



THE CRANE VALLEY

A Water Framework Directive Catchment Plan



This plan has been produced by London Wildlife Trust for the Crane Valley Partnership, with funding from DEFRA directly and through the Royal Society of Wildlife Trusts.



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THE CRANE VALLEY PARTNERSHIP

The Crane Valley Partnership

The CVP is formed of five London boroughs and public, voluntary and private stakeholders, all working towards a shared vision: for a well-managed and high quality river corridor which is accessible to all, in which wildlife can thrive and local people can take pride and ownership.

Our Mission

To develop a coordinated strategic plan that will raise awareness and support appropriate action for conservation, restoration or new approaches to design and management of the river valley. This strategy will operate across political and geographical boundaries, as part of a regional approach to planning in west London but will also recognise the local issues of each borough.

To use our knowledge, expertise and resources to help partners and communities to work together for a coordinated and sustainable approach to managing and improving the River Crane and its tributaries, to include biodiversity, community cohesion, historical and educational opportunities.

To be the catalyst for improving and protecting the biodiversity of native flora and fauna by contributing to London's Rivers and Streams Habitat Action Plans and working across boundaries to control pernicious weeds and pests, working in conjunction with each of the partnering borough's Biodiversity Action Plans.

To maximise the use of the river corridor as a resource for healthier living and educational activities to improve quality of life for local people.

To promote connectivity along the river corridor wherever possible.

Current Partners

Core Executive

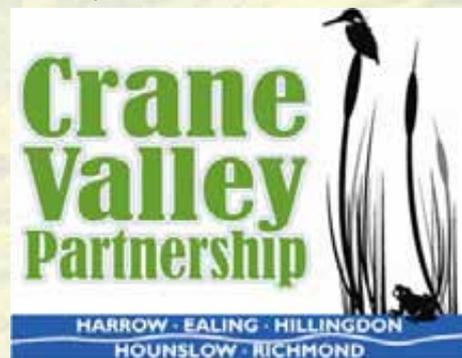
London Borough of Ealing
London Borough of Harrow
London Borough of Hillingdon
London Borough of Hounslow
London Borough of Richmond-upon-Thames
Heathrow Airport Limited

Extended Executive

Environment Agency
Friends Of the River Crane Environment (1 representative)
London Wildlife Trust (1 representative)
Thames Anglers Conservancy (1 representative)
Thames Water

Project Delivery

A Rocha
Canal & River Trust
Environment Agency
Friends Of the River Crane Environment
Green Corridor
Heathrow Airport Limited
London Wildlife Trust
The Royal Parks
Thames21
Thames Water
TW4
Sustrans
Zoological Society of London



THE CATCHMENT PLAN SUMMARISED

Water Bodies in the Crane Catchment

- The Yeading Brook East
- The Yeading Brook West
- The Crane
- The Duke of Northumberland's River
- The Longford River
- The Grand Union Canal

Ecology

Key habitats found in the catchment

- Lowland river (in-river habitat)
- Lowland river (riparian habitat)
- Oxbow lakes
- Wet woodland
- Dry woodland and scrub
- Marsh
- Pasture
- Grassland
- Grassland and heathland

Urban habitats

- Gardens and allotments

Issues Affecting the Catchment

Invasive Species

Heavily modified channels

Pollution

Risk of flooding

Restricted access

The Seven Objectives of this Plan

1. A River Rich and Diverse in Habitats and Native Wildlife

Outcomes

- The river and river corridor supports healthy and diverse populations of priority native species and habitats.
- To understand the distribution of problem invasive species and control them.
- Diverse and sustainable populations of native fish throughout the catchment.

Catchment-wide Approach

- Undertake habitat opportunity mapping of the catchment to assess existing habitats and identify opportunities to create and enhance ponds, backwaters, wet woodland, reedbeds and grazing marsh within the active floodplain.
- Best practice management of riverside and floodplain habitats throughout the catchment.
- Reduce shading of the river channel through selective and considerate tree and scrub clearance.
- Deliver national, regional and local targets for biodiversity.
- Every local authority in the catchment understands and protects the river from unsympathetic development using buffer zones.
- Improve connectivity along the river by installing fish passes and habitat improvements.
- Reinstatement of gravels using natural materials to promote natural river processes.
- Ongoing, coordinated programme for the control

and management of problem invasive plants and animals, including monitoring and surveys.

2. Clean Clear Water

Outcomes

- All misconnections are identified and addressed at all priority outfalls by 2021.
 - To ensure that pollution is understood and new cases are identified and controlled effectively.
 - Physical, chemical and biological water quality within its desirable limits, to achieve Good Ecological Potential.
 - Improved quality of surface water runoff using Sustainable Urban Drainage Systems in appropriate locations.
- #### Catchment-wide Approach
- The local community is inspired to take action to solve domestic pollution, through greater public understanding of its sources and impacts.
 - Thorough data collection and analysis on pollution sources and specific contaminants.
 - Encourage or introduce in-channel vegetation to capture suspended particulates and improve dissolved oxygen levels.
 - Investigate feasibility of installing reedbeds or other wetland habitats at polluted outfalls throughout the catchment to intercept pollution.
 - Assessment and implementation of appropriately located Sustainable Urban Drainage Systems (SUDS) to filter surface water runoff.

3. A Natural Looking and Functioning River with Sustainable Flow

Outcomes

- The natural shape of the river should be restored and adapted to climate change.
- Increased and more variable flow throughout the Crane, DNR and Longford Rivers.

Catchment-wide Approach

- Review all man-made structures associated with the river, and assess whether they should be removed, altered or simply maintained as appropriate.
- Improved water level management scheme for the lower River Crane involving all relevant stakeholders.
- River realignment, and channel narrowing and reprofiling in overly widened sections of river.
- Reinstatement of gravels using natural materials to promote natural river processes.

4. Reduced Risk of Flooding in Built-up Areas

Outcomes

- Increased innovative solutions to improve the catchment's capacity to store and slowly release stormwater.
- To improve the ability of the River Crane to adapt to stormwater events.

Catchment-wide Approach

- Promotion of green roofs, SUDS, attenuation ponds, and other green infrastructure through the

borough planning process.

- Improved connectivity between the river and the floodplain to ensure the floodplain is as natural as possible.

5. Collaboration and Engagement

Outcomes

- Better collaboration with all stakeholders.
- Greater community engagement along the river.
- All projects to include community engagement in maintenance/legacy plans.

Catchment-wide Approach

- Partnership working between all stakeholders, particularly between the different local authority departments.
- More coordinated activities, commissioning and delivery in the catchment using localised working groups.
- Better and easier to read strategies.
- Solve land grabbing and land abandonment alongside the river.
- Promote, support and coordinate 'bottom-up' volunteer activities and 'friends' groups across the catchment.
- Problem litter and fly-tipping sites are regularly cleaned up and these problems are reduced by promoting a greater sense of ownership among residents and businesses.
- Better promotion of catchment to residents; increased involvement and sense of community ownership of the Crane.
- Local schools utilise the river for educational field trips.
- Landowners are aware of and understand their responsibilities along the river.
- Agreed protocols and priorities regarding access

to high quality biodiversity and heritage sites. CVP website with information on the catchment plan and projects.

6. Awareness, Access and Appreciation

Outcomes

- Safe and welcoming sites for visitors.
- Diverse opportunities to engage with the river.
- To link the river and its tributaries to local transport networks.

Catchment-wide Approach

- Creation of a continuous River Crane walk, which is sensitive to the requirements of wildlife, with appropriate, up-to-date signage along its length and safer road crossings.
- Plan to influence all travel networks to make links with the continuous River Crane walk.
- Develop and promote formal and informal activities such as angling, riverside walking and exploration, with access points in appropriate locations.

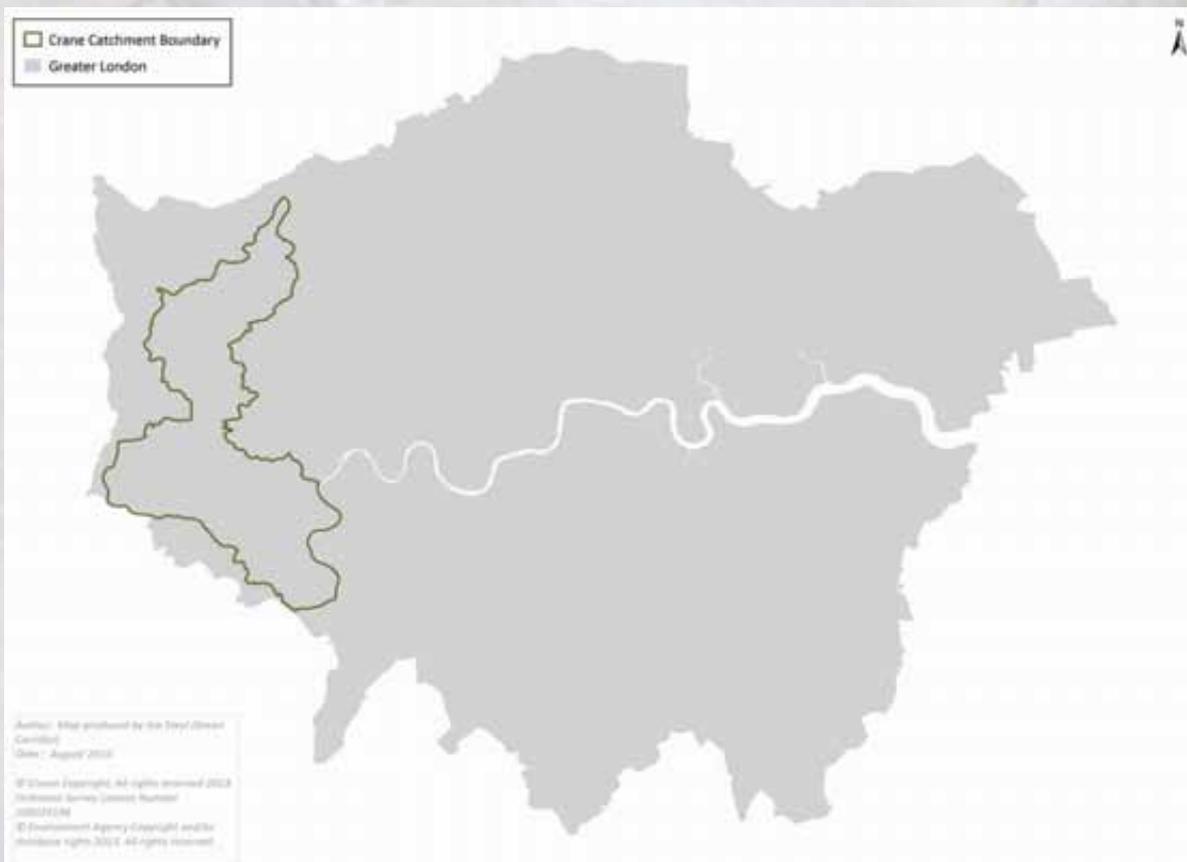
7. A Celebration of the Crane's Heritage

Outcomes

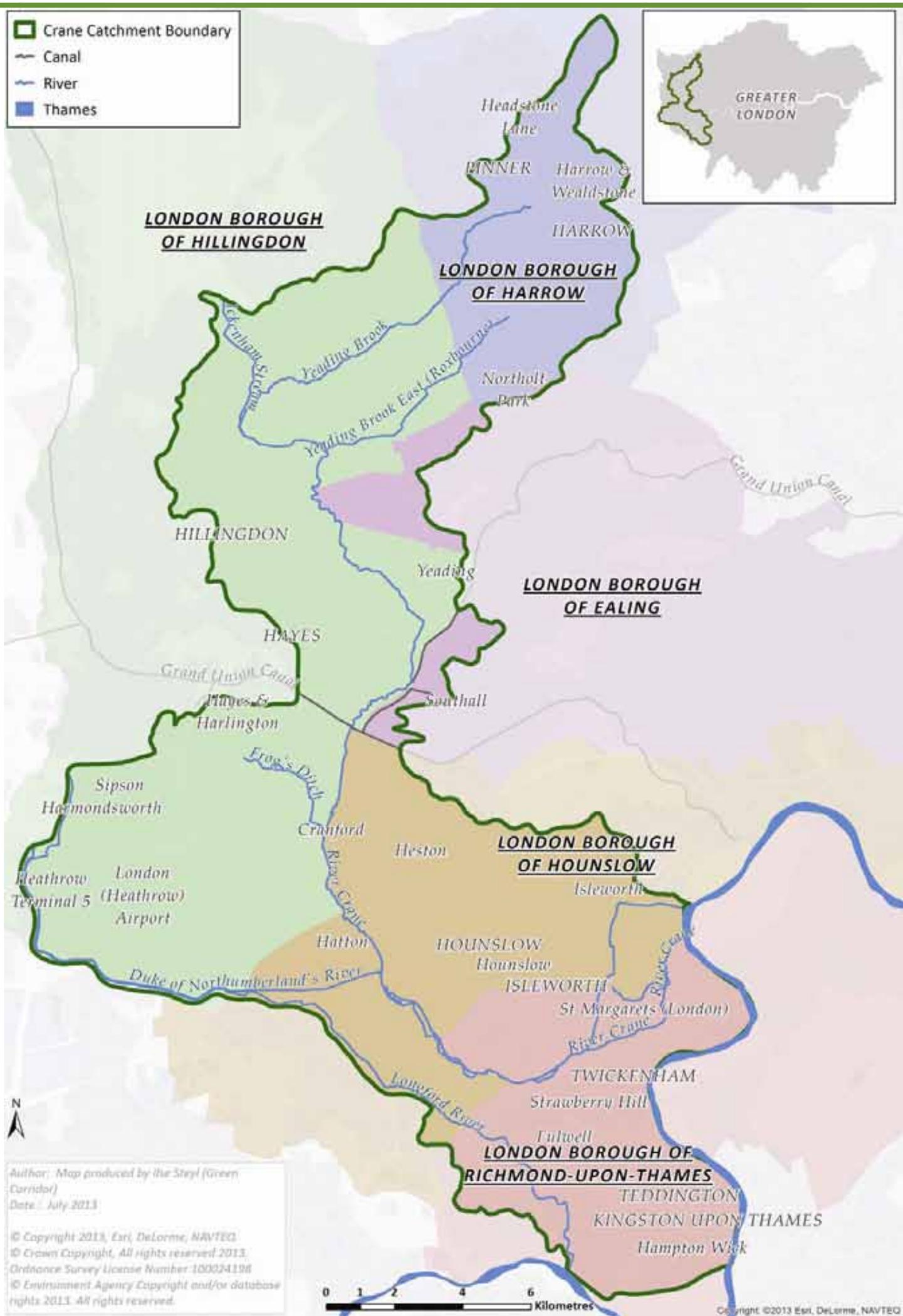
- The Crane's heritage should be recognised.
- Heritage sites in the catchment should be re-stored and brought back to use.

Catchment-wide Approach

- More research into local history and heritage; and subsequent awareness raising.
- Recognise and establish historic viewpoints and features.
- Improve access to and interpretation of the Crane's heritage through signage, events and activities.



- Crane Catchment Boundary
- Canal
- River
- Thames



Author: Map produced by the Styl (Green Corridor)
 Date: July 2013

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Catchment overview map ▲

THE CATCHMENT DESCRIBED IN BRIEF

The River Crane is a lowland river that flows through West London. Rising as the Yeading Brook West, from nine springs in the low hills of west Harrow, the river flows south before converging with its first tributary in North Hillingdon, the Yeading Brook East. The Yeading Brook continues through North Hillingdon and then briefly enters the London Borough of Ealing. The river then re-enters Hillingdon and, after passing Minet Country Park, becomes formally known as the River Crane. The Crane then flows through the London Borough of Hounslow, where it is joined by the Duke of Northumberland's River, a man-made river that flows from the River Colne. Finally the river flows through the London Borough of Richmond-upon-Thames, where the Duke of Northumberland's River branches away from the main river again before both arms reach their confluence with the River Thames in Isleworth.

The 66km of river channel that the catchment provides is responsible for draining an area of around 125km². Much of the river has been modified for industrial purposes over the past 300 years. Historically, the Crane was once a source of power for West London's numerous water mills. Flour, oil and even gunpowder have been milled on the river at various times. Today, the catchment's notable industrial sites include Heathrow Airport; and transport links such as the M4, M40 and mainline westbound rail services pass through large areas of urban and suburban development. Prior to industrialisation, the river would have taken a much different shape. Once a meandering river of good depth and flow, the Crane now follows an artificially straightened course for parts of its duration with angular turns, lined and enforced banks, artificially widened sections, concrete culverts and weirs which prohibit the river from functioning naturally.

As a result of being such an urbanised catchment, the River Crane is at risk of different types of pollution. The catchment suffers from pollution incidents, surface water runoff from roads containing oil and other pollutants, and problems with the sewerage system. The poor water quality that results from this has a significant effect on the fishery and biological quality of the river.

Despite the negative impacts of urbanisation on the catchment, the River Crane and its tributaries form part of West London's Green Chain, a twenty mile chain of interconnected green spaces running throughout the catchment. It is recognised as a vital wildlife corridor, allowing the movement of fish, birds and small mammals and the distribution of plant species throughout the urban landscape of West London. Some stretches of the river are cared for and appreciated by local communities and teem with colourful dragonflies and plants such as the vibrant purple loosestrife. But, while kingfishers make the most of this rich habitat, much of the river cannot be seen, let alone appreciated by people.



The entrance to a culvert on the upper river



The old mill race, Crane Park Island



An outfall on the upper river—a source of pollution?



Kingfishers inhabit the river corridor

THE WATER FRAMEWORK DIRECTIVE



What is the Water Framework Directive?

During the 1990s the European Commission recognised that we needed an integrated and comprehensive way of managing the water environment and so the Water Framework Directive (WFD) came into existence. It has been part of UK law since 2003.

The original aim of the WFD was for all rivers, lakes, reservoirs, streams, canals, estuaries, coastal and groundwater (known as water bodies) to be in good ecological health by 2015. However, the EU has recognised that it will be an almost impossible task to reach this goal by 2015, so in most cases this deadline has been extended to 2021 or 2027.

The Environment Agency produces River Basin Management Plans, which explain what the current ecological health is for all water bodies and what needs to be done to improve them. They were first published in 2009 and are produced in six yearly cycles, so the next one will be available in 2015. The Crane catchment is included in the Thames River Basin Management Plan.

All of the water bodies in the Crane catchment are classified as either Heavily Modified or Artificial Water Bodies. A Heavily Modified Water Body is one that has had its original appearance significantly changed to suit a particular human purpose. For example, large sections of the River Crane have been heavily modified by being put into concrete channels due to historical industrial activities and then for the purposes of flood defence.

The effects of modification and artificial construction mean that some measures of ecological health cannot be used reliably for heavily modified and artificial water bodies. Ecological health is thus assessed using similar, but different, systems which are reflected in the use of two different terms: Ecological Status in natural rivers, and Ecological Potential in Heavily Modified and Artificial Water Bodies. Since all of the water bodies covered by the Crane Catchment Plan fall into the latter category, we are aiming for Good Ecological Potential.

What is a healthy water body?

A healthy water body has thriving populations of fish, invertebrates, plants and diatoms (microscopic algae).

They depend upon a healthy flow of water and a variety of natural habitats. All of these are affected by the levels of pollution and nutrients in the water, and the shape and structure of the water body. The Environment Agency uses many different measures to assess the ecological health of a water body. They include:

- the variety and numbers of different types of animals and plants living in the water body
- the state of the water itself, such as the temperature, the amount of oxygen, how acidic or alkaline it is (the pH), and the concentration of nutrients like ammonia and phosphate
- the concentration of polluting chemicals from human activity, such as arsenic, cyanide and the breakdown products of pesticides
- and for Heavily Modified and Artificial Water Bodies, whether it could be made more natural without interfering with the way it is used.

These are combined to come up with an overall classification for each water body. The classifications are:

High	Good	Moderate	Poor	Bad
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Further information on the classification system can be found at: <http://cdn.environment-agency.gov.uk/geho0911bueo-e-e.pdf>.

The official classification for each water body is the one listed in the most recent River Basin Management Plan. But because data is collected each year, the Environment Agency also produces interim classifications, which indicate the health of the water body based on current best evidence.

When the status of a water body is Moderate, Poor or Bad, the Environment Agency is investigating the reasons why it is not in good ecological health.

The Environment Agency has identified physical modification as an issue that must be addressed in order to get all the water bodies in the Crane catchment to Good Ecological Potential, in order to mitigate for the effects of heavy modification. This does not mean that all of the modifications must be removed, but the rivers must be made more natural wherever possible to improve the habitat for populations of invertebrates, plants, fish and diatoms (microscopic algae).

Good Ecological Potential in the catchment will only be achieved by reducing phosphate pollution from sources such as sewage and runoff from transport and urban drainage. These sources of pollution are having an adverse effect on ecology throughout the catchment.

Other Frameworks and Plans ►

There are other frameworks and plans that support this document. We have integrated the objectives of these plans into our objectives for the catchment. The plans also share a number of projects and aim to strengthen each other to gain support and funding.

OTHER FRAMEWORKS AND PLANS

THE LONDON PLAN AND THE BLUE RIBBON NETWORK

The London Plan is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. Policy 2.18 of the London Plan calls for the protection, promotion and management of London's network of green infrastructure. The plan promotes the idea that water is a valuable and scarce asset within London and it must be set within sustainable limits which prioritise those uses and activities that need a waterside location.

Policy 4C.1 of the London Plan outlines the importance of a 'Blue Ribbon Network' of healthy and sustainable rivers throughout the capital. It states that "The Mayor will, and boroughs should, recognise the strategic importance of the Blue Ribbon Network when making strategies and plans, when considering planning applications and when carrying out their other responsibilities. Other agencies involved in the management of the Blue Ribbon Network should recognise its strategic importance through their policies, decisions and other activities."

Policy 4C states that: "All agencies involved in the management of the Blue Ribbon Network should seek to work collaboratively to ensure a coordinated and cohesive approach to land use planning, other activities and the use of the Blue Ribbon Network. Decisions should be based upon the Blue Ribbon Network Principles."

THE ALL LONDON GREEN GRID (ALGG)

The All London Green Grid builds on policy 2.18 of the London Plan and aspires to create a network of inter-linked, multifunctional and high quality open spaces connecting town centres, public transport hubs and major employment and residential areas with parks and open spaces, the Thames and the green urban fringe. The ALGG intends to do this by:

1. Increasing access to open space.
2. Conserving landscapes and natural environment and increasing access to nature.
3. Adapting the city to the impacts of climate change.
4. Making sustainable travel connections and promoting cycling and walking.
5. Encouraging healthy living.
6. Promoting sustainable food growing.
7. Enhancing visitor destinations and promoting green skills and sustainable approaches to design management and maintenance.

Eleven ALGG Area Frameworks have been produced. These have been produced by All London Green Grid Area Groups. The Crane Valley falls under the ALGG Area 10 framework composed of two cross boundary initiatives: the Colne Valley Regional Park and Crane Valley Partnership.

THE LONDON RIVERS ACTION PLAN (LRAP)

The main aim of the 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.

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

The five key aspirations of the plan are to:

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.

BIODIVERSITY ACTION PLANS (BAPs)

The London Biodiversity Action Plan (BAP) identifies priority habitats that are of particular importance for biodiversity in London. Many of these habitats are covered by Habitat Action Plans (HAPs) and in area-specific BAPs produced by local authorities. The London BAP has 11 HAPs. Most cover just one priority habitat, but others cover several priority habitats e.g. Ponds, Lakes and Canals are all featured in the Standing Water HAP.

Priority Habitats include:

1. Acid grassland.
2. Chalk grassland.
3. Heathland.
4. Parks and urban green spaces.
5. Private gardens.
6. Reedbeds.
7. Rivers and streams.
8. Standing water.
9. Tidal Thames.
10. Wasteland.
11. Woodland.

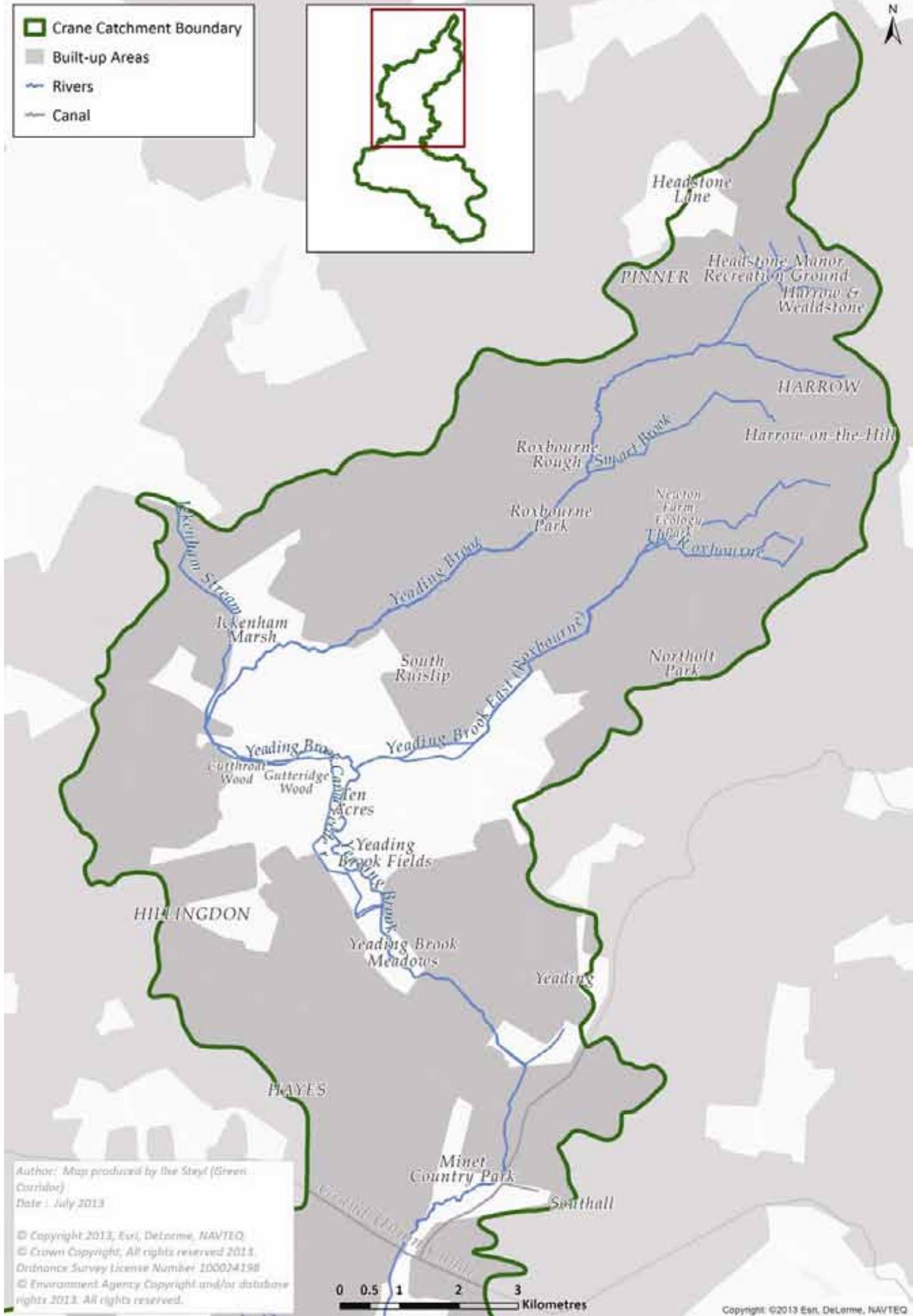
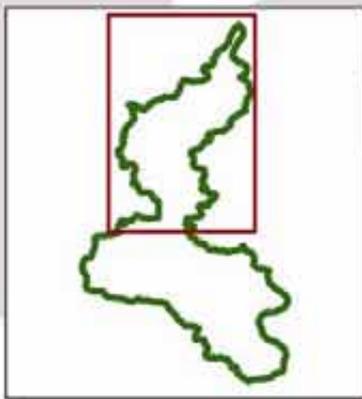
Other important habitats include:

1. Built structures.
2. Meadows and pastures.
3. Fen, marsh and swamp.
4. Open landscapes with ancient/old trees.

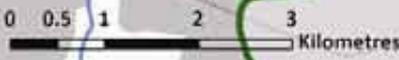
Partners and developers are encouraged to take action to deliver the habitat targets on their own land and incorporate them in their own BAPs. Greenspace Information for Greater London (GiGL) has produced London Habitat Suitability Maps, which allow areas to be identified where creating and improving habitats would give the best benefit to biodiversity. Nevertheless, further resolution is required to identify these in detail.

Further details can be found on BARS, the UK-wide Biodiversity Action Reporting System.

Crane Catchment Boundary
 Built-up Areas
 Rivers
 Canal



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The upper catchment map ▲

THE UPPER RIVER: THE YEADING BROOK

Harrow, Ealing, Hillingdon

The Yeading Brook West comprises 11.2km of river channel. It rises at Headstone Manor, North Harrow and flows through Harrow to Rayners Lane and Ruislip. The river has been artificially straightened for part of its duration and suffers from heavily modified banks in many places. A large part of the upper brook is also forced into an underground culvert, designed to divert flood waters away from housing developments and North Harrow underground station.

Notable sites for wildlife conservation along the river's reach include Ickenham Marsh, Roxbourne Park, Roxbourne Rough, Cutthroat Wood and Gutteridge Wood and Meadows. The river receives water from the Smarts Brook at Roxbourne Park, a now lost tributary of the Yeading Brook, which is culverted in its entirety and a source of poor quality water.

The Yeading Brook East, locally known as the River Roxbourne, also rises in Harrow and can be first sighted at Newton Park Ecology Farm. It comprises 6.7km of river channel but for a notable length the river is culverted and cannot be followed above ground. It converges with its westerly neighbour in Ruislip on the southern side of Western Avenue.

After the two arms of the river merge in North Hillingdon, the Yeading Brook enters Ealing before returning to Hillingdon whilst passing through the wildlife havens of: Ten Acre Wood, Michael Frost Park, Yeading Brook Fields, Yeading Brook Meadows and Minet Country Park. All sites are publicly accessible. Ten Acre Wood and Gutteridge Wood are managed by London Wildlife Trust on behalf of the London Borough of Hillingdon. The other sites are managed by the London Boroughs of Hillingdon and Ealing.

The Grand Union Canal

The Grand Union spans 220km and is a historical transport link between London and Birmingham. The Canal crosses the Crane in Hayes before splitting into two arms, serving Paddington and Brentford.

WFD Status

River	WFD Water body ID	2009 Ecological Potential	2012 Ecological Potential
Yeading Brook West	GB106039 023060	Moderate (2009 RBMP official status)	Moderate (Based on current best evidence)
Yeading Brook East	GB106039 023050	Moderate (2009 RBMP official status)	Moderate (Based on current best evidence)
Grand Union Canal	GB706100 78	Good (2009 RBMP official status)	Moderate (Based on current best evidence)



Headstone Manor, Harrow



Roxbourne Park



Yeading Brook Meadows



Ten Acre Wood

THE LOWER RIVER: THE CRANE

Hillingdon, Hounslow, Richmond

After leaving Minet Country Park, the following 17km of river channel becomes formally known as the River Crane. The Crane flows south through Hillingdon to Cranford Country Park, a historic countryside estate that was originally the grounds of Cranford House, offering public access to the Crane and surrounding open space and woodland. After leaving this area the river passes Avenue Park, Hounslow, and then flows on to the outskirts of Heathrow Airport.

At this point the river receives water from the Heathrow balancing reservoirs, a reservoir system designed to receive and treat runoff from the impermeable landscape of the country's largest airport. The water the Crane receives at this point is much needed in terms of improving river depth and flow. During cold winters, more anti-icers and de-icers are used at the airport to protect planes and runways. If very cold weather coincides with heavy rainfall, the treatment capacity of the reservoirs may become overloaded and glycol in the discharges raises the river's biological oxygen demand and reduces levels of dissolved oxygen. The airport is working with the Environment Agency to resolve this problem.

After leaving the outskirts of the airport the river continues south, flowing past Donkey Wood, Brazil Mill Wood and Hounslow Heath, to the east, and Feltham Marshalling Yards, to the west. Brazil Mill Wood was home to a dye works in the 16th-17th century, making pigment from the Brazil wood grown on site. The bridge, sluices and mill race associated with the mill still exist on this part of the river today. At this point the Crane is also joined by an artificial tributary flowing from the River Colne, the Duke of Northumberland's River. The extra volume of water provided by the DNR helps maintain the main river's flow.

The Crane next enters Pevensey Road Open Space, a local nature reserve that features areas of meadow, scrubland, woodland and newly created wetland habitats alongside the River Crane. This area borders Crane Park as the river flows underneath Hanworth Road. Crane Park provides a mosaic of woodland, scrub and reedbeds. There are a number of islands scattered throughout the river here, one of which is home to London Wildlife Trust's Crane Park Island nature reserve. The island was created in the old mill pond that drove the once active mill race that can still be seen near the park's historic Shot Tower and ruins. Water voles and kingfishers can often be seen on this stretch of the river and it is a favourite port of call for many conservation groups, volunteers and school groups.

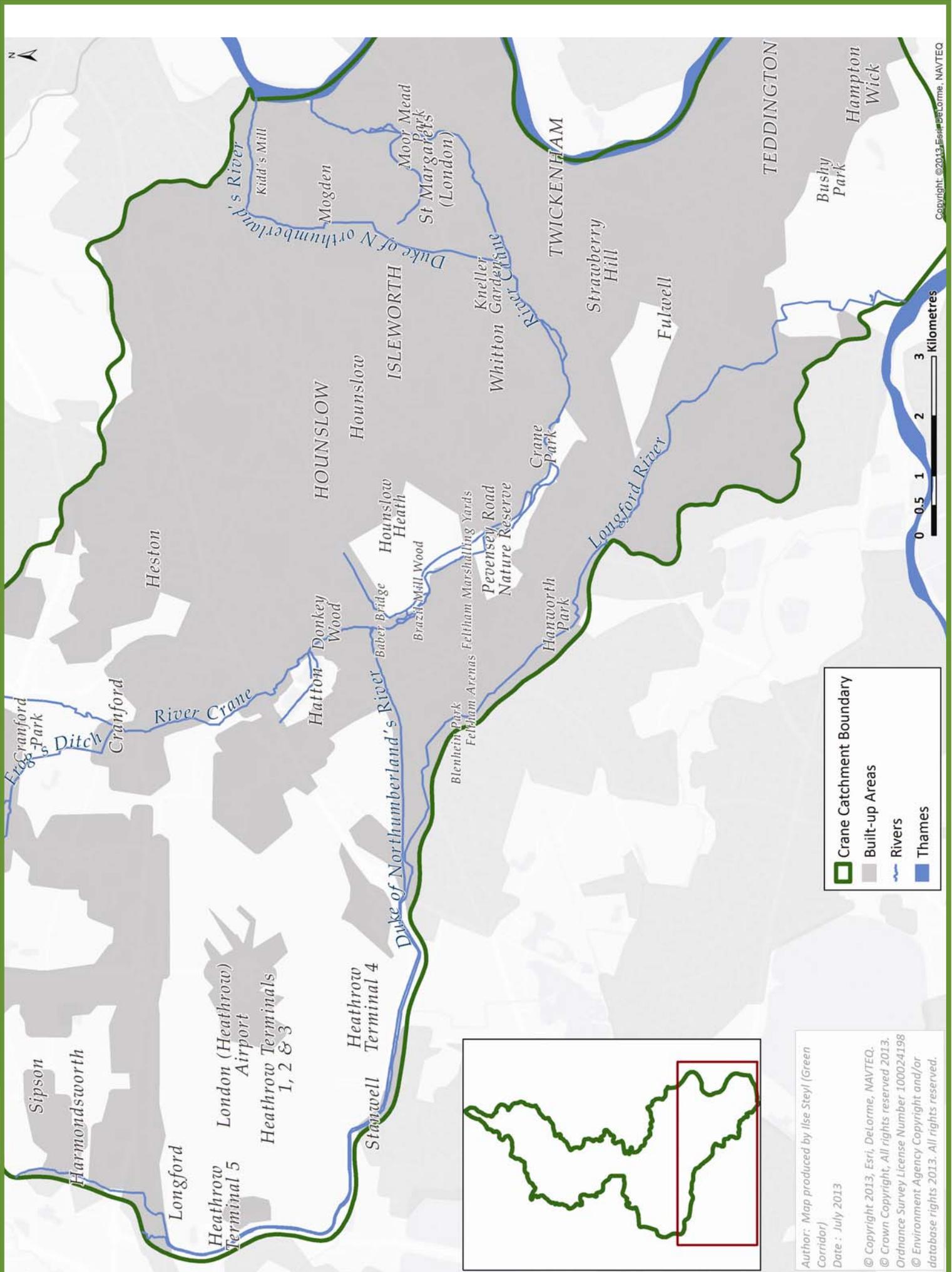
Upon leaving Crane Park the river takes an easterly direction and enters Kneller Gardens where it is bordered by allotments and residential housing. The Duke of Northumberland's River leaves the Crane at Mereway

Road, where the river is split, significantly reducing flow downstream of this feature. The main river continues through the heavily urbanised areas of Twickenham and St Margarets, where it is met by the Whitton Brook near the A316. Next it passes Isleworth, where it is often forced into concrete channels and fish migration is impeded by a series of man-made barriers. Here the Crane becomes tidal before it converges with the River Thames at the southern end of Isleworth Ait nature reserve, in the middle of the Thames.

WFD Status

River	WFD Water body ID	2009 Ecological Potential	2012 Ecological Potential
River Crane	GB106039 023030	Poor (2009 RBMP official status)	Poor (Based on current best evidence)





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The Longford River and Duke of Northumberland's River map ▲

THE DUKE OF NORTHUMBERLAND'S RIVER AND THE LONGFORD RIVER

The Duke of Northumberland's River (DNR)

The Duke of Northumberland's River consists of two sections of artificial waterway, constructed during the reign of King Henry VIII to increase the flow of the Crane in order to supply more power to existing water-mills on the river, and to provide an area for new mills to be built. The river provided a source of revenue to the Duke of Northumberland's estate. The DNR flows from the River Colne to the Crane in Hounslow. The second section flows from the Crane to the River Thames.

The western section of the river is 9.3km in length and diverts water from the River Colne near Harmondsworth Moore, West Drayton, to the Crane at Donkey Wood, Hounslow. The DNR provides a much needed volume of water to the main river and helps maintain flows. The DNR skirts the western and southern perimeter of Heathrow airport, running alongside its twin river, the River Longford, which also flows from the Colne. The rivers were diverted along their current course in 2002 as part of the *Twin Rivers Diversion Scheme* associated with the construction of Terminal 5. The scheme saw parts of the rivers that were once culverted under the airport's runways, reopened to wildlife. However, these sections of river are still lined with concrete panels and pass through heavily industrialised areas.

The two rivers separate in Bedfont, southeast of Terminal 4. This section of the DNR meets the Crane at Donkey Wood, Hounslow and flows as the Crane until it splits off in its eastern reach at Mereway Rd, Kneller Gardens, Twickenham.

The eastern section of the river takes a noticeable amount of flow from the Crane and is thought to be the reason why flows and river levels are so low on the main river beyond this point. The DNR flows through Twickenham, past the rugby stadium and on to Isleworth. The river flows past Mogden Sewage Treatment Works before supplying the ponds of Syon Park with their water. Syon House is the former residence of the Duke of Northumberland himself. Just before the river eventually meets the Thames on the northern side of Isleworth Ait, the man-made structure of Kidd's Mill Sluice presents a major barrier to fish migration.

The Longford River

The Longford River is an artificial water body that provides the catchment with 12km of river channel. It was built by King Charles I in 1639 to supply water to Bushy Park and Hampton Court Palace. The river also flows from the Colne, and flows from Longford, near Colnbrook, to the River Thames on the south side of Hampton Court Palace.

After flowing south from its source, the river's first major point of call is Heathrow Airport. The river's course has been diverted on a number of occasions due to airport

expansion, most recently due to the *Twin Rivers Diversion Scheme*, as mentioned previously.

After leaving the southern perimeter of the airport, the Longford flows south east through Bedfont, Feltham and Hanworth, passing through Blenheim Park, Feltham Arenas, and Hanworth Park. The river is forced through a series of culverts around the Hanworth Park area, impeding connectivity and causing a barrier to the migratory movements of mammals and fish. The river passes under the Hounslow and Uxbridge Roads before flowing through an aqueduct running over the Shepperton railway branch. After this point the river flows through Hampton Hill before entering Bushy Park through its western perimeter.

In the Royal Park itself, the river is diverted in a number of directions to feed several ponds. Various strands of the river are also culverted away from Bushy Park to feed water features, ponds and waterways in Hampton Court Palace Gardens and Home Park. The river is forced underground again before entering the Thames at two points on the south side of Hampton Court Palace, adjacent to the River Mole and at Raven's Ait in Surbiton.

WFD Status

River	WFD Water body ID	2009 Ecological Potential	2012 Ecological Potential
DNR East	GB806100095	Good (2009 RBMP official status)	Moderate (Based on current best evidence)
DNR West	GB806100108	Good (2009 RBMP official status)	Moderate (Based on current best evidence)
Longford River	GB106039023450	Moderate (2009 RBMP official status)	Moderate (Based on current best evidence)



The DNR near Twickenham Rugby Stadium

ECOLOGY

The Habitats of the Crane Catchment

Lowland River (In-river habitat)

Lowland rivers, such as the Crane, are warm in temperature, with slow flows and moderate levels of dissolved oxygen. They support fish, aquatic invertebrates and plant life that can tolerate these parameters. A diverse range of aquatic wildlife is indicative of good water quality and a healthy river.

Species of fish found in the Crane include: European eel, chub, dace, barbel, roach, perch, minnow, stickleback, bullhead and stone loach. The presence of some of these species is, however, now unknown following a pollution incident in 2011.

Species of aquatic invertebrate include: caddisfly, mayfly, leeches and bloodworm, and aquatic plants include river water crowfoot and starwort.

Locations Found: Whole Catchment.

Lowland River (Riparian Zone)

A riparian zone is the area that falls between land and river. This habitat is extremely important due to its influence on aquatic and terrestrial habitats and its function to act as a buffer zone against pollution.

The riparian zone of the Crane supports small mammals such as water vole, birds such as kingfisher, wagtails and grey heron, and provides shelter for species of fish against predation.

Locations Found: Whole Catchment.

Oxbow Lakes

Oxbow lakes exist in areas where the river has been artificially straightened. Historically these lakes have been left overgrown and over shaded with willow, ash, elder and hawthorn. As a result the lakes have become badly silted up with leaves and other organic debris.

Recently work has taken place to begin reconnecting and restoring some of these lakes, opening them up to plant species such as yellow flag iris, yellow cress and sweet grass. As water quality is restored in these lakes they will become home to a range of aquatic invertebrates, such as dragonfly larvae, and provide an important nursery area for juvenile fish.

Locations Found: Crane Bank, Donkey Wood, Pevensey Road Open Space, Ten Acre Wood.

Wet Woodland

Wet woodland occurs on poorly drained or seasonally wet soils. They are typically found in river valleys, such as the Crane. Wet woodland in the catchment is predominantly composed of willows and alders. This is due to the two species' ability to extract oxygen from their water saturated habitat. Wet woodland is able to support a range of invertebrates including beetles and craneflies, and the associated mammals and birds that



In-river: River water crowfoot (a sign of good flow)



Riparian: Reedbed at Crane Park Island



Oxbow Lake: Pevensey Road Open Space



Wet Woodland: Donkey Wood

feed on them.

Locations Found: Donkey Wood, Ickenham Marsh, Pevensy Road Open Space.

Dry Woodland and Scrub

Woodland provides shelter for many creatures. Trees provide animals such as birds and deer with nuts and fruit, invertebrates such as stag beetle larvae thrive on decomposing organic matter and varied scrub vegetation can support a diverse range of insect life.

Woodland areas within the catchment can be composed of a range of: oak, ash, sycamore and horse chestnut. Scrub habitat includes: hawthorn, holly and brambles and can contain associated ground flora such as: cow parsley, stinging nettle, ivy and common bluebell.

Locations Found: Gutteridge Wood, Ten Acre, Donkey, and Brazil Mill Woods, Mereway Nature Park.

Marsh

A marsh is a wetland habitat dominated by herbaceous rather than woody plant species. Marshes are often found where there is a transition between aquatic and terrestrial ecosystems. The marsh habitat in the catchment is dominated by reed sweet-grass but also contains reed-mace and common reed amongst other species. Reeded areas provide superb cover for birds, voles and insects such as dragonflies.

Locations Found: Hounslow Heath, Green Lane, Ickenham Marsh.

Pasture

Pastures are the product of hundreds of years of land management and typically consist of widely spaced, large trees interspersed with grazed grassland, heathland and woodland wildflowers.

Pastures in the Crane catchment can be home to plant species such as: bugle, meadowsweet, cuckooflower, ragged robin and dropwort. These mature pastures make a good home for insect species such as butterflies, grasshoppers and bumblebees.

Locations Found: Yeading Brook Fields, Yeading Brook Meadows, Cutthroat Woods, Ten Acre Wood, Cranford Country Park, Huckerby's Meadows, Hounslow Heath.

Grassland and Heathland

UK lowland grasslands are a priority for nature conservation. This is due to their steep decline and scarcity. Grasslands offer a home to a wide range of highly specialised plants and animals. Acid grassland develops on low nutrient acidic soils overlaying acidic rocks or free-draining soil such as those found in many places in London.

Grasslands in the Crane catchment, such as Feltham Marshalling Yards, provide an area of dry herb-rich grassland, including regionally rare species such as: vipers bugloss, sainfoin, salad burnet and haresfoot clover.

Locations Found: Crane Park, Feltham Marshalling Yards, Gutteridge Wood, Pevensy Road Open Space, Twickenham Rifle Club, Yeading Brook Meadows.



Dry Woodland



Marsh: Old water meadows at Green Lane



Pasture: Yeading Brook Meadows



Grassland: Yeading Brook Meadows

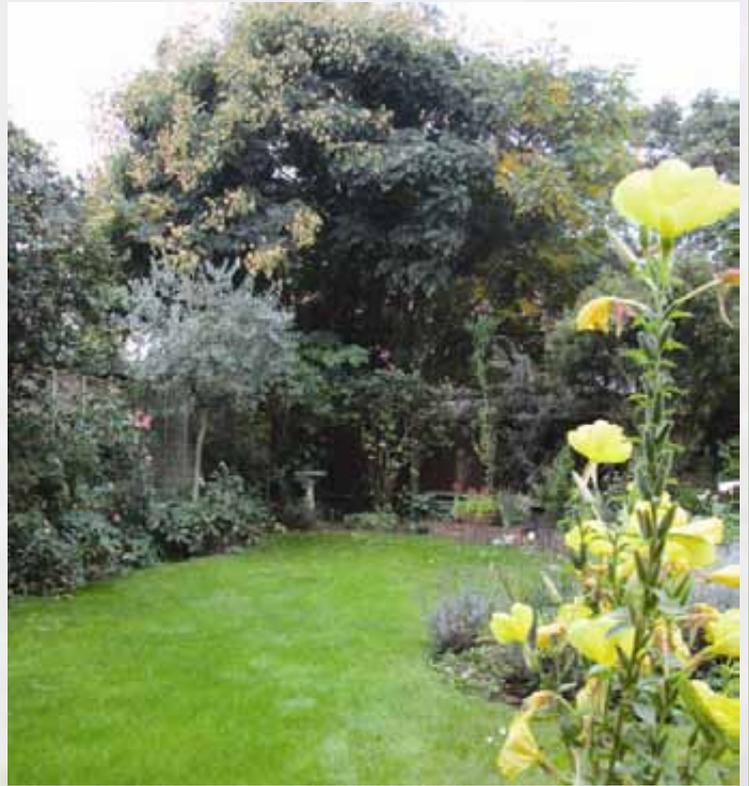
ECOLOGY

Urban Habitats

Gardens and Allotments

Domestic gardens and allotments in the catchment provide an important home for wildlife. Many species that are declining in the countryside, such as the common frog, song thrush and hedgehog, can thrive in domestic gardens and allotments if we provide the right conditions for them. Gardens in the Crane catchment help break up the urban landscape of West London, giving wildlife access to areas that are ordinarily inaccessible.

Residents can improve the biodiversity of their gardens in a number of ways. Planting a range of plants with different flowering times ensures that gardens are in flower from spring until autumn, benefiting bees, butterflies and other insects. A variety of trees, shrubs and climbers will provide good food and shelter for wildlife such as nesting birds. Mature trees should be cared for instead of removed. Garden ponds provide important refuge for aquatic life such as amphibians and invertebrates, but only in the absence of fish. Leaving a pile of dead wood creates a home for beetles and other mini-beasts. Building compost heaps can shelter a range of creatures, including slow worms and grass snakes.



Key Indicators of River Health

Aquatic Plants

Aquatic plants can be useful water quality indicators. River water crowfoot requires a stony substrate with shallow, fast flowing, oxygen-rich water, clean and free of pollutants.

Aquatic Invertebrates

Many aquatic invertebrates cannot survive in polluted or excessively engineered rivers. Their presence or absence indicates the extent to which a body of water is polluted. Mayfly and caddisfly larvae are indicative of a clean river with good flows, whereas an absence of these species and a presence of invertebrates such as bloodworms and sludge worms is indicative of poor water quality and potentially, a polluted river.

Fish

Fish species such as bullhead and stone loach thrive in fast flowing, well oxygenated rivers with hard and stony substrates. Sustainable populations of these species indicate good river health. The presence of migratory species of fish, such as the European eel, indicates that a river has good connectivity with neighbouring water bodies.

Birds

Common kingfishers are good indicators of freshwater community health. The highest densities of breeding birds are found in habitats with clean, clear water, making prey easily visible, with good riparian habitat for cover. Sustainable populations of these birds are also indicative of sustainable populations of fish.



River water crow foot



Caddisfly larvae



Bullhead



European eel



Kingfisher

ISSUES AFFECTING THE CATCHMENT

Invasive Species

The Crane, like many other rivers in the UK, is home to a number of invasive plant species. These species cause structural damage, increase erosion or create a risk to public health, as well as excluding native species. The invasive species with the greatest need for control are listed below.

Japanese knotweed (*Fallopia japonica*)

Japanese knotweed is a tall, vigorous ornamental plant that escaped from cultivation in the late nineteenth century to become an aggressive invader in the urban and rural environment. Japanese Knotweed is lush green in colour with shovel shaped leaves and a red, hollow stem. It produces white flowers around September or October and can grow by 10cm a day. The weed can cause heave below concrete and tarmac, coming up through the resulting cracks and damaging buildings and roads.

Himalayan balsam (*Impatiens glandulifera*)

Himalayan balsam was introduced to the UK in 1839 from Northern India. It is most commonly found on river banks and damp areas, although it is capable of living in many other habitats. The species spreads quickly due to its lack of natural predators and disease. It grows in dense stands up to 3 meters tall and dominates areas, shading out our native plant species. As Himalayan balsam dies back in late autumn, the plant leaves bare areas of river bank that are susceptible to erosion.

Giant hogweed (*Heracleum mantegazzianum*)

Giant hogweed is native to the Caucasus Mountains of southwest Asia and was introduced to the UK in 1893. The plant grows rapidly due to the dispersal of seeds by water, colonising river banks. The plant's hollow stems can be 5-10cm in diameter, with raised purple spots and bristles along their length. In summer months it can reach a height of 3-4m when its white, umbrella-like flowers bloom, which can be 70cm in diameter. Giant hogweed can cause human health issues arising from a poisonous sap on the leaves, causing burns and irritation as it comes in contact with skin exposed to sunlight.

Floating pennywort (*Hydrocotyle ranunculoides*)

A North American plant introduced to British waterways in 1980 by the aquatic nursery trade. It roots in the shallow margins of slow flowing rivers and forms dense mats of vegetation that rapidly cover the water surface interfering with both the ecology, morphology and amenity uses of the river.

The plant's leaves can be circular or kidney shaped and can grow to a maximum size of 18mm diameter, extending up to 40cm above the water surface, with its roots extending up to 50cm downwards.



Japanese knotweed: Roxbourne Park



Himalayan balsam: Crane Park



Giant hogweed: Pevensey Road Open Space



A dense mat of floating pennywort

ISSUES AFFECTING THE CATCHMENT

Heavily Modified Channels

River Channelisation

River channelisation involves a series of engineering practices historically used to control flooding, to drain wetlands and to improve navigation. Methods of channelisation found on the River Crane include widening, straightening and bank enforcement.

Alterations to a river's morphology, such as those found on many parts of the Crane, are known to negatively impact the way a river functions. By removing meanders, river channels are shortened and gradients are increased. This has been shown to alter flows, depth and affect the deposition of sediment along many reaches of river.

River channelisation has been shown to have a negative effect on wildlife, especially fish. This can be attributed to the loss of the natural pool-riffle sequence associated with the variety of low flows that fish require for shelter. Meanders create the areas of slack water that fish require to hold position when currents are fast. Straightened channels also lack the habitat complexity that diverse populations of macro-invertebrates need to thrive. Enforcing the banks of rivers also reduces biodiversity in terms of marginal and riparian plant life, avian species including kingfishers, and mammals such as water voles.

Restoring Channelised Stretches of River

In order to restore these heavily modified stretches of river we must redefine the river's shape by: creating meanders and using flow deflectors to naturalise straightened channels; removing wooden toe-boarding where appropriate to improve the riparian zone; narrowing overly widened sections, in order to improve flow, by redefining banks through techniques such as faggoting and spiling; removing culverts to open up lost

sections of river; improving substrate via the introduction of new gravels or the creation of structures that cause scouring.

Barriers to Fish Migration

The Crane hosts a number of man-made barriers that prevent fish stocks utilising the river's entire reach. These barriers also prohibit the ingress of fish species from the River Thames. This is hindering the rehabilitation of the river's fish stocks and poses a serious threat to migratory species such as the European eel.

The Zoological Society of London have identified 19 barriers on the lower river and their eel monitoring surveys show that elvers (juvenile eels migrating to the river from the sea via the Thames) are unable to pass these obstructions. The EA have begun identifying barriers for removal or for mitigation via the installation of fish passes.

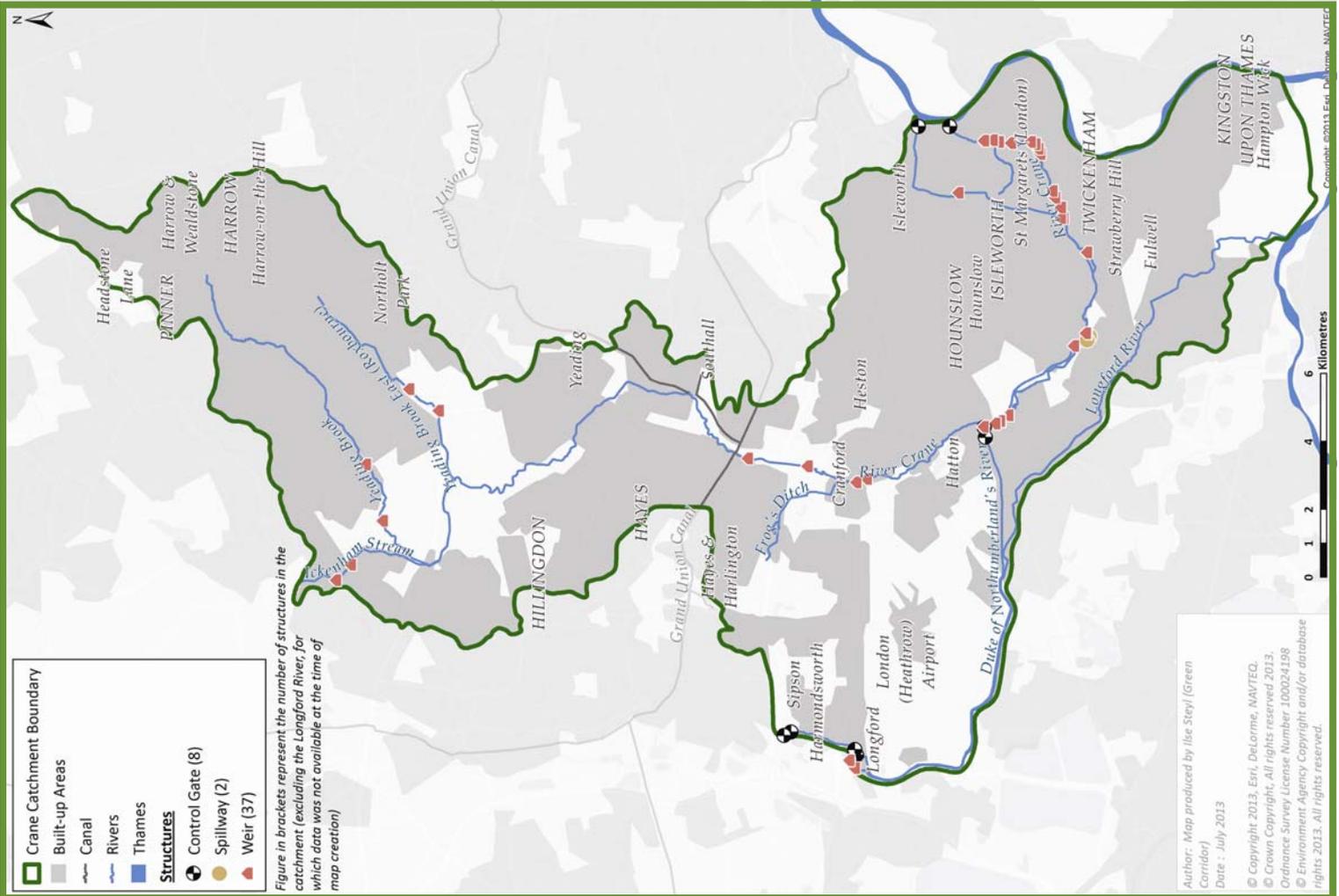
Barriers, such as the Kidds Mill sluice, prevent migratory fish from ascending the river



An overly widened and straightened channel is realigned and a back water is created using flow deflectors and faggoting.

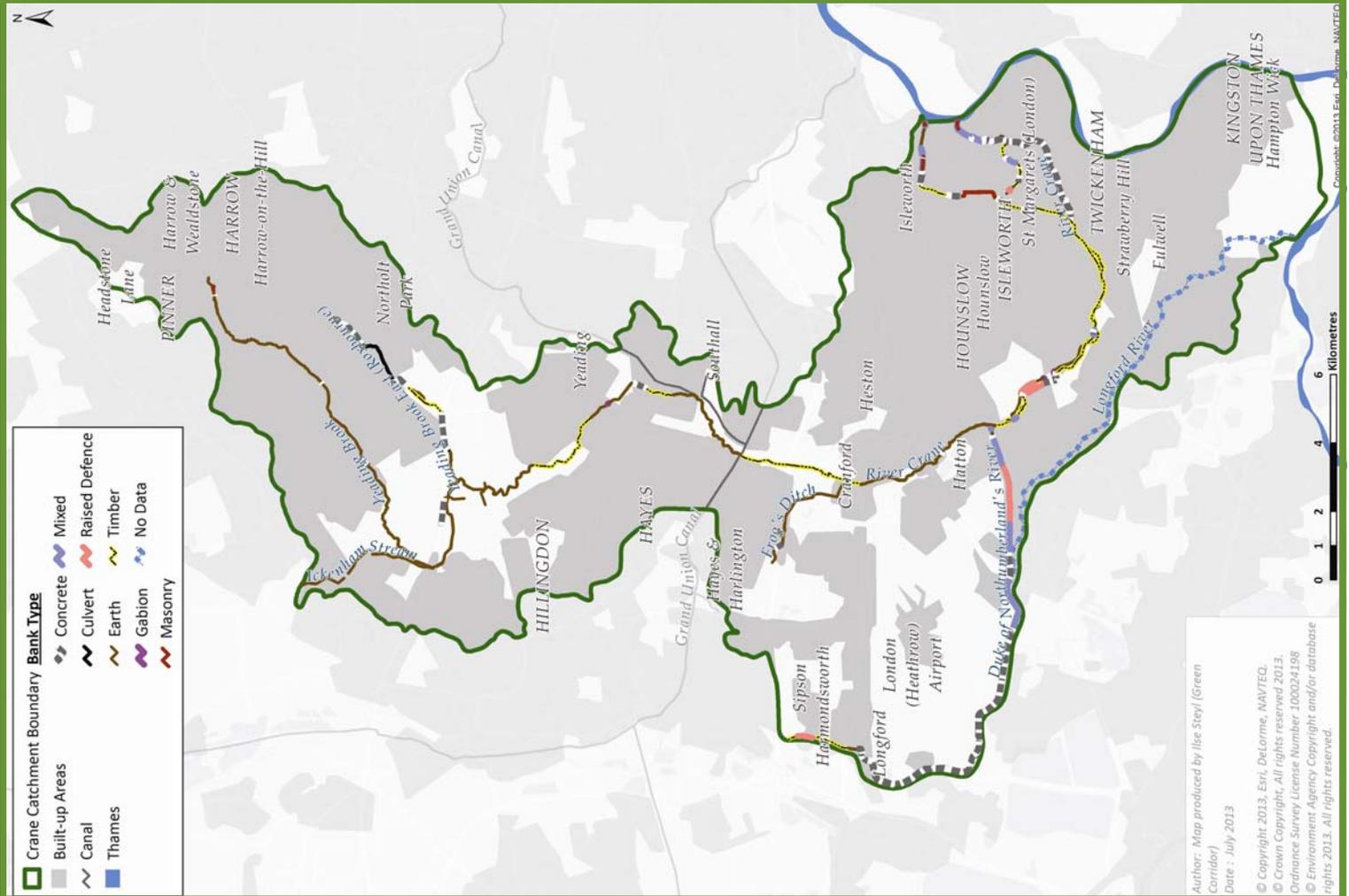


Volunteers install faggots to create meanders and narrow the river at Crane Park



▲ Barriers to fish migration throughout the catchment

▼ Type of bank throughout the catchment



ISSUES AFFECTING THE CATCHMENT

Pollution

The Crane is typically subject to pollution, both direct and diffuse. Pollution has been present on the Crane for several hundred years, although changing in type, source and intensity.

Surface Water Runoff

Surface water runoff has an impact on the water quality of the river. This is due to surface water picking up contaminants as it drains from the urban landscape and flows into the river. Contaminants that create the greatest impact to surface waters include petroleum substances, herbicides and fertilisers. High levels of these chemicals can cause serious damage to aquatic life, affecting fish at every life stage, and cause illness in birds. Surface water runoff can cause major problems in the river during periods of high temperature, when oxygen levels are naturally lower and fish are more vulnerable.

The Crane also suffers from high levels of glycol when freezing temperatures coincide with heavy rainfall. In freezing conditions glycol is used by Heathrow Airport as an anti-freeze agent. Heavy rainfall may then overload the treatment capacity of the airport's reservoirs and excess glycol may be discharged into the Crane. Its effects can be seen in the river as grey fungus and although it is unproven to have a direct effect on aquatic life, glycol does raise the biological oxygen demand (BOD) of the river. Increased BOD leads to lowered levels of dissolved oxygen (DO) and this can be detrimental to aquatic life forms that cannot tolerate low levels of DO.

Sewage Misconnections

It is easy to assume that river pollution comes from places like factories, farms and industry. Yet, in many cases the pollution in our rivers comes from a much less obvious source - our homes. Incorrect plumbing could mean that waste water from dishwashers, washing machines, sinks, baths and even toilets is flushed directly into a local river. People doing their own plumbing and even professional plumbers can accidentally create these misconnections. These 'misconnected' pipes are a common cause of pollution to rivers and streams, especially in towns and cities.

When untreated sewage enters our rivers, DO can drop significantly and ammonia levels may become toxic to fish. Grey fungus is typically seen on the bed and banks of the watercourse, or on other structures such as outfall pipes and gullies.

What is being done about misconnections in the Crane Valley?

The Environment Agency and Thames Water are identifying polluted outfalls and surveying the entire catchment to identify misconnected properties. Once the misconnection has been demonstrated to the property

owner they must arrange for the problem to be resolved.



owner they must arrange for the problem to be resolved.

What can local people do?

Working together is essential if we are to solve the issue of misconnections. Your home could be misconnected, and we need you to help by checking the external drainage on your property. Please visit the Connect Right website to find out if your home is connected properly www.connectright.org.uk. Speak to your neighbours and friends and get them to check their drainage too.

Blocked Sewers

Fats, oil and grease (FOG) are a common cause of blocked sewers. This happens due to people incorrectly disposing of FOG down their sinks and drains. Blocked sewers can overflow and lead to spills and flooding that can be harmful to the environment and hazardous to our health.

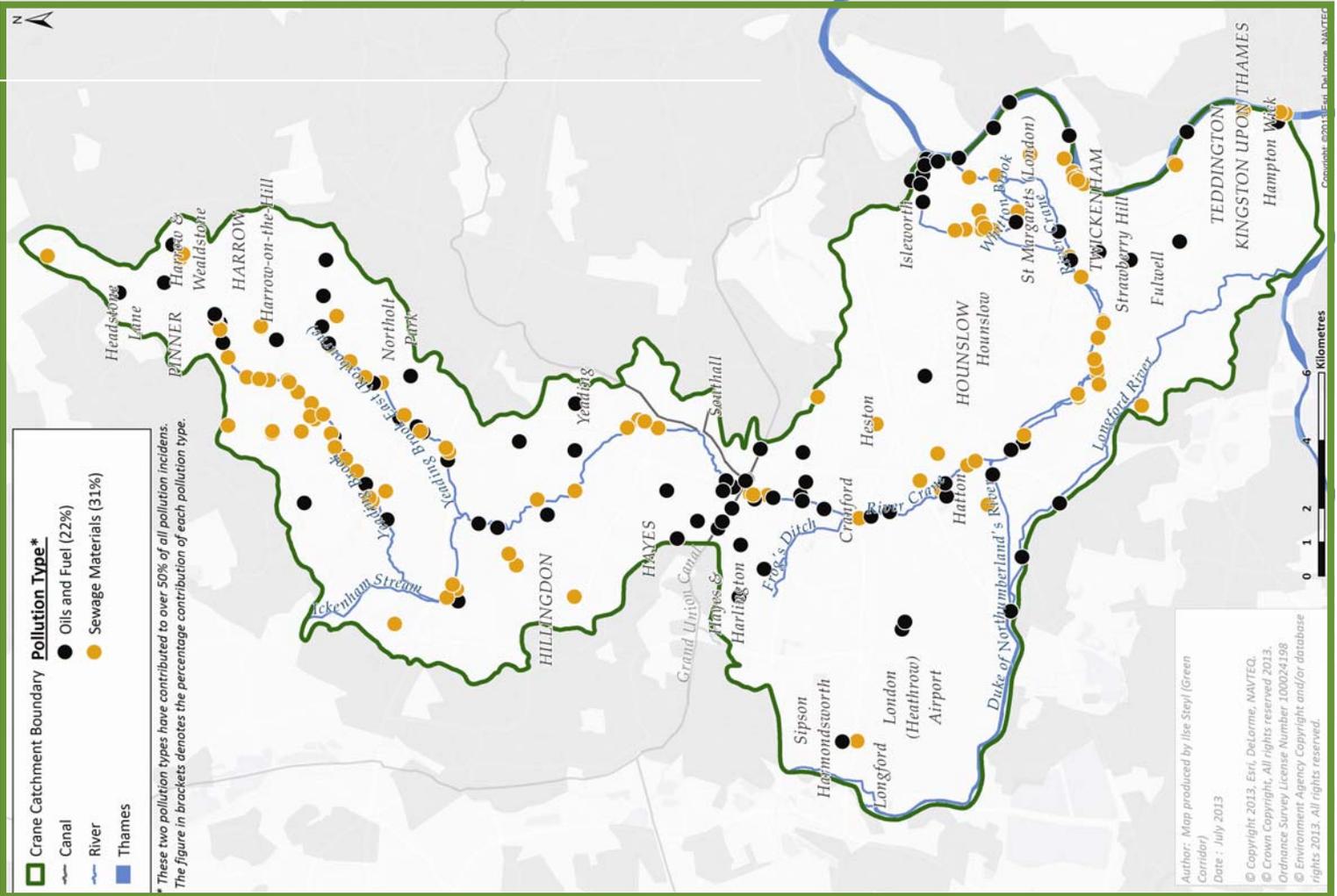
It is easy to help prevent fat, oil and grease blockages. When you've finished cooking, just pour the hot liquid into a container, allow it to set and then dispose of it in your rubbish bin. For full guidance please visit:

<http://www.water.org.uk/home/resources-and-links/snap/snap/11807---fog-a4-12-page-ver1.pdf>.

Pollution Incidents

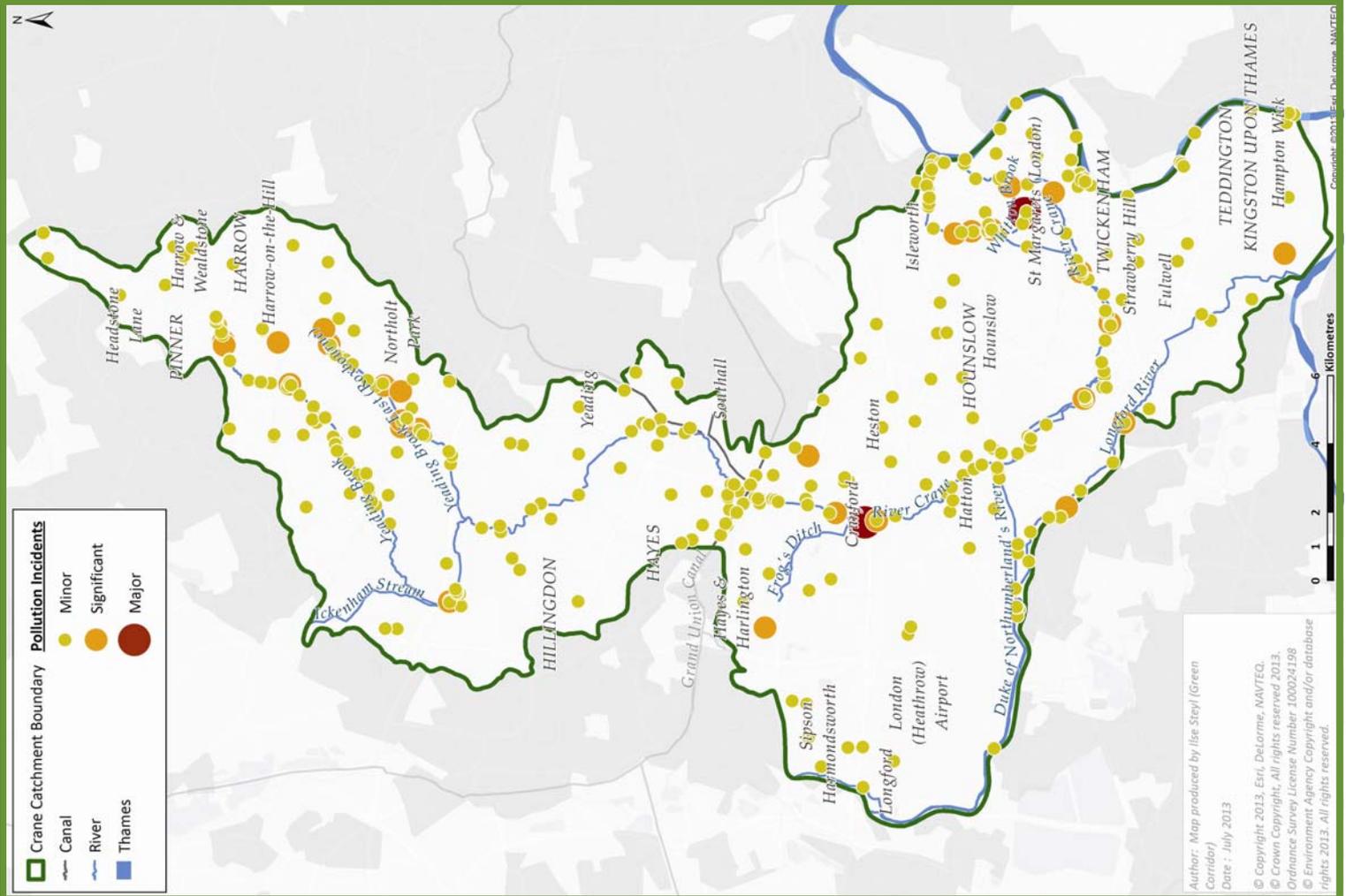
There have been many pollution incidents in the catchment over the past 11 years. The maps on page 23 illustrate the number of pollution events and type of pollution that occurred between 2001-2012. We need you to help by reporting any pollution incident you see to the Environment Agency's incident hotline. This way, they can deal with it efficiently, record it and try to find out who is responsible. So don't ignore it, report it!

0800 80 70 60



▲ Type of pollution (2001-2012)

▼ Number of pollution incidents (2001-2012)



ISSUES AFFECTING THE CATCHMENT

Risk of Flooding

Surface Water Runoff and River Levels

The impermeable London clay geology throughout the catchment makes runoff relatively rapid during periods of rainfall. The predominant urbanisation of the catchment has exacerbated this natural situation. Concreted streets drain directly into surface water sewers that discharge into the river when it rains. In the catchment's natural state, water was able to drain through soil, ensuring a slower release into the river and surrounding floodplain. In its urbanised state, water is quickly flushed into the watercourse causing river levels to sharply rise, sometimes overtopping the river's banks.

Loss of Natural Floodplain

The urbanisation of the catchment has also seen housing and industrial developments encroach on the floodplain. This has led to the river being put into restrictive structures and channels to prevent it from flooding these areas. Although this can prevent flooding in a localised area it can be responsible for moving the problem downstream to areas where there is a smaller area for the river to flood.

Restrictive Structures

Many reaches of the river, especially small tributaries and historical drainage ditches, have been either culverted, canalised, turned into sewers or are significantly engineered. It is believed that some flooding in the northern part of the catchment is caused by the overflowing culverted tributaries, manholes and drainage systems.

Rubbish, Debris and Silting

The accumulation of rubbish, debris and vegetation can block channels and screens causing water to back up and overflow the river banks or culverts. Blanket weed was quoted as the cause of the flooding upstream of Field End Road in 1999 when it clogged up the culvert trash screen and flood levels behind it were too high to allow clearing until after the flood. It is important that debris and rubbish thrown in or washed into the watercourses from riverside paths is removed on a regular basis.



The Twickenham Crane lost much of its floodplain to housing developments in the 1800's resulting in flood events becoming a regular occurrence by the turn of the 20th Century.

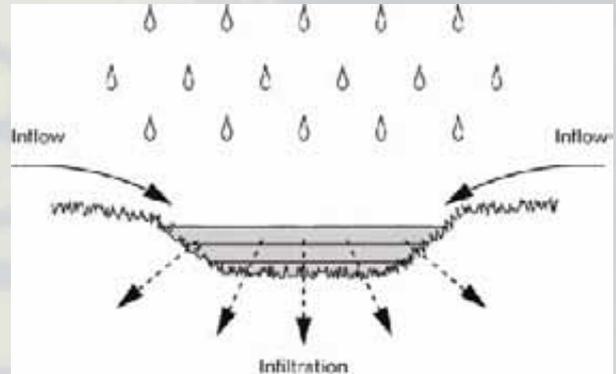
When have floods occurred on the Crane?

Historically flooding has been a regular occurrence on the Crane. Floods have taken place in: 1763, 1892, 1895, 1903, 1914, 1916, 1920, 1927, 1928, 1947, 1958, 1959, 1965, 1968, 1974, 1977, 1979, 1987, 1988, 1990, 1992, 1993, 1999 and 2000.

What can be done to prevent flooding?

Sustainable Urban Drainage Systems (SUDS)

SUDS are designed to reduce the potential impact of new and existing developments in terms of surface water drainage. They now must be implemented on all new developments where appropriate.



SUDS try to replicate natural drainage systems in order to drain away surface water runoff sustainably. SUDS ensure that water is stored and cleaned before it is slowly released into watercourses such as the Crane. This prevents sharp rises in river levels and reduces the impact of pollution. Reedbeds, and other wetland habitats that allow water to be collected, stored and filtered, can be used as part of this type of system. They are advantageous as they also provide a great habitat for native wildlife and can provide an attractive green space for people to enjoy.

For full guidance on implementing SUDS see *The National Standards for Sustainable Drainage* produced by DEFRA. Available here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82421/suds-consult-annexa-national-standards-111221.pdf.

Protection and Enhancement of the Floodplain

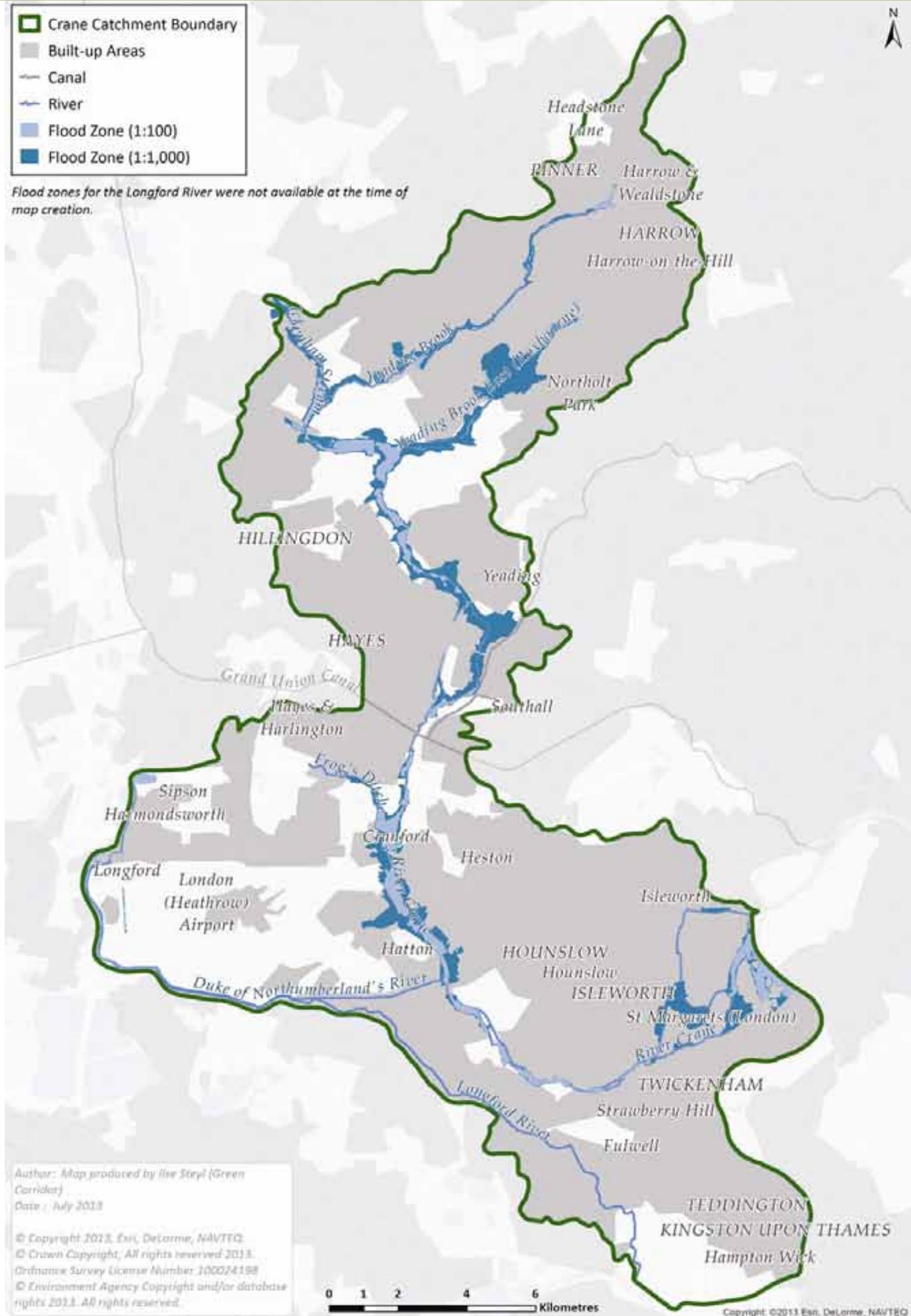
Steps should be taken to increase the water storage capacity of the floodplain, via the creation of wetland habitats such as backwaters and wet woodland. The river channel should be redesigned to take high and low flows and restrictive structures should be removed, where appropriate. It is also vital that new developments do not encroach on the river's floodplain.

Developers and local authority planners are urged to take account of government policies that prevent this from happening and that highlight the necessity to incorporate SUDS into new developments. These policies are highlighted in Objective 4, page 35.

- Crane Catchment Boundary
- Built-up Areas
- Canal
- River
- Flood Zone (1:100)
- Flood Zone (1:1,000)



Flood zones for the Longford River were not available at the time of map creation.



Author: Map produced by Iser Steyl (Green Corridor)
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0 1 2 4 6 Kilometres

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Crane catchment flood zone with 1:100 year and 1:1000 year flood modelling ▲

ISSUES AFFECTING THE CATCHMENT

Restricted Access

Some stretches of the River Crane are inaccessible. This is due to private developments, local authorities unintentionally restricting access to the river, and land abandonment leading to fragmented, unmanaged spaces along the river corridor.

If green spaces in the catchment are well managed, communities are more likely to use these areas and take some pride in the place that they live. Green spaces give communities a sense of place and belonging and provide opportunities for recreation, health and fitness and social events. These areas in London offer an escape from the urban landscape and a rare opportunity to appreciate nature.

The range of activities and opportunities that green spaces provide are particularly important during times of economic hardship, especially for less well-off individuals and families.

In recent years there has been a shift in the health agenda towards encouraging a healthy lifestyle. The environment has been recognised as a key contributor towards enhancing health by helping people to keep physically and mentally fit. Less well-off areas may

often struggle with these health issues the most yet often have the least access to high quality open spaces to improve their sense of wellbeing.

The river corridor provides an excellent opportunity to create a continuous walk from the Crane's source to the Thames. The DNR and Longford River could also act as green transport links from the River Crane to the River Colne and Royal Parks. Greater connectivity between areas will bring communities together and restore the heart of the Crane Valley.

In 2009, a feasibility study for the lower Crane Valley to become a Metropolitan Park of London set out an important aspiration: to manage the currently fragmented open spaces along the Crane corridor together as a whole and to increase access through these spaces.

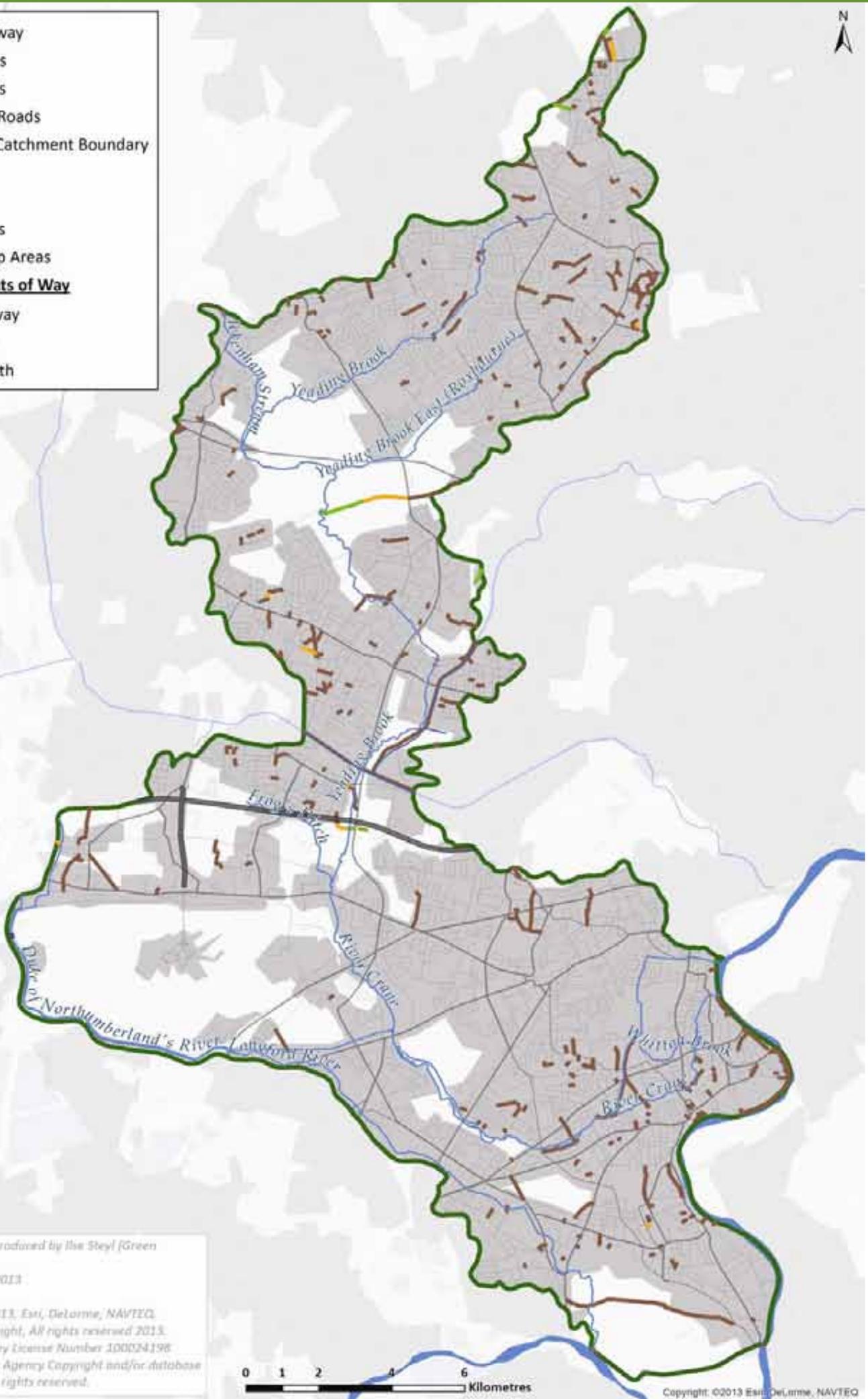
The map on page 27 shows public rights of way and roads and provides a starting point for identifying areas to open up and link to the rest of the river's accessible reach. ▶



One of the many river walks held every year on the Crane



-  Motorway
-  A Roads
-  B Roads
-  Minor Roads
-  Crane Catchment Boundary
-  Canal
-  Rivers
-  Thames
-  Built-up Areas
- Public Rights of Way**
-  Bridleway
-  Byway
-  Footpath



Author: Map produced by Ise Steyl (Green Corridor)
 Date: August 2013

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Objective 1

A RIVER RICH AND DIVERSE IN HABITATS AND NATIVE WILDLIFE

“We want to ensure that the river, and river corridor supports healthy and diverse populations of native species and habitats”

We plan to do this by using habitat opportunity mapping of the catchment to assess existing habitats, and identify opportunities to create and enhance ponds, backwaters, wet woodland, reedbeds and grazing marsh within the active floodplain.

We also need to ensure that the best management practices are used to enhance these habitats throughout the catchment. This includes selective tree and scrub clearance in order to expose areas of river channel to sunlight and encourage the growth of aquatic plants whilst leaving sufficient cover to future proof the river against higher temperatures and provide suitable shelter for fish.

We recognise the importance of national, regional and local targets for biodiversity, and we intend to integrate them into our own aspirations for the catchment and the way that we work. We also want to ensure that every local authority in the catchment understands and protects the river from unsympathetic development. This can be achieved through outlining buffer zones to protect the river and its environment.



Water vole

“We want to understand the distribution of problem invasive species and control them”



Volunteers help clear an area of balsam

Data showing the occurrence of invasive plant species in the catchment, such as Himalayan balsam, giant hogweed and Japanese knotweed, need to be compiled and mapped as a reference point to ensure we are taking a methodical and coordinated approach when tackling their eradication. Maps also enable us to monitor the success of a removal operation and prevent new outbreaks of invasive species spreading to areas that have already been cleared.

Other invasive species, such as signal crayfish, may be more difficult to tackle as they are currently not being monitored in the river.

“We want diverse and sustainable populations of native fish throughout the catchment”



Chub, roach, dace and barbel are stocked into the Crane

We intend to achieve this by improving connectivity along the river via installing fish passes where barriers to migration are present and by removing these barriers where possible (e.g. weirs and sluices). This should allow the free passage of fish up and down the river and permit the ingress of species from the River Thames such as the European eel.

We plan to focus on making in-river habitat enhancements. This could include the creation of refuge and recruitment areas for fish by increasing habitat complexity. This could be achieved by: the replacement of wooden toe-boarding with faggots; the creation of backwaters; the improvement of riparian and marginal zones; the removal of culverts and lined channels; and the creation of meanders on artificially straightened sections of river.

We also recognise the importance of reducing siltation and reinstating gravels in the river. Clean gravel is the substrate that species of fish, such as barbel, require to spawn and that many species of freshwater invertebrates need to survive. We plan to focus on areas where we can reinstate gravels through using natural materials to promote natural river processes.

72%

of people list watching wildlife as one of their favourite activities when by the river.



61%

of people are aware that invasive species are a problem.

40%

of people are aware that there are not enough suitable habitats for wildlife in the Crane Valley.

Objective 2

CLEAN, CLEAR WATER

“We want to ensure all misconnections are identified and addressed at all priority outfalls by 2021”

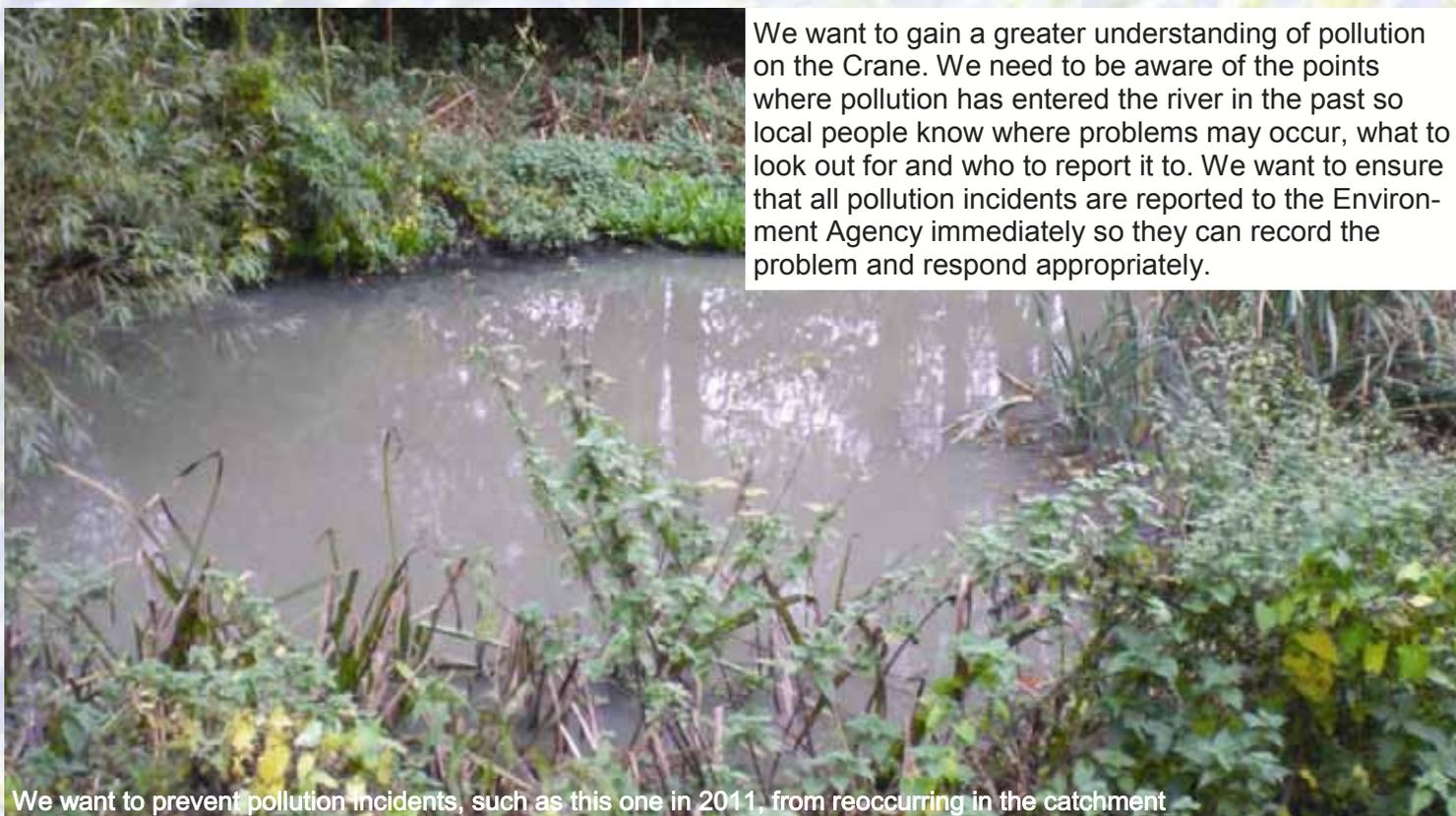
We recognise that misconnected sewers are one of the main sources of pollution on the Crane. We want to identify their outfalls and ensure all properties in the catchment are correctly connected to the area’s sewer system to prevent this problem from continuing. Thames Water are working collaboratively with the Environment Agency to identify misconnections through data collection and analysis of pollution sources and specific contaminants.

Once we have found the misconnections responsible for polluting the Crane, we want to work with property owners to ensure they are taking the right steps to ensure that their dirty water goes to the nearest waste water treatment works before it enters our river. We want to inspire the local community to take action against domestic pollution through promoting a greater understanding of its sources and impacts.



Outfalls, such as this one, bring foul water to the river

“We want to ensure that pollution is understood and new cases are identified and controlled effectively”



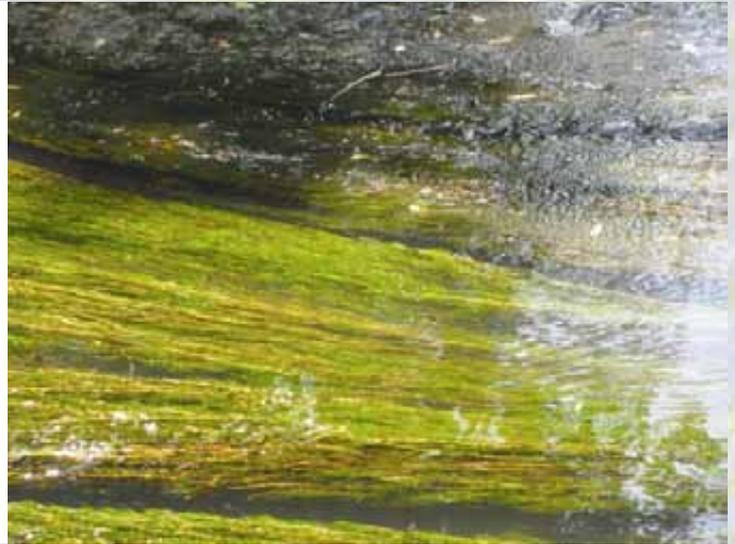
We want to gain a greater understanding of pollution on the Crane. We need to be aware of the points where pollution has entered the river in the past so local people know where problems may occur, what to look out for and who to report it to. We want to ensure that all pollution incidents are reported to the Environment Agency immediately so they can record the problem and respond appropriately.

We want to prevent pollution incidents, such as this one in 2011, from reoccurring in the catchment

“We want physical, chemical and biological water quality within its desirable limits, to achieve Good Ecological Potential”

Implementing the Water Framework Directive is critical and we want to achieve its targets for good ecological potential. We aim to do this through a range of actions including investigating the feasibility and effectiveness of creating wetland habitats at polluted outfalls throughout the catchment to intercept pollution.

We also want to encourage in-channel vegetation to capture suspended particles and improve levels of dissolved oxygen. We plan to monitor the water quality of the river with Environment Agency water quality analysis and through other partners monitoring natural water quality indicators such as aquatic invertebrates.



“We want to improve the quality of surface water runoff using Sustainable Urban Drainage Systems in appropriate locations”

32%

of people say that dirty, polluted water is what they like least about being by the Crane.

We recognise contaminated surface water runoff as one of the main pollutants of the river. We want to assess appropriate locations for Sustainable Urban Drainage Schemes and implement them where possible.

Local people can do their bit too. How many hard surfaces do you have in your garden? And have you ever thought about replacing them with a permeable material or grass? We all can do our bit to reduce the amount of surface water running into rivers from our concreted, urban landscape. The time to act is now!

73%

of people say that dirty, polluted water is one of the issues that concerns them the most about the Crane.



Objective 3

A NATURAL LOOKING AND FUNCTIONING RIVER WITH SUSTAINABLE FLOW

“We want the natural shape of the river to be restored and adapted to climate change”

We recognise that urban catchments have limitations that prevent the restoration of an entire river being possible. For example, culverts that run underneath residential housing cannot be opened up without demolishing houses.

However, we believe that much of the Crane could be restored to its natural shape. We intend to achieve this through river realignment, channel narrowing and re-profiling projects focussing on artificially widened, straightened and enforced stretches of river.

Due to the excessive width, shallow depth and low flows on such stretches, they are most at risk from climate change and drought. By re-profiling these unnatural channels we can increase depth and flows and enhance in-river features such as meanders and deep pools. By enhancing these areas, we can provide quality habitat for aquatic life to flourish in when rainfall is scarce and water levels are low.

47%

of people are aware modified banks are a problem in the catchment.



River restoration works at Crane Park

“We want increased and more variable flow throughout the Crane, DNR and Longford Rivers”

We want to tackle the issue of the slow, uniform flow found on most parts of the Crane. We aim to do this through the river realignment, channel narrowing and re-profiling work described previously and through an improved water level management scheme for the lower river involving all relevant stakeholders.

Below is an example of an area where flow deflectors have been implemented in an artificially straightened section of the Crane. This alteration to the river's morphology will provide fast mid-channel areas and slack water areas that provide fish and invertebrates with the varied habitats they require to flourish. This type of river restoration is relatively inexpensive, it is easy to do and can be applied elsewhere in the catchment.



Flow deflectors, such as these, help restore flows on overly straightened sections of river



Installing faggots to reshape the river, improving flows and the riparian zone

Objective 4

REDUCED RISK OF FLOODING IN BUILT-UP AREAS

“We need increased innovative solutions to improve the catchment’s capacity to store and slowly release stormwater”



Implementing SUDS improves water quality and reduces the volume of surface water that sewers discharge into the river

We acknowledge that the Crane is surrounded by an urban landscape surfaced with impermeable materials and as a result the river receives large quantities of surface water runoff. We think we can promote change in this landscape to soften the effects of excessive storm water entering our river. We believe that green roofs, Sustainable Urban Drainage Systems, attenuation ponds, and other green infrastructure should be promoted through the borough planning process and that local developers should incorporate these sustainable methods of flood prevention in their plans.

“We want to improve the ability of the River Crane to adapt to stormwater events”

We recognise that many of the Crane’s backwaters now lie unconnected to the main river and that urban development has encroached on the Crane’s floodplain. We want to ensure that connectivity is improved between the river and the floodplain to ensure the floodplain functions as naturally as possible.

Work has already begun to reconnect disconnected meanders to the main river, increasing the catchment’s capability to store stormwater. Habitat suitability mapping is being used to assess areas where wet woodland can be created or enhanced.



Oxbow lakes, such as this one, improve the ability of the river to adapt to storm water events

“In order to secure this objective, we want local authorities and developers to adhere to the following policies of the London Plan 2011”

Policy 5.11

Green Roofs and Development Site Environs

Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

1. Adaptation to climate change.
2. Sustainable urban drainage.
3. Mitigation of climate change.
4. Enhancement of biodiversity.
5. Accessible roof space.
6. Improvements to appearance and resilience of buildings.
7. Growing food.

Local Development Framework Preparation

Within LDFs, boroughs may wish to develop more detailed policies and proposals to support the development of green roofs and the greening of development sites. Boroughs should also promote the use of green roofs in smaller developments, renovations and extensions where feasible.

Policy 7.28

Restoration of the Blue Ribbon Network

Development proposals should restore and enhance the Blue Ribbon Network by:

1. Taking opportunities to open culverts and naturalise river channels.
2. Increasing habitat value; development which reduces biodiversity should be refused.
3. Preventing development and structures into the water space, unless it serves a water related purpose.
4. Protecting the value of the foreshore of the Thames and tidal rivers.
5. Protecting the open character of the Blue Ribbon Network.

Local Development Framework Preparation

Within LDFs, boroughs should identify any parts of the Blue Ribbon Network where particular biodiversity improvements will be sought, having reference to the London Rivers Action Plan.

Policy 5.13

Sustainable Drainage

Developments should utilise Sustainable Urban Drainage Systems unless there are practical reasons for not doing so, and should aim to achieve greenfield runoff rates and ensure that surface water runoff is managed as close to its source as possible in line with the following drainage hierarchy:

1. Store rainwater for later use.
2. Use infiltration techniques, such as porous surfaces in non clay areas.
3. Attenuate rainwater in ponds or open water features for gradual release.
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release.
5. Discharge rainwater direct to a watercourse.
6. Discharge rainwater to a surface water sewer/drain.
7. Discharge rainwater to the combined sewer.

Local Development Framework Preparation

Within LDFs, boroughs should, in line with the Flood and Water Management Act 2010, utilise Surface Water Management Plans to identify areas where there are particular surface water management issues and develop actions and policy approaches aimed at reducing these risks.

Policy 5.14

Water Quality and Wastewater Infrastructure

Development proposals must ensure that adequate wastewater infrastructure capacity is available in tandem with development. Proposals that would benefit water quality, the delivery of the policies on this page and of the Thames River Basin Management Plan should be supported while those with adverse impacts should be refused.

Development proposals to upgrade London's sewage treatment capacity should be supported provided they utilise best available techniques and energy capture.

The development of the Thames Tideway Sewer Tunnels to address London's combined sewer overflows should be supported in principle.

Local Development Framework Preparation

Within LDFs, boroughs should identify wastewater infrastructure requirements and relevant boroughs should in principle support the Thames Tideway Sewer Tunnels.

Only

21%

of people were aware the risk of urban flooding is a problem in the catchment.

Over

50%

of people say that flooding is an issue that concerns them the most in the catchment.

Objective 5

COLLABORATION AND ENGAGEMENT

“We want better collaboration with all stakeholders”

We want to see our partnership working between all stakeholders, particularly between the different local authority departments. We also want to ensure that local working groups are involved in the commissioning and delivery phases of projects.

We want to promote, support and coordinate ‘bottom-up’ volunteer activities and ‘friends’ groups across the catchment. It is important that smaller groups and volunteers are represented in the Crane Valley Partnership and receive the support they need to get projects off the ground or to collaborate with others on existing projects.

The Crane Valley Partnership website will ensure a unified approach to how projects are delivered across the catchment. The website supports this catchment plan and serves as a hub to provide information on the projects that will fulfil our seven objectives. The live project information on the site will highlight areas where collaboration or funding is needed and ensure stakeholders are aware of how each project fits into the ‘bigger picture’ of catchment restoration.



“We want to see greater community engagement along the river”

We want there to be better promotion of the catchment to residents. This will be implemented through the CVP website and those of partners, better and easier-to-read strategies, such as this plan, and events and activities held along the river. We believe that this will lead to increased involvement and a greater sense of community ownership of the Crane amongst local people. We also want local schools to utilise the river for educational field trips. Not only will this teach kids about the great outdoors, it will ensure that the next generation has an interest in their local rivers.

We want to ensure that landowners are aware and understand their responsibilities along the river. This will hopefully help to solve the issue of land grabbing and land abandonment alongside the river. We want land owners to see themselves as land managers and adopt a duty of care for the space that they own.

We are aware that litter and fly-tipping are a problem in the catchment. We want to ensure that problem litter and fly-tipping sites are regularly cleaned up and these problems are reduced by promoting a greater sense of ownership among residents and businesses.



“We want all projects to include community engagement in maintenance/legacy plans”

We want ‘friends’ and local working groups to be involved with the delivery of projects including the maintenance of works once they are completed. We want communities to take ownership of areas that have been restored to ensure that they last and can be appreciated for a long time. This should include local groups agreeing on protocols and priorities regarding access to high quality biodiversity and heritage sites. This will help to protect areas enhanced for wildlife or of significant historical value.



65%

of people would be prepared to get involved in sorting out issues affecting the Crane.

85%

of people who volunteer do so to help their community and wildlife.

31%

of people do not volunteer because they are not aware of opportunities.

71%

of people say that litter is what they enjoy least about the catchment.

Objective 6

AWARENESS, ACCESS & APPRECIATION

“We want safe and welcoming sites for visitors”

We want the open space around the Crane to be an area where you can appreciate nature in safety. We need up to date signs at all sites to inform visitors of their location, interesting wildlife to look out for and local points of interest. We believe that increasing public access to sites will make them safer as opposed to secluded, isolated spots that attract antisocial behaviour and crime. We want to see a continuous River Crane Walk to be created incorporating appropriate sign posting and safe road crossings. We hope that this will give people better access to nature and help to unite the communities in the catchment as well as providing a green transport link to the Rivers Colne and Thames.



“We want there to be diverse opportunities to engage with the river”



We want to develop and promote formal and informal activities such as angling, riverside walking and exploration. More river users means that there are more eyes on the river. Anglers can be some of the most observant river users and are often the first to notice a decline in fish stocks or river health. River walkers often have an appreciation for nature and are great at reporting the wildlife they observe or antisocial behaviour impacting on others' enjoyment of the river. Engaging with our green spaces helps us appreciate them more and develop a duty of care towards them.

46%

of people are aware that there is restricted access for people to or along the river.

28%

of people say that restricted access for people to or along the river is one of their biggest concerns.



*“We want to link the river
and its tributaries
to local transport networks”*

Much of the River Crane footpath is already used by people commuting to work or to their neighbouring boroughs. We aim to influence local transport networks, such as Sustrans, to make links to the River Crane Walk. The River Crane Walk should consist of an unrestricted, but sensitively designed and appropriately routed, footpath from the river’s source to its confluence with the Thames. Refuge areas will need to be incorporated into the design of the route to prevent the disturbance of wildlife and fragile habitats.

There should also be appropriate links to the Colne catchment via the Duke of Northumberland’s River. We feel that by giving the river a function as a transport link more people will be able to access it and awareness and appreciation will increase.



Objective 7

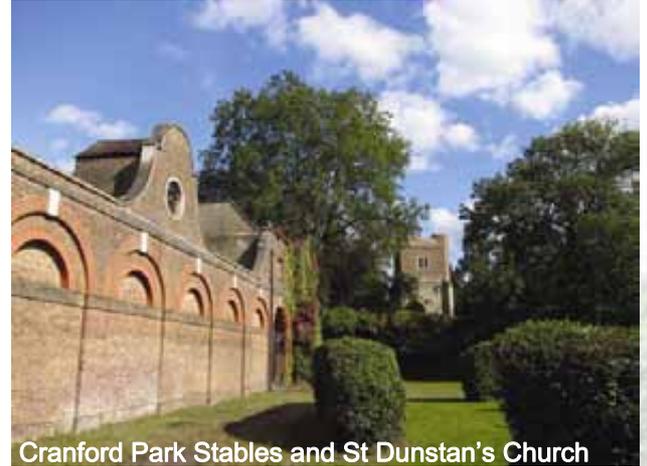
A CELEBRATION OF THE CRANE'S HERITAGE

“We want the history of the Crane catchment to be recognised”

The River Crane is steeped in history from its source to its confluence with the Thames. Its historical sites include: Headstone Manor, the Minet Estate (now Minet Country Park), the Cranford Estate (now Cranford Country Park) and Syon House and Gardens, amongst many others.

The River Crane and Duke of Northumberland's River have been of great industrial importance for centuries. They were once host to numerous watermills responsible for grinding corn and creating products made of calico, flax, copper and linseed. The catchment's most important industries were connected with the military. These included sword mills in Feltham and most importantly the Gunpowder mills in Bedfont and Hounslow. Many features from this industrial era are still visible on the river today at sites such as Crane Park in Whitton.

We need to prevent the history of the catchment from being lost. We want to encourage more research into local history and heritage. We hope that this will, along with other measures, increase public awareness of the vast array of sites of historical interest in the Crane catchment.



Cranford Park Stables and St Dunstan's Church



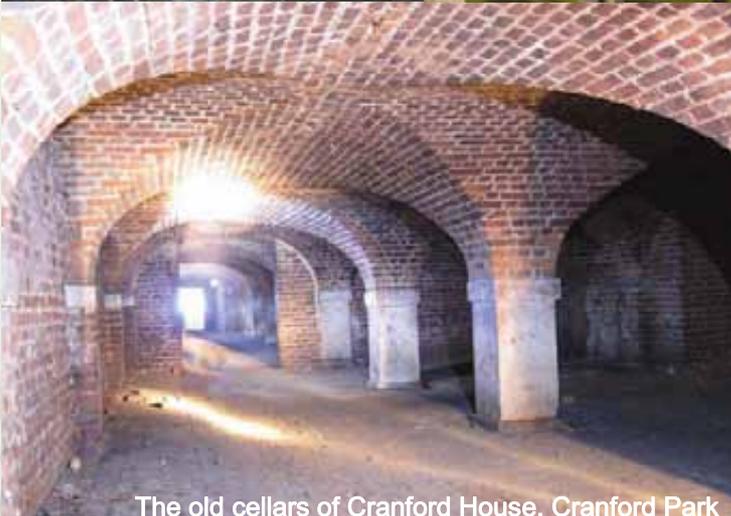
Headstone Manor, Harrow

“We want heritage sites in the catchment to be restored and brought back to use”



The old mill race and shot tower, Crane Park Island

We want to ensure that heritage sites in the catchment can be appreciated by people. Sites of historical importance are great for drawing people into the catchment with other interests than just wildlife. Well kept historical landmarks also serve as waypoints for walkers navigating the river and remind us of its former purposes. We want to ensure that heritage sites are accessible and open to the public with appropriate signage. This will enable people to interpret their surroundings and gain a deeper understanding of the catchment. We must also ensure that management works to the river do not destroy, obscure or disrupt heritage sites and that their maintenance is incorporated into management plans.



The old cellars of Cranford House, Cranford Park

24%

of people list archaeology/heritage as one of the things they enjoy most about sites along the Crane.

56%

of people say that they want more heritage/archaeology walks along the Crane.

Crane Catchment Boundary

■ Built-up Areas

— Canal

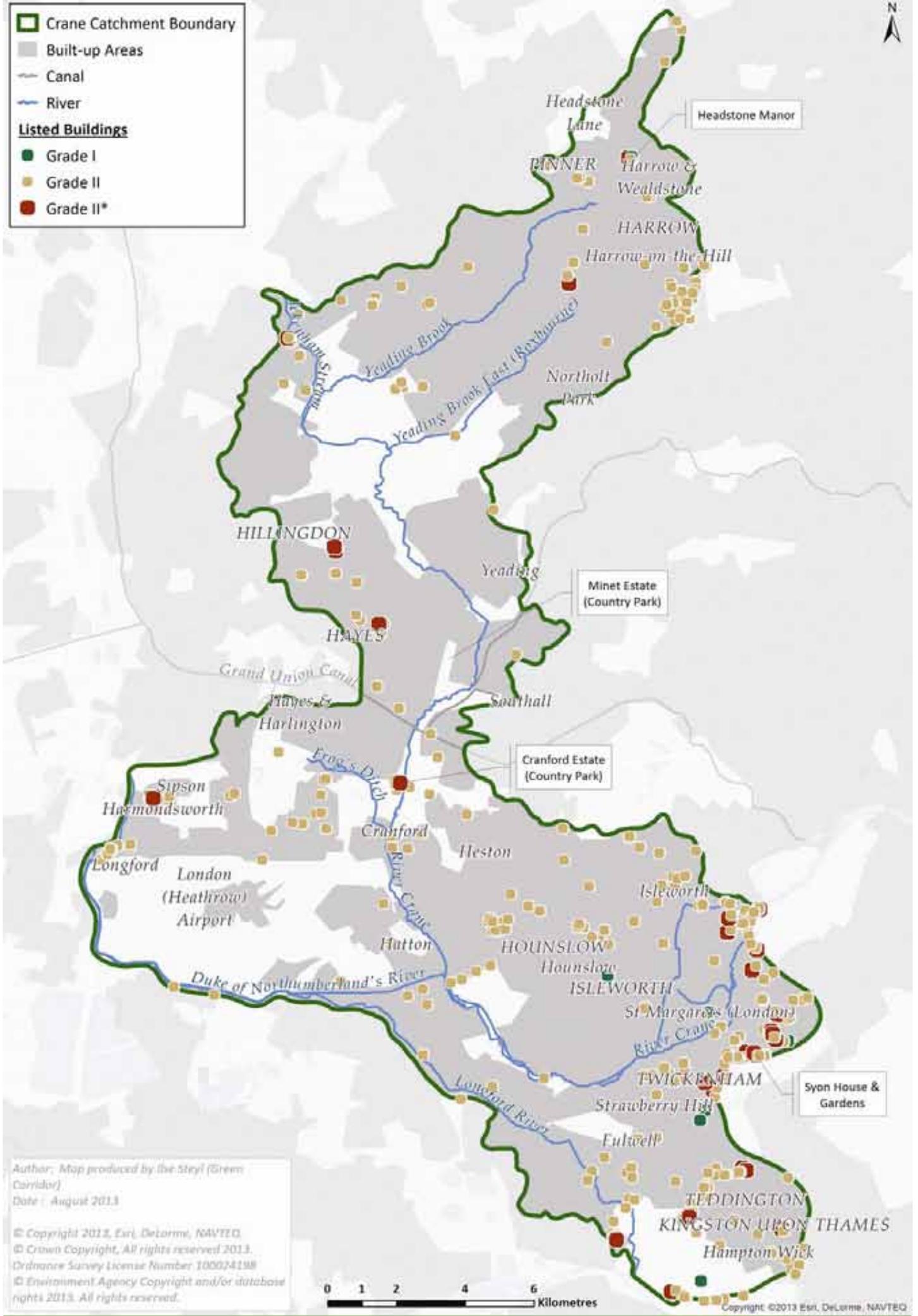
— River

Listed Buildings

● Grade I

● Grade II

● Grade II*



Author: Map produced by the Steyl (Green Corridor)
 Date: August 2013

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Listed buildings and heritage sites in the Crane catchment ▲

THE FUTURE OF THE CRANE VALLEY CATCHMENT PLAN

cranevalley.org.uk

This catchment plan will be continued as a live document online.

Please visit cranevalley.org.uk for information on past, present and future projects occurring in the catchment that work towards fulfilling the seven objectives of this plan.

Online visitors can use the Crane Valley website to monitor the progress of these projects and see how different organisations are collaborating to make our vision for the catchment become a reality.

The website's discussion forum links in with social media platforms such as Twitter and Facebook. This allows people to share information about the catchment and comment on projects being implemented by the Crane Valley Partnership.

If you would like to get involved with the good work happening in the catchment, volunteer opportunities will be publicised as they become available.

The Crane Valley Partnership will continue to assist in the implementation of this plan.

This involves providing a strategic overview of the various activities and projects being undertaken in the catchment in order to provide a coordinated approach to restoring the river. This will ensure that projects are carried out methodically in order to increase the resilience of the water course and its catchment area.

The production of the catchment plan has catalysed collaborative working amongst stakeholders in the partnership, ensuring that we stand in good stead to work together to achieve the seven objectives of this plan.

Positive impacts could be achieved by sharing expertise and resources across administrative boundaries and increasing the scale at which projects are delivered and their impacts are felt.

The River Crane and the river valley it supports has been an active and productive area for hundreds of years. In working together we will endeavour to make sure it will continue to be so for many more years to come.



LIST OF ABBREVIATIONS USED IN THIS PLAN

ALGG	The All London Green Grid	FORCE	Friends Of the River Crane Environment
BAP	Biodiversity Action Plan	GC	Green Corridor
BARS	The UK wide Biodiversity Action Reporting System	GIGL	Greenspace Information for Greater London
BOD	Biological Oxygen Demand	HAP	Habitat Action Plan
CVP	The Crane Valley Partnership	LDF	Local Development Framework
DEFRA	Department for Environment, Food and Rural Affairs	LRAP	London Rivers Action Plan
DNR	The Duke of Northumberland's River	LWT	London Wildlife Trust
DO	Dissolved Oxygen	RBMP	River Basin Management Plan
EA	Environment Agency	SUDS	Sustainable Urban Drainage System
EU	European Union	WFD	Water Framework Directive
FOG	Fats Oils and Grease	ZSL	Zoological Society of London

PHOTO CREDITS

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STATISTICS USED IN THIS DOCUMENT

The statistics about the catchment in this document were taken from a purpose designed survey that received over 200 responses: The Crane Community Survey 2012.

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River Restoration

The River Restoration Centre website: <http://therrc.co.uk/>

The Wild Trout Trust website: <http://www.wildtrout.org>

Fish Passage

Environment Agency website: <http://www.environment-agency.gov.uk/business/sectors/32651.aspx>

Invasive Species in London

The London Invasive Species Initiative website: <http://londonisi.org.uk/>

The Greenspace Information for Greater London website: <http://www.qigl.org.uk/>

Sewage Misconnections

The Connect Right website: <http://www.connectright.org.uk/>

Sustainable Urban Drainage Systems

The Susdrain website: <http://www.susdrain.org/>

Water Quality in London

Environment Agency website: <http://www.environment-agency.gov.uk/research/library/publications/41015.aspx>

Wildlife Gardening

The London Wildlife Trust website: <http://www.wildlondon.org.uk/wildlife-gardening-guides>

The Wild About Gardens website: <http://www.wildaboutgardens.org.uk/>

Access to Nature

The Natural England website: <http://www.naturalengland.org.uk/ourwork/enjoying/default.aspx>

Catchment Wildlife and History

Cranford Park Friends website: <http://cranfordparkfriends.org/>

Friends Of the River Crane Environment website: <http://www.force.org.uk/>