

AWESOME FORCES OF NATURE



RAGING FLOODS



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Revised and updated



Louise and Richard Spilsbury





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Contents

What is a flood?	4
What causes a flood?	6
What are flash floods?	10
CASE STUDY: Fort Collins, USA, 1997	11
What happens in a flood?	12
Who helps when floods happen?	16
CASE STUDY: United Kingdom, 2007	19
Can floods be predicted?	20
How do people prevent floods?	22
CASE STUDY: Bangladesh	26
What about floods in the future?	28
Major floods of recent times	29
Glossary	30
Find out more	31
Index	32

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What is a flood?

A flood is when a normally dry area of land is covered by water. Floods are one of the most common natural disasters in the world. Floods can affect many different types of land, but occur most often in places where flat, low-lying land meets rivers or seas. When sea or river levels rise, water spills out onto the land.

Important water

Water is vital for living things. Humans drink water, wash in it, and cook in it. The plants and animals we eat also need water to survive. Yet, water can be very dangerous and damaging to people during a flood, especially if the flood comes without warning.



This Australian highway was overcome by flood waters in 2009.

The power of floods

When water rushes through a town, it can damage buildings and bury houses under mud. It may drown people if they cannot get away in time. Even after the water finally drains away, there are still problems. In China in 1931, as many as 3.7 million people starved after a flood ruined their **crops**.

In Mozambique in 2001 many people had to wait a long time before being rescued. Water covered so many roads and bridges that rescue workers were unable to reach the flooded villages.

FLOOD FACTS

- 1 After fires, floods are the most common of all natural disasters.
- 2 Many people who die in floods are in vehicles. They make the mistake of trying to drive through flood water.
- 3 Rushing water only 12 cm deep can knock down a person. That much water would only cover an adult's ankles!



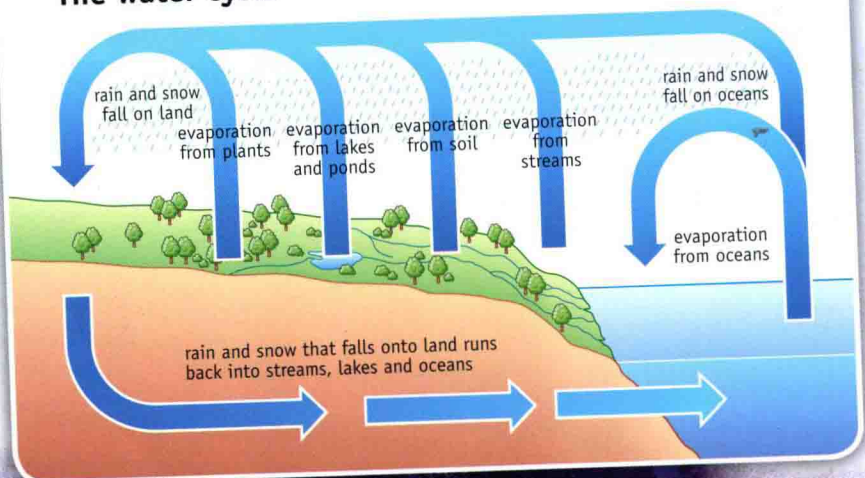
What causes a flood?

Water falls from the air onto land as rain or snow. Then it drains into rivers and streams and eventually ends up in the ocean. Finally, the water **evaporates** from the ocean back into the air. This is called the water cycle. If lots of water falls at once, it cannot all drain away immediately, so some stays on the surface of the land for a short time. This small amount of flooding is normal. Bad floods happen when very large amounts of water arrive on land in a short space of time.

How does the water cycle work?

Most water that falls on land either drains into the soil as **groundwater**, collects in lakes and **reservoirs**, or forms ice at the **poles**. Living things use some of this stored water. The rest of the water that falls on land drains into rivers that flow into the oceans. Heat from the sun evaporates water from ocean surfaces. This means it turns liquid water into a gas or vapour in the air. When water vapour cools again, it condenses – it changes back from vapour to liquid water. Droplets of the liquid water gather as clouds in the sky. The water then falls to Earth as rain, snow, or hail.

The water cycle



When do floods happen?

In **temperate** parts of the world, such as the UK, flooding happens most often in the spring and winter. These seasons are colder and wetter than summer and autumn. Large amounts of water arrive on land during heavy spring rains, which sometimes last for days or weeks. Water also collects on land in spring when large amounts of snow or ice that built up over winter begin to melt.

In **tropical** countries, such as Kenya, it is warm all year round. Most of the year's rainfall comes in one short, very wet season. This is called the **monsoon**. There are often floods during monsoons. Floods can also come after sudden heavy rainstorms or when large waves of seawater caused by earthquakes, hurricanes, or typhoons hit land. Seawater floods can happen at any time on low-lying coastal land that is near **sea level**.



Rains from a monsoon caused this flood in New Delhi, India, in 2003.

Making matters worse

Some natural conditions make flooding more likely. If soil is frozen or waterlogged (full of **groundwater**), water that falls onto it cannot drain away. It then stays on top of the land and builds up until it causes floods.

People also make things worse. They build **dams** and **reservoirs** to store water but these occasionally break or overflow, releasing tonnes of water all at once. When people cut down trees for firewood or for building with, wind blows away the top layer of soil that normally holds water. Without this **topsoil**, rainwater collects on the surface of the land. Also, in cities and towns, large areas of concrete around buildings and tarmac on roads stop water soaking into the soil. Drains may not be big enough to take away the water quickly, so it stays on the surface.

In China, large areas of land have little or no topsoil because of flooding. Without topsoil, few plants can grow.



Can floods be a good thing?

Some areas flood regularly. Low-lying areas that are usually affected by river flooding are called **floodplains**. The floodplains and **deltas** of big rivers such as the Nile in Egypt or the Mississippi in the USA often flood during heavy rain.

In spite of the threat of floods, floodplains and deltas can be good places for people to live. After floods, **nutrients** in the water soak into land making it **fertile** there. Some **crops**, such as rice, grow best in waterlogged soil.

Land that will flood is cheap to buy and is fertile. This is why lots of people live on or near floodplains, despite the risks.



What is a delta?

A river moves more slowly as it reaches an ocean. Bits of soil it is carrying drop to the river bottom forming a triangular area of land near the mouth of the river. This is called a delta.

What are flash floods?

Flash floods happen very suddenly – in a flash! Flash floods can happen with little or no warning and they can become extremely dangerous within a very short time.

Flash floods are usually caused by sudden heavy storms, where a huge amount of rain falls in a short time. When the rain collects in a stream or river, it turns these gentle waterways into raging torrents. Flash floods are particularly dangerous because people don't have time to get out of the way.

“ *It's difficult to judge the depth, speed, and power of flood waters; in an instant, you can be swept into a drainage system or your car floated off a road or bridge.* ”

Rocky Lopes, Disaster Services worker for the Red Cross

”

Flash flood water moves very quickly, destroying buildings, pulling up trees and rolling over cars in its path.



CASE STUDY

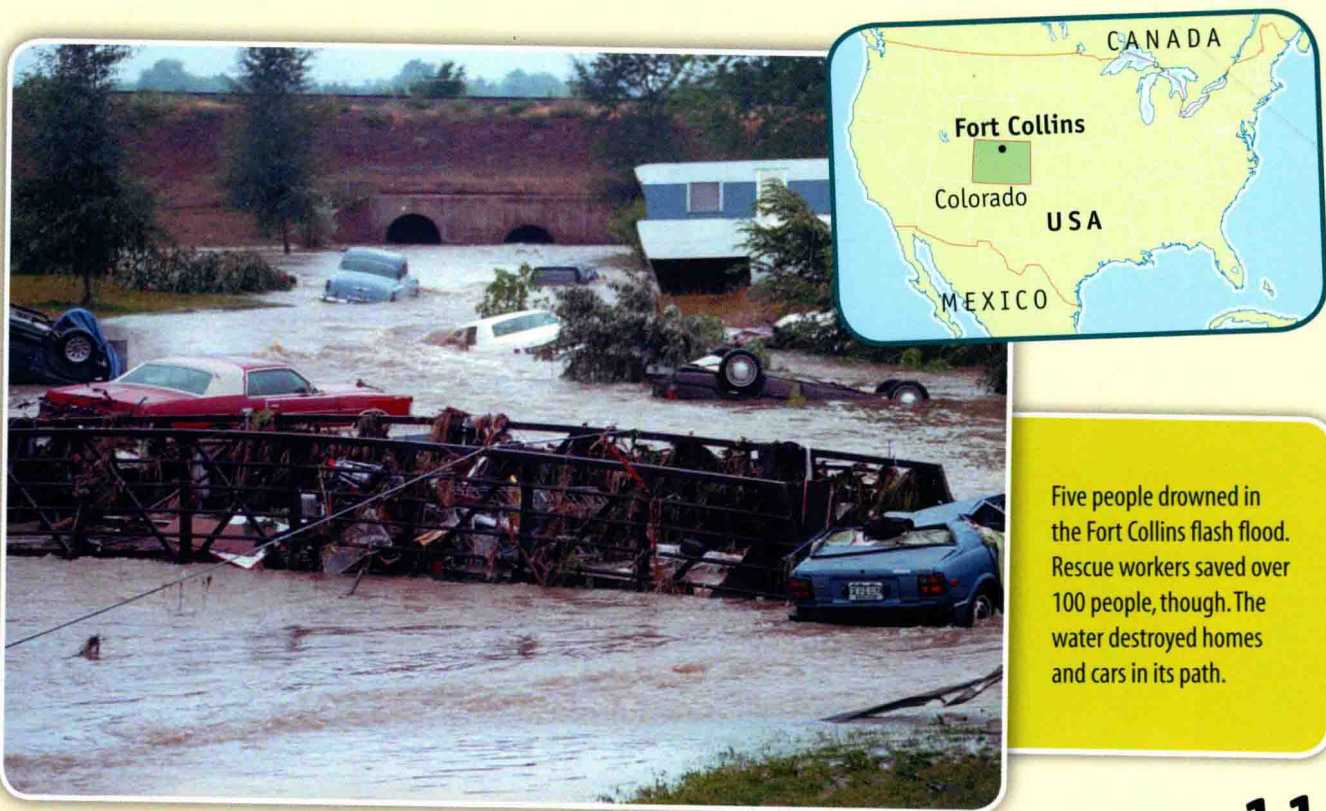
Fort Collins, USA, 1997

On the evening of 28 July 1997, the people of Fort Collins, Colorado were sleeping peacefully. They were unaware of the disaster that was about to happen. It had been raining since midday and the water had been collecting behind a railway **embankment**. Suddenly, at 11 p.m., a wall of water two storeys high crashed through the embankment. It smashed into two mobile home parks at the edge of the town.

“*‘When we got there, there were children hanging on trees.... We had people standing on mobile homes – people trapped. I’ve never seen anything like this in my life.’*

Jim Pietrangelo, Fort Collins Fire Officer

”



Five people drowned in the Fort Collins flash flood. Rescue workers saved over 100 people, though. The water destroyed homes and cars in its path.

What happens in a flood?

Floods change people's lives. They can affect their health, their possessions, and their work. Some effects of a flood can be dealt with quickly, but others last a long time.

Immediate health dangers

When a really bad flood suddenly hits a town, people can be swept away by rushing water or by walls of mud washed off the land. They may be injured or drown as they are washed away.



Heavy rains caused this road in Henniker, New Hampshire, USA, to break apart in 2006. About a foot of rain fell over one weekend causing flooding.

FLOOD FACTS

- 1 Since 1900, floods have killed more than 10,000 people in the USA alone.
- 2 It only takes roughly 60 cm of water to float a car or even a bus.
- 3 Most of the people killed by flash floods die because they try to outrun the water, rather than climbing uphill out of its way.

Other hazards

Floating cars, trees, or rocks injure some people. Water can also knock down **powerlines** and break gas and oil pipes. Electricity from the powerlines can **electrocute** anyone touching the water. If broken powerlines touch each other, they produce sparks. These sparks can cause fires in buildings. They can also cause explosions of gas and oil released from broken pipes.

Water, food, and shelter

Even though people are surrounded by flood water, they cannot drink it. The waste in people's drains, called **sewage**, mixes with drinking water in **reservoirs** and wells. This makes the tap water too **polluted** to drink.

People affected by flooding often have no food. Food stores are washed away, polluted, or out of reach in buildings that are completely covered by water or mud. Farm animals may be washed away or drowned and farmers' **crops** may be ruined.

In a flood, people have little shelter. Their homes are sometimes washed away or else full of water.



In 2002, a flood in southern Russia killed around 100 people and made about 100,000 homeless.