The London Mayor and the Greater London Authority (GLA) have a vision for developing London as an ‘exemplary sustainable world city’. This document highlights how and where river restoration can play an integral part in realising that vision.

The Government’s Urban White Paper, published in November 2000, the Mayor’s forthcoming draft London Plan and the political drivers that support these strategies have brought sustainable urban regeneration to the fore.

River restoration can play a positive role in urban regeneration and the creation of sustainable urban communities through delivering a wide range of social and environmental benefits for all. These can include:

- Attractive, safe and accessible greenspace
- A diversity of natural habitats
- A community focal point promoting improved environmental awareness
- Walking and cycling routes for sustainable transport
- Improved health and well-being
- An invigorated area to help attract business and investment
- A natural river channel that is connected to its floodplain
- Improved biodiversity in the urban environment
- Habitats for some of London’s key biodiversity species
- Improved flood storage capacity that reduces flood risk in the urban environment
- Water quality improvements

River restoration will not be possible along the entire length of South London’s rivers but this document seeks to highlight the ‘areas of immediate opportunity for river restoration’. It also seeks to promote the potential for enhancement of river corridors in areas of regeneration where culverted or channelised rivers pass through proposed development sites. Maps to highlight ‘development zones’ with potential for river restoration will be produced over the coming months for all the river catchments in London. These maps will help to highlight to local authorities and developers the potential for river restoration in London. The aim being that river restoration will eventually be considered as an integral part of any regeneration or development proposal within the river corridor.

The principles in this document are equally valid for the whole of London. It now just requires the maps to be produced for the other catchments in London, this will be done later in the year.

The Environment Agency and our partners strongly believe that regeneration incorporating river restoration actively promotes a more environmentally sustainable approach to design and planning. This will help to create a more attractive, safe and accessible urban environment that all local people can value and take pride in.
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There is a willow grows aslant a brook
That shows his hoar leaves in the glassy stream;
There with fantastic garlands did she come,
Of crow-flowers, nettles, daisies and long purples.

William Shakespeare, Hamlet, IV. vii

Ophelia by Sir John Everett Millais
©Tate, London 2002
The river scene was painted on location on the Hogsmill at Ewell (1851-1852)
Introduction

I see what was, and is, and will abide,
Still glides the stream and shall forever glide

William Wordsworth

Rivers and People
Throughout history, rivers have been a central feature in the development of human societies – the vast majority of our towns and cities are associated with rivers. This relationship has developed because of their social and recreational value to communities as well as for the opportunities they present for practical exploitation and economic development. However, as our societies have become increasingly urbanised the pressures placed on rivers have become ever greater. The development of London around the Thames and its tributaries provides a quintessential example of man’s affinity for, and exploitation of, the river.

Trials and Tribulations of Urban Rivers
The increase in the density and extent of urbanisation in Greater London has increased the pressure on our river environment. Rivers are naturally dynamic systems, continually moving and interacting with their floodplain. This has, unfortunately, placed them in direct conflict with the process of urbanisation. Once urban development moved into the floodplain, rivers were heavily modified to allow maximum land take and to provide the subsequent flood protection that these new developments required.

During the 1900s the traditional approach to flood defence and river management was to ‘take the river out’ of river management and straighten it within concrete channels or culverts. This process, which is akin to putting them in a strait-jacket, results in a uniform and sterile channel of negligible ecological or social value and high long-term maintenance costs. Some rivers such as the Fleet, Tyburn and Effra, have been lost altogether, pushed underground to become part of the city’s sewage system.

Increasing urbanisation has resulted in the gradual loss and degradation of natural habitats, such as river corridors and green open spaces, throughout London. Landscape assessment surveys on the rivers of South London have highlighted the legacy left by this type of insensitive river management. The results of the Ravensbourne landscape assessment showed that 63% of the river channel is highly modified, by containment in either a culvert or concrete channel.

The water quality in South London’s rivers has improved over the last 10 years, but without accompanying improvements in the habitat quality of the river corridor, the ecological and social value of these rivers will never be realised.
Rivers and their Contribution to Urban Life
In urban areas rivers can provide important natural refuges and corridors between adjacent green spaces, for both people and wildlife. These river corridors are not only critical for maintaining the diversity and abundance of urban wildlife populations, but they also provide a place for people to connect with nature and escape from an urban environment which can otherwise be stark and impersonal. As London’s population is expected to rise over the next 15 years the requirement for sufficient quantity of good quality, accessible open space is likely to become an increasingly important issue which can actually be addressed, in part, by river restoration.

Helping our rivers to return, in parts, to nature will provide a real opportunity for city dwellers to re-establish a lost relationship with the natural world and improve the quality of their lives. And nature is not income dependent. Across the board, people from Wimbledon to Lambeth will be able to reap the benefits.

Rivers as a Measure of Sustainable Development
The quality of our urban rivers should be an important yardstick in measuring our progress towards this goal.

This Strategy aims to:
- demonstrate to London boroughs and others the potential for river restoration in South London by identifying ‘areas of immediate opportunity for river restoration’
- highlight the environmental, social and economic benefits that can accompany river restoration
- promote the role that river restoration can play in sustainable urban regeneration
- highlight and develop the proposals on river restoration in both the Mayor’s Biodiversity Strategy and the expected policy on tributaries of the Thames in the forthcoming draft London Plan or Mayor’s Spatial Development Strategy
- encourage and inform those groups who already have an interest in river restoration

Rivers and the Opportunity for Restoration and Regeneration
The drive for urban regeneration and renewal is gathering pace and is now well supported by an array of political drivers and funding streams that have been developed by the UK Government and Europe. There now exists a great opportunity for river restoration to capitalise upon this political commitment and financial support for sustainable regeneration.

A sustainable approach to regeneration represents a real opportunity for us to re-discover our relationship with the natural world by ‘putting the river back’ into river management and, in doing so, make a huge contribution to improving the quality of urban life.
River restoration schemes have five broad environmental objectives that benefit humans as much as wildlife. By evaluating and measuring each scheme against these objectives it is possible to deliver a range of integrated environmental benefits.

The objectives are sequential and need to be considered together; by achieving one, you contribute to the next.

Re-establish Natural Channel Processes within the River Corridor
The creation of a natural river channel, a gravel bed and earth banks, re-establishes the natural hydro-geological relationship between the river and its channel. A process of erosion and deposition gradually creates a natural diversity of instream river habitats, such as riffles and pools, for river life.

Improve the Quality and Role of the River Corridor
Creating a natural channel within the river corridor - the river and its associated greenspace, such as riparian corridor and floodplain – provides a connection between the river and its corridor once again. The corridor plays a very important role in contributing to the abundance and diversity of both aquatic and terrestrial habitats within the river corridor. These habitats provide refuge areas for aquatic life during extreme events, such as high and low flows or pollution incidents. This provides a natural corridor for wildlife movement that links adjacent green spaces in the city and thereby helps to sustain healthy and viable wildlife populations.

Improve Flood Storage Capacity
Re-instating the floodplain provides a natural increase in the flood storage capacity of the site, providing improved flood protection for adjacent properties. The use of the floodplain for storing floodwater reduces the volume and velocity of water in the main channel during peak flows and contributes towards flood protection.
downstream. The reduction in water speed during flood events is also important in ecological terms because it reduces the risk of aquatic and riverside flora and fauna being washed away. The wetlands that may be constructed as part of a restoration scheme can also improve water quality by intercepting run-off and filtering out pollutants before they enter the river.

**Improve Biodiversity within the River Corridor**

Creating a variety of aquatic and terrestrial habitats within the river corridor is the first part in improving the biodiversity of the site. As the habitats develop and mature, they are gradually colonised by a variety of flora and fauna. The river channel and its aquatic and marginal vegetation provide habitats for fish and aquatic insect larvae. A high quality riparian corridor with its diverse vegetation provides habitats for riverine animals, such as water voles, dragonflies and kingfishers. Any wetland and pond areas in the floodplain provide additional valuable habitats that will be colonised by different plant and animal species.

**Encourage Community Involvement and Improve People’s Understanding of the Function and Value of Rivers**

Involving local people in developing river restoration projects brings opportunities for public participation in regeneration. This often helps to meet the social needs of the community, by providing improvements to local quality of life through additional greenspace, traffic-free cycleways and footpaths and considerable improvements to the visual appearance and accessibility of the local environment. Not only this but it engenders a sense of place, community spirit and pride, values which are increasingly rare in today's urban societies.

**Completing the Urban River Renaissance**

The water quality in the rivers of London used to be so bad that it was the primary limiting factor to enhancing biodiversity and improving the recreational and aesthetic value of the river corridor. Over the last 10 years, considerable time and money has gone into improving the water quality in these rivers. It has improved so much that the primary limiting factor is now habitat quality and the physical constraints imposed upon rivers. For urban river corridors to realise their potential for biodiversity, conservation and recreational provision, and to justify the money spent on improving water quality, there has to be a commitment to deliver the wider benefits available through a programme of river restoration.

Learning about the river
The social benefits of river restoration for a local community can be numerous and far reaching, but only if local people are actively involved in developing the aims of the project. Urban rivers represent a valuable social and environmental asset that should play a crucial role in the drive for sustainable urban communities.

It is one of the aims of the Mayor's Biodiversity Strategy that all Londoners should be within walking distance of a quality and accessible natural place. River restoration certainly offers London boroughs a chance to create many accessible and quality natural places within London. The catchment maps, in the next section, illustrate where the “areas of immediate opportunity for river restoration” are within South London.

Attractive, Accessible and Safe
"Squiggly bits are cool." “The area where the river meanders looks attractive.” *

The physical improvements to a site provide people with a visually pleasing and easily accessible experience. Developing better and safer access to the site, for groups such as the elderly, disabled and children, helps to open the area up to the socially excluded and more vulnerable groups in a community.

The unique variety of habitats and wildlife associated with a natural river corridor make these environments particularly special for communities in highly urbanised areas who may have few opportunities for regular contact with nature.

Furthermore visually stimulating and accessible sites create the perception of a much cleaner and safer environment. This often contrasts with many people's experience of much of our municipal urban green space which often comprises of an unimaginative and unappealing combination of mown grass and scattered trees.

Peace and Action
“The children like the meanders, they imagine they are on a desert island.” *

A variety of accessible and attractive environments provide local people with a range of recreational and amenity opportunities.

These opportunities include: walking, jogging, cycling, playing, dog walking, picnics, feeding the ducks and connecting with nature.

Such areas are highly valued by children as play areas because they provide new and exciting natural environments, ripe for exploration and adventure. Properly restored river corridors, redesigned with people in mind, can be safer than the concrete drainage channels that frequently pass for rivers in many urban locations.

Health and Happiness
"It was a channel for conveying water and preventing flooding. Now it is an interesting place to visit.” *

The wide range of active and passive recreational opportunities available in the restored area, can have a positive effect on the health and well-being of the local community.

Providing an attractive and safe place to go away from traffic and fumes can encourage people to start exercising more. These areas also provide a natural sanctuary, away from the hustle and bustle of city life, where people can relax, slow down and unwind.

Sustainable Transport
"Looks more like a river than a canal.” *

These new environments can contribute to a borough’s sustainable transport plans by providing safe walking and cycling routes to the town centre or between other popular places in the area. In South-East London, the Green Chain initiative works to provide and develop natural corridors between adjacent green spaces.
The River as Teacher
“You feel you have a bit of countryside in town.” *

The improved natural environment and its wildlife can provide valuable opportunities for formal and informal learning, helping develop people’s appreciation of their local environment and raising their awareness of environmental issues. It can also help to lessen the cultural gap between town and country.

On-site interpretation can provide information about the new site and the habitats and wildlife that can now be found there.

Local schools can run field trips for students to learn about their local river and its associated pond and wetland environments.

Connecting People and the Community
“You see more people walking on a spring evening. The river is more open and you can see more. The wildlife has attracted people.” *

As more people use the site, it starts to be seen as a safe place to visit and this will encourage others. As this happens it begins to provide a focal point for local people and helps to promote a sense of community.

If people develop appreciation for their river environment they will begin to protect and care for it.

The creation of a more attractive river environment as part of an overall regeneration programme can help local economic development by attracting businesses into a new and invigorated area. There is an increasing demand for quality riverside developments in both the commercial and domestic sectors; the incorporation of river restoration within such developments provides an attractive and distinctive urban environment. Sustainable riverside development has become an integral part of many urban regeneration schemes throughout the country.

Geographic Coverage

This document looks at the potential for river restoration on four river catchments in South London – the Ravensbourne, Wandle, Beverley Brook and Hogsmill (see map), similar maps conveying the same information on the other rivers in London will be produced in the near future. This will not include the ‘lost rivers’ of London e.g. Effra. The area covered, at present, extends along the River Thames from Kingston-upon-Thames to Greenwich in the North, to the North Downs and the towns of Caterham and Warlingham in the South and from Epsom in the West to Bromley in the East.

Each of these rivers have their source at or near the spring line of the North Downs, which is where the porous chalk of the North Downs meets the impervious London Clay. This spring line runs West to East across South London through Epsom, Sutton, Croydon and Orpington. From each of their sources these rivers then flow in a northerly direction towards their respective confluences with the River Thames. The Ravensbourne flows into the Thames at Deptford, the Wandle at Wandsworth, the Beverley Brook at Barn Elms, near Putney, and the Hogsmill at Kingston-upon-Thames.

As mentioned, the principles in this document are equally valid for the whole of London and maps will be created, in the near future, for each of the other catchments in London to highlight the ‘river channel types’, ‘areas of immediate opportunity for river restoration’ and ‘zones of development’.

A typical channelised river running through a park

A restored section of river in Wandle Park, Colliers Wood
Maps to Illustrate ‘River Channel Types’ and ‘Areas of Immediate Opportunity for River Restoration’

This section contains two maps for each river catchment. The first highlights the existing river channel types, categorised by landscape assessment surveys, and the second highlights where the ‘areas of deficiency for nature conservation’ and ‘areas of immediate opportunity for river restoration’ are in each catchment. It is hoped that local authorities and developers will use these maps to assess where development proposals are in relation to the river corridor so that during development and regeneration the opportunity for river restoration is not overlooked.

Channel Type Definitions

Culverted Rivers
The river flows underground within either a brick or concrete chamber

Artificial Channel
Either the banks and/or bed of the river comprise of a man made material

Toe-boarded Channel
Wooden planks have been attached to the base of the riverbank

Semi-natural (straightened)
The bed and banks comprise of natural material, but the river has been straightened

Semi-natural (meandering)
The bed and banks comprise of natural material, and the course of the river has not been changed

Areas of Deficiency for Nature Conservation
Areas more than 1 km from accessible wildlife sites that qualify as Sites of Borough Importance for Nature Conservation as shown in the Handbooks on Nature Conservation in the boroughs of Kingston-upon-Thames, Sutton, Merton, Lewisham, and Greenwich published by the former London Ecology Unit between 1993 and 2000, plus surveys of the London Borough of Wandsworth in 1992 and London Borough of Bromley in 2000.

Areas of Immediate Opportunity for River Restoration
Modified channels within open space and in the public realm.