

Fertiliser pollution lives on in the River Thames

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The rapid rise in intensive agriculture since the Second World War together with the use of fertilisers has led to severe nitrate pollution in the River Thames, report scientists.



London skyline.

They say nitrate levels are now so high that a clean-up would mean massive changes to land use and management, which would compromise food security and take decades to implement.

The UK researchers used a 140-year record of water quality in the river Thames to reach their conclusions. This is the longest continuous record of river water chemistry anywhere in the world.

They found that nitrate levels in the river have trebled since the 1930s. Major land-use changes after the Second World War led nitrate levels to double and then rise even higher in the 1970s.

'Our results suggest it could take several decades for nitrate levels to drop even with significant changes to land management practices,' says Dr Nicholas Howden from the University of Bristol, lead author of the report.

Intensive agricultural practices developed over the last century have undoubtedly improved food security, but this has come at a cost. Greater food production has led to intractable environmental problems like soil erosion and water pollution.

Nitrates are harmful to newborn babies and prevent our blood from carrying oxygen, so they have to be removed from the water before it's safe to drink. Nutrients from agricultural fertilisers also trigger the rapid growth of algae in rivers and watercourses. This darkens the water and reduces its oxygen content, killing fish and choking plants.

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Howden and colleagues from the universities of Durham and Cranfield wanted to know how nitrates move through the land, eventually turning up in our water supplies. They were also interested in how long it takes for them to leach into rivers and other water sources, like springs and boreholes.

Aquifers in the Thames river basin supply around five million people with drinking water, but another six million rely on water taken from the river.

'We were keen to find out what level of nitrogen input into agricultural land is safe such that groundwater remains sustainable over the long term,' Howden says.

They found that it can take a surprising amount of time for nitrates to find their way from farmland to the River Thames.

'We found a 30-year time delay – our net nitrate inputs don't get to our aquifers, springs and boreholes for decades,' explains Howden.

And even though the amount of nitrate from agriculture has fallen since the 70s, levels remain high. Crucially, they found that it can take around 30 years for nitrate concentrations to drop off.

It seems that these agricultural pollutants arrived in two stages. In the first, surface run-off took half of the nitrates to the River Thames, while the second delayed stage comes as the rest of the chemicals work their way through to the aquifers.

'A policy to embrace long-term management should now be an urgent priority,' says Howden.

'What's challenging is feeding our rapidly growing population, but at the same time providing safe and secure drinking water, and maintaining a healthy ecosystem,' he adds.

The study is published in *Water Resources Research*.

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