Environmental Health Indicators for New Zealand

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RECREATIONAL WATER EXCEEDANCES

Recreational contact with polluted water, for example through swimming, can have health effects such as water-borne diseases. Water-borne diseases are caused by ingesting pathogens, which can originate from animal or human faeces, and can be transmitted through drinking-water or recreational water (Ball 2006). In New Zealand, guidelines have been set for water quality at recreational marine and freshwater beaches to protect human health, as part of the Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas (Ministry for the Environment and Ministry of Health 2003). The bacterial group *Enterococci* are used to index faecal pollution in recreational marine water (including coastal and estuary waters), while the bacterium *E. coli* is used to indicate the presence of faeces, and therefore an increased risk of water-borne infection in recreational freshwater (including rivers and lakes). Councils monitor coastal and freshwater beaches during the swimming season, usually from November to March (Ministry for the Environment 2007).

Contamination of recreational freshwater and marine water is mainly caused by discharged human sewage and animal and livestock effluent from agricultural and urban areas. Faecal contamination of waterways is generally correlated with rainfall events, which cause much higher levels of run-off. In general, coastal beaches are less likely than freshwater beaches to have higher background levels of bacteria and longer-lasting contamination events, as faecal pollution is more rapidly diluted and dispersed by currents and large volumes of water at the coast (Ministry for the Environment 2007).

Studies have shown that human exposure to recreational marine water contaminated with *Enterococci* can have health effects, including eye, ear, nose and throat symptoms and respiratory and gastrointestinal illnesses (Corbett et al 1993; Harrington et al 1993; McBride et al 1998; WHO 2003a). Epidemiological studies have found that adverse health outcomes in swimmers and surfers were associated with high concentrations of *Enterococci* at marine beaches in New Zealand (McBride et al 1998) and in Australia (Corbett et al 1993; Harrington et al 1993). Exposure to contaminated freshwater (indicated by high levels of *E. coli*) can have adverse health effects, including gastrointestinal and respiratory diseases (Ministry for the Environment and Ministry of Health 2003).

EXCEEDANCES AT RECREATIONAL BEACHES

Figure 1 and Figure 2 show monitored recreational marine and freshwater beaches in the North Island and South Island. These indicate the suitability of beaches for swimming in the 2008–2009 bathing season according to their exceedance rates for *Enterococci* (marine beaches) or *E. coli* (freshwater beaches), using the categories listed above. As noted previously, the proportion of freshwater beaches compliant with guidelines was lower than the proportion of complying marine beaches.

Figure 1: Exceedance rates from samples taken at monitored recreational beaches, North Island, 2010–2011