

10.1.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for Water Vole, led by the Monnow Rivers Association and the Herefordshire Wildlife Trust, describes the threats to Herefordshire's water voles and sets out six main objectives with seven associated actions. Objectives include; A) locate and map existing populations; B) halt the decline in the water vole population in Herefordshire; C) reduce or eliminate threats to water voles; D) create refuge areas where known populations exist; E) ensure habitat is not lost to development; and F) restore habitat to allow reintroduction and/or re-colonisation. The Board could work with the HWT in a future reintroduction scheme, undertaking appropriate habitat management in advance of reintroduction within IDB-maintained watercourses near to reintroduction sites.

10.1.3 Local Status

In Herefordshire, the only known population of water voles is a result of a reintroduction scheme located on the River Dore, undertaken in 2006 and 2007.

10.1.4 Status within Drainage District

The 2010 BAP mapped four records of water vole from 1985 and 1990; two from the Curl Brook system, and one from Pinsley and Moreton Brooks respectively. However, it is considered highly unlikely that viable populations of this species now occur anywhere other than along the River Dore, and there have been no validated records post-2000 within the IDB district.

10.1.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 11.

- Liaise with NE, EA, HWT, MRA and landowners to identify and agree suitable sites for a reintroduction scheme, where sympathetic management could be undertaken, and would not conflict with flood prevention objectives;
- In advance of a reintroduction scheme, undertake appropriate management of IDB-maintained watercourses near to reintroduction areas;
- Maintain low intensity habitat management on nearby watercourses following a reintroduction; and
- In liaison with landowners, contribute to the water vole reintroduction and recovery in the operation of mink eradication programmes on nearby IDB-maintained watercourses.

Table 11. Species Action Plan: Water Vole.

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	To participate in any water vole reintroduction scheme planned to take place within the Board's District	1.1	Liaise with partners over suitable areas for potential reintroduction	MRA, NE, EA, HWT, landowners	TBD	Suitable reintroduction locations identified and agreed, and methods selected/agreed for pre-reintroduction management	TBD
		1.2	Undertake suitable management of watercourses in advance of reintroduction scheme	NE, EA, HWT, landowners	TBD	Channel length (m) and habitat suitability for water voles assessed	TBD
		1.3	Post-reintroduction, maintain low intensity bank and channel maintenance programmes on nearby watercourses	HWT, landowners	TBD	Channel length (m) and habitat suitability for water voles assessed	TBD
		1.4	Contribute to mink eradication programme in reintroduction area	HWT, landowners	TBD	Methods agreed and undertaken, followed by annual review and feedback	TBD

MRA - Monnow Rivers Association; EA – Environment Agency; NE – Natural England; HWT – Herefordshire Wildlife Trust.

10.2 Otter *Lutra lutra*

Otter is a Species of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. Otter is also a Local Biodiversity Action Plan Species in Herefordshire. Otter is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives some limited protection under Section 9. This species is also all listed as a European Protected Species in Schedule 2 of The Conservation of Habitats and Species Regulations 2017 (which implements the EC Directive 92/43/EEC in the United Kingdom) which gives them full protection under Regulation 43.

10.2.1 Threats

Following a number of years of acute decline of this species in the 20th century, the UK's otter population has gradually recovered from impacts of organic pollutants, which are now controlled through legislation. Impacts upon the current population include insufficient prey associated with poor water quality; impoverished bankside habitat features for resting and breeding; and incidental mortality from roadside deaths.

10.2.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for Rivers and Streams – Species Assemblage, lists otter as a target species for this habitat. Objectives and targets for the Rivers & Streams Habitat Action Plan (see Section 9.1) are applicable. The Board should undertake appropriate works and suitable habitat management to benefit this species.

10.2.3 Local Status

Herefordshire was always a stronghold for this species as was recognised in the citations for the River Wye SAC and the River Lugg SSSI. The populations in the Wye and Lugg catchments probably declined in the latter part of the 20th century but such declines are now thought to be in reverse and this species is likely to be widespread across Herefordshire, present on all river systems within the county.

10.2.4 Status within Drainage District

Otters are likely to occur anywhere within the drainage district. Most otter signs are of spraints, which only indicate the movement of otters; this species travels widely to feed; the indication of their widespread presence does not necessarily indicate the suitability of the habitat where they were found for supporting otters.

10.2.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 12.

- Support habitat management which helps to support good fish populations in IDB-maintained watercourses, and maintains channel side trees, especially those with large root boles under which otters will lie up;
- Enhance riparian habitat for this species by providing suitable lay-up sites, including suitable tree management and creation of 'natural' revetments, planting new trees and shrubs in quiet areas, and creation of artificial holts and large wood piles from cut tree material, which would provide suitable holt opportunities;
- Create or maintain safe linking routes between potential breeding/lying up sites and river system. This would include planting of trees and scrub in quiet areas, such as meander loops; and
- Consider installing otter ledges within culverts at known or potential Road Traffic Accident (RTA) hot-spots for this species.

Table 12. Species Action Plan: Otter

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Ensure annual works includes habitat management to support fish populations and maintenance of otter lying up places.	1.1	Incorporate otter-friendly measures in annual works programme. Record evidence of otter presence.	Landowners	2019	Record of habitat improvement works to benefit fish prey species. Records of otter presence.	2020
2	Enhance riparian habitats to create suitable features for lying-up/holts	2.1	Undertake management to create 'natural' revetments	Landowners	2019	Locations and features created	2022
		2.2	Planting suitable areas (e.g. unused meander loops) with native tree and shrub species	Landowners	2019	Locations, species and area planted	2022
		2.3	Creation of artificial holts and large woodpiles from cut tree material	Landowners	2019	Number and location of features created	2022
3	Improve ecological connectivity for this species to travel along watercourses and	3.1	Liaise with NE, HWT and HBRC to identify areas where otters are susceptible to road traffic accidents, and identify potential mitigation measures.	NE, HBRC, HWT	2019	List of hot-spot locations for otter RTAs where prevention measures could be considered. Identify appropriate methods, such as guide fencing and otter ledges.	2022

	reduce otter road mortality with IDB district	3.2	Seek funding. Install prevention measures	HWT, landowners, EA, NE	As occurs	Location and type of measure installed. Follow up camera monitoring.	As occurs

EA – Environment Agency; NE – Natural England; HWT – Herefordshire Wildlife Trust; HBRC – Herefordshire Biological Records Centre

10.3 Bats

Seven species of bat have been listed as Species of Principal Importance in England, under section 41 of the NERC (2006) Act. Bats are also Local Biodiversity Action Plan Species in Herefordshire. All bat species are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receive some limited protection under Section 9. Bats are also listed as European Protected Species in Schedule 2 of The Conservation of Habitats and Species Regulations 2017 (which implements the EC Directive 92/43/EEC in the United Kingdom) which gives them full protection under Regulation 43.

10.3.1 Threats

Threats to bat populations include a reduction in prey availability due to agricultural intensification, climate change resulting in milder winters and lower survival rates of hibernating bats, habitat fragmentation and effects of roads and artificial lighting, and an ongoing loss of roosts sites, particularly for summer maternity colonies and hibernating bats.

10.3.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for Bats, led by the Herefordshire Mammal Group, describes the threats to Herefordshire's bats and sets out six main objectives with five associated actions. Objectives include; A) map distribution of all bat species, prime feeding habitats, hedges, tree lines, etc: B) manage key landscape elements to conserve, maintain and enhance flight lines between roosts and foraging sites; C) maintain and increase opportunities for bat roosts including maternity colonies, transitional and night roosts, swarming and hibernation sites; D) maintain and enhance, and possibly restore, high value feeding habitats; E) ensure wildlife enhancements are incorporated into new builds via the planning process, providing additional roosting sites to alleviate pressures from existing buildings; and F) provide potential roost feature training / advice to woodlands managers who manage woodland for timber extraction. The Board could work to enhance the value of riparian corridors along its watercourses for bat foraging and commuting. Conserving suitable features in riparian willows would also provide suitable roosting opportunities for bats.

10.3.3 Local Status

Of the 17 species of bat known to breed in the UK, 15 species have been recorded in Herefordshire[10]. However, bats are only identifiable either in the hand or with the use of specialised equipment which detects the ultrasonic calls that bats emit, and thus bat records often reflect the number or activity of recorders, or the location of development sites, rather than the true distribution of the species.

[10] Herefordshire Bat Atlas 1960-2015. Herefordshire Mammal Group. Denise Foster & David Lee.

10.3.4 Status within the Drainage District

The 2010 Biodiversity Action Plan audit identified records, provided by the HBRC, of four species of bat within the Board's District, recorded at 9 different roost sites: long-eared Bat, common and soprano pipistrelle and Natterers bat (see Appendix 9). There are likely to be many more species and roosts occurring within the Board's District, roosting in trees lining the banks of the Board's watercourses. Consequently, it should be assumed that any trees with potential roost features could be used by roosting bats.

10.3.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 13.

- To ensure the avoidance of damage to possible bat roosts through appropriate training of contractors.
- To maintain existing pollards where they occur.
- To increase bankside tree cover and pollard establishment on IDB-maintained watercourses.

Table 13. Species Action Plan: Bats

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Ensure staff and contractors can identify possible bat roosts.	1.1	Train contractors to recognise Potential Roost Features (PRF) suitable for bats	Staff, Contractors	2019	No staff/contractors trained	2022
2	Maintain pollards	2.1	Continue pollard maintenance programme throughout the district, using appropriate management methods.	Staff, Contractors	2019	Build database of pollards within district.	2022
3	Increase bankside tree cover	3.1	Subject to flood risk assessment, extend tree cover on one bank of watercourses. Manage newly planted trees/shrubs.	Landowners	2019	Location, species and number/area of cover. Review and maintain.	2022

10.4 Barn Owl *Tyto Alba*

Barn owl is a Local Biodiversity Action Plan Species in Herefordshire. All species of bird are protected under Section 1 (1) of the Wildlife and Countryside Act 1981 (as amended). Certain species, including barn owl, are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Section 1(5). There are special penalties where offences are committed for any Schedule 1 species.

10.4.1 Threats

Following major declines in the population of barn owls in UK and mainland Europe, in the mid and late 20th century, numbers in many areas are increasing again, and the species is currently of low conservation concern (green-listed) according to the most recent review on the status of birds in the UK (Eaton *et al*., 2015). Previously, populations in the UK had suffered as a result of nest site destruction during the major phase of barn conversions in the late 20th century, but before that they had suffered as a result of pesticide poisoning and changes to farming practices. Dutch Elm disease in the 1970s also led to the loss of many tree nest sites. Modern intensive farming practices still present many threats to barn owl populations, including loss of habitat (e.g. rough grassland, hedgerows, hedgerow trees) for barn owl prey species, loss of prey abundance due to excessive use of pesticides/insecticides, use of rodenticides and loss of nest and roosts sites in old buildings through development. Other hazards include mortality caused by vehicle collisions, electrocution/wires, wind turbines and drowning in water troughs and other steep-sided water-filled containers. Climate change also poses a threat to barn owls as weather patterns, and associated prey availability, become more erratic.

10.4.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for barn owl, led by the Herefordshire Barn Owl Group (HBOG), describes the threats to Herefordshire's barn owls and sets out six main objectives with five associated actions. Objectives include; A) locate and map existing populations; B) maintain viable populations; C) change farming practices to increase small mammal numbers and improve availability of prey; D) enhance breeding success and ability to monitor by providing nest boxes; E) protect know populations through targeting finding and protection through planning process; and F) reduce barn owl casualties from road traffic accidents. The Board can work to enhance the value of riparian corridors along its watercourses for barn owl foraging; ensure availability of suitable nest sites by conserving mature and hollow trees, and by installing barn owl nest boxes in suitable locations; and help to map existing populations by recording sightings and feeding back to partners.

10.4.3 Local Status

The current status of this species within Herefordshire is unknown.

10.4.4 Status within the Drainage District

The species is highly likely to occur within the drainage district for example, barn owl is present along the Curl Brook system. However, individuals of the species can have a home range of 5000 hectares or more, and thus the riparian corridors will form only a minor component of their range. Barn owls are far more likely to

nest near to good foraging resources with abundant prey, including areas of unimproved or semi-improved rough grassland and floodplain meadows (e.g. Lugg and Hampton Meadows, Moseley Common), rush pasture, wetland and conservation headlands.

10.4.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 14.

- Enhance bankside grassland habitat for barn owl prey in order to increase prey abundance and availability. Link to existing key areas for the species; and
- Map and retain suitable trees for barn owl nesting and roosting, and provide new roosting and nesting opportunities in key areas for barn owls.

Table 14. Species Action Plan: Barn Owl

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Enhance bankside habitat for small mammal prey species	1.1	Identify suitable habitats for this species, and target watercourses where habitat could be enhanced.	HBOG, HWT, HOC, Landowners.	2019	Location of existing habitat, and suitable target areas mapped. Suitable flailing method established.	2022
		1.2	Enhance bankside rough grassland cover by adopting flailing regime (e.g. every 3 years) that establishes a tussocky sward with a deep grass litter layer to support small mammal populations.	Landowners, contractors	2022	Flailing method adopted in target areas. Length of channel under new regime recorded annually.	2025
2	Provide roosting and nesting sites for barn owls in watercourse trees	2.1	Identify and retain of trees with suitable nest sites, such as cavities and hollow trees. Identify areas lacking suitable nest sites.	Landowners, contractors	2019	Location of suitable nesting/roosting trees mapped and areas lacking suitable trees identified. Manage suitable trees in order to retain suitable nest holes/cavities.	2022
		2.2	Install barn owl nest boxes in locations lacking natural nest sites, and on suitable trees	Landowners, contractors	2022	Location and number of boxes installed.	2025

HWT – Herefordshire Wildlife Trust; HBOG – Herefordshire Barn Owl Group; HOC – Herefordshire Ornithological Club

10.5 Fishes: Atlantic Salmon, brown trout, bullhead and lamprey species

Atlantic salmon, brown/sea trout, river and sea lamprey have been listed as Species of Principal Importance in England, under section 41 of the NERC (2006) Act. Brown trout, bullhead, brook, river and sea lamprey are also Local Biodiversity Action Plan Species in Herefordshire, under the species assemblage BAP for Rivers and Streams. Atlantic salmon and river lamprey are listed as European Protected Species in Schedule 4 of The Conservation of Habitats and Species Regulations 2017 (which implements the EC Directive 92/43/EEC in the United Kingdom) which gives them protection from being captured or killed in certain ways under Regulation 45.

10.5.1 Threats

Major threats to the different fish species listed under this Biodiversity Action Plan include habitat modification, such as bankside and channel vegetation management and geomorphological alterations of watercourses, with concomitant loss of macrophytes and associated prey species, and loss of gravel spawning and fish nursery sites; pollution and associated alteration of physico-chemical conditions, such as water oxygen and pH; excessive water abstraction resulting in abnormally low flows and associated pressures; recreation pressures, fisheries management; increase in spread and abundance of invasive, non-native fish species; and climate change.

10.5.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for Rivers and Streams – Species Assemblage, lists brown trout, bullhead, brook, river and sea lamprey as target species for this habitat. Objectives and targets for the Rivers & Streams Habitat Action Plan (see Section 9.1) are applicable. The Board should undertake appropriate works and suitable habitat management to benefit these species.

10.5.3 Local Status

Atlantic salmon, brown trout and bullhead are widespread in the Wye, Lugg and Monnow catchments. There are fewer lamprey records within Herefordshire's rivers, but they have similar habitat preferences to salmonids, requiring clean substrates and stable flows for spawning.

10.5.4 Status within the Drainage District

The above fish species may occur anywhere within the district but are most likely limited to faster flowing watercourses with more natural geomorphological conditions supporting gravel/stone substrates and abundant macrophytes/invertebrates, rather than the smaller, slow-flowing and less diverse field drains.

10.5.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 15.

- Identify IDB watercourses where management would most benefit target fish populations;
- Undertake watercourse management to reduce erosion, siltation and pollution of watercourses;
- Enhance in-channel habitat to benefit target fish species; and
- Enhance bankside habitat to benefit target fish species

Table 15. Species Action Plan: Fishes

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Map IDB watercourses for suitable areas to enhance and restore for fish habitat	1.1	Identify watercourses where sediment control and habitat enhancement would be of most benefit	NE, EA, WUF, landowners	2019	Watercourse locations	2022
2	Reduce erosion, sediment loss and diffuse water pollution of watercourses	2.1	Work to reduce siltation of bed substrates by reducing bank erosion. Adopt methods of silt trapping during works to bank and beds.	NE, EA, Landowners	2019	Locations and methods of bank protection adopted and recorded. Silt trap methods adopted during reprofiling works to bed and bank, and during capital works (e.g. culvert installation or repair)	2022, 2025
		2.2	Work to reduce runoff of soils and sediment from adjacent farmland. Discuss with landowner opportunities for introducing and/or increasing the width of bank top habitat acting as a buffer between farmed land and watercourse.	Landowners	2019	Locations and methods adopted	2022, 2025
		2.3	Explore opportunities to reduce livestock poaching of watercourse banks and bed by installing fencing	Landowners, WUF	2019	Length of watercourse fenced	2022, 2025
3	Enhance in-channel habitat for	3.1	Explore opportunities to install in-channel berms to introduce pool-	NE, EA, WUF, Landowners.	2019	Location and details of berms recorded	2022, 2025

	fish spawning and fish nurseries		riffle sequences into the water column				
		3.2	Where feasible, introduce woody debris to provide fish valuable nursery habitat	Landowners	2019	Locations recorded, and methods utilised	Annually
4	Enhance bankside habitat	4.1	Undertake tree works to provide both shaded and unshaded areas (microhabitats) along watercourses	Landowners	2019	Locations and lengths of watercourse managed	Annually

EA – Environment Agency; NE – Natural England; HWT – Herefordshire Wildlife Trust; WUF – Wye & Usk Foundation.

10.6 White-clawed Crayfish *Austropotamobius pallipes*

White-clawed crayfish is a Species of Principal Importance in England, as listed under section 41 of the NERC (2006) Act. White-clawed crayfish is also a Local Biodiversity Action Plan Species in Herefordshire. The white-clawed crayfish is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives protection under Section 9 parts 1, from killing, taking or injury, and Part 5, which prevents their sale. They are also listed under Annexes II and V of the EC Habitats Directive, implemented in the UK by The Conservation of Habitats and Species Regulations 2017 (as amended); Annex II listing requires that Special Areas of Conservation (SACs) are established specifically to conserve the species.

10.6.1 Threats

The main threat to the decline of white-clawed crayfish is from crayfish plague *Aphanomyces astaci*, carried by the north American signal crayfish *Pacifastacus leniusculus*, as well as other introduced non-native crayfish species. Signal crayfish are also able to outcompete our native crayfish. Other pressures include habitat loss and fragmentation; modification of watercourses; and pollution and siltation of watercourses.

10.6.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for white-clawed crayfish, led by Natural England, describes the threats to Herefordshire's water voles and sets out five main objectives with five associated actions. Objectives include; A) locate and map existing populations of white-clawed and signal crayfish; B) maintain viable populations; C) ensure habitat is not lost to development; D) stop non-native crayfish affecting vital populations; and E) ensure non-native crayfish are not released near populations. Measures to improve in-channel habitat for fish, and to reduce erosion, siltation and runoff, will enhance habitat for this species. The Board can also help to record the presence of non-native signal crayfish, and prevent its spread when undertaking works.

10.6.3 Local Status

The 2010 Biodiversity Action Plan audit identified few records of this species within Herefordshire, with the overall population trend showing an accelerating decline. The species is thought to be scattered thinly across the county with no particular stronghold.

10.6.4 Status within the Drainage District

There is an historic record of this species within Dinmore Ditch, but it is likely that this species occurs in few of the Board's watercourses. In contrast, the Signal Crayfish is expanding its range within the district, with more recent records occurring annually.

10.6.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 16.

- Record occurrence of both white-clawed and signal crayfish, or any other non-native crayfish in the Board's watercourses;
- Establish approved monitoring and trapping programme for signal crayfish where it occurs in the Board's watercourses; and
- Prevent the spread of "crayfish plague" to white-clawed crayfish.

Table 16. Species Action Plan: White-clawed crayfish

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Record presence of all crayfish species	1.1	Train staff and contractors in identification of crayfish species, particularly white-clawed and signal crayfish	NE, HWT	2019	Number of staff/contractors trained	End 2021
		1.2	Monitor occurrence of species in IDB-maintained watercourses	NE	2019	Number and location of records	Annually
2	Control Signal crayfish	2.1	Seek approval for control programme where species is found within Board's watercourses	NE, landowner	As required	Location of signal crayfish records	As occurs
		2.2	Undertake approved control programme (under licence)	NE, landowner	As required	Location and trapping method established, and undertaken	As occurs
3	Help to reduce spread of crayfish plague	3.1	Ensure "sterilisation" of any plant which might be moved from the Lugg IDB to areas where white-clawed crayfish are known to occur.	Staff, contractors	As required	Record of biosecurity measures adopted.	As occurs

NE – Natural England; HWT – Herefordshire Wildlife Trust.

10.7 Black Poplar *Populus nigra* ssp. *betufolia*

The black poplar is a Local Biodiversity Action Plan Species in Herefordshire, surviving on the alluvial soils of floodplains, along river valley watercourses and sometimes marking parish boundaries. This species is not a UK priority species and has no legal protection.

10.7.1 Threats

The black poplar *Populus nigra* subspecies *betulifolia* is probably the most endangered native tree species in the UK, with approximately 7000 trees remaining in Britain. Historically, black poplars were lost as floodplains were drained and rivers canalised, while across Europe, the species genetic composition has been eroded through extensive cross-breeding with hybrid poplars, such as the faster growing *P. canadensis*. The species in the UK is threatened due to the low molecular diversity and rarity of female clones; it is estimated that only 600 females remain, and thus most remaining trees in Britain have been artificially propagated, with natural propagation rarely occurring. The species is also prone to attack from fungal diseases, including cankers, leaf rusts and poplar scab.

10.7.2 Local Biodiversity Action Plan Targets

The Herefordshire LBAP for black poplar, led by the Environment Agency, describes the threats to Herefordshire's remaining black poplar trees and sets out five main objectives with seven associated actions. Objectives include; A) locate and map existing trees; B) protect females; C) protect and increase numbers of both males and females; D) increase sympathetic tree management; and E) increase public awareness and encourage people to plant local variety. The Board can help to record the presence of black poplars along its watercourses, undertake planting of this species in suitable locations, and carry out appropriate management to prolong the lifespan of existing mature specimens.

10.7.3 Local Status

There are currently thought to be approximately 150 mature black poplar trees in the Herefordshire, with only five female trees; a survey in 2002 undertaken by Herefordshire Council identified 208 trees, within six females, so the county population appears to be declining. The species is found particularly on the floodplains of the Wye and Lugg and along associated watercourses, although the species is declining in the county due to a lack of natural seedlings and young trees, and inappropriate management or lack of management of existing trees. Herefordshire is thought to have a particular genetic variety known as the 'Marches' variety[11].

[11] Herefordshire Biodiversity Action plan

10.7.4 Status within the Drainage District

The 2010 Biodiversity Action Plan identified 33 trees within the Drainage District of which 8 were within 50 metres of IDB watercourses. There is no information on the current status of these trees, or whether any management, such as pollarding, has been undertaken.

10.7.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 17.

- Establish locations and status of black poplars on IDB water courses to avoid damage to them during routine operations;
- Undertake appropriate management of old/unstable/damaged trees to prolong their survival; and
- Seek to increase range by appropriate planting (NB. genotype is important).

Table 17. Species Action Plan: Black poplar.

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Map locations of black poplars along Board's watercourses	1.1	Undertake training of staff and contractors in identification and management of this species	NE	2019	Number of staff and contractors trained	End 2021
		1.2	Record location and status of black poplars along the Board's watercourses	NE, staff, contractors	2019	Location of all existing trees mapped	2025
2	Manage existing trees to prolong lifespan	2.1	Ensure staff and contractors adopt the most appropriate management methods	NE, staff, contractors	2019	Number and location of black poplars managed recorded	2025
3	Increase population along Board's watercourses	3.1	Identify appropriate genetic variety which to plant, identify appropriate locations and establish recommended planting method	NE, landowners	2019	Source of appropriate genetic stock and method of planting for this species established	2022
		3.2	Plant appropriate genotype. Monitor success of tree establishment	Staff, contractors	2022	Number and location of trees planted	2025

NE – Natural England.

10.8 Invasive Non-native Species

Several invasive, non-native animal and plant species are listed on Schedule 9, Parts I and II respectively, of the Wildlife and Countryside Act 1981 (variation of Schedule 9) (England and Wales) Order 2010. Schedule 14 (1 and 2) makes it illegal to release or allow to escape (animals) into the wild, or to plant or cause to grow (plants) in the wild, any animal or plant species listed on schedule 9 (parts 1 and 2).

EU Regulation (1143/2014) on invasive alien (non-native) species imposes restrictions on a list of 49 animal and plant species known as 'species of Union concern', whose potential adverse effects across the European Union are such that concerted action across Europe is required. Strict restrictions (subject to certain exemptions) mean that these species cannot be imported, kept, bred, sold, used or exchanged, allowed to reproduce, grown or cultivated, or released into the environment.

Table 6 and Section 7.2.8 describe the main invasive non-native species of concern to the Board. In particular, Himalayan balsam is widespread within the district, expanding its range along main rivers, streams and minor watercourses.

10.8.1 Threats

Each if the invasive non-native species listed in Table 6 exerts specific impacts upon local ecosystems while some can be especially problematic, both to native wildlife and to infrastructure associated with, and adjacent to, the watercourse network.

Himalayan balsam is now very widespread within the Wye and Lugg catchments, spreading very easily along river banks, and has the effect of outcompeting native species resulting in stands of balsam dominating long sections of watercourse. Although this species provides a good nectar source in late summer for bees, the plant dies back completely over winter leaving the banks unvegetated, exposed and vulnerable to erosion that would not otherwise occur if native grasses were present. This species spreads by ejecting seed capsules for several metres and can rapidly colonise new areas along watercourses.

Japanese knotweed also thrives in damp soils and tends to form dense, localised stands which supress native plants and have potential to impede water flows. This species can be especially damaging to watercourse infrastructure and other built structures due to its ability to send up vigorous, penetrating rhizomes. This species spreads very easily from rhizome fragments.

New Zealand pygmyweed is a partially submerged/partially emergent plant with several growth forms. It can form dense layers on slow-moving or still water which can impede drainage and outcompete native aquatic plants, reducing the biodiversity value of watercourses, ponds and lakes. This species spreads vegetatively from stem fragments.

Parrot's feather forms very dense emergent stands in nutrient-rich slow-flowing or still waterbodies. The plant can choke watercourses and outcompete native macrophytes. This species spreads vegetatively from stem fragments.

Water fern is a small free-floating plant able to form dense mats on still or slow-moving water, such as canals and ditches. When dense mats develop, they block out the light causing deoxygenation of the water column and a reduction of the water temperature; this effectively kills air-breathing invertebrates and reduces both plant and invertebrate diversity, as well as clogging up infrastructure.

Impacts of American mink and signal crayfish have been described in sections 10.1 (water vole) and 10.6 (white-clawed crayfish) respectively.

10.8.2 Local Biodiversity Action Plan Targets

There are no biodiversity action plan targets for invasive non-native species other than those already described in relation to water vole (Section 10.1) and white-clawed crayfish (Section 10.6).

10.8.3 Local Status

Some species, such as American mink and signal crayfish, are likely to be scattered but widespread across the county. Himalayan balsam is more common and widespread across the lower Wye and Lugg catchments but is rapidly spreading upstream. Other species have a more localised presence.

10.8.4 Status within the Drainage District

A variety of invasive non-native species are established within the IDB district, some of which can be positively harmful to watercourse management and the maintenance of the drainage system. Locations of some of the more localised species are listed in Table 6. With few exceptions, invasive non-native species adversely affect the native ecological balance.

It is illegal to cause the spread of invasive non-native species, and it is conceivable that legal action could be taken if, for example, a machine operating for the Board knowingly transported an invasive non-native species from one location to another. It is therefore important that the Board is aware of the problem, both in terms of the identity of the species of concern, but also of their occurrence in the District, and undertakes appropriate biosecurity measures where these species are present.

10.8.5 IDB Objectives and Targets

The following broad objectives are further detailed in Table 18.

- Identify locations of invasive non-native species within Board's district; identify hotspots and locations where quick eradication could make a difference to further spread;
- Liaise with others in control and eradication programmes; and
- Ensure the Board's activities do not contribute to the spread of invasive non-native species.

Table 18. Species Action Plan: Invasive Non-native species

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Establish status of invasive non-native species within the Board's District	1.1	Provide training to staff and contractors in identification and legal obligations	Staff, contractors	2019	Number of staff and contractors trained	2022
		1.2	Identify all current locations of invasive non-native aquatic plants within district	Staff, contractors	2019	Location, species and number of records. Provide records to HBRC annually.	2025
		1.3	Record all new occurrences of invasive non-native species and pass records to HBRC	Staff, contractors	As occurs	Location, species and number of records. Provide records to HBRC annually.	As occurs
2	Control alien species	2.1	Work with others in coordinated control and eradication programmes.	EA, NE, HWT, landowners	As occurs	Location, species and scheme details. Include monitoring to assess success.	As occurs
		2.2	Ensure Board's activities do not result in spread of invasive species. Incorporate appropriate biosecurity measures in annual works. Ensure staff know where invasives species occur, and are familiar with biosecurity measures.	Staff, contractors	As occurs	Annual works programmes reporting.	As occurs

EA – Environment Agency; NE – Natural England; HWT – Herefordshire Wildlife Trust.

11 PROCEDURAL ACTION PLAN

Introduction

A number of procedural targets and actions have been established within this Procedural Action Plan. These are intended to integrate biodiversity considerations into IDB practices and procedures.

Objectives and Targets

- Improve employee/contractor biodiversity awareness
- Introduce training for staff and contractors in conservation management of drainage channels
- Extend partnership-working across the county
- Improve data and information flows
- Maintain public awareness of the Board's biodiversity enhancement work

Table 19. Procedural Action Plan

Target Ref	Target	Action Ref	IDB Actions	Partners	Start Date	Outcomes / Indicators	Review Date
1	Provide training on Biodiversity awareness and biodiversity conservation management for relevant staff and contractors	1.1	Establish appropriate training/instruction programme for Board staff and contractors	Staff, contractors	2019	Number of staff/ contractors trained	Annually
		1.2	Provide on-site ID cards/booklet of key species/locations for staff & contractors	Staff, contractors	2019	Number ID cards issued	Annually
2	Establish partnerships with appropriate bodies for the execution of the Herefordshire Biodiversity Action Plan	2.1	Maintain annual liaison with key partners in order to contribute to Biodiversity Action Plans within the Board's district	EA, NE, HWT	2019	Occurrence of meetings/liaison	Annually
		2.2	Maintain annual liaison with other leads of county BAPs over development of appropriate management	EA, NE, HWT, MRA, HMG, HBOG, HOC, WUF	2019	Occurrence of meetings/liaison	Annually

3	Establish procedure for reporting conservation management & ecological records	3.1	Establish and maintain GIS database and reporting system for staff	Staff	2019	Active GIS and annual reporting system	Annually
		3.2	Establish reporting system for contractors	Contractors	2019	Active reporting system	Annually
4	Maintain public awareness of Board's conservation work	4.1	Update Board's web site annually	Staff	2019	Frequency of updating	Annually

12 IMPLEMENTATION

The River Lugg IDB Biodiversity Action Plan will be implemented, always following appropriate flood risk management assessments, in 2 ways:

- Through modifications to standard operations across the drainage district; and
- In special projects with partners

The same modification to a standard operation may fulfil the requirements of a number of BAP species or habitats. For example the establishment of staggered bank-flailing operations would benefit water vole, barn owls and even bats, as well as non-target, but perhaps threatened species like reed bunting, as well as support the survival of some scarce plants. Where flood risk management does not preclude it this option should be adopted as widely as possible in the Board's annual works programme.

Special projects will take place under the advice of specialist partners and sometimes in conjunction with actions undertaken by them. For example, if water voles were to be re-introduced into an area, the Board would be responsible for carrying out appropriate watercourse management, while other partners would arrange for predator control and the provision, release and monitoring of the animals. These operations are likely to be covered under annual maintenance programmes.

There will be projects that may require capital works or by one-off management experiments. For example the replacement of a culvert under a road, where there is a high incidence of otter fatalities, with one allowing otters passage under the road at all water levels. An experimental project requiring special funding might be the construction of silt traps for the mitigation of diffuse water pollution.

13 MONITORING

The Board Engineer and Ecologist, or others from time to time specifically appointed, will record changes in management practices or special management undertaken as part of the BAP and make arrangements to have the ecological effects monitored by specialists.

Management changes will be recorded at each change in management which, for most actions, may only require one record for the period of the BAP.

Ecological conditions will be monitored at the end of 2025 and be compared with the state at the start of the period.

Partnership projects will usually have specially designed monitoring appropriate to the project and often requiring the specialised skills of partners to accomplish. The Board will monitor its own input to such projects, for example by recording the length of watercourse bank specially managed for the project, but biological data will be obtained from partners to indicate the effectiveness of the management.

14 REVIEWING AND REPORTING PROGRESS

The RLIDB Ecologist will act as Local BAP co-ordinator and RLIDB BAP representative and be responsible for liaison with partners and recording annual progress.

The Ecologist will liaise with lead partners within the Herefordshire LBAP Partnership to ensure co-ordination of the Board's activities, and initiate any reviews which may become necessary over the period of the BAP.

A summary report of the BAP's progress will be produced in 2025 for the Board. This report will also be available through the Board's web site as a downloadable document.

15 REFERENCES

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River Wye/Afon Gwy Special Area of Conservation:
http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012642

Sites of Special Scientific Interest:
https://designatedsites.naturalengland.org.uk/

16 HABITAT ACTION PLANS – IMPORTANT RLIDB WATERCOURSES

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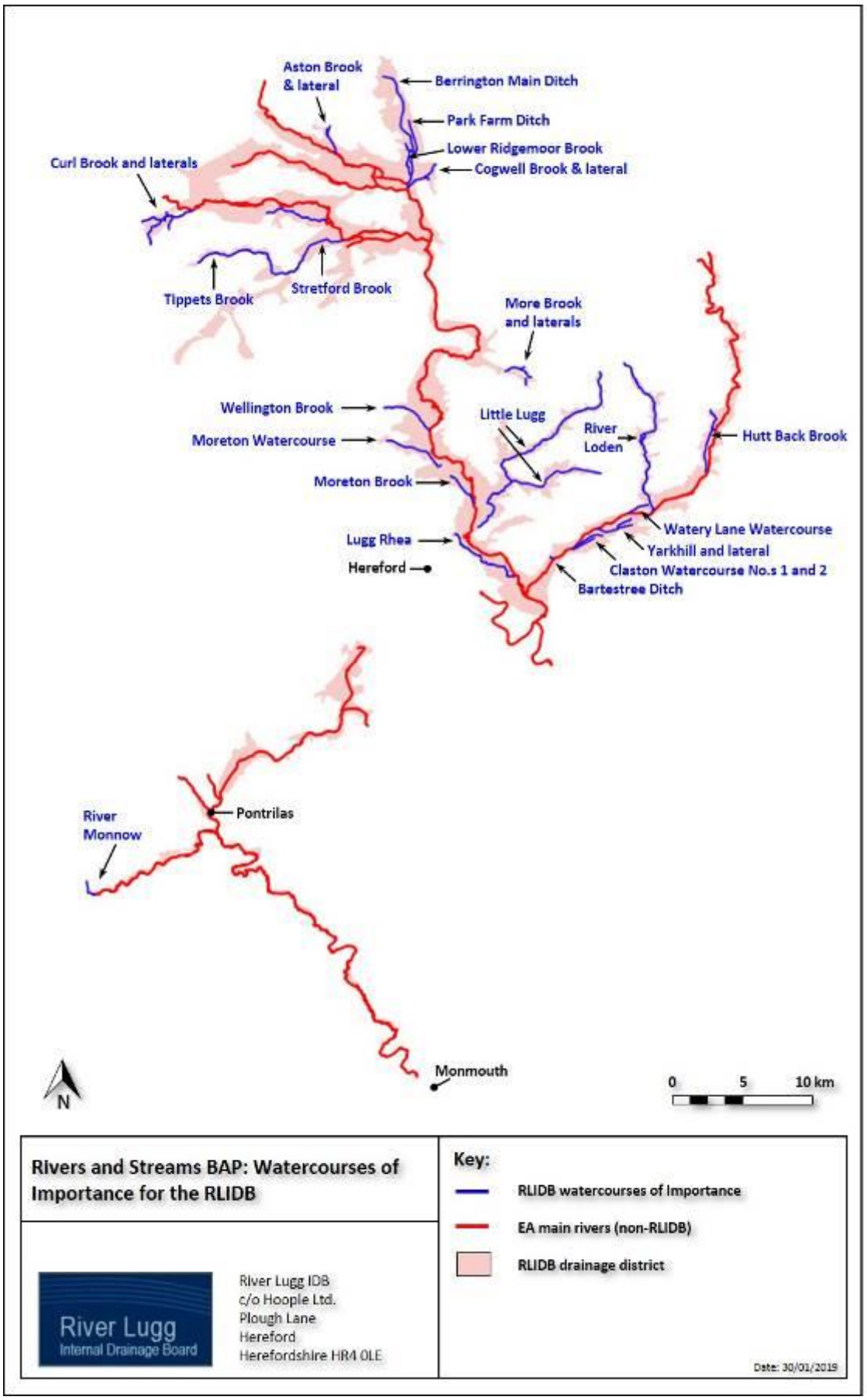
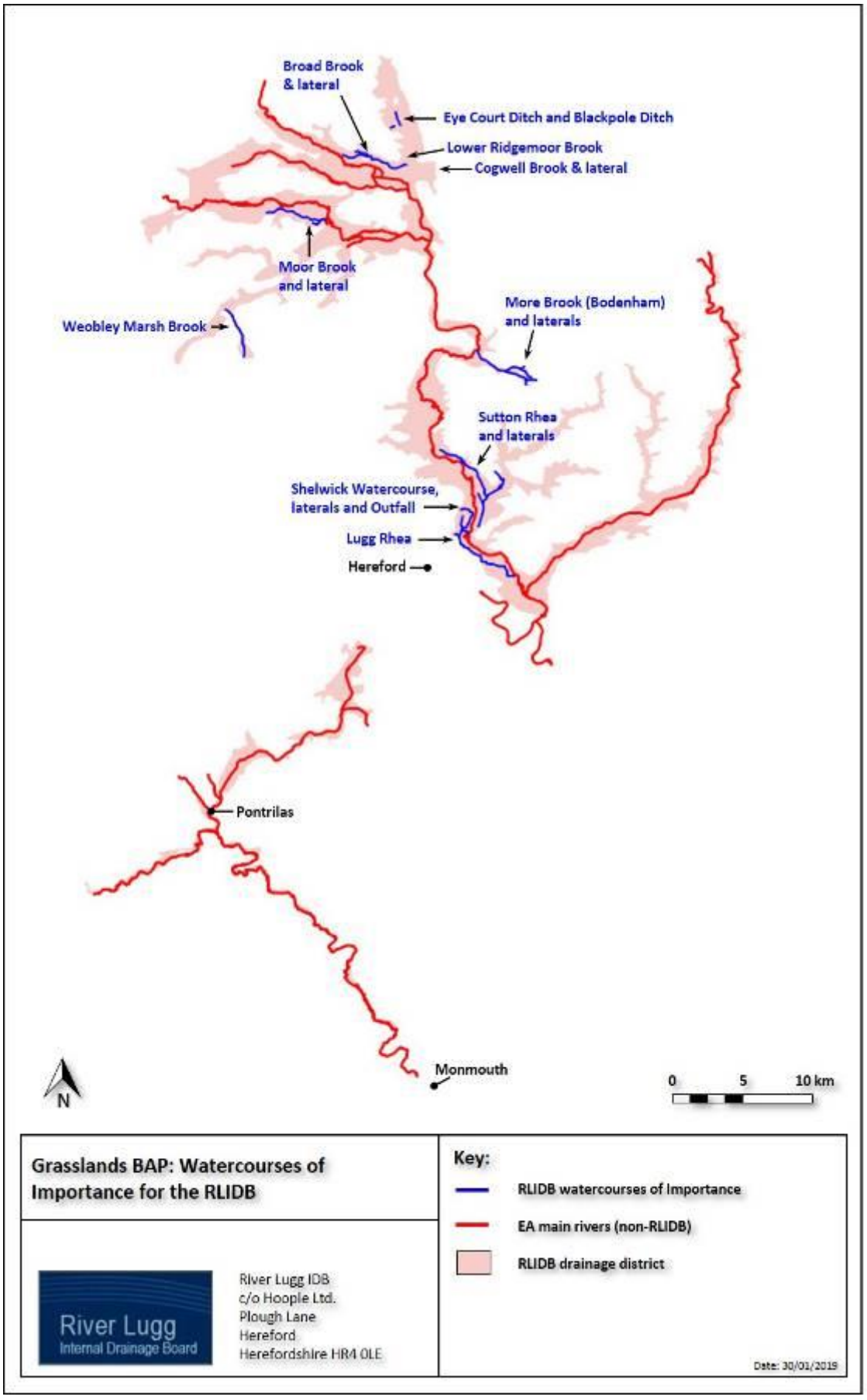
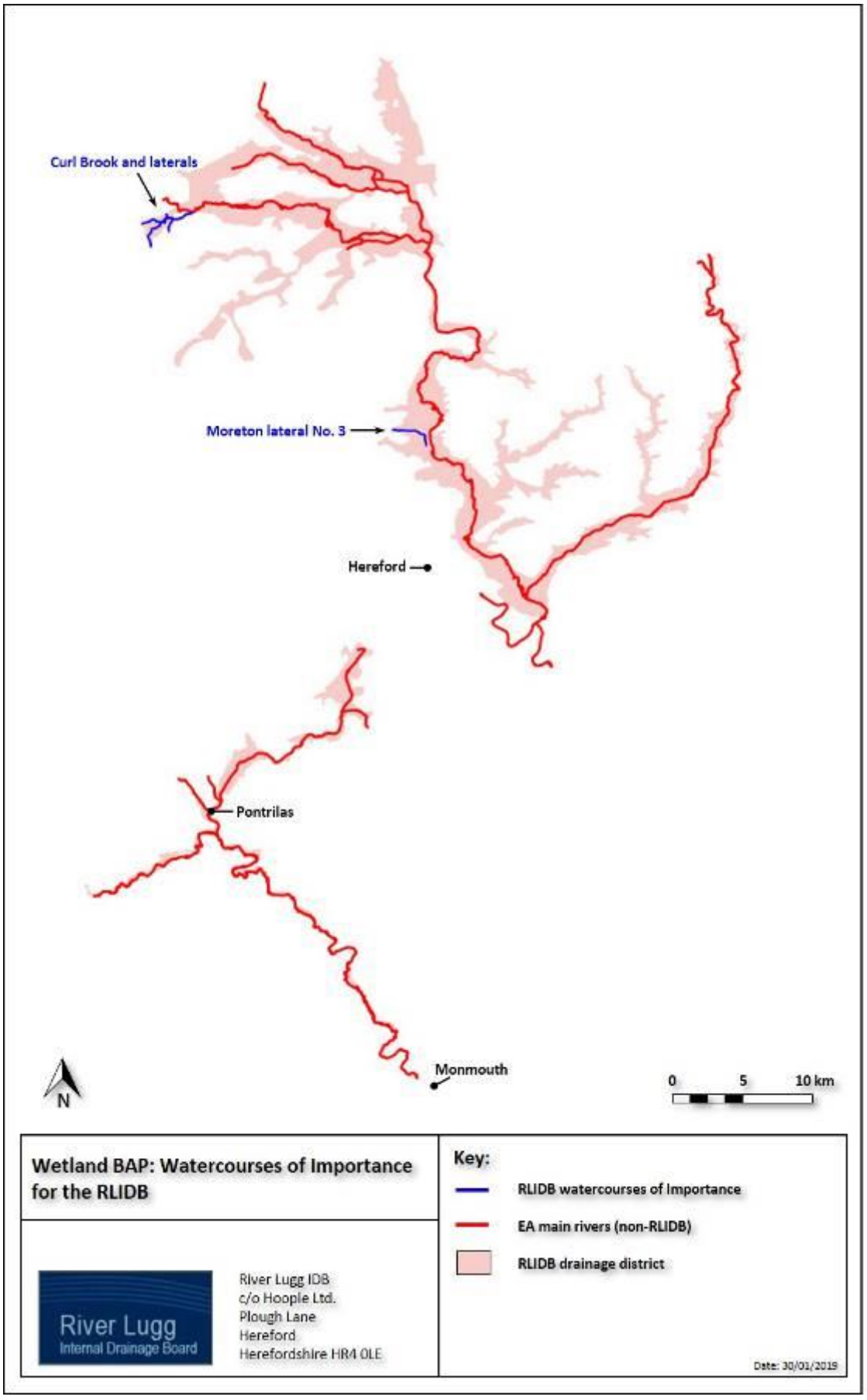
16.1 Rivers and Stream BAP – Important RLIDB Watercourses



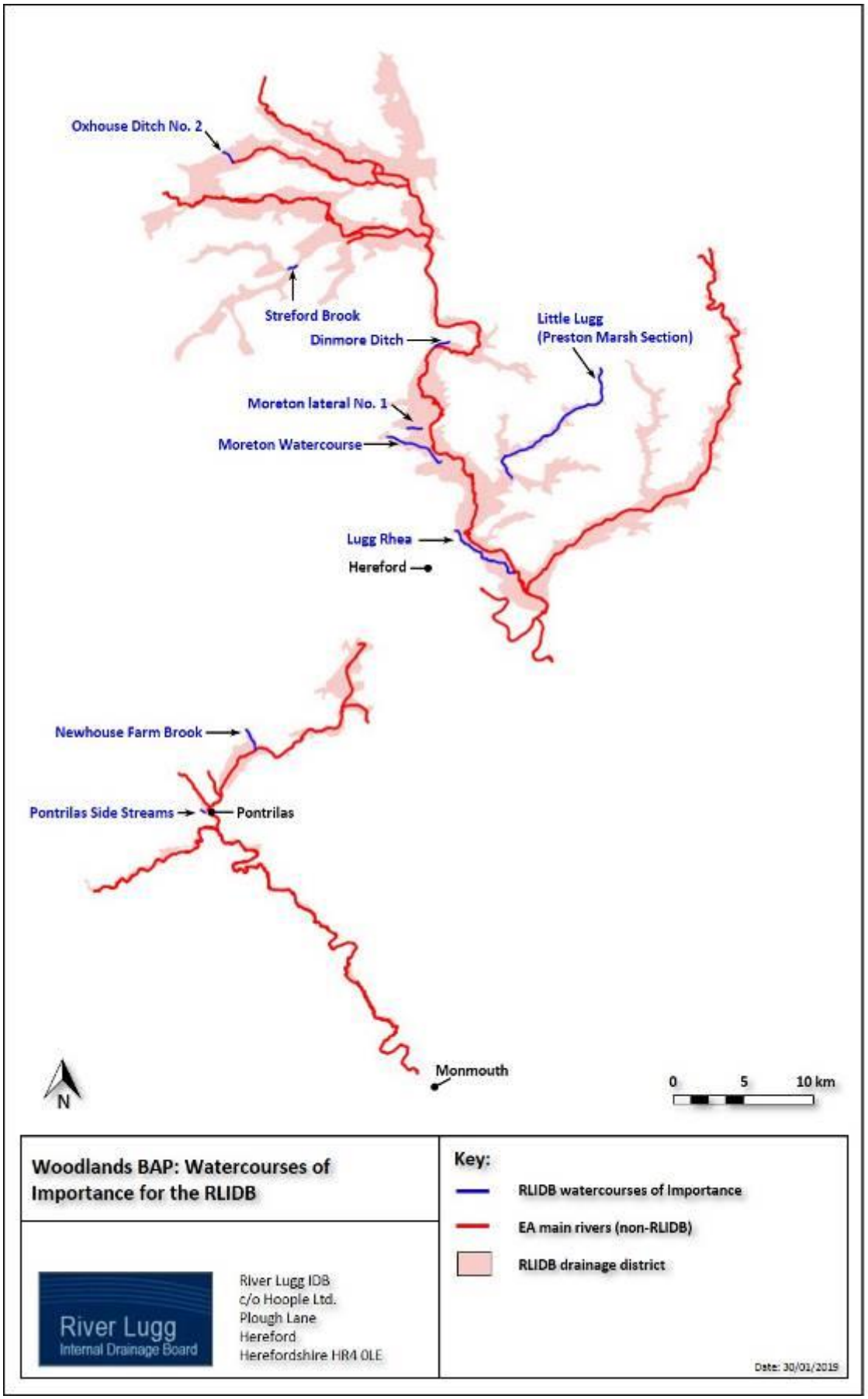
16.2 Grasslands BAP – Important RLIDB Watercourses



16.3 Wetland BAP – Important RLIDB Watercourses



16.4 Woodland, Wet Woodland BAP – Important RLIDB Watercourses



17 APPENDICES

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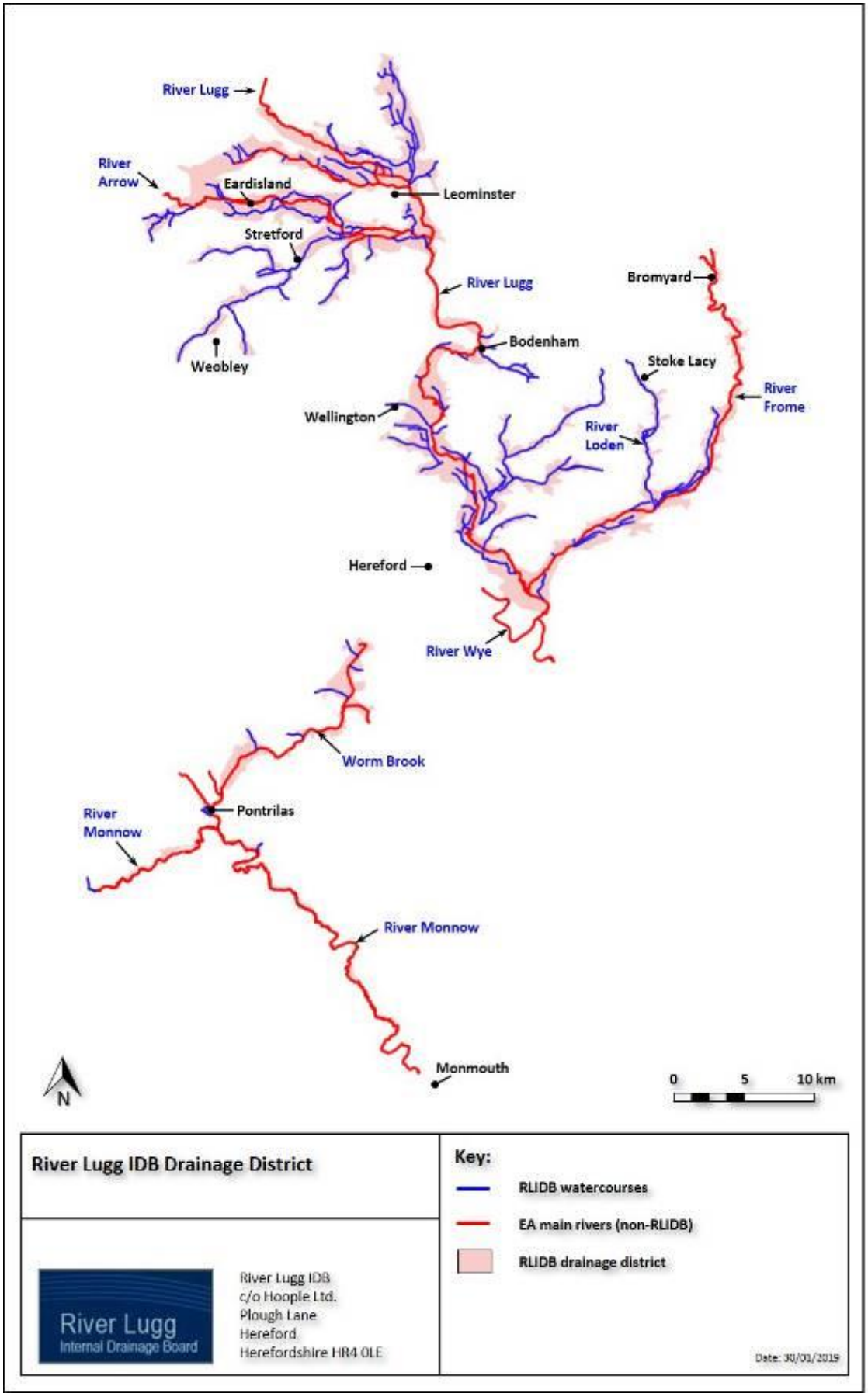
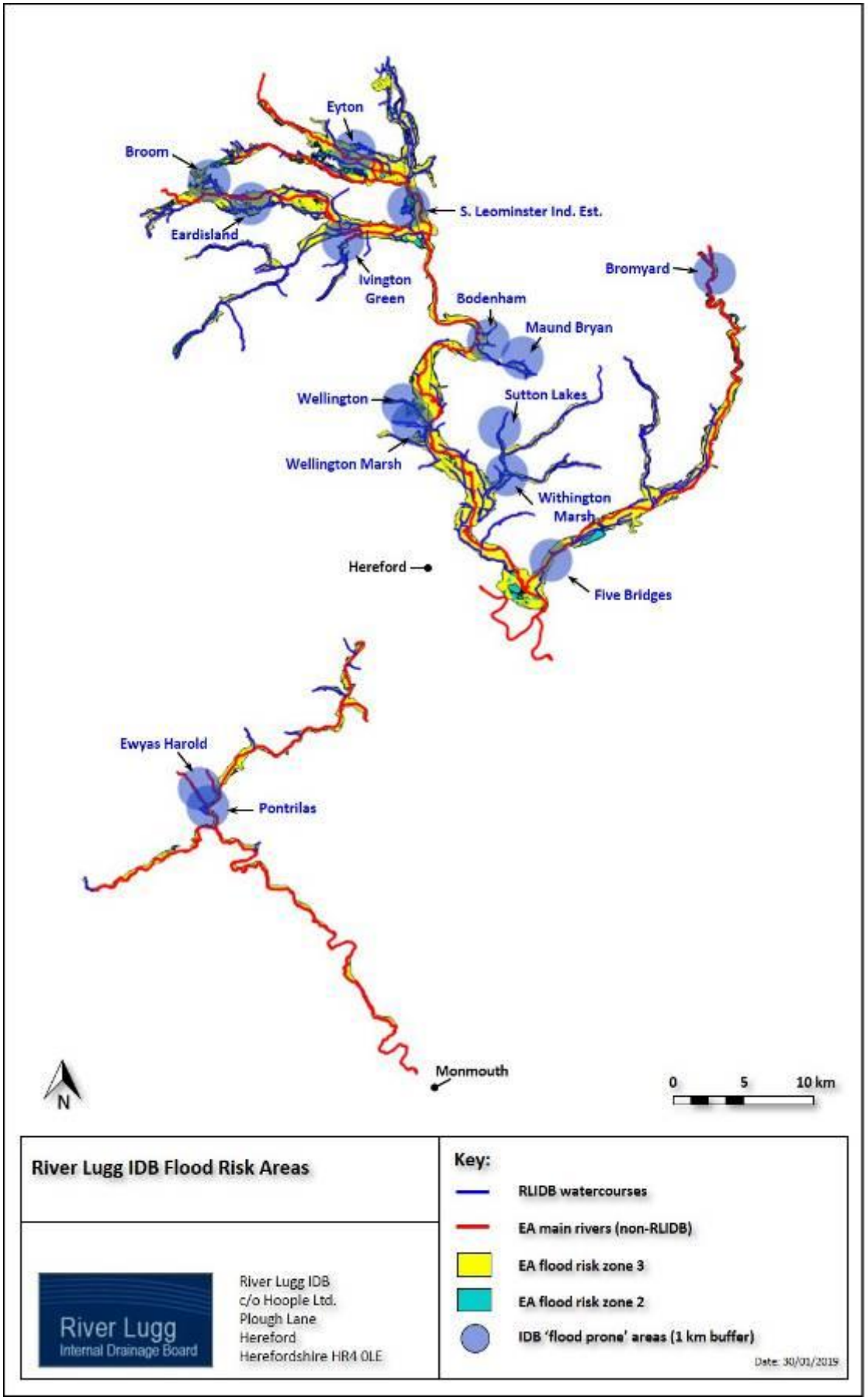
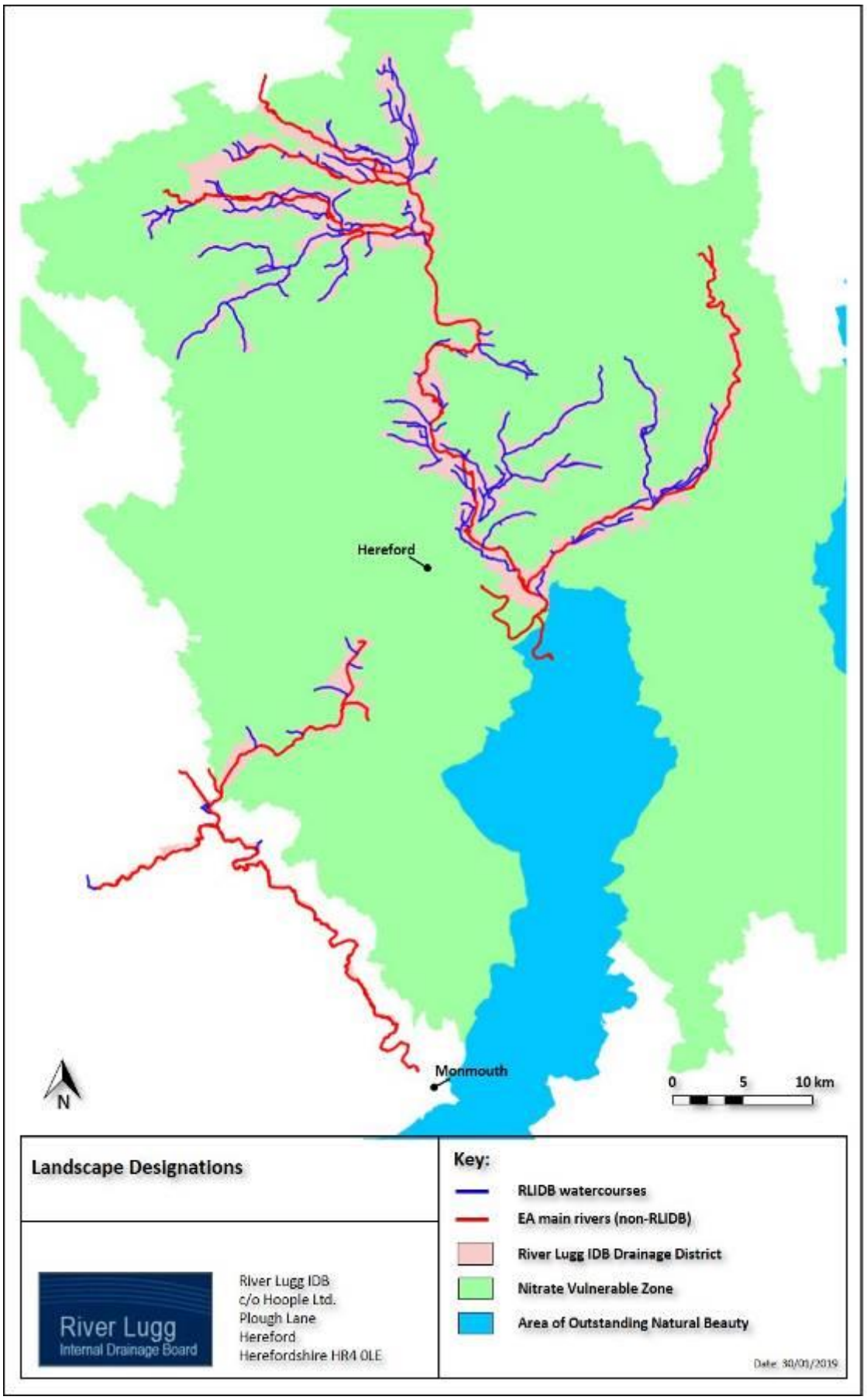
17.1 Appendix 1: River Lugg IDB Drainage District



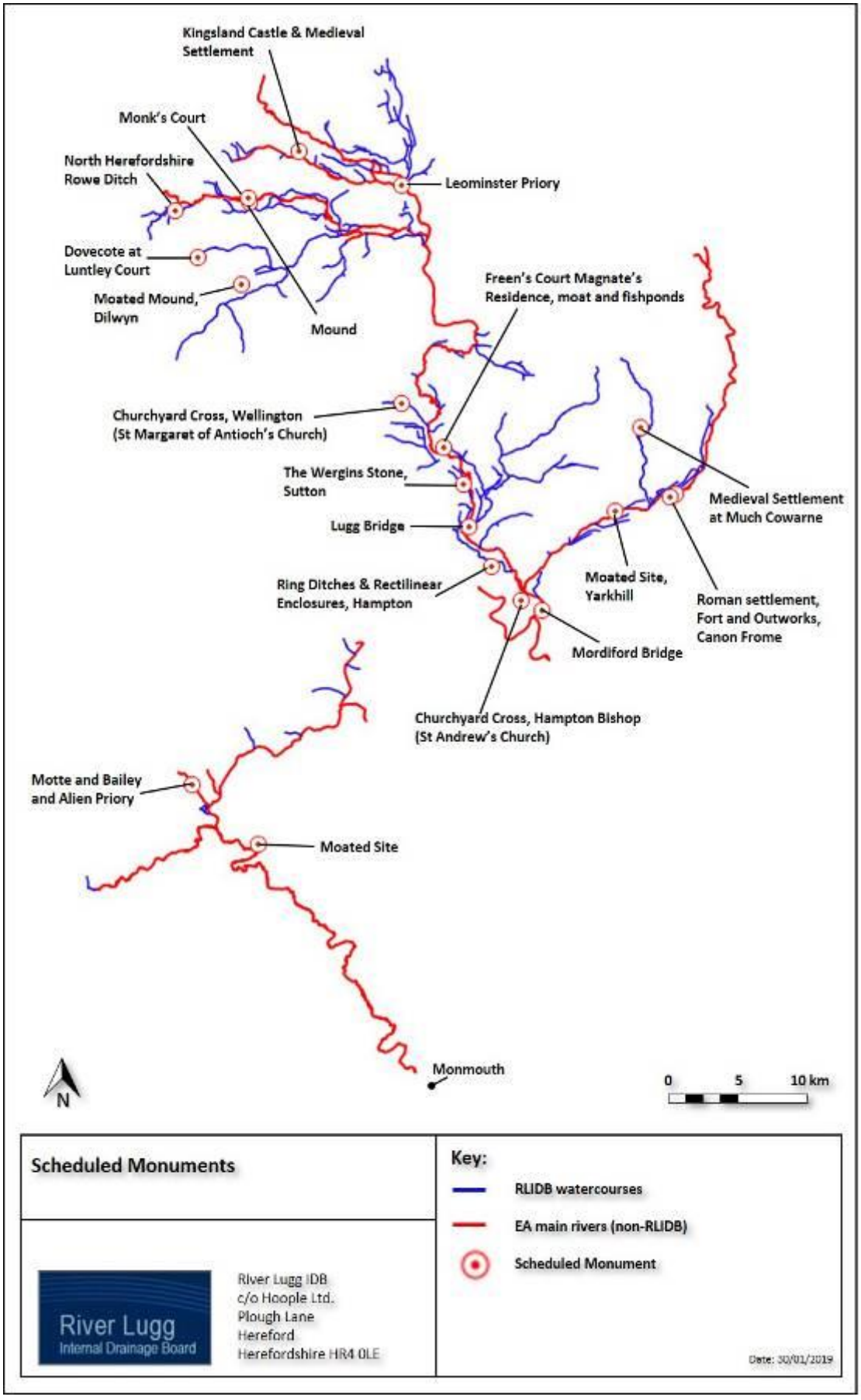
17.2 Appendix 2: Flood Risk Areas



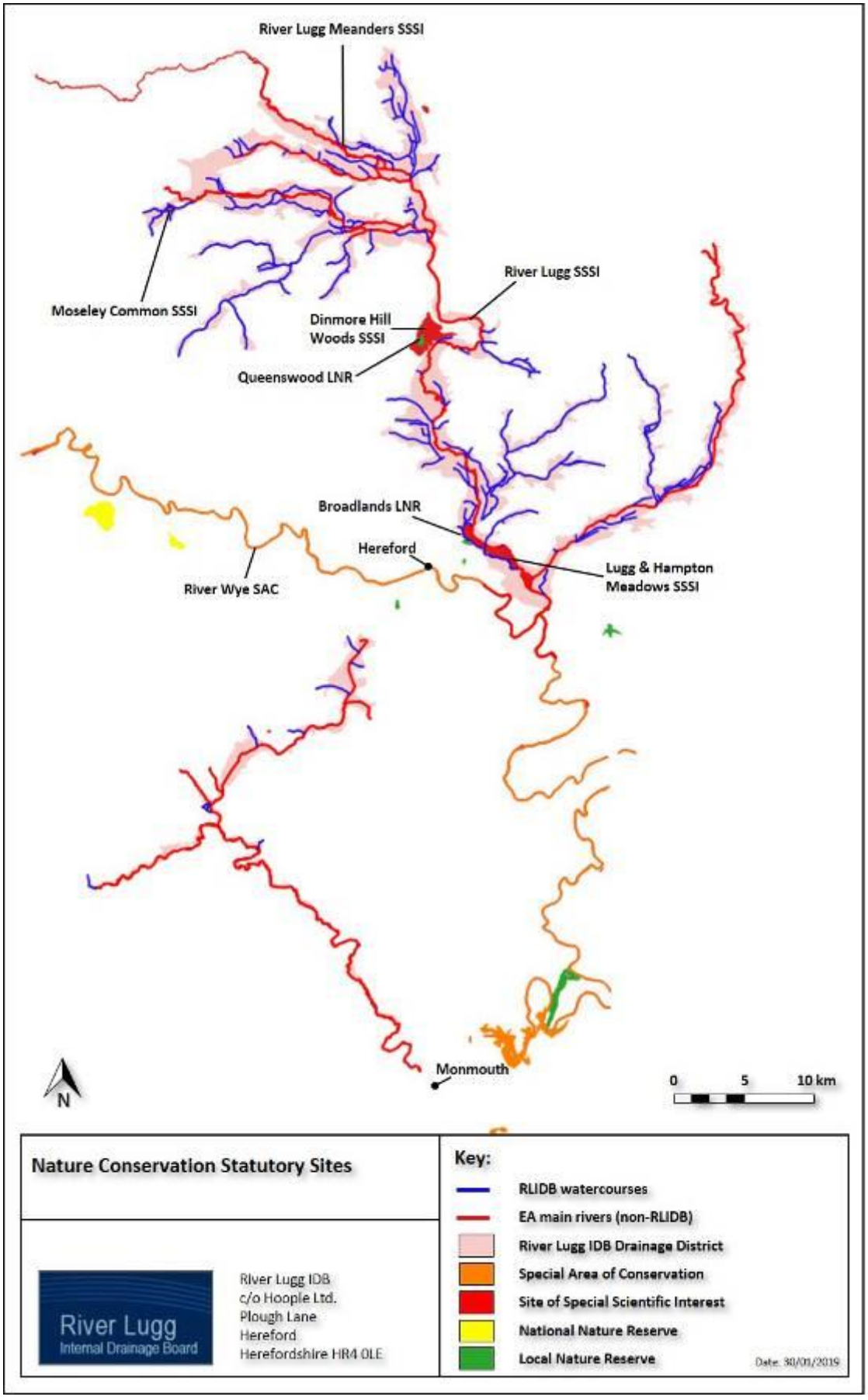
17.3 Appendix 3: Landscape Designations



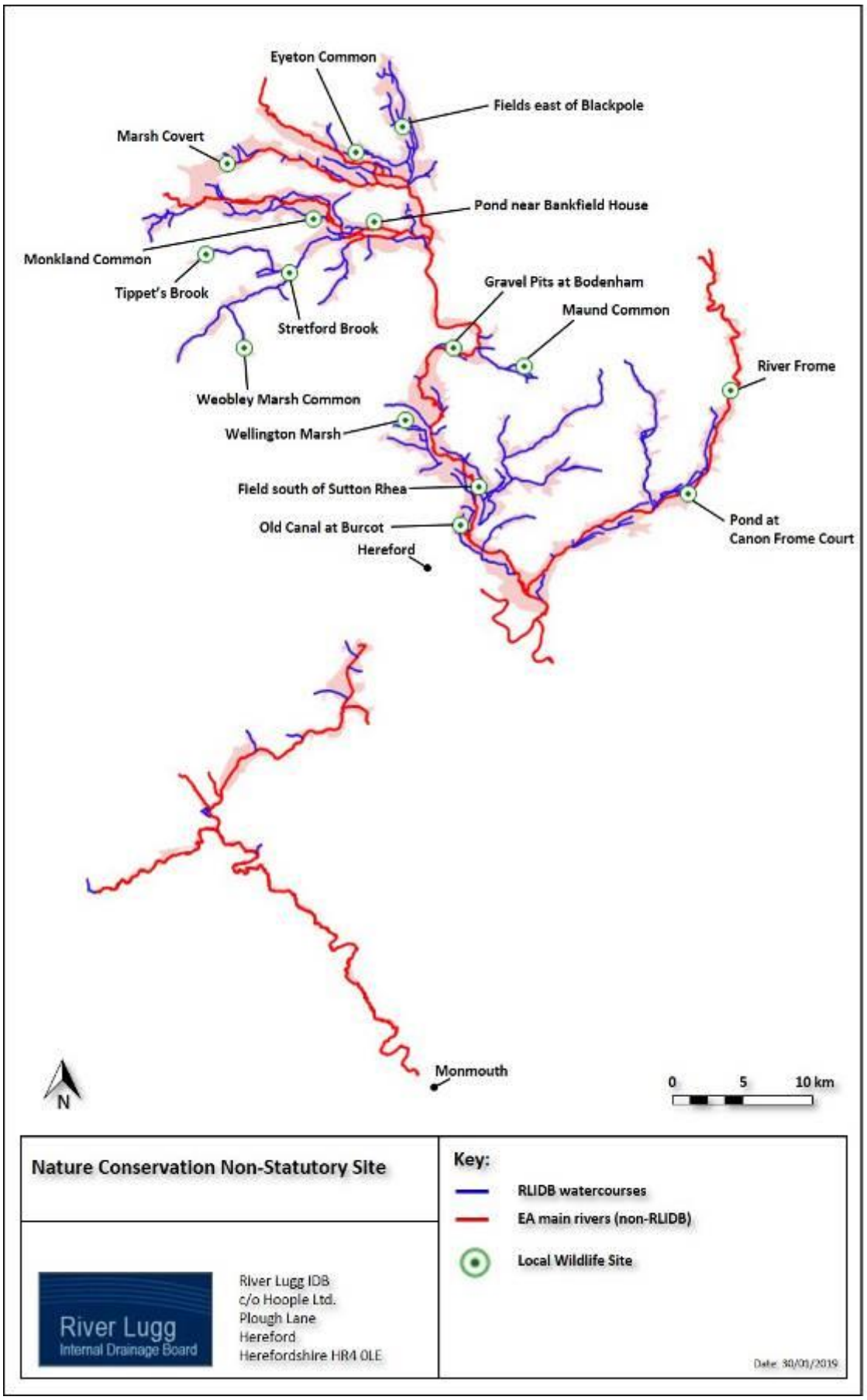
17.4 Appendix 4: Scheduled Monuments



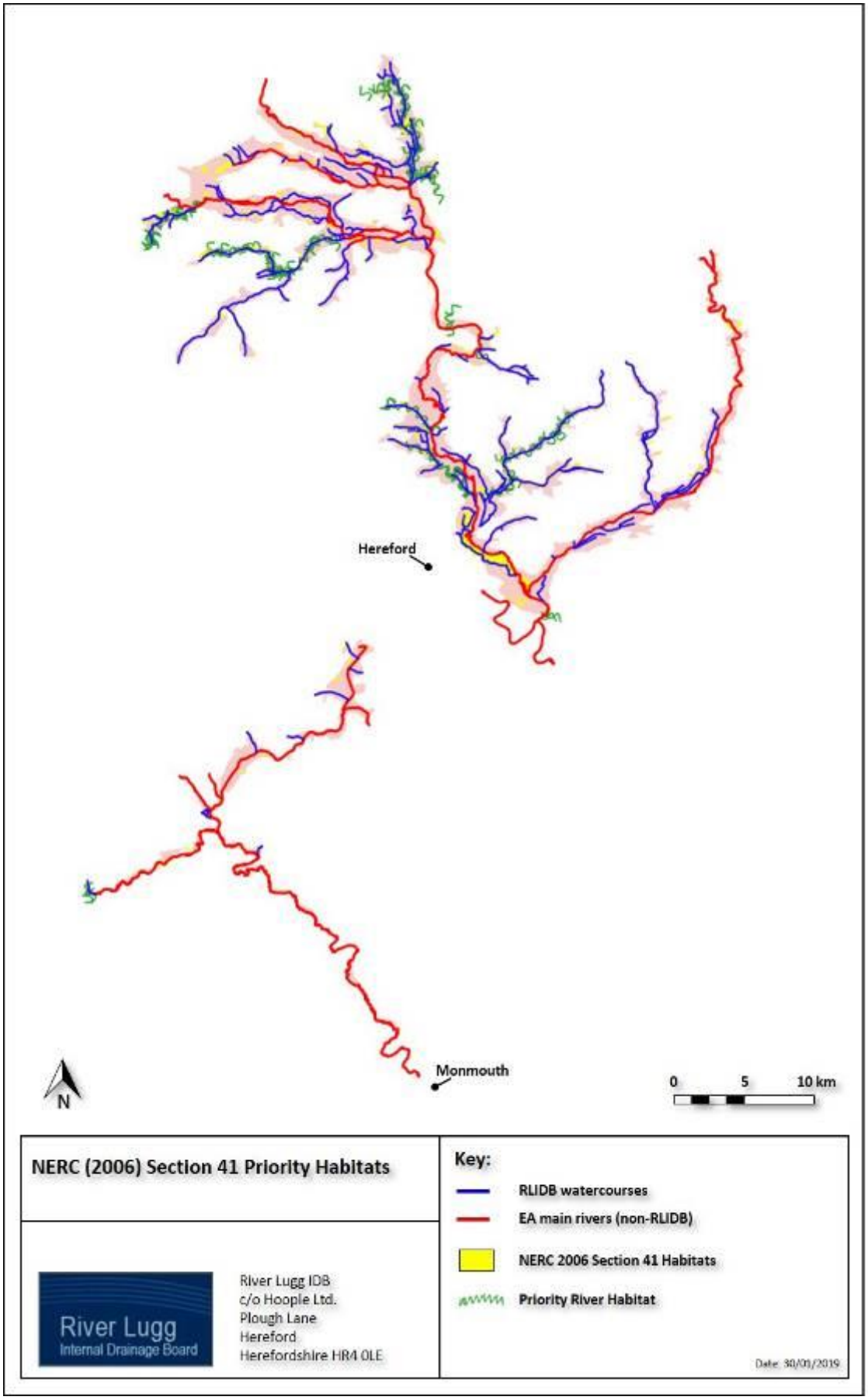
17.5 Appendix 5: Nature Conservation Statutory Sites



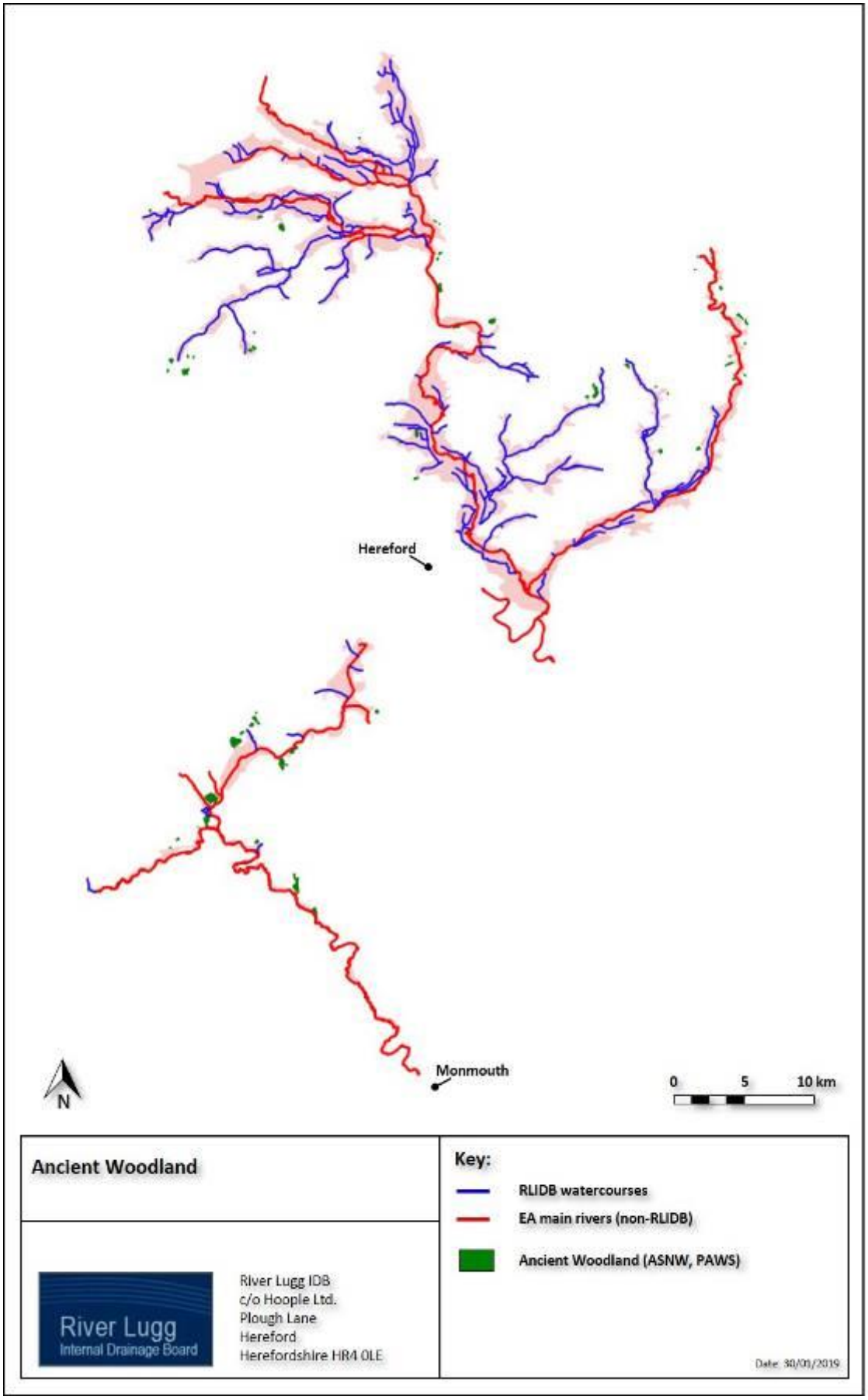
17.6 Appendix 6: Nature Conservation Non-Statutory Sites



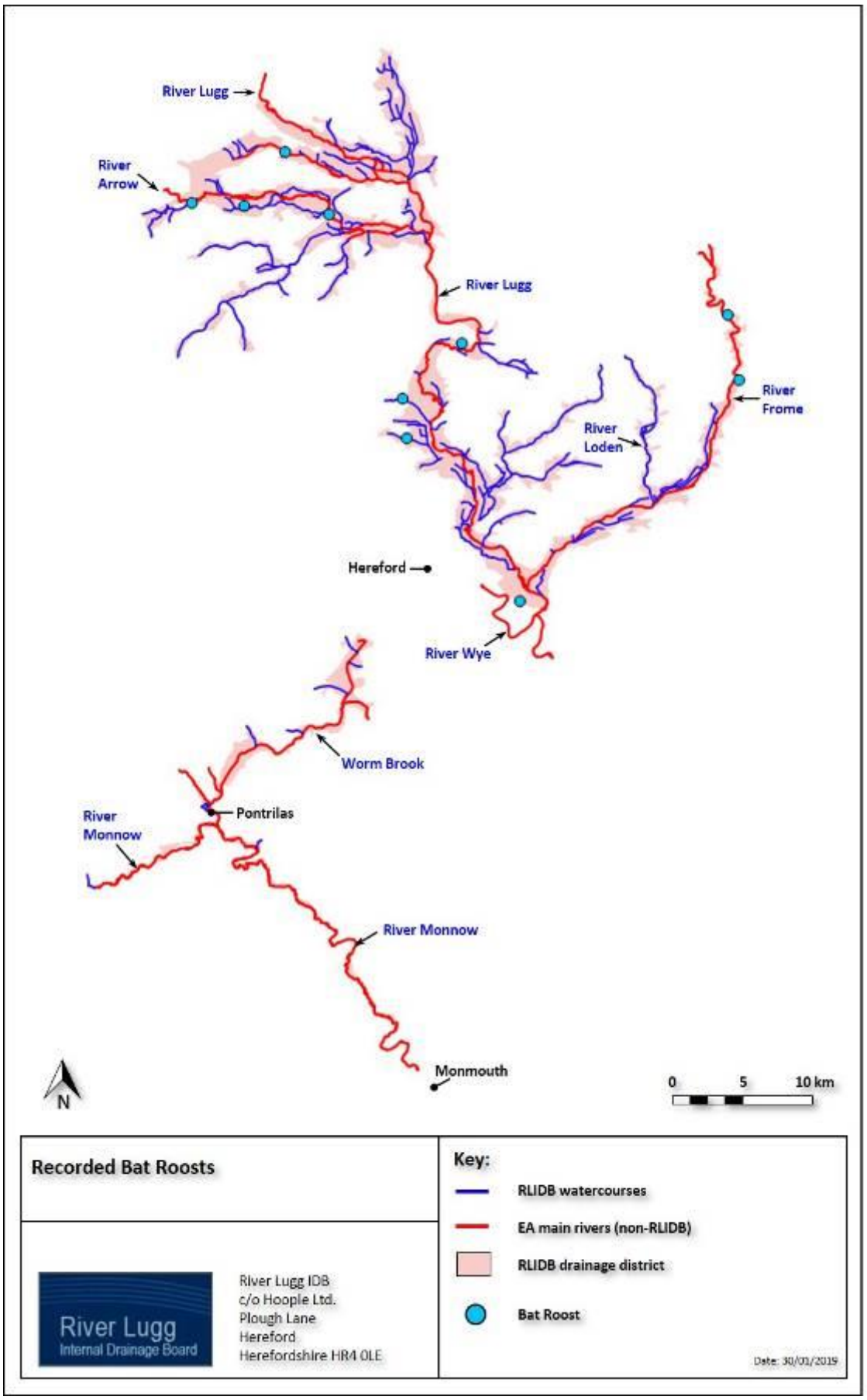
17.7 Appendix 7: NERC (2006) Section 41 Priority Habitats



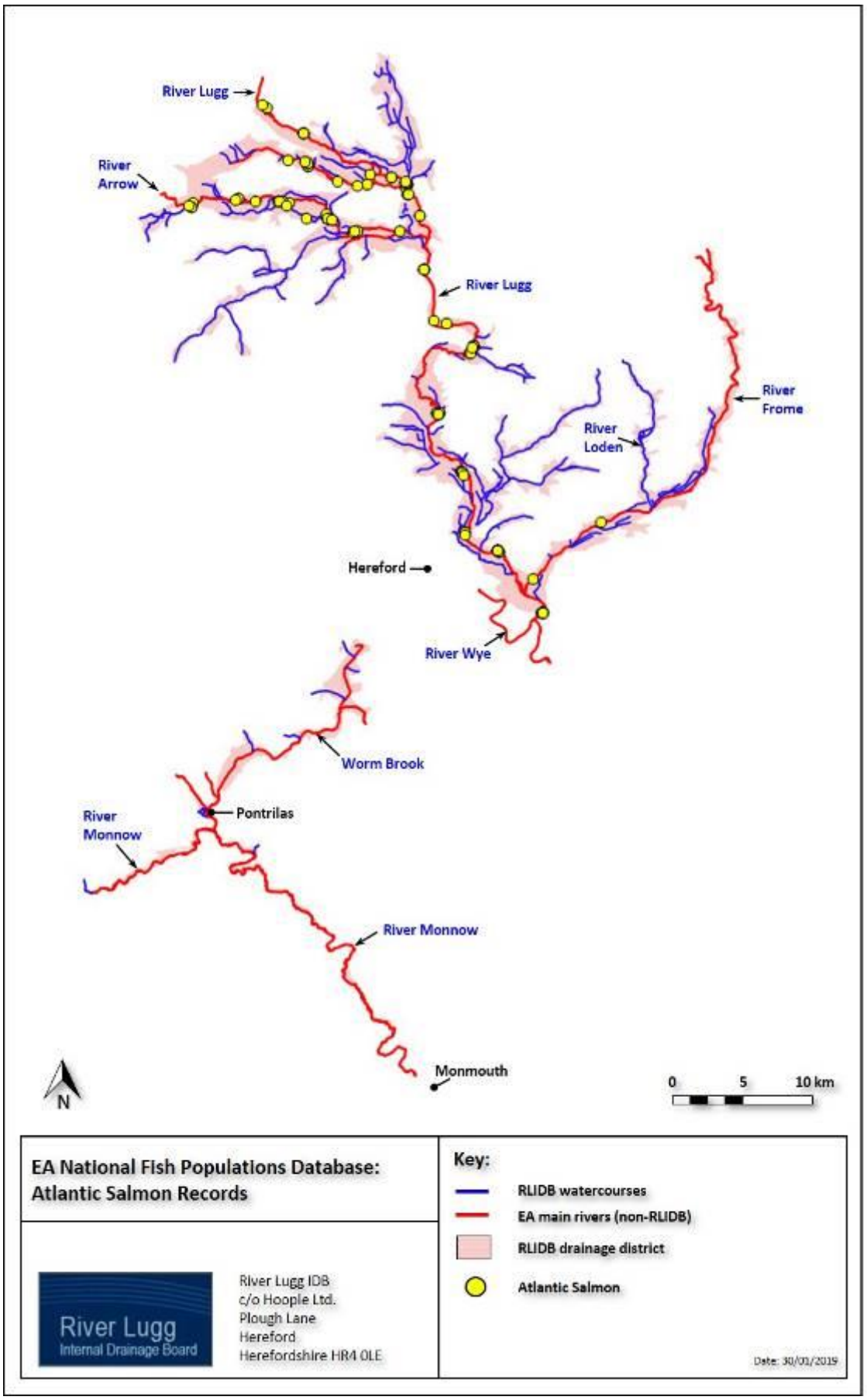
17.8 Appendix 8: Ancient Woodland



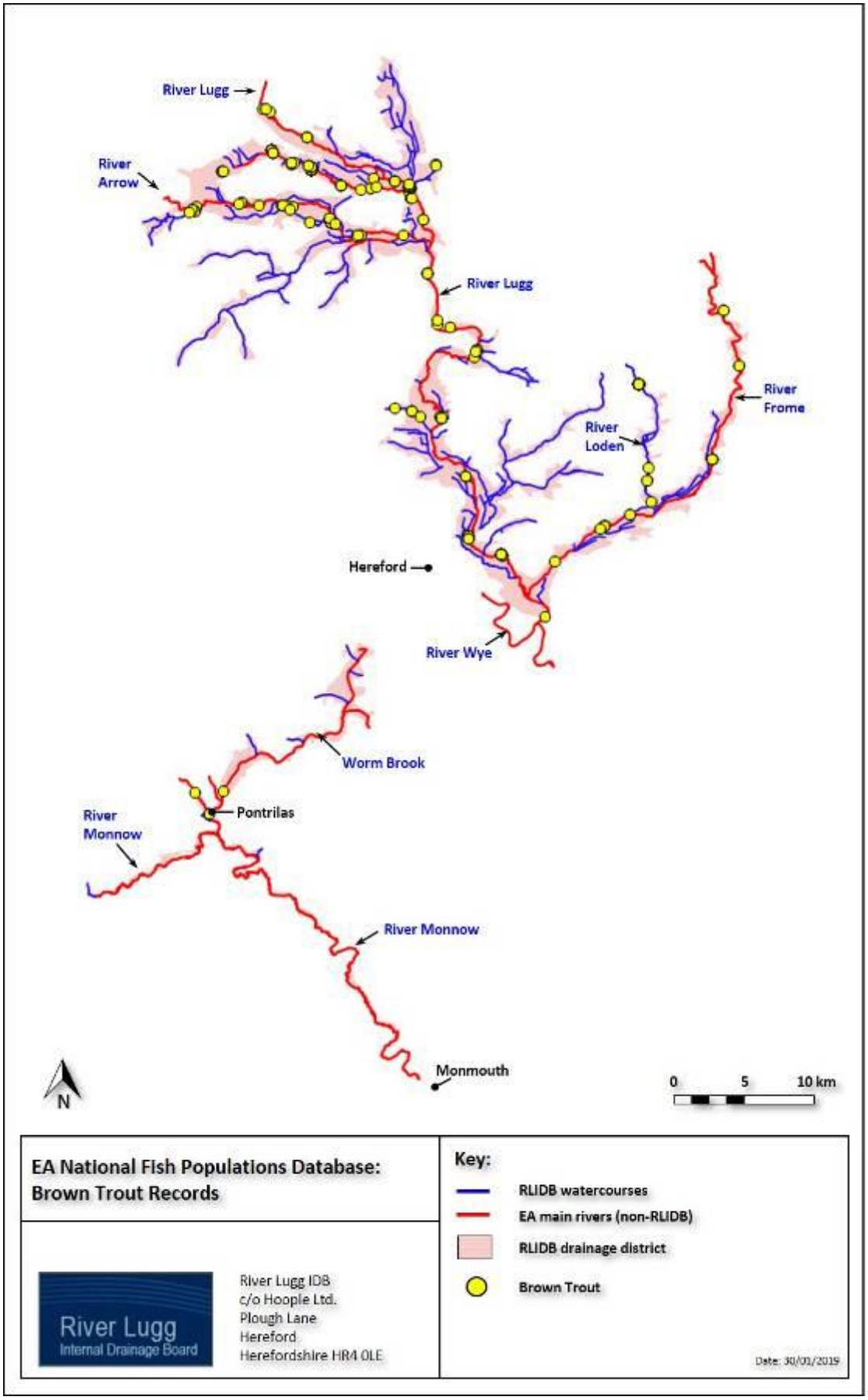
17.9 Appendix 9: Bat Roosts



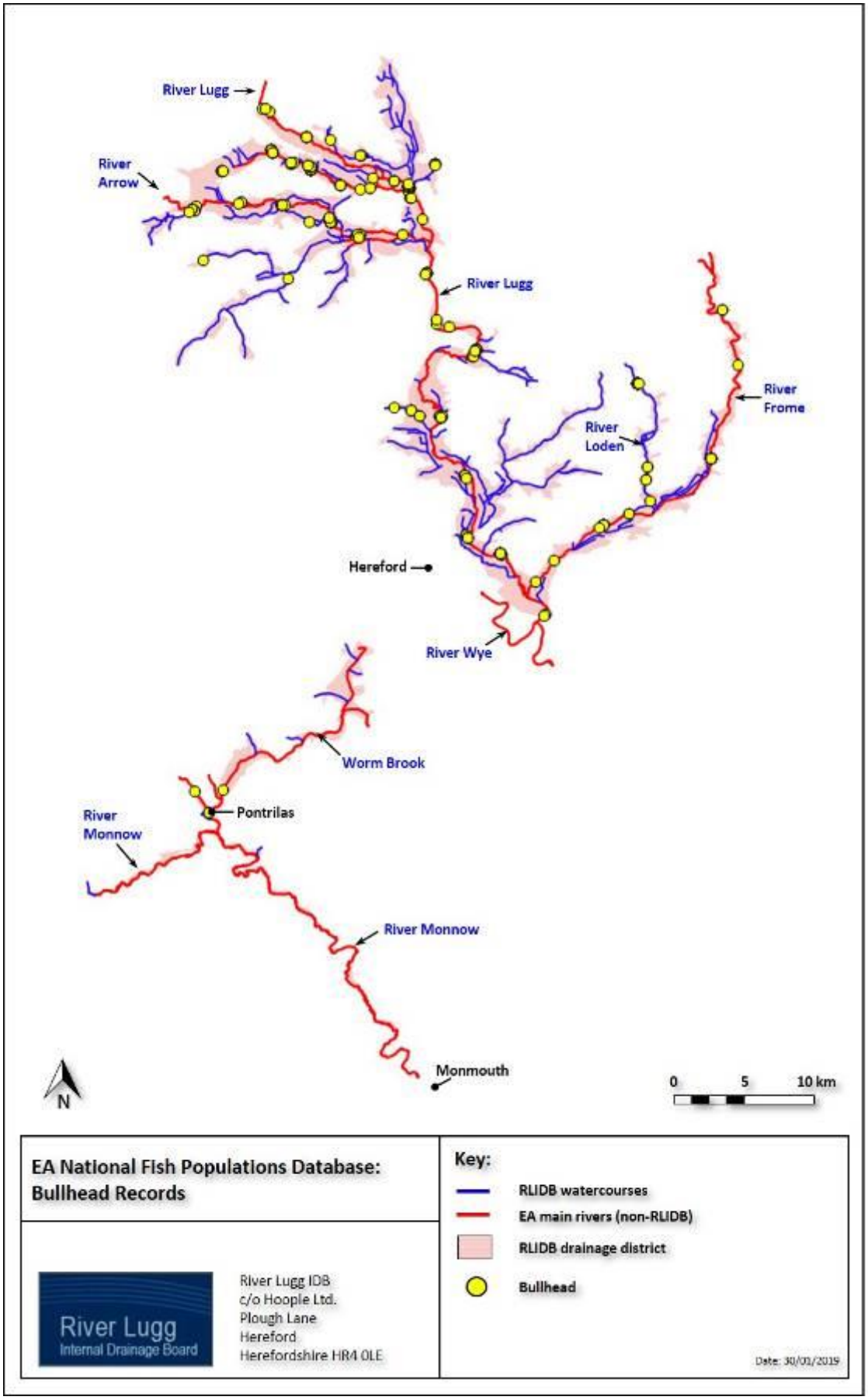
17.10 Appendix 10: National Fish Populations Database: Atlantic Salmon



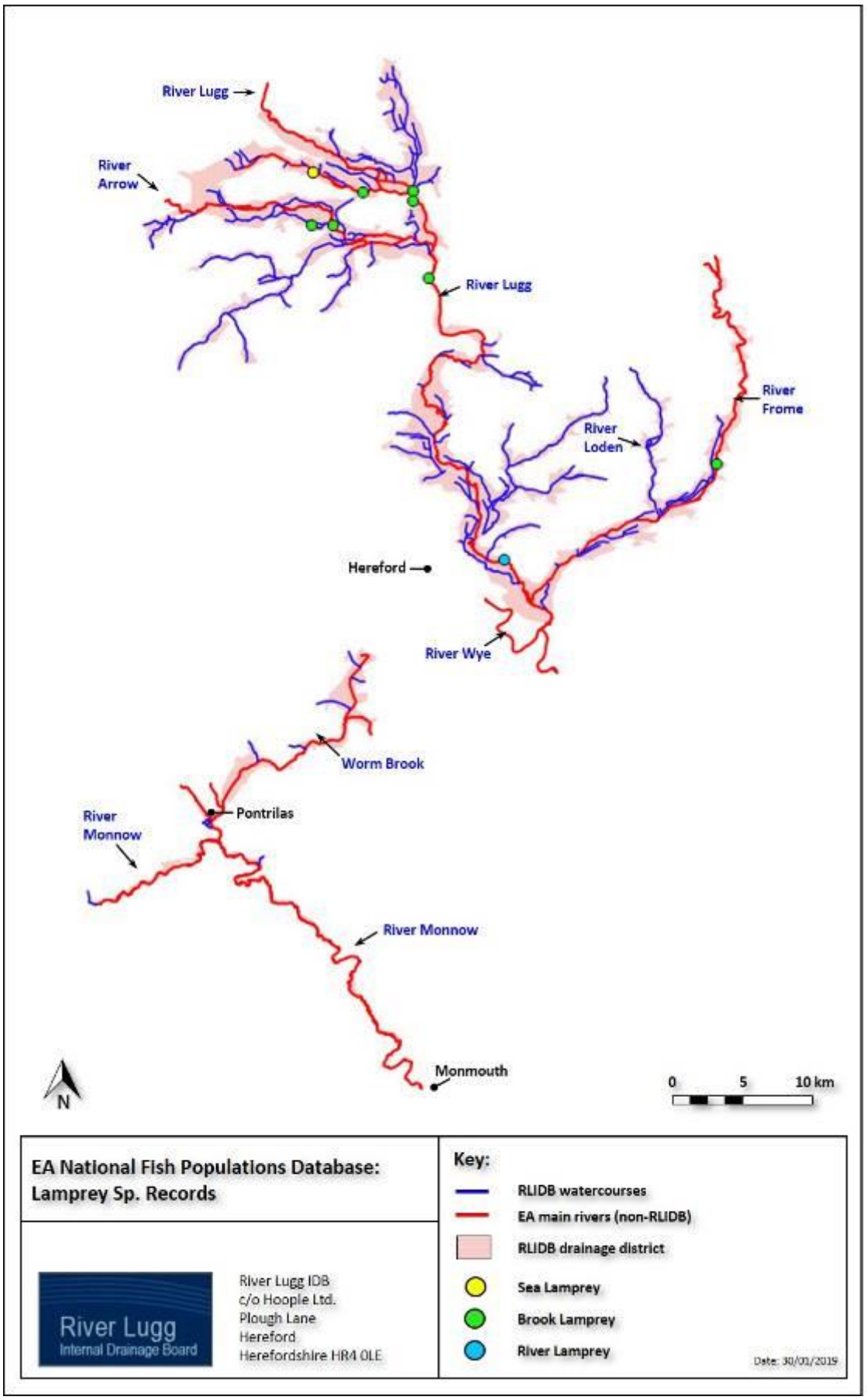
17.11 Appendix 11: National Fish Populations Database: Brown Trout



17.12 Appendix 12: National Fish Populations Database: Bullhead



17.13 Appendix 13: National Fish Populations Database: Lamprey sp.



17.14 Appendix 14: Black Poplar