

River Aire

FACT FILE



ENVIRONMENT
AGENCY

KEY FACTS

ALTITUDE AT SOURCE

230 metres above sea level
(Above Ordnance Datum)

TOTAL CATCHMENT DRAINAGE AREA

1100 square kilometres

APPROXIMATE TOTAL CATCHMENT POPULATION

Approximately 1.1 million

MAIN TRIBUTARIES

Otterburn Beck, Eshton Beck,
Broughton Beck, Eller Beck,
Eastburn Beck, Silsden Beck,
River Worth, Harden Beck,
Bradford Beck, Oil Mill Beck,
Meanwood Beck, Wyke Beck,
Lindyke Beck/Sheffield Beck,
The Fleet, Pudsey Beck/Low Beck,
Fryston Beck, Washdyke Beck,
Ings & Tetherings Drain, River Calder

WATER QUALITY OF RIVER AIRE AND TRIBUTARIES

107.8km good; 258.1km fair;
88.3km bad

LENGTH FROM SOURCE TO CONFLUENCE WITH RIVER OUSE

148 kilometres

RAINFALL

The average annual rainfall in the western, upland area of the catchment is approximately 1200mm. Further downstream the figure drops to 625mm



River Aire

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The River Aire rises high in the Pennine hills near Malham in the Yorkshire Dales National Park. It flows in a south easterly direction through limestone moorland areas passing Keighley, Bingley, Bradford and Leeds. At Castleford, the river turns eastward to Goole where it meets the River Ouse, some 148 kilometres from its source at Malham. From Keighley to Goole, the river flows through heavily populated and industrialised areas.

For the last 26 kilometres upstream of Goole, the river is tidal. The Aire's main tributary is the River Calder, which joins the Aire at Castleford.

A CHEQUERED HISTORY

The Aire, like many other rivers in the industrial areas of the country, has suffered greatly over the past two centuries from our industrial heritage.

Until the 17th century, the river was used as a source of drinking water by the people of Leeds. The onset of the industrialisation soon made this a hazardous pursuit.

At the turn of the 19th century, salmon could still be caught in the Aire downstream of Bradford. By 1825 though, the river was nearly devoid of life and remained so for another 100 years.

The Victorians soon realised that open sewers and the disposal of 'night soil' (human waste) to land around the towns was causing appalling outbreaks of diseases such as typhoid and cholera. To deal with this, they introduced a water-borne sewage system. The problem was that this system meant that the waste from homes and streets went directly into rivers without any treatment. Once in the River Aire, it mixed with industrial and factory waste.

By 1840, the River Aire was described as a 'reservoir of poison,



The industrial heritage of Leeds

careful kept for the purpose of breeding pestilence in the town'. It was full of refuse from water closets, cesspools, privies, common drains, dunghill draining, infirmity refuse, wastes from slaughter houses, chemical soap, gas, dye-houses and manufacturers, coloured by blue substances and occasionally a decomposed human body!

WATER QUALITY TODAY

Today the River Aire is most definitely an improving river. Great strides in pollution prevention are now making the river cleaner than ever before.

Since the 1950s, various Acts of Parliament have come into force allowing much stricter controls to be imposed on anyone discharging into our waterways. The Agency uses these



The Agency regulates emissions from power stations

legal powers to issue discharge consents to companies who put effluents into the river. These discharge consents are legal documents stating what the company can and cannot discharge to ensure a river does not suffer from pollution. Consents are regularly monitored and anyone exceeding the limits written in their consent can be prosecuted.

However, industry remains a source of pollution in the modern era and this catchment is no exception. The area is famous for its textile mills which can result in coloured effluents and foam on weirs, especially noticeable in the past at Castleford. The Agency is carrying out national research projects to find the best ways of reducing this pollution.

Industries are also working together to minimise pollution in the catchment in a special waste minimisation project. By careful housekeeping, companies throughout the catchment are successfully reducing the volume and strength of their effluents – and finding that they save money too.

Another major source of pollution is the large sewage treatment works taking domestic and industrial wastes from Keighley, Bradford and Leeds. In fact, during dry summers, more than two-thirds of the river's flow through Leeds is treated sewage effluent. The key to further improvements is, therefore, better sewage treatment.

Yorkshire Water is improving some sewage treatment works and are planning improvements to others. The Agency will advise on priorities and

ensure the work is done as planned. These works should improve water quality throughout the catchment to a good/fair standard by 1998.

The upper reaches of the River Aire have good water quality due to the rural, sparsely populated nature of the area. Nevertheless, these upland streams can become polluted by farm wastes. Environmental Protection Officers work closely with farmers in the area to identify practical solutions to prevent pollution.

The Agency has a system for classifying the water quality of rivers. Class A and B rivers are of high quality. They are clean enough for salmon and trout to live in and can be used for drinking water. They will also support a variety of invertebrates, including mayflies, stoneflies and most pollution

RIVER AIRE AND ITS TRIBUTARIES WATER QUALITY CLASSIFICATION TABLE 1995

Quality Class	Length of Aire Km
A – GOOD	0
B – GOOD	107.8
C – FAIR	160.8
D – FAIR	97.3
E – BAD	78.5
F – BAD	9.8

sensitive insects. Class C and D rivers are of fair quality. Coarse fish such as roach, chub and bream can live in them and possibly trout in some C waters. These rivers can only be used for drinking water if it is substantially treated. A good variety of invertebrate species can be found apart from the most pollution sensitive animals.

Class E and F rivers are badly polluted. Some small animals like worms and midges can live in them, but rarely fish.

To monitor the general state of the river, scientists undertake a comprehensive programme of checking river flows, chemical and biological quality, the fish stocks and the quality of effluents discharged into the Aire.

INTEGRATED POLLUTION CONTROL

Pollution may harm people and all other parts of the living world. Industrial materials or the by-products of industrial processes constitute many of the worst pollutants – those that can do the most harm if mishandled and which are the hardest to dispose of safely. The role of the Environment Agency is to regulate these processes so that, where possible, pollution is prevented, or minimised and made harmless.



Chemical industry on the River Aire

The Agency's authority to regulate industrial discharges stems principally from the Environmental Protection Act of 1990, a key feature of which is the concept of Integrated Pollution Control (IPC). This is being established internationally as the way forward for controlling pollution from industrial sources. As a system, it considers pollution to land, air and water and the way in which it interacts and impacts on the environment as a whole. It also takes a long term view on whether processes are sustainable or make demands on the environment that will rapidly exhaust available resources.

Businesses which want to operate certain industrial processes, those with the greatest pollution potential or those that are particularly complex, must

apply to the Environment Agency for permission to operate. Their application must contain all the information required to assess the impact on the environment, including the effects that polluting releases will have in both the short term and long term. Agency inspectors use this and other independent information to assess whether the activity should be permitted. If the decision is then issued the process, an authorisation is then issued which includes limits on the amount of emissions to land, air or water.

In West Yorkshire, there are a large number of chemical manufacturers, textile processes, a large coal burning power station and some incineration operations, all of which must have an authorisation to operate. The Agency monitors all authorised processes to ensure that conditions are respected and, if necessary, will use vigorous legal enforcement to protect the environment. The Agency can also order processes to be shut down if there is a serious risk of pollution.

The Agency regulates the storage and use of radioactive materials and the accumulation and disposal of radioactive waste. Hospitals, universities and industry are all users of radioactive material and are regulated by the Agency.

FISH IN THE RIVER AIRE

Historically, the Aire was a salmon river with catches recorded into the early part of the 19th century. But now they rarely return to the Aire principally because of its poor water quality.

From the headwaters of the Aire down to Gargrave, the river is a trout fishery. Below Gargrave grayling, chub, dace and pike are also found and these form the main species through to Skipton.

After Skipton, fewer grayling are seen as roach and bream make their



Fish stocking of the River Aire



appearance. These populations increase down to Keighley.

Downstream of Keighley, hardier roach dominate the fishery, though most species are present in small numbers. Improving water quality will contribute to the gradual recovery of the fishery between Keighley sewage treatment works and Bingley.

Around Saltaire, the fishery includes roach, chub and bream and improvements to Marley and Esholt sewage treatment works will allow the restoration of the fishery in this area. In the centre of Leeds, roach, bream, chub and gudgeon are the main species found in the stretch to the south eastern edge of the city where Knostrop, the main sewage treatment works for Leeds, is sited. Below Knostrop there are few fish because of poor water quality.

More fish are again found around Knottingley and, from here to Beal, roach, bream and chub steadily increase – an encouraging sign of the river's gradual recovery from decades of pollution.

GEOLOGICAL FEATURES

From its source near Malham to Skipton, the River Aire flows over Carboniferous Rocks which are between 280 and 360 million years old. It crosses younger Carboniferous Rocks – first the Millstone

Grit and then the Coal Measures – between Skipton and Castleford. The bottom of the valley, enlarged by glacier movement in the Ice Age, is covered with drift deposits.

At Castleford, the river crosses a narrow outcrop of the Magnesian Limestone before crossing the flat, mineral-rich Selby Plain. In this area there are also outcrops of the Sherwood Sandstone – the main aquifer in the area – which is used for public water supply.

WATER SUPPLIES

As the Aire's catchment is home to nearly 1.1 million people, water needs to be piped in from other, cleaner areas for supply to homes and industry. The Wharfe, Nidd, Ure, Ouse and Derwent catchments all provide water supplies to the Aire catchment for homes and industry.

Nevertheless, the cleaner upper reaches of the Aire and its tributaries feed reservoirs which are used for drinking water. Winterburn reservoir near Gargrave supplies water to the

The River Aire and its tributaries



Regeneration of the riverside in Leeds



Frog



Leeds and Liverpool Canal. Lower down, the Aire is also the source of cooling water for the power stations at Ferrybridge and Eggborough.

Water is also taken from aquifers – underground rocks that absorb and hold water – using wells or boreholes. Underground supplies in the Millstone Grit area are commonly used for industrial water supplies and the Sherwood Sandstone for public water supplies to Selby, Goole, Askern and Pontefract.

Although groundwater is generally of good quality, it is vulnerable to the seepage underground of polluting materials and, once polluted, it is difficult and costly to remedy.

The protection of water resources is achieved through licences that specify the amount of water that can be abstracted at any one time. To strike the right balance, the Agency carefully monitors surface and underground water sources using river flow measurements, observation boreholes and rain gauges

and it also ensures licence conditions are adhered to.

BEATING THE FLOODS

Flood storage washlands in the wide upper Aire valley, between Gargrave and Keighley, serve to reduce the risk of major flooding in the heavily built-up middle reaches downstream of Keighley.

These natural washlands act as a safety valve storing excess water during periods of heavy rainfall. The water is held in the washland and then slowly released when the main flood surge has passed. This reduces the maximum water levels downstream, lessening the risk of flooding.

Below Leeds, further washlands help to protect riverside towns like Castleford. Downstream of Ferrybridge, large areas of riverside farm land are embanked to prevent regular flooding. However, larger floods will overtop these defences and the water will spill on to the flood plain to prevent flooding further downstream.

The Aire also suffers tidal flooding

from the North Sea, particularly the villages of Snaith, Carlton, Rawcliffe and Airmyn. Here, earth banks and washlands protect large areas which are below the highest tidal levels.

Tidal flooding is made worse by storms that occur when low pressure weather systems are over the North Sea. Future flood alleviation schemes are scheduled for Castleford and Leeds by 2005.

FLOOD WARNING

The Environment Agency operates a sophisticated flood warning service which uses the latest technology to monitor rainfall, river levels, tides and sea conditions 24 hours a day, throughout the year. When there is a flood risk, warnings are issued to the general public, the police, local authorities and the media, so that those most at risk can take action to protect themselves and their property.

There are a number of ways people who live in affected areas can find out about flood warnings.

In some areas those who have agreed to receive flood alerts, will be telephoned by the Environment Agency's Automatic Voice Messaging (AVM) system. This will give details of the flood warning and a contact for further information. Sirens and public address systems are most appropriate in some situations.

Local flood alert procedures may also be in place. These could include a local warden scheme where a nominated resident passes flood warning information to local households.



The Agency uses the latest technology to predict possible flooding

The Environment Agency also provides a 'dial and listen' national telephone service for information on flooding. Floodcall – 0645 88 11 88 – is a 24 hour recorded information service providing up to date details on warnings in force across England and Wales. It gives details of those places most at risk and information about what to do in a flood.



Fields in flood

The Environment Agency provides local radio stations with up to date information so they can broadcast regular updates. Flood warning information will also be broadcast by AA Roadwatch on many local commercial and BBC stations during their travel bulletins. Weather pages on Teletext (ITV) and weather forecasts on local television and radio may also include flood warning information.

CONSERVATION

Around the headwaters of the River Aire – Malham Cove and Tarn, Goredale and the limestone fells of the Yorkshire Dales National Park – the upland scenery is magnificent. Much of the catchment above Malham is a Site of Special Scientific Interest (SSSI) because of its geological features, limestone pavement plants and animals.

Further down the river, along the valley bottom at Bingley, Saltaire and Kirkstall, the river corridor provides a 'green lung' for the urban population living nearby. In the centre of Leeds, decades of dereliction along the banks of the Aire are being swept away as factories and old industrial sites make way for new offices and housing. This is creating even more pressure for the river to be cleaned and anglers have been catching roach and other coarse fish in the very heart of the city. Below Leeds, there are initiatives to landscape and develop for conservation and amenity, land that has been damaged by industry and mineral workings.

There are a number of mining 'flashes' (or shallow lakes) along the River Aire which are important to wildlife. The Royal Society for the

Protection of Birds nature reserve at Fairburn Ings, near Castleford, is of major importance. The lakes formed as a result of subsidence and in times of flood they can store water. These provide wetland habitat for a variety of ducks, geese, waders and swans which winter at the reserve or use the Aire valley as a migration route.

Part of the Leeds and Liverpool Canal, running alongside the Aire, in the Kirkstall Valley, is also designated as a Site of Special Scientific Interest because of the plants and wildlife found within it.

WASTE MANAGEMENT

Waste needs to be carefully managed. Hazardous waste may pose a serious threat to the environment and in the worst cases can be dangerous to life. Other wastes may cause a problem by their sheer volume or nuisance value such as litter, flies and smell. This means the disposal and recovery of waste must be carefully controlled to ensure that there is no damage to the environment or harm to human health.

It is estimated that the average household produces approximately one tonne of refuse each year. With approximately 1.1 million people living in the catchment area this adds up to a



Compacting waste at a landfill site

vast amount of waste which has to be safely disposed of each year.

Landfill remains the prime method for the disposal of household and other forms of solid waste from industry and commerce. Sites suitable for landfill are becoming more difficult to find and, as a consequence, are being located remotely from the urban centres of population.

All facilities where waste is handled, treated or disposed of must be licensed by the Environment Agency. The licence specifies the types and quantities of waste which can be accepted at the site and the precautions which must be taken by the site operator to protect the environment. West Yorkshire has a long industrial heritage, especially in textiles and engineering and there are approximately 486 licensed sites in the area. These include transfer stations, waste storage facilities, chemical treatment plants, incinerators, scrapyards, household waste sites, gas flaring facilities and landfill sites.



Recycling saves precious resources

When waste is deposited in a landfill site it breaks down to produce a polluting liquid (leachate) and landfill gas (mainly methane). The site operator must line the landfill site with an impermeable barrier to stop leachate polluting groundwater and landfill gas from migrating into property where it might explode. In some cases, landfill gas is extracted from sites and burned to produce heat or generate electricity. Other waste disposal methods include incineration facilities and chemical treatment plants.

However, not all waste is disposed of. Thousands of tonnes of metal and other valuable materials are recycled through a network of scrapyards. Household Waste Sites and other recycling centres take a range of recyclable wastes such as oil, paper, cans, plastic, textiles and even paint. These too are licensed and regulated by the Agency to ensure that they do not harm the environment.

Industry and commerce have a Duty of Care to make sure their wastes are only collected by an authorised person and taken to an authorised waste disposal site. Waste carriers also have to be registered with the Agency before they can collect any waste. Illegal dumping (fly tipping) of waste at unauthorised sites is always a problem, particularly in urban areas. Those who are caught flytipping are prosecuted.

Wastes which are the most dangerous to people or to the environment are called Special Waste. They include hazardous or toxic waste such as acids, pesticides and asbestos. Movement of Special Waste from its place of production to the disposal site must be authorised by the Agency. This provides an opportunity to check that the disposal site is suitable for the waste and that it is deposited safely.

There is a growing acknowledgement, however, that we cannot continue using up natural resources and producing waste the way we do. The government has recently produced a National Waste Strategy in order to try and address these problems. The first priority is to reduce the amount of waste we produce and if we must produce waste then we should try to reuse or recycle it. Only as a last resort should it be disposed of. Everyone has a part to play in this strategy whether at home, at school or in the work place. The Agency issues advice on the safe, efficient disposal of waste and will play a key role in delivering the new national strategy.

● The Agency has a 24 hour emergency hotline – **0800 807060** – for reporting environmental incidents. Pollution, poaching, fish in distress, risks

to wildlife, flytipping, flooding – don't ignore it, report it!

ENJOYING THE AIRE

The scenic upland areas of the Aire – most notable around Malham – attract visitors in their thousands each year. This area is beloved by walkers, anglers, birdwatchers and sightseers alike.

Ramblers walking the Pennine Way follow the beginnings of the Aire from Malham Tarn to Gargrave, where they may sometimes see dippers but more often wagtails and kingfishers. There is also good walking in the Brontë country of Haworth and on the south side of the Rombalds Moor.

As the valley widens, a unique double-decker aqueduct carries the Leeds and Liverpool Canal over the Aire near Gargrave and whilst there is no navigation on the river itself, narrow boats, cruisers and canoes make use of the canal here. Both the river and canal flow alongside one another through pasture land to the west of Skipton. At Skipton, a branch of the canal connects with the centre of the market town with its still-roofed castle, while the river passes to the south. From here to Keighley, the river is of increasing interest to anglers.

Saltaire is a place of notable historical and architectural interest with the famous Titus Salt's Mill now converted into an art gallery and craft workshops and the river here is a base for rowing activities.

The next notable place of interest is downstream at Kirkstall Abbey where monks began the early UK woollen



Enjoying the river in Leeds

industry using the plentiful supply of water from the Aire.

There is also an industrial museum at Armley, based in a large old mill between the River Aire and the canal.

Access to the river through the suburbs of the city becomes limited by industrial sites developed to the water's edge.

In the centre of Leeds, the canal and river merge and flow under Leeds Bridge where one of the first movie films ever, was shot by Louis Le Prince in 1888. The film, made with his invention of a single lens camera, showed horse-drawn wagons and pedestrians moving across the bridge. The river and canal merge and part a number of times downstream of Leeds. The navigation is used by commercial vessels coming upstream as far as Hunslet.

Along the river banks here is seen evidence of the Aire's industrial heritage. A restored water powered putty mill has been opened to the public at Thwaite Gate. Fishing is once again possible downstream of Leeds almost to the tideway – the river is slowly recovering from years of pollution. Salmon passes have been restored at some weirs in the hope that migratory fish will return in the future.

The Aire navigation then threads its way past Temple Newsam Estate and through the Yorkshire coalfield. Vessels plying the downstream reaches of the navigable Aire are able to join with the Ouse via the Selby Canal, West Haddlesey.

Much of the riverside is already enjoyed by walkers and efforts to establish recognised paths along the river corridor continue. One such route, the Leeds spur of the Trans Pennine Trail, provides a link between the fabulous new Armouries museum in Leeds and the main line of the trail downstream. Part of this route is shared by the Leeds Waterfront Heritage and Wildlife Trails.



Along the Pennine Way

NORTH EAST REGION ADDRESSES

REGIONAL OFFICE:
Environment Agency
Rivers House
21 Park Square South
Leeds LS1 2QG
Tel: 0113 244 0191
Fax: 0113 246 1889
Minicom: 01904 692 297

NORTHUMBRIA AREA
Environment Agency
Tyneside House
Skinnerburn Road
Newcastle Business Park
Newcastle upon Tyne NE4 7AR
Tel: 0191 203 4000
Fax: 0191 203 4004
Minicom: 01904 692 297

DALES AREA
Environment Agency
Coverdale House
Amy Johnson Way
Clifton Moor
York YO3 4UZ
Tel: 01904 692 296
Fax: 01904 693 748
Minicom: 01904 692 297

RIDINGS AREA
Environment Agency
Olympia House
Gelderd Road
Leeds LS12 6DD
Tel: 0113 244 0191
Fax: 0113 231 2116
Minicom: 01904 692 297



Environment Agency
Information Centre



For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

**ENVIRONMENT AGENCY
GENERAL ENQUIRY LINE
0645 333 111**

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

**ENVIRONMENT AGENCY
EMERGENCY HOTLINE
0800 80 70 60**



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