

Australia

State of the Environment

2011

In Brief

This is a summary of *Australia state of the environment 2011*,
which is an independent report presented to
the Australian Government Minister for Sustainability,
Environment, Water, Population and Communities

by the
State of the Environment 2011 Committee



Australian Government

**Department of Sustainability, Environment,
Water, Population and Communities**

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This report may contain images, names of or references to deceased Aboriginal people.

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Foreword

The Australian environment is precious. Our ecosystems, biodiversity and heritage are vulnerable to the choices we make. At the same time, we depend on them for our survival and wellbeing. Our ecosystems, and the biodiversity they support, provide services that are fundamental to human life, such as regulation of the atmosphere, maintenance of soil fertility, food production, filtration of water and pest control. The major future drivers of change—climate change, population growth, economic development and associated consumption of natural resources, as well as the pressures that these drivers place on the environment—will need to be managed carefully if our society is to achieve a sustainable relationship with the Australian environment.

This document is a summary of a national assessment of Australia’s environment, *Australia state of the environment 2011*.

The *Australia state of the environment 2011* report was prepared by an independent committee using a range of best available information to support assessments of environmental condition, pressures, management effectiveness, resilience, risks and outlooks. The report is targeted at both decision-makers and the public, and was written to:

- provide relevant, credible and useful information on environmental issues to decision-makers and the public
- increase awareness of environmental issues among decision-makers and the public
- support evidence-based environmental management decisions that lead to more sustainable use and effective conservation of our environmental resources
- identify ways in which the environmental evidence base could be strengthened.

In the report, the Australian environment is divided into nine themes representing biogeographic or conceptual aspects of the Australian environment. Each theme—atmosphere, inland water, land, marine environment, Antarctic environment, biodiversity, heritage, built environment and coasts—is assessed at a national scale following a similar approach. The main drivers of change in the Australian environment are also described and the report concludes with a discussion of opportunities and challenges associated with future reporting.

The report was presented to the Minister for Sustainability, Environment, Water, Population and Communities in December of 2011 and subsequently tabled in the Australian Parliament.

The full text of the *Australia state of the environment 2011* report is available online, along with a range of additional material, at www.environment.gov.au/soe.



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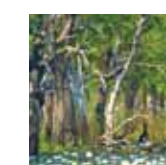
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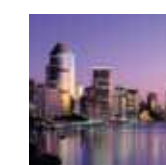
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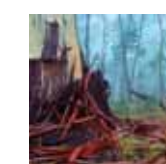
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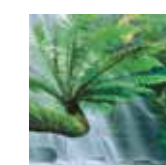
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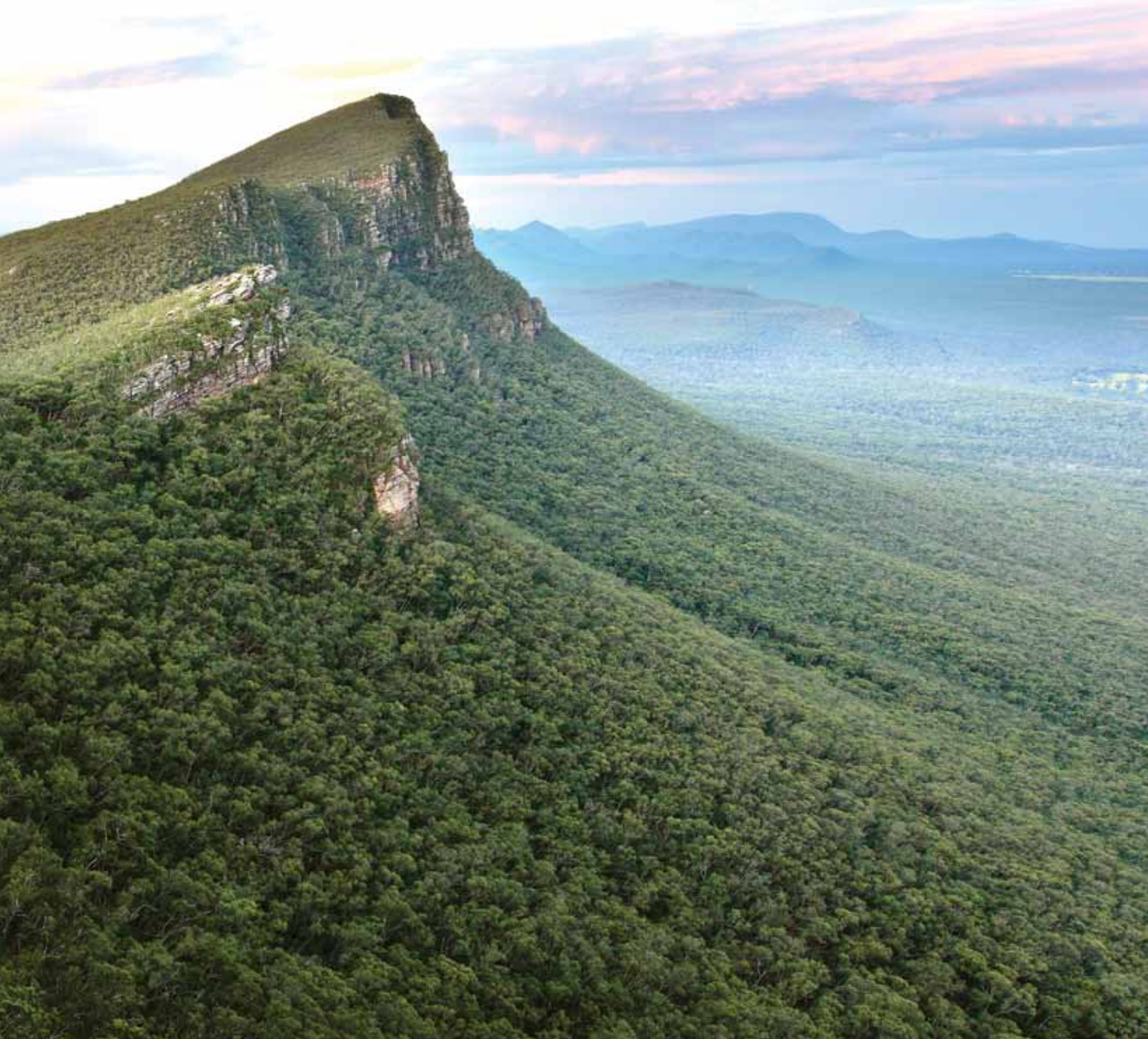


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The Australian environment in 2011



■ Sentinel Peak, Grampians, Victoria
Photo by Michael Boniwell



Much of Australia's environment and heritage is in good shape, or improving. Other parts are in poor condition or deteriorating. Some of the pressures on our environment arise from past decisions and practices that have left an ongoing legacy of impact. Our changing climate, and growing population and economy, are now confronting us with new challenges.

The consequences of our past environmental and heritage management are reflected in a number of environmental issues that continue to cause concern. Introductions of feral animals and weeds, widespread land clearing, drainage of wetlands, intensive harvest of fish stocks and a host of other past actions will continue to exert pressures on our environment, regardless of environmental policies and management that now prohibit or minimise such actions, and regardless of our management of the drivers of climate change, and growing population and economy. For example, even if we did not add one more person or business to the nation, the ongoing impacts of feral goats, rabbits, cane toads, land clearing and vegetation dieback would continue to be significant.

In general, environmental and heritage management in Australia reflects a sound understanding of this historical context, and translates to environmental and heritage planning with clear intent. Future environmental impacts will not necessarily be based on historical relationships between growth and resource use, biodiversity loss or environmental degradation. There is evidence that we have the means to disconnect, at least to some degree, the relationship between growth and environmental impact that has been seen in the past. While our population and economy have continued to expand, we are no longer subjecting the continent to wholesale land clearing or unmitigated industrial pollution, and sea-floor trawling is now limited. We no longer develop water resources without any reference to the needs of the environment. We attempt to recognise and protect Indigenous heritage. And while we have had only limited success in controlling introduced weeds and pests, we now take biosecurity very seriously so that we might not have as many new pests to deal with.

However, the resources required to reverse or reduce historical impacts are, in many cases, beyond the means of even a wealthy nation like Australia. Conservation investments and interventions tend to focus on our environmental and heritage assets that are of greatest value and under greatest threat. With this focus, significant restoration of the environment towards its pre-settlement condition will continue to be elusive.

If we consider the major environmental challenges we now face, the most confronting is the prospect of a changing climate. In part, this is because climate is such a direct and pervasive driver of environmental response, in part because global warming is something beyond our near-term or local control, and in part because of the uncertainties of scientific prediction and global policy. Climate change is now widely understood as a prime risk to both our environment and our society, and is clearly a major item on our national agenda. The Climate Commission's 2011 report, *Climate science, risks and responses*, makes the reality, certainty and implications of our changing climate clear and immediate.

The growth in global greenhouse gas emissions since 2005 is tracking above the middle of the Intergovernmental Panel on Climate Change's (2000) scenario range. The inertia in the atmospheric-oceanic system will drive climate change for centuries to come, even if global mitigation efforts dramatically reduce emissions. Together, these factors mean that we are facing climate consequences for the foreseeable future. Key sectors of the Australian environment are vulnerable to relatively small increases in temperature or drying, or to projected increases in sea level. There is evidence that early



action by Australia to reduce emissions and to deploy targeted adaptation strategies will be less costly than delayed action. To the extensive analyses and national dialogue on this issue, we will only add that we can expect to be surprised by both the vulnerability and resilience of different parts of our environment and heritage.

The other major drivers that put our environment and heritage at risk are the impacts of population and economic growth. These drivers are more directly under our influence than climate change. More people and more economic activity may mean more resource use, but the actual impact on the environment depends on where and how the growth occurs, and how we live our lives. Australia is making progress in lowering per-person water use and landfill waste. There is strong evidence that while our economy has grown, we are generating more wealth per unit of water or energy used. But if we are to succeed in meeting even the least ambitious greenhouse gas emission reduction targets, we need to achieve far more substantial reductions in the energy intensity of our economy.

Australians will continue to do what we can to redress the legacy of our mixed history of environmental and heritage management, while ensuring we mitigate or wisely adapt to the ongoing drivers of climate change, population growth and economic growth. To support this, we will need to choose our environmental (and sustainability) indicators with equal wisdom. These indicators need to measure the effects and effectiveness of our current and future approaches to environmental sustainability to allow us to improve our strategies.

Assessing the state of Australia's environment is inherently difficult. It is a big country, with a wide variety of ecosystems and heritage. There are many unconnected means by which we gather and store information on our environment, and accessing this information at a national scale is tremendously complicated and not always possible. We look forward to continuing improvement of environmental information systems across jurisdictions, industries and communities. There is also great value in the information we have already collected if we can access it more efficiently and effectively.

Although more and better information is essential, it is not all we need to meet our challenges. It is clear that the complexity of environmental management in a changing world demands a more integrated approach to planning, and management that focuses on achieving and maintaining environmental and heritage values.

The inadequacies of environmental data in Australia are, in part, a symptom of a lack of national coordination. Australia is a federation with nine major jurisdictions and hundreds of local authorities, plus thousands of individual government departments and nongovernment organisations. The responsibility for environmental governance is shared among the three levels of government, and with the community and private sector. Furthermore, jurisdictional divisions establish precise spatial boundaries of control, each with their own focus and purposes. Developing and implementing integrated approaches to address common objectives can therefore be challenging because the Australian environment crosses jurisdictional boundaries and its management needs rarely reflect our organisational and administrative structures.

Because of this complexity, the Australian Government has an important role to play in environmental management. This role is leadership—partly through the government's own actions and partly through national coordination. This leadership extends to priority setting, funding and handling of policy on national issues; information gathering and sharing; and coordination of programs, guidelines and standards. National programs such as the Murray-Darling Basin Plan, Caring for our Country or the National Reserve System are also important in providing overarching systems for particular aspects of our environment. The prognosis for the environment at a national level is highly dependent on how seriously the Australian Government takes its leadership role.

We can harness our increasing power to influence environmental processes to achieve positive outcomes. The key to achieving this will be national policy and management decisions that improve Australian environmental outcomes, cooperation and coordination of all governments and stakeholders, and the support of the Australian people to drive environmental change for the better.

Headlines

Our environment is a national issue requiring national leadership and action at all levels.

Effective environmental management requires adequate information.

Australians cannot afford to see themselves as separate from the environment.

Earth is warming, and it is likely that we are already seeing the effects of climate change in Australia. As the driest inhabitable continent, Australia is particularly vulnerable to climate change.

Early action by Australia to reduce emissions and to deploy targeted adaptation strategies will be less costly than delayed action.

Ambient air quality and air pollution management in Australia's urban centres is generally good, but the impact of urban air quality on health is still a matter of serious concern.

Pressures of past human activities and recent droughts are affecting our inland water systems.

Meeting our water needs will be a critical challenge.

Australia's land environment is threatened by widespread pressures.

Threats to our soil, including acidification, erosion and the loss of soil carbon, will increasingly affect Australia's agriculture unless carefully managed.



Snow gums, Mt Buffalo, Victoria
Photo by Mark Gray

The overall condition of the Australian marine environment is good, but integrated management will be key to the future conservation of our ocean resources.

The ocean climate is changing and we will need to adapt.

The Antarctic environment is showing clear signs of climate change, which is likely to have profound effects on Antarctic species and ecosystems.

Our unique biodiversity is in decline, and new approaches will be needed to prevent accelerating decline in many species.

Our extraordinary and diverse natural and cultural heritage is currently in good condition, but is threatened by natural and human processes, and a lack of public sector resourcing.

Australia's built environment faces many pressures and consumes significant natural resources, though consumption may be slowing.

Coastal regions bring together many of the issues affecting other parts of the environment, and coordinated management will be needed to mitigate pressures.

Drivers of Australia's environment

Main messages



■ Observatory Hill, Sydney, New South Wales
Photo by Mark Gray

The principal drivers of Australia's environment—and its future condition—are climate variability and change, population growth and economic growth.

Our challenge is to mitigate the degree and potential impacts of climate change, and to decouple national growth from increased pressures on our environment. There is ample historical evidence of a strong correlation between population and economic growth, and increased resource use and waste production. However, we are not necessarily bound by this history. The opportunities to decouple this relationship through innovation and improved efficiency are many and varied.

Climate variability and climate change have a direct impact on the condition of Australia's environment.

As the driest inhabitable continent, Australia is particularly vulnerable to the potential effects of climate change. We face a significant challenge in understanding the environmental implications of climate change, and how we might mitigate those impacts or adapt to them.

Australia's exposure to climate change depends on global greenhouse gas emissions.

In 2000, the Intergovernmental Panel on Climate Change developed emissions scenarios to guide global climate projections. Since 2005, global emissions of greenhouse gases have continued to track above the middle of the scenario range. Based on our current understanding of atmospheric processes, the implication is that current policies will not achieve the significant reductions needed to mitigate profound climate change.

It is likely that we are already seeing the effects of climate change in Australia.

Australian average surface temperatures rose by nearly 1 °C between 1910 and 2009. Warming was modest in the early part of this period, declined slightly between 1935 and 1950, and then rapidly

increased. The decade 2000–09 was the nation's warmest on record. Some regions have had temperatures increase by 2 °C since 1960. The frequency of hot nights has increased and the frequency of cold nights has declined. Rainfall trends are more difficult to distinguish, given the large natural variability across regions and over time. During the past few decades, cool season (April to November) rainfall has largely decreased in the south-west and south-east when compared with natural variability, and winter season rainfall in the south-west of Western Australia has declined by about 15% since the mid-1970s. Climate models project that, by 2030, average annual temperatures across Australia are likely to warm by 1 °C (above 1990 temperatures), with warming of 0.7–0.9 °C in coastal areas and 1–1.2 °C inland. Drying is likely in southern areas of Australia, especially in winter, and in southern and eastern areas in spring. Changes in summer tropical rainfall in northern Australia remain highly uncertain.

Under the base scenario, Australia's population of 22.2 million people in 2010 is projected to grow to 35.9 million by 2050.

This figure may reach only 30.2 million if there is less net migration and continuing low fertility rates. The projected development of infrastructure (e.g. housing, transport, water supply, energy, communications) strongly correlates with anticipated population growth, reflecting the longstanding pattern of association between these variables. In the absence of effective policies to reduce the impacts of population growth, this will remain a good indicator of future pressures.

The Australian economy is projected to grow by 2.7% per year until 2050.

Higher labour productivity gains could increase this to 3% per year. As Australia's economy expands, it is likely that our resource consumption and waste production will also increase. However, improved efficiencies in resource use have weakened the link between economic growth and energy use over recent decades.



Drivers

Trends and impacts

The condition, trend and outlook for the Australian environment are subject to some major drivers of change. Understanding and quantifying these drivers is fundamental to understanding the past, present and future state of our environment.

Climate change is a direct driver of change. *Population growth* (with associated growth in the built environment) and *economic growth* (with associated increases in resource consumption and waste generation) are indirect drivers. As a direct driver, climate change has direct and ongoing effects on the environment—higher temperatures and changing rainfall regimes in some areas can be expected to have profound and pervasive effects on a host of natural processes that underpin the condition and trend of ecosystems. The effects of indirect drivers are mediated by other processes, including the policies, culture and technology that we bring to bear on our use of our environment. For example, population growth is likely to continue to drive the need for expanded suburban development. The size of this impact will depend on the sensitivity of planning towards local environmental assets and values, and the effectiveness of policies to improve the energy efficiency of housing and transport.

Historically, a higher population has generally translated into an amplified demand for resources, a larger physical ‘footprint’ for our settlements, and more waste and emissions going back into the environment. At the global scale, the Millennium Ecosystem report states that, over the past 50 years, humanity has changed ecosystems more rapidly and extensively than in any comparable time in human history, largely to meet increased demands for resources.

In the future, population and economic growth will probably still increase demand for energy and other resources, as well as increase waste generation. Alternatively, economic growth may be largely decoupled from increased consumption of resources

and increased production of waste. Improvements in the efficiency of resource use have weakened the link between economic growth and energy use over recent decades. For example, tens of millions of tonnes of solid waste were successfully diverted from landfill to productive uses between 1996 and 2009, as a result of government policy (strongly influenced by a growing community desire to recycle) and improved technology. This saved large quantities of valuable materials, and significant amounts of embodied energy and water.

Changes in our economy will also change our environmental impact. Over the past century, the structure of the Australian economy changed markedly: the significance of agriculture reduced, manufacturing declined from peak levels reached in the 1950s and 1960s, and there has been a steady rise of the already dominant service sector since 1950. Since different industries exert different pressures on the environment, future structural changes in the economy can be expected to have an impact—either positive or negative—on the environment.

Understanding the trends and environmental implications of environmental drivers is fundamental to establishing what a sustainable Australia might be like. However, establishing clear relationships between drivers and environmental impacts is not easy, particularly when we are projecting outlooks. There are strong and diverse interactions among climate change, economic growth and population growth that make predictions uncertain. In addition, climate change and economic growth—and, to a smaller extent, population growth—are subject to global processes that are largely outside Australia’s control.

In the short term, continued growth can be expected to further increase demand for energy and production of waste. In the long term, while significant policy and technological change (in some cases requiring global adoption) will be needed to break this relationship, there is substantial room for hope that we will be able to minimise the negative environmental impacts of a growing nation.



■ Wandjina rock art figures, the Kimberley, Western Australia
Photo by Nick Rains

Indigenous land and sea management

Indigenous land and sea management, also referred to as ‘caring for country’, includes a wide range of environmental, natural resource and cultural heritage management activities undertaken by individuals, groups and organisations across Australia. These activities have their origins in the holistic relationships between traditional Aboriginal and Torres Strait Islander societies and their customary land and sea estates—or ‘country’—that have existed for at least 50 000 years. These cultural rights and practices have adapted and evolved over time and now encompass a diversity of local, regional, state, territory and national institutional arrangements. These include Indigenous employment in government agencies, such as national parks and natural resource management organisations, and increasingly, the establishment of Indigenous land and sea management agencies and ranger groups. There are now several hundred community-managed Indigenous land and sea management groups or organisations around Australia.

Indigenous land and sea management initiatives are contributing to a conservation-based economy with significant social, health and cultural benefits, especially in remote regions. All levels of government, recognising the high biodiversity and other environmental values of Indigenous management lands, have responded to caring for country initiatives through funding, partnerships and other support. Ongoing financial support and some institutional reform, including greater recognition of Indigenous management of sea country, will be required to enable these opportunities to reach their full potential.



■ A planning workshop at Garbemerri, from the Wunambal Gaambera Healthy Country Plan 2010–2020; the traditional owners used a conservation action planning process to involve relevant people (photo by the Wunambal Gaambera Aboriginal Corporation)

Atmosphere

Main messages

Earth is warming and large step-changes in climate may occur.

Since the release of the *Fourth assessment report: climate change 2007* from the Intergovernmental Panel on Climate Change, observations and research outcomes have further confirmed and strengthened the position that Earth is warming and that human emissions of greenhouse gases are the primary cause. Internationally, there is a clear consensus among atmospheric scientists that mean global temperatures have risen compared with pre-industrial levels in 1750. In addition, a number of feedback mechanisms exist that can amplify or accelerate climate change and have the potential to cause large step-changes (sudden or major changes) in regional and global climate.

It is likely that we are already seeing the effects of climate change in Australia.

Although Australia's climate is naturally highly variable, evidence continues to accumulate that temperatures are increasing and rainfall distribution patterns are changing. Models project that, by 2030, average annual temperatures across Australia are likely to warm by 1 °C (above 1990 temperatures). Drying is likely in southern areas of Australia. As the driest inhabitable continent, Australia is recognised as particularly vulnerable to climate change.

We will need both a national approach and approaches at the state and territory level to mitigate and adapt to climate change.

There is broad international consensus that major reductions in greenhouse gas emissions are necessary to minimise the extent of climate change. Per person, Australia's emissions are the largest of any country in the Organisation for Economic Co-operation and Development (OECD). The *Fifth national communication on climate change* sets out the Australian Government's strategic approach to climate change. Such an overarching strategy, implemented at all levels of government via a range of policies, plans and programs, is essential if we are to succeed in limiting climate change and addressing key areas of vulnerability through adaptation. Early action to reduce emissions and to deploy targeted adaptation strategies will be less costly than delayed action.

Ambient air quality in Australia's major urban centres is generally good.

National health-based standards are rarely exceeded for prolonged periods, and very high levels of pollution are usually associated with short-lived extreme events such as bushfires and dust storms. Levels of carbon monoxide, nitrogen dioxide, sulfur dioxide and lead in urban air have decreased over the past two decades, but ozone and particle levels have not declined. Prospects for reducing levels of these two pollutants will depend on factors such as improved vehicle technology, the extent of ongoing low-density suburban development, the availability of reliable public transport and the impact of climate change.

Despite this broadly favourable situation, the impact of urban air quality on health is still of serious concern.

There is clear evidence that periods of poor urban air quality impact adversely on human health. One source estimates that urban air pollution accounts for 1% of deaths and illness in Australia, with some 3000 deaths attributable to this cause in 2003—nearly twice the national road toll. Research indicates there is no threshold below which key pollutants such as particles, ozone and sulfur dioxide have no health effect. This means that sensitive individuals, such as asthmatics and people with respiratory or cardiovascular disease, may be affected even when air quality standards are met.

Despite the success of the Montreal Protocol in controlling ozone depleting substances (ODSs), depletion of stratospheric ozone will continue for some decades.

Concentrations of chlorofluorocarbons and other ODSs in the atmosphere have been decreasing since the mid-1990s, but many of these substances are long lived and will continue to affect stratospheric ozone for some decades. Nevertheless, the prospects for recovery of the stratospheric ozone layer by around mid-century continue to be good.

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