

Toxic chemicals in UK whales and dolphins are exceeding safe limits

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Credit: Unsplash/CC0 Public Domain

Almost half of marine mammals around the UK are being poisoned by banned chemicals.

The compounds, once used in pesticides, flame retardants and coolants, are having significant impacts on the health and reproduction of the animals.

The UK's whales and dolphins are full of toxins—and it might only get worse.

Despite many being banned almost 20 years ago, levels of persistent organic pollutants (POPs) remain high in the oceans. In fact, these chemicals may breach safe limits in as many as half of all marine mammals living around the UK, based on a new study of stranded animals.

While the researchers found that levels of six key POPs are declining, they're concerned that the chemicals currently contained in coastal landfill sites could increasingly leak out as flooding, extreme weather and coastal erosion are enhanced by climate change.

Dr. Rosie Williams, the lead author of the study at the Zoological Society of London, says, "This is a huge wake-up call. It's been over 20 years since several of these chemicals were banned globally, yet we still see concerningly high concentrations in wildlife."

"We need to act now, learn from our past mistakes and employ stronger, science-backed measures to curb pollution. Ambitious and urgent action is required and by beginning today we can start mitigating the profound impact that chemical pollution continues to have on [marine life](#)."

The findings of the research were [published](#) in the journal *Environmental Science & Technology*.

The problem with POPs

Many POPs were first developed in the twentieth century as part of a new wave of synthetic chemicals. At the time, they were seen as groundbreaking new compounds which could be used in stronger pesticides, longer lasting paint, and more fire-resistant furniture.

However, the same properties that made these chemicals so useful came at a cost: they are highly toxic and do not easily break down in nature. Over time, these chemicals leached into our soil, air and rivers, eventually making their way into the ocean.

"These toxins are initially taken up by plankton at the bottom of the food chain," Rosie explains. "Unable to be broken down or excreted, these persistent chemicals increase in concentration the further up the food chain they go in a process known as biomagnification."

"As [apex predators](#), many marine [mammal](#) species consume large amounts of toxins every time they feed, making them some of the most contaminated wildlife species."

While the effects of these chemicals vary, they are unfailingly harmful. As they build up in the body's fats, they can damage the reproductive system, the immune system, and hormonal cycles.

When this was recognized in the 1970s, countries began to introduce rules on their use. However, it wasn't until 2004 that the Stockholm convention came into force which bans or restricts the production and use of the most damaging compounds.

Despite this, the staying power of these chemicals means that marine mammals will remain vulnerable to their impacts for many years to come. Though no death of a marine mammal has ever been directly linked to pollution, the chemicals continue to provide another threat to animals already under pressure from fishing bycatch, noise pollution and

climate change.

Every year hundreds of marine mammals end up dying after becoming stranded on the coast of the UK. Many of these animals are reported to the UK's Cetacean Strandings Investigation Program, who investigate the events which led up to their death.

As a result of this work, the team have toxicology samples dating back more than 30 years. This is allowing researchers to reveal what impact the pollutants are still having on marine mammals.

What did the strandings data reveal?

One of the clearest examples of the effect these chemicals can be found off the north coast of Scotland. The UK's [only resident orca population](#) lives here, a group of four males and four females.

However, you'll find no calves among them. In fact, no calf has been born to the pod in more than 20 years, which may be a result of them being highly contaminated with particular POPs known as PCBs which have an impact on reproduction.

Andrew Baillie, the cetacean stranding officer at the Natural History Museum, says, "The UK's resident orcas are massively overburdened with toxins. In fact, they contain levels of PCBs as much as 30 times higher than the point at which they start to have negative health effects."

"Orcas are probably at greater risk than other species because they eat seals, which are already very contaminated in their own right, and because they live for a long time."

In fact, PCBs were the most abundant POP found in the study. From 2014 to 2018, 48% of animals had levels of this chemical higher than the

point where it starts to have noticeable effects on hormones and the immune system.

Many of these animals were [bottlenose dolphins](#), which have to contend with a historic legacy of pollution in the area they call home.

"Many bottlenose dolphins live in the southwest of the UK," Andrew says. "Historically, there used to be a factory in Newport which manufactured PCBs and released them into the Bristol Channel, meaning that these animals are more saturated with these chemicals than those living elsewhere."

Over half of [bottlenose dolphins](#) were also over a critical level of DDT, a pesticide that is known to harm the immune system of mammals. However, [sperm whales](#) appeared to be most affected by this chemical, being the only species where DDT was the most abundant POP in their body.

A cleaner future?

While the findings present a concerning future for the UK's marine mammals, there were a few reasons for hope. Though levels of POPs remain high in the oceans, their concentration in wildlife appears to be in decline.

"Persistent organic pollutants are, by their very nature, persistent," Andrew says. "Once they've been created, they're out there in the environment and they're very hard to get rid of."

"However, more recent strandings contain a lower amount of these chemicals than animals from 30 years ago. Some of that decline might be because these chemicals are now dispersing more widely, having been banned."

"It shows that, with concrete action, we can make a difference to our environment and help these marine mammals."

Despite this progress, the scientists remain concerned that leaks of existing POPs and newly developed chemicals could set this progress back. They're calling for [urgent action](#) to improve pollution control measures, and to phase out the non-essential use of hazardous chemicals as soon as possible.

"The global costs associated with environmental chemical exposure, such as medical treatment, has been estimated to be around 10% of the entire world's GDP," Rosie says. "This means there's a huge economic incentive to address this problem now."

"Tackling the issue of [chemical](#) pollution will not only protect the environment and our wildlife, but will also protect humans too."

At the same time, it will also be vital for the strandings program to continue its research on the current condition of the UK's marine mammals. If you spot a dead whale, dolphin, seal, marine turtle or large shark in England and Wales, you should report it by emailing strandings@nhm.ac.uk or calling 0800 6520 333.

More information: Rosie S. Williams et al, Spatiotemporal Trends Spanning Three Decades Show Toxic Levels of Chemical Contaminants in Marine Mammals, *Environmental Science & Technology* (2023). [DOI: 10.1021/acs.est.3c01881](https://doi.org/10.1021/acs.est.3c01881)

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