

River Meon

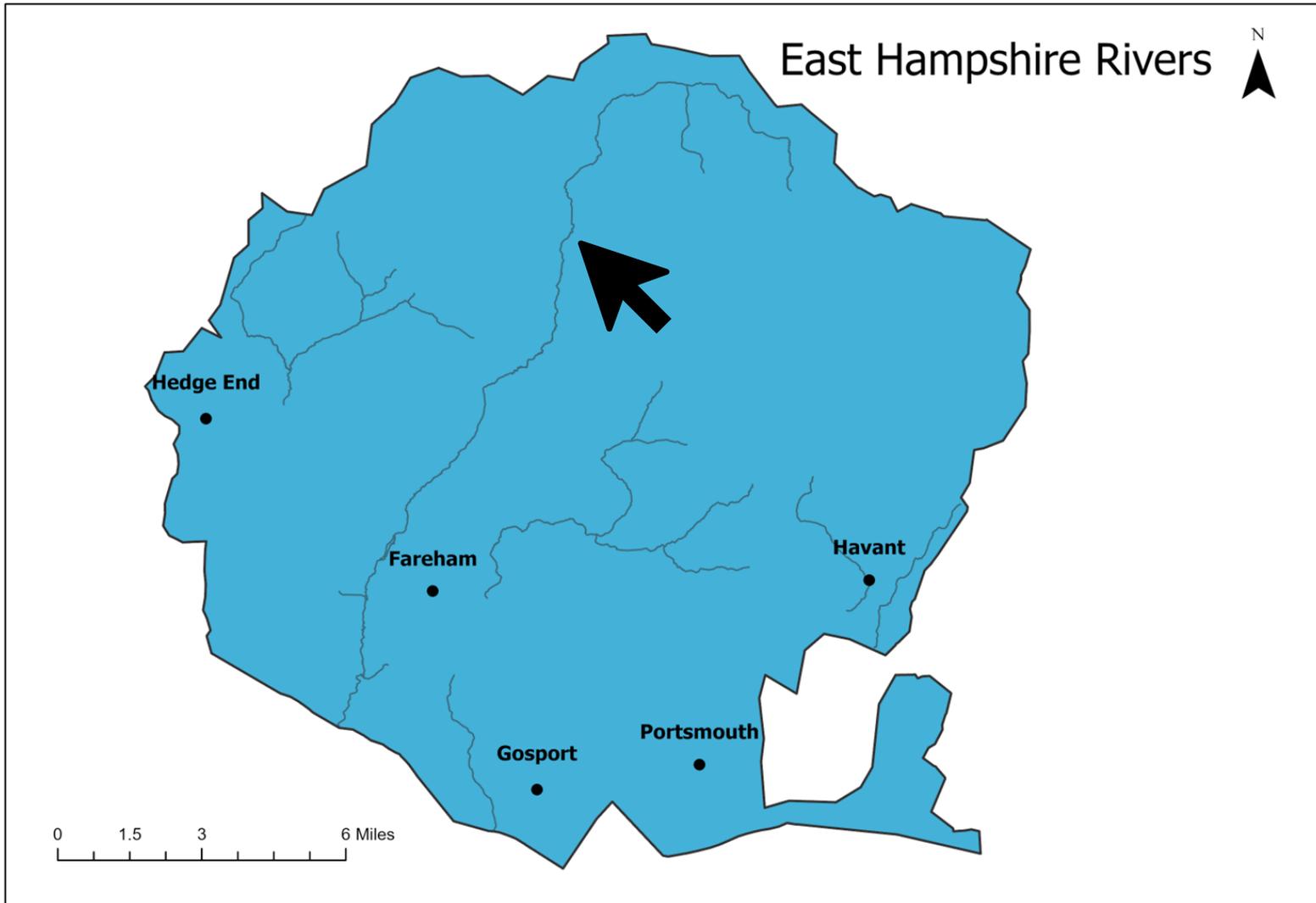
A Key Stage 2 Geography Resource

The Wessex Rivers Trust offers a variety of subsidised activities that enable children to actively engage in fieldwork.

Bespoke education programmes are planned with schools to enhance their Science and Geography projects and topics.

For further details visit:

<https://www.wessexrt.org.uk/schoolrivereducation.html>

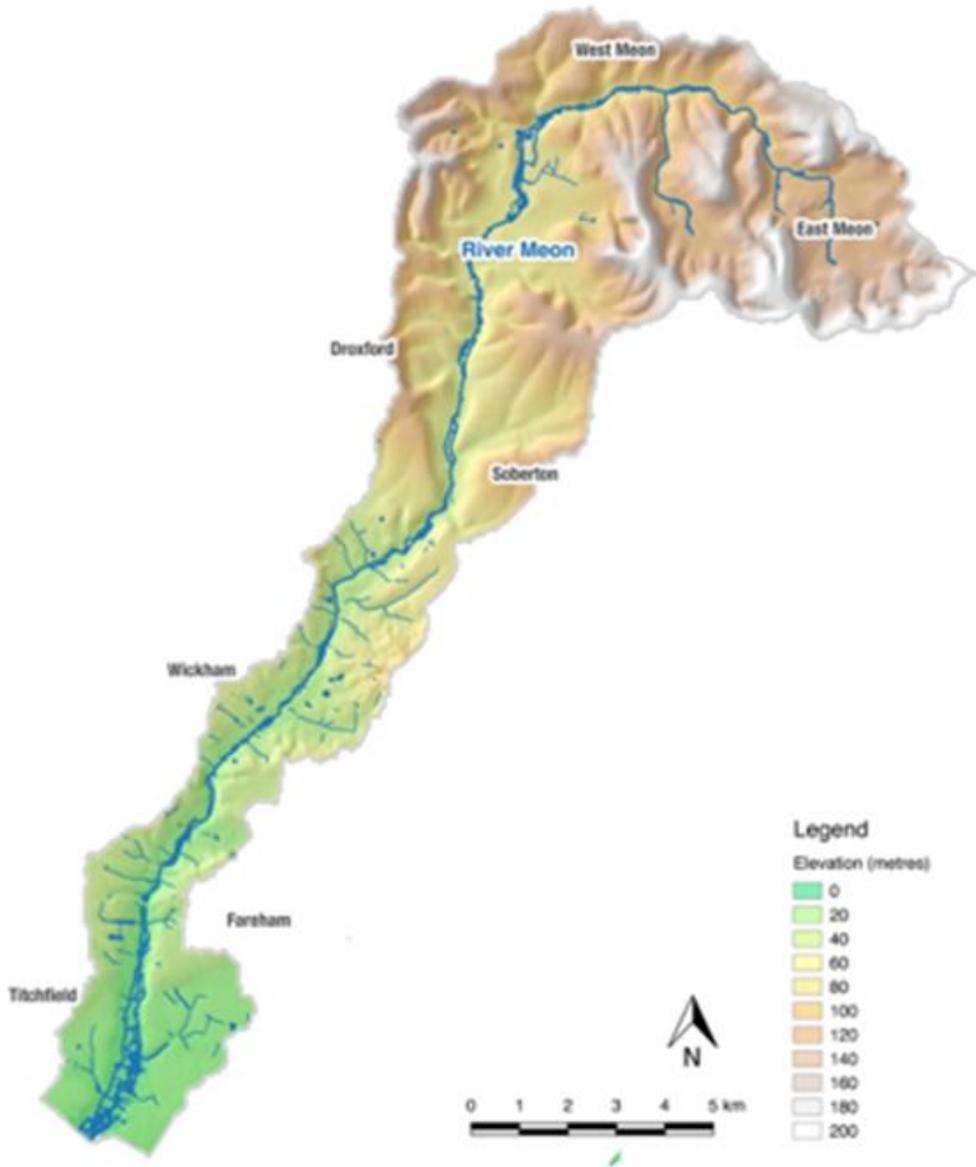


The source and the mouth of the River Meon are in East Hampshire.

The river has well defined upper, middle and lower sections.

There are a few short tributaries.

NC Geog KS2: Identify topographical features such as rivers and coasts, land use patterns and understand how aspects have changed over time

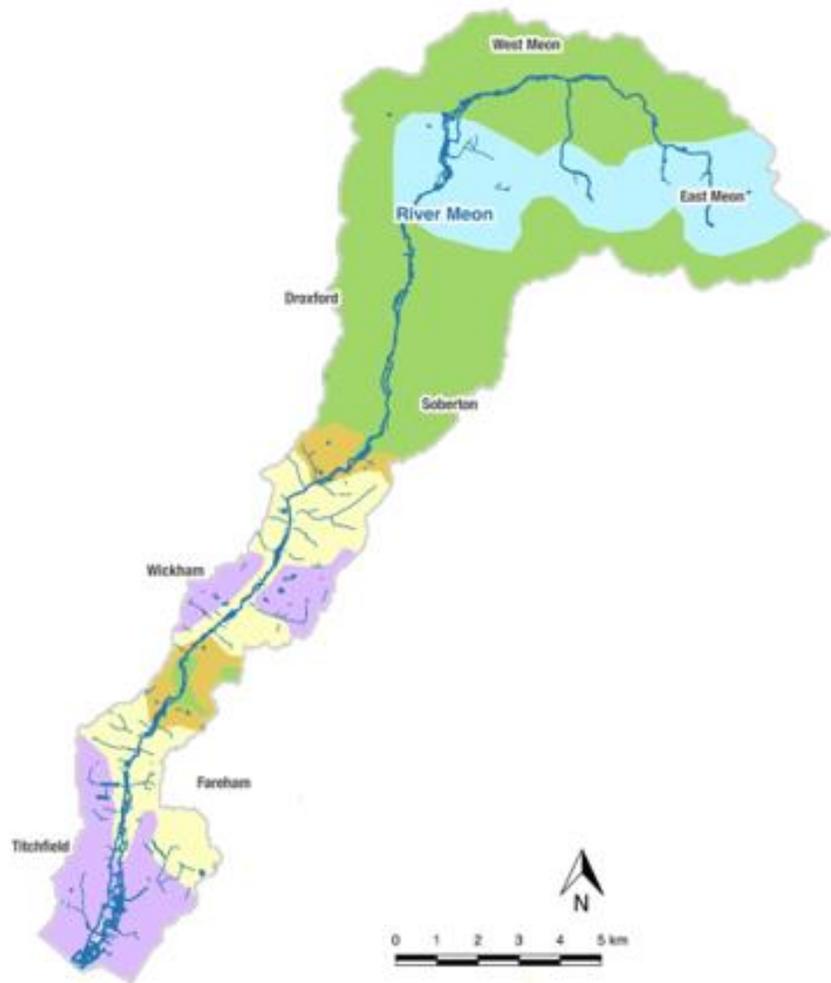


The River Meon drains a fairly small catchment, covering an area of 108 sq.km.

The Meon is one of Hampshire's small chalk streams. The river rises from springs on the chalk downs near East Meon, flowing south-westwards for approximately 34km before discharging into the Solent at Titchfield Haven.

The upper and middle reaches of the catchment are mainly rural. The river flows in a valley surrounded by the chalk downland hills.

Downstream of Wickham, the character of the catchment changes with a geology dominated by clays and sands and more urban areas.



Geology

The River Meon is a chalk stream. The underlying rock is predominantly chalk.

The source of the Meon are the aquifers and springs.

Typically, chalk streams display a relatively small difference between winter and summer flows because most of the water comes from the groundwater rather than surface run off.

The water temperature range is less than in rivers receiving more surface runoff. Chalk streams have high levels of calcium carbonate, so the water is soft.

Geology such as the clays and sands in the mid-lower Meon catchment are generally less permeable, so there is more overland flow.



The upper Meon.
The spring near
to East Meon is
the source.

A middle section at
Warnford

The mouth of the River Meon at
Titchfield Haven



Direction of flow

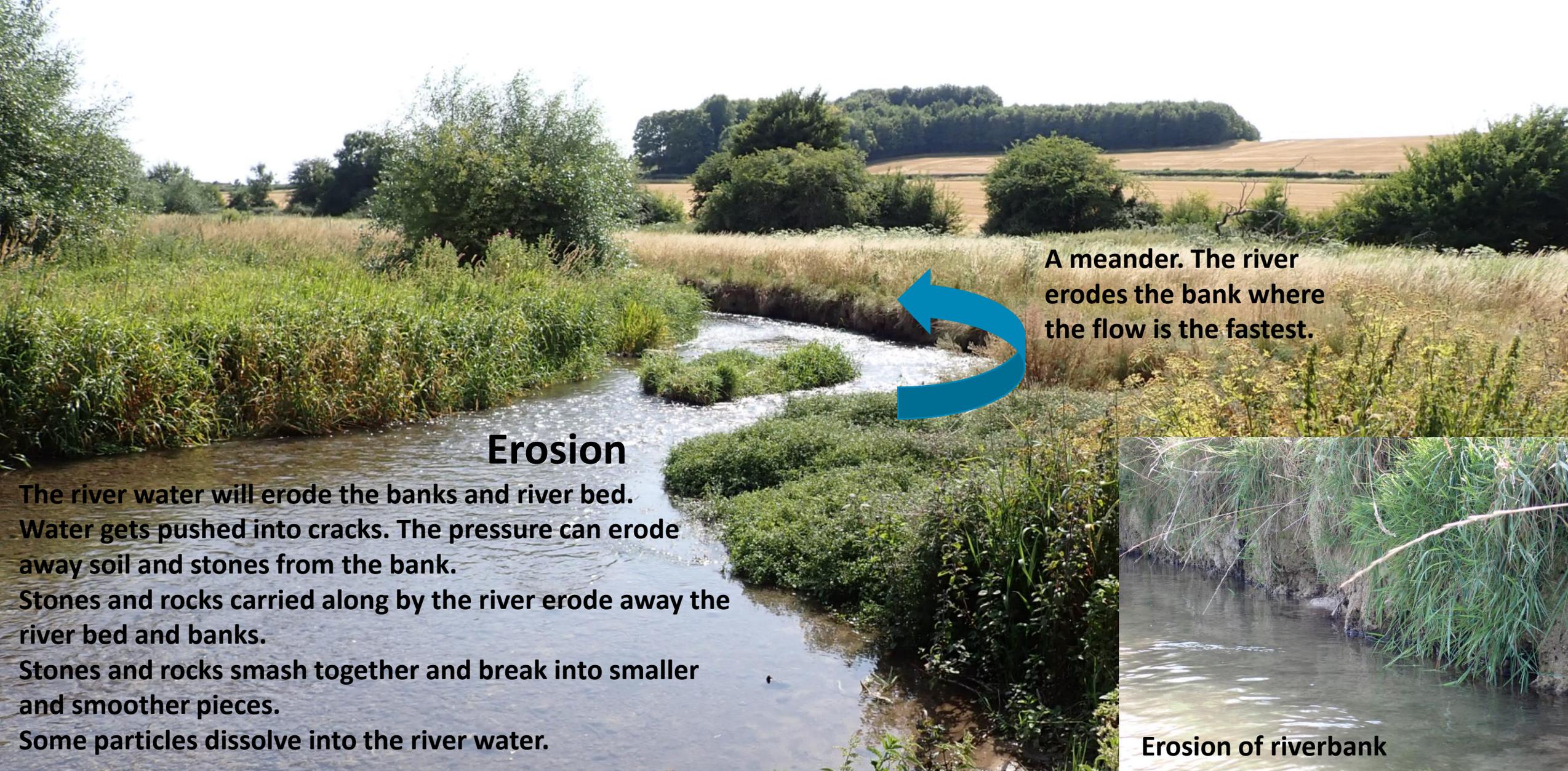
How and why does the river change?

NC Geog KS2: Describe and understand river processes.

As the river flows through the channel it will erode, transport and deposit silt and stones.



Healthy rivers for wildlife and people



A meander. The river erodes the bank where the flow is the fastest.

Erosion

**The river water will erode the banks and river bed.
Water gets pushed into cracks. The pressure can erode away soil and stones from the bank.
Stones and rocks carried along by the river erode away the river bed and banks.
Stones and rocks smash together and break into smaller and smoother pieces.
Some particles dissolve into the river water.**



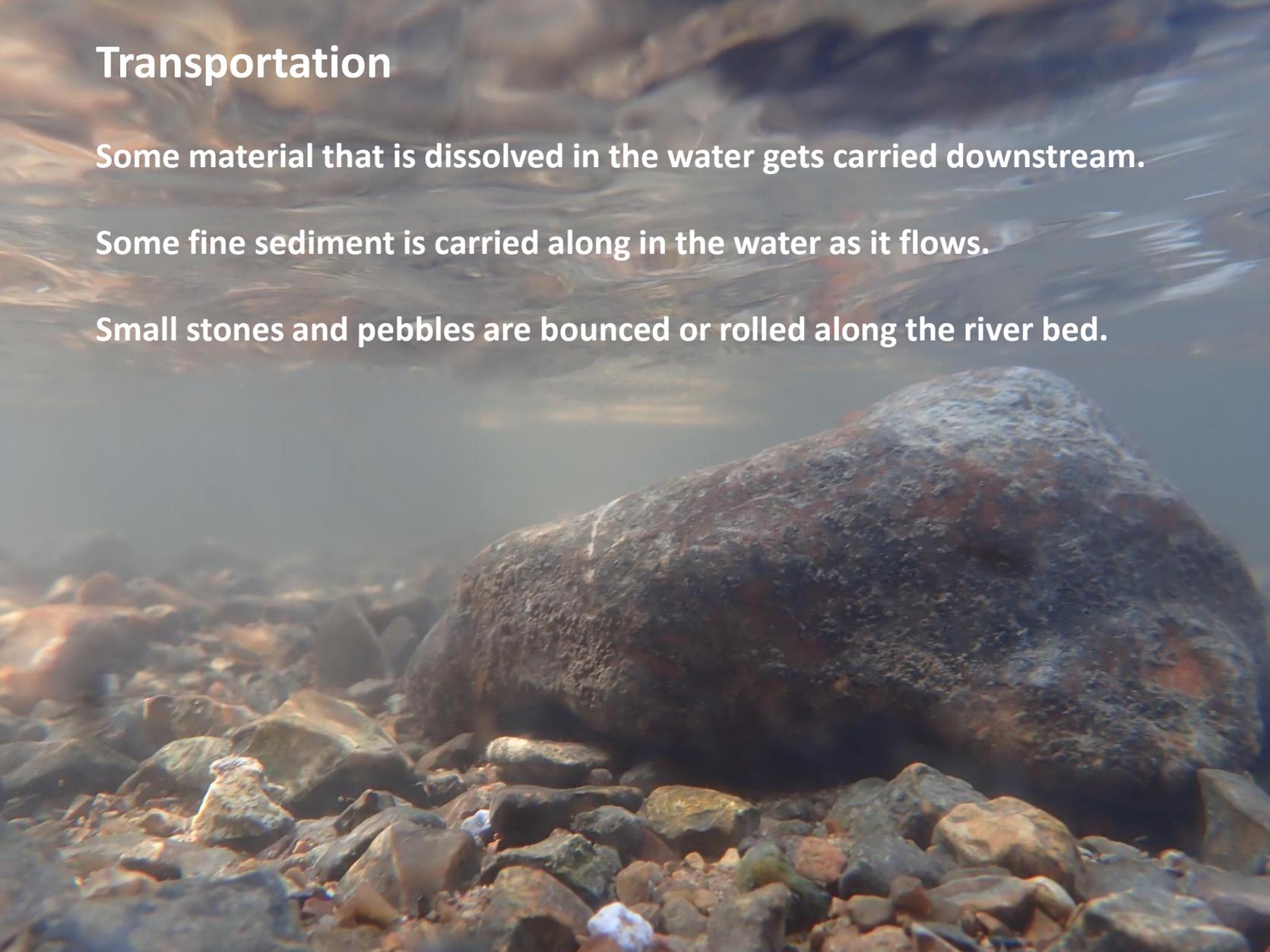
Erosion of riverbank

Transportation

Some material that is dissolved in the water gets carried downstream.

Some fine sediment is carried along in the water as it flows.

Small stones and pebbles are bounced or rolled along the river bed.





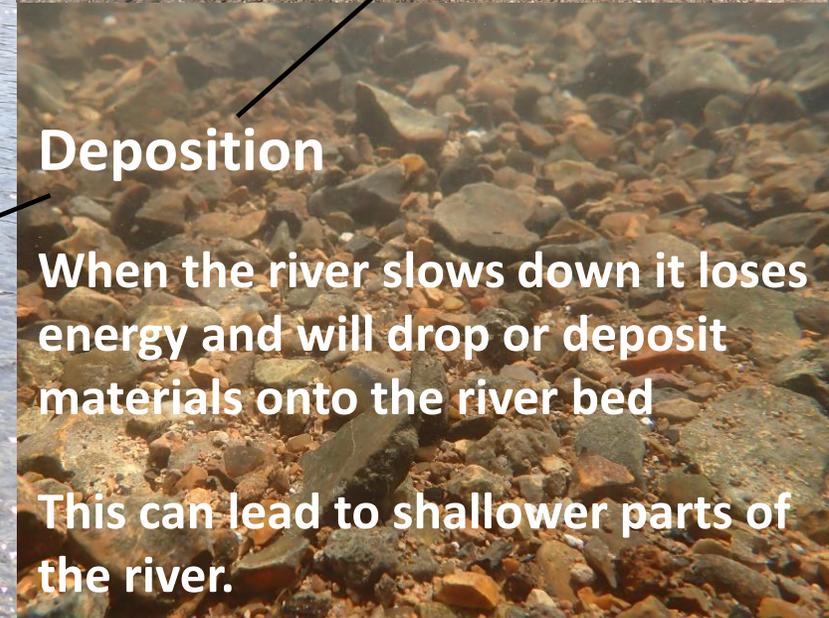
**Fastest
flow**



Deposition

When the river slows down it loses energy and will drop or deposit materials onto the river bed

This can lead to shallower parts of the river.





Throughout history humans have built settlements in the Meon Valley.

Sections of the river have been altered. For example mill streams, weirs, flood defences and canals have been built.

Along the course of the River Meon there is evidence of interacting physical and human features.

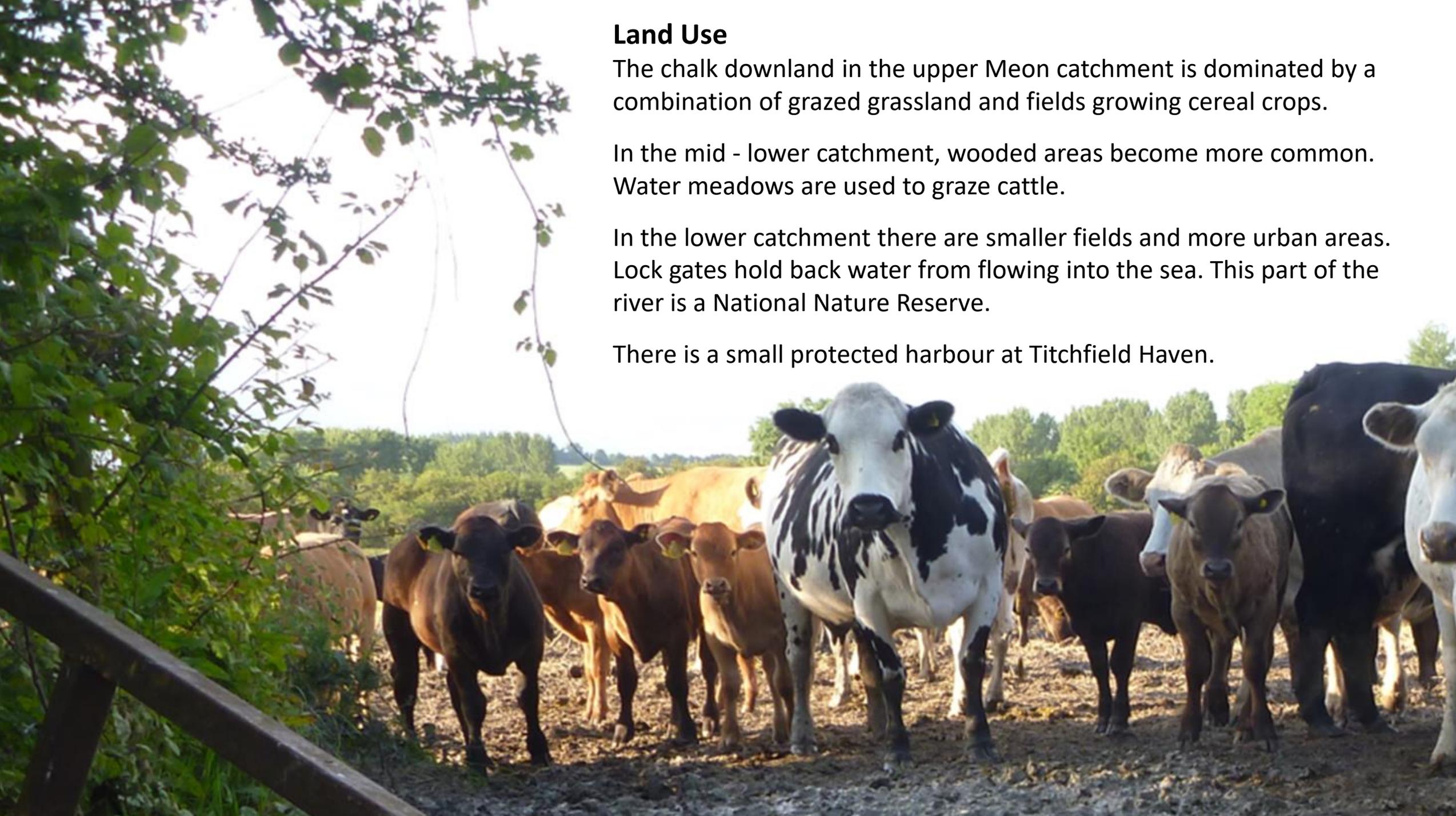
Land Use

The chalk downland in the upper Meon catchment is dominated by a combination of grazed grassland and fields growing cereal crops.

In the mid - lower catchment, wooded areas become more common. Water meadows are used to graze cattle.

In the lower catchment there are smaller fields and more urban areas. Lock gates hold back water from flowing into the sea. This part of the river is a National Nature Reserve.

There is a small protected harbour at Titchfield Haven.





Many sections remain natural and support a diverse range of wildlife.

The Wessex Rivers Trust helps to restore rivers so that the biodiversity increases.

Overall the River Meon remains a healthy chalk stream. However there are threats that put the ecosystem under stress.

Healthy rivers for wildlife and people



Threats

Too much sediment

The river flow slows down; natural erosion, deposition and transportation processes become imbalanced.

Pollution

Fertilisers and pesticides add too many phosphates, nitrates and toxins to the river. Organic slurry and sewage increase levels of ammonia and decrease oxygen levels.

Abstraction

Water is taken from the chalk aquifer to supply homes and industries with fresh water. This reduces groundwater levels and the flow of the river.



The Wessex Rivers Trust works with farmers, fisheries, landowners and conservation agencies to help reduce these threats.

Nature reserves have been established.

Restoration projects are helping to make the river more natural. This increases the biodiversity and therefore the river is becoming healthier.

Research studies are showing that there are healthy populations of invertebrates. This means that there is food for top predators such as wild trout, kingfishers, voles and otters.

NC Science KS2: Pupils should explore examples of human impact (both positive and negative) on environments.

Improving the river at East Meon by making a more natural habitat

The River Meon flowed through a concrete-lined channel, a biologically sterile environment with very few plants, insects or birds. The channel had been made to stop flooding.

The restoration project has created a meandering stream. Two lines of stones were bonded to the concrete bed of the river with berms created by the addition of 25 tonnes of stone; these berms have been planted up with a range of local chalk stream plant species.

The result is a more natural riverbed and a better habitat for wildlife. There is no increased risk of flooding.

Before...



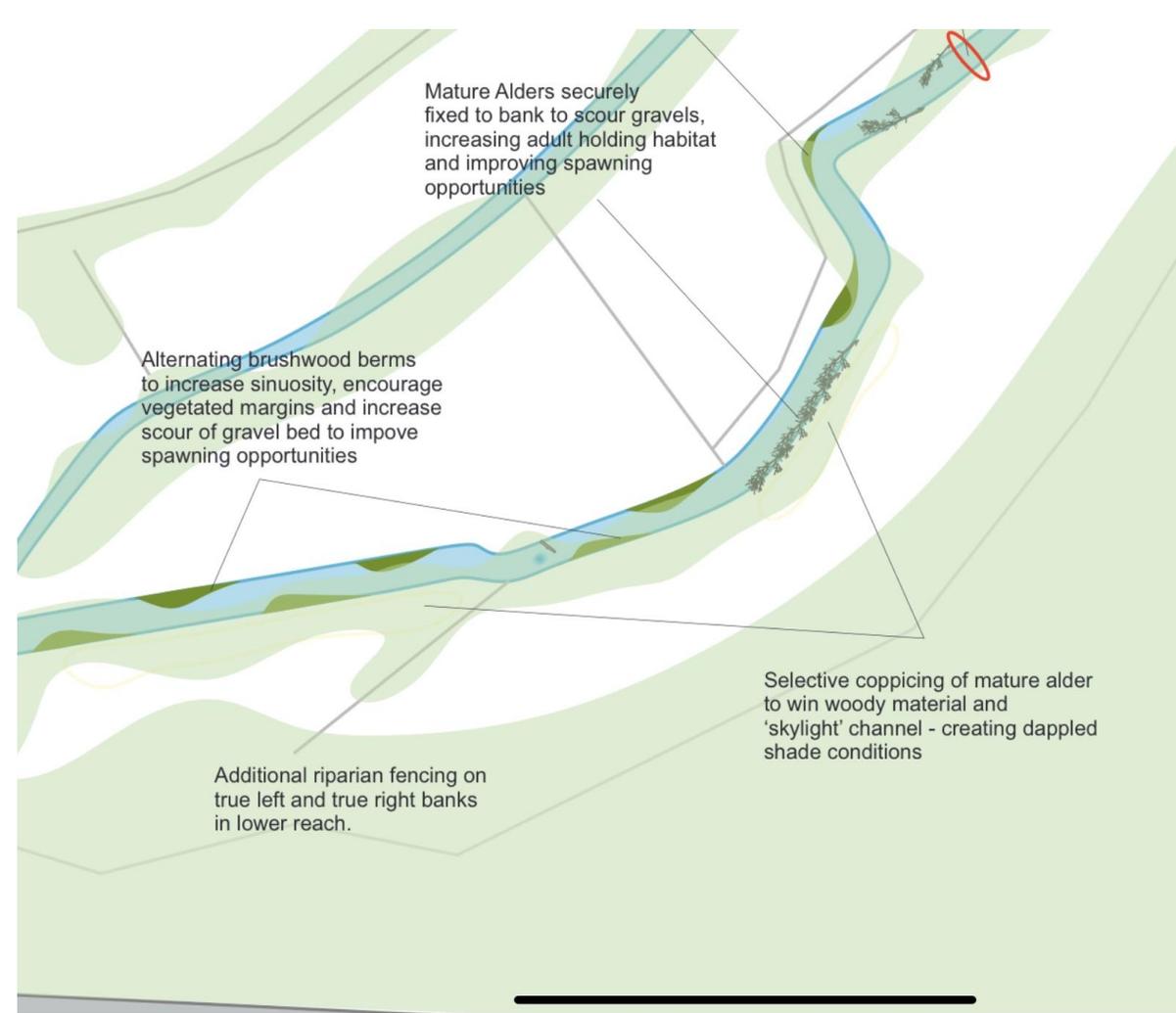
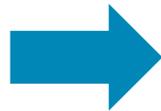
After...





A plan to make a section of the River Meon more natural.

- Berms are made of natural materials. These curved structures help to make the river meander and the flow increases.
- Erosion of the river bed increases. Silt is transported and deposited downstream.
- Gravel beds are exposed which are good spawning areas for wild brown trout.
- Trees and other plants on the margins provide habitats for wildlife.





Woody berm used to increase flow rate around existing meander.



Woody berm used to create new meander.

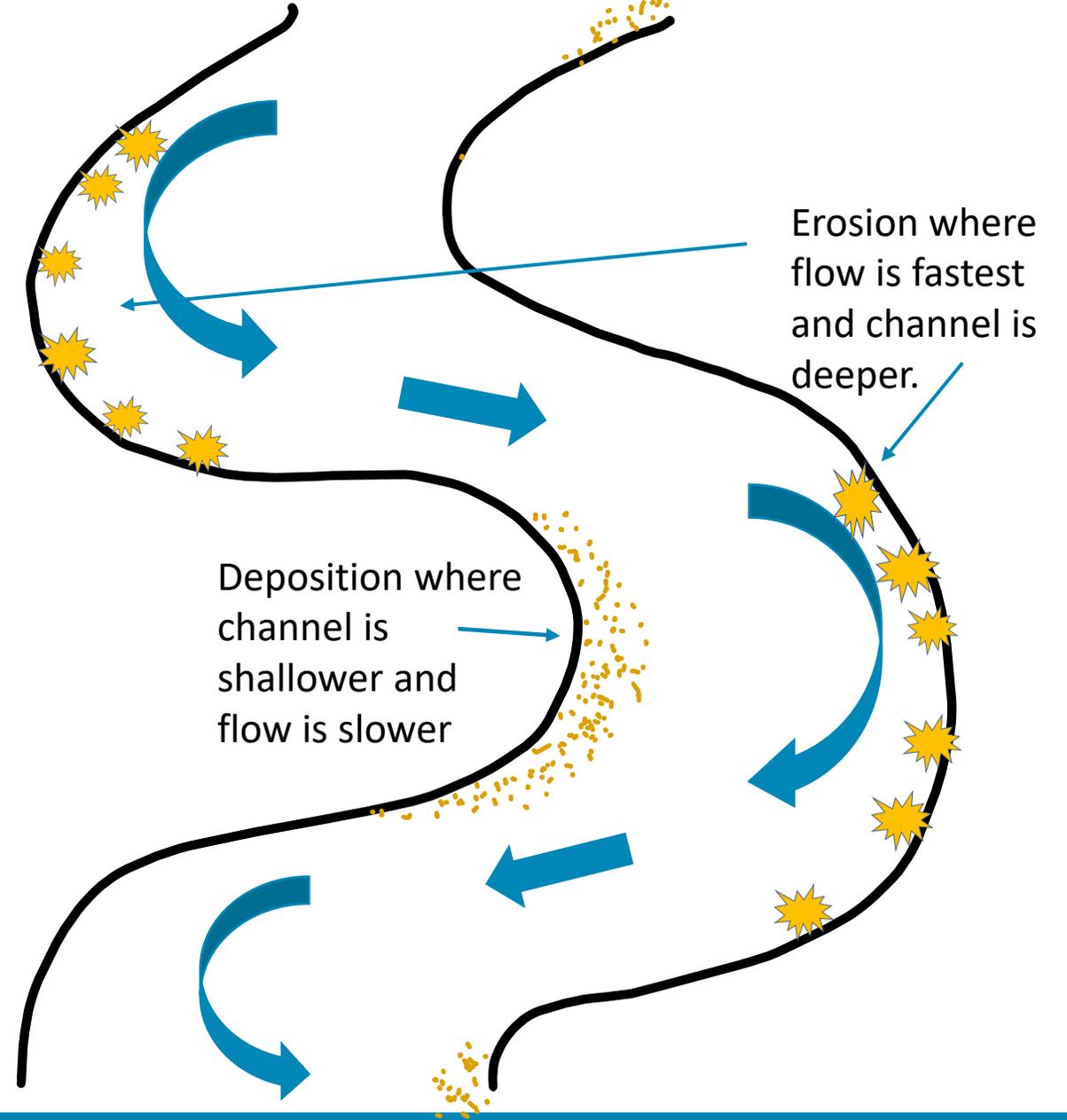


Woody berms used both sides of the river covered in marginal vegetation.



Hinged Trees

Restoration techniques to create meanders and increase flow.





Repairing a damaged dam

Rather than just building a new concrete dam a fish ladder has been created that will allow fish to travel up and downstream.

Natural materials, wood and stone, have been used.



Looking downstream

Looking upstream to dam



NC Geog KS2: Describe and understand types of settlement, land use and economic activity.

Titchfield

By the early 17th century Titchfield was linked to the sea by a navigable channel, which allowed seagoing vessels to reach the heart of the village and trade. A dyke was built across the mouth of the river, and in 1611 a canal was excavated. Access from the sea was by a simple lock, and ships had to float in at high tides

Titchfield Haven National Nature Reserve

Building the dyke here turned the saltwater estuary into a freshwater marsh and lush water-meadows. It shelters a rich variety of plants and wildlife, notably marsh marigolds, flowering rushes, wildfowl, waders and summer migrating birds.



Water meadows were managed by the local farming communities. Water was diverted from the river to flood the meadows early in the spring. This gave extra nutrients and boosted the growth of lush grass. This meant there was an early supply of hay, the sheep were well fed and the cows produced more milk.

The use of fertilisers and the high cost of maintaining the channels, hatches and sluices led to the decline of water meadow structures from the late 19th century.



Cultural heritage is important; the water meadow structures can still be seen at St Clair's Meadow Nature Reserve. The reserve, which was established in 2017, has improved the environment:

- It is a haven for otters, bats, birds, wild brown trout, dragonflies and water voles.
- Cattle now graze in the meadow but they are fenced off from the river and have alternative drinking water.
- The river has been restored by increasing the flow and improving habitats.

NC Geog KS2 Describe and understand key aspects of the water cycle



Rainfall percolates through the thin top soil into the chalk.

The groundwater forms a large aquifer.



NC Geog KS2: Distribution of natural resources, including water

Fresh water supply for Gosport

People in Gosport originally got their water supply from wells on the Gosport peninsula. However, the water was untreated and often was brackish. (A mixture of fresh and salty water.)

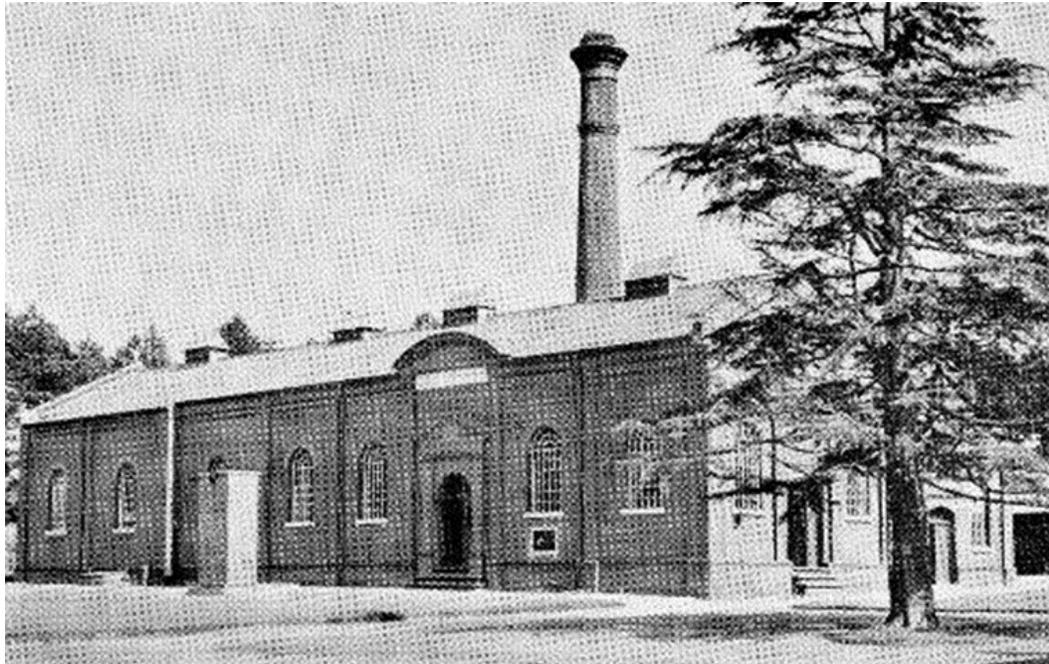
240 houses in Gosport did receive piped water from Forton Well. The pipes were made from hollowed out elm trees. The waterworks got into financial difficulties and closed down.

Water also used to be delivered in 36 large water containers, each one holding a ton of water. It was sold for one farthing per bucket.

The Gosport Waterworks Company was formed in 1858. The town received its first supply of water from the Bury Cross waterworks and then from a water tower at Foxbury Point. However, salt water from Porstsmouth harbour was seeping into the Foxbury supply, and it was abandoned in 1903.



The Soberton pumping station, in the Meon valley, began supplying water to Gosport in 1907. Steam power would have been used to pump the water to Gosport. These were later replaced by electric pumps.



Today water is pumped up from the chalk in the South Downs. Rainwater soaks into the chalk through cracks and fissures.



The majority of water supplied to houses is taken from ground water and springs. When water filters through the ground, it is naturally stored in water-retaining rocks known as aquifers. These act a bit like sponges. Water can be pumped out from the aquifers using boreholes. These are holes that are drilled down through the rocks. Pumps and pipes are then lowered into the boreholes to help bring the water to the surface. It is then treated to remove any bacteria before entering our water supply. Ground water is usually much better quality than surface water as it has been naturally filtered by the chalk.





Chlorine gets added before high lift pumps push the water uphill to the treatment works.



When the water arrives at the treatment works 'Rapid gravity filter systems' are used to filter the water through sand and gravel to remove dirt and debris.



The next stage is to rid the water of any remaining bacteria, including cryptosporidium, which causes nasty stomach bugs. To do this ultraviolet light is used to 'zap' the bacteria and neutralise it.



The water is transferred to service reservoirs and stored there until it enters the supply network. These reservoirs are always built on high ground so that gravity fed pressure transfers the water to homes.



Too much water is being extracted from the sensitive chalk streams, especially during a drought. People use more water in the summer. Water conservation is important. A proposed solution is to build a water recycling plant.

Hampshire Water Transfer and Water Recycling Project

Consultation Brochure
Public consultation 2022



Healthy rivers for wildlife and people

Opportunities for fieldwork

The Wessex Rivers Trust offer subsidised fieldwork sessions at educational sites near to each school. For further details visit: <https://www.wessexrt.org.uk/schoolrivereducation.html>

The programmes offered include:

- An interactive assembly that explains the interaction of physical and human features and processes.
- Riverbank sessions that enable children to identify river features and investigate river processes. The children kick sample for river invertebrates to evaluate how healthy the river is.
- Follow up classroom sessions that enable the children to explore adaptations, food chains, habitats, biodiversity and water conservation.

The Wessex Rivers Trust provide all the resources, undertake risk assessments and provide specialist river educators.

NC Geog KS2: Use fieldwork to investigate enquiry questions. Observe river features and processes, measure flow and river channel. Present and analyse data. Use a range of methods including sketch maps, diagrams, graphs, and digital technologies such as cameras, flow meters and thermometers.

Opportunities for school-led fieldwork

- Playground / school ground rivers. Ingredients: slope, soil, sand & gravel and a hose! Identify river processes in action and label river features.
- Send research groups to different locations along the course of a river. Each group gathers data, photos and sketches of different processes and features. These can be presented and displayed back at school. Maps, atlases and digital mapping can be used to plan and present research projects.
- If there is a river local to a school, then a longitudinal study can be set up. Flow, temperature, pH levels and invertebrate kick samples can be measured at different intervals / seasons. Life cycles of aquatic and marginal plants and animals can be investigated.

Please contact local landowners for permission to undertake fieldwork.

Creative and purposeful assessment

- A section of river is straight, silted up and has too much algae. There are a few trees on the river banks but there is mostly cut grass. Design and present an engineering solution to increase flow and improve habitats for wildlife.
- Plan and make a short video on how to increase biodiversity so that chalk streams become healthier. The video must outline some of the threats that adversely affect water quality, water quantity and habitats.
- On a base map of the River Meon add photographs to show human and physical features of rivers
- Identify river features from a range of maps, satellite images and photographs. Use maps to follow the route of the river from source to sea and explain how the river changes.
- Draw a diagram and use photographs and maps of the Meon Valley to show how the water cycle works.
- Research how settlements and economic activities have developed along the course of the river: water mills, fisheries, watercress beds, water meadows....

The Meon Valley, A Journey of Discovery

<https://youtu.be/mV50I-ksEKI>

Click on the link to open this 25-minute video.

The video illustrates the development of settlements, land use changes and chronology.

A recommendation would be for children to have access to an OS Explorer map of the Meon Valley (OL3) so that they can locate settlements and interpret symbols.

