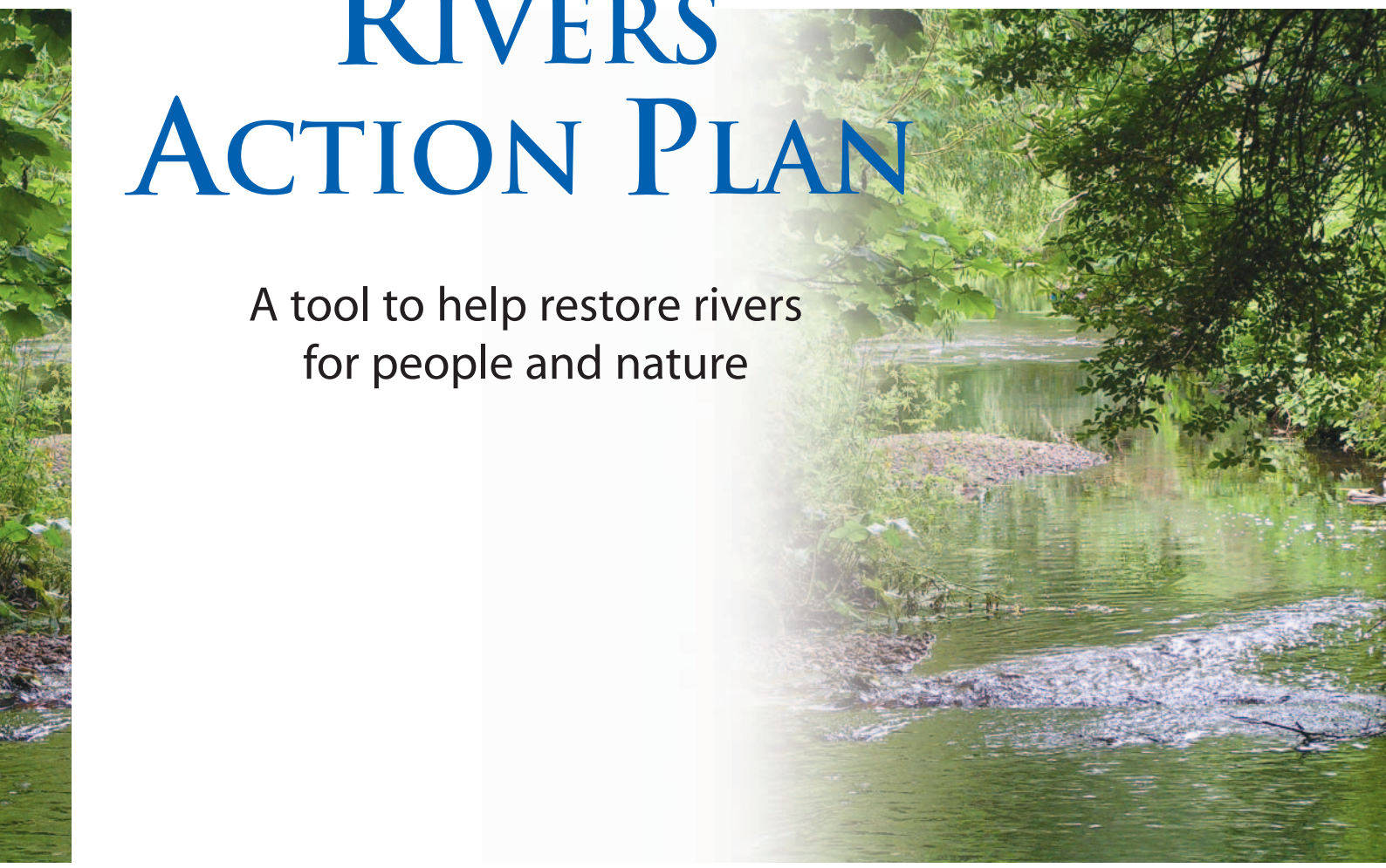
The London Rivers Action Plan



A tool to help restore rivers
for people and nature

January 2009

www.therrc.co.uk/lrap.php

Acknowledgements

Steering Group

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Photo acknowledgements

We are very grateful for the use of photographs throughout this document which are annotated as follows:

[1] Environment Agency
[2] The River Restoration Centre
[3] Andy Pepper (ATPEC Ltd)

How to use this guide

This booklet is to be used in conjunction with an interactive website administered by the The River Restoration Centre (www.therrc.co.uk/lrap.php). Whilst it provides an overview of the aspirations of a range of organisations including those mentioned above, the main value of this document is to use it as a tool to find out about river restoration opportunities so that they can be flagged up early in the planning process. The website provides a forum for keeping such information up to date.

Who should use this guide

Anyone who has an interest in improving the wildlife and amenity value of a river. It should be of particular interest to community groups, local businesses, planners and developers all of whom should be working together with the key agencies to achieve the five key aspirations outlined in this document.

Links with other documents

Neither the printed document nor the website should be seen as a stand alone information pack. ***Page 20*** of this document provides a list of valuable further information.

Contents

Foreword

The River Thames is an iconic symbol of London. The City was founded on the Thames, which together with its tributaries, forms a Blue Ribbon Network that stretches into every one of London's 33 boroughs. These tributaries provide corridors of green landscape, offering habitats for wildlife and opportunities for outdoor recreation, close to local communities.

The Thames itself has been hugely improved over the past century. However, the condition of many of its tributaries leaves much to be desired. Many of London's rivers are constrained by heavily-engineered channels that were constructed in the 20th Century to combat flooding and facilitate urban development.

The 21st Century will be shaped by climate change and the need for more sustainable approaches to urban living. The modern challenge is to restore and improve London's rivers in ways that improve flood risk management; support sustainable regeneration; enhance wildlife habitat; help the city adapt to a changing climate and, by so doing, contribute to a better quality of life for Londoners.

Over the past 15 years, some 22 kilometres of tributaries have been improved or restored, bringing benefits to people and wildlife. Now it is our ambition to step up the rate of river restoration. This plan, known as the London Rivers Action Plan (LRAP), will drive the process forward by highlighting opportunities and providing practical guidance to local authorities, developers, Non Government Organisations (NGOs), community groups and others.

Working together, we aim to provide future generations with revitalised watercourses that play a central role in a sustainable London.

Signed

Boris Johnson
Mayor of London

Howard Davidson, Regional Director
Environment Agency

Alison Barnes, London Regional Director
Natural England

Robert Oates, Director
Thames Rivers Restoration Trust

Glyn Davies, Director of Programmes
WWF-UK

Carlo Laurenzi, Chief Executive
London Wildlife Trust

Karen Fisher, Chairman of Directors
The River Restoration Centre

Introduction

This Action Plan has been developed to provide a delivery mechanism to take forward London's river restoration strategies - "A strategy for restoring rivers in North London" (2006) and "River restoration - a stepping stone to urban regeneration highlighting the opportunities in South London" (2002). These strategies have been very successful in stimulating river restoration across the London area. This plan will build upon their success and look for river restoration opportunities that will benefit people, businesses and wildlife by putting river corridors at the heart of regeneration and renewal through the enhancement of riverside parks, green spaces and the built environment.

The main aim of this London Rivers Action Plan (LRAP) is to provide a forum for identifying stretches of river that can be brought back to life. This can be done by improving river channel or riparian habitats, by removing or modifying flood defence structures where safe to do so, or by reclaiming 'lost' rivers currently buried under the Capital's surface. Nearly 100 projects have been identified with numerous large scale projects on the Lee, Wandle, Ravensbourne, Crane and Roding catchments.

This document focuses primarily on restoration opportunities along the non-tidal freshwater tributaries in the context of the planning process and the Mayor of London's aspirations for all Londoners to have access to high quality natural green spaces. However, it also recognises the contribution of other organisations that have specific restoration related roles along the River Thames and its estuary. ***See page 20***.

The plan

- Supports the delivery of the Thames River Basin Management Plan under the Water Framework Directive;
- Contributes to sustainable regeneration through the implementation of the Blue Ribbon policies (Chapter 4C of the London Plan);
- Contributes to the implementation of the Mayor's access to nature aspirations;
- Supports one of the London Plan's biodiversity targets to restore 15km of river by 2015;
- Supports the delivery of the Environment Agency's Thames Catchment Flood Management Plan.

Note:
All of the weblinks relating to the above strategies and others discussed within this document can be found on ***pages 10–14***.

Five key aspirations

1) Improve flood management using more natural processes;

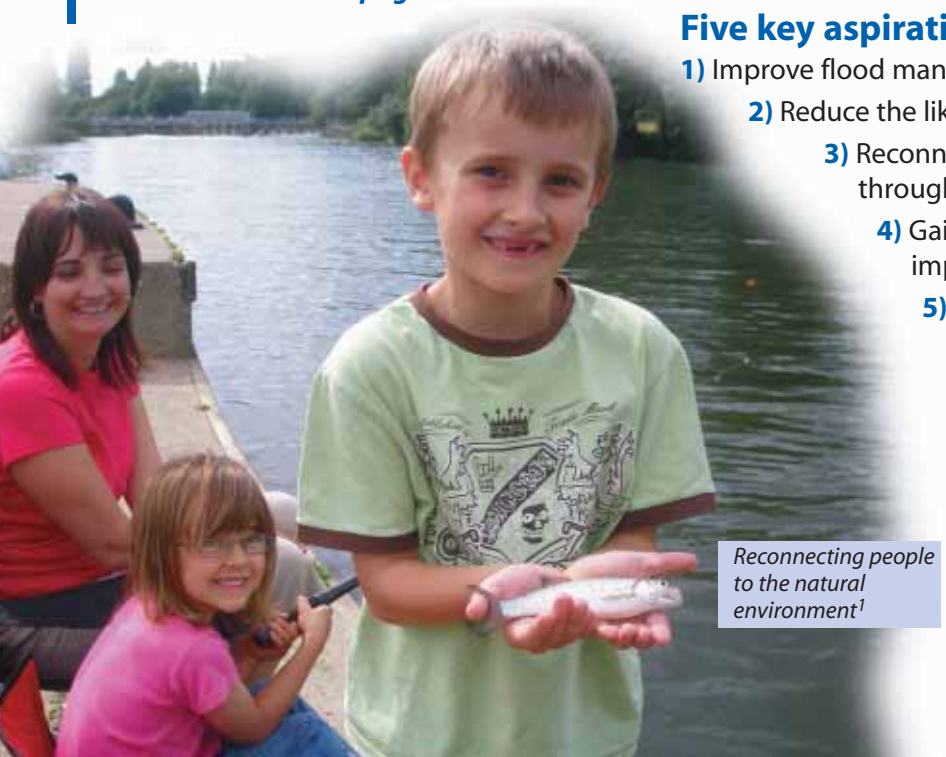
2) Reduce the likely negative impacts of climate change;

3) Reconnect people to the natural environment through urban regeneration;

4) Gain better access for recreation and improved well-being;

5) Enhance habitats for wildlife.

This document provides an overview of the plan. Detailed information on restoration sites and opportunities is held on the associated LRAP website (**www.therrc.co.uk/lrap.php**) where opportunities and activities will be geographically referenced and periodically updated.



Reconnecting people to the natural environment[1]

New approaches to flood risk management

In London and other urban centres where buildings encroach to the edge of the rivers, flood risk has often been managed by encasing rivers in concrete with many culverts. These constraints result in river maintenance difficulties and reduce the ability of channels to cope with increasingly intense summer storms. Many concrete-lined channels were designed to accommodate major flooding (i.e. every 20 – 30 years). This may no longer be adequate due to predicted climate change impacts.

Space for floodwater

Making space for water during flood conditions at Chinbrook Meadows, River Quaggy[1]

Flood risk managers are now committed to creating space for floodwater where possible through river restoration activities, in line with government policy outlined in the DEFRA document "Making Space for Water". To achieve this will require the creation of long-term master plans to ensure that functional floodplain creation is linked to regeneration activities through the planning control process. This needs partnerships. DEFRA's Planning Policy Statement 25 (PPS25) provides a policy framework to enable the Environment Agency, the London boroughs, developers and local communities to work together to ensure that flood risk is taken into account at all stages of the planning process and help to direct development away from areas of highest risk.

Thames catchment flood management

- Up to 80% of the floodplain in the Thames area is developed and flood risk will increase unless we take radical steps to improve flood management;
- There are approximately 45,000 properties at risk from a flood that, on average, would be expected to occur every 100 years;
- Most of these flood-prone properties are located in socially-deprived areas;
- When flooding occurs it results in surface water, sewer and fluvial flooding often within minutes of heavy rainfall;
- Because of these rapid occurrences at any time of the year, flood warning time is short;
- The UK Climate Impacts Programme (UKCIP) predicts that flood risk in the Thames basin will increase due to climate change.

River restoration is promoted within the Environment Agency's Thames Catchment Flood Management Plan and is recognised as an essential measure in reducing flood risk across London.

Some projects have incorporated innovative ways of designing-in better, more natural flood management. Sutcliffe Park on the River Quaggy was an area where floodwaters could be stored and is an example of where wetland and river habitat have been added as part of river restoration with benefits for local residents. ***See page 18***.

Sutcliffe Park: New approaches to flood risk management[1]

Adapting to climate change

Climate change brings the threat of increasing temperature, more intense air and water pollution, increased episodes of droughts and floods, and loss of wildlife. It may also result in a poorer quality of life, particularly for people living in degraded urban areas. Even if all possible steps were taken today to reduce the emissions of carbon dioxide and other greenhouse gases, past human activities will bring inevitable climate change for fifty years or more. There is an urgent need to demonstrate how society can adapt to this change.

Impacts on river systems

The predicted scenarios of wetter winters, drier summers and increased temperatures will have a profound impact on rivers. Excessive fluctuations in flow (from trickle, to flood, as a result of drought or downpour), water temperature and water chemistry will have a significant impact on the management of flooding; the timing of natural events (such as fish spawning periods); and people's opportunity to enjoy and access riverside walkways and green spaces.

To date, extreme flood and drought events have been relatively infrequent in London and river systems usually recover. However, if the frequency and intensity of these events increase as predicted, then the cumulative impacts will reduce the ability of river systems to recover, especially where they are confined to a narrow corridor.

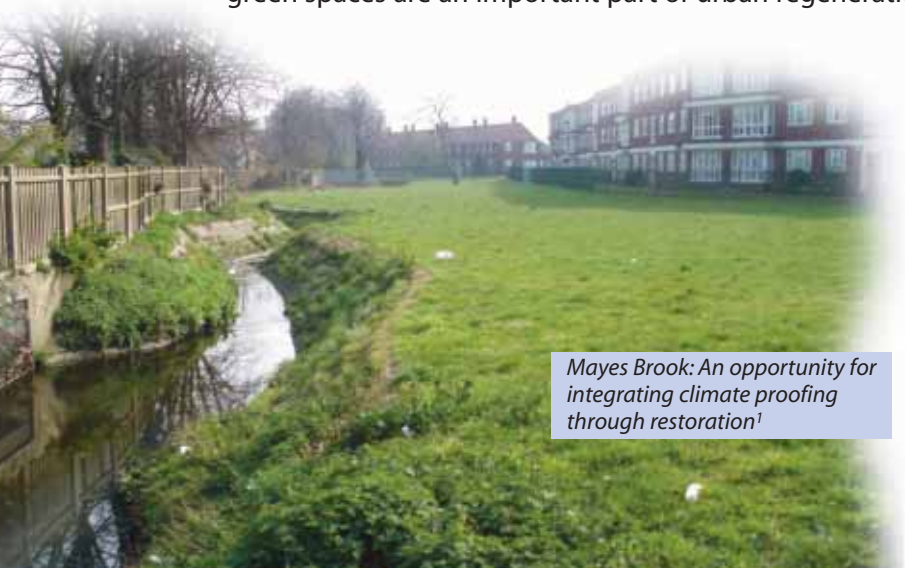
River Ravensbourne at Norman Park, during drought conditions[1]

Restoration to manage climate change

River restoration, as part of a package of changes to the way we design and manage the green spaces in London, can make a significant contribution to lessening the unpleasant impacts of climate change for both humans near rivers and the wildlife that relies on the habitats they provide.

Building climate change adaptation into river restoration projects can produce multiple benefits including:

- Better flood management;
- Improving habitats and corridors for river wildlife;
- Ensuring that urban development recognises that rivers and associated green spaces are an important part of urban regeneration.



Mayes Brook: An opportunity for integrating climate proofing through restoration[1]

Climate change is the new challenge for river restoration in urban areas. The Mayes Brook, Barking, Essex has been identified as an opportunity to demonstrate best practice river restoration principles that integrate climate proofing with other key aspirations outlined in this document. ***See page 12***.

Linking people to nature through urban regeneration

Providing high quality green space in urban environments is at the heart of sustainable regeneration and renewal. Just as it is critical to maintain and enhance the built environment and its supporting infrastructure, it is vital to maintain and enhance a city's green infrastructure.

Cornmill Gardens: A river encased in concrete and disconnected from its surrounding environment[1]

Planning-in opportunities

Major river restoration is, in part, dependent upon urban regeneration, for it is often when an urban area is being transformed that significant opportunities arise. Indeed, river restoration is sometimes a prerequisite to urban regeneration as improved, more sustainable flood management, or a better local environmental quality, are seen as integral to transforming social and economic conditions.

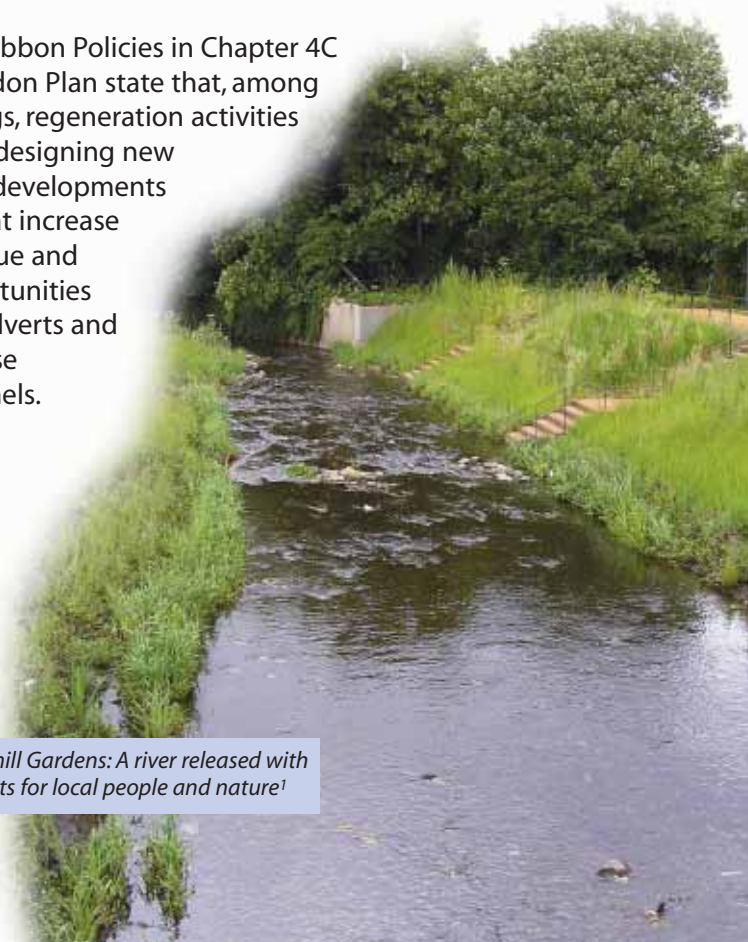
Great crested grebe: Connecting people to nature in London[1]

Creating an identity

Restored rivers can be instrumental in creating an identity for a newly-regenerated urban area. A sense of place can be established that enables people to connect with each other and connect with their neighbourhood.

The Blue Ribbon Policies in Chapter 4C of the London Plan state that, among other things, regeneration activities should be designing new waterside developments in ways that increase habitat value and take opportunities to open culverts and re-naturalise river channels.

The opportunity to naturalise rivers and encourage local communities to establish a place of which they are proud, has been demonstrated in a number of places within London. At Cornmill Gardens, Lewisham, an open space adjoining a new housing development, has provided residents with better access to the River Ravensbourne, a river now released from its concrete walls. ***See page 15***.



Cornmill Gardens: A river released with benefits for local people and nature[1]

Connecting with the natural environment

More than 80% of the UK's population now live in cities. Limited open spaces in many residential areas and busy lifestyles have resulted in a greater need for public green areas in which to relax and reflect.

Such areas can offer a much needed change of scenery but work best when they are visually diverse and welcoming. People rightly expect their local open spaces to offer a wide range of services such as sports and play facilities, as well as opportunities to experience wildlife. If designed and managed sympathetically, they can also offer an opportunity to interact with the surrounding natural world.

Opportunities to improve well-being

Restoring rivers enhances the quality of parks and urban green spaces by providing wildlife rich areas, often replacing unappealing hard-engineered drains. Restored rivers can create positive and dramatic changes by making the waterway a central feature. The sight and sound of running water and the feeling of being closer to nature can all help to improve mental well-being by relieving anxiety and helping people to relax and unwind.

Fishing platform provides an ideal opportunity for people to connect with the natural environment[1]

River corridors for people and wildlife

If green spaces are adopted by local communities and well cared for, they can provide safe and attractive spaces in which to exercise. Restored river corridors not only contribute towards such activities by creating recreational routes that improve connections between parks and other open spaces for walkers and cyclists. They also provide much needed routes for wildlife.

Experiencing the changes in river patterns and water levels helps people to reconnect with natural processes as annual seasonal rhythms and weather patterns are mirrored in the ebb and flow of the river.

The Chinbrook Meadows river restoration project that was completed in 2002, has demonstrated the benefits of bringing people closer to their natural environment by providing routeways designed to mirror the river's new meandering course and an opportunity for people to connect with the river. In North London, the River Brent runs through Tokyngton Park and its restoration has been instrumental in bringing together previously divided communities. ***See pages 13 and 17****.*

The restored Tokyngton Park has helped to reconnect people to nature and each other[2]

River Quaggy, Chinbrook Meadows: A once neglected park and river now provides a focal point for local residents[1]

Conserving and enhancing river wildlife

Restoring the life to our rivers and wetlands aids the implementation of national and local initiatives aimed at improving our natural environment. Such initiatives include the delivery of Biodiversity Action Plans, driven by the London Biodiversity Partnership, A 50-Year Vision for (England's) Wetlands, the EU Water Framework Directive, the Million Ponds Project and Living Landscapes.

River Wandle with pools and shallow riffles providing a range of habitat for wildlife[1]

London river types

The rivers and streams of Greater London total over 600km in length (excluding the main stem of the River Thames). London's rivers are broadly classified as chalk or clay depending upon the underlying geology. The clean water and gravel beds of chalk rivers can support a rich variety of wildlife, including water-crowfoot, mayflies and brown trout. Chalk-type rivers are fragile systems and sensitive to low flows during periods of drought.

Clay rivers typically have deep pools and shallow riffles supporting wildlife such as kingfishers, dragonflies and damselflies, heron and fish species such as chub, roach and dace. Water levels in clay rivers can fluctuate considerably in response to rainfall. However, the effects of urbanisation have masked many of the characteristics of both chalk and clay rivers.

Damaged habitats

Previous human activities over hundreds of years (including navigation, hydro-power and flood defence) have altered London's rivers. These activities have resulted in significant changes to the river ecology. Important habitats within and alongside them have been removed, damaging the river ecology and fragmenting their vital role as a wildlife corridor. Many species rely on rivers without artificial barriers or low flows to complete their life cycles, such as fish migrating from estuaries to headwaters to breed.

Re-creating lost habitats

River restoration addresses damaged ecological environments by re-creating conditions that allow wildlife to re-colonise the river, use it to migrate to complete their life cycle, or move to more suitable areas to escape the impacts of climate change. This may include: the establishment of backwaters and wetlands where wildlife can shelter during storm events; the creation of channel features such as pools and riffles; the introduction of river gravels to increase the range of habitats partially destroyed through previous human intervention; or the removal (or adaptation) of obstructions to species' movement (such as weirs, culverts and concrete channels).

The Watermeads project at Morden Hall Park, Mitcham, on the River Wandle, demonstrates how a simple technique of skilfully excavating ditches can improve habitat for wildlife, in this instance for water voles. ***See page 16***.

A natural river margin reed habitat is essential for the life cycle of wildlife such as this grey heron[1]

The LRAP Webpage

The need for a webpage

A key objective of the LRAP is to provide a central updateable resource of information which documents the opportunities available for restoring London's rivers. To help achieve this, a webpage (hosted by The River Restoration Centre) has been set up. The webpage enables all interested parties to examine options for river restoration in London today, which should help to ensure they are incorporated into the planning process and deliver London Plan targets.

Links between river catchments and boroughs

The webpage provides the user with an interactive map of the Greater London Authority area and links to maps of each catchment. This catchment approach to identifying river restoration opportunities and benefits is an important concept, since planners and councillors need to appreciate that river reaches are part of a wider river system that crosses borough boundaries; what is implemented in one place can have an effect elsewhere.

Beam
Beverley Brook
Brent
Colne
Crane
Darent & Cray
Hogsmill
Ingrebourne
Lee
Ravensbourne
Roding
Thames
Wandle

www.therrc.co.uk/lrap.php
View of the river catchments in the Greater London area

Viewing projects online

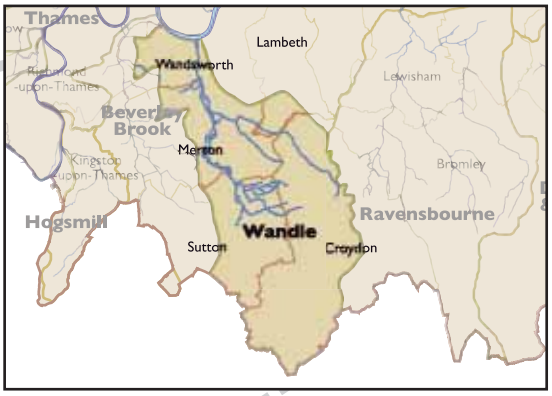
The webpage provides a view of the river catchments in the Greater London area. Within each catchment, completed and proposed schemes are shown via a series of geo-referenced dots indicating their location along the river. Summary information is outlined for both on ***page 14***.

In addition the webpage also links to a number of completed 'case studies' that demonstrate what can be achieved from a simple small-scale enhancement (for example for water vole habitat) to larger-scale opportunities that incorporate better flood management and at the same time, reconnect people to the natural environment. Details of each of these can be accessed by clicking on a dot as shown on ***page 11***.

Accessing the web-based information

Viewing a catchment

A catchment can be accessed either by using the mouse to hover over the area of interest or by clicking on the 'catchment name' list at the side of the map. Once a catchment is identified it will be highlighted and all the London boroughs that fall within it will be displayed. These are delineated by brown lines.



Project locations

By clicking on a catchment, a new page is displayed which identifies the major locations and the London boroughs that cross them. Three types of dot appear on the map to show the following categories of projects:

- Case study
- Completed project
- Proposed river project

Summary information is provided for proposed and completed projects which becomes visible by placing the mouse over the dot as shown in the tables below. Clicking on a dot will open a new browser window with further details for the proposed projects and the case studies. ***See pages 12 and 13***.

Helping with the planning process

One of the key aspects of this document is to help planners, developers, landowners and others recognise where restoration opportunities exist during the early stages of the planning process. Knowledge of the 'status' of a proposed project is therefore a vital piece of information. Status has been divided into 4 categories as follows:

- Concept only - where a place has been identified as having potential for river restoration but no funding has been allocated to scope these ideas.
- Early preparation - where initial scoping plans exist identifying constraints and outline proposals.
- Planned and designed - projects that have designs in place and sufficient technical detail to deliver works on the ground.
- Funding and commitment to deliver - projects to start with known timescales for completion.

Project Name:	Morden Hall water vole project
Main River:	Wandle
Reach Length:	600m
NGR (*upstream*):	TQ 262 689
Project Status:	Funding and commitment to deliver
Key Aspirations:	Climate Change; Flood Risk Management; Access & Regeneration; Biodiversity

Summary information viewable on website for proposed restoration sites by placing mouse over proposed river restoration dot

Project Name:	Pickle Ditch enhancement
Main River:	Wandle
Tributary:	Pickle Ditch
Reach Length:	250m
Completed:	2000
Main Motivations:	Habitat

Summary information viewable on website for completed projects

Proposed projects information (an example)

Mayes Brook : An example of a proposed project with associated full information sheet[1]

Project name
Mayesbrook Park restoration scheme

Status
Early preparation stage

Catchment/tributary
Roding/Mayes Brook

OS grid reference *(upstream)*
TQ 461 856

Length (m)
1000m

Type
Realignment of the river through parkland; Creation of more natural bank profile; Introduction of meanders and backwaters.

Reasons
The Brook has been straightened and deepened and its banks are reinforced. High bankside fences have been erected reducing access. The river is very degraded with low ecological value. Adjacent riparian land is now grassland with few features.

Key themes
Indicate by ticking one or more that apply.

☑ Sustainable urban regeneration/development	☑ Biodiversity/conservation
☐ Fisheries	☐ Education
☑ Recreational amenity (access to nature)	☑ Climate change
☑ Sustainable flood risk management	☑ Other

Possible constraints
Flood risk must be considered.

Potential partnerships
This is potentially a collaborative project with a range of local stakeholders – see contact details

Approximate cost
Unknown

Possible funding
University of East London site (UEL) redevelopment; Section106 money from the redevelopment of the area; Mitigation funds re Kingsbridge tidal sluice works from the Environment Agency.

Next steps
A feasibility study is required to include assessments: flood risk modelling, geomorphology and sediment transport, potential contamination and land-use. Ecological survey is required to assess existing habitat including a water vole survey

Contact details
Primary contact: Rebecca O' Shea (Environment Agency)
Landowner details:
Left bank: London Borough of Barking and Dagenham (LBBD)
Right Bank: London Borough of Barking and Dagenham (LBBD)
Landowner contact: Dave Theakston at LBBD (020 82273081

*If you would like to register a river restoration opportunity please refer to the contacts on the **inside back cover** or visit **www.therrc.co.uk/lrap.php***

Other
Key themes (Other):
1.) Biodiversity Action Plan. Will contribute towards the 'Creating a Better Place' objective to make proportionate progress towards BAP targets for wetland-related species and habitats'
2.) Work falls within Environment Agency's duties to promote the conservation and enhancement of inland waters (Environment Act 1995)

Pre-works surveys available: River Corridor Survey, River Habitat Survey

Completed project case study (an example)

*Demonstration of information available on the **RRC website***

River Quaggy, Chinbrook Meadows

Technique: Re-meander channelised section and floodplain storage

Project location: Lewisham
River: Quaggy
County: London
Project start date: Spring 2002
Project end date: Autumn 2002
Length: Approx 0.5km
Cost: £104,000
Upstream grid reference: TQ 410 721

The River Quaggy, d/s of Chinbrook Meadows, prior to restoration

Site background

This section of the River Quaggy, with a flashy flow regime, was channelised and straightened between 1960-1970 as part of a flood alleviation scheme. Prior to restoration it was encased in concrete with fences and high privet hedges near to each bank. It could neither be accessed nor viewed by the public and was devoid of natural fauna and flora.

Objectives

To reintroduce the floodplain as a natural flood storage area as part of a larger catchment flood alleviation plan; to enable the River Quaggy to become accessible to the public and hence create a local amenity; to create an environment where native fauna and flora could colonise and allow for natural channel processes.

Marginal planting around the pond & along edge of river (2002)

Design

- The concrete channel in the park was replaced by a sinuous channel, allowing easy access. It was (except where the cost of moving existing sewage drains prevented this) cut to follow its path prior to channelisation.
- Whilst cutting the channel old gravels were evacuated and sufficient 'room' was left along the river corridor to allow for natural adjustment.
- The margins of the channel were planted using a reputable source of native wetland plants (including iris, water mint and reeds), a wetland grass and wild flower mix was also sown. One section downstream has not been planted since there was a request from the local group to allow natural colonisation.
- Flood storage ponds were included in the scheme and at the upstream section a boardwalk, pond dipping and educational area, were incorporated to attract local school children.

Rapid natural changes in the river planform (2002)

Subsequent performance – RRC's views (2002 and update 2007)

Vegetation development at the pond (2007)

This project is an excellent example of a partnership initiative that has not only restored the river and floodplain, but has also paid careful attention to improving the park amenities. The channel work was completed in spring 2002 and by September that year there had already been considerable movement of gravels. Natural geomorphological features including a pool/riffle sequence, gravel bars and steeper banks had formed. The pond has been colonised by invertebrates and the vegetation planted along the banks is now providing good cover in both the planted and unplanted sections.

This scheme continues to be successful. Some desilting of the dipping pond (not linked to the main channel due to the location of a drain) may be necessary in the future together with some vegetation management.

the **River Restoration Centre Case Study Series**

Tel/fax: 01234 752979 Email: rrc@therrc.co.uk http://www.therrc.co.uk

A SNAPSHOT OF PROJECTS IN YOUR CATCHMENT

Completed project locations

Within the Greater London area there are over 60 completed restoration projects ranging from small enhancement projects such as reedbed creation to the full deculverting of a river section. In most cases the main motivation of these projects has been habitat creation. Many of the projects have been completed on the Ravensbourne, the Wandle, the Colne and the Brent catchments.

Opportunities for proposed projects

Providing a forum for identifying places where river restoration can be beneficial for wildlife and people will help to ensure that all opportunities to enhance the Greater London area's rivers are identified and that the successes already achieved, can be extended. The table (*right*) summarises the current proposed projects for each catchment, details of which are included on the LRAP webpage. Whilst habitat or fisheries gain remains a key driver for many of these projects, nonetheless there is also a strong focus on flood risk management, recreation and urban regeneration, demonstrating an understanding of the wider benefits of river restoration and how it can fit within the planning process and aspirations for a greener London.

Number of proposed projects per catchment	
Beverley Brook	4
Beam	3
Brent	7
Colne	6
Crane	6
Cray	1
Effra	1
Hogsmill	4
Ingrebourne	4
Lee	25
Ravensbourne	12
Roding	6
Thames	5
Wandle	8

Completed river projects provide a much needed environment for a range of creatures such as this water-diving beetle[1]

Help us to keep the webpage up to date

The webpage is structured so that it is easily accessible to the general public. In addition, new opportunities or case studies can be added by contacting the project partners or The River Restoration Centre. So, if you have knowledge of a section of river that you think has potential for enhancement then let us know.

Achieving healthy rivers in London

The information contained on this website aims to provide an up to date, valuable resource that can help to identify ways to contribute to the health of London's rivers. It should encourage those living and working in London to deliver projects and to take ownership of river restoration initiatives across London, that focus on the five key aspirations highlighted in the introduction (***page 4***) of this document.

Bringing back wildlife to the city; banded demoiselle flies can thrive in London's restored rivers[1]

Cornmill Gardens: River Ravensbourne

Location:
Lewisham,
South East London
TQ 381 757 (*upstream*)

Borough: Lewisham

Completed: 2007

Drivers: = main = secondary

Flood Risk Management
Climate Change
Urban Regeneration
Access & Recreation
Biodiversity Enhancement

Length: 100m

Partners:
Building Design Partnership;
LB Lewisham;
Environment Agency

Background

Before the regeneration of this site, this section of the Ravensbourne flowed through an area known as the Sundermead Estate. The river had been constrained within a narrow concrete channel as part of an historic flood defence scheme. This, together with high steel railings and overgrown vegetation, had resulted in a neglected river possessing little ecological or local community interest. The river restoration scheme formed part of the 'Urban Renaissance in Lewisham' programme which aimed to create a new public open space within the Town Centre.

A constrained river encased in concrete[1]

Urban regeneration allowing for better access to nature[2]

Scheme description

Following the preparation of design proposals and a full public consultation, a masterplan was developed for the site. The concrete walls of the river were removed and replaced with more natural sloping banks, providing more flood capacity, which were interspersed with steps and wooden platforms to improve river bank access. A puddle-clay liner was constructed to help restore flows. Gravels were introduced into the bed of the river. These were sized to ensure that they could move in the channel with respect to the flow conditions, thus creating natural habitat features for wildlife. Marginal areas were planted with native species such as Rush (*Juncus effusus*) and Yellow flag Iris (*Iris pseudacorus*) whilst a wildflower mix was sown along the banks. An overflow storage area which retains water during high flows was designed into the scheme by lowering an open space alongside the river.

Creation of riffles results in a more diverse, attractive river and provides a much needed wildlife habitat[2]

Benefits

- Improved flood management within the channel and through the retention area which should help to mitigate against climate change implications;
- Creation of an attractive, diverse and accessible public open space;
- Provision of a more natural river environment with the potential to support a range of wildlife including mallards and moorhens.

Watermeads Island: River Wandle

Location:
Morden,
South London
TQ 275 675 (*upstream*)

Borough: Merton

Completed: 2008

Drivers: = main = secondary
Flood Risk Management
Climate Change
Urban Regeneration
Access & Recreation
Biodiversity Enhancement

Length: 900m

Partners:
London Wildlife Trust;
The National Trust;
Carillion PLC;
Environment Agency

Constructed ditch with steep earth banks and shelves suitable for water vole habitat[2]

A water vole with a much needed food source close to his burrow[1]

Background

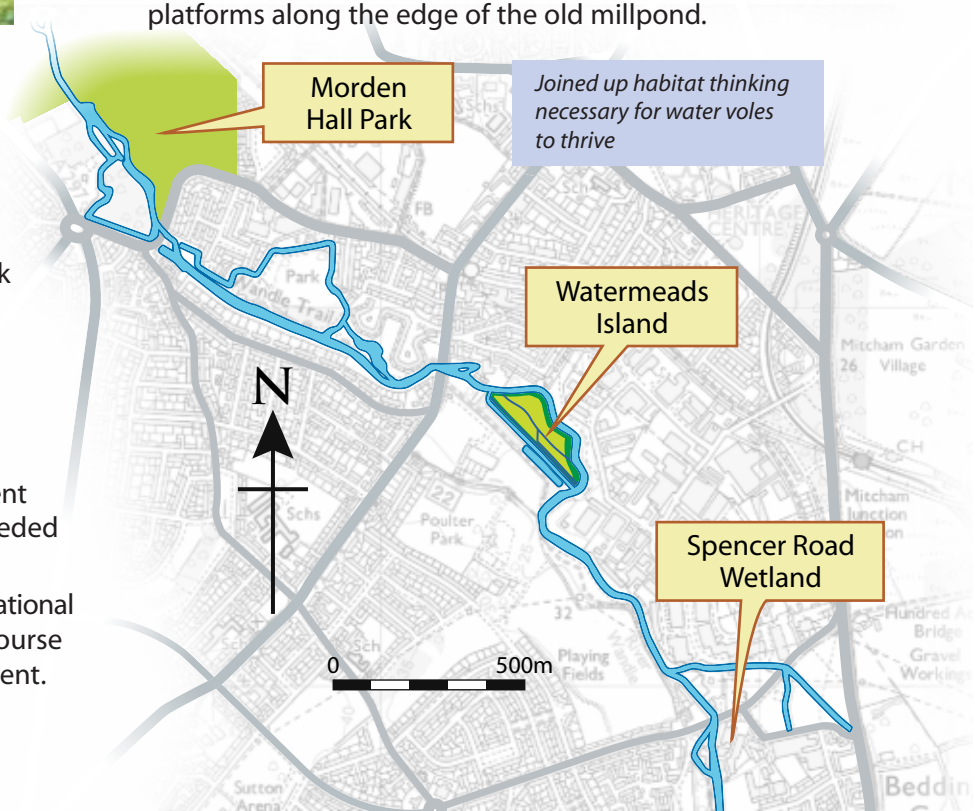
This site is an historic 13 acre wetland area now owned by the National Trust. The ditch network had become filled with sediment thus losing much of its biodiversity value. In 2007 Watermeads Island was identified by the London Water Vole Project as a potential site along the River Wandle for the reintroduction of water voles, a mammal protected under The Wildlife and Countryside Act (1981) and a UK Priority BAP species.

Scheme description

Nine hundred metres of ditches were excavated primarily for water vole habitat. Ditches were constructed with steep earth banks and shelves, suitable for digging burrows. Six water level control structures were constructed within the excavated ditches to enable water levels to be controlled to encourage the development of a diverse wetland habitat and to ensure sufficient water is retained in the main river during times of drought. Angling platforms for disabled people were constructed on the edge of the mill pond to be stocked with native fish. The scheme also provided the opportunity to create a recreational facility through the provision of angling platforms along the edge of the old millpond.

Site connectivity

Water voles require 1.5km of continuous connected habitat to thrive. The work at Watermeads Island is therefore part of a wider River Wandle strategy aimed at creating a sufficiently sized habitat network to enable these creatures to flourish. Once this habitat target is met, water voles will be released.



Benefits

- Working within a wider catchment strategy will provide a much needed mosaic of habitats;
- An opportunity to improve recreational facilities and access to a watercourse within a highly urban environment.

Tokyngton Park: River Brent

Location:
Wembley,
North West London
TQ 201 847 (*upstream*)

Borough: Brent

Completed: 2003

Drivers: = main = secondary

Flood Risk Management
Climate Change
Urban Regeneration
Access & Recreation
Biodiversity Enhancement

Length: 2km

Partners:
Environment Agency;
LB Brent

Background

Extensive historical flood alleviation works undertaken in the 1940's and 1970's led to this section of river being straightened and encased in concrete. The river provided little or no recreational value, whilst the quality of wildlife habitat was poor. In 1999 a partnership was formed, with the aim of carrying out improvements to the park and providing a new lease of life for the river.

Reconnecting two disconnected communities through the river restoration initiative[1]

Scheme description

The partnership developed a masterplan for the whole park following community consultation through a Planning for Real® exercise. The river provided a focal point in this process with the aspiration to provide a better environment for wildlife and people. The concrete river banks were removed and the watercourse re-meandered. Some banks needed stabilisation which was achieved using live willow poles on the bank and recycled crushed concrete from the site at the toe; other less vulnerable banks were left to naturalise. Pool and riffle sequences were initiated within the design by varying the bed levels and introducing natural river gravels. A backwater was created and planted with reeds to provide an additional habitat feature and refuge in times of flood or pollution events.

Bank stabilisation with crushed concrete (hidden) and live willow poles providing good marginal habitat[2]

Benefits

- Flood protection has been improved by working with natural river processes;
- A green space with improved routes across the river has linked previously divided communities;
- Creation of a more natural channel within an urban landscape that can support a variety of habitats for wildlife.

Creating a green space for people and wildlife[2]

SUTCLIFFE PARK: RIVER QUAGGY (RAVENSBOURNE)

Location:
Eltham,
South East London
TQ 412 749 (*upstream*)

Borough: Greenwich

Completed: 2003

Drivers: = main = secondary

Flood Risk Management
Climate Change
Urban Regeneration
Access & Recreation
Biodiversity Enhancement

Length: 500m

Partners:
Environment Agency;
QWAG;
Breheny Engineering;
LB Greenwich

Open water providing space to manage flood risk and provide access to nature[2]

Background

For years the River Quaggy at Sutcliffe Park was lost underground in a culvert. Local residents only became aware that a river was there when their homes flooded more frequently as development increased. Rather than further deepening and widening the hidden channel, a decision was made to combine flood risk management with a strategy for river restoration to benefit the local community.

Scheme description

A new 'low-flow' meandering channel was cut through the park, following its original alignment. The previous culvert was retained, enabling it to take excess water in times of extreme flood events. Flow is now regulated between the two watercourses by a sluice. To provide further flood water storage, the park itself was lowered and re-shaped to create a floodplain capable of storing a maximum of 85,000 cubic metres of flood water. A network of boardwalks, pathways and viewing points were designed to encourage access to the river and ponds, all of which were an integral part of the scheme.

Benefits

- Flood risk has reduced for the surrounding area;
- The combination of the new open river, together with the old culverts, enables the regulation of flows for a range of environmental conditions associated with climate change impacts;
- People have been reconnected to nature and since opening the park visits have increased by 73%;
- The open watercourse and wetland pond areas sustain a range of native plant species which, together with the natural gravels found on site, provide a variety of habitats necessary for a more diverse wildlife.

Boardwalks close to the river and informal wetland areas link people to nature[2]

Ray lodge park: river roding

Location:
Redbrige,
North East London
TQ 419 924 (*upstream*)

Borough: Redbridge

Completed: 2008

Drivers: = main = secondary
Flood Risk Management
Climate Change
Urban Regeneration
Access & Recreation
Biodiversity Enhancement

Length: 150m

Partners:
Environment Agency;
LB Redbridge;
London Waterways Partnership

Background

Works on the nearby M11 in the 1970's and 1980's resulted in the river being artificially diverted and straightened and banks reinforced with artificial materials, resulting in poor quality wildlife habitat. The resulting fast flowing and flashy nature of the river also had implications for the survival of fish fry. A partnership project sought to address these issues by creating new habitats for a range of species, including water voles, dragonflies and numerous fish species.

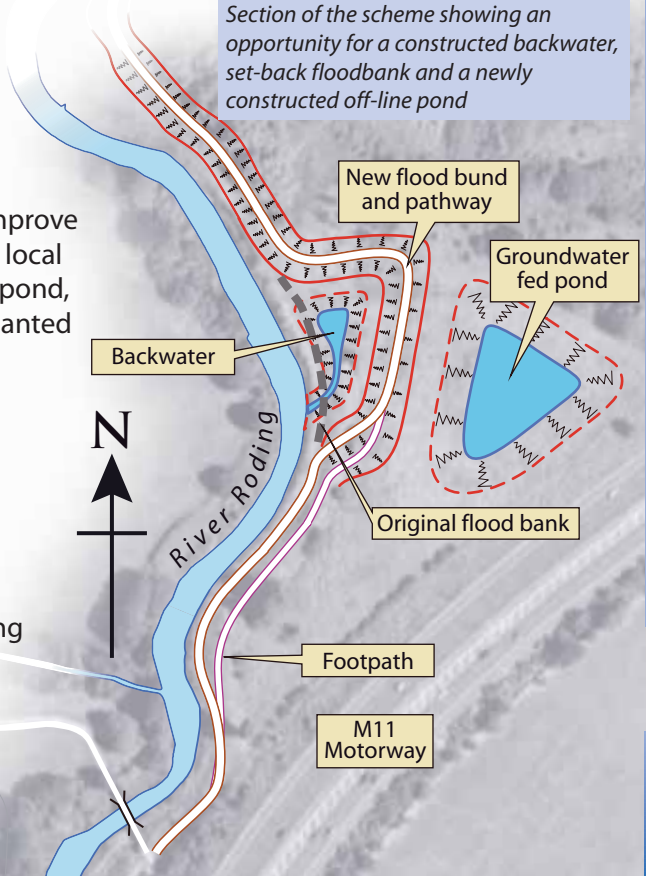
Work in progress to achieve new habitat features[3]

Colonisation of marginal vegetation along the new backwater[2]

Scheme description

Following the receipt of £140,000 of Office of the Deputy Prime Minister (ODPM) funding, earthworks took place between August and October 2007 at a number of locations. The banks of the river were re-profiled to a more natural, gentle gradient. Upstream of the footbridge the flood bund was realigned away from the river bank and a backwater excavated for species such as chubb, roach and eel to shelter during periods of high flow. A pond was dug behind the flood banks, with excavated gravel being used to strengthen footpaths and improve access for the public. In May 2008, with help from local volunteers and Environment Agency officers, the pond, backwater and a section of the river bank were planted with numerous riverside plants.

Section of the scheme showing an opportunity for a constructed backwater, set-back floodbank and a newly constructed off-line pond



Benefits

- Provision of a diversity of wildlife habitats able to support a range of species and a much needed backwater area;
- An opportunity to involve the local community which has been an important aspect in achieving a valuable and successful restoration scheme;
- Improved access to nature and an enhanced recreational facility.

Links to associated websites

Name	Web-link	Aspirations
A 50 year vision for wetlands	www.wetlandvision.org.uk	Analyses wetland opportunities for England in the context of threats, preservation and climate change
A Strategy for Restoring Rivers in North London	www.london.gov.uk/mayor/environment/biodiversity/docs/restoring-rivers-nlondon-env-agency.pdf	Highlights the potential for restoring rivers in North London
Blueprint for Water	www.blueprintforwater.org.uk	Ten-point plan calling for action by Government, regulators and water companies to protect and enhance water bodies
Creating a Better Thames	www.environment-agency.gov.uk/regions/thames/1343302/?lang=_e	Thames region 5 year Plan 2006–2011
FORCE	www.force.org.uk	Volunteer group on the River Crane
Groundwork London	www.groundwork-london.org.uk	Environmental regeneration charity in the capital
Living Landscapes	ttp://www.wildlifetrusts.org/files/uploaded/download.php?filename=A Living Landscape (full).pdf	A four-point plan which maps the way forward in countering climate change and restoring the UK's ecosystems
London Biodiversty Partnership	www.lbp.org.uk	This partnership delivers the London Biodiversity Action Plan (BAP) for important habitats and species within the Greater London area
London Plan	www.london.gov.uk/thelondonplan	Strategy for London including the Blue Ribbon Network
London Water Vole Project	www.wildlondon.org.uk/Projects/The WaterVoleProject/tabid/240/Default.aspx	Dedicated to the conservation of this species throughout Greater London
Lower Lee Strategy	www.environment-agency.gov.uk/yourenv/consultations	A strategy for flood risk management on the lower Lee
Making Space for Water	www.defra.gov.uk/environ/fcd/policy/strategy.htm	Government programme forwarding the developing strategy for flood and coastal erosion risk management in England
Mayor's Access to Nature	www.london.gov.uk/mayor/planning/docs/access-to-nature.pdf	Supplementary guidance on access to nature
Mayor's Biodiversity Strategy	www.london.gov.uk/mayor/strategies/biodiversity/index.jsp	Biodiversity Strategy for London
Mayor's Green Grid SPG	www.london.gov.uk/mayor/strategies/sds/spg-east-lon-green-grid.jsp	Supplementary guidance on implementing the Green Grid
Million Ponds Project	http://www.pondconservation.org.uk/millionponds/millionpondsintro.htm	Aims to create up to half a million new, clean-water ponds in the UK
Planning Policy Statement 25 (PPS25)	www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/pps25/	Sets out Government policy on development and flood risk, and aims to ensure flood risk is considered at all stages in the planning process
QWAG (Quaggy Waterways Action Group)	www.qwag.org.uk	Volunteer group on the Ravensbourne
River Restoration - a Stepping Stone to Urban Regeneration	www.therrc.co.uk/rrc_publications.php	Highlights the potential for restoring rivers in South London
Thames21	www.thames21.org.uk	An environmental charity working with communities to bring London's waterways to life
Thames Basin Vulnerability Assessment	www.wwf.org.uk/freshwater	How vulnerable is the Thames to threats such as climate change?
Thames Catchment Flood Management Plan	www.environment-agency.gov.uk/yourenv/consultations/1695546/1696092/	Provides a summary of the main messages for the region, based on research into the characteristics of the region and the options available for managing the risk of flooding
Thames Estuary Partnership	www.thamesweb.com	Charity providing a framework for estuarine management
Environment Agency Thames Region	www.environment-agency.gov.uk/regions/thames	This website will house the Draft Thames River Basin Management Plan and other Water Framework Directive associated documents
UK Biodiversity Action plan	www.ukbap.org.uk	UK Government's response to the Convention on Biological Diversity (1992). Describes the UK's biological resources, reviews priority species, habitats and associated targets
UK Climate Impacts Programme	www.ukcip.org.uk	UKCIP works with public, private and voluntary sectors to reduce future greenhouse emissions
Wandle Trust	www.wandletrust.org	Volunteer work on the Wandle
Wildlife and Countryside Act (1981)	www.statutelaw.gov.uk/content.aspx?activeTextDocId=809266	Act of Parliament in the United Kingdom which aims to protect the wildlife and countryside of the United Kingdom

Contacts

If you would like to find out more about this document or require advice on river restoration techniques then contact:

The River Restoration Centre
Building 53
Cranfield University Campus
Cranfield
Bedford
MK43 0AL

Email: therrc@therrc.co.uk

Telephone: 01234 752979

Website: www.therrc.co.uk

RRC Manual of Techniques:
www.therrc.co.uk/rrc_manual.php

For further information about the environment or river restoration aspirations for the London area visit:

Environment Agency
www.environment-agency.gov.uk

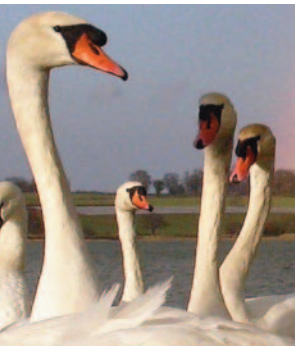
Greater London Authority
www.london.gov.uk

WWF-UK
www.wwf.org.uk

London Wildlife Trust
www.wildlondon.org.uk

Natural England
www.naturalengland.org.uk

Thames Rivers Restoration Trust
www.trrt.org.uk



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Working to restore & enhance our rivers

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