

5

Rivers

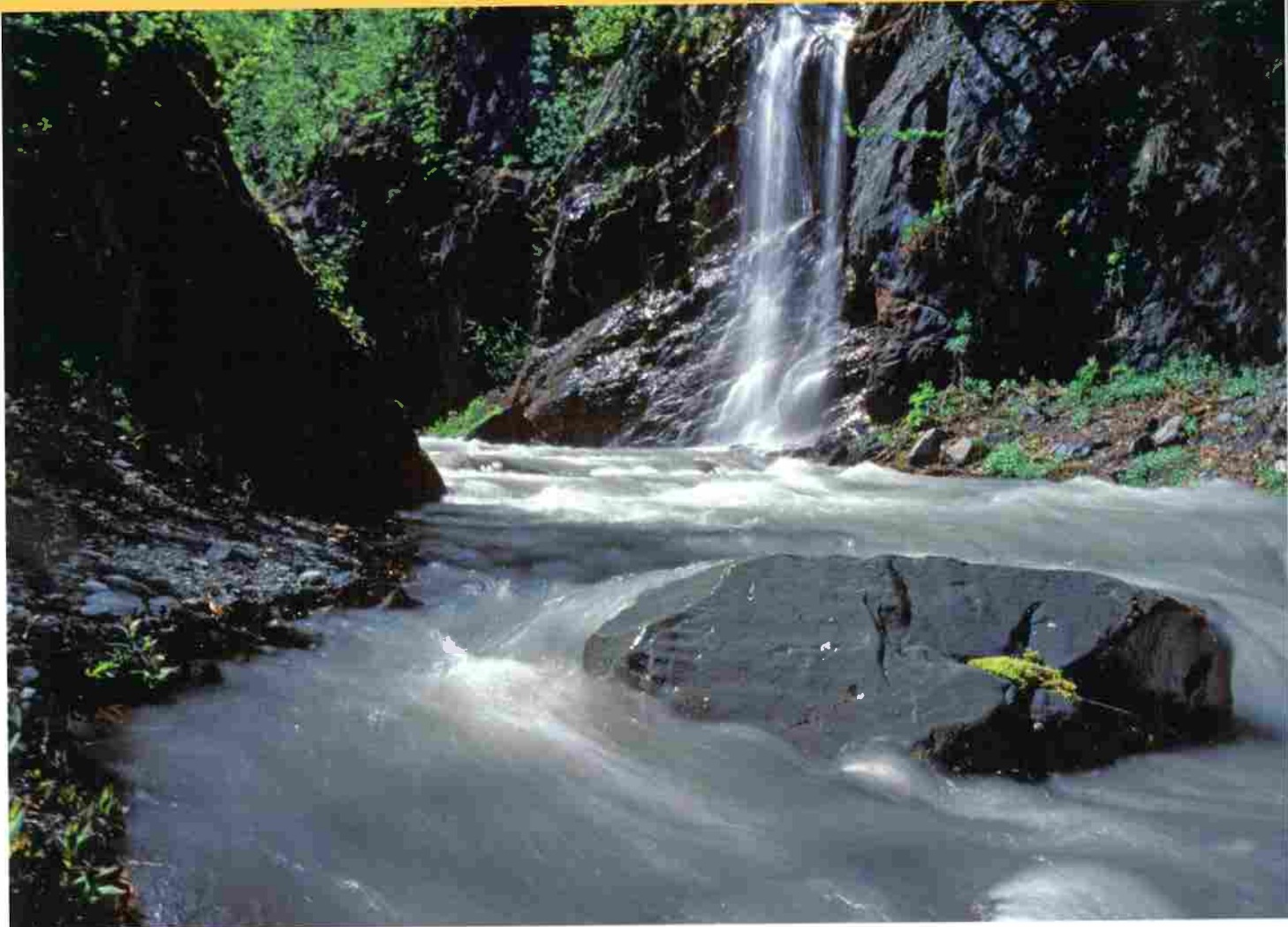


Figure 5.1 A beautiful waterfall and creek from a glacier near Seward, Alaska

Learning intentions

In this chapter, I am learning:

- what rivers are
- the different features of a river
- how rivers are important for us
- how people can damage rivers
- how rivers can be protected
- how to investigate pollution levels in a river.

What are rivers?

A river is made from fresh water flowing downhill across the surface of the Earth, usually to the sea or to a lake. It is fed by water from **springs** and from **tributaries**.

A river drains water that has fallen on the land (for example as rain or snow) back towards the sea where it will evaporate and can fall on the land again. This is called the **water cycle**. Rivers are a very important part of the water cycle.

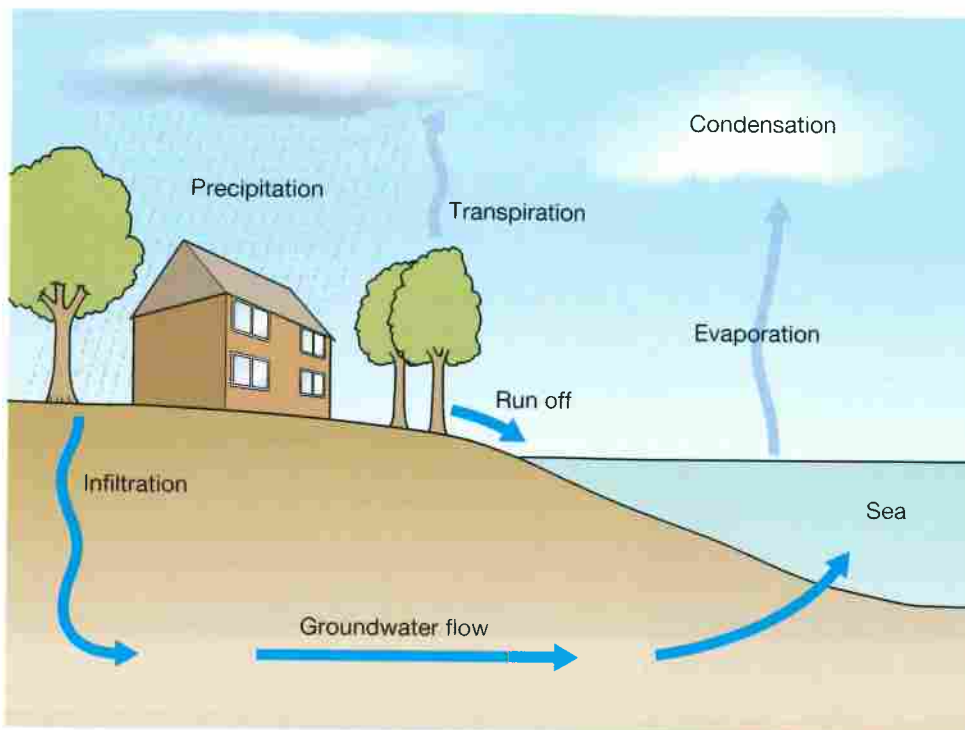


Figure 5.2 The water cycle



Figure 5.3 High Force, River Tees, England



Figure 5.4 Nile Delta, Egypt



Figure 5.5 Rapids, California, USA



Figure 5.6 River bank, River Braid, near Ballymena

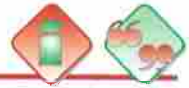


Figure 5.7 Meanders, River Dart, England



Figure 5.8 Confluence of River Vlatava and River Berounka, Prague, Czech Republic

Get Active 5.1



a) Match the definition to the water cycle term.

Term	Definition
1 Infiltration	i Droplets of water falling to the ground as rain, hail or snow
2 Evaporation	ii Water in the rocks flowing slowly towards the sea
3 Precipitation	iii Water seeping into the ground
4 Runoff	iv Water droplets forming when the hot air cools down
5 Groundwater flow	v Water made into a gas by being heated
6 Condensation	vi Water running in streams and rivers along the ground towards the sea

- b) Work in pairs. Put together the water cycle story using the table above and Figure 5.2. Why does it not matter where you begin?
- c) The run off in the water cycle is **usually** in rivers. Find out a series of facts about rivers using the LNI library or on websites that your teacher can provide. Aim to get six facts in total. They can be about anything to do with rivers (but try to find facts which you find **interesting**, as they are more likely to be interesting to others too). Use the photos on page 86 to help you get started. Put your facts into a table or chart to display in your classroom and add some pictures of rivers around the edge.

Get Active 5.2



Look at Figures 5.3 to 5.8 showing features of rivers.

Work in pairs. Look carefully at the photographs and answer the following questions.

- 1 Is there a scary photograph? Which one? Why?
- 2 Is there a peaceful photograph? Why do you find that one peaceful?
- 3 Which feature is the largest? How can you tell?
- 4 Which is your favourite photograph? Why did you pick that one?
- 5 Which river scene would you photograph to show to other people? Why would you pick that one?

Think of some questions to ask each other about the photographs. Join with another pair and share your thoughts on the photographs.

The longest river is generally accepted to be the Nile River in Africa, with a length of 6,695 km from its headwaters in central Africa to its mouth at the Mediterranean Sea (some people argue that the Amazon River is longer, as satellite images in the 1990s seemed to show a very small tributary high up in the Andes Mountains).

The Huang He in China translates as the Yellow River. It gets its name from the yellow mud and sand of the soils of central China which it erodes. The Huang He carries more sediment to the sea than any other river. In 1933, it carried 3.91 billion tonnes.

The Amazon in South America carries more run-off than any other river and is 6,400 km long. This one river contributes one-fifth of all the river water that flows into the world's oceans. The mouth of the Amazon is about 270 km wide.

Get Active 5.3



Researching the different features of a river

- a) Work in a small group. Research the different features that can be found along a river. You could pick from the list below, or your teacher might give you some other features.
- channel
 - meander
 - delta
 - valley
 - interlocking spurs
 - banks
 - tributaries
 - confluence
 - floodplain
 - waterfalls
- b) For the features that you are finding out about, research the following:
- a picture (diagram or photograph)
 - a few facts about it
 - where on a river it is found
 - where you could go to look at it (is there an example close to you?).
- c) Your group will be the experts on your feature. Once you have completed your research, work with your group to make a poster of your feature. Then combine all your posters to make a giant poster called 'River Features'.
- d) Using the big poster, write down some of the details about the features that you did not research. You could ask the experts on those features questions about them.

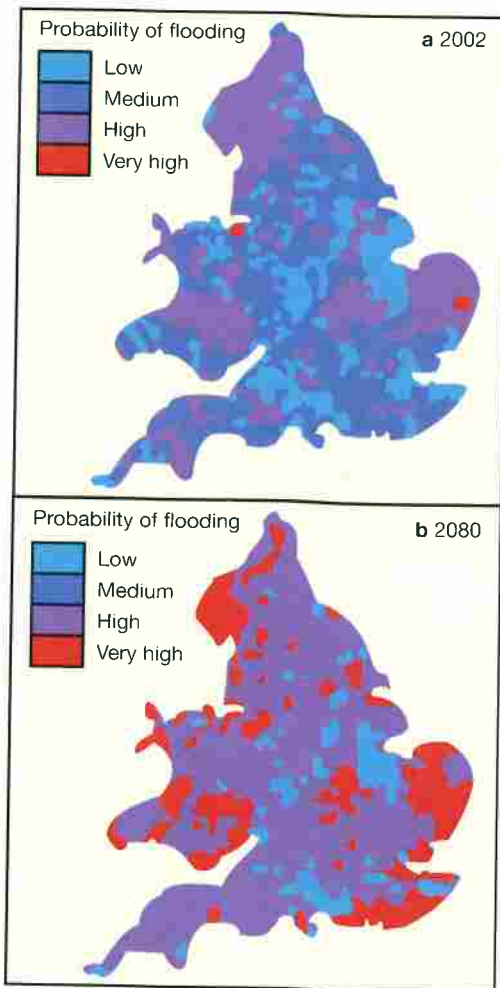


Figure 5.9 Chances of flooding in England and Wales

River flooding

When a river has more water between its banks than it can cope with, the water overflows, submerging the land beside the river. This is called flooding and it usually happens naturally. It often occurs after heavy rainfall or, in some rivers, when snow melts in the spring. Rivers flood when the **precipitation** does not all sink into the ground (**infiltrate**) and so the amount of run-off increases rapidly.

Flooding can be a good thing. The flood water leaves mud behind on the **floodplains**, making these very fertile areas. In some countries such as Egypt, the flooding was eagerly looked forward to each year as it brought water to **irrigate** the crops along the River Nile.

More and more people live beside rivers and on **floodplains**. For them, flooding can be a nuisance and, in some cases, it can be deadly. Severe river floods can wash away houses and bridges and cause enormous damage. Crops can be ruined leading to food shortages and even starvation and lives may be lost through drowning, disease or homelessness.

Flooding in India in July 2005 resulted in 700 deaths with some places submerged under 5 metres of water. In July 2007 in England, rivers flooded many thousands of properties. This caused more than £2 billion of damage – many businesses and houses were flooded. Also many crops, such as potatoes and peas, were lost and many farm animals were drowned. There are now estimated to be almost one and a half million houses in England, Scotland and Wales at risk from flooding, and in many places defences against flooding are rated as not good.



Get Active 5.4

Study Figures 5.10 and 5.11.

- 1 Work in pairs. On a page, list down one side the similarities between the photographs and on the other the differences.
- 2 Now compare Figures 5.11 and 5.12. These are the same place but taken at different times. How are the photographs different?
- 3 What clues are there to indicate the time of year that the photographs were taken?
- 4 The trees are **growing** in a ditch and at the edge of the river. Why might this be a **difficult** place for a tree to grow?
- 5 What sort of tree is this?



Figure 5.10 A river in the Grampian Mountains, Scotland



Figure 5.11 River Main, near Ballymena



Figure 5.12 River Main, near Ballymena (in flood)



Figure 5.13 Flooding in Boscastle

Get Active 5.5



- 1 In places where trees have been cut down further **upstream**, flooding is often worse. It is also worse in places where a lot of houses and roads have been built **upstream**. Why do you think that would be? Try to use words from the water cycle diagram (page 86) to explain.
- 2 Work in pairs. Think of three reasons why only a few **people** died in the English floods (described on page 88), but a lot of people died in those in India (described on page 88).
- 3 Read the **resources** from a newspaper, website and radio **broadcast** (Figure 5.14) about the effects of flooding. Write a letter to a newspaper to convince people who do not worry about flooding that it is a serious problem.

Flood shoppers rationed to three loaves

Tesco has been forced to limit shoppers to the number of loaves of bread they can buy, as they try to control panic buying in flood areas.

The supermarket has put up signs in fifteen of its stores in Gloucestershire, Oxfordshire, Worcestershire and Herefordshire telling customers that they can only buy three loaves of bread, 12 pints of milk and 16 litres of water at a time.

There has been panic buying in some of the affected towns with many supermarket shelves stripped bare of some essentials.

Source: *Daily Telegraph* 26 July 2007 (Harry Wallop)

Figure 5.14a A newspaper account of a flood

'People look at me and say I look fine, but inside I'm all churned up,' said Sylvia Williams, a 69-year-old widow among the evacuees. Among the hardest hit areas was Tewkesbury, north of Gloucester, where rising water entered the 900-year-old abbey church for the first time since 1760.

'It was just devastation – total chaos, cars floating past, rubbish, all kinds,' said John King, a 68-year-old retired fire fighter from Tewkesbury. 'You just can't stop water of that power.'

Sir Nick Young, chief executive of the British Red Cross, said he was shocked by what he saw overnight in Gloucester and Tewkesbury – 'these awful scenes of people huddled around candlelight in the upper floors of buildings,' he said.

'It was ridiculous to see young children playing in the water as if it was the beach at Blackpool,' Young added. 'It is unsafe water, absolutely filthy, polluted by sewage, and people really need to be advised to stay out of it.'

Figure 5.14b A flood described in a webpage

William Chase, founder of Tyrell's Crisps, grows 300 hectares of potatoes in Gloucestershire and Herefordshire.

'It's really the long term that I'm very concerned about, how the crops are going to store ... we have lost a lot [of potatoes] on the River Severn where the water came up four feet above the crops, that has definitely finished those ... it is a complete disaster for farmers ... farmers can't insure for flooding with farms as you can with residences ... farmers have lost 50% or 60% of their crops already by flooding, right through the Midlands on low-lying land ... the long term is going to be very serious. If bread went to £2 a loaf or if things went out of the shops, it would be the first time for many tens of years that things have run out ... If it rains for the next two weeks... it could ruin a lot of farmers. [Food prices] will definitely rise. It is going to be very, very tough for those farmers to survive.'

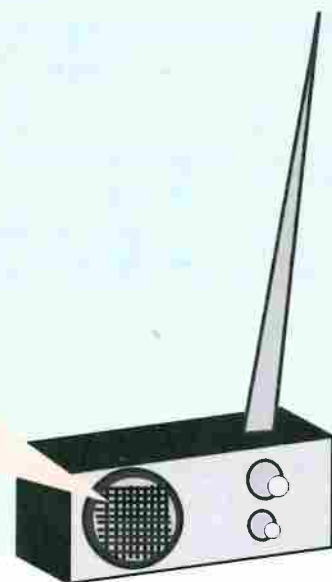


Figure 5.14c An account of flooding in a radio broadcast

Preventing floods

Floods are natural events for rivers, but people have tried for a long time to control and prevent the damage floods cause. Artificial floodbanks can be built to stop most floods from affecting towns and cities. Rivers can be straightened to make them carry away the floodwater more quickly, or their bed can be dredged to make the water level lower. While sometimes these actions can help to reduce flooding, they are often very damaging to the plants and animals that live alongside the rivers.

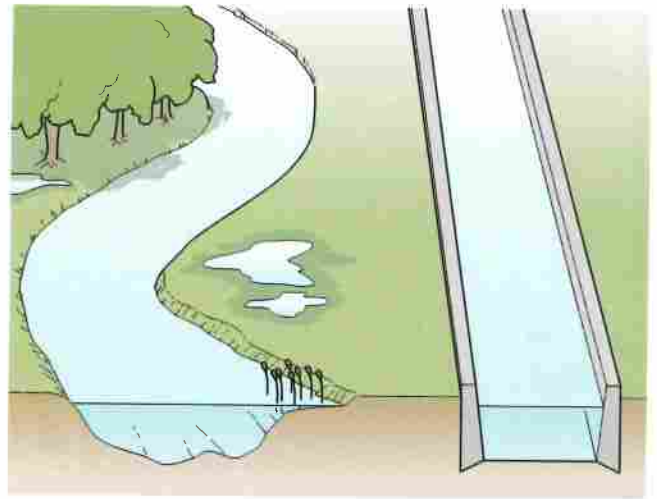


Figure 5.15 Natural and 'improved' river



Figure 5.16 Flooding in York, 2000

The city of York is one of the most important and ancient of settlements in the north of England. Its situation along the River Ouse has meant that it has suffered from flooding since it was built. The worst was in 2000 (as Figure 5.16 shows), but floods in 2007 were nearly as high (with flood water 4.36 m above normal levels).

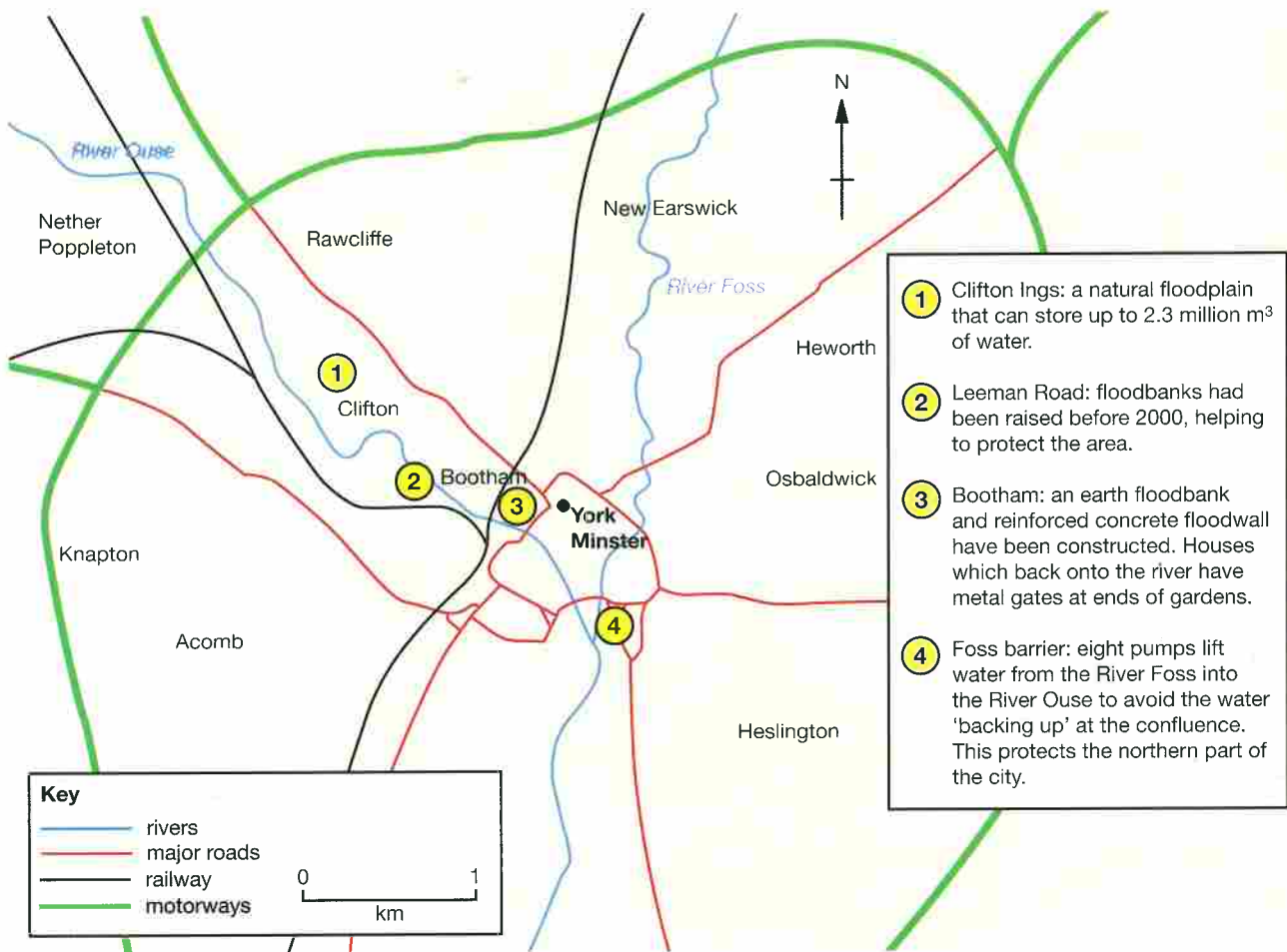


Figure 5.17 York flood defences: York has tried to protect itself from flooding in a number of ways



Figure 5.18 Clifton Ings storing floodwater as the River Ouse returns to normal flow

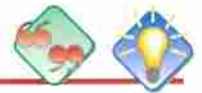
Even with the precautions shown on the map, in the 2000 flood, more than 350 houses were flooded and 3,000 people were put on **evacuation** alert.



Figure 5.19 The Foss Barrier, York

The work to reduce the impact of flooding goes on around York. In 2004 to 2005, the UK government spent £3.97 million on flood protection on the Ouse, and York City Council another £600,000.

Get Active 5.6



- a) Work in pairs. Check out these websites about the floods in York. Either, write a newspaper story about flooding of the River Ouse; or, research a story for a river that had flooded very recently. You should quote from people who were there, and include pictures where you can. What flood prevention methods have been used and how does each help to prevent or reduce flooding?
- http://news.bbc.co.uk/1/hi/england/north_yorkshire/6254541.stm
<http://news.bbc.co.uk/1/hi/uk/1005519.stm>
http://news.bbc.co.uk/1/hi/england/north_yorkshire/4441302.stm
http://news.bbc.co.uk/1/hi/uk_politics/1111359.stm
- b) Check out the floods happening now in the United States at:
<http://www.weather.gov/dhps/> or warnings about flooding in England and Wales at: <http://www.environment-agency.gov.uk/subjects/flood/floodwarning/>. These websites have been set up mainly for people who live in the areas that might be affected by floods. Why would they be useful? Would there be any people who could not use them?

How do we depend on rivers?

Rivers are used by people in lots of ways:

- They drain the water from the land and carry it away. The water can be used for watering crops in places where there is not enough rainfall (called **irrigation**).
- When dammed, rivers can create electricity in **hydroelectric power** (see page 48).
- In less rich parts of the world (**LEDCs**) water taken straight from rivers is often used as a water supply for drinking, washing and cooking. In richer countries (**MECDs**) the rivers are dammed and these reservoirs store the water before it is treated and piped to our taps.
- Large rivers are important for transporting goods and people, and so many of our great cities grew up around rivers.
- Rivers can support large **fisheries** feeding many of the people around them.
- Many rivers are important for tourism.
- Rivers (and the land that they drain) are important habitats for wildlife. The water in the river supports fish, and some plants and other animals that live in fresh water (such as otters, kingfishers and dragonflies who live on the banks).
- Most ancient civilizations grew up around rivers, such as the Tigris/Euphrates in Iraq, or around the Nile in Egypt.

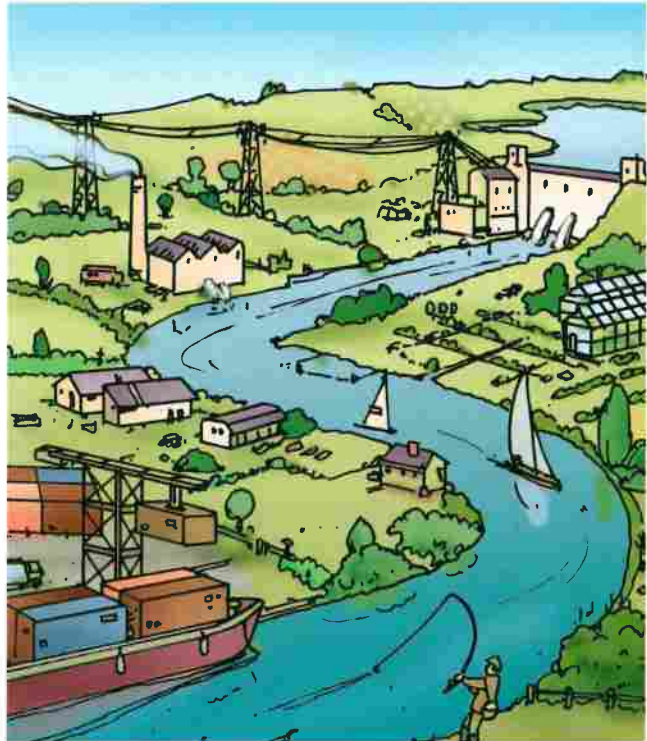


Figure 5.20 Uses of a river

Get Active 5.7



Work in pairs.

- 1 Find out about the river nearest to where you live. **Discuss** uses for the river.
- 2 Make a poster (if possible, with a photograph of your local river in the middle) and put the uses to which your river is put around the edge of the poster. In what way is it not used? Was that always the case? How would your local area be different if the river was not there?

How rivers are damaged

Many rivers are not in their natural state. Figure 5.21 shows the result of a study on river quality in Northern Ireland in 1996.

Percentage of rivers	Classification	Description
71.2%	unpolluted	high in oxygen
16.8%	slightly polluted	lower oxygen levels, some chemicals present
11.4%	moderately polluted	low in oxygen, more chemicals present
0.6%	seriously polluted	very low in oxygen, slime growth, high levels of waste in water

Figure 5.21 River quality in Northern Ireland, 1996

Where does pollution come from?

There are a lot of causes of water pollution. If there is a large spillage or discharge of poisonous chemicals into a river, this makes the news. For example, just one litre of insecticide has been blamed for the death of over 1,000 fish in one river in Norfolk.

However, pollution which is not on a big scale but goes on for a long time is often even more serious than the events that hit the headlines.

