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 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 their national identity, and guardianship of the land and other aspects of the physical environment is seen as an important part of social wellbeing.[76] This image is also vital for the health of New Zealand's economy, as it is a key factor in both attracting tourists and underpinning the nation's success as an exporter of primary products.

Harm to the environment can reduce the 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 do not harm present and future wellbeing by damaging the natural environment, and do not 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. No direct measure of people's access to natural areas and public spaces is included due to a lack of adequate data.

The two indicators provide an insight into both current and future wellbeing. They relate to the health, cleanliness and beauty of the environment. 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 levels of fine particles in the air at certain sites. Fine particles are known to have an adverse effect on people's health. Prolonged exposure to elevated levels has been linked with the aggravation of existing respiratory and cardiovascular diseases and premature death.

The second indicator measures the percentage of the population receiving drinking water that complies with the 2000 drinking water standards. Poor-quality drinking water can create health risks from water-borne disease and contaminants. It is also likely to be associated with poor-quality sewerage infrastructure and electricity supply.

Air quality

DEFINITION

The average annual PM_{10} levels in selected sites above the ambient PM_{10} guidelines. PM_{10} is particulate matter that is less than 10 microns in diameter. The New Zealand ambient air quality guideline for PM_{10} is 20 micrograms per cubic metre (20µg/m^3) averaged annually.

RELEVANCE

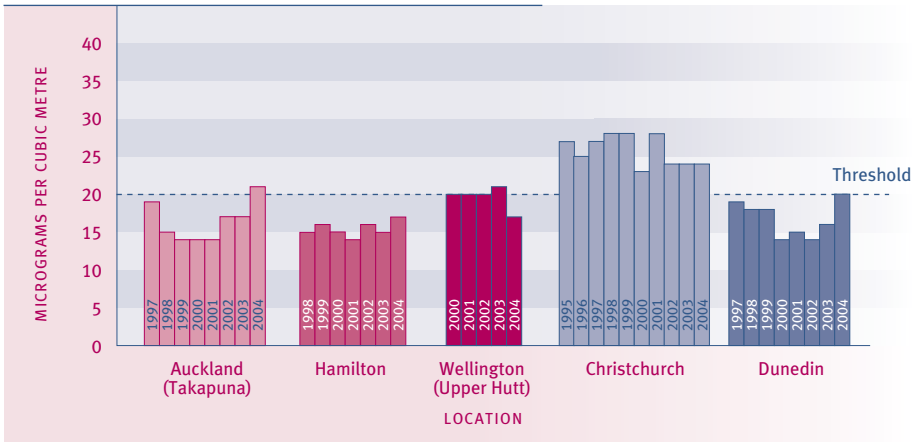
Good air quality is an important component in maintaining our quality of life, the appeal of New Zealand as a tourist destination, and the health of people, plants and animals. PM_{10} is the primary contaminant of concern in New Zealand and it is known to affect many people with adverse health effects. Health effects associated with this contaminant include increased premature mortality, the 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

Figure EN1.1 shows the average annual PM_{10} levels in the air at selected monitoring sites in the six major cities. At the one Christchurch site used in Figure EN1.1, average annual PM_{10} levels were above the ambient guideline for all years between 1995 and 2004. Since 2002 there have been signs of an improvement, with the levels stabilising, though still at a level above the guidelines. The Auckland site exceeded the guideline in 2004 and appears to be on the rise. The Wellington site exceeded the guideline in 2003, but was below the threshold in 2004. The Dunedin site reached the threshold level in 2004. Recorded PM_{10} levels at the Hamilton site have been consistently below the New Zealand annual guideline.

Poor air quality in New Zealand is typically associated with urban areas and is a product of vehicle emissions (Auckland) and domestic home heating (nationally). Industrial and agricultural emissions are also lesser sources of PM_{10}, as are dust pollens and sea spray, which are natural sources of small particles. Annual data presented here should not be confused with daily average PM_{10} concentrations, which are known to exceed health-based guidelines in 28 urban centres in New Zealand. In September 2005, new air quality standards will be introduced that are based on daily average PM_{10} concentrations.

Figure EN1.1 **PM_{10} concentration in selected sites, 1995–2004**



Source: Ministry for the Environment (2005) unpublished analysis
Note: Data is unavailable for: Wellington before 2000, Hamilton before 1998 and Dunedin and Auckland before 1997

INTERNATIONAL COMPARISON

Ambient air quality is entirely location-specific and it is not possible to compare countries. For example, it is possible to compare annual PM_{10} in Auckland with annual PM_{10} in Los Angeles, but an OECD median cannot be calculated. The air quality in New Zealand's urban areas is, however, broadly comparable with or better than a number of OECD countries.

Drinking water quality

DEFINITION

The percentage of the surveyed population who receive their water from community water supplies, whose drinking water complies with the *2000 Drinking Water Standards of New Zealand* relating to E. coli and Cryptosporidium. About 87 percent of the New Zealand population drink water from community supplies.[77]

RELEVANCE

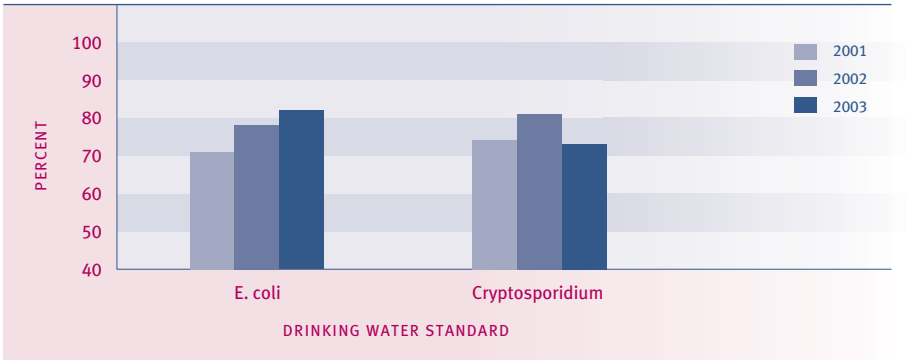
Maintaining good drinking water quality is critical for human health and quality of life outcomes. The health risk to consumers from water-borne disease in drinking water supplies comes from two main types of microorganisms: bacteria (such as faecal coliforms and E. coli) and parasites (such as Giardia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

CURRENT LEVEL AND TRENDS

The majority of New Zealanders are supplied with community drinking water that complies with the microbiological standards. However, many smaller communities are supplied with microbiologically non-compliant drinking water. The surveyed proportion whose drinking water, measured at the tap, complies with the 2000 drinking water standards regarding E. coli has increased over the past three years, from 71 percent in 2001, to 78 percent in 2002, to 82 percent in 2003. Most water supplies serving large population areas are fully compliant with the 2000 standards. A significant reason for non-compliance is inadequate monitoring rather than the actual contamination of drinking water.

Compliance with the 2000 drinking water standards for Cryptosporidium is measured at the water treatment plant rather than at the tap. Cryptosporidium compliance has fluctuated over this period, from 74 percent in 2001, to 81 percent in 2002, to 73 percent in 2003. The decrease in compliance from 2002 to 2003 is largely due to non-compliance at the Waitakere plant which has since been resolved.

Figure EN2.1 **Proportion of the surveyed population served with water that meets the 2000 drinking water standards, 2001–2003**



Source: Ministry of Health (2005b)
Note: Previous editions of the social report used the, now out-dated, 1995 Drinking Water Standards of New Zealand, rather than the 2000 Drinking Water Standards of New Zealand

REGIONAL DIFFERENCES

Groundwater sources supply drinking water for approximately 40 percent of the New Zealand population, while about 60 percent of people are supplied from source (catchment) water. Most water in catchment headwaters is of good quality. Lower down the catchment where farming and intensive land use occurs (for example horticulture), water quality deteriorates. Problems with the quality of some groundwater sources have also been identified.

There is considerable regional variation in the population served with drinking water that is fully compliant. In 2003, only 1 percent of the population in Marlborough was served with drinking water that fully complied with the 2000 drinking water standards. Otago and the Wairarapa also had low compliance rates, with 25 percent and 27 percent of the population covered. Compliance was highest in the Manawatu (94 percent), followed by Auckland (85 percent), South Canterbury (81 percent) and Tauranga (80 percent). A major reason for non-compliance is 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.[78]

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.[79]