

DESIRED OUTCOMES

The natural and built environment in which people live is clean, healthy, and beautiful. All people are able to access natural areas and public spaces.

Physical Environment

INTRODUCTION

The physical environment includes land, air, water, plants and animals, buildings and other infrastructure, and all of the natural resources that provide our basic needs and opportunities for social and economic development.

A clean, healthy environment is important for people's physical and emotional wellbeing. At a fundamental level, factors such as clean air and good quality drinking water are vital for people's physical health. Other environmental factors such as noise pollution can cause both physical harm and psychological stress.

The cleanliness and beauty of the environment is also important for people's sense of wellbeing. For many people, access to an attractive physical environment contributes greatly to their contentedness with life. A healthy environment also provides recreational opportunities, allowing people to take part in activities they value. For New Zealanders, the 'clean, green' environment is also an integral part of national identity, and guardianship of the land and other aspects of the physical environment is seen as an important part of social wellbeing.⁵³ This image is also vital for the health of New Zealand's economy, as it is a key factor both in attracting tourists and underpinning the nation's success as an exporter of primary products.

Harm to the environment can reduce quality of life not only for people living today but also for many years in the future. The concept of 'sustainability' is an important aspect of social wellbeing. It acknowledges that social and economic developments need to take place in ways that don't harm present and future wellbeing by damaging the natural environment, and don't harm future wellbeing by using natural resources in unsustainable ways.

INDICATORS

Two indicators are used in this chapter. Both measure important aspects of the environment that have a direct impact on individual wellbeing. The indicators are: air quality and drinking water quality.

These indicators provide an insight into both current and future wellbeing. They relate to the health, cleanliness and beauty of the environment. No direct measure of people's access to natural areas and public spaces is included due to a lack of adequate data.

Clean air and good quality drinking water are both necessities of life. Pollution in either air or water can have significant detrimental effects on people's health, as well as being detrimental to the beauty of the environment.

The first indicator measures the level of suspended particles less than 10 microns in diameter in the air at certain sites. Particles of this sort are a key pollutant emitted by motor vehicles, wood fires, and industrial emissions. Prolonged exposure at moderate levels can lead to increased mortality,⁵⁴ aggravation of existing respiratory and cardiovascular diseases, hospital admissions and emergency department visits, school absences, lost work days and restricted activity days.

The second indicator measures the percentage of the population receiving drinking water that complies with the 1995 drinking water standards. Poor quality drinking water can create health risks from water-borne disease and contaminants. It is also likely to correlate with poor quality in other basic infrastructure such as sewerage and electricity supply.

Air quality

DEFINITION

PM10 is particle matter that is less than 10 microns in diameter. The government's recommended guideline or maximum threshold for PM10 is 20 micrograms per cubic meter (20µg/m³) averaged annually.

RELEVANCE

Good air quality is an important component in maintaining our quality of life, the appeal of New Zealand as a tourist destination, and the health of people, plants and animals. PM10 is one of the main contaminants of concern in New Zealand as it affects so many people and has many health effects. Health effects associated with this contaminant include increased mortality,⁵⁵ aggravation of existing respiratory and cardiovascular diseases, hospital admissions and emergency department visits, school absences, lost work days and restricted activity days.

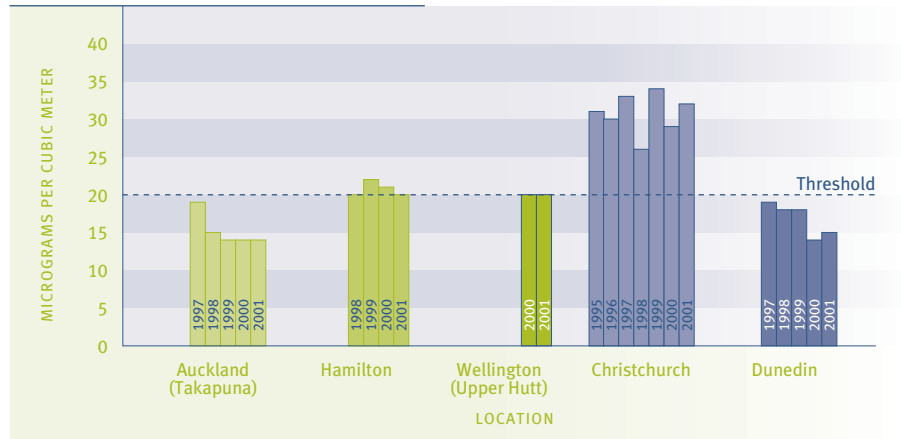
CURRENT LEVEL AND TRENDS

Average annual PM10 levels in the air were above the recommended threshold in Christchurch for all years between 1995 and 2001. Hamilton also exceeded the recommended threshold in 1999 and 2000, but by a smaller amount. Christchurch had particularly poor results, with PM10 levels half again the level of the recommended threshold in all monitored years except for 1998.

The other major centres were closer to the guideline, with Wellington recording PM10 levels just on the threshold. Dunedin and Auckland consistently recorded levels of air particles below the recommended threshold. Part of the difference between Dunedin and Auckland on one hand, and the other cities, may be related to the way in which PM10 levels were measured in different cities.

Poor air quality in New Zealand is often associated with urban areas where vehicle and domestic emissions of PM10 are a major contributor to air pollution. Industrial and agriculture emissions are also sources of PM10, as are dust pollens and sea spray which are natural sources of particles.

Figure EN1.1 **PM10 concentration in selected sites**



Source: Ministry for the Environment

Note: Data for Wellington is unavailable before 2000, for Dunedin before 1997, and for Hamilton before 1998

INTERNATIONAL COMPARISON

As a broad generalisation, the air quality in New Zealand's urban areas is comparable with or better than a number of OECD countries. It is not possible to compare PM10 levels between New Zealand and other countries at the moment, but New Zealand emits below the average OECD level for carbon monoxide on a per capita basis.⁵⁶ Ambient air quality is generally good due to New Zealand's remote location, maritime climate and relatively low level of industrialisation.

Drinking water quality

DEFINITION

The percentage of the surveyed population who receive drinking water that complies with the Drinking Water Standards of New Zealand 1995 relating to E. Coli and Cryptosporidium. About 85 percent of the New Zealand population drink water from community supplies.

RELEVANCE

Maintaining good drinking water quality is critical for human health and quality of life outcomes. The health risk to consumers from water-borne disease in drinking water supplies comes from two main types of microbiological organisms: bacteria (such as faecal coliforms, and E. Coli), and parasites (such as Giardia, and Cryptosporidium). Improvements in this indicator ensure that less of the population is at risk of water-borne disease and other contaminants.

Water is of particular significance to Māori, who believe that all elements of the environment, including water, possess a life force or 'mauri'. Good quality drinking water is an essential component of New Zealanders' physical, social and cultural wellbeing.

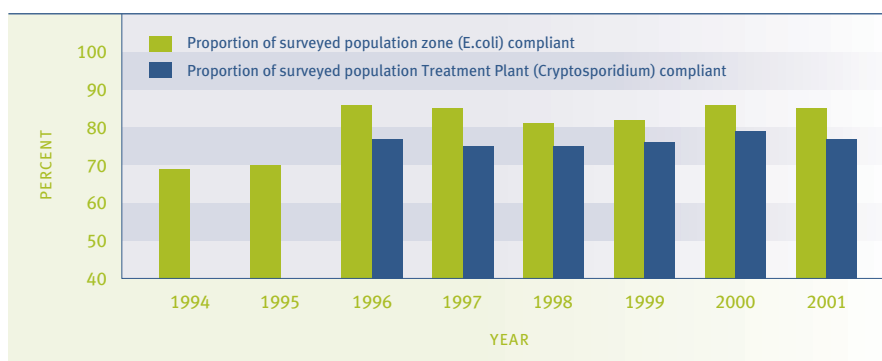
CURRENT LEVEL AND TRENDS

The majority of New Zealanders are supplied with community drinking water that is free of micro-organisms. The proportion of New Zealanders whose drinking water, measured at the tap, complies with the 1995 drinking water standards regarding E. Coli increased from 69 percent in 1994 to 85 percent in 2001. Overall the level of E. Coli compliance has fluctuated over the second half of the 1990s from a low of 81 percent in 1998 to a high of 86 percent in 1996 and 2000. Most water supplies serving large population areas are fully compliant with the 1995 standards. The main reason for non-compliance is inadequate monitoring rather than the actual contamination of drinking water.

Compliance with the 1995 drinking water standards for Cryptosporidium is measured at the water treatment plant rather than at the tap. Data is not available for Cryptosporidium compliance before 1996. Since 1996, the compliance rate has been fairly flat with a value of 77 percent in 1996 and 2001. Between the two years there was some measured fluctuation in levels of compliance with a low of 75 percent in 1997 and 1998, and a high of 79 percent in 2000.

While the proportion of consumers with fully compliant drinking water supplies has remained fairly flat since 1996, this reflects the replacement of the 1984 standards with the more stringent standards adopted in 1996 rather than any decline in water treatment over this time.

Figure EN2.1 **Proportion of the surveyed population served with water that meets drinking water standards, 1994-2001**



Source: Ministry of Health 2002c

REGIONAL DIFFERENCES

Groundwater sources supply drinking water for about 40 percent of the New Zealand population, while about 60 percent are supplied from surface (catchment) water. Most water in catchment headwaters is of good quality, but problems with the quality of some groundwater sources have been identified.

There is considerable regional variation in the population served with drinking water that is fully compliant. In 2001 only 11 percent of the population in Southland, were served with drinking water that fully complied with the 1995 drinking water standards. Otago, the Wairarapa, and Whakatane also had low compliance rates, varying between 54 percent and 58 percent of the population covered. Compliance in Auckland and Wellington, however, was close to 100 percent. The vast majority of non-compliance is due to inadequate monitoring, rather than actual contamination.

Where drinking water quality is affected, the agricultural sector is seen as the most important source of water quality problems.⁵⁷

INTERNATIONAL COMPARISON

Overall, the quality of New Zealand water is high by international standards. New Zealand's water supplies are free of many of the diseases that result in sickness and death in other countries. However, the incidence of infection from Giardia in water supplies is 85 per 100,000 people, which is considered high compared to the reported rates for other western countries.⁵⁸