

Guidelines, or when set in a legal framework 'National Standards', usually consist of a list of contaminants and the maximum concentration allowable in certain land use or groundwater conditions.

The development of Guidelines or Standards is a complex and often non-transparent process. In view of current developments the first thing for New Zealanders to consider is what these guidelines or standards are aiming to protect. The Ministry for the Environment is developing over 2008 and 2009 a set of guidelines to protect human health. Humans are rather resilient creatures with complex metabolism and often feature a large buffering capacity and thus can stand rather high concentrations of chemicals, or so we believe. This may be more perception than fact, however very few contaminants are directly linked to a specific disease¹.

The environment, New Zealand's no. 1 international selling attribute, is much more sensitive to chemicals and other man-made disturbances. While people, especially city people, can stand living on soil containing huge concentrations of contaminants, soil ecosystems will perish even at only moderate concentrations. Thus by protecting the environment, humans are automatically protected against most contaminants or combinations of contaminants. However there are many cases where an only slightly contaminated environment (well below the Human Health based proposed National Standards) can be toxic to humans.

Example: bioaccumulation

Our environment can become a dangerous place, even for humans, when guidelines or standards are only set to protect human health. One aspect is bio-accumulation and a typical example is watercress. Many people collect watercress, a delicacy growing in small creeks and rivers. The Maori use Toroi to cover the stones in a hangi. Folk legend tells us watercress only grows in unpolluted streams. This relates to levels of nitrate, an indicator of farm (manure) run-off, which is not well tolerated by watercress (Toroi). However watercress, like many aquatic plants are hyper-accumulators of heavy metals. Arsenic, for example can accumulate up to 1000 mg/kg of arsenic in its leaves by concentrating the arsenic present in the creek sediments / soil close to the creek². Well over 50,000 sheep-dips have been operational in New Zealand³. Often these were constructed along a creek to have easy access to water to dilute the chemicals used for sheep dipping (arsenic was used from 1840 – 1980). During and after dipping thousands of sheep, the sludges built up in the dip were disposed of into the creek, severely contaminating sediments. Anecdotal evidence exists of dead eels and crayfish (kura kura), or large numbers of eels sliding through paddocks away from the creek.

Guideline and Standards are often controversial.

A study into the derivation of guidelines and standards used in many countries has shown huge variations up to 7 orders of magnitude, with an average variation of 2 – 3 orders of magnitude (i.e. one country has set 1 mg/kg as a safe level and another 1000 mg/kg). Further information is available in a paper presented at a conference in Blenheim (Nov. 2008)⁴.

¹ However when the correlation seems to exist (Dioxins in New Plymouth), often more money is spent on disproving the relationship than on finding ways to remediate the problem.

² <http://www.ito.ethz.ch/people/robinson/Arsenic.html> (Dr Brett Robinson works at Lincoln University from Jan. 2008).

³ <http://www.mfe.govt.nz/publications/hazardous/risks-former-sheep-dip-sites-nov06/risks-former-sheep-dip-sites-nov06.pdf>

⁴ National Standards for soil and groundwater: Why do they differ so much between countries? Can be found in the near future on www.wasteminz.org.nz in the section past conferences.