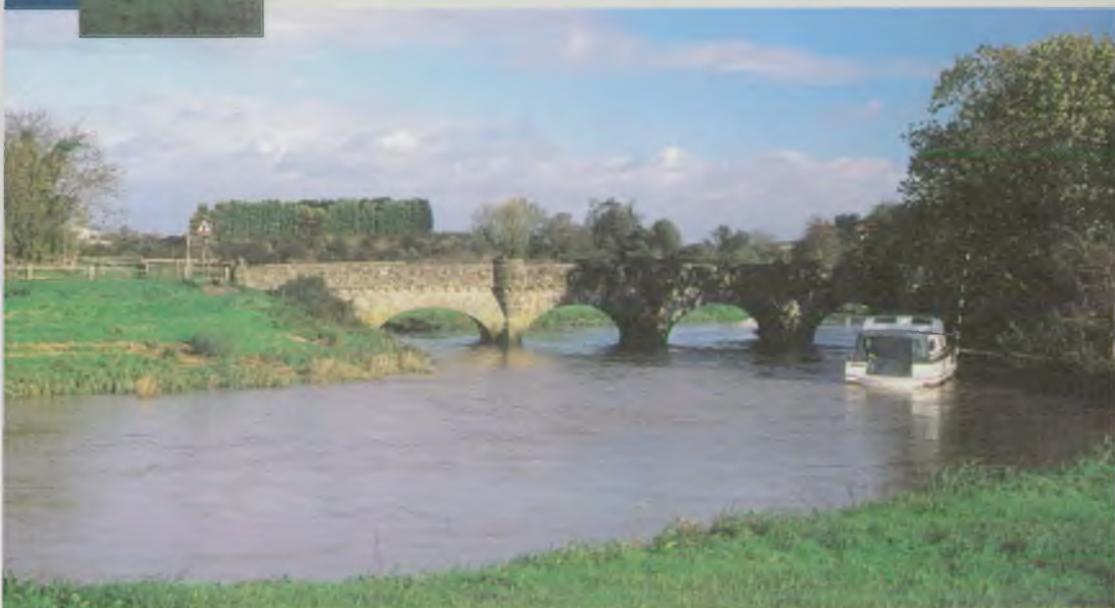




ENVIRONMENT
AGENCY



FACT FILES

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River Arun



ENVIRONMENT AGENCY



Environment Agency - a better environment in England and Wales for present and future generations.

The Environment Agency is one of the world's most powerful environmental watchdogs, regulating air, land and water. As 'guardians of the environment' the Agency has legal duties to protect and improve the environment throughout England and Wales and in doing so contributes towards 'sustainable development' - meeting the needs of today without harming future generations.

Created by the 1995 Environment Act, the Agency started work in 1996. It is officially a 'non-departmental public

body', which means that the organisation works for the public and has specific duties and powers.

The Agency has funding of about £585 million, 75 per cent of which is funded from its own charges and the rest from Government.

Nationally, around 15 million hectares of land are managed by the Agency along with 36,000km of rivers and 5,000km of coastline, including more than 2 million hectares of coastal waters.

There are eight regional offices which are split into 26 area offices. Southern Region covers the counties of Kent, Sussex, Hampshire and the Isle of Wight.



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— River Arun —

A major West Sussex watercourse, the River Arun flows for 84 kilometres from its source at St Leonard's Forest near Horsham and southwards through the Downs before joining the sea at Littlehampton. Much of the Arun runs through countryside and farmland which includes Amberley Wild Brooks,

a Site of Special Scientific Interest (SSSI) which is situated within the South Downs Area of Outstanding Natural Beauty. Tidal velocities at Arundel Bridge are very high and makes the Arun one of the fastest flowing rivers in the country.



*Hawkins Pond,
St. Leonard's Forest*

Facts at a glance

Length of main river	84 km
Area of river system	1,405km ² (sq)
Resident population	500,000
Average annual rainfall	806mm
Potential licensed abstraction from river	270 million MI per day



Swanbourne Lake

From source to sea

The River Arun rises 120 metres above sea level in the High Weald of St Leonard's Forest, to the east of Horsham. The river, fed by springs in the Tunbridge Wells Sandstone strata, runs westwards before turning south at Bucks Green, where hard rocks give way to the Wealden Clay. From here the Arun meanders through a broad floodplain to Pallingham, the tidal limit, even though it still has nearly thirty kilometres to run before meeting the sea.

The tidal reaches are characterised by high flood banks which protect low-lying land. Between Houghton and Arundel the Arun runs in a deep valley cut through the Chalk of the South Downs by a torrential Ice Age river, at a time when sea level was some sixty metres lower than it is now. As the

climate warmed and sea level gradually rose, this valley **silted** up, leaving the modern river perched on a deep bed of **alluvial silt** and peat.

Ancient river meanders at North Stoke and Burpham were by-passed in the nineteenth century when the railway was driven south from Pulborough to Littlehampton, blazing a new path through the Arun valley. The older north-south road, now the A29, had been forced to take a route over the Downs, avoiding the valley floor which was too wet and muddy for wheeled traffic. Below Arundel the river is scoured by violent tidal currents, both on the flood tide and the ebb, and the river discharges to the sea at Littlehampton.

The largest **tributary** of the Arun is the Western Rother, which joins it at Hardham, between Pallingham and Pulborough. This river rises from Chalk springs near Petersfield in Hampshire, flowing eastwards for more than thirty kilometres in the vale between the Chalk of the South Downs and the Lower Greensand ridge to the north. The Western Rother is sustained by a number of small spring-fed streams rising at the foot of the Downs, giving it a stable base flow. It also has something of the flashy character of a



Wealden river on account of those tributaries which flow from the Lower Greensand and Weald Clay to the North.

A **winterbourne** to the north of Arundel was dammed in the eighteenth century to form Swanbourne Lake, which is a feature of

the landscape and a popular tourist honneypot. In recent years water levels in the lake have declined drastically due to a prolonged drought and the effects of **groundwater abstraction** for public supply. The Environment Agency is working with the abstractors and others to restore the situation.

History

The Romans called it *Alta Ripa*, the Normans used the name *Haute Rey*. Much later the Arun became known as the Tarrant and the High Stream of Arundell Rape, at which time Sussex was sub-divided into six Rapes, each with its own castle, river and forest.

Like many of the Sussex rivers, the history of the upper reaches of the Arun and Rother is tied up with the iron industry using local deposits of iron ore. Hammer ponds such as Hawkins Pond, Birchenbridge Pond and Carters Lodge Pond in the Slaugham and Mannings Heath areas, show how important the streams were to the Wealden iron industry. Cinderbank Copse below Hawkins

Pond is still strewn with heaps of slag and clinker. The ironstone of the Weald was first exploited in the Iron Age and then by the Romans and sporadically through the Middle Ages. The headwaters of the Sussex and East Kent rivers were used for cooling the molten masses of iron which were extracted by heating within a charcoal mound. By Tudor times, blast furnaces had been introduced which revolutionised the industry. The draught from bellows created higher temperatures allowing cast iron to be produced and wrought. The steep streams of the Weald were ideal for damming to give a head of water to drive water wheels for bellows and forging hammers.



The Arun Gap



Arundel Castle and the river

Man's influence on the lower reaches of the river is comparatively recent. Until the latter half of the 15th century the natural outlet of the river to the sea was at a place called Pen-House not far from Lancing Church, where the River Adur also entered the sea. Shingle drift, driven by the prevailing south westerly winds and waves, restricted the entrance, diverting the River Adur progressively eastwards and causing the River Arun to turn back on itself and find new outlets to the west. The river broke through at Worthing, Goring and Ferring and ultimately at Littlehampton between 1500 and 1530. In the last half of the 16th century, Henry Fitzalan had the channel cleared and widened to enhance Arundel's prospects as a commercial port. As a result, ship building became an important local industry and imports included playing cards, glass, wrought iron, millstones, Purbeck paving stones, tombstones and French and Spanish wine. A thriving oyster fishery based on shellfish beds in the English Channel also brought great prosperity.

For centuries the River Arun's major use was as an important trading route in West Sussex. Arundel is mentioned as a port at the time of the Domesday Book, and at about 1077, shortly after the Norman Conquest, the Arun was used to carry Caen stone from Normandy to reface the keep of Arundel Castle.

Arundel grew in importance as the market town of the Arun Valley and in the late sixteenth century a huge development operation began to upgrade the river. With active encouragement of the Earls of Arundel, wharves were set up, shipyards opened, the river bed dredged and even the course of the Arun was changed so that it flowed to the edge of the town.

During the reign of Queen Elizabeth I, the Arun was made navigable from Littlehampton as far as its junction with the Rother at a place called 'Turning Stream'. It was also cleared to carry timber by barge from nearby Pallingham to Arundel for shipment.



As trade grew in the late eighteenth century navigation on the Arun was further extended. Two canals were built, one from Coldwaltham to Hardham to allow waterbourne trade as far as Newbridge. The completion of these works in 1790 meant you could travel on the Arun to within about 35 kilometres of the River Wey, near Guildford. An idea to link the two rivers led to the building of the Wey and Arun Junction Canal in 1813.

The final link was completed in 1816 and provided access to the London markets from Surrey and Sussex. However, commercial use of the river was largely confined to the carriage of lime from Pepper's Kilns at Houghton Bridge for building and agriculture,

and chalk from both Houghton and the pit at the Black Rabbit which was used for road building and river bank maintenance.

The coming of the railways saw the decline of the canals and the fixing of the formerly movable railway bridge at Ford stopped the general use of sailing barges. Hence the route was formally abandoned in 1871.

Littlehampton remains a small but active port popular with yachtsmen and with commercial trade mainly in sea ballast and stone for the construction industry and occasional seasonal cargos such as grain.



Ford railway Bridge with Boat and Anchor Marina. The railway bridge formerly swung open for river traffic.



Drying berths in Littlehampton Harbour



Water Quality

The Environment Agency monitors the quality of water in all rivers, lakes and estuaries in England and Wales. There is a strong commitment to improve these waters and protect their ecology wherever possible.

In the Arun catchment where there is a mixture of rural and urban areas, many different water quality problems occur. In rural areas there are drainage problems with cess pits and septic tanks causing localised pollution. Leaks from domestic oil tanks are common but through the Agency's prevention work, farm pollution incidents have been cut.



Amberley Castle

The water of the River Arun and its **tributaries** is generally of good to fair quality. The catchment supports a healthy population of coarse fish whilst trout thrive in some of its streams. The biology of the Arun is also generally good and includes a number of sites important for nature conservation.

Flora and fauna

The Agency works in partnership with other organisations such as English Nature, the RSPB and the Sussex Wildlife Trust, to protect the Arun's many important natural habitats.

The Upper Arun is particularly important for dragonflies including the rare Club Tailed Dragonfly and the uncommon Scarce Chaser. Much of the Arun and its flood plain is designated for its conservation interest. In the lower valley the grazing marshes support internationally



Amberley Wildbrooks

important numbers of overwintering birds. The RSPB reserve at Pulborough is the best site to see them from. Further downstream, Amberley Wildbrooks, a site of special interest, is particularly important for the number of wetland plants that it supports. About 80% of those found in the UK.

The area is also designated an Area of Outstanding Natural Beauty. The Arun and Rother Valley Countryside Project promotes the enhancement of the valley and encourages environmentally friendly farming. The project is a partnership between the Agency and the South Downs Conservation Board.

Flood Defence

The Agency is responsible for protecting the public and property from flooding. A special team keeps the Arun flowing by dredging the river, controlling weeds and removing debris. At times, the water flows very quickly down the Arun - at Arundel Bridge the speed of the water can reach six and a half knots (12 km/h), making the Arun the second fastest flowing river in the country. This fast flow of water causes erosion of the river banks, hence the main flood defence work along the river involves the maintenance and protection of 54km of flood banks between Littlehampton and Pulborough.



Stopham Bridge

Fisheries

The Arun holds a mixed population of coarse fish in its middle and lower reaches. The lower, slower flowing stretches support populations of roach and bream. Chub and dace are the dominant species in the middle reaches. Below Arundel mullet and bass replace the freshwater fish.

The sea trout are typically large weighing between 2 and 25kg. Spawning takes place in winter in the gravels of the headwaters and tributary streams. These upper reaches and **tributaries** support native brown trout, bullhead, stone loach and minnow.

*Angling clubs fish the river between Horsham and Burpham. Footpaths along the Arun link up with both the South Downs Way and the Wey South Path.

Careful management of the river and its streams helps develop and conserve fish stocks for the future. Anyone wishing to go fresh water fishing must have an Agency rod licence. Money

raised from the sale of such licences goes towards improving habitat and fisheries throughout the catchment.

Recreation

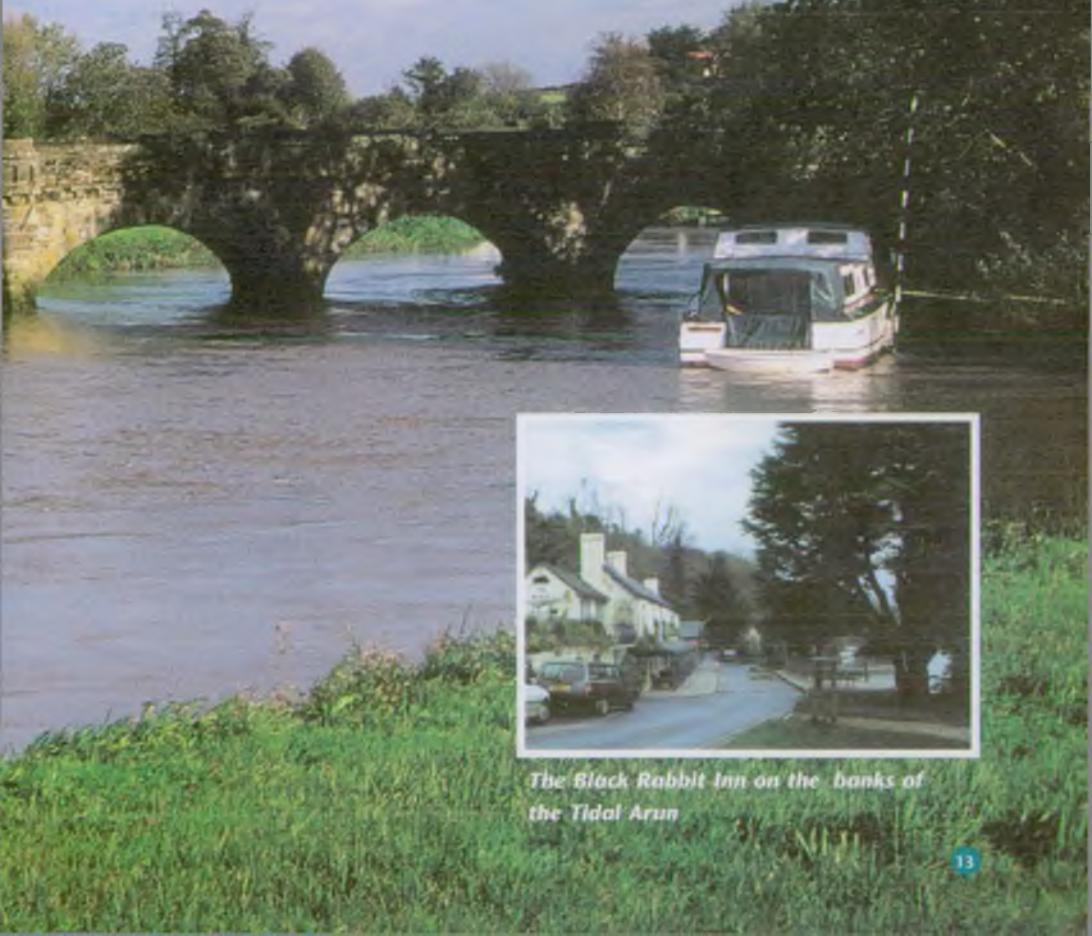
Another important aspect of the work of the Agency is in promoting recreation. The Arun is a popular attraction for a range of recreational activities. Pleasure cruising is popular and canoe enthusiasts enjoy the waterway up to Pallingham the tidal limit. However, the speedy, tidal currents and the hazard of mud banks, known locally as the Amberley Pies, can be dangerous to the inexperienced boat user. The Wey and Arun Canal Trust is working to extend navigable waterways by restoring the adjacent canal, first used in 1816.

The Rother also has some beautiful walks. Working in collaboration with the East Hants Area of Outstanding Natural Beauty (AONB) and the Sussex Downs Conservation Board, the Agency has produced a set of guides to walks in the Rother Valley.

*Refer to *Fishing in the South*



Anglers at Burton Mill Pond



The Black Rabbit Inn on the banks of the Tidal Arun

Water Resources

The Southern Region is one of the driest areas of the country. Rainfall averages 806mm a year, and 75% of our public water supply comes from natural underground reservoirs. By monitoring river flows, **groundwater** levels, rainfall and climate, it is possible to manage this precious resource. The need to protect the environment must be balanced with the demands of industry and the public.

The Arun is characterised by flash floods in winter and sluggish flows in summer. There are nearly 40 licences authorising removal of water from the Arun and its minor **tributaries**, mainly for spray irrigation of field crops. Approximately one third of these licences specify the Arun itself, with the rest being scattered around the **tributary** system.

In contrast, the chalk springs which feed the Rother, the major tributary of the Arun, maintain a faster flowing river with higher quality, cooler water. Indeed, the ancient name for the Rother was the Suoyr, meaning 'clear

and bright'. Nearly 50 licences have been issued to allow water to be taken from the Rother and its tributaries, including an important public water supply source at Hardham. As on the Arun, the majority of these are for spray irrigation, with the newer licences only permitting winter storage.

Additional water may be taken from underground at Hardham. This area has an unusual geology - 30 million years ago, folding and flexing of underground rock strata shaped the underlying Folkestone sands to form a natural underground basin. When more water is needed, it is taken from this underground source as well as from the river. As rain falls, it seeps through the rock and replenishes this underground reserve. However, there may come a time when water is taken out more quickly than the basin naturally refills. If this happens, it may be necessary to pump surplus water from the river into this aquifer, effectively using it as a huge underground storage tank.

Hardham pipe bridge and footbridge, fluvial flooding. The pipe bridge carries the water main from Hardham to Crawley, which also serves Worthing area at times when the chalk aquifer is recovering from abstraction.



Hardham Weir. This serves as the tidal limit to the River Rother, a river flow gauge, fish pass and flood control structure, and maintains a head of water for abstraction to the Southern Water treatment plant.



Preventing Pollution from Industry

Much of the catchment's drinking water comes from boreholes.

Protecting the surrounding chalk aquifer is therefore very important. Oil and chemicals seeping into the groundwater, for example, could cause problems to both the environment and public.

As part of its role to prevent and control pollution, the Agency regulates the treatment and disposal of controlled waste. Waste regulation officers issue licences for safe handling, storage, treatment, transport and disposal of all kinds of waste. They aim to ensure there is no threat to the public or the environment. Regulated industries include scrapyards, incinerators, car breakers, landfill and nuclear sites. The officers monitor the safety of these industries whilst operational, and after they are closed, and advise local councils on all new developments close to landfill sites.



Don't Ignore it, Report it!

You can help the Agency protect the Environment by phoning the Agency hotline if you see what you think is damage to the environment.

Call **0800 80 70 60**, free, 24 hours a day, seven days a week, 365 days a year, to report damage or danger to the natural environment

- Pollution
- Poaching
- Risks to wildlife
- Fish in distress
- Illegal dumping of waste
- Flooding incidents

For general enquiries ring your local Environment Agency on 0645 333 111 during office hours

The harbour entrance and Littlehampton beach



The shipping channel and breakwater at Littlehampton harbour

Glossary of Terms

Abstraction	When water is taken from a river or underground rock strata
Aquifer	A layer of permeable rock, deep under the surface, capable of absorbing and storing water
Alluvial	Fertile soil made up of mud, silt and sand left by flowing water
Dredging	Removing material from a river bed
Groundwater	Water which seeps through the ground into the permeable rocks many metres below the surface
Siltation	Deposits of sand and mud collect on the river bed, gradually filling it
Tributary	A small stream that joins the main river
Winterbourne	A seasonal river, only containing water during the winter months

SOUTHERN REGION ADDRESSES

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HAMPSHIRE AND ISLE OF WIGHT AREA OFFICE

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Wessex Way
Colden Common
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Hampshire SO21 1WP
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Fax: 01962 841 573

ISLE OF WIGHT

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KENT AREA OFFICE

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Orchard House
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Fax: 01732 875 057

SUSSEX AREA OFFICE

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Saxon House
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Tel: 01903 215 835
Fax: 01903 215 884



- Area Administrative Boundaries
- - - Regional Boundary
- Area Office

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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