Rivers & Streams Habitat Action Plan

“By the time it came to the edge of the forest, the stream had grown up, so that it was almost a river, and being grown-up, it did not run and jump and sparkle along as it used to do when it was younger, but moved more slowly. For it knew now where it was going, and it said to itself, “There is no hurry. We shall get there some day.”

A. A. Milne

1 Aims

- To maintain and enhance the ecological health of existing rivers and streams and ensure that management is appropriate.
- To restore reaches of rivers and streams where possible. Any unavoidable loss should be adequately compensated with the securement of a Biodiversity Net Gain.
- To raise the awareness amongst Council Officers and the public of the importance of rivers and streams to encourage greater appreciation of them across the borough.

Acknowledgements

We thank Harry Gray from South East Rivers Trust for their time and expertise in reviewing this plan.

2 Introduction

Aside from the Thames Catchment which is not covered by this plan (see the Thames HAP), Kingston is fortunate to have two rivers flowing through the borough; the Hogsmill and the Beverly. According to GiGL data, rivers and streams comprise approximately 1.3% (47 hectares) of Kingstons' total land area.

The Hogsmill is a 9.9km chalk fed stream that rises at Bourne Hall in Epsom and Ewell. From there it flows towards Kingston, with over 6 km of the river stretching across the Borough. Despite being a heavily modified and straightened system, significant stretches of the Hogsmill are still lined with greenspaces, many of which are nature reserves and Sites of Importance for Nature Conservation. The Hogsmill is therefore an essential wildlife corridor and a key component in the fabric of the borough's ecological network.

The Hogsmill River has two main tributaries within the borough, these being Tolworth Brook and Bonesgate. Both of these streams, though in-part heavily modified, are vitally important ecological features which provide habitat and ecological connectivity. This plan encourages the enhancement of and protection of the tributaries, in addition to the main river channel.

As well as being a vital blue-green space for wildlife, the Hogsmill is a well-loved community asset which is much used by local people. The river also has a fascinating history, a highlight of which is that it provides the setting and backdrop for John Evert Millias', 1851 pre-raphaelite masterpiece 'Ophelia'.

The Hogsmill has an established Catchment Partnership chaired by South East Rivers Trust, which brings together the river's active stakeholders from across the catchment area. Their work encourages a strategic and collaborative approach to both protect and enhance the riverine system. This habitat action plan endorses the adoption and delivery of the Hogsmill Catchment Plan and is aligned with the plan's strategic aims.

The other river which flows through the borough is Beverley Brook. Interestingly its name comes from 'Beaver's Ley', which means place where Beavers rest, an indication that this very urban river was once home to a now rare and locally extinct keystone species. The Beverly is 14.4km long and rises in Cuddington Park in Stoneleigh, from there it heads north through South West London. Approximately 6.4 km of the river flows through Kingston much of which it culverted or canalised. Within New Malden, the river borders Beverley Park, an area which potentially offers opportunities for enhancement.

Like the Hogsmill, there is an established Catchment Partnership chaired by South East Rivers Trust which brings together active stakeholders for the Beverly catchment. This plan also endorses the adoption and delivery of the Beverley Catchment Plan and is aligned with these wider aims.

3 Current status

a. **Legal / policy status -** Many rivers and streams are protected as Special Areas of Conservation (SAC’s) under the EC Habitat Directive. England in particular holds one of the foremost chalk river resources of Europe and many of these are designated Sites of Special Scientific Interest (SSSIs). Through Kingston flows the Hogsmill, an urban chalk stream which, in Kingston, has multiple SINC designations including Local and Borough Grade 1.

b. **Conservation status -** Rivers are listed as a UK BAP priority habitat. (See Appendix A for SINC designated sites). The Environment Agency, water companies, internal drainage boards and local authorities all have statutory obligations to conserve river and stream habitats. See Appendix B for relevant legislation.

c. **Distribution**

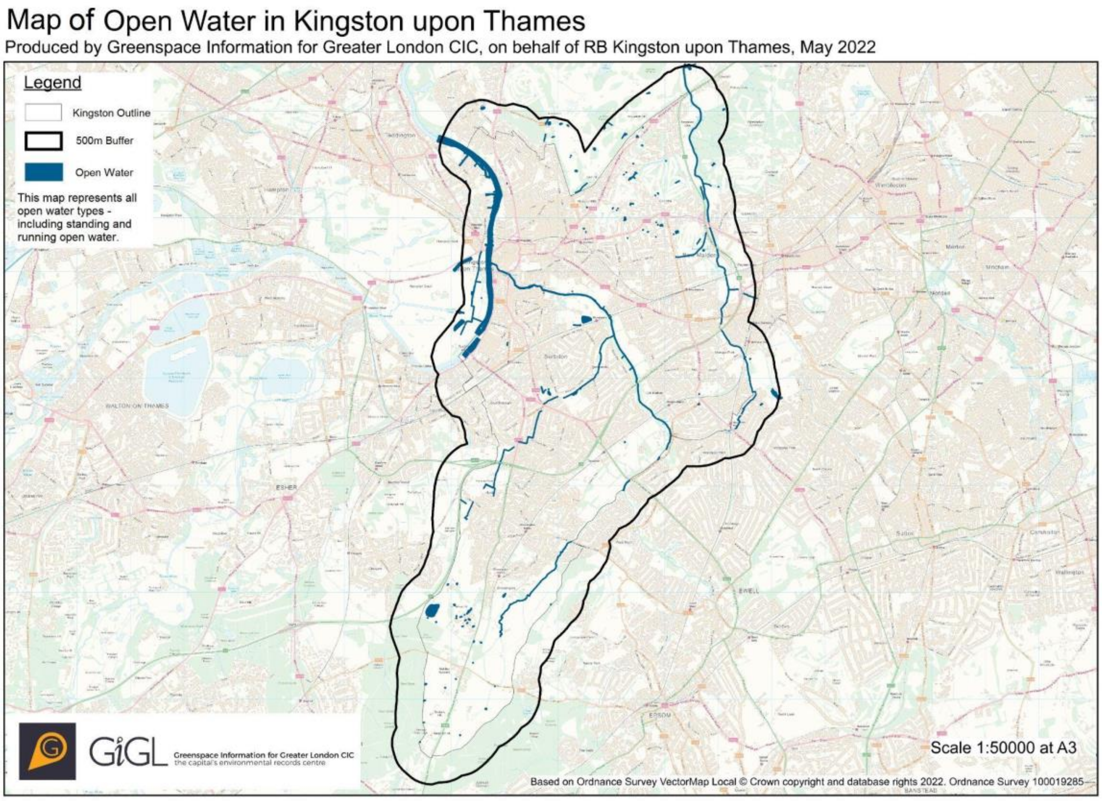

Figure 1 Distribution of open waterbodies in RBK with 500m buffer into neighbouring boroughs

4 Associated Indicator Species

Most rivers and streams vary greatly in character and their living communities are largely determined by geographical area, underlying geology and water quality. In turn, indicator species can be used to determine the quality and characteristics of a river or stream.

Nutrient-rich lowland rivers, such as those in the London area, are often dominated by coarse fish such as chub, dace, roach, gudgeon and eels, as well as higher plant species including water-crowfoot and water-starworts. Additionally, rivers and streams support some species that are not present in standing open water habitats.

Chalk rivers and streams are rare and valuable habitats that have the potential to support a unique and rich diversity of life. The Hogsmill river that flows through Kingston is one example of a chalk fed stream, as its headwaters are derived from springs in Ewell where the North Downs chalk meets London clay. No species are endemic to chalk streams, though many require good water quality to thrive.

In a healthy state, chalk stream flows are clean, alkaline and high in calcium carbonate, cool, well oxygenated, and have very stable flows because they are fed by spring water rather than surface run-off. These conditions are ideal for fish, including iconic species like salmon and trout, invertebrates and macrophytes which make excellent food sources for insectivorous and piscivorous birds, mammals and amphibians. Chalk is also highly absorbent compared to other bedrocks, soaking up rainfall over the winter months and releasing it slowly through the summer. Chalk streams therefore have a natural buffering effect against floods and droughts and provide refuge for flow vulnerable species such as water voles.

Unfortunately, around 30% of chalk streams were classified as being in poor condition (O'Neill & Hughes, 2014) due to complex pressures stemming from climate change and population growth. Furthermore, data published by the Environment Agency revealed that just 14% of English rivers as a whole were of 'good' ecological status in 2019, and none were free from chemical pollution (GOV, 2022).

Such anthropogenic influences on water quality are expected to alter the community of species found in our river systems, particularly species that are sensitive to pollution. The River Monitoring Initiative that is currently active along the Hogsmill collects such information, using invertebrate species as indicators for the health of the river. Citizen Science Outfall Safaris are also conducted to identify and locate polluting outfalls or pipes.

Table 1 Indicator species associated with rivers and streams

Group	Associated Indicator Species
Fish	Trout, salmon, grayling, chub, eel, stickleback, stone loach, dace, gudgeon, roach rudd, flounder, minnow, perch, barbel, tench.
Bird	Kingfisher, grey wagtail, sand martin, mallard, heron, moorhen.
Mammal	Water vole, water shrew. Most bat species will utilise freshwater habitats for foraging although a particular indicator is the Daubenton's bat. *aspirational species: otter, beaver.
Reptile	Grass snake.
Amphibian	Frogs, toads and newts.
Invertebrate	Mayflies, damselflies, caddisflies, Gammarus spp. Olive spp. (in line with the Hogsmill RMI)
Plant	Macrophytes and hydrophytes (aquatic vascular plants, bryophytes, stoneworts, macro algae) Trees: alder, willow, birch, black poplar.

5 Ecosystem Functionality and Services (Role in the Climate Emergency)

Rivers and streams have long been an important source of food, water, materials, power and transport across the globe that distribute a wide range of ecosystem services across the landscape. In developed areas, many of these services have been deteriorated or lost and are becoming an important focus for restoration. Well-planned strategies to reverse the decline in the quality of alluvial habitats may enhance some of these benefits for wildlife and society, especially as a resilient environment is needed to cope with a changing climate.

5.1 Climate Regulation

Rivers and streams generate cool air through the process of evaporation and evapotranspiration. This effect varies with the configuration (size, vegetation cover, land roughness etc.), though it is generally understood that water cools (Kazmierczak & Carter, 2010). The presence of such features is particularly important in the urban context, as the growing replacement of natural land cover with dense concentrations of urban materials is a major driver of the urban heat island effect.

Nature-based solutions such as the incorporation of blue and green corridors in urban development can help to mitigate heat stress, especially when considered synergistically. Highly vegetated riparian banks for example, show significantly lower temperatures than those consisting of only hard engineering materials, and green corridors that extend from rivers and streams allow cool air to penetrate further into the city (Hathway & Sharples, 2012).

Theeuwes, Solcerová & Steeneveld (2013) demonstrated that the cooling effect of water bodies is mainly felt adjacent to their boundaries and in downwind areas. To facilitate air exchange and urban comfort, blue and green infrastructure should be well connected so that a number of ecosystem services associated with climate change adaptation can be delivered across the urban landscape, including the reduction of flood risk, improved water cycling and urban cooling (Kazmierczak & Carter, 2010).

5.2 Water Supply & Quality

Water supply is a regulating ecosystem service of rivers and streams that benefits humanity in a variety of ways. The quality of water is heightened within the freshwater landscape as it filters through associated habitats, such as wetlands, forests, sedimentary layers and riparian vegetation (Allan, 2004). Riparian zones (vegetated banks) are considered a particularly important element for water quality, as they are dynamic environments in which the interface between terrestrial and aquatic ecosystems lie (Nava-López *et al.,* 2016).

5.3 Flood Management

Rivers, streams, their floodplains and bankside vegetation have a natural capacity to retain water during periods of heavy precipitation. All once would have been connected in a mosaic of interacting habitats, however urbanisation has largely diverted and fragmented them, reducing their capacity to contribute to flood management.

The restoration of rivers and streams contributes to flood risk management by supporting their natural capacity to attenuate flow, while simultaneously improving ecological function. In the urban context, Sustainable Drainage Systems (SuDS) and the implementation of water permeable surfaces are additional solutions which improve water quality, mitigate the urban heat island effect and reduce the strain on stormwater management systems.

5.4 Nutrient Cycling

Riparian areas such as streambanks, riverbanks and floodplains constitute important areas for nutrient cycling, as they are able to retain, transform and release nutrients, thereby influencing water quality (Roberts, Stutter & Haygart, 2012). This has direct benefits for human wellbeing by increasing the quality of drinking and other water sources (Cardinale *et al.,* 2012).

The use of riparian areas for nutrient management has led to a number of initiatives.
For example, the restoration and reconnection of floodplains and wetlands, and the management of riparian buffer strips which can be optimised by vegetation type for the removal of nutrients (Weigelhofer, Hein & Bondar-Kunze, 2018). Floodplains provide

Additional ecosystem services, namely habitat for a diverse range of flora and fauna, flood protection and groundwater replenishment (Hein *et al.,* 2016).

Aside from encouraging bankside vegetation, stream restoration techniques such as channel widening, re-meandering and the addition of complexity through debris dams and side pools can enhance nutrient retention by increasing residence time (Bukaveckas, 2007; Craig *et al.,* 2008; Hines & Hershey, 2011) and through the addition of carbon to which nutrients bind (Roberts, Mulholland & Houser, 2007).

It is important to recognise that due to the complex and heterogeneous nature of rivers and streams, it is difficult to quantify which restoration methods may benefit nutrient retention rather than nutrient release. Additionally, managers must consider the possible detrimental consequences of restoration and reconnection on the valuable services and processes that are already present in the catchment (Verhoeven *et al.,* 2006).

5.5 Carbon Sequestration & Soil Formation

Rivers and streams play a globally significant role in carbon sequestration, as carbon is either stored in sediment, soil and living biomass or is transported to seas and oceans. Naturally meandering streams and rivers, with highly vegetated banks, that are connected to backwaters and floodplains and where woody debris is allowed to build, have a higher capacity to store carbon compared to their straightened and reinforced urban counterparts. Reintroducing keystone species such as the Eurasian beaver for example, can also restore ecological processes related to carbon sequestration, like sediment trapping and an increase in the abundance of living organisms resulting from dam construction.

5.6 Culture, Recreation & Spirituality

Water has been a culturally and spiritually significant symbol of the natural world for thousands of years. However, as our rivers and streams have been transformed over time for the purpose of navigation and urban development, so has the meaning of them to modern people. Consequently, trade-offs that maximise ecosystem services, which encourage recreation, tourism, social cohesion and educational opportunities as well as the aforementioned services, is required to achieve a balance between ecological health, civic functionality and cultural value in a heavily urbanised environment.

A good example are blue-green corridors, which make up an important aspect of rivers and streams in terms of human health, recreation, sustainable transport and aesthetic value, but also facilitate species migration, pollution mitigation and a number of other services.

6 Threats to habitat

Rivers and streams are complex ecosystems that face a wide range of threats. They provide multiple ecosystem services to humanity, but these are seriously under threat from stressors interlinked with urbanisation. The impacts can be widespread and severe, especially as human populations grow. Understanding local threats, such as those on the Hogsmill and Beverley, and bringing back the services that underpin human wellbeing is essential.

6.1 Pollution

Water quality is one of the ecosystem services most affected in urban rivers and streams, as they are exposed to pollutants from a wide range of sources, mainly sewage discharges by water companies, chemical discharges from industry and agricultural run-off, as well as pollution release through deforestation, urban households and exhaust emissions. Impacts range from acidification and eutrophication to the introduction of pesticides, plastics, toxic metals and pharmaceuticals (Everard & Moggridge, 2012). Owing to the linear and unidirectional nature of rivers, their pollution has the potential to exert effects for a large distance downstream, with slow flowing waterbodies being particularly susceptible (Malmquist & Rundle, 2002).

One common issue is point-source discharges from sewage works leading to nutrient enrichment, which has been shown to decrease biotic richness and shift community composition towards pollution-tolerant species (Walsh *et al.,* 2005). Often, sewage flows from old storm tanks which become overloaded after heavy precipitation events, as they no longer have the capacity to deal with the volume of sewage entering the system. To combat this issue, studies should be undertaken to quantify the impacts on downstream catchments.

A lesser known side effect of surface runoff is thermal pollution gained from urban materials that absorb and maintain heat. Pluhowski (1970) has shown that runoff from heated impervious surfaces led to streams being 10-15°C warmer than their nearby rural counterparts, demonstrating the importance of innovative technology and sustainable drainage systems.

6.2 Development & Urbanisation

Urban development is rarely sympathetic with the environment and often imposes a heavy strain on ecological function. Small streams are particularly vulnerable to urbanisation due to their high land contact area and relatively low water volume (McGarrigle, 2014). This phenomenon is widely known as the urban stream syndrome; a term used to describe the consistently observed ecological degradation of streams draining urban land (Walsh *et al.,* 2005).

In their 'natural' state, rivers and streams in the freshwater network make up a dynamic mosaic of complex and ever-changing habitat patches, sculpted and connected by water flow, sediment transport processes and interactions with riparian vegetation. While river engineering has benefits for the conveyance of floodwaters, urban development poses an enormous threat to the form and function of riparian systems through the construction of impervious surfaces and stormwater drainage systems, with implications for water quality (Gurnell, Lee & Souch, 2007).

It is clear that, for both rivers and streams, the preservation of ecological function requires freedom from stressors and connectivity to other high quality networks in the freshwater landscape (Merriam & Petty, 2016).

6.2.1 River Engineering

River engineering such as channel straightening, widening, deepening and reinforcement largely favours modifications designed for flood protection and navigation (Gurnell, Lee & Souch, 2007), rather than the provision of habitats for wildlife. Furthermore, the construction of weirs, sluices and culverts act as barriers to dispersal for both plant and animal species who rely on aquatic dispersal for gene flow. One example is the threatened European eel, who undertakes long migrations to complete their life cycle. Weirs also create an impounded reach of the river where sediment is able to build and degrade natural features, including valuable riffle habitat. Additionally, rivers and streams in the urban setting are more likely to be cut off hydrologically from natural floodplain or wetland areas, preventing marginal plants from establishing.

6.2.2 Urban Drainage Systems
Another key impact on rivers and streams has been the rise in impervious surfaces and urban drainage systems. The reduction of infiltration through natural processes contributes to surface runoff thus contributing to flood risk and pollution dispersal (Everard *et al.,* 2009). The risk of drought is simultaneously increased due to a reduction in groundwater recharge (Lerner, 1990; Paul & Meyer, 2001).

6.2.3 Artificial Lighting
Artificial light at night (ALAN) along the banks of rivers and streams can significantly influence the dynamics of both aquatic and terrestrial populations on multiple scales. The phenomenon is well documented across the trophic cascade, affecting everything from the primary plant productivity to insect behaviour and predator success (Sullivan, Hossler & Meyer, 2019). Thus, artificial lighting in the riparian zone should be limited wherever possible.

6.2.4 Riparian Deforestation
Riparian deforestation is associated with the narrowing of riparian channels and the reduction of habitat complexity within rivers and streams, especially for species who utilise woody debris for food, shelter and reproduction. Furthermore, forested catchments tend to have a wider and more natural configuration, and a higher capacity to support biodiversity and process pollutants with positive impacts on downstream catchments (Sweeney *et al.,* 2004; Valente-Neto *et al.,* 2015).

Riparian deforestation not only reduces habitat itself, but also reduces the quality of habitat due to loss of organic carbon in the system, loss of shade, increased temperatures, an increased risk of erosion and sediment loading, and a decreased buffering effect from pollutants. Although, it is important to note that over shading from trees prevents instream plants from establishing and thus, canopy cover should vary on the landscape scale.

6.2.5 Misconnected properties
Misconnected properties are those that have been incorrectly plumbed so that sewage and other wastewater, from sinks and dishwashers for example, flows directly into nearby rivers rather than to sewage treatment works. The main concern in relation to this issue is phosphate pollution leading to eutrophication, as well as impacts from other household pollutants.

6.3 Invasive Species
In any condition, rivers and streams serve as dispersal corridors for both aquatic and terrestrial organisms, allowing the delivery of ecosystem services into the wider landscape (de la Fuente *et al*, 2018). In pristine conditions, transportation is an essential service that facilitates colonisation and gene flow. In the modern

era, particularly in densely populated cities, rivers and streams can be dispersal highways for non-native and invasive species.

Common invasive plants in the Kingston context include Himalayan balsam, New Zealand pigmyweed and Japanese knotweed. These have the potential to dominate the landscape and out-compete native species. A number of strategies and trials have been developed by South East Rivers Trust in response to this crisis, including the biological control of balsam using the rust fungus, *Puccinia komarovii.* Invasive animals include the Chinese mitten crab, signal crayfish and American mink.

A major challenge for management is the interlinking role of a number of climatic and anthropogenic stressors that favour invasive species. Namely eutrophication, increased temperatures (exacerbated by the urban heat island effect), the physical alteration of waterways, introductions from household gardens and atmospheric pollution to name a few. All can decrease the resilience of native ecosystems and increase vulnerability to better adapted invaders (Kernan, 2015). Prevention, monitoring and control strategies are key aspects in regulating and mitigating the impacts of invasive species in the freshwater realm.

6.4 Climate Change

Native species can be sensitive to climate-related stressors including an altered flow regime, increased temperatures, increased salinity and as part of the anthropogenic response – water development activities in the form of canal and reservoir construction (Rahel & Olden, 2008). Again, due to their volume, urban streams are particularly susceptible to heightened average temperatures and seasonal fluctuations (Paul & Meyer, 2001).

The complex and synergistic relationship between climate change and existing pressures present novel challenges for river and stream management, so that desirable water quality can be achieved under the EU Water Framework Directive (Wilby & Perry, 2006; Kernan, 2015). Additionally, heavily modified rivers and streams are unlikely to have retained their natural features, such as back waters and meanders, that help to increase resilience to extreme weather events. Subsequently, there will be an expected increase in the incidence of drought and flood.

6.4.1 Drought

With a predicted rise in global temperatures, the current pressure on water as a resource is likely to escalate. Current water management practices may no longer be appropriate for preserving the quality of rivers and streams on which human wellbeing is so heavily dependent (Arthingon *et al.,* 2010). London for example is already classified as a seriously water stressed region with approximately 80% of its water being sourced from rivers (EA, 2007; Thames Water, 2022). In terms of ecology, drought can deplete oxygen to a fatal level, especially when periods of drought are followed by heavy rain (Kragh *et al.,* 2020).

6.4.2 Flood

The expected increase in extreme weather and heavy precipitation events, combined with altered hydrological regimes as a result of urbanisation, contribute to flood flows which flush fish and invertebrates from the river system. Maintaining backwater systems which act as refuge areas will be essential in mitigating the impacts of flood events on aquatic organisms. An increase in storm frequency will also have implications for surface runoff, pollution, sediment transportation and erosion.

In 2019, it was estimated that £1.1 billion of flood damage is currently being prevented by river barriers and defences in the UK (RMS, 2019). Nature-based solutions such as restoring river bends, restoring natural floodplains, introducing 'leaky' dams and planting riparian trees can also be used in flood management (Brown *et al.,* 2018), though any approach will need to consider the entire river catchment.

6.5 Lack of Knowledge

Given the heterogeneous character of rivers and streams, there are significant knowledge gaps in terms of understanding the relationships between various interlinking factors and pressures that are unique to local and regional catchments (Biggs, Fumetti & Kelly-Quinn, 2017). For example, the relationship between climate change, the potential distributions of invasive species and the subsequent effect on freshwater ecology (Kernan, 2015). Without quantifying the biodiversity of rivers and streams within the freshwater network, effective monitoring and management cannot be warranted. Furthermore, long-term studies are needed to characterise changes in physio-chemical and ecological conditions, as well as responses to management and land-use.

7 Conservation actions (Tabulated)

Action	Timeframe	Lead	Partners	Evidence base
RS01 – Work with existing catchment partnerships to identify key issues and share best practice. This may best be achieved by working in close coordination with one or more other groups.	2023 - ongoing	Catchment Partnership Chairs	Catchment Partnership Members	The Hogsmill - South East Rivers Trust Catchment Partnerships in London Group (CPiL) Catchment Partnership Action Fund - GOV.UK
RS02 – Identify opportunities to incorporate protections and improvements to rivers and their corridors through the planning system and borough mechanisms e.g. the Local Plan and the CIL.	2023 - 2028	RBK		RBK Local Plan RBK Community Infrastructure Levy Policy 2015 Tolworth Court Farm Moated Manor Management Plan - RBK

RS03 – Encourage the creation of new Friends groups where appropriate.	2023 - 2028	RBK		N/A
RS04 – Provide support to and increase awareness of citizen science programmes.	2023 - 2028	SERT, ZSL, KU	RBK	Outfall Safaris - South East Rivers Trust Citizen Science and Volunteer Monitoring Guidance - Rivers Trust
RS05 – Provide support to and increase awareness of river restoration and re-naturalisation projects.	2023 - 2028	SERT, Thames Water	RBK	The Hogsmill - SERT Beverley Brook - SERT
RS06 – Continue to target the removal or mitigation of significant fish and/or eel migration barriers.	2023 - 2028	SERT, EA, Thames Water	RBK	Hogsmill Connectivity Project - South East Rivers Trust
RS07 – Evaluate the key issues regarding invasive species and target the removal or reduction of priority species. Consider this on the catchment scale.	2023 - 2028	SERT	RBK	Invasive Non-Native Species - South East Rivers Trust
RS08 – Work with RBK and others (such as the EA) to incorporate new and/or enhanced policy approaches to key concerns and opportunities such as river restorations; misconnections; hard standing; invasive species etc.	2023 - 2028	EA	RBK	N/A

RS09 – Work to develop a biodiversity rich approach to SuDS schemes through the planning system.	2023 - 2028	RBK	SERT	Sustainable Drainage Systems - Thames21
RS10 - Promote and support sustainable drainage and blue-green infrastructure projects.			RBK, SERT	See **RS09**
RS11 – Work with organisations to better understand the impact of road run-off on the river ecosystem.	2023-2028	TfL, HE, SERT, ZSL, EA	RBK	Road Runoff Project - Thames21, ZSL, EA, TfL, GLA
RS12 – Ensure that floodplain habitats such as wet meadow, river valley ponds and scrapes, and wet woodland are included in active management plans.	2023 - 2028	RBK		Urban Wetland Design Guide - ZSL Urban Wetlands Replenish Project - Thames 21 Case Studies - European Centre for River Restorations Riparian Vegetation Management - Best Practice Guide River Restoration and Biodiversity
R13 - Work with partners to reduce the frequency of pollution incidents.	2023 - ongoing	SERT	RBK	See **RS04** & **RS11**

R14 - Ensure that abstraction in the Hogsmill and Beverly catchments is sustainable and does not negatively impact the health or recreational value of the rivers or their tributaries.	2023 - ongoing	SERT, SES Water, Thames Water, EA	RBK	N/A
RS15 – Encourage and promote reintroduction and recovery schemes for flagship species that utilise rivers and streams but are currently rare or extinct in RBK.	2023 - ongoing	ZSL, CZ	RBK	Returning Water Voles to the Hogsmill - Citizen Zoo London Beaver Working Group - Citizen Zoo Restoration of Freshwater Pearl Mussel Streams - WWF
RS16 - Promote means to more effectively monitor and assess the value of the river system through mechanisms such as RMI monitoring; outfall safaris; Urban River Surveys etc. Support the implementation of at least one per annum	Monthly RMI counts by Citizen Scientists	RBK, Community Led	EA, TW, ZSL, TLS	N/A
Engagement & Awareness	**Timeframe**	**Lead**	**Partners**	**Evidence base**
RS17 – Develop an annual programme of river and stream focussed events, to raise awareness of key issues, and the benefits of healthy river systems.	2023-2028	RBK		N/A

8 Planning Context - Biodiversity Net Gain

In the UK, a planning condition is defined as ‘a constraint placed on the granting of planning permission which allows development to go ahead only if the conditions are satisfied’. When used properly, conditions can enhance the quality of development and enable it to proceed where it would have otherwise been necessary to refuse, by mitigating the adverse effects. As an automatic condition of the Environment Act 2021, applicants will need to measure the existing and proposed biodiversity values of their sites before development begins in order for permissions to be granted.

As a priority habitat for the borough, rivers and streams should be protected through the planning system and, where possible, habitat creation and enhancement is encouraged. Backwaters and floodplains should also be considered as part of the river and stream ecology. As part of the new conditions, if the loss of a habitat cannot be avoided appropriate mitigation and compensation actions must be taken, with a minimum of 10% biodiversity net gain (calculated using The Biodiversity Metric 3.0). Additionally, these biodiversity enhancements must be secured for a minimum of 30 years. Reaches of adjoining priority habitats, such as woodland and grassland, may form an integral part of river and stream conservation management.

The new Biodiversity Net Gain (BNG) policy does not trump other environmental policies, meaning irreplaceable and locally important habitats should remain protected from development and are not to be insufficiently replaced with newly created habitats. The delivery of BNG through landscaping and green infrastructure is preferred onsite. Where onsite improvements are not possible measurements must be delivered off site on land holdings or via habitat banks, or as a last resort, through the purchase of statutory biodiversity credits.

9 Monitoring

Metric	Process of Monitoring	Timeframe	Lead	Partners
RS01, RS04, RS05, RS06, RS07, RS08, RS09, RS10, RS11, RS13, RS15 - Number of collaborations made with existing partnerships / organisations	Ad hoc, Annual report	2023 – 2028	RBK	
RS02 – Number of protections introduced through the planning system and borough mechanisms	Annual account	2023 – 2028	RBK	

RS03 - Number of new Friends groups created	Annual account	2023 – 2028	RBK	
RS04, RS15, RS16 - Number of monitoring programmes supported / undertaken	Ad hoc, Annual report	2023 – ongoing	RBK	
RS01, RS05, RS06, RS07, RS09, RS10, RS12, RS15 - Number of habitat enhancement projects supported / undertaken	Ad hoc, Annual report	2023 – ongoing	RBK	
RS09 - Number of SuDS created through the planning system	Annual report	2023 – ongoing	RBK	
RS12 – Number of floodplain habitats newly incorporated into active management plans	Annual report	2023 – 2028	RBK	
RS14 – Number of events where abstraction negatively impacts the health or recreational value of the Hogsmill or Beverly	Annual report	2023 – 2028	RBK	
RS17 - Number of events held and number of attendees	Post-event press releases	2023 – 2028	RBK	

10 Other relevant HAPs/ SAPs

a. Amphibians
b. Badger
c. Bats
d. Swift
e. Water Vole
f. Grassland
g. Standing Open Water
h. Woodland

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12 Abbreviations

BBP: Beverley Brook Partnership
CIL: Community Infrastructure Levy
EA: Environment Agency
GLA: Greater London Authority
HE: Highways England
KU: Kingston University
RMI: River Monitoring Initiative
TfL: Transport for London
TW: Thames Water
RBK: Royal Borough of Kingston
SINC: Sites of Importance for Nature Conservation
SERT: South East Rivers Trust
SuDS: Sustainable Drainage Systems

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14 Appendix

Appendix A. SINC designation status of RBK sites with rivers and streams.

Site	Habitat	SINC Designation
Edith Gardens Allotments	River	Local
Chessington Wood	Stream	Borough (Grade 1)
Coombe Wood	River	Borough (Grade 2)

Hogsmill Valley	River	Borough (Grade 1)
Tolworth Court Farm Fields and Medieval Moated Manor	River	Borough (Grade 1)
Castle Hill and Bonesgate Open Space	River	Borough (Grade 1)
Bonesgate Stream	Stream	Borough (Grade 2)
Bonesgate Open Space (ext.)	Stream	Unspecified / Proposed Local
Beverley Brook in Kingston	River	Borough (Grade 2)
Riverhill House	River	Borough (Grade 2)
Raeburn Open Space	Stream	Borough (Grade 2)
Hogsmill River in Central Kingston	River	Local
Malden Golf Course and Thames Water Pipe Track (Kingston)	River	Borough (Grade 1)

Appendix B. Table of legislation relevant to Rivers and Streams.

Act	Description
The Rivers (Prevention of Pollution) Act 1961	Makes provisions for maintaining or restoring the wholesomeness of rivers and other inland/coastal waters
The Environmental Protection Act 1990	Brings together the system of integrated pollution prevention and control (IPPC)
The Water Resources Act 1991	Regulates water resources, water quality, pollution and flood defence
The Water Industry Act 1991	Sets out the main powers and duties of water and sewerage companies

The Land Drainage Act 1991	Sets out the functions of boards and local authorities in relation to land drainage and requires that a watercourse be maintained by its owner in such a condition that the free flow of water is not impeded
The Clean Neighbourhoods and Environment Act 2005	Provides local authorities with more effective powers to tackle poor environmental quality and anti-social behaviour. In particular: nuisance and abandoned vehicles, litter, graffiti, waste, noise and dogs
The Flood and Water Management Act 2012	provides comprehensive management of flood risk/coastal erosion, creates safeguards against rises in surface water drainage charges and protects water supplies for consumers
The Water Act 2014	the aim of this Act was to reform the water industry to make it more innovative and responsive to customers and to increase the resilience of water supplies to natural hazards such as droughts and floods
The Environment Act 2021	The Act includes provisions to strengthen and improve the duty on public bodies to conserve and enhance biodiversity, including mandating a net gain biodiversity through the planning system