IF THE TIDE IS HIGH, OUR SEWERAGE SYSTEMS WON’T HOLD ON

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Sea levels are rising and the world’s vast coastal settlements face many damaging changes. One of the most difficult and expensive challenges is the risk to the safe and effective operation of our sewerage systems.

We give our sewerage system little thought, but life in modern cities would be dangerous and unhealthy without a reliable and sound sewerage system. This may be a “weak point” in our public health defences if we do not respond to the threat of climate change effects.

Infrastructure down the drain

Gravity is the best friend of the conventional urban sewerage system. When we flush our toilet or pull the plug out from the bath, gravity drains the wastewater away from us. For many people, that’s the last time we think about our wastewater.

Sewerage infrastructure (mostly small, medium and large pipes or “sewers”) is built on or under ground at lower levels than your house. This is often along streams, rivers and the coast line.

Predicted sea level rises will make the difficult job of building and maintaining the sewerage system even harder. There is speculation about the timing, extent and nature of sea level rise, but the most authoritative predictions are between 15 and 80cm by the end of the century.

Sea level rises, associated tidal events and storm surges may enter the sewerage system along coasts and estuaries. Australia’s coastal developments are getting bigger and bigger, which means increasing amounts of wastewater. This is accelerating the scale of the problem and cost of the solution.

Sydney Water has assessed exposure of its drainage and sewerage system and identified the lowest lying assets, many of them very close to sea level. Sydney’s situation holds true for many sewage treatment and water treatment plants in Australia. Relocation of such facilities may be of enormous cost.

What are the risks of climate change effects?

Rising sea levels could cause water to flow back into the sewerage system and stop wastewater flowing out. This could lead to “overflows” of untreated sewage getting into our waterways or other locations of public health risk. Saline sea-water may corrode the infrastructure - such as pipes, steel reinforcing, and electrical pumping and control equipment - not designed to deal with it.

Extreme weather events may cause dramatic damage to systems. In the US, Cyclone Sandy created enormous sewage pollution from storm
surges and coastal flooding. The system was swamped and damage was caused to sewers, pumps and treatment plants. The cost of repairs to New York’s sewage treatment plants is estimated at US$2 Billion.

Other US cities have recognised their vulnerability. Three major sewage treatment plants in Florida, due to their very low elevation, may be engulfed by rising sea levels in five decades according to a recent investigation.

In 1998 Australia got a stark reminder that untreated sewage wastes and estuarine waters can have devastating effects on human health. A period of wet weather and high holiday populations caused sewage contamination of oysters in Wallis Lakes in NSW. This caused an outbreak of 467 cases of hepatitis A through the rich oyster leases in this coastal estuary. Much of the sewage system in the area relied on on-site sewage disposal or boats that discharged untreated sewage waste.

Are there solutions?

Identifying the key sewerage infrastructure that is at risk of damage from sea level rise and tidal or storm surge events is very important.

As sections of the sewerage infrastructure approach the end of their design life they can be rebuilt at higher elevations or relocated further from exposed coastal locations, if this is possible. Corrosion from salt water intrusion may accelerate the need to replace damaged assets.

We also need urban planning to consider the difficulties of low altitude coastal developments. These have been constructed with impressive ocean views in mind, but without a thought for the sewerage engineers who have to get the wastewater away in an efficient and safe manner.

I have seen hundreds of locations where the sewerage system blocks or malfunctions and the resulting impact is unpleasant and unhealthy for people and the natural environment. On a very large scale, the situation can be disastrous.

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