

Sewage in our rivers

Teachers' notes and answer sheet

About combined sewer overflows (CSOs)

Raw Sewage (waste matter such as faeces and dirty water from homes, factories and farmyards) is being discharged into UK rivers every day. See [Eden Rivers Trust's media release](#) on page 4 for some headline statistics for the Eden Catchment in 2021. This made front page news in Eden's local papers.

How does sewage get into rivers?

When you flush the toilet, the contents are washed into a sewer system. These systems are designed to transport waste to a sewage treatment plant, where it is cleaned to an environmentally safe standard before being released back into rivers, or re-used. However, it doesn't always work like this in practice.

There are a number of factors which contribute to sewage discharges, but the main culprit is something called a Combined Sewer Overflow (or CSO).

Heavy rainfall

Periods of heavy rainfall can easily overwhelm sewer systems. To prevent our homes from flooding as the sewers begin to back up, a mixture of sewage and rainwater can be discharged into rivers.

This form of release is permitted by the government – however, there are no regulations as to what constitutes heavy rainfall, and some sewage outfalls have been recorded discharging without any rainfall at all.

Sewer blockages

If sewers become blocked, this can result in the discharge of backed up sewage into rivers. Blockages can occur when non-flushables, such as wet wipes, are flushed down the toilet, or when grease and oils are washed away down the sink.

Old or outdated sewage treatment plants

Legally, outdated sewage treatment plants are able to discharge constantly. Despite this, the levels of treatment are not sufficient to protect environmental health.

Find out more about CSOs by watching this short video by The Environment Agency.

[What is a storm overflow and how do they work?](#) (3 minute video: Environment Agency YouTube channel)

The activity sheet

The children's activity sheet is in two parts, using two online resources created by The Rivers Trust. For this, they will need access to a computer, in pairs.

Part 1. Sewage in our Rivers StoryMap

<https://storymaps.arcgis.com/stories/ebbc9dccc0224420b9d6668ed3356ef4>

This online resource gives an introduction to the problem of raw sewage entering our rivers and will give children the information they need to answer the first series of questions.

Part 2. Is your river fit to play in?

This **interactive map** shows the locations of CSOs and wastewater treatment works and their discharge. By using the 'investigate' tab, you can find out where, how often and for how long raw sewage was discharged in our rivers.

We have suggested some locations (the worst offenders) you could investigate, but you can also choose to add other locations of interest to you and your class, or compare a site that has shown an improvement from 2020 to 2021. As this is created by our national umbrella body, The Rivers Trust, you could extend this further by investigating and comparing with rivers in other parts of the country.

Top tips for using the interactive map

There are three tabs that you can explore. **Map, Investigate, Download.**

Map

Explains the how the interactive map works, and how to use it.

Left-hand side: text information.

Map: As with other online maps, you can change the 'basemap' so it's illustrative or photographic. This can be done using the box with 4 squares in it, located in the top RHS of the map.

You'll see lots of brown spots, of varying sizes, on the map. When you click on a spot a pop-up box will appear giving you the data for that location.

Note: using the map on your mobile phone out and about by a river. You can allow the website to show your location to help you find the CSO – BUT, be careful if by riverbank, not to get too close to the riverbank – be especially careful on riverbanks that are steep, high, uneven or where you cannot see the edge. Be extra careful if the river is high, or fast and during/after rainfall.

Investigate

Allows you to look for specific information. You can, for example, look at the data for the whole of United Utilities area, or just for the Eden Catchment, or even just for your local river!

1. To find data for the whole of the Eden Catchment

Use the filter tool on the left-hand-side of the screen. Click on **CaBA Catchment** and select **Eden** from the drop-down options.

2. To find data for a particular river, or section of river

Carry out 1. above, then click on **WFD Waterbody Catchment**. This will give you a list of the becks and rivers in the catchment. Some have upper and lower sections. You'll be able to work out when you click (by looking at the map) which length of the river each has data for.

Download

Allows you to download a report of spills, so you can find out more facts for your local area. This includes being able to compare spills in 2021 with spills in 2020.

Water companies are responsible for providing data on the amount of raw sewage discharged into rivers each year. Not all of the Combined Sewer Overflows currently provide data.

It's important to know, if you enjoy playing in rivers, where your nearest Combined Storm overflow is, and to make sure that you don't go in the water immediately downstream of one – especially after it has been raining.

CSOs in the news

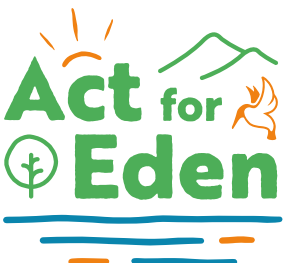
900,000 hours of human sewage and rainwater flow into UK rivers in just one year - revealed – informative Channel 4 news clip, but mentions condoms and sanitary towels. Watch on YouTube.

It's not just CSOs that are causing problems for our rivers.

No English river is free from pollution, report finds - BBC News (4 minutes, YouTube)

Not a single river in England is free from pollution. A 'chemical cocktail' from agriculture, raw sewage, micro plastics, slurry, road run-off also cause huge problems for our rivers.

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Act for Eden website



Sewage stats show improvement for Eden's rivers, but Defra's plan threatens stagnation

With the latest figures from the Environment Agency now out showing how much raw sewage was released in England in 2021, river conservation charity, Eden Rivers Trust welcomes the improvements made in the Eden catchment over the last year but cautions that Defra's plan threatens the pace and progress needed to ensure clean and healthy rivers that can support a brighter future for all.

Elizabeth Radford, CEO Eden Rivers Trust responded to the figures:

*"We are pleased to see that the overall amount and frequency of untreated sewage discharged over the last year has decreased in the Eden catchment. Despite this, there were still **6,495** reported sewage discharges that spilled for a total of **51,397** hours during 2021, so there is a long way to go before Eden's rivers are sewage-free all year round."*

Snapshot from around the catchment:

- Overall, the number of spills in the catchment is down by **32%** and hours that sewage was discharged for is down by **35%** - outperforming the average for England. There is no information supplied which indicates why spills have declined, so any improvement cannot be attributed to any particular drivers.
- **6.8%** of the total number of hours that sewage is spilled into Eden's rivers is down to one location - **Cargo wastewater treatment works**, with **361** spills for a total of **3,503** hours. However, this is a significant reduction on the 6,233 hours reported by this site in 2020 (warning, may be understated as this site has flagged an issue with reporting data in 2021).
- **Glassonby** has gone from being the 3rd worst performer in 2020 with **284** spills to **zero** spills in 2021 - good news for wildlife in Glassonby Beck.
- **Morland** Beck now has the dubious honour of being the 2nd worst performer in the catchment with number of spills increasing by **38%** to **315** spills. Despite spilling more often, this site is discharging sewage for a shorter amount of time - still sizeable at **1,875** hours (which is 44% lower than 2020).
- **Brough** wastewater treatment works reduced the number of times it discharged sewage in 2021, but the number of hours it spilled for increased from **368** hours to an unacceptable **2,780** hours.
- In 2020, **Askham** wastewater treatment works only discharged sewage for 10 hours. Last year this had surged to 1,177 hours.

- On a positive note, more stations reported data in 2021, with United Utilities committing to fitting event duration monitors to the rest by the end of 2023.

Ahead of the release of the 2021 statistics, Defra announced a consultation on their proposed Storm Overflows Discharge Reduction Plan (SODRP). However, Eden Rivers Trust do not think this plan goes far enough, fast enough.

Elizabeth continues:

"In their recent road map, United Utilities has recently committed to reducing spills by a third by 2025 – a much faster time-scale than the government is proposing. We are facing a climate and nature crisis; we're calling on the government to set discharge targets and time-scales that reflect the urgency that is needed.

"We appreciate that water companies are key to ensuring our rivers are clean and healthy, but in the Eden, we also need everyone else with responsibility for managing storm water and diffuse pollution to come on board too, such as developers, councils, farmers and landowners.

"Our rivers deserve better. We encourage residents and businesses alike in the Eden catchment to respond to this consultation before the 12th May and stand up for the cleaner, healthier water we all expect and deserve."

The charity believes in working with a wide range of partners to tackle the issues around river pollution.

They have put plans in place with United Utilities (UU) that will improve the health of Eden's rivers, such as working with local farmers and landowners in the Petteril to reduce levels of phosphate reaching and polluting rivers and groundwater, and with primary schools to inspire the next generation to Act for Eden by using water wisely, stopping pollution and protecting rivers.

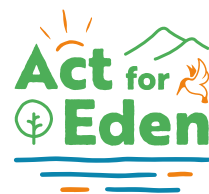
UU are also supporting their River Guardians volunteering programme this summer cleaning up and improving rivers.

Take part in the consultation by the 12th May [now ended].

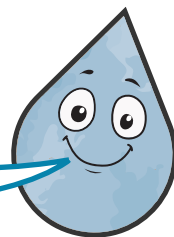
ENDS

Sewage in our rivers

Answer sheet



Read the **Sewage in our Rivers StoryMap**, then answer the questions!



- 1** **Q.** Define sewage.
A. Sewage is waste matter such as faeces and dirty water from homes, factories and farmyards.
- 2** **Q.** a) Where is raw (untreated) sewage supposed to go after you have flushed the toilet?
A. To a sewage treatment plant
Q. b) What happens there?
A. It is then cleaned to an environmentally safe standard before being released back into our rivers, or re-used.
- 3** **Q.** What does the abbreviation CSO stand for?
A. Combined Sewer Overflow
- 4** **Q.** Which 3 factors (when, and why) cause raw sewage to sometimes get discharged (released) into rivers? (Hint: make sure you click on this [website link](#))
A1. Heavy rainfall can cause sewers to get full and this could flood our homes with sewage and rainwater.
A2. If sewer pipes become blocked by non-flushables items, backed up sewage needs to be discharged before it floods homes.
A3. Old or outdated sewage treatment plants cannot treat sewage properly.
- 5** **Q.** a) Name two reasons why achieving 'bathing water status' is good for rivers:
A1. Wildlife and plants have clean, healthy habitats to call home.
A2. People can swim, paddle and play without worrying about sewage pollution.
Q. b) How many English rivers have bathing water status?
A. Two (A stretch of the River Thames at Port Meadow, Oxford* and the River Wharfe in Ilkley.) *only announced in spring 2022, not updated on the storymap as of Nov 2022.
- 6** **Q.** a) Read "Testing the Water". What are the two most commonly used methods people rely on to find out if a river is polluted?
A. Sight and smell.
Q. b) Are these methods reliable? If not, why not?
A. A river can appear or smell clean, despite sickness-inducing sewage pollution lurking beneath the surface.



Is your river fit to play in?

This interactive map will help us find out where raw (untreated) sewage sometimes enters the Eden river system.

Using the Investigate tab of the "Is your river fit to play in?" map:

1

Select the River Eden in the CaBA catchment category.

Q. How many raw sewage spills were counted in 2021, and for how many hours was raw sewage discharged into Eden's rivers?

A. **6,515** spills for **51,421** hours.

2

Q. Where did the most spills happen in 2021? *Hint. Use the scroll bar to increase the minimum number of spills in Number of counted spills category until there are just two solid brown circles remaining.*

A. 1. **Cargo** Wastewater Treatment Works (WwTW) sewer storm overflow spilled **361** times for a total of **3,503** hours discharging into the River **Eden**.

2. **Morland** WwTW sewer storm overflow spilled **315** times for a total of **1,875** hours discharging into **Morland** Beck.

3

Q. Which sewer storm overflows were the worst offenders for the number of hours they spilled sewage into Eden's Rivers?

A. 1. **Crosby Garrett** WwTW, releasing into Crosby Garrett Beck. **225** times for a total of **4,164** hours.

2. **Cargo** WwTW, discharging into the River **Eden**. **361** times, for a total of **3,503** hours.

4

Q. 4. Can you work out the total number of days they both spilled for?

A. 1. Crosby Garrett: **4,164** hours = the equivalent of **173.5** days.

2. Cargo: **3,503** hours = the equivalent of **146** days.

5

Now we are going to investigate a river near to where you live.

In the top right corner of the map there is a search bar. Enter the name of your town or village, or the postcode of your school or home.

Find the nearest CSOs to you (there might be more than one nearby) and click on the brown circle to find the data for that site.

Write down what you found out about.

6

If you play or swim in a river near you, can you find the place on the map?

Search for the nearest CSO and write down anything you now need to consider before playing safely in the river again.

Encourage students to refer to the "Sewage in our rivers" StoryMap to find details of things they need to consider.

Hint - look at the "Testing the waters" section and also think about whereabouts they might play in the river - e.g. upstream or downstream of a CSO?

Answers correct as of 30 November 2022.

Please check the interactive map and StoryMap for the most recent figures.

