



Australian Capital Territory

ACT State of the Environment Report



Office of the Commissioner for
Sustainability and the Environment

2015

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For further information, contact:

Office of the Commissioner for Sustainability and the Environment
GPO Box 158, Canberra ACT 2601

Telephone: (02) 6207 2626

Facsimile: (02) 6207 2630

Email: envcomm@act.gov.au

Website: www.environmentcommissioner.act.gov.au

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Commissioner's message

Recognition of Aboriginal cultural heritage

The Office of the Commissioner for Sustainability and the Environment recognises that Aboriginal people have traditionally had responsibility for custodianship of their country. Traditional custodianship acknowledged the spiritual and physical values of natural ecosystems of the region.

The Office of the Commissioner for Sustainability and the Environment acknowledges the continuation of these responsibilities and supports partnerships in the planning and management of the natural ecosystems of the region.

I am pleased to present the seventh State of the Environment Report for the Australian Capital Territory (ACT). It is prepared in accordance with the *ACT Commissioner for Sustainability and the Environment Act 1993*. The Hon. Mr Simon Corbell, MLA, Minister for the Environment, agreed to the report being presented for transmission to the Legislative Assembly.

The 2015 report has been developed independently by the Office of the Commissioner for Sustainability and the Environment, assisted by the views of a wide range of experts. It builds on the strong legacy of the past Commissioners and staff who have prepared reports every four years since 1994–95. It completes the significant work undertaken under Robert Neil's leadership during the past four years.

In preparing this State of the Environment Report, this Office has used a set of indicators consistent with previous reports so that trends can be revealed and changes assessed. However, we are aware that this indicator set has some limitations in providing a holistic picture of sustainability outcomes for the ACT. The Office intends to review the indicators as part of the statutory review of the state of the environment reporting process and the ongoing work of the Office in integrating the consideration of ecologically sustainable development into reporting.

This report undertakes the important task of collating the best information and standing back to assess how our environment is fairing on our watch. The dedicated staff of this Office have sought to access the best available information and use the assessment tools wisely. In doing so, they have relied on independent assistance and advice. The report has benefited from the contributions of highly qualified and passionate people, and outstanding institutions (listed in the acknowledgements). I welcome any additional advice that would improve the process and will consider it in the review of this report.

The context for this report is an increasingly highly modified environment. Human impact has reached even the most remote areas of wilderness, and climate change poses a significant threat. We must manage these threats and impacts, and we cannot wait until we have perfect information. What we can do is work with the best information available. The ACT is in the fortunate position to have an incredible wealth of scientific and practical environmental expertise. We are generally well placed to make informed

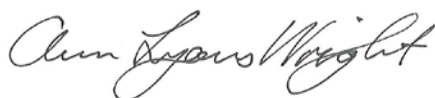
decisions while continuing to build our knowledge base and recalibrate our actions. This 'adaptive management' approach is a logical, rational and cost-effective way to proceed.

Our biggest environmental challenge is climate change. It is the 'tragedy of the commons' on a global scale – climate change is the result of our combined decisions and behaviour – yet it is all of us that stand to lose from the degraded or dysfunctional ecosystems that will result.

Despite this, the key message from this State of the Environment Report is positive. On the defining issue of climate change, the ACT community and its Government have acted locally and shown leadership that will hopefully inspire other jurisdictions to commit to action.

We have also generally managed the local environment well, using an adaptive management approach to uncertainty. Where there are concerns and issues that this Office has raised previously, there is evidence of effort to address these. Where we consider there is still work to be done, we have made recommendations in this report. These are a short list of focused and targeted recommendations, and it is hoped that these will assist the Government in prioritising expenditure of funding given the many competing pressures on the budget.

I congratulate the community and the ACT Government for their commitment to improving the sustainability and resilience of our Territory and showing leadership in tackling climate change, our most pressing environmental challenge.



Ann Lyons Wright MEnv Stud, MMgt, BSc, Dip Ed
Commissioner for Sustainability and the Environment
Australian Capital Territory

Acknowledgements

This 2015 State of the Environment Report has been developed independently by the Office of the Commissioner for Sustainability and the Environment (OSCE), assisted by the views of a wide range of experts.

I am pleased to acknowledge the vital contributions of those involved in providing advice and feedback.

Robert Neil, ACT Commissioner for Sustainability and the Environment 2011–2015, is acknowledged for his leadership throughout the development of the report.

Office of the ACT Commissioner for Sustainability and the Environment

I am grateful to the team in the OCSE for dedication, patience and good humour throughout a long and, at times, very intense period of work.

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My thanks to Amanda Slade and Warren Geeves for invaluable contributions in collecting and collating data, and drafting and redrafting chapters of the report.

Thanks also to Megan Reichstein for administrative assistance, Aileen Power and Mitchell Woolfenden for assistance with case studies, and Hannah Lambie for assisting the team with research and design.

ACT Government agencies

Special thanks to staff of the following ACT Government directorates for their cooperation in providing data, information and advice on various parts of the report:

- Territory and Municipal Services Directorate
- Health Directorate
- Chief Minister, Treasury and Economic Development Directorate
- Community Services Directorate
- Education and Training Directorate
- Justice and Community Safety Directorate.

I would particularly like to thank the staff of the Environment and Planning Directorate, who provided photos, maps, case studies and specific additional assistance and expert advice.

Subject experts

I would also like to extend my appreciation to the following experts from research and educational institutions:

- University of Canberra – Institute for Applied Ecology (special thanks to Jacki Schirmer, Sonya Duus, Fiona Dyer, Evan Harrison and Jarrod Kath)
- Uniquist – Marc Hockings and Andrea Leverington
- Bureau of Meteorology (Canberra office)
- Australian National University – Fenner School
- University of Sydney – Chris Dey
- Interaction Consulting Group – Lesley Richards.

Special thanks to:

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- Lisa Lambic (MEIANZ)
- Kelly Lee (MEIANZ)

Government advisory bodies

- ACT Natural Resource Management Council
- ACT Natural Resource Management Advisory Committee
- ACT Scientific Committee
- ACT Heritage Council

Consultancies

- Katestone Environmental Pty Ltd
- Umwelt (Australia) Pty Ltd

ACT Government agencies

- Environment and Planning Directorate
- Territory and Municipal Services Directorate

Production

- Biotext Pty Ltd



Night sky over Canberra, taken near Tharwa Bridge
Photo: Angus Kennedy

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Acronyms and abbreviations

AAQ	ambient air quality	IUCN	International Union for Conservation of Nature
ABS	Australian Bureau of Statistics	km	kilometre
ACT	Australian Capital Territory	LDA	Land Development Agency
ANBG	Australian National Botanic Gardens	LMA	Land Management Agreement
AP2	<i>AP2: A new climate change strategy and action plan for the Australian Capital Territory</i>	MOU	memorandum of understanding
AUSRIVAS	Australian River Assessment System	NARCLiM	NSW ACT Regional Climate Modelling
BOP	Bushfire Operational Plan	NCA	National Capital Authority
BPP	Basin Priority Project	NEPC	National Environment Protection Council
COG	Canberra Ornithologists Group	NEPM	National Environment Protection Measure
CPR	Conservation and Planning Research	NES	National Environmental Significance
CSIRO	Commonwealth Scientific and Industrial Research Organisation	NRM	natural resource management
DPSIR	Driver–Pressure–State–Impact–Response	NSW	New South Wales
EIS	Environmental Impact Statement	OCSE	Office of the Commissioner for Sustainability and the Environment
ENSO	El Niño–Southern Oscillation	OECD	Organisation for Economic Co-operation and Development
EPA	Environment Protection Authority	OEH	Office of Environment and Heritage
EP Act	<i>Environment Protection Act 1997</i>	O:E ratio	Observed:Expected ratio
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>	PCS	Parks and Conservation Service
EPD	Environment and Planning Directorate	PM	particulate matter
EPP	Environment Protection Policy	SBMP	Strategic Bushfire Management Plan
ESA	Emergency Services Authority	TAMS	Territory and Municipal Services
ha	hectare	WSUD	water-sensitive urban design
IPCC	Intergovernmental Panel on Climate Change		

1

Introduction

Eastern Spinebill – found in eastern Australia's dry sclerophyll forests, scrub and heathlands from Cooktown to Tasmania. It is the smallest honeyeater and is commonly seen darting from shrub to shrub in the suburbs of Canberra. This species is not considered to be endangered or threatened

Photo: Leo Berzins



1.1 About this report

1.1.1 Background

Every four years, the Commissioner for Sustainability and the Environment prepares a State of the Environment Report for the Minister for the Environment. The *Commissioner for Sustainability and the Environment Act 1993* (CSE Act) prescribes the contents of the report, and the Minister must present the report to the Legislative Assembly.

This *ACT State of the Environment Report 2015* is the seventh report since the CSE Act started in 1993. It covers the reporting period 1 July 2011 to 30 June 2015.

This report, presented by the Office of the Commissioner for Sustainability and the Environment (OCSE) captures and presents key information on the state of the Australian Capital Territory (ACT) environment. It provides an assessment of the state and trends of the environment, the pressures on it

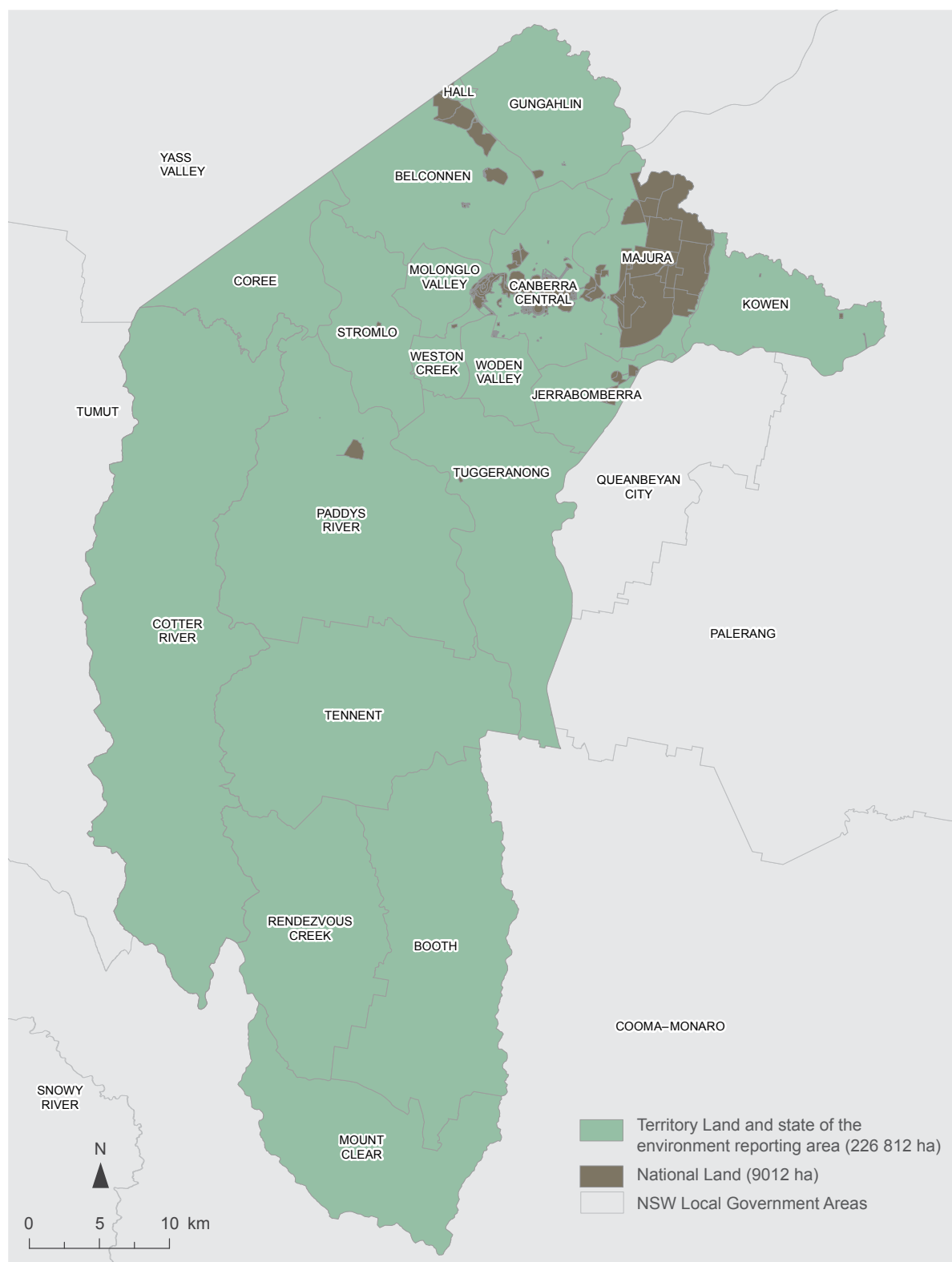
and the drivers of those pressures and their impacts, the management initiatives that are in place to address environmental concerns, and the effect of those initiatives. The report also examines the ecosystem services provided to the people of the ACT by the environment, and makes an assessment of the resilience of these services.

1.1.2 Scope

ACT land is described and managed as either National Land or Territory Land under the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth). The area examined in this report is Territory Land managed by the ACT (as defined by the *Australian Capital Territory (Self-Government) Act 1988*). Figure 1.1 shows the reporting area.



The Royal Bluebell is Canberra's floral emblem
Photo: M Fagg, Australian National Botanic Gardens

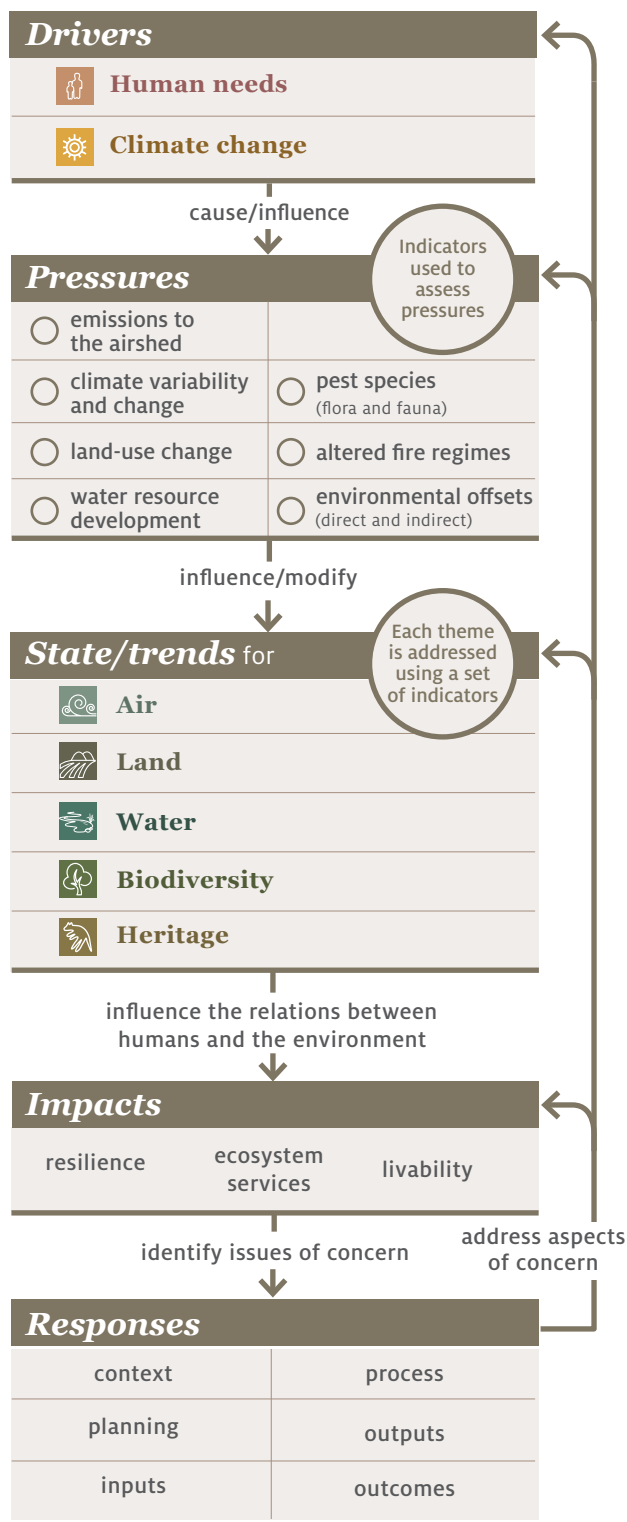


Source: Environment and Planning Directorate, Office of the Surveyor-General and Land Information, Mapping & GIS Services

Figure 1.1 State of the environment reporting area, 2015

Links and influences

The *Driver–Pressure–State–Impact–Response* model as used in the ACT State of the Environment Report



The 2015 report recognises the conservation importance of natural ecosystems within the ACT and surrounding areas of New South Wales (NSW). The ACT is situated within two bioregions,¹ five local government areas, three catchment areas,² four Rural Lands Protection Board areas and five Local Aboriginal Land Council areas.³

The report aims to assess the biodiversity, air, water, heritage and land values of the ACT, while recognising that these values are inextricably connected to the region biophysically, politically, socially and economically.^a

1.1.3 Assessment approach

The report is based on a framework – the **Driver–Pressure–State–Impact–Response** (DPSIR) model⁴ – which assesses the:

- **drivers**, which are the forces that increase or mitigate pressures on the environment (eg population growth or climate change)
- **pressures**, which are the direct stresses on the environment that occur as a result of drivers (eg pollution, reduced rainfall)
- **state of the environment**, which is the condition of the environment (including trends over time)
- **impacts**, which are the effects of environmental degradation
- **responses**, which refers to the responses by society to the environmental situation (eg the legislation, policies and programs of government agencies to improve or maintain the state of the environment).

The DPSIR model was developed by the European Environment Agency and is widely used for environmental assessments.

a The ACT has a number of memorandums of understanding (MOUs) with regional NSW that allow for cross-border collaboration on strategic issues that affect the region. The ACT Government and South East Regional Organisation of Councils MOU was signed in 2012, and the Australian Capital Territory and New South Wales MOU for Regional Collaboration in 2011.

National Environment Protection Measures

National Environment Protection Measures (NEPMs) are a set of national objectives designed to assist in protecting or managing particular aspects of the environment. NEPMs are set by the National Environment Protection Council (NEPC). NEPC comprises one Minister from each participating jurisdiction (the Commonwealth, states and territories). Complementary legislation in each jurisdiction establishes the NEPC and gives it the power to make the NEPMs. In the ACT, NEPMs are made under the *National Environment Protection Council Act 1980* and implemented by the ACT Environment Protection Authority (EPA) through the *Environment Protection Act 1997*.

NEPMs are designed to provide equivalent protection from pollution to all Australians. They also ensure that decisions by businesses are not distorted and markets are not fragmented by variations in environmental standards between jurisdictions.

The ACT EPA implements the following NEPMs:

- Ambient Air Quality
- Movement of Controlled Waste
- Assessment of Site Contamination
- National Pollutant Inventory.

The Used Packaging Materials NEPM is implemented by the Environment and Planning Directorate, and the Territory and Municipal Services Directorate.

The CSE Act requires every State of the Environment Report to contain an assessment of the degree of compliance with the NEPMs.

These NEPM compliance assessments are provided in Chapters 3: Human needs, 4: Air and 5: Land.

You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make.

-Jane Goodall

1.1.4 Structure of the report

The report is structured with the aim of providing answers to four key questions. In answering these, the report aims to present the best current and available data, and to assess these data in relation to environmental conservation and management.

1 What are the drivers and pressures on our environment?

Drivers are the social, demographic and economic developments in societies, and the corresponding changes in lifestyles, overall levels of consumption and production patterns. Meeting human needs is degrading the environment in many instances and, conversely, environmental degradation is hampering meeting human needs.

Climate change is also considered a major driver of environmental change, because not only does it result from the already significant pressures caused by human populations and their consumption, but it also profoundly exacerbates these pressures.

In this report, human needs and climate change are measured through a series of internationally verified indicators,⁵ including weather trends, greenhouse gas emissions and demographic patterns. Chapter 3: Human needs also presents calculations of the ecological footprint of the ACT. The footprint represents the land area equivalence (in hectares) of all the resources required to support the lives of the ACT population and to absorb their pollution.

The ACT Government has a number of significant – and often far-sighted – statutes, policies and programs to address the pressures posed by a changing climate and human needs on the environment. This part of the report describes these government responses and examines the progress being made.

2 How is our environment faring?

The report presents assessments of the current state or condition of five themes for the ACT – air, land, water, biodiversity and heritage – and the impacts of pressures on each of these themes. The assessments are structured as follows.

Theme definition

Each theme is described in relation to its importance to the ACT community. This includes a brief discussion on the role of the theme in providing the ACT with ecosystem services.

Measuring the environment

The environment is complex, and discerning environmental trends can be difficult. Environmental indicators allow physical, chemical, biological and social factors that best represent key elements of complex ecosystems or environmental issues to be measured.

Environmental indicators should be selected on the basis that they:

- have relevance and use to policy and management needs
- allow environmental trends to be tracked at a range of spatial scales

- are scientifically credible
- are cost-effective
- serve as a robust indicator of environmental change
- are monitored regularly, either by existing programs or by new programs that might be established in the future at a reasonable cost.

Although this report primarily uses the same indicators as previous reports to allow comparison over time, it also highlights a number of challenges about both the selection and subsequent use of indicators for assessing environmental state, change, impacts and pressures. In populating the indicators with relevant data and using them to make assessments of the state or trends of environmental issues, such as the condition of threatened ecological communities in the ACT, it became apparent that a number of indicator selection criteria, as listed above, were not able to be met. These challenges are explained within each indicator.

The indicators used in the theme chapters are modelled on the Australian and New Zealand Environment and Conservation Council guidelines,⁶ and have been adapted to suit ACT state of the environment reporting requirements.

The presentation of each indicator includes:

- the indicator (eg 'Area of vegetation burnt, by frequency and intensity of burning and type of vegetation')
- why this indicator is important (eg 'Although fire is a part of many ecosystems, it can be damaging, since inappropriate fire regimes – such as fires of high or low intensity that are either too frequent or insufficiently frequent – can lead to loss of native species, communities and ecosystems')
- current monitoring status (eg 'Fire intensity and frequency are routinely measured by satellite in the north of Australia. In the southern parts of Australia, some data are available from fire service and other records, but are not collated within a systematic framework across Australia')

- interpretation issues (eg 'Interpreting changes in fire regimes is complex and difficult. Fire plays a critical role in many Australian ecosystems, yet, in most areas, little is known about pre-European settlement fire regimes')
- what this indicator tells us (eg 'Unplanned fires have declined since reporting began in 2004; however, the change in the proportion of unplanned fires occurring within each vegetation type has remained relatively stable').

Assessment summaries

Each theme chapter also contains graded assessment summaries, which provide snapshots of key information, and focus on identifying areas for continued or more concentrated attention on strengthening environmental systems to cope with pressures in the future (see sample assessment

summary in Figure 1.2). Assessment summaries are provided for pressures, and state and trend sections of each of the themes. The reasoning in the assessment tables should be read in conjunction with the text in each section of the theme chapters.

The strength of the evidence for each assessment is indicated with a 'level of confidence'. If adequate high-quality data were available or if consensus was high, confidence is indicated as high. If there were only limited data or consensus to determine grades, confidence is indicated as low. Where data are insufficient to attempt scores, this is also indicated, and the component remains on the list to indicate that it is still an important aspect of the ACT environment, and that more information is needed to improve understanding and capacity to respond to environmental challenges.

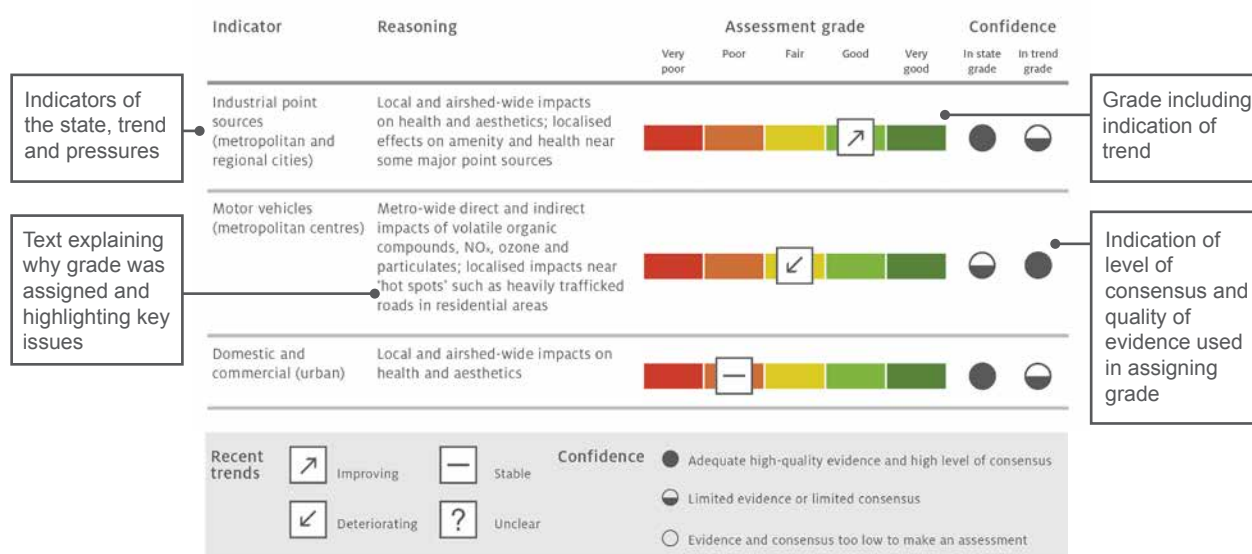


Figure 1.2 Sample assessment summary^b

^b Assessment summaries for Air, Land, Heritage and Biodiversity were conducted by the OCSE. They have five possible grades for state and five for pressures. The assessment summaries for Water were conducted by water experts from the University of Canberra Institute for Applied Ecology. The Water assessments have four possible grades for both state and pressure. The grades assigned for all assessments were confirmed through expert peer review.

Resilience

Resilience assessment involves looking at the systems, networks, human resources and feedback loops involved in maintaining environmental values. Resilience assessments of the ACT's biodiversity, land, heritage, air and water values, as well as the pressures on these values caused by climate change and human needs, were conducted for the 2015 State of the Environment Report (see Chapter 9). The outcomes of these assessments are summarised in each theme chapter.

Response

The ACT Government has a comprehensive legislative and policy framework to conserve, maintain and improve the environment. This section outlines key government environmental policies and programs in place during the reporting period. The effectiveness of these responses in achieving environmental outcomes is assessed in Chapter 10.

3 What does the changing environment mean?

The most advanced applications of DPSIR explain how the components of the framework can be considered together to answer questions such as 'What do changes to biodiversity or air quality mean to our way of life?' Used in this way, DPSIR can be used to explain the interactions between humans and the environment.

The structure of the 2015 State of the Environment Report was developed through a series of community and expert workshops.⁷ The primary outcome of these workshops was that ACT state of the environment reporting should consider:

- not only what impacts humans have on ecological systems, but also the benefits that humans derive from these systems (the concepts of livability and ecosystem services)
- how susceptible coupled socioecological systems might be to shocks,^c which might mean they could no longer function in desirable ways.

^c 'Shocks' include environmental variability or social, economic and political upheaval.⁸

This chapter of the report aims to address these considerations by providing indicative and preliminary assessments on:

- livability (a way to assess how attractive the ACT is compared with other places in terms of the perceived quality of life here)
- ecosystem services (a way to identify the ways in which the environment provides goods and benefits to people in the ACT, which both support and fulfil our lives)
- resilience (a way to consider how well the coupled socioecological systems in the ACT might be able to cope with expected and unexpected pressures and shocks without losing the essential characteristics of those systems).

4 What are we doing and what effect is it having?

Effective environmental management is crucial to the conservation of environmental values, and the maintenance and improvement of ecosystem resilience. To assess the effectiveness of this management in the ACT, the OCSE commissioned an independent expert assessment of existing ACT Government measures to protect and manage the ACT environment.

The assessors are experts in protected areas management, monitoring and evaluation, public policy and governance. Their assessment included all government activities that contribute to the protection and management of the ACT's air, water, land, biodiversity and heritage values.

The Commissioner accepted their assessment and it forms the basis of Chapter 10.

Conclusions and recommendations

The CSE Act provides for the Commissioner to make recommendations to the Minister for the Environment on matters relating to the condition and management of the ACT environment.

A high level of circumspection was applied to the design of recommendations made in this report. The number of recommendations was limited to ensure that they address both significant and systemic issues, and that government management actions can be focused where they are likely to have the greatest effect.



Urban green space in Ainslie

Photo: ACT Government

The 2015 recommendations are prefaced by their relationship with the broader challenges facing the ACT, most significantly climate change. Chapter 11 provides the historical context for each recommendation, summarising previous and similar recommendations, and the Government's success in implementing them. This context supports the rationales given for each of the 2015 recommendations, presented in this chapter by theme.

Case studies and community case studies

Most chapters include ACT Government and community case studies highlighting current and innovative ACT Government initiatives designed to improve environmental values, or redress pressures and impacts on the environment.

In particular, community case studies focus on the work of ACT environmental community groups. These stories provide snapshots of the valuable projects going on in the ACT and how these projects are contributing to environmental sustainability. The stories also provide ideas for all ACT community members about how to get involved in conservation and sustainability activities.

1.1.5 Content development

This report was prepared by OCSE staff with the support of subject experts from a number of academic institutions, including the Australian National University, the University of Canberra, the University of Queensland, the University of Technology Sydney, the Bureau of Meteorology, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Government expert advisory committees, and policy, management and research staff in ACT Government directorates.

The framework for this state of the environment process was developed through a series of workshops in 2013 involving a range of stakeholders including academics, the private and community sectors, and ACT Government agencies.^d These workshops generally confirmed the use of the DPSIR framework and the indicators used in previous state of the environment reports. They also proposed some novel approaches to the assessment of the impacts of the DPSIR framework, namely management effectiveness, ecosystem services, resilience and livability. These can be seen as different lenses through which to view our impacts on the environment, taking into account the drivers, pressures and responses identified in the body of the report. The job of integrating these assessments into the report has been challenging. The OCSE welcomes feedback on these approaches and their usefulness.

1.1.6 Quality and accuracy assurance

Independent peer review was used to validate and strengthen the content of the report. Independent reviewers were asked to provide objective assessment to identify unfounded assertions, omissions of relevant data or analyses, issues with clarity and objectiveness, and poorly drawn conclusions. The 2015 State of the Environment Review Report, containing reviewer guidelines, reviewer comments and OCSE responses, is available on the OCSE website.^e

Data were sourced from the most credible sources available. Where possible, these sources were the land managers and the scientists who support them. Before peer review, major data providers were asked to review components of chapters related to their contributions to ensure the accuracy of the information presented.

Despite the volume of information available, there remain many aspects of the ACT environment, its values and the impacts upon these values about which little is known. Significant information gaps are noted in the text.

1.1.7 Next report

The 2015 State of the Environment Report describes the increasing effects of climate change and pressures on our resources, especially land and water. The next report, due in December 2019, is likely to see these trends continue. We look forward to seeing the results of ACT Government and community responses aimed at protecting and improving our environment.

^d The outcomes of these workshops, including the framework, are available at http://environmentcommissioner.act.gov.au/publications/soe_about-the-report.

^e www.environmentcommissioner.act.gov.au

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