Screening quantitative microbial risk assessment (QMRA): Kaikohe wastewater treatment plant – lay summary

How did this study come about?

The Kaikohe wastewater treatment plant (WWTP) services the communities of Kaikohe and Ngawha. The resource consent for discharge of wastewater expires on 30 November 2021. The Far North District Council (FNDC) preparing an application to renew the consent, which will be lodged by 30 August 2021. FNDC require a technical assessment which reports on the likely risk of the discharge to public health.

What is a quantitative microbial risk assessment (QMRA)?

Wastewater can contain 'bugs' that can make people sick if they swallow them or inhale them. The most common harmful bugs in human waste are viruses. Viruses can cause many human illnesses, such as the common cold. Viruses in wastewater usually cause stomach upsets, such as vomiting and diarrhoea. However, as the wastewater passes down a river system, you are less likely to find viruses, as the wastewater becomes more and more mixed with the river and sea water (dilution). Also, the viruses may start to die.

A quantitative microbial risk assessment (QMRA) is a computer model of a real-life situation. It estimates how many viruses will be in the river water when it reaches places where people swim or collect kai. The model also includes information on how many viruses it takes to make someone sick.

The QMRA takes a cautious approach. If we don't know the true situation we assume it is worse, not better. Because of this, most of the time, the risk of getting sick will be less than estimated by the QMRA.

What did this QMRA look at?

This QMRA looks at the risk of people getting sick from the discharge of wastewater from the Kaikohe WWTP into the Wairoro-Tāheke-Punakitere-Waima river system and the Hokianga Harbour. The waterways will also be polluted by other human activities, but the QMRA only looks at the Kaikohe discharge.

The Kaikohe WWTP and the associated wetlands will remove viruses from the wastewater. We don't know exactly how many of the viruses are removed, but it is likely to be at least 99% and may be more than 99.9%.

As this is a screening QMRA only one virus (norovirus) was looked at and only risks from water swallowed during swimming were estimated.

What was found?

National standards have been set for rivers and beaches used for swimming. The standards are based on how likely people are to get sick from bugs when they go for a swim. If the Kaikohe WWTP removed 99% of the viruses the risk of getting sick at most of the identified locations would be so low that the location would be classed as good or excellent for swimming under the national standards. If the virus removal is 99.9%, which is likely, most locations would be considered excellent for swimming. However, at the discharge point at Kaikohe under low river flow conditions water quality would only be classed as fair.