

Abandoned landfills are polluting UK rivers

August 26 2014, by Alex Peel



Sampling at Port Meadow

Abandoned landfill sites throughout the UK routinely leach polluting chemicals into rivers, say scientists.

At Port Meadow alone, on the outskirts of Oxford, they estimate 27.5 tonnes of ammonium a year find their way from landfill into the River Thames. The researchers say it could be happening at thousands of sites around the UK.

In water, ammonium breaks down into nitrogen. The extra nitrogen can trigger excessive plant growth and decay, damaging water quality and starving fish and other aquatic organisms of the oxygen they need to survive.

Scientists are most worried about so-called blue-green algal blooms,

which can produce toxins capable of killing wild animals, livestock and domestic pets. In people, they can cause skin rashes, nausea, stomach pains, headaches and fever.

'We've been getting rid of waste for an awful long time,' explains Dr Daren Goody, of NERC's British Geological Survey, who led the study. 'Since Victorian times, we've been putting it into landfill and ad-hoc waste dumps on the edge of our towns and cities, often on the fringes of floodplains.'

'There are 11 landfill sites at Port Meadow alone. If you scale that up for the whole of the UK, then you're probably talking about thousands of them.'

Port Meadow lies on the banks of the River Thames to the northwest of Oxford. The area is popular with walkers and birdwatchers, with annual winter floods attracting spectacular flocks of wildfowl and waders.

The birds make their own contribution of ammonium to the floodplain, effectively using the wetland as an enormous open-air toilet.

To disentangle the different sources of the chemical, and get an estimate of the total amount moving through the floodplain, the team drilled a series of boreholes, taking regular water samples for three years between May 2010 and August 2013.

Using isotopic analysis, a kind of chemical fingerprinting technique, they were able to attribute 27.5 tonnes of ammonium to household waste.

Over an eight kilometre reach of the Thames at Port Meadow, this could increase concentrations of the chemical by up to 40 per cent.

Nutrient pollution of waterways has been a growing concern over recent decades. Fertilisers containing large amounts of nitrate and phosphate are used on farmland up and down the country to boost crop growth.

Much of this eventually finds its way into rivers, where it can wreak havoc on ecosystems, and raise the cost of treating water for human consumption.

Today's landfills are lined with a thick layer of clay to limit the risk of chemicals leaking out into the environment. But around the UK, there are potentially thousands of un-lined historic landfills leaching large amounts of nitrogen into major rivers.

Goody says it's a scenario likely to be repeated throughout the developed world.

'Collectively, this contribution to overall ammonium concentrations in rivers could be very high,' he says. 'It's something that really ought to be taken into account when we're drawing up management plans for floodplains on the margins of towns and cities.'

The research is published in the journal *Science of the Total Environment*.

More information: D C Goody, D M J Macdonald, D J Lapworth, S A Bennett, K J Griffiths, 'Nitrogen sources, transport and processing in peri-urban floodplains,' *Science of the Total Environment*, 2014.

This story is republished courtesy of [Planet Earth online](#), a free, companion website to the award-winning magazine Planet Earth published and funded by the Natural Environment Research Council (NERC).

Provided by PlanetEarth Online

Citation: Abandoned landfills are polluting UK rivers (2014, August 26) retrieved 26 April 2024 from <https://phys.org/news/2014-08-abandoned-landfills-polluting-uk-rivers.html>

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