

Factsheet No.1 in the Environment Agency educational series

River Flooding

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ENVIRONMENT
AGENCY

A flood is a natural event that can have far reaching effects on people and the environment. It is caused by a combination of factors, not just heavy rainfall.

Rainfall might drain from the land, creating streams and rivers, or sink into the ground to refill **aquifers**. These are layers of **porous** rock, such as chalk, with many small holes or 'pores' that can fill with water, forming underground reservoirs. When heavy rain occurs, there may be too much water for the porous rock to absorb and so it will lie on the surface. Water will also lie on the surface if it is **impermeable** - that is, it does not allow water to pass through. Clay is an example of an impermeable rock. As more of the natural landscape is covered by buildings, it becomes impermeable, so rainwater cannot easily soak into the ground, or flow naturally across the surface (run-off). This can lead to an increased risk of flooding, which can occur quickly during heavy rain. Some flooding can be beneficial since



it helps to sustain natural wetland habitats that contain many rare plants and animals. The Thames Region is at risk of flooding since the underlying rock in large parts of the

Region is impermeable clay, and in recent years there have been several examples of severe flooding. Floodwater can be very dangerous - in the floods of 1953 for example, people were swept away and killed as well as many farm animals. It can cause great damage to property and its contents, and can severely disrupt transport and communications links. If the flooding occurs in an important commercial area, such as a town centre, trade can be badly affected.

THE WORK OF THE ENVIRONMENT AGENCY

One of the aims of the Environment Agency is to protect people and their property from flooding. The Agency provides effective defence against flooding for 12 million people and their property. Each year millions of pounds are spent on flood defences in the Region, of which half is for new works and half is for maintenance

of existing long sections of river defences. Its function can be broken down into the following areas:

Prevention - advice on controlling developments that may increase the danger of flooding or be in areas prone to flooding.

Defence - building flood protection structures.

Operations - maintaining and operating flood defences and the monitoring of river flow.

Warning - forecasting and issuing flood warnings.

PREVENTION

The population is still increasing, leading to more severe pressure on the environment. The Environment Agency aims to protect the environment from possible damage from new developments, to protect any of these developments from flooding and to reduce flood risk to existing property. In order to avoid new flooding problems the Agency is consulted by local planning authorities before permission is given for any new development. These include the construction of new buildings and roads. Each year the Agency is consulted on thousands of planning applications. The Agency would generally resist any new development on areas liable to flooding, such as homes being built on flood plains (areas of flat land next to a river). They would also resist any development that would greatly affect the natural water cycle. These include bridges and weirs, as they prevent the natural flow of water in a river, and large car parks that stop rainwater sinking into the ground.



DEFENCE

Although flooding can never be

totally prevented, the Agency continues to develop new schemes to reduce the risk of flooding by, for example, regulating the flow of rivers. In the works, when there is too much water, the Agency will seek to reduce the flow. This can be done in several ways including:

- building raised riverbanks to create a 'berm'. A berm increases the capacity of the river channel so that it can take excess water and also creates wetland habitats which are valuable for wildlife.
- the construction of a relief channel. In effect, another river channel is built, able to take excess water when the main channel is full.
- increasing the capacity of the river channel by dredging, when the shape of the river channel is changed, made deeper and/or wider.

New works are needed because of increased urbanisation, which has led to more rapid run-off, meaning that previously acceptable channels have needed further improvement.

OPERATIONS

Environment Agency staff work constantly measuring the amount of water flowing in the river. This is done automatically at gauging stations and by staff in times of emergency (such as extreme heavy rainfall or during flooding), so that warnings can be issued promptly and



action taken to reduce damage from flooding. Maintenance of existing flood defences is essential. Activities include weedcutting which helps to ensure water is able

to flow uninterrupted through the river channel, so reducing the risk of local flooding. Agency staff also work, where necessary, to maintain raised river banks, keeping the river in a defined channel. In the event of river floods occurring, staff will take emergency action. This may include using sandbags to raise the riverbank and contain the excess water in the channel, clearing blockages in river channels, or opening sluice gates to enable floodwater to drain away quickly. If the river breaches the riverbank, they may also build emergency dams to contain the water.

FLOOD WARNING

The Environment Agency uses this information to assist the operation of the flood warning system. Flood defence staff constantly monitor weather conditions, in particular rainfall figures, river flow data and tidal levels to determine where floods may occur, the severity of

the flood and the extent of areas that may be affected. Information is gathered using data from the Meteorological Office weather radar stations, and automatic sensors that alert Agency staff of exceptionally high levels of water in the river channel.

When Agency staff decide that flooding is possible, flood warnings are issued to the general public in areas likely to be affected. These warnings are passed to the police, the emergency services and the local authorities. Some places have flood wardens who pass warnings to households at risk. The Environment Agency may telephone some people who live in areas at risk from flooding, to inform them that flooding is possible. Local radio stations also broadcast warnings to their listeners. The three phases of the warning system are:

- **Yellow Warning** - minor flooding of agricultural land and roads in rural areas. No property flooding is expected and no public warning is issued.
- **Amber Warning** - flooding of agricultural land, parkland and gardens. Some individual properties may be at risk so consequently vulnerable properties are alerted.
- **Red Warning** - flooding forecast of residential and commercial properties. An indication of the severity will be provided in the public warning issued.

The Environment Agency has a target for those affected to be warned where practicable two hours before flooding occurs, and has information on what action to take in the event of a flood.

LOCAL ENVIRONMENT AGENCY PLANS

Many conflicting demands are placed on the water environment. These varied uses and influences interact in many ways, demanding an integrated approach. A **Local Environment Agency Plan** is based on river systems, treating a river and its tributaries, together with the land and underground water connected with it, as a single unit. The plans enable all interested parties to work in partnership with the Agency to protect and improve the water environment of individual river catchments, allowing for the need to protect people and their property from flooding.

THE ENVIRONMENT AGENCY

The Environment Agency was formed by a merger of the National Rivers Authority with Her Majesty's Inspectorate of Pollution and the Waste Regulation Authorities. This new organisation began operating on 1 April 1996, and has responsibilities for the environmental protection of water, land and air.

ENVIRONMENT AGENCY



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MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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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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