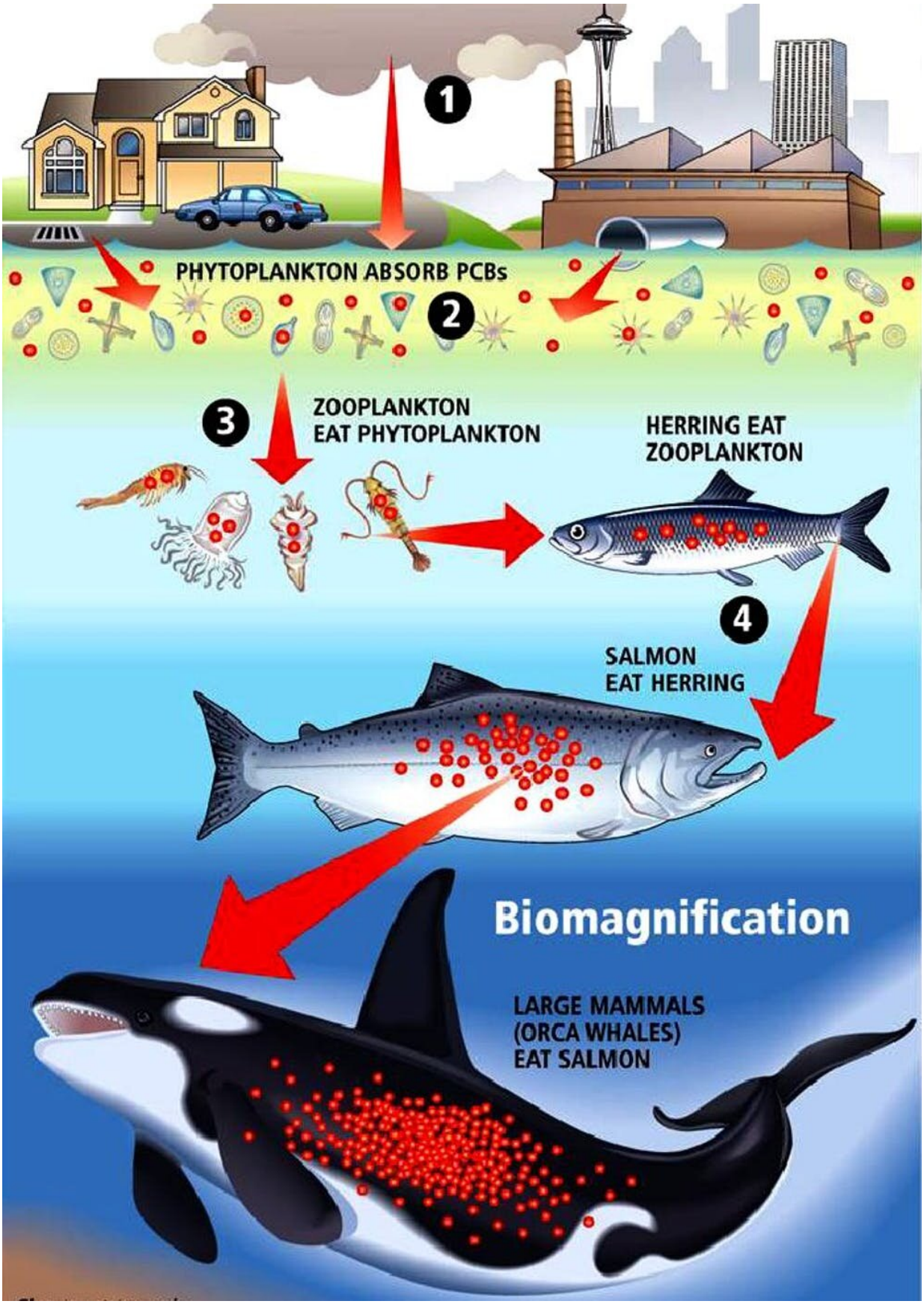
Coastal landfills risk leaking long-banned toxic chemicals into the ocean

July 16 2021, by Alex Ford and Kate Spencer


1
PHYTOPLANKTON ABSORB PCBs
2
3
ZOOPLANKTON
EAT PHYTOPLANKTON
HERRING EAT
ZOOPLANKTON
4
SALMON
EAT HERRING
Biomagnification
LARGE MAMMALS
(ORCA WHALES)
EAT SALMON

PCBs accumulate further up the food chain, meaning apex predators like killer whales can become very contaminated. Credit: blue-growth.org, CC BY-SA

Five years ago, a killer whale called Lulu washed up on the shores of Scotland. She was thought to be over 20 years old, though autopsies revealed she had never had any offspring. Tissues recovered from Lulu suggested she was one of the most PCB-contaminated animals on the planet. She came from the UK's only resident killer whales, a group of eight, none of which had ever had young and are now considered infertile from pollution.

Legacy pollutants

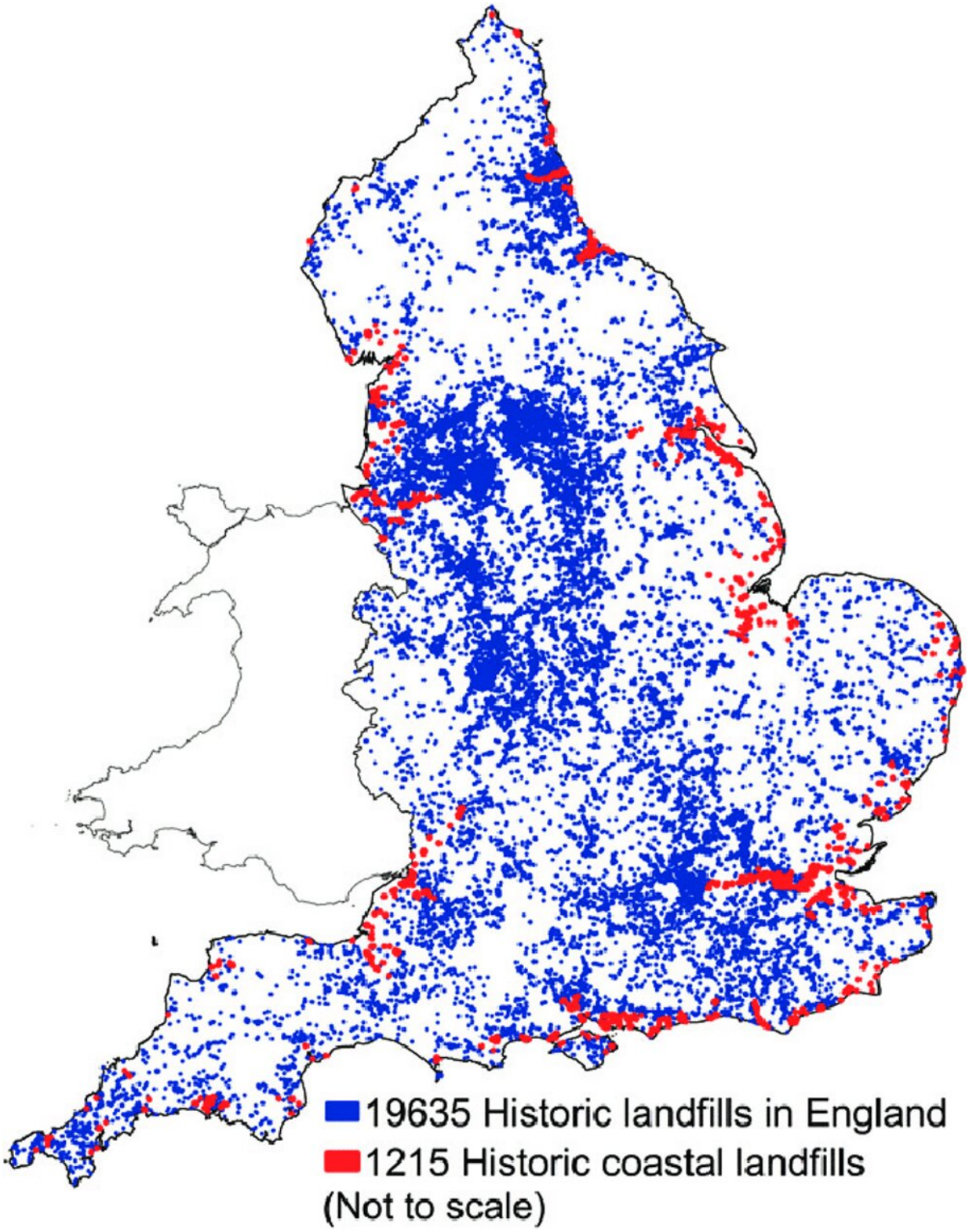
like PCBs are

chemical contaminants that take a long time to break down in the environment and often still cause harm to humans and wildlife many decades after they are banned. Many legacy pollutants have been buried in landfills out of our sight and therefore out of our minds. PCBs or polychlorinated biphenols were used in electrical components and many other materials between the 1930s and 1970s, before being phased out around the world after concerns about their toxicity and ability to accumulate through the food chain. In total, over a million tons were produced. A third of this has already been released to the environment, but up to two-thirds is still locked up in either old landfill or storage sites or materials.

While some studies have indicated that PCBs released into the environment are in decline, many marine mammals have concentrations

way above safe thresholds for their immune system and fertility. This has led some scientists to predict dramatic declines and extinction of some killer whale populations in the next 30 to 50 years. PCB levels in killer whales appear very much dependent on the geographical populations and their diets, with seal-eaters accumulating more pollutants than the fish eaters or the whales with mixed diets.

If the scientists are correct in their predictions, then some marine mammals are at a critical juncture in their survival. The last thing they or future generations need is a second wave of legacy contaminants released from landfills.



Historic landfill sites in England. 'Coastal' includes sites on estuaries and other areas subject to tides. Credit: Brand et al 2017, CC BY-SA

The second wave

Historic landfills—those built before the introduction of stringent environmental regulation—are a ticking time bomb, containing millions of tons of hazardous, industrial, commercial, domestic and in some cases low-level radioactive and military wastes. Depending on the age of the landfill, they can contain substances that are now banned, such as PCBs and asbestos, and materials that are only just starting to cause concern, such as plastics. In addition, these sites predate legal requirements to record the waste they received or to engineer for pollution control.

In Europe alone there are almost 1 million historic landfill sites and of these, around 10,000 are situated on coasts at risk of climate change, sea-level rise, flooding or erosion with the potential to release their contaminant load directly to the marine environment.

There have already been examples of catastrophic flooding and erosion of historic landfills, for example, in Texas, following Hurricane Harvey and in New Zealand, where flooding washed out the disused Fox River landfill releasing waste over hundreds of kilometers of coastline. Such extreme weather events are predicted to increase in frequency under climate change scenarios and in England alone up to 79 coastal landfills could erode by 2055 if sea defenses are not maintained and across the UK more than 1,700 are at risk of flooding.

None of the options are cheap

The presence of waste can constrain decisions on how to manage the coasts, for instance, by forcing continued maintenance of hard sea defenses or "hold the line" policies rather than more sustainable alternatives such as managed retreat or the restoration of coastlines to

benefit ecosystems and communities.

However, none of these options are cheap. Authorities looked at one UK south coast landfill and estimated it would cost £200 million to hold the line or £1 billion to relocate the waste, while the restoration of Port Sunlight, Merseyside, cost more than £3 million. Given the potential number of coastal landfills at risk in the UK alone, projections for continued sea-level rise and increased frequency and severity of coastal flooding and erosion it is evident that the UK alone is looking at an issue that will cost billions to address.

This is a long-term societal problem that will cause significant problems for future generations if we ignore it today. That's why there is a need for national strategies and funding, and the issue can't be allowed to fall foul of governmental short-termism. Internationally, there need to be coordinated efforts to accept this will be an issue not just for some countries, but all, due to the global importance of healthy oceans.

Provided by The Conversation