



New South Wales

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**State of the  
Environment**

2012





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# Foreword

I am pleased to present *New South Wales State of the Environment 2012*. The report has been prepared by the Environment Protection Authority using information from a wide range of government agencies and authorities with input also provided from independent experts as part of a review process and oversight from the joint EPA and Office of Environment and Heritage State of the Environment Executive Committee.

*NSW State of the Environment 2012* is the eighth such report for NSW and continues the series as a comprehensive document that considers the status and condition of the major environmental resources of NSW and examines the associated environmental trends, including the implications for the environment and human health. Key pressures on the condition of our environmental resources are identified and discussed, and programs and activities, including policies and legislation, that assist with improving environmental outcomes are outlined.

There have been a number of improvements to environmental outcomes since the last SoE report in 2009. With most of the state experiencing above-average rainfall over the last three years, the impact on the overall condition of NSW wetlands has been positive, along with an increase in waterbird populations. Our rivers have also benefited with an improvement in hydrological condition and a dramatic increase in the water supply held in storage.

Since *SoE 2009*, the reserve system has also been enhanced with the establishment of Dharawal and Berowra Valley national parks. Dharawal National Park reserves more than 6000 hectares in south-western Sydney and recognises the important Aboriginal cultural values of the area, while Berowra Valley National Park ensures the protection of the outstanding conservation values of this area in northern Sydney. These and many other positive outcomes are discussed in detail in the five chapters of *SoE 2012*.

However there are also areas that provide ongoing challenges. Energy use, particle pollution, invasive species, and the distribution of native animals and number of threatened species in NSW are all areas that require continued management to arrest further declines in status.

These challenges also provide opportunities. I am confident that the reinvigorated Environment Protection Authority will work with industry to improve its environmental performance. In addition, the Government has recently released its draft Renewable Energy Action Plan that outlines actions to help NSW meet the 20% renewable energy target by 2020.

The NSW Government is committed to working with communities, industry and other stakeholders in ensuring better outcomes for the environment.



**Robyn Parker MP**

*Minister for the Environment*

# Preface

In November 2011, the NSW Government passed legislation to strengthen and reinvigorate the Environment Protection Authority. In February 2012, an independent Board was appointed to oversee the work of the EPA, modernising the authority and making it more accountable to the community of NSW. I was appointed Chair and CEO of the EPA in April 2012. One of the principal requirements of the reforms to the EPA is to increase its transparency through clear reporting and thus improve the community's access to information.

*New South Wales State of the Environment* is prepared every three years by the EPA in accordance with the requirements of the *Protection of the Environment Administration Act 1991*. This is the first SoE report to be prepared by the EPA since the recent reforms and, being the eighth NSW SoE report, provides valuable time-series data.

*NSW State of the Environment 2012* details the condition of the environment and describes the major environmental issues across the state and how they affect human and environmental health. It provides an overview of the NSW environment using the most recent scientific information available. The report reviews the status and condition of the NSW environment, the pressures that affect the environment and responses to those pressures. *SoE 2012* is a valuable addition to the body of knowledge we are building on the environment in NSW.

Preparation of the SoE report relies on extensive contributions both from within the EPA and from many other NSW Government departments and agencies. The presentation of the data and information provided was appraised and validated by contributing organisations by way of a Verification Review. My sincere thanks to all of those concerned in providing information and advice during its compilation. I would especially like to offer my appreciation to a number of independent experts who have made invaluable contributions to this report by providing a range of perspectives and helpful advice.

*SoE 2012* reflects the continuing trend of improvement and refinement shown over the eight iterations of the report. It assembles a wide breadth of information from a large array of sources into a format that is both accessible to the wider community yet able to withstand scientific rigour.

For *SoE 2012*, the indicators have been simplified to provide a more efficient and objective evaluation of trends. The 86 indicators now relate to over 20 major environmental issues in NSW and enable readers to examine their status in a more concise form than in any previous report.

I trust that this report will be a valuable resource for the general community as well as guiding policy-makers in determining future priorities and objectives that will lead to the best possible outcomes for the environment.



**Barry Buffier**

*Chair and Chief Executive Officer  
Environment Protection Authority*

# About SoE 2012

## Purpose

*New South Wales State of the Environment 2012 (SoE 2012)* reports on the status of the main environmental issues facing NSW. The report has been prepared in accordance with the requirements of section 10 of the *Protection of the Environment Administration Act 1991*. This is the eighth SoE report since 1993 and it was prepared by the NSW Environment Protection Authority (EPA).

*SoE 2012* aims to provide credible, scientifically based, statewide environmental information to assist those involved in environmental policy- and decision-making and managing the state's natural resources.

## Preparation

*SoE 2012* is structured differently from previous SoE reports. The first chapter, People and the Environment, considers the key drivers and pressures that can have an impact on the environment. This chapter incorporates sections on Urban Water, Energy, Transport, Waste and Noise that formerly appeared in an SoE chapter called Human Settlement. The remaining chapters of Atmosphere, Land, Water and Biodiversity are thematic and largely unchanged. An exception is that this year's Biodiversity chapter no longer reports on fisheries resources. This is because the *Status of Fisheries*

*Resources in NSW 2008/09* (K. Rowling, A. Hegarty & M. Ives (eds) 2010, NSW Industry & Investment, Cronulla) provides a general overview of the state of marine and estuarine fish populations harvested by commercial and recreational fishers in NSW.

Although *SoE 2012* has been prepared by the EPA, much of the material it contains results from extensive input by a wide range of government agencies, other organisations and individual specialists, who provided data, information, analysis and interpretation, and reviewed the assembled content of the report. The EPA relies heavily on receiving this support from contributing agencies.

The specialist input also includes reviews and advice from independent experts as well as members of the SoE Executive Committee from the EPA and NSW Office of Environment and Heritage.

## Indicator summaries

*SoE 2012* assesses each environmental indicator's current status, its trend since *SoE 2009*, and the availability of information used to make an assessment against the indicator. The status and trend ratings depend on the extent and appropriateness of available information, both qualitative and quantitative, and the information availability rating signifies the level of information used to make the assessment.

## Indicator presentation

Indicator and status	Trend	Information availability
Indicator status refers to the environmental condition of the indicator.	The trend describes the direction of significant change in indicator measures. It has generally been judged over the reporting period since the previous SoE report in 2009 and in the future may impact on the overall status of the indicator. The following descriptors have been used in <i>SoE 2012</i> :	Information availability describes the statewide extent, condition and 'fitness for use' of the data used for the indicator. It is represented by the symbols below.
<b>Green</b> – Good: the data shows a positive or healthy environmental condition	<b>Decreasing</b> – The indicator measure is getting smaller.	✓✓✓ = <b>Good</b>
<b>Yellow</b> – Moderate or fair: the data shows that the environmental condition is neither positive nor negative and results may be mixed across the state	<b>Increasing</b> – The indicator measure is getting larger.	✓✓ = <b>Reasonable</b>
<b>Red</b> – Poor: the data shows poor environmental condition or condition under significant stress	<b>Stable</b> – There has been no <i>significant</i> change in the measure of the indicator.	✓ = <b>Limited</b>
<b>Grey</b> – Unknown: insufficient data to make an assessment	<b>Unknown</b> – There is not enough information to determine a trend for the indicator.	

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# Summary

*New South Wales State of the Environment 2012* covers 22 different environmental issues across five chapters with data and information that addresses 86 indicators. In *SoE 2012*, 20 indicators are rated as good, 49 are rated as fair, 14 are rated as poor and the condition of three indicators is classed as unknown due to a lack of available information to inform an assessment.

The summaries for each chapter below outline key issues and trends over the last three years.

## 1. People and the Environment

- Public transport patronage continues to increase, especially for commuting to work in Sydney.
- NSW greenhouse gas emissions per person have fallen below the Australian average with energy production and transport the two largest contributors.
- Waste recycled in NSW continues to increase with 59% of all waste recycled in 2008–09.
- Regional residential water consumption has fallen by more than half over the last 20 years.
- The state's renewable energy supply has doubled since 2008 and residential electricity demand is now at its lowest since 2000, although energy production is still overwhelmingly dependent on the burning of fossil fuels.
- The area of public land protected for Aboriginal cultural values continues to increase.

This first SoE chapter provides the broad context for environmental issues in NSW and discusses some of the key drivers that can affect the state of the environment.

The NSW population was estimated to be 7.21 million in June 2011 and is projected to grow to 9.1 million people by 2031. On current trends, 40% of this growth is expected to come from migration. Natural increase (the excess of births over deaths) has been steadily increasing its contribution to population growth since 2003–04, reaching 46,311 in 2009–10, the highest level in two decades. Most growth will be centred in Sydney, with other coastal urban areas experiencing modest growth and some parts of the far west a small population decline.

Increasing population density can create environmental challenges. Noise in particular is a persistent problem with a 39% increase in noise complaints to Environment Line in 2010–11 compared with 2007–08. A number of large-scale studies have linked the community's exposure to environmental noise with adverse health effects.

Overall household spending in NSW increased by more than 82% over the last 20 years. Environmental impacts associated with a growth in consumption are being offset in part by greater energy efficiency and waste recycling initiatives and NSW should continue to ensure that its environment and natural resources are not negatively affected. Approximately 59% of all waste produced in NSW was recycled in 2008–09 and the use of renewable sources of energy doubled in the two years to 2009–10. Overall electricity demand per household has declined to 2000–01 levels, demonstrating the effect of both cost increases and environmental concerns on the community at large.

More than any other factor, the production of energy has been identified as the greatest emitter of greenhouse gases in NSW: over 40% of NSW emissions were the result of electricity production in 2009–10. While per capita emissions in NSW are decreasing and were below the Australian average in 2009–10, the country's emissions are still increasing overall and are now higher than many other developed economies. Transport is the third-largest producer of greenhouse emissions in NSW – just behind the industrial sector, but growing.

Private vehicle ownership now exceeds 1.5 vehicles per household even though the total number of kilometres travelled by car has declined in recent years. Some changes in transport choice were evident in the decade to 2009–10. During this time, the proportion of public transport use increased for commuting to work and work-related trips, but fell for all other purposes: commuting by public transport was up 3.4% while that by car fell 4.4% over the same period. Freight transport in NSW remains overwhelmingly road-based and is expected to continue to increase by over 16% in the 10 years to 2018–19.

One of the greatest challenges facing NSW is continued reliable access to water. Ensuring a secure, sustainable and equitable water supply for people, agriculture, industries and the environment is important. Urban water for NSW cities and regional centres meets the Australian Drinking Water Guidelines nearly 100% of the time. With ongoing schemes to reduce its use, such as NABERS, water recycling and Water Wise Rules, water consumption has decreased throughout the state. In Sydney, it stood at 303 litres per person per day in 2010–11, down from 343 litres in 2004–05.





Responding to the new and increasing environmental challenges presented by a growing NSW economy will require improved understanding of how the economy and the environment interact. This will be supported by the use of appropriate evaluation methods to assess environmental policies and investment decisions, as well as innovative market-based instruments to manage pollution. It is important that new technologies and land-management practices are developed and refined so that the increasing consumption of energy, water and land does not have a negative impact on the state's environment and natural resources. This is a clear imperative in current patterns of energy use, which rely largely on high greenhouse gas-emitting fossil fuels.



It is now clear that community opinions are essential in achieving positive environmental outcomes. Public concern around environmental issues has translated into both direct and indirect actions by individuals and local groups to achieve real reductions in waste and energy use. Social research has underpinned a range of practical government-funded education and engagement programs to help communities adopt sustainable behaviours and learn about local environment protection. These programs support business, government and non-government agencies to use innovative strategies that save costs in energy, water and waste management and engage their staff to use resources more efficiently.



Aboriginal culture and heritage are linked closely with the natural environment and the traditions and assets it contains, both tangible and intangible. The strong relationship between Aboriginal people and their lands makes culturally appropriate management of Country and its resources a critical part of protecting Aboriginal cultural values. Joint management of NSW public land with Aboriginal groups has proved effective with over 1.6 million hectares now managed this way. The NSW Government is currently reviewing Aboriginal heritage legislation to improve the protection and management it affords and is consulting widely with Aboriginal communities, government agencies and key stakeholders.

## 2. Atmosphere

- Air quality in NSW continues to improve.
- National standards for most regulated air pollutants are met in NSW, but there are continuing exceedences of the goals for ground-level ozone and particles.

Air quality in NSW has improved since the 1980s with full compliance with national air quality standards for four of the six major 'criteria' air pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide

and lead. However the national standards continue to be exceeded in some regions for the two other pollutants: ground-level ozone and particle pollution.

Ground-level ozone (a key component of photochemical smog which appears as white haze in summer) remains an issue for Sydney, with concentrations generally continuing to exceed national air quality standards on up to 16 days a year between 2009 and 2011. Particle pollution (appearing as brown haze) has recently exceeded the standards on up to 18 days a year across Sydney and up to 21 days a year in some regional areas. Bushfires and dust storms are major causes of these exceedences, along with stubble burning, coal mine dust, and woodheaters in regional areas.

Controlling pollution has improved, with low concentrations of a number of the most common dangerous air pollutants (such as ammonia, carbon monoxide, lead and sulfur dioxide): since the early 1990s emissions of these and other pollutants (such as oxides of nitrogen and volatile organic compounds) have fallen by 20–40% across the Sydney region.

Levels of air toxics are generally low and stable, with periodic assessment required to verify that all remain at acceptable levels.

Air quality indoors can be worse than it is outside and may pose health risks in many enclosed environments. Investigations into the impacts of indoor air quality on health are continuing.

## 3. Land

- The soil resources of NSW are in fair condition overall, both at the state and regional level.
- Current land management practices are broadly sustainable and generally lead to only a moderate risk of degradation but this varies across soil health indicators and catchment management areas.
- More widespread use of conservation farming practices is helping to counteract pressures on soil resources.
- On a statewide basis, the chemical contamination of land, food and produce is low and stable.
- The presence of hazardous chemicals in consumer products has been identified as an emerging issue.

Healthy soils are necessary for both landscape health and to provide the basis for the productive capacity of the land. While soil resources across NSW are in fair condition overall, significant specific issues of land degradation remain: 74% of 124 priority soil monitoring units examined were rated as poor or very poor for at least one degradation hazard.

Across NSW, gully and sheet erosion have been found to be the least problematic of the soil health indicators, while decreasing organic carbon and soil structure decline present the greatest challenges. Potential acid sulfate soils are also a long-term management issue in some coastal areas.

Mapping of land and soil capability across NSW has been combined with land-use maps for the first time to show the capability of the state's soil resources and the land-use pressures on those soils. Current land management practices are broadly sustainable and the greater use of conservation farming is helping to counteract the pressures on soil resources from an intensification of agriculture to meet the needs of growing populations. These land management practices generally lead to only a moderate risk of degradation but this varies across soil health indicators and catchment management areas.

Contamination of land, food and produce can occur through the use of chemicals either directly or as a by-product of manufacture. Contamination rates in food and produce is low and stable, while the pace of remediation of industrially contaminated land has increased. In contrast, the presence of hazardous chemicals in consumer products has been identified as an emerging issue.

## 4. Water

- Widespread rains after the prolonged drought have increased river flows and the availability of water held in storage for both water users and the environment.
- Significantly increased amounts of environmental water are now being delivered to improve the health of rivers and wetlands.
- Increased natural flows and more environmental water have led to improvements in river health, wetland vegetation and waterbird numbers, but fish communities have been slower to respond.
- Demand for groundwater has eased significantly and sustainable levels of extraction in some aquifers are now being managed under water sharing plans.
- The marine environment is generally considered to be in good health although localised contamination of water quality due to stormwater runoff still occurs during heavy rains.
- Estuaries and coastal catchments are coming under increasing pressure from coastal development and their condition is highly variable.

With the breaking of the drought in 2010–11, substantial rains across NSW brought widespread flooding in many river valleys and the filling and spilling of most major storages for the first time in a

decade. Water sharing plans are now balancing access to the water available for water users while maintaining the health of river systems. Sixty-three water sharing plans have been introduced progressively since 2004, covering 95% of water use in NSW. Significantly increased amounts of environmental water have been delivered to priority aquatic ecosystems to improve the health of rivers and wetlands: an annual average of about 1 million megalitres over the past two years.

Since 2009, improved flows in most inland and coastal rivers have eased some of the stresses experienced by the systems during the prolonged drought and enhanced the productivity of aquatic ecosystems. While the condition of macroinvertebrate communities has shown some improvement, fish communities have been slower to respond. The majority of inland rivers are still affected by the ongoing pressures of water extraction and altered flow regimes and the overall river health ratings have largely remained poor, although the algal blooms of previous years have dissipated with increased flows. Coastal rivers are less affected by these pressures and, while they have not been fully assessed, are likely to be in better health overall.

The condition of wetlands has improved markedly since 2009 also due to increased rainfall and water availability and higher river flows. The area of inundated wetlands has expanded dramatically with most inland floodplain wetlands currently undergoing a cycle of enhanced productivity in wetland vegetation and waterbird breeding not experienced for over 10 years. This recent boom contrasts with the more general pattern found in long-term surveys of a decline in the extent and productivity of inland wetlands due to the effects of water extraction and altered flow regimes. Habitat degradation as the result of changes in catchment land use, clearing and modified drainage patterns are other significant pressures on wetland health. Since 2009, the area of inland wetlands protected within the terrestrial reserve system has more than doubled to 7%, while 19% of coastal wetlands are also protected.

Demand for assigned groundwater resources in NSW has eased significantly over the past three years as more surface water has become available following the widespread rains. Groundwater levels have risen in most areas in response to the higher rainfall, enabling aquifers to recharge and usage levels to drop. While extraction from some groundwater sources has been above the long-term sustainable yield in the recent past, use is now being managed to align with the sustainable yield through the implementation of 34 groundwater sharing plans. These plans will be extended to cover all groundwater sources in the Murray–Darling Basin by the end of 2012.



The overall health of the NSW marine environment and ecosystems is generally considered to be good. Recreational water quality at NSW beaches is also good and has improved over the past 10 years, though quality is lower in enclosed waters and estuaries where localised contamination from stormwater runoff still occurs after heavy rains. The survival of some species in coastal water is also under threat, particularly seabirds and some larger aquatic mammals and fish. The main pressures on marine species include destruction of vital habitats, overfishing, entanglement in disused fishing gear, chemical contamination and refuse, such as plastic bags and ring pulls.

The condition of estuaries and coastal lakes in NSW varies greatly, from near-pristine to highly disturbed. Condition generally reflects the level of disturbance in the catchment and the degree of flushing of the water body. Disturbance of estuary catchments and waterways results in habitat modification and changes in stormwater flows and runoff characteristics, increasing the loads of sediments and nutrients which can affect estuarine water quality and ecosystem health. Population growth and coastal development continue to put pressure on estuaries and coastal lakes and it is anticipated that these pressures will intensify along the NSW coast in the future.

## 5. Biodiversity

- The overall diversity and richness of native species in NSW remain under threat with another 35 species listed as threatened under NSW legislation since 2009.
- Habitat destruction, including clearing, and invasive species are the greatest threats to biodiversity in NSW.
- The clearing of native vegetation has stabilised in NSW over the past six years but the condition of most vegetation has deteriorated.
- The terrestrial reserve system now covers 8.8% of NSW and a higher percentage of bioregions and vegetation classes are represented in reserves than ever before. This system is increasingly being supplemented by off-reserve conservation across other land tenures.
- Many invasive pest and weed species are now widespread across NSW and have a major impact on native species, while fungal diseases are a growing threat.

Native species remain under threat due to the clearing of vegetation, habitat degradation and invasive species. Over longer time frames, birds have been more resilient than other vertebrate groups, having experienced the lowest proportion of declines in distribution, while mammals have experienced the highest as well as the greatest number of extinctions.

Since 2009, 35 additional species have been listed as threatened under NSW legislation and the number of listed populations and ecological communities has also increased. While a general pattern of decline is evident, many species have maintained their levels of distribution. Sixty-six per cent of terrestrial vertebrate species are not considered to be threatened.

The current condition and extent of native vegetation is considered to be fair. Land clearing is recognised as the greatest threat to native vegetation but clearing levels have stabilised over the past six years and the total extent of woody vegetation appears to have remained stable since 2003. Changes in the condition of vegetation are much harder to monitor than the effects of clearing. While 61% of NSW is still covered by naturally occurring vegetation, only 9% of this is in relatively natural condition and condition has deteriorated significantly in the remainder. Many revegetation and restoration activities are occurring regionally and the condition of vegetation is expected to improve as the results of these activities take effect.

The area of terrestrial reserves has increased by 5.7% since 2009, with significant additions to previously under-represented terrestrial areas. An increased focus on conservation on private land is facilitating greater involvement by landowners in private land conservation, providing improved connectivity across landscapes. Conservation on private and other (non-reserve) public lands complements the public reserve system by protecting a greater range of values. The extent of marine protected areas remains unchanged since 2009, covering 34% of NSW waters and managed under multiple-use zoning plans.

Widespread invasive species, including foxes, feral cats, rabbits, goats, carp and an increasing number of weeds, are a major threat to the survival of many native species. Deer are expanding their range and impacts, and fungal diseases, such as chytrid fungus and myrtle rust, are newly developing threats. Over half the listed key threatening processes in NSW relate to invasive species, while pests and weeds have been identified as a threat to more than 70% of the state's threatened species. Once established, there is little prospect of eradicating invasive species and broadscale control is rarely effective. Controls are therefore targeted to areas where the benefits will be greatest and on preventing the introduction and spread of new species.

Fire plays an important role in maintaining the health of many natural ecosystems, but at the same time altered fire regimes constitute a significant threat to the structure and function of ecosystems. The incidence and extent of fires vary from year to year and are strongly related to adverse weather conditions. The levels of hazard reduction burning and remote area fire suppression across NSW have risen sharply over the past three years as new fire management techniques are implemented.