LOCAL NEWS PARTNERSHIPS

Getty Images - not for reuse

The Drum Online Media Awards Winner 2020

Failing flood defences

Embargoed - 0:00GMT, Wednesday, 10 December

Please note this report and accompanying dataset is subject to change

BBC Shared Data Unit, BBC Local News Partnerships

shared.dataunit@bbc.co.uk

Wincott Award Winner 2022

What's the story?

Almost 8,500 flood defences in England are below their required condition as winter approaches.

Exclusive figures obtained by the BBC Shared Data Unit show that, as of 20 October this year, 8.6% of the 98,466 defences inspected by the Environment Agency fell below their required standard.

About 6,500 of those below condition are considered 'high consequence', meaning they are meant to protect multiple homes or businesses.

While the Department for the Environment, Farming and Rural Affairs (Defra) says the situation has improved since the same time last year following record levels of investment - stark disparities remain at local authority level.

North Tyneside, Brentwood and Hart are among council areas with more than 40% of their defences currently below the required standard.

Today we can share with you the proportion of flood defences falling below their required condition at district authority level in England here.

With winter approaching, the data shows the scale of the challenge facing the government's repair efforts, despite ministers pledging £2.65bn over two years to build and restore more than 1,000 flood defences across England.

Last winter, the UK was hit by six named storms. Among them, storms Bert and Connall caused severe flooding in England during November 2024.

- MET Office A look back at the 24-25 storm season: https://www.metoffice.gov.uk/blog/2025/a-look-back-at-the-2024-25-storm-season
- MET Office: State of the UK Climate: https://www.metoffice.gov.uk/research/climate/maps-and-data/about/state-of-climate

Winters are also getting wetter, according to the Met Office. Six of the ten wettest winter half-years (October to March) for England and Wales have been in the 21st Century so far.

In April, Floods Minister Emma Hardy told MPs that 3,000 of the Environment Agency's 38,000 high-consequence assets were in the "poorest condition on record" following "years of under-investment". A full statement from Defra and the Environment Agency can be found here.

The Agency's target is for just 2% of its high consequence defences to be below target condition.The current figure is near 9%.

The BBC found third-party maintained flood defences were more likely to be failing, with 104 in every thousand below required condition. That's 46% higher than the rate for EA maintained defences of 71 in every thousand.

Flooding expert Professor Hannah Cloke said the figures in some areas were concerning.

She said, “All it would take would be a large storm to come through, or a series of storms that we've seen before, and then these assets would fail and there would be a massive problem.”

What does this pack contain?

- This pack contains data showing you the number and proportion of flood defences below their target condition at district-level local authorities in England.
- National findings for you to put local stories in context
- Interviews with two flooding experts, former Environment Agency area manager Dave Throup and leading hydrologist Professor Hannah Cloke OBE, of the University of Reading.
- A full methodology

As always you can use any of the information contained within this pack.

Background

What is a flood defence?

A flood defence is any “asset” that provides protection from rivers, sea or standing water. This includes both manmade and natural defences. However, natural defences, like the embankment of a river, may include man-made elements to make them more effective or to protect them from erosion. (Environment Agency)

Traditional flood defences, like flood walls and embankments, confine water to river channels, preventing it spilling out in particularly vulnerable areas like towns and cities

Most flood defences in England are classed as “fluvial” defences. This means they are a structure or system designed to protect areas from flooding caused by rivers and streams.

However, most of the fluvial defences in England are simply classed as “natural high ground” or outfalls

Descriptions of all flood defence types can be found here

Who looks after them?

Flood defences are maintained by a patchwork of organisations across England from private individuals, to water companies, charities and local authorities - but just over half of defences with a flood risk management purpose are maintained by the Environment Agency.

The Environment Agency routinely inspects and grades the 51,000 flood defences it maintains as well as around 47,000 maintained by third parties, giving them a score between 1, meaning very good, and 5 meaning very poor. However, it does not publish the scores of flood defences maintained by third parties.

What the ratings mean:
1 - Very Good - Cosmetic defects that will have no effect on performance
2 - Good - Minor defects that will not reduce the overall performance of the asset
3 - Fair - Defects that could reduce performance of the asset
4 - Poor - Defects that would significantly reduce the performance of the asset. Further investigation needed
5 - Very Poor - Severe defects resulting in complete performance failure

What do we mean by failing flood defences?

Defences maintained by the Environment Agency are also given a **target score between 1 and 5**. For example, if a defence has a target score of 3 - which is “fair” - and on the last inspection received a score of 4, “poor”, it will be classed as being Below Required Condition (BRC).

The Shared Data Unit study looks at how many defences in each local authority area are falling behind that target score.

Failing flood defences can have a number of potential defects:

- **Cracks or fractures** in concrete or masonry walls
- **Erosion or scouring** at the base of embankments or walls
- **Slumping or settlement** of earth embankments
- **Vegetation overgrowth** that weakens structural integrity
- **Blocked or broken drainage systems** that prevent water flow
- **Corrosion** on metal components like sheet piling or gates
- **Displacement or tilting** of structural elements
- **Water seepage or leakage** through or beneath the defence

Further background reading:

1. **Public Accounts Committee Inquiry: Flood Defences**
   Flood Defences Inquiry Overview

2. **Committee of Public Accounts Report: Resilience to Flooding**
   Seventh Report of Session 2023–24

3. **News Release: Flood Resilience Eroded by Poorly Maintained Defences**
   Committee Statement on Flood Risk

4. **House of Commons Debate: Flooding and Coastal Erosion Risk Management Strategy**
   Hansard Transcript – 6 February 2024

5. **Environment, Food and Rural Affairs Committee: Flood Risk Management**
   EFRA Committee Flood Risk Inquiry

6. **Written Questions and Answers: Flood Defence Funding**
   Parliamentary Written Questions – Flood Defence

7. **Westminster Hall Debate: Flooding in England**
   Hansard Transcript – 23 January 2024

8. **National Audit Office Report Referenced in Parliament**
   NAO Report on Flood Defence Investment

9. **House of Lords Debate: Flood Risk and Infrastructure Resilience**
   Hansard Transcript – 12 March 2023

10. **Environment Agency Evidence to Parliament**
    EA Oral Evidence – Flood Risk Management

Methodology

All of the Shared Data Unit's findings come from a dataset prepared by Defra's data services team.

The SDU tried a number of different sources to try and assess the condition of flood defences at a local authority level. Among them, the publicly available AIMS asset bundle shows the location of and condition score of flood defences around England that are owned or maintained by the Environment Agency.

The BBC obtained three separate snapshots of these data from January, July and October 2025 to see whether the condition of defences had improved or decreased over the six-month period. We put our analysis to Defra for comment.

Eventually an agreement was reached with the Defra data services team to give the Shared Data Unit tallies of flood defences both above and below standard at their last inspection at local authority level. The dataset did not include the exact location of GDPR-protected flood defences, but allowed us to see aggregates for each local authority area and Environment Agency flood risk management region.

What we found

England-wide findings

- Our data contains details of 98,466 flood defences in England

We found that 8,459 or 8.6% of all flood defences in England were below their target condition as of 20 October this year.

- 75,364 of those defences (77%) are considered “high consequence” defences - that means they protect multiple homes and/or businesses.

We found that 6,498 high consequence defences were below target condition. That means the same proportion of high consequence defences, 8.6%, were below required condition.

- Flood defences were around 45% more likely to be below Required Condition if they were maintained by a third party other than the environment agency.

Proportion of all Environment Agency maintained defences Below Required Condition	7.5%
Proportion of just high consequence Environment Agency maintained defences Below Required Condition	7.1%
Proportion of all third party maintained defences Below Required Condition	9.8%
Proportion of just high consequence defences maintained by third parties, which are Below Required Condition	10.4%

How do local authority areas compare?

The table below shows the top 20 local authorities with the highest proportion of flood defences below their required condition in England.

Please note that the table below includes local authority areas with a very low starting base. For example, Hackney has only three flood defences in the Environment Agency dataset and one of them is below target condition. Compare that to Hart in Hertfordshire, where 50 of its 121 defences are below required condition.

TABLE 3: Top 20 council areas with the highest proportion of flood defences falling below their target condition.

Local authority area	Total number of flood defences	Number of all flood defences below required condition (BRC)	Proportion of defences Below Required Condition (BRC)
North Tyneside	15	7	47%
Brentwood	24	11	46%
Hart	121	50	41%
Gosport	10	4	40%
Swindon	158	58	37%
Hackney	3	1	33%
Portsmouth	69	23	33%
Tandridge	43	14	33%

Surrey Heath	56	18	32%
Wokingham	70	21	30%
Rushmoor	14	4	29%
Ealing	29	8	28%
Runnymede	69	19	28%
Southend-on-Sea	156	42	27%
Three Rivers	130	34	26%
Solihull	104	27	26%
Woking	111	28	25%
Thurrock	291	71	24%
Coventry	21	5	24%
Castle Point	211	50	24%

Local authorities: High consequence defences

When looking at just high consequence defences, it is again important to note that some of the local authority areas in the table below have a very low starting base. North Hertfordshire has only two high consequence assets, of which, one is below target condition.

Local authority area	Total number of flood defences	Number of all flood defences below required condition (BRC)	Proportion of defences Below Required Condition (BRC)
North Hertfordshire	2	1	50%
North Tyneside	14	7	50%
Gosport	10	4	40%
Hart	110	43	39%
Swindon	153	57	37%
Basingstoke and Deane	36	12	33%
Hackney	3	1	33%
Portsmouth	69	23	33%
Surrey Heath	56	18	32%
Oxford	51	15	29%
Rushmoor	14	4	29%
St Albans	35	10	29%
Ealing	29	8	28%
Runnymede	69	19	28%
Southend-on-Sea	143	39	27%
Tandridge	33	9	27%
Broadland	15	4	27%
Solihull	99	26	26%

Three Rivers	130	34	26%
South Oxfordshire	23	6	26%

Defra response

Floods Minister Emma Hardy said:

"Flooding devastates communities, but this government's preparations mean our towns and cities are better protected than last year.

"We inherited flood assets in their worst condition on record. Our immediate response was to redirect £108 million into maintenance and repair works.

"But this is just the start. We're investing at least £10.5 billion – the largest programme ever – in flood defences until 2036. This will build new defences and repair assets across the country, protecting our communities for decades to come."

Environment Agency response

An Environment Agency spokesperson said:

"Protecting communities in England from the devastating impact of flooding is a top priority - which is more important than ever as climate change brings more extreme weather.

"Each year, we complete up to 165,000 inspections of flood assets across the country and have recently redirected £108 million into repairs and maintenance. This will help to ensure the strongest protection for nearby communities.

"If the performance of an asset is reduced, then immediate action is taken to ensure that flood risk continues to be effectively managed until the asset is fully repaired or replaced."

FURTHER BACKGROUND FROM THE ENVIRONMENT AGENCY (BACKGROUND ONLY - NOT FOR DIRECT QUOTING)

What is the Environment Agency's assessment of the current condition of flood defences nationwide, particularly in light of the approaching winter season?

Current condition of flood assets

Our target this year is to maintain asset condition at or above 92%.

As of October 2025, 92.9% of Environment Agency high consequence (EAHC) assets are at or above required condition.

To ensure we maintain asset condition at this level, we have:

o Reprioritised £108 million of funding to asset repairs and asset maintenance (£36 million in 2024/25 and £72 million in 2025/26)

o Prioritised maintenance activities on high consequence assets – preventing an increase in deterioration rate

o Implemented mitigation measures and contingency plans to those assets which remain below required condition

o Continuing to inspect assets and assessing those below condition

Below Required Condition

An inspection assesses the condition against a “target condition”, if it is not at target condition it is called below required condition (BRC).

However, when an asset is listed as BRC, it does not mean that they have structurally failed, or that performance in a flood is compromised.

An asset can be below its required condition and still function fully, for example a flap valve may not be moving freely, but it remains operational.

When an asset is found to be BRC, a more detailed assessment is then undertaken to determine if repairs are needed, the level of urgency for the repair and how this will be funded.

Importantly, assessment will also determine what mitigation measures are needed to be put in place to ensure the asset can operate until the full repair is complete.

If the performance of an asset is reduced, then action will be taken to ensure that flood risk continues to be effectively managed until the asset is fully repaired or replaced and meets the required condition.

What measures are being taken to address the 6,500 high consequence assets currently below standard?

Environment Agency assets

· Of the 6,500 assets below required condition, 2,892 are Environment Agency assets in High Consequence systems and the rest are third party owned assets.

· For Environment Agency assets below required condition, £36 million was reprioritised from capital investment in 2024/25 to undertake repairs to defences damaged during the storms and flooding events experienced across winter 2023/24.

· In 2025/26 a further £72 million was reprioritised from capital investment towards maintaining flood assets. As well as targeting repairs to damaged assets, this will also help reduce deterioration.

· The repair programme is still ongoing, and some assets remain below target condition. However, it should be emphasised that these assets will work as required during a flood event.

· Stability of performance for assets is only achievable through long term, consistent investment in maintenance and refurbishment of existing assets. Planned preventative maintenance is a cost-effective strategy, reducing rates of deterioration and delaying costly major repairs.

What is the reason behind Thames the infrastructure being substantially worse – is it due to geographical differences – management – funding – or are they simply different sorts of defences?

The condition of Thames area high consequence assets (EA and third party) is 80.2% and 11% below the national figure of 91.4% (for EA and third party).

Thames was one of four areas that saw the biggest impacts from the 2023/25 winter storms which damaged many of Environment Agency and third party assets. Although we have repaired many of the highest risk assets, many remain below their required condition.

Of the 426 HC assets BRC in Thames, 89 are EA HC and the remainder are third party assets.

How is the Agency working with local authorities such as North Tyneside, Brentwood, Hart, and Gosport, where more than 40% of defences are below standard? What is your response to the finding that high consequence assets maintained by third parties are 45% more likely to be failing than those maintained by the Environment Agency?

· The Environment Agency inspects and reports on the condition of flood risk management assets in England. This includes our own and third-party assets - some of which are owned by local authorities - that work together to protect people and property.

· We do not have legislative powers to require third parties to undertake repairs to their assets, but we do make them aware of the condition and associated risk and recommend they undertake repairs.

· It is a matter for each local authority to determine maintenance of its assets considering its own fiscal conditions

· In some circumstances, we can intervene in the interest of public safety and exercise our emergency powers to undertake works where the asset is in serious risk of failure and the owner is unable to undertake repairs.

• Based on the October national figures it is correct that third party high consequence assets are 45% more likely to be below required condition compared to EA high consequence assets. However as mentioned previously below required condition assets are not failing assets.

The Agency's target is for only 2% of high consequence assets to be below standard, yet the current figure is closer to 9%. What is the timeline and strategy for meeting this target?

· In the short term we have reprioritised £108 million of capital investment to support asset repairs and maintenance. Further capital funding is planned to be allocated to asset repairs and asset refurbishment in our capital programme.

· The Environment Agency is modernising its approach to asset management, to address and reverse the deterioration rate. This includes changing the asset performance metric from asset condition reporting to asset health.

· Asset health will be a more granular measure. For example measures for earth embankments include additional indicators such as geometry, grass coverage, materials amongst others to give greater insight to the performance of the asset. This will enable better targeting of maintenance funding and together with improved technology develop a stronger and more efficient asset management planning programme for the future.

How does the Agency plan to mitigate risks given the increasing frequency and severity of winter storms?

· We're already planning for climate change – we build climate change projections into the design of flood defences to make sure they are fit for the future.

· We also keep our data and modelling under constant review and examine it rigorously after every flooding incident.

· We published the new National Flood Risk Assessment (NaFRA) data in January 2025. NaFRA incorporates future climate change scenarios (e.g., for river flows, rainfall, sea-level rise) based on the UK Climate Projections 2018, and provides a single picture of current and future flood risk from rivers, the sea and surface water for England.

· The Environment Agency has a strong track record: our new flood defences meant over 400,000 properties were better protected between 2015-2024.

· Between April 2024 and March 2025, the Environment Agency worked with other risk management authorities across 145 schemes to better protect around 27,500 properties from flooding and coastal erosion. 58 of these were capital maintenance projects (repair or full refurbishment of existing assets) better protecting 13,000 properties.

· Between April and September 2025, a further 44 projects have completed, better protecting 13,050 properties – of which 12 were capital maintenance schemes.

Interviews

Dave Throup:

Dave is a former Environment Agency area manager for Herefordshire and Worcestershire and is now a trustee and director of Heart of England Forest. He is a regular BBC contributor and expert on flood defences.

Q&A

Q: "Do our findings concern you?

A: "Any flood defence that is not operating as close to 100% efficiency as possible is of a concern.

"It's difficult to say why that is happening. Is it a lack of money? Or is it the bashing that these flood defences have taken over the last three or four years as a result of many very large flood flood incidents? It's very difficult to pull that apart."

Q: Can you explain what an underperforming flood defence might look like?

A: "It can vary. If it's a hard defence made out of bricks and stone, there can be weak points around the joints not operating as well as they could.

"In a lot of cases, flood defences are actually grass banks over large areas. Now, the problem with grass banks is that they operate as a flood defence only once or twice, every few years. But when they get huge amounts of water on them on a regular basis you start getting erosion, and you start getting faults.

“Then when you think those defences could extend over tens of kilometers, making sure that all those are operating at very high levels of efficiency - while still getting a bashing on a regular basis - is quite a demanding task.”

Q: Experts are telling me that flood defences meant to offer a 1-in-100 year level of protection are no longer doing so - and that is partly down to climate change. Is that true?

A: “I certainly stopped using the phrase one-in-100 years because it’s been so devalued. If I went on the radio now and said we've seen a one-in-100 year flood - I'd be back three weeks later saying we've had another 100-year flood.

“It's almost becoming meaningless because floods are becoming more frequent and are becoming bigger as a result of heavier rainfall, as a result of man made climate change.

“It's something that we are going to have to get used to. We can start planning for and making sure that our defences are as resilient as they can be, but they're never going to be able to protect against the really big floods, and that's not what they're designed to do.

“They're designed to protect against a flood of a certain level, and there will always be a flood that's bigger than that.”

Q: Our study looks at the effectiveness of existing flood defences in England, but that doesn’t tell the full story, does it? Many areas are flooding simply because they have no defences at all?

A: That’s right. There are hundreds, possibly thousands of communities across the country that are prone to flooding but will never receive a formal flood scheme.

“In many cases, it’s simply not practical. There’s no high ground to tie defences into, or the cost would be disproportionate—millions of pounds to protect just a handful of properties.

“In some instances, it would be cheaper for the state to purchase those homes and allow them to flood.

“So, for many rural or isolated communities at high risk, the prospect of traditional flood defences is very slim.

“Instead, we need to look at managing water across the catchment to reduce the frequency of flooding, or focus on property-level protection—making homes more resilient. That won’t stop water getting in, but it does make recovery quicker and less costly.”

Q: So flood defences are not the only tool we have to protect homes and businesses?

A: Flood defences are excellent when they're in the right place. I'm a big supporter and I've seen the difference they make.

"But they're not suitable everywhere. Sometimes they're too expensive or physically impossible to build.

"So, we have to consider other ways to prevent water reaching what we call 'receptors'—where people live and work.

"One of the most effective approaches on a large scale is slowing water down across the catchment.

"That can be done by planting trees, creating bogs, building attenuation ponds—there are many methods.

"It's effective, but slow to implement. It requires cooperation from landowners, especially farmers, since much of the land involved is agricultural.

"They'll need incentives, and the work must be targeted where it will have the greatest impact.

"Catchment management is absolutely vital for future flood resilience, especially as rainfall intensifies. But it's a long-term challenge."

Q: What exactly do you mean by catchment management?

A: "Water follows gravity—it's heavy, it falls from the sky and flows into the nearest watercourse, then into rivers.

"The key is slowing that journey. If all the water across a catchment arrives at the same time, you get flood peaks.

"Natural flood management is about introducing multiple interventions across the catchment to slow the flow.

"Even a small river's catchment can cover many square kilometres, so we're talking about large areas of land.

"In short, it's about delaying water before it reaches vulnerable towns and villages."

Q: The government is considering mandatory regulations for new developments to include Sustainable Urban Drainage Systems. How important are these?

A: “In my view, they should absolutely be mandatory—and rigorously assessed to ensure they’re fit for purpose.
“At the moment, it’s a mixed picture. It depends on the developer and how proactive the local authority is.

“There’s no statutory mechanism to guarantee these systems work properly.

“I’ve seen attenuation ponds that remain bone dry even during heavy rainfall—they’re simply not functioning as intended.

“New developments increase impermeable surfaces, which speeds up runoff. Combine that with more intense rainfall, and you’ve got a recipe for trouble.

“Sustainable drainage is a crucial part of catchment management and future flood resilience.”

Q: What about building in floodplains or areas at high risk of flooding?

A: “It’s a difficult issue. The instinctive response is to say, “Don’t build in floodplains.” But in many parts of the UK, especially within certain local authorities, there are very few alternatives.

“With statutory housebuilding targets, it’s virtually impossible to avoid some high-risk areas altogether.”

Q: Is it a problem that river catchments cross multiple local authority boundaries? For instance, why should Warwickshire County Council invest in flood schemes that benefit Leicestershire?

A: “Yes, it’s a longstanding challenge. Water doesn’t respect county lines—it only follows the catchment boundary.

“Take the Severn or the Wye, for example. These rivers rise 50 or 60 miles from where they cause flooding.

“The heaviest rainfall often falls in areas unaffected by flooding, but it all travels downstream.

“So you need to intervene where the rain falls, which might be in a different county or local authority.

“That’s why catchment-based working is essential. Authorities and organisations must collaborate across boundaries that water actually follows.”

Professor Hannah Cloke OBE

Professor Dr Hannah L. Cloke OBE is a professor of hydrology at the University of Reading. She is an internationally recognised hydrologist specialising in floods, climate extremes, and disaster risk reduction.

Q&A

Q: Our findings show roughly 8 per cent of all flood defences in England are failing - does that concern you?

A: It's very worrying that so many defences are in such a bad condition. That means that lots of people are in danger and there's a large flood risk to lots of people in this country.”

Q: Is climate change happening quicker and more devastating than we've imagined here in the UK, do you think?

A: “It is very complicated but we have some indications that climate change is affecting how big those floods will be in the Thames catchment, but it's really difficult to get a handle on because there's lots of people who keep building houses along the Thames - and that also interferes with how many people are at risk of flooding.

“What is certain is that we are already seeing heavier rainfalls. And it's happening faster than our climate models are predicting as well. So that's something we're really concerned about and the long term impacts on flood risk.

“There are some aspects of how our climate is changing that we're not keeping pace with.

“Where we've had a warm ocean in recent years, we've seen some really very heavy downpours associated with that and that means that our infrastructure is just not able to cope - we haven't planned it into the infrastructure at all. And that's just the infrastructure we're building now - flood defences built five, ten years ago are already getting over-topped. That's not even considering the stuff that we built 30 to 40 years ago.”

Q: But is there also an issue with the way planning legislation works because councils have targets of housing they need to supply and if some local authority areas sit entirely in the floodplain - it stands to reason they need to build houses there?

A: “There's a massive problem because it's just not joined up. On the one hand, we need to make sure that people are not put in harm's way in terms of flooding so they're not in the path of a flood. But we also need to build houses because people have to live somewhere and that's a commitment the current government has made - but those two policies are not talking to each other at all and that's a massive problem because we will then be building in places that are at risk.”

Q: The government’s capital programme to provide better flood protection to 336,000 properties in England underspent in the first two years - why is that?

A: “These schemes are really difficult to implement because they affect a lot of people.

“It's really important to have a consultation and make sure everybody's views are taken into account because people have to live with these schemes and there are problems associated with them, not just just with keeping floods at bay.

“They are very expensive, so they're difficult to get procurement processes through and get all the planning sorted - and it takes ages because there's a lot of red tape around them.

“We have filled up our land as well, so where do you put these flood defences? There isn't really spare space in order to make these things happen - we have a really complicated landscape full of people's homes and farms and roads.”

Q: But what can we propose in terms of solutions? How do we prevent the damage to homes and livelihood we saw at the start of 2025?

“There are some very important things that we can do which is trying to make our catchment function as it should. So making sure that we're not paving over everything and then making sure that land can soak in that rainfall when it does rain.

“We can use natural flood management solutions for that, those are really handy - where we can do things like plant trees in some areas.

“We can use sustainable drainage systems and new developments, making sure the land can hold on to that water even on the surface or soaked into the ground. But it's really important to realise that that will only help with some of the problem. When we get a very big storm or a series of storms or a wet winter we will still have a very big flood problem and we do need to maintain flood defences. We cannot get away with just using natural solutions.

“We must do both things at the same time to keep people safe and that means we have to maintain our flood defence spending both for maintenance and for new defences and preferably increase it because at the moment we still have a lot of people at risk and it's getting worse.”
