

From: Dr Anjan Ghosh, Director of Public Health

To: Kent Flood Risk and Water Management Committee – 4 November 2026

Subject: Water Borne Pollution

Classification: Unrestricted

Past Pathway of Paper: None

Future Pathway of Paper: None

Summary

This briefing paper provides a short report on the impacts and risk of water-borne pollution .

Kent's extensive coastline, rivers, groundwater and bathing waters benefit residents and visitors, but water-borne pollution can present public health risks through microbiological, chemical and emerging contaminants.

Although water companies, regulators and district and borough councils lead on water quality, Kent County Council (KCC) has important roles in public health protection, health intelligence, emergency preparedness, flood risk management and partnership working.

This report outlines:

- The main types and sources of waterborne pollution affecting Kent, including microbiological, chemical and emerging contaminants.
- The potential physical and mental health impacts on residents, visitors and communities.
- Who is most likely to be exposed or experience more severe impacts, and how water pollution can widen health inequalities.
- Current and emerging risks, including changing climate, population growth, increased recreational water use and infrastructure pressures.
- The responsibilities of relevant organisations and the role and actions of KCC Public Health in reducing risk and protecting health.

Recommendation(s)

The Kent Flood Risk and Water Management Committee asked to **NOTE** and **COMMENT** on the content of this report.

1. Background

- 1.1** Water is central to Kent's environment, economy and quality of life. The county's coastline, rivers, groundwater, bathing waters and private water supplies support drinking water, recreation, tourism, agriculture and wildlife. Pollution can affect these uses and create risks to health.
 - 1.2** Public concern has increased because of sewage discharges, bathing-water classifications, agricultural pollution and the effects of climate change on drainage and wastewater infrastructure. The Environment Agency monitors designated bathing waters and publishes annual classifications of Excellent, Good, Sufficient or Poor.
 - 1.3** Managing these risks requires coordinated action across drinking water, wastewater, environmental regulation, local government and health protection. Roles vary according to the pollution source and the type of water affected.
 - 1.4** KCC Public Health does not sample water or enforce water-quality standards, but assesses and communicates health risks, monitors emerging threats and inequalities, and identifies populations at greater risk. It also supports emergency preparedness and multi-agency incident coordination, and reviews incidents to strengthen longer-term prevention.
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2. The main types and sources of waterborne pollution affecting Kent

There are 3 main types of water borne pollution: microbiological contamination, chemical pollutants and emerging contaminants.

2.1 Microbiological Contamination

The most common microbiological contamination is gastrointestinal infection after exposure to contaminated recreational water.

Key microbes include bacteria (*E. coli*, *Campylobacter* and *Salmonella*), viruses (norovirus, hepatitis A and enteroviruses), and parasites (*Cryptosporidium* and *Giardia*).

Main sources include sewage discharges, faulty drainage, septic tanks, livestock manure, agricultural run-off, animal faeces and contaminated floodwater.

Microbe	Main health issues	People at greater risk
<i>E. coli</i>	Diarrhoea, abdominal cramps and vomiting; some strains can cause bloody diarrhoea, kidney damage and haemolytic uraemic syndrome.	Young children, older adults and immunocompromised people.
Campylobacter	Diarrhoea, abdominal pain, fever, nausea and vomiting; rare complications include reactive arthritis and Guillain–Barré syndrome.	Young children, older adults and immunocompromised people.
Salmonella	Diarrhoea, fever, stomach cramps, nausea and vomiting; infection can occasionally spread to the bloodstream.	Infants, older adults and immunocompromised people.
Norovirus	Sudden vomiting and diarrhoea, abdominal cramps and dehydration; outbreaks can spread rapidly.	Young children, older adults and people in care or institutional settings.
Hepatitis A virus	Fever, fatigue, nausea, abdominal discomfort and jaundice caused by inflammation of the liver; illness may be prolonged.	Older adults and people with existing liver disease.
Enteroviruses	Often mild or symptomless, but may cause fever, respiratory or gastrointestinal illness, rash and, rarely, meningitis or neurological disease.	Infants, young children and immunocompromised people.
Cryptosporidium	Prolonged watery diarrhoea, stomach cramps, nausea, vomiting and dehydration; illness can be severe or persistent.	Young children and immunocompromised people.
Giardia	Prolonged diarrhoea, abdominal cramps, bloating, nausea, fatigue and weight loss; malabsorption may occur.	Young children and immunocompromised people.

Reference: UK Health Security Agency (2020), *Gastrointestinal infections: guidance for public health management*, GOV.UK.

2.2 Chemical Pollutants

Chemical pollutants can enter surface water, groundwater and coastal waters from industrial processes, wastewater, agriculture, transport, contaminated land and consumer products.

Health risk depends on the substance, concentration, route and duration of exposure; regulated public drinking-water supplies are routinely monitored and treated to protect public health.

Pollutant	Main sources and pathways into water	Main potential health impacts
Pesticides and herbicides	Agricultural run-off and spray drift; amenity use on roads, railways and public land; accidental spills; and leaching	Impacts depend on the product. High exposure may cause acute poisoning, skin or eye irritation and neurological symptoms; long-term exposure to

	into groundwater.	some substances has been associated with neurological, reproductive, endocrine or cancer effects.
Nitrates and nitrites	Fertilisers, livestock manure, septic tanks, sewage and agricultural run-off or leaching to groundwater.	High nitrate exposure can reduce the blood's oxygen-carrying capacity in infants, causing methaemoglobinaemia ('blue baby syndrome'). Infants fed formula made with contaminated private-water supplies are at greatest risk.
Heavy metals and metalloids (including lead, arsenic, mercury and cadmium)	Natural geology; mining and industry; contaminated land; landfill leachate; urban run-off; and corrosion of plumbing or historic lead pipes.	Potential effects include impaired brain and nervous-system development, kidney and liver damage, cardiovascular effects and cancer. Fetuses and young children are especially vulnerable to lead and mercury.
Hydrocarbons and PAHs	Fuel and oil spills, road run-off, shipping and marinas, industrial activity, fires, contaminated land and atmospheric deposition.	Short-term exposure may irritate the skin, eyes and airways or cause nausea and neurological symptoms. Some polycyclic aromatic hydrocarbons are genotoxic and carcinogenic with long-term exposure.
Persistent organic pollutants (for example PCBs, dioxins and some flame retardants)	Historic industrial use, combustion and waste burning, contaminated sediments and land, atmospheric deposition and remobilisation during flooding or dredging.	Many persist and bioaccumulate through the food chain. Long-term exposure may affect the immune, reproductive, developmental and nervous systems, and some are carcinogenic.
Harmful algal and cyanobacterial blooms and associated toxins	Naturally occurring algae and cyanobacteria can multiply rapidly where water is warm, slow-moving and enriched with nutrients, particularly nitrogen and phosphorus from agricultural run-off, sewage and wastewater. Blooms may form in lakes, reservoirs, rivers and coastal waters, with climate change potentially increasing favourable conditions.	Some blooms produce toxins or cause irritation. Exposure through swallowing water, skin contact or inhaling spray may cause gastrointestinal illness, skin and eye irritation, respiratory symptoms and, rarely, liver or neurological effects. Children, dogs and people undertaking recreational water activities may be at greater risk of exposure.

References: [Drinking Water Inspectorate, *Drinking water standards and regulations*, UK Health Security Agency, *Chemical hazards compendium*.](#)

2.3 Emerging Contaminants

- 2.3.1** Emerging contaminants are substances or biological hazards that are newly recognised, increasingly detected, or not yet routinely monitored or regulated. Their health significance varies and, for many, evidence on long-term, low-level and combined exposure remains uncertain.
- 2.3.2** Key emerging contaminants include PFAS or “forever chemicals” which are highly persistent and can accumulate in people and wildlife with varied health impacts and microplastics (and nano plastics) where health impacts from water exposure remain limited.
- 2.3.3** UKHSA have contributed to the governments [PFAS Plan](#) and have reviewed evidence, provided public health guidance and are developing a pilot human biomonitoring programme.
- 2.3.4** UKHSAs work on microplastics is currently more research led because the human health evidence remains uncertain.
- 2.3.5** The following emerging contaminants require a precautionary and proportionate approach rather than implying that every detection presents an immediate risk to health.

Emerging contaminant	Main sources and pathways into water	Main potential health impacts
PFAS (“forever chemicals”)	Industrial and consumer products, firefighting foams, contaminated land, landfill leachate, wastewater and surface run-off. They are highly persistent and some accumulate in people and wildlife.	Some PFAS have been associated with immune, liver, developmental and reproductive effects, and increased risk of some cancers. Risk depends on the specific compound, dose and duration of exposure.
Microplastics and nanoplastics	Breakdown of plastic waste, synthetic fibres, tyre and road wear, paints, wastewater and urban run-off.	Evidence on health effects from water exposure remains limited. Research is examining possible inflammatory, cellular and chemical-carrier effects, particularly for the smallest particles.
Endocrine-disrupting chemicals	Some bisphenols, phthalates, pesticides and other industrial or consumer chemicals entering water through wastewater, agricultural run-off, landfill leachate and contaminated land.	May interfere with hormone signalling. Depending on the substance and exposure, potential concerns include reproductive, developmental, metabolic and thyroid effects.
Pharmaceuticals and personal-care products	Human and animal excretion, medicine disposal, healthcare, livestock farming,	Concentrations in drinking water are generally low and direct health risks are considered low, but long-term exposure, mixture effects and

	aquaculture, wastewater and products washed into drains.	impacts from biologically active substances remain under study.
Antimicrobial-resistant organisms, resistance genes and antimicrobial residues	Sewage and wastewater, healthcare facilities, livestock farming, aquaculture, manure and slurry, and medicine manufacture or disposal.	Water may help resistant organisms and genes circulate between people, animals and the environment. Population-level risks from environmental exposure remain under assessment, but resistant infections are harder to treat and may cause longer illness and more complex care.
Newly identified metabolites and transformation products	Pesticide metabolites, industrial chemicals and products formed as substances break down in the environment or during water treatment.	Health effects may not yet be fully characterised. Some breakdown products may persist, remain biologically active or differ in toxicity from the original substance.

References: [Confronting antimicrobial resistance 2024 to 2029 - GOV.UK PFAS Plan: building a safer future together](#) - [GOV.UK Microplastics in drinking-water Wastewater and Environmental Surveillance: summary for antimicrobial resistance](#) [World Health Organization and United Nations Environment Programme \(2013\)](#), *State of the Science of Endocrine Disrupting Chemicals 2012: Summary for Decision-Makers*. WHO/UNEP.

3. Who is most likely to be exposed or experience more severe impacts, and how water-borne pollution can widen health inequalities

- 3.1** People more likely to be exposed include recreational water users, residents of flood-prone, coastal or riverside communities, households using private water supplies, and people working with water, wastewater, agriculture or contaminated land.
 - 3.2** Infants and young children, pregnant women, older people, and people with weakened immune systems, liver or kidney disease, or other long-term conditions may experience more severe effects. Gastrointestinal illness and dehydration can be more serious in these groups, while some chemicals may affect foetal and child development.
 - 3.3** Water pollution and repeated flooding can also affect mental wellbeing, trust in responsible organisations, participation in swimming, angling and other blue-space activities, and local tourism, businesses and community identity.
 - 3.4** Health inequalities may widen where communities experience poorer environmental conditions, repeated disruption, fewer resources to avoid exposure or recover, or barriers to information and healthcare. Advice should therefore be accessible to people with disabilities, communication needs, limited digital access or limited English, and shared through trusted channels.
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4. Current and emerging risks

- 4.1** Climate change may increase water-pollution risks through heavier rainfall, surface and coastal flooding, and more frequent storm-overflow operation, placing additional pressure on ageing drainage and wastewater infrastructure.
 - 4.2** Population growth and new development may increase demand on sewerage, drainage and wastewater systems, particularly where infrastructure capacity is already constrained.
 - 4.3** Growing participation in sea swimming, paddleboarding, kayaking and wild swimming may increase the number of people exposed to polluted recreational water.
 - 4.4** Continued investment, monitoring and scrutiny are needed to improve water-company performance and strengthen the resilience of sewerage, drainage and wastewater infrastructure.
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5. Current KCC Action

- 5.1** KCC Public Health assesses and communicates health risks, emerging threats and inequalities, and identifies populations at greater risk. It works through Kent and Medway health-protection arrangements, multi-agency incident management and local resilience structures to support emergency preparedness and coordinated responses, and reviews incidents and surveillance findings to strengthen prevention, risk reduction and future preparedness.
- 5.2** KCC reduces risk through its flood risk management and climate adaptation functions, including local flood strategies, sustainable drainage and surface-water planning, and work to strengthen resilience to flooding and extreme weather.
- 5.3** KCC provides evidence-based incident messages, raises awareness and promotes safer recreational water use, working with the Environment Agency, UKHSA, water companies, district and borough councils, NHS partners and local communities.

6. Future Opportunities

- 6.1** Potential areas for further development include improving surveillance and intelligence, strengthening public health input into water management, and providing clearer information to support safer recreational water use.

- 6.2 Improve monitoring of health impacts linked to recreational water use and use environmental intelligence to identify emerging risks.
- 6.3 Strengthen public health input into water-management planning and continue scrutiny of Kent's water-quality trends.
- 6.4 Improve public communication on bathing-water quality and safer recreation.

7. Conclusion

- 7.1 Water-borne pollution presents a continuing and evolving risk to health in Kent, particularly for people and communities with greater exposure or vulnerability. Effective prevention and response depend on coordinated action across regulators, water companies, local authorities, health partners and communities. KCC will continue to contribute through public health intelligence, emergency preparedness, flood risk management, clear communication and partnership working, while strengthening surveillance and planning for emerging risks.

Recommendation(s)

The Kent Flood Risk and Water Management Committee asked to **NOTE** and **COMMENT** on the content of this report.

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