

NRA Thames 178

# *Fact File*

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## RIVERS OF NORTH WEST LONDON



GUARDIANS OF THE WATER ENVIRONMENT



**NRA**

*National Rivers Authority  
Thames Region*



# RIVERS OF NORTH WEST LONDON FACT FILE

## FACTS IN BRIEF

### Brent

- From its source to its confluence with the Thames the River Brent is 24 km long and the catchment area is 151 square km.
- The lower reaches of the Brent are navigable after its confluence with the Grand Union Canal at Green Lane Hanwell.
- The Brent becomes tidal at Brentford Lock, shortly before joining the River Thames at Brentford, opposite Kew Gardens.
- Main tributaries: Silk Stream, Mutton Brook, Dollis Brook, Wealdstone Brook, Costons Brook, Clitterhouse Ditch, Deans Brook, Decoy Brook, Edgware Brook, Edgwarebury Brook, Kenton Brook, Mitchell Brook and Wembley Brook.
- The Welsh Harp reservoir, located at the confluence of the Silk Stream and the River Brent is so named after its distinctive shape. It was built in 1835 to help maintain water levels in the Grand Union Canal rather than for drinking water supply. The construction of the reservoir with its shallow depth and sloping earth banks creates a wide range of wetland and waterside habitats, and it is now designed as an SSSI. It has particular value as a breeding ground for wetland birds, especially the great Crested Grebe and has a rich plant life around its margins. Permanent oil booms and trash screens are maintained on its tributaries to protect the Reservoir.
- Other SSSIs in the catchment include Harrow Weald and Hampstead Heath.

### Crane

- The source of the River Crane is taken to be at a point south of North Hyde Road in Hayes from where it flows in a southerly direction.
- It's lower reaches are tidal for a short distance before its confluence with the Thames at Isleworth, just south of Isleworth Ait.
- From its source in Harrow to its confluence with the Thames the river is 13.6 km long and the catchment area is 110 square km.
- Main tributaries: Yeading Brook East and West, Duke of Northumberland's River, Roxbourne, Hounslow Ditch, Whitton Brook, Cranford Park Brook, Frogs Ditch, Hayes Park Stream, Yeading Tributary, Greenhill Stream, Ickenham Stream.
- The three most significant tributaries are the Yeading Brook East and West and the Duke of Northumberland's River the latter links the River Colne at Harmondsworths to the River Crane at Hounslow Heath.
- The Yeading Brook West rises in Headstone and the Yeading Brook East rises in Harrow. These two tributaries flow in a southerly direction before their confluence just south of the A40 Western Avenue. Further south the combined flow becomes the River Crane.
- Crane Park Island Nature Reserve lies on the River Crane, within Crane Park. It was once the site of the old Hounslow Gunpowder Mills. Established in 1766, the mills were built on the River Crane as it provided essential water power. During their operational years from 1766 to 1926 no less than 55 explosions were recorded, many fatal. In 1983 work began to turn Crane Park Island into a nature reserve to be enjoyed by the local community and it is now a rich habitat for an enormous variety of wildlife.



## THE NATIONAL RIVERS AUTHORITY

Established on 1st September 1989, the NRA is an independent public body charged with safeguarding and improving the natural water environment. It is responsible for flood defence, regulating the quality of rivers and groundwaters, balancing the needs of various water users, protecting the improving fish stocks and promoting water-based recreation of all kinds. The NRA is committed to improving wildlife habitats and conserving the natural environment in all it undertakes.

### PLANNING LIAISON

The NRA works with local planning authorities to protect the Brent and Crane catchments from undesirable development. The water environment is subject to a wide variety of uses which invariably interact and sometimes conflict with each other. Our catchment management planning process has been developed to help manage these interactions and conflicts for the overall benefit of the water environment and its users.

### WATER QUALITY

The Brent and Crane flow through predominantly urbanised areas, and as a result are at risk from very different types of pollution compared to rural rivers. Run off from roads, containing oil and other pollutants, has a major impact. The impervious nature of much of the catchment results in a "flashy" response in the receiving watercourses with rapid increases in flow creating an inhospitable habitat for aquatic flora and fauna.

#### Crane

The two most significant discharges into the River Crane catchment are both from airports. The Yeading Brook receives run-off from RAF Northolt and the River Crane receives run-off from Heathrow. All the discharges from both airports are closely monitored to ensure they comply with their discharge consent standards. The chemicals used to de-ice the aircraft and runways are of particular concern because they breakdown quickly and require oxygen to do so. This can result in reduced oxygen levels in the receiving watercourse. Balancing lagoons and aeration equipment are used at Heathrow to treat run-off from the runways prior to discharge. Contaminated land is also an issue with a former Gas Works site at Southall and Victorian rubbish dumps such as that at Hounslow Heath.

#### Brent

Many of the Brent's tributaries, such as the Wealdstone Brook and Costons Brook flow in culverts for much of their length. This makes tracing pollution incidents much harder as it involves lifting manholes and sometimes entering underground culverts. These culverts can contain dangerous gases and special precautions must be taken.

In addition to road run-off the catchment suffers from problems with the sewerage system. These are often as a result of misconnections, where extensions or domestic appliances are connected to the surface water sewers. This is a particular problem in the smaller tributaries. In some areas the sewers are very close to their maximum capacity, especially in older areas where the increase in per capita water consumption has been made worse by increased population density. As a result, discharges of inadequately treated sewage can occur from storm overflows more frequently than they should. Thames Water and local councils are working to identify these problem areas and both increase sewer capacity and limit development where possible.

Urban run-off caused by summer storms of medium intensity can cause oxygen levels to drop in the lower reaches of the Brent. Fish are driven down into the canalised section at Hanwell by a combination of higher flows and a plug of polluted water until they reach Osterley Lock. At this point the fish are driven up against the weir and cannot escape. This can result in fish mortalities if the conditions are severe enough to cause removal of most of the oxygen.

The canal can also suffer from algae. Where the algae continue to grow they form blooms which can adversely affect the appearance and quality of the water in the canal. When the algal blooms die and decay they use up oxygen in the water which can cause fish to die. In the lower Brent this does not happen because the higher flows prevent algal blooms occurring.



Osterley Park, Isleworth



## Pollution Prevention

Pollution control staff carry out proactive visits to industrial, agricultural and commercial premises to identify pollution risks and ways to reduce the threat they pose to the water environment. In the Brent and Crane catchments such pollution prevention has been carried out at a number of industrial areas including Pump Lane, Hayes and Abbeydale Road/Park Royal, Ealing.

## GENERAL QUALITY ASSESSMENT (GQA)

In June 1994 a new system for measuring water quality was introduced, called the General Quality Assessment Scheme (GQA). It is used to assign the most likely class for a river for a given time period using three years of data. The scheme will assess both the chemical and biological quality along side each other. At a later stage nutrient and aesthetics components to the scheme may also be produced. The chemical component is based on three determinants: Biochemical Oxygen Demand, Dissolved Oxygen and Ammonia. The new chemical grades are A (good) graduating to F (bad).

In addition to this the Water Resources Act 1991 gives the Government the power to set statutory water quality objectives for watercourses based on the river usage. Use related standards must reflect local needs and conditions and for this the GQA is not appropriate. To meet this need five key uses have been selected for evaluation:

River Ecosystem, Special Ecosystem, Abstraction for Potable Supply, Agricultural and Industrial Abstraction and Water Sports. Each use will have a defined set of parameters to provide a quality objective which will be used to set Water Quality Objectives in the future. The following table shows GQA classes for 1991 - 1993 in the Brent and Crane catchments.



*River Brent - at the Junction of the M1 and N. Circular Roads*

FROM	TO	LENGTH (km)	GQA1991-1993
<b>Brent</b>			
Confluence Dollis and Mutton Brooks	Costons Brook	14.5	D
Costons Brook	Wyke Stream	3.4	E
Wyke Stream	Tideway	3.4	D
<b>Crane</b>			
Yeading Brook	Tideway	13.6	C
<b>Dollis Brook</b>			
Hendon	Brent	1.8	D
<b>Duke of Northumberland's River</b>			
Crane	Tideway	4.3	C
<b>Duke of Northumberland's Upper River</b>			
Colne	Crane	9.3	C
<b>Yeading Brook</b>			
Confluence Yeading Brook East + West	Crane	7.8	D
<b>Yeading Brook East</b>			
Source	Yeading Brook	6.7	E
<b>Yeading Brook West</b>			
Source	Yeading Brook	11.3	D

## DISCHARGES

The following are the main discharges into the Brent and Crane catchments. The figure given is the maximum amount permitted to be discharged. Airfield drainage is derived from rainfall and is not therefore subject to a volume restriction.

DISCHARGE	CUBIC METERS PER DAY	TYPE OF EFFLUENT
<b>Dollis Brook</b>		
St Edwards College STW, Totteridge	33	Sewage Effluent
<b>Crane</b>		
Heathrow Airport		Airfield Drainage
<b>Yeading Brook East</b>		
Northolt Airport		Airfield Drainage
<b>Yeading Brook West</b>		
Northolt Airport		Airfield Drainage
Northolt Airport		Airfield Drainage

## BIOLOGY

The rivers, streams and canals in the Brent and Crane catchments are regularly sampled for aquatic invertebrates by the biologists of the NRA. The diversity of invertebrate life responds quickly to changes in water quality, including the short-lived "episodic pollution" associated with storm run-off which is particularly significant in urban areas. Sampling points are visited to complement chemical water quality monitoring programmes and to assess the ecological quality of rivers.

### Crane

The River Crane is fed by two arms. The Yeading Brook East has a particularly restricted fauna comprising the most pollution tolerant snails, peas mussels, leeches, flatworms, hoglice, midge larvae and worms that are found through out the catchment. The Yeading Brook West also supports freshwater shrimps, river limpets, water beetles and bugs, although it is still of relatively poor biological quality. Below the confluence of these two arms the biological quality of the Yeading Brook improves steadily.

As the river enters its middle reaches and becomes the River Crane there are important sections of semi-natural, sinuous channel and a mix of riffle and pool areas in attractive surroundings. These lengths are potentially ideal for river corridor wildlife and the river channel is particularly suitable for the development of communities of aquatic plants, invertebrates and fish. The invertebrate life of this part of the River Crane is now fairly good and has fully recovered from two serious pollutions which occurred in 1989 (involving creosote) and 1990 (detergent). Biologists have since recorded about 30 different invertebrate types in a part of the river above River Gardens near Hounslow Heath. As many as 20 invertebrate types can be found on each visit, including types of mayflies, dragonflies, damselflies, caddisflies, and a variety of beetles and bugs. Several relatively pollution sensitive species of invertebrates are largely confined to this section in the River Crane.



Brentford - tidal reaches of River Brent

The Duke of Northumberland's River which joins the Crane at River Gardens is of good biological quality with the greatest diversity of aquatic plants and animals of any watercourse in the Crane catchment. This river originates from a high quality part of the River Colne and over forty different types of invertebrates have been found in it - including eight families of caddisflies. The river provides a constant supply of invertebrates for recolonisation to the River Crane as and when conditions are favourable. Curiously, the Duke's River is still of fairly good biological quality in a lower part just above the River Thames whilst the River Crane - from which it splits - is of poorer quality in this vicinity.



## **Brent**

In contrast to the Crane, the rivers and streams in the more heavily urbanised Brent catchment are consistently of poor biological quality. The River Brent and its tributaries the Silk Stream and Dollis Brook support very limited invertebrate communities - less than ten invertebrate types are normally found. Shrimps, river limpets and cranefly larvae are only rarely recorded as the fauna is restricted to the most pollution tolerant species. Aquatic plants (with the exception of slimy filamentous algae) are also largely absent. However, more diverse invertebrate communities can be found in two short sections of the River Brent, one below the Welsh Harp Reservoir and the other after the river combines with the Grand Union Canal. Shrimps, water beetles and water bugs are common and mayflies, damselflies and caddisflies can also be found here. These parts of the River Brent may also be less prone to the effects of spate flows after heavy rains. Pronounced spates in urbanised catchments regularly cause plants and animals to be washed away.

## **FISHERIES**

### **Crane**

Fishing on the Crane system is largely casual. There is only one known angling interest, Feltham Piscatorial Society who fish a 3km section of the Upper Duke's at Heathrow.

A qualitative fish survey of 1982 found a modest coarse fishery on the Upper Duke's, with chub, dace, roach, perch, gudgeon and stone loach present. The Railshead Creek was identified as an important nursery ground for fish populations normally resident in the tidal Thames.

The 1988 River Crane fisheries survey indicated that fish populations of the Crane and Duke's River are poor. Recruitment is poor and current fisheries may be largely a reflection of past restocking work. Limiting factors appear to be poor available habitat (inadequate depth and cover) and high velocities under peak flow conditions.

Public access throughout the river system is good. There is considerable potential for enhancement of the fisheries by habitat improvements and such improved fisheries may be capable of supporting a modest angling amenity.

### **Brent**

The 1987 Grand Union Canal fisheries survey indicated that fish populations of the lower Brent were poor and probably continuous with those of the GUC at Hanwell. Poor habitat, highly variable flows and storm run-off conditions are believed to affect the fisheries. Populations above Greenford are believed to be minimal and temporary. There is no known angling interest.



*Invasive species - River Brent -  
Uxbridge Road, Hanwell*

## HYDROLOGY AND WATER RESOURCES

A small proportion of the flow in these rivers is from the local gravels such as the Taplow Gravel and Lynch Hill Gravel. However these rivers are essentially fed by urban and clay run-off. The hydrographs of these rivers show the typically 'flashy' nature of such run-off rivers with a very rapid response to rainfall, and little or no aquifer baseflow. The minimum flow in these rivers corresponds to hot dry summers and does not necessarily occur during drought years. More than half of the rainfall falling on the area is lost through evaporation and the growth of plants. The remainder provides the resource of water which must be shared between river flow to support the natural environment and the community's need for water supplies to homes and industry. In order to ensure that there is enough information on river flows the NRA carries out regular measurements and has a number of fixed gauging stations. The highest recorded flow in the Brent was 57.5 cumecs (cubic metres per second) at the Greenford gauging station on 22nd September 1992. The highest flow in the Crane of 18.8 cumecs was recorded at the Cranford Park gauging station on the 8th April 1979.

Another feature of the Crane catchment are the man made watercourses of the Duke of Northumberland's River and the Longford River. Both of these take water from the Colne catchment and then cross into the Crane catchment. The Longford River goes to Hampton Court and the Duke of Northumberland's River flows to the Crane, then another branch goes from the Crane to the Thames near Syon Park. Both catchments are also crossed by the Grand Union Canal.

The long-term average annual rainfall totals for these catchments are 636mm and 673mm per annum for the Crane and Brent respectively. Run-off for the Crane is 156mm and for the Brent is 206mm. These figures are for areas of open grassland. Built up urban areas which are totally covered by impermeable material will give much higher run-off figures.



Headstone Block - redesigned channel

LOCATION	NGR	START YEAR	MIN FLOW CUMECS	MAX FLOW CUMECS
Yeading Brook West at Yeading West A40	TQ083846	1978	0.001	7.970
Yeading Brook East at Western Avenue	TQ111845	1992	0.009	6.510
River Crane at Cranford Park	TQ103778	1977	0.008	18.800
River Crane at Marsh Farm	TQ154734	1977	0.001	13.400
Duke of Northumberland's River at Mogden	TQ153753	1977	0.000	8.780
Dollis Brook at Hendon Lane	TQ240895	1978	0.000	16.400
River Brent at Brent Cross	TQ236880	1988	0.055	35.000
Silk Stream at Colindeep Lane	TQ217895	1973	0.011	40.500
Wealdstone Brook at Wembley	TQ193862	1978	0.000	29.200
River Brent at Monks Park	TQ202850	1978	0.057	56.200
River Brent at Greenford	TQ148822	1988	0.145	57.500



## ABSTRACTIONS

Water can only be abstracted from rivers or groundwater under licence granted by the NRA. In the Brent catchment both groundwater and rivers are important sources of supply. The total amount licensed in the Brent catchment is about 5.089Ml/d (million litres per day), of which groundwater supplies around 60%. In the Crane catchment groundwater is the most important source of supply, and accounts for more than 95% of the total amount of 3.71Ml/d licensed in the catchment. Much of the groundwater abstracted in the two catchments is

from the Confined Chalk aquifer which underlays the London Clay in the London Basin. This abstraction has no impact on the surface water environment and the water is discharged to the surface river environment after use. All licences specify the maximum amount of water that may be taken and are regularly checked by the NRA's Licence Inspectors.



Welsh Harp/Brent reservoir

## FLOOD DEFENCE

Reducing the risk of flooding on a day-to-day basis and planning major flood defence projects in the Brent and Crane catchments forms part of the NRA Thames Region's work. The NRA's flood warning centre at Waltham Cross keeps a round the clock check on weather conditions and river levels. Staff interpret the information and give the local emergency services early warning of possible floods.

A flood defence team is based at Rickmansworth to carry out regular river maintenance work. This includes dredging, weed cutting, and removal of blockages. This team is mobilised during flood emergencies to keep rivers clear of obstructions so that flood waters can be conveyed away as quickly as possible. They also provide assistance to environmental quality staff in cleaning up after pollution incidents.

The NRA is committed to protecting and improving the natural river environment and wherever possible our flood defence work. *NRA Thames 178* environmental education and enhancement.



**NATIONAL RIVERS AUTHORITY**  
**THAMES REGION**  
KINGS MEADOW HOUSE  
KINGS MEADOW ROAD  
READING  
BERKSHIRE RG1 8DQ  
TELEPHONE: 01734 535000



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