

# Upper Mole Information Pack

Spring 2013

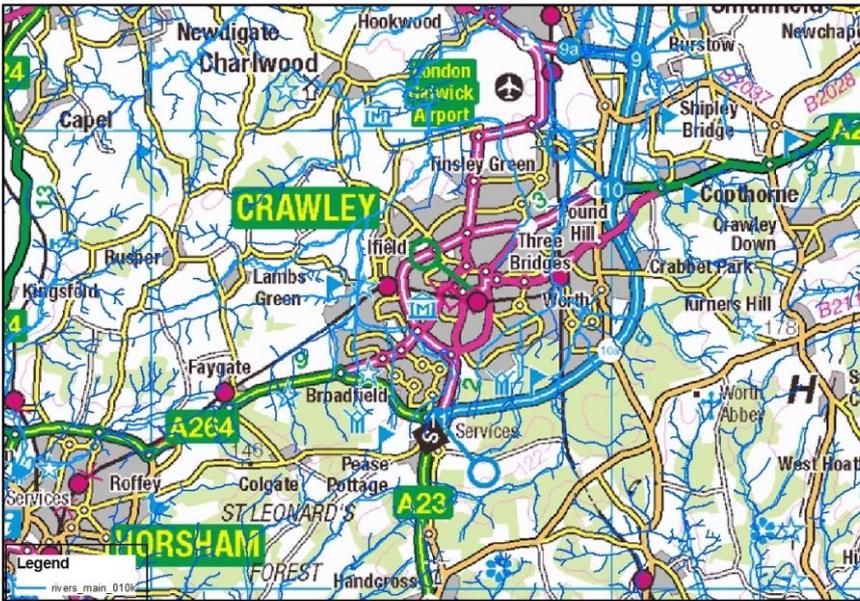
This information pack summarises the key issues in the Upper Mole sub catchment. It provides a snapshot of the latest findings from the Environment Agency's rolling programme of scientific investigations and will be updated annually.

## Summary

The Environment Agency has split the Upper Mole sub catchment into seven river [water bodies](#). It also contains two monitored lakes. Each waterbody is given a [status](#) based on the most recent investigations, with the worst status being Bad, rising to Poor, Moderate and Good. The investigations look at ecology (fish, insects, plants), water chemistry, water flow and morphology (shape and structure). Some water bodies are still awaiting assessment, so their status may change as more data is collected. For this reason, the 'status confidence', how accurate the information is, has been provided.

| Water bodies in this area                                   | Type of water body       | 2012 Status | Status confidence | Known failures in 2012<br>✓ = confirmed failure<br>= confirmed pass<br>blank = awaiting assessment |         |                     |                 |            |            |
|---|--------------------------|-------------|-------------------|--|---------|---------------------|-----------------|------------|------------|
|   |                          |             |                   | Fish   | Insects | Plants <sup>1</sup> | Water chemistry | Water flow | Morphology |
| Stanford Brook  | River (Natural)          | Poor        | Very certain      | ✓  |         |                     | ✓               | ✓          |            |
| Ifield Brook  | River (Heavily Modified) | Moderate    | Uncertain         | ✓  |         | ✓                   | ✓               | ✓          | ✓          |
| Baldhorns Brook   | River (Natural)          | Poor        | Very Certain      | ✓  | ✓       |                     | ✓               | ✓          |            |
| Mole Crawley to Gatwick Airport                             | River (Natural)          | Moderate    | Uncertain         |  | ✓       |                     | ✓               | ✓          |            |
| Mans Brook  | River (Natural)          | Poor        | Quite Certain     |  |         | ✓                   | ✓               | ✓          |            |
| Tilgate Brook, Crawters Brook and Gatwick Stream at Crawley | River (Heavily Modified) | Moderate    | Uncertain         | ✓  | ✓       |                     | ✓               | ✓          | ✓          |
| Mole at Gatwick Airport                                     | River (Heavily Modified) | Moderate    | Uncertain         | ✓  |         |                     | ✓               | ✓          | ✓          |
| Douster Pond  | Lake                     | Moderate    | Uncertain         |  |         |                     |                 |            |            |
| Black Pond  | Lake                     | Good        | Uncertain         |  |         |                     |                 |            |            |

*<sup>1</sup>This includes macrophytes (plants and mosses living in the water or on river banks) and phytoplankton (microscopic algae that grow on the riverbed).*

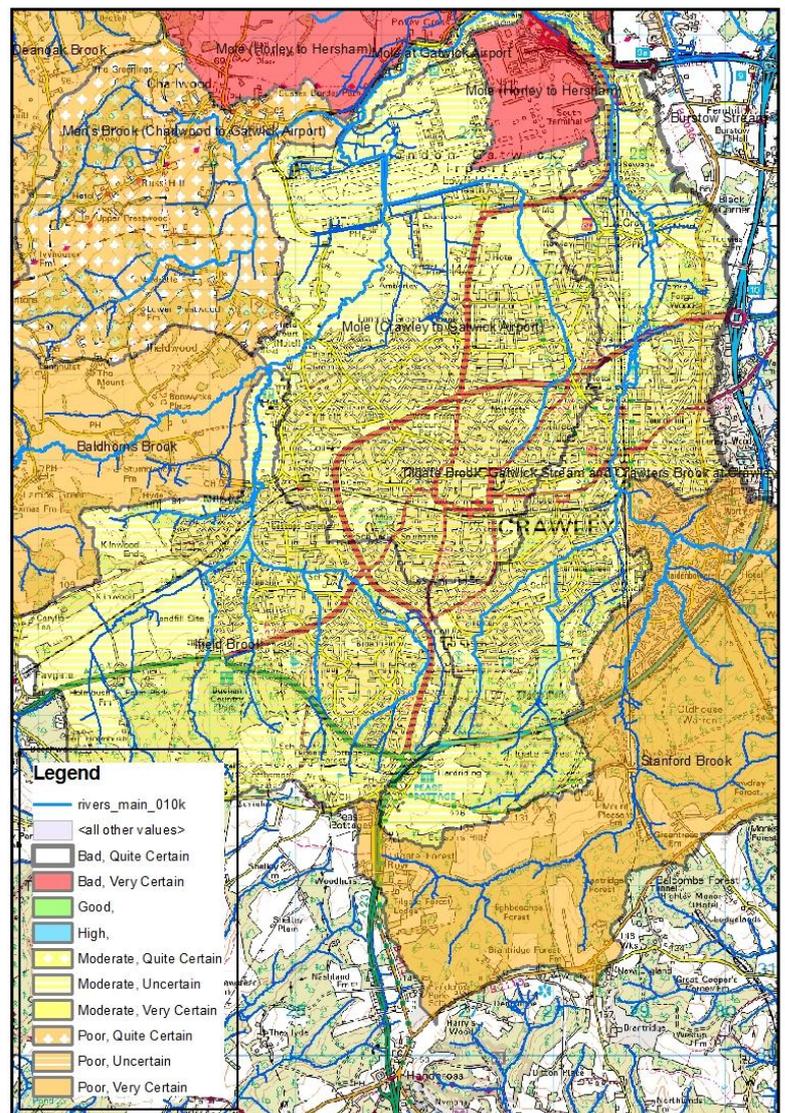


The Upper Mole area

## Overview of area

The Upper Mole and its tributaries, Stanford Brook, Ifield Brook, Baldhorns Brook, Mans Brook, Gatwick Stream, Crawters Brook and Tilgate Brook rise to the south of Crawley in East Sussex. Their flow is made up of a combination of groundwater emerging from the sandstone to the south and drainage from the Wealden clay that makes up most of the catchment. The rivers generally flow in a northerly direction merging in to two main channels, the Mole and Gatwick Stream. The Gatwick Stream merges with the Mole just to the North of Gatwick airport at Riverside Gardens and continues North from there.

The rivers in this sub catchment begin as natural channels but quickly become altered by man, modified. In **some cases the river is heavily modified with concrete channels and realignments mostly** due to the influence of the new town of Crawley with over 90,000 inhabitants and Gatwick airport, the UK's second largest airport. The heavily urbanised nature of the area combined with the clay soil in the sub catchment mean that little rain water soaks in to the ground. River levels can rise rapidly after heavy rain increasing the risk of flooding. A number of flood alleviation schemes have been constructed including dams on the Ifield brook at Ifield mill pond, Stanford Brook at Clays Lake, Gatwick



stream at Worth Farm at Tinnesy green, and Tilgate brook at Tilgate lake. These alterations to the natural channel protect Crawley and Gatwick airport but have had a damaging effect to river wildlife.

Where the rivers are in their natural state, the land use is mainly woodland or pastoral farming with little public access. Once the rivers run through the urbanised areas there are some open spaces such as Riverside Gardens and the Ifield Brook downstream of Ifield Pond where the rivers are accessible.

The huge pressure from the Crawley urban area and Gatwick airport, which dominate the rivers in this sub catchment have an influence the habitats and the water quality. The river downstream is also affected.

However, there is huge scope to transform the Upper Mole and its tributaries in to a wonderful amenity; a large population who have the potential to enjoy a healthy and wildlife rich river on their door step.

## Ecology

### Habitat

The natural and semi natural habitats at the top of the rivers in the upper mole can be described as Good under the Water Framework Directive. Natural low flows during summer periods can cause these areas to dry up.

Much of the course of the rivers downstream of the M23 and in to the Crawley urban area have been modified and realigned. This includes concrete channels or walls, over widening and over deepening the banks. This has reduced the quality of the habitat restricting the number and the amount of different animals and plants that can live in there. This has the knock on effect of restricting fish populations. The lack of refuge and hiding places for fish is also limiting the number and types of fish that can live there.

Clay sediment is washed in to the rivers on a regular basis from rainfall. Fine sediment is a major reason watercourses do not meet the Good Status required under WFD for fish. It creates a grating affect on fish gills and covers gravels reducing the survival rate of fish eggs. It can also reduce the airspaces in gravel necessary for aquatic insects. Excessive amounts can lead to blocking of channels and flooding issues.

Investigations are currently looking into how much sediment occurs naturally in this catchment and how much is caused by manmade processes.

There are numerous barriers to fish, such as salmon or trout, which limit migration throughout Crawley and through Gatwick Airport. These issues are examined in more detail in the Morphology section.

Plants and animals are also restricted by the quality of the water on all of the water courses except the Stanford brook, which is almost entirely rural. The poor water quality reduces the range of species that are able to live in the water and limit the numbers. The species that are more susceptible to pollution are absent from the rivers.

### Negative effects of non-native species

Non native invasive species are not currently considered a major problem in this sub catchment. However vigilance is needed to protect the rivers from invasive species and prevent issues occurring in the future. Plant species such as Himalayan Balsam are present and if left untreated will start to create a problem. Other species which could cause future problems are signal crayfish, floating pennywort and killer shrimp.



Above left – concrete lined channel on Ifield Brook, Above right – weir up stream of Ifield Mill pond,  
 Below left, large step weir on the Ifield Brook, below right Gauging station on the Gatwick Stream



## Water chemistry

Parts of the Upper Mole sub catchment has poor water quality, failing under WFD, because of high levels of Phosphate and Ammonia as well as low levels of dissolved oxygen. Investigations into chemical water quality are currently ongoing but there are confirmed failures for; high levels of ammonia in the Mans Brook, high levels of phosphate in the Mole, Mans brook and Gatwick stream and low levels of dissolved oxygen in the Baldhorns brook and Mans Brook. The latter is classified as Bad under WFD. These failing elements have a damaging or limiting effect on the water environment. The Stanford brook at the top of the catchment, is classified as good overall for water chemistry.

Low dissolved oxygen levels mean that fish and other wildlife that breathe underwater could suffocate. Low dissolved oxygen levels are caused when too much pollution such as sewage is eaten by naturally occurring bacteria that use up the oxygen in the water, lowering the amount for other animals.

Ammonia, which can come from sewage as well as fertilisers, can be toxic to fish at higher levels but at lower levels it is a nutrient that can cause excessive growth of plants and algae in the water. Too much plant and algae growth can choke up rivers, blocking out sunlight for other life, as well as lowering oxygen levels. This is known as eutrophication. Sewage treatment works (STW) can remove ammonia under natural conditions as long as the sewage is treated to a high standard.

Phosphate is another chemical that can cause eutrophication. It comes from sewage and detergents, as well as fertilisers. Phosphates do not get removed naturally at STW's unlike ammonia. It is possible to remove phosphates if extra equipment is installed at a STW but it is costly.

## Pollution from waste water

Crawley sewage treatment works (STW), which is the largest Thames Water STW outside of London, discharges treated sewage and waste water, effluent, in to the Gatwick stream just to the south of Gatwick airport. Although the quality of the effluent has greatly improved over the past 30 years, the treatment does not currently remove phosphate. The amount of effluent discharged into the river in relation to the amount of natural flow can have a major influence on water quality, especially during times of low flows in the summer. There are also a number of smaller discharges of treated effluent from domestic treatment plants and Rusper Sewage treatment works

## Pollution from towns and transport

Other sources of pollution entering the river include mis-connected homes and businesses, where incorrect plumbing could mean that waste water from dishwashers, washing machines, sinks, baths and even toilets is flushed directly into a local river rather than going to the STW. Investigations are ongoing to identify where the water from misconnected properties enters the river. The catchment also has combined sewage outfalls (CSO's) which are overflows in to the river from the foul sewers when it rains too much for them to cope.

De-icer is used in large amounts in winter at airports to stop aeroplanes for icing up and keep runways open. It is a pollutant that can have a similar effect to sewage, where it lowers oxygen levels. It is important to control the amount of de-icer that gets in to the river.

## Pollution from rural areas

Fertilisers containing phosphates and nitrates can be washed off fields in to rivers if they are incorrectly sprayed or if the fields run right up to the river banks. It is likely that these nutrients are adding to the problem of poor water quality. The rural parts of this catchment are classified as a Nitrate Vulnerable Zone (NVZ) which means that farmers have limits on the amount and times that they can spread fertilisers.

## Water flow

### Natural low flows

All of the water bodies in this sub catchment currently pass for water flows under the Water Framework Directive. However because most of the water in the head of these streams comes from rainfall run off and not ground water, they are susceptible to drying up during long periods of dry weather.

## Morphology

### Physical modifications to heavily modified rivers

The Gatwick stream, Crawters Brook, Tilgate stream, Ifield Brook and Mole at Gatwick airport have been classified as heavily modified water bodies under the Water Framework Directive.

The Crawters brook and Tilgate stream run through a number of concrete culverts both covered and uncovered for a large proportion of their length. The Gatwick stream also has a number of culverts including a long culvert underneath the Gatwick airport terminal building. These rivers have also been realigned in places to make them straighter, deeper and wider. This has big impacts on plants and animals and is not necessarily vital for flood risk reasons.

There are at least 11 dams, weirs or steps on these rivers. They block fish passage and hold water creating pond like, slow moving, less diverse habitat behind them. The dams, such as the one at Tilgate lake, are used to reduce flood risk as well as creating a public amenity. Some weirs historically could have

held water back in times of extreme low flows but many are now redundant. There is a flow gauging station on the Gatwick stream at riverside gardens which is also blocking passage to most fish. This structure is used for flood warning and to measure low flows.

The Ifield Brook has at least five obstructions including Ifield Mill pond dam, which is used as a flood storage area. The Ifield brook also has stretches of concrete lined channel which severely restrict the ability for plants and animals to live and breed in the area.

The Mole at Gatwick airport does have some good semi natural areas. Some river restoration was carried out 15 years ago when the airport expanded and a semi natural channel was created to the north of the airport with a functioning flood plain. However, the river does run through a concrete culvert underneath the runway. This could be preventing fish moving along the river due to low water levels at dry periods and the long dark channel, which fish will avoid.

## Physical modifications to natural rivers

The Stanford Brook, Baldhorns Brook, Mole Crawley to Gatwick airport and the Mans Brook have been classed as 'Natural' rivers in terms of Morphology. However all of these rivers have some physical modifications which negatively affect the plants and animals in them. There are at least three weirs in these rivers that are causing an obstruction to fish and other wildlife. Weirs also hold back water behind them creating a pond like, slow moving, less diverse water environment.

## What needs to be done

The following list describes the actions which could be taken to help improve the water environment in the Upper Mole area. These actions are provided as possible solutions only – a full action plan will be developed by the local Catchment Improvement Group.

- Remove all unnecessary river obstructions and concrete banks
- Make all remaining structures passable to fish.
- Introduce in channel enhancements to create habitats and diversify the flow in heavily modified channels
- Upgrade Crawley Sewage treatment works so the effluent treatment removes Phosphate
- Tackle misconnections in the catchment.
- Carryout further investigations to understand the effects of agricultural runoff
- Investigate possible illegal impoundments in the catchment
- Ensure that future development does not deteriorate the rivers further and is seen as an opportunity to enhance river environment.

## Further information

Use our interactive maps to find out more about the Upper Mole area. Search [What's in Your Backyard](#). Further detailed monitoring data will be available on the Catchment Planning System (due summer 2013).

The Mole sits within the **Thames** river basin. Read the first [Thames River Basin Management Plan \(2010-15\)](#).

**Provide your views on the Challenges and Choices consultation: [need web address](#)**

## Contacts

Environment Agency Catchment Coordinator; Peter Ehmann; [Peter.ehmann@environment-agency.gov.uk](mailto:Peter.ehmann@environment-agency.gov.uk)

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