

RECREATIONAL WATER QUALITY

What is this?

Coastal beaches, rivers and lakes are widely used for a range of recreational activities such as swimming, sailing, surfing, water skiing and underwater diving. Maintaining and protecting recreational water quality is therefore an important public health and resource management issue.

Why is it important?

Good quality recreational water is an essential part of the natural ecosystem. Recreational water quality can affect the health of recreational water users if high levels of harmful organisms are present. These organisms include viruses, algal blooms, bacteria and protozoa. Exposure to these may cause a variety of illnesses. Contamination found in water are largely derived from water fowl, sewage, storm water or farm run-off. Algal blooms occur naturally in lake or rivers. Some species produce toxins which can be a threat to the health of people and animals.

Contamination of rivers and beaches may also destroy the confidence of the community in the area as a desirable destination for recreation and social occasions. Fish or shellfish may also be contaminated in areas where there are high levels of harmful organisms and should therefore not be collected for human consumption.

Data

There is little specific data to report here as most of it is collected and reported via the Environment Canterbury website (www.ecan.govt.nz). This section looks at what information is available through this site.

Environment Canterbury (ECan) monitors both marine and freshwater recreational water quality at popular recreational sites in Canterbury over the summer months. Water monitoring is based on the Ministry of Health/Ministry for the Environment Microbiological Water Quality Guidelines for Marine and Freshwater Areas.¹

The microbiological guidelines provide a safe limit of 550 E. coli/mL in freshwater and 280 enterococci/mL in marine water. Any identified risk to the public is notified on the ECan website² and a media release issued. Each site is graded according to these results and sanitary survey results.

The 2010/11 Annual plan shows an increase in the proportion of swimming sites at lakes and rivers that are graded as suitable for contact recreation. For rivers the increase is from around 45% in 2003/4 to over 50% in 2008/9, the increase for lakes is more marked from approximately half to over 80% in the same timeframe.³



¹ Ministry of Health/Ministry for the Environment. 2003. Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas. Wellington: Ministry of Health and Ministry for the Environment.

² Water Quality monitoring, Environment Canterbury <http://ecan.govt.nz/services/online-services/monitoring/swimming-water-quality/Pages/contamination-health-risks.aspx>

³ Environment Canterbury. 2010. Annual Plan 2010/11 pg 80 <http://ecan.govt.nz/publications/Pages/annual-plan-2010-11.aspx>

ECan are also responsible for the surveillance of cyanobacterial algal blooms on Canterbury lakes and rivers. Algal bloom protocols are based on the Interim Guidelines.⁴ Algae can multiply and form blooms in lakes or thick mats attached to rivers in stream beds. Some species produce natural toxins which can be a threat to people and animals. There have been numerous reports of dog deaths from eating the bloom which collects on the banks of rivers. Health messages are erected along the side of lakes and rivers when blooms are present.

The pollution of city based rivers is a global issue. There are a number of sources. Historically industry has dumped contaminants into local waterways but this not a big issue locally. Environmental Science and Research's (ESR) project⁵ on the Avon River indicates that rainfall results in significant degradation of the microbial water quality. The primary sources of the degradation appear to be related to wild fowl and possibly dog fecal material. Another form of contamination occurs after high rainfall events where sewage may overflow and contaminate city rivers.

Of the samples taken by ECan since 2003 river samples consistently exceeded the guidelines as opposed to the beach and estuary samples.⁶ Results have improved slightly at the Avon and Heathcote sites over the years when looking at compliance with the 550 MPN/100mL trigger level, but not enough to improve the grades.

Impact on inequalities

Contaminated recreational water restricts access to water based activities. Those that regularly participate in recreational water activities will be disadvantaged the most. There is not a large body of research on inequalities but a scientific report from the UK suggests that it is increasingly recognised that those who live in deprived areas, or who form part of deprived social groups, are simultaneously more in need of the recreational and well-being benefits that may come from their proximity to water resources and less likely to be able to take advantage of those benefits.⁷ Hence while naturally occurring waters are freely available to all those who have fewer financial and social resources may find it more difficult to find alternative leisure activities.

The risk of catching a disease from waterways within Christchurch is never absent, however when contamination levels are high there is a much increased chance of developing a stomach, skin or respiratory infection. There is a greater risk of developing illness for those with reduced immunity such as the elderly and the very young.

Solutions

Permanent signs are erected at recreational sites where past monitoring has indicated consistently poor or very poor water quality. Over the summer sampling period when the safe levels are exceeded at other sites, temporary signs warning people not to swim are erected.

⁴ Ministry for the Environment and Ministry of Health. 2009. New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters – Interim Guidelines. Prepared for the Ministry for the Environment and the Ministry of Health by SA Wood, DP Hamilton, WJ Paul, KA Safi and WM Williamson, Wellington: Ministry for the Environment.

⁵ Microbial Analysis of the Avon River: Past, Present, and Future. Prepared for Environmental Canterbury and Christchurch City Council by Devane, M.C., Moriarty, E.M., Williamson, W.M., Gilpin, B.J. Environmental Science and Research Ltd, April 2011.

⁶ Freshwater and Coastal recreational water quality monitoring programmes. Canterbury Region. Annual summary reports (2003-2010). Stevenson, M, Bolton-Richie, L. Environmental Canterbury.

⁷ Environmental Agency UK, Science Report Addressing Environmental Inequalities: Water Quality. 2007
<http://www.geography.lancs.ac.uk/envjustice/downloads/SR2%20Water.pdf>

The direct discharge of treated effluent into the Avon-Heathcote Estuary / Ihutai was discontinued following the completion of the ocean outfall⁸ during 2010. A new pumping station and a five kilometre pipeline stretching three kilometres into Pegasus Bay took three years to construct at a cost of \$87.2 million. The wastewater is treated and disinfected then diluted before discharging at the end of the pipeline to ensure there is a negligible impact on the environment, marine life, and water quality.

The Waimakariri District Council has also recently built an outfall for its treated sewage. This will have a significant impact upon the health of the Cam and Kaiapoi Rivers. These two outfalls ended the need to discharge treated sewage into the estuaries and therefore positively impacted on the water quality. These improvements have increased water quality in associated areas for swimmers, kayakers, windsurfers and also allowed the safe collection of shellfish.

Pre-earthquake ESR results clearly show that the major sources of contamination come from waterfowl and dogs. Therefore improvements to water quality will be achieved through incentives around better control of dog defecation and disposal and discouraging wildfowl around waterways.

Data limitations

Data is collected routinely on water ways but is not easily accessed for annual comparisons for the general public.

The ESR Project - Microbial Analysis of the Avon River: Past Present and Future³ currently are being undertaken aims to follow the impact and dispersion of an influx of human effluent pollution into a major urban waterway over time. The project also aims to quantify the public health risk and provide greater certainty when water is safe to use for recreational purposes following discharge of sewage into waterways during other sewage overflow events. The project will improve knowledge around the extent and endurance of the pollution and potentially provide evidence to advocate for more actively restricting sewage overflow events during and after heavy rainfall.

Connections with other issues

Satisfaction with Leisure Time, Activity Levels and Exercise, Open and Green Spaces, Green Prescription

Impact of the earthquakes

As time passes and these papers are updated the initial sections on the impact of the earthquake are going to be kept as an archive. Updates are provided where possible.

As at October 2011

The Christchurch earthquakes in September and subsequent events in February and June 2011 caused considerable damage to sewerage pipes and sewerage treatment systems in and around Christchurch and Kaiapoi. This resulted in untreated human sewage being discharged directly into several waterways. ECan continues to monitor a range of sites after both earthquakes to track levels of bacterial contamination. They continue to monitor these sites, plus additional sites as the sewerage system comes back on line. These results have been used to advise the public of the potential health risk associated with recreational water activity sites as well as being able to clear sites for recreational water use.

Prepared by Community and Public Health.

⁸ <http://www.ccc.govt.nz/cityleisure/projectstoimprovechristchurch/wastewater/oceanoutfall/index.aspx> Accessed 01.06.11.