



Submission to

House of Representative Standing Committee on  
Climate Change, Environment and the Arts

**INQUIRY INTO AUSTRALIA'S BIODIVERSITY  
IN A CHANGING CLIMATE**

Submission by Liz Burton  
Planning and Environment Advocate

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## **CONTENTS**

- 1. PREFACE**
- 2. INTRODUCTION**
  - 2.1 Need for reconceptualisation of relationship to natural resources
  - 2.2 Reasons to introduce a national strategy for biodiversity conservation in the context of climate change
  - 2.3 Convergence of impacts on biodiversity
- 3. KEY DRIVERS IMPACTING BIODIVERSITY**
  - 3.1 Geography driver
  - 3.2 Population driver
  - 3.3 Economic and industry drivers
  - 3.4 Climate change driver
  - 3.5 Governance driver
- 4. AUSTRALIAN BIODIVERSITY TRENDS**
  - 4.1 Australian Bureau of Statistics tracking
  - 4.2 Australian Natural Resources Atlas
- 5. PROPOSED NATIONAL STRATEGY ON BIODIVERSITY IN A CHANGING CLIMATE**
  - 5.1 Objectives for the introduction of a national strategy
  - 5.2 Recommendations on national strategy
- 6. CONCLUSION**
- 7. BIBLIOGRAPHY**
- 8. APPENDICES**
  - Appendix A Major vegetation groups in Australia circa 1997
  - Appendix B Major vegetation groups affected by clearing and reasons for clearing as mapped at 2001
  - Appendix C Distribution of Australian deserts (arid regions)
  - Appendix D Satellite image showing world's deserts
  - Appendix E Extract from Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 11, Executive summary
  - Appendix F Surface water, developed yield, Australian continent

## **1. PREFACE**

Thank you for the opportunity to make a submission to this Inquiry.

The focus of this submission is to consider the following:

(a) identification of the key drivers affecting biodiversity and the need to ensure that biodiversity conservation is not considered as a silo, separate from key industry sectors and economic considerations; and

(b) the adequacy of named current governance arrangements to deal with the challenges of conserving biodiversity in a changing climate (dot point 6 of the Committee's Terms of Reference); and

(c) to propose the establishment of a national strategy on climate change, developed collaboratively, to position Australia's economy and biodiversity conservation in relation to the projected impacts of climate change. It is considered that this conservation needs to commence as a high priority.

## **COMMENTS TO THE COMMITTEE**

### **1. Committee's Terms of Reference**

It is noted that the Committee's Terms of Reference (TOR) apply to "nationally important ecosystems" but it is not clear how the construct of "nationally important ecosystems" is defined. That is, does it refer to iconic ecosystems such as the Great Barrier Reef, which are also associated with tourism and revenue generation or does it refer to pristine environments such as James Price Point or other definition.

Additionally, although there is reference to connectivity in the TOR, there is an implication in the wording of the TOR that the Committee's brief is restricted to "nationally important ecosystems", many of which are concentrated in the 30 per cent of terrain located in the temperate and tropical areas of Australia, particularly coastland.

It is important to note that disaggregating Australia's ecosystems into "nationally important ecosystems" and others, is perhaps a distinction that may be considered appropriate for economic purposes but may fail to recognise the importance of the contribution of each ecosystem community to the functioning of the system as a whole. As such, this distinction may be counterproductive on the grounds that those that are not "nationally important ecosystems" may be considered expendable and the aggregate of their demise over time can undermine the condition and function of ecosystems in the "nationally important" category. Ecosystems, unlike National Trust properties, are living organisms and sometimes we do not have the scientific data to be clear about the impact of such, relatively arbitrary, distinctions.

### **Recommendation**

That the Committee consider whether it is appropriate to comment in its report on the scope of its Terms of Reference in relation to the focus on certain types of ecosystems ie "nationally important ecosystems" and whether such distinctions are helpful in achieving the aim of biodiversity conservation.

## **2. Key drivers impacting on biodiversity**

It is considered that the management of biodiversity in a changing climate cannot be addressed in isolation from the key drivers impacting on biodiversity, including the structure of Australia's economy and its impact on biodiversity. The Australian economy is heavily reliant on raw material extraction, natural assets harvesting, primary production and the consumption of goods and services, all of which impact on land and coastal use.

The lack of diversification in the core components of the economy is seen as a relentless driver of biodiversity loss.

While the Committee's Terms of Reference do not specifically refer to consideration of the economy as a source of impact on biodiversity, it is suggested that dot point 4 in the Terms of Reference:

- *"strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities"*

be engaged to give consideration to the structure of the Australian economy and its performance as an ongoing driver of biodiversity depletion and perhaps the most significant one.

Alternatively, that the structure of the Australian economy in terms of its core sectors, be included in the Committee's recommendations warranting separate consideration of their impacts on biodiversity and ecosystems.

It should be noted that the current controversy about the Great Barrier Reef is centred on an extensive number of projects involving industrial expansion and coal shipping. Concerns by the United Nations' environment organisation, UNESCO, has projected that continuing development of the Reef could threaten the Reef's World Heritage status.

"Considering the high rate of approvals over the past 12 years, this unprecedented scale of development affecting or potentially affecting the property poses serious concerns over its long-term conservation".<sup>1</sup>

This example highlights the contest of economic drivers over environmental conservation and the decisions of state governments being made on a case by case basis, achieving economic aims but failing in biodiversity conservation.

### **Recommendations**

That the Committee consider including in its report:

- (a) reference to the core components of the Australian economy based on raw material extraction, natural assets harvesting, primary production and the consumption of goods and services, all of which deliver ongoing and potentially catastrophic impacts on ecosystems, as identified in Australian Bureau of Statistics data, for example, ABS Data Category No. 4613.0 Australia's environment: Issues and Trends, Jan 2010 ; and
- (b) the proposal to introduce a national strategy on climate change, developed collaboratively, to position Australia's economy and biodiversity conservation in relation to the projected impacts of climate change.

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<sup>1</sup> United Nations Educational, Scientific And Cultural Organization Convention concerning the protection of The World Cultural and Natural Heritage, World Heritage Committee, "State of Conservation of World Heritage properties", 1 June 2012, p23

### **3. Biodiversity and genetic diversity**

Consideration of biodiversity conservation in government legislation and policies seldom refers to the importance of genetic diversity in both fauna and flora populations. Genetic diversity is essential to promote healthy, resilient populations. It is recognised in the following reference in the EPBC Act, Part 12, Identifying and monitoring biodiversity and making bioregional plans, under Division 1 - Identifying and monitoring biodiversity, Paragraph 171, Identifying and monitoring biodiversity:

"(3) In this Act:  
*components of biodiversity* includes species, habitats, ecological communities, genes, ecosystems and ecological processes."

However there is no other reference to genetic diversity in the Act and nor is this reference specific to requiring that the genetic diversity of Australia's flora and fauna be protected. Despite scientific advances enabling relatively inexpensive genetic testing, tracking genetic diversity is seldom undertaken in monitoring fauna and flora populations, including those listed in the vulnerable and threatened categories in the EPBC Act.

#### **Recommendations**

That consideration be given by the Committee to recommending:

- (a) the establishment of a national registry of the gene pool for all known flora and fauna species in relation to their population distribution across Australia, to assist in evaluating the resilience of specific populations and therefore to inform their management;
- (b) a review of federal, state and local government legislation involving biodiversity management to require:
  - (i) protection of the genetic diversity of fauna and flora populations under their management, and
  - (ii) the establishment of policies and/or the review of existing policies aimed at protection of the existing stock of genetic diversity of species; and
- (c) that the identification of the genetic variation of species, their population distribution and tracking of populations concerning the retention of their genetic diversity over time, be referred to universities in the form of research grant funding.

## **2. INTRODUCTION**

#### **Summary of paragraphs**

<b>Para graph</b>	<b>Title</b>
2.1	Need for reconceptualisation of relationship to natural resources
2.2	Reasons to introduce a national strategy on biodiversity conservation
2.3	Convergence of impacts on biodiversity

### **2.1 Need for reconceptualisation of relationship to natural resources**

The concentration of population into one third of the Australian land mass to avoid living in desert conditions has profound implications for biodiversity. It also necessitates the development of policy on biodiversity and ecosystems protection consistent with the Australian physical conditions which effectively corral the population along the coast.

Public policy at all levels of government relating to land use needs to officially recognise the physical constraints imposed by desert occupying two thirds of the land mass. This is

unlike the United States land mass for example, which has allowed the spread of population across the country.

In Australia, the competition for land by species living in the one third of Australia that is not desert, has become increasingly fierce as the native vegetation is cleared for more housing, associated infrastructure, and for industry, business and civic buildings to cater for a rapidly growing human population.

The declining position of biodiversity in Australia reflects the lack of legislative strength to protect habitat as demonstrated in the data of the Australian Bureau of Statistics. The ABS in its Issues and Trends report 2010 observes that since the introduction of the Environment Protection and Biodiversity Act in July 2000, there has been further substantial declines in threatened species:

"Since 2000, when the EPBC Act was introduced, the total number of listed threatened fauna species has increased by 37%, rising from 312 in 2000 to 427 in 2009. These increases may reflect taxonomic revisions and improved reporting in conservation status and do not necessarily mean a change in the conservation status of the fauna.

Associated with this vegetation clearance, the question that needs to be considered is how much clearance can be tolerated before the weather patterns respond and commence integrating the desert weather pattern with the cleared areas. There does not appear to be a public or even academic discourse on this question.

Seventy percent of the Australian terrain comprises desert (arid and semi arid regions) characterised generally by low lying vegetation adapted to scant rainfall and high daily maximum temperatures. The areas outside the arid and semi arid regions, the coastal, temperate, tropical and semi tropical areas, have a diverse range of vegetation types responding to climatic variations. The lush rain forests of tropical Queensland and the Eucalypt forests and woodlands, located mainly along the eastern coastline and the south west of Western Australia, provide a strong contrast to the hummock grasslands and mixed shrubs of the arid interior.

There is significant need for a fundamental shift in the conceptualisation of our relationship to natural resources in the 30 per cent of coastal, temperate and tropical land which supports 80 per cent of the Australian population. It is in these non arid, mainly coastal and temperate areas of Australia, that the contest for territory is at its most ferocious, particularly in relation to biodiversity.

The existing reserves of native vegetation outside the desert are cleared without reference: (a) to their finite quantum; (b) to vulnerabilities from the impacts of climate change; (c) depletion of natural assets with regard to intergenerational equity and (d) to the implications of removal of these vegetation types causing over time, greater exposure to the desert climate.

In response to the demands of urbanisation and the economy, native vegetation and biodiversity assets are regularly and indiscriminately cleared, a process which substitutes complex ecosystems delivering a wide range of environmental services, with mainly inanimate objects servicing urbanisation needs and economic purposes.

## **2.2 Reasons to introduce a national strategy on biodiversity conservation**

Land clearance is a major driver of biodiversity loss and threat across Australia. Projects involving land clearance are considered on an individual basis and not in the context of: (a) existing clearance levels within the state/territory; or (b) whether the clearance causes fragmentation of a corridor; (c) whether the clearance has national significance; or (d) the escalating rate in Australia of species extinctions, threatened populations and vulnerabilities as documented by the Australian Bureau of Statistics.

The value to the economy of functioning ecosystems is currently not adequately recognised by governments and threats to their performance from development projects, while analysed through the environmental impact statement process, only rarely prevent the project's approval. The most likely outcome is an attempt to limit the damage through management processes in the form of conditions to project approval. However a lack of outcome targets and the requirement to monitor environmental outcomes, sanctions accountability gaps.

As noted above in the Preface, measures to conserve biodiversity need to be considered not in a silo, but rather in the context of the key drivers impacting on biodiversity conservation. A national strategy is needed, based on agreed principles and objectives across key stakeholders, including the three tiers of government, as well as business and industry.

## **2.3 Convergence of impacts on biodiversity**

The condition of terrestrial biodiversity is directly related to the condition of habitat whether terrestrial or marine. Australia's three tiered government structure delivers a fragmented approach to habitat conservation. Ecological communities and biodiversity are not able to take account of state and territory borders yet are impacted by the decisions of these governments that take a local perspective.

There appears to be an underlying assumption by governments at all levels and by business and industry, that increasing levels of vegetation clearance and fragmentation in the 30 per cent of area outside Australia's desert regions, does not matter.

The convergence of three major impact forces:

- (a) climate change;
- (b) ongoing and indiscriminate native vegetation clearance; and
- (c) the impacts of natural resource commercial exploitation

are not well addressed in public policy and legislation despite the rigorous scientific assessments of their impacts. The scientific research and published projections on climate change highlight a range of significant impacts on Australia of magnitudes equivalent to a paradigm shift. Appendix E provides selected extracts of projections of climate change impacts on Australia and New Zealand from the IPCC report, "Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change", chapter 11, Executive Summary.

Natural systems have limited adaptive capacity and projected rates of climate change are very likely to exceed rates of evolutionary adaptation in many flora and fauna species. The fragility of these systems appears to be underestimated in public policy and legislation. Climate change, particularly warming, droughts, wildfires and floods, already

effect Australia's ecosystems and their ability to cope and regenerate but governments at all levels lack a proactive, coordinated and effective response. An example of this relates to the need to reassess existing assumptions behind current policies and systems in place regarding flooding and fires.

Consideration of just how much vegetation can be cleared in the 30 per cent of terrain outside the arid and semi arid regions, before it is impacted by environmental feedback loops and the effects of climate change, is unknown. Research and scenario modelling is urgently needed to inform future policy and decisions at all levels of government as well as business investment.

The contribution of biodiversity to functional ecosystems appears to lack recognition and support at all levels of government. Without a national, coordinated framework there is potential for work on biodiversity protection at local levels to be undermined by cross-sectoral priorities, particularly involving economic and employment needs.

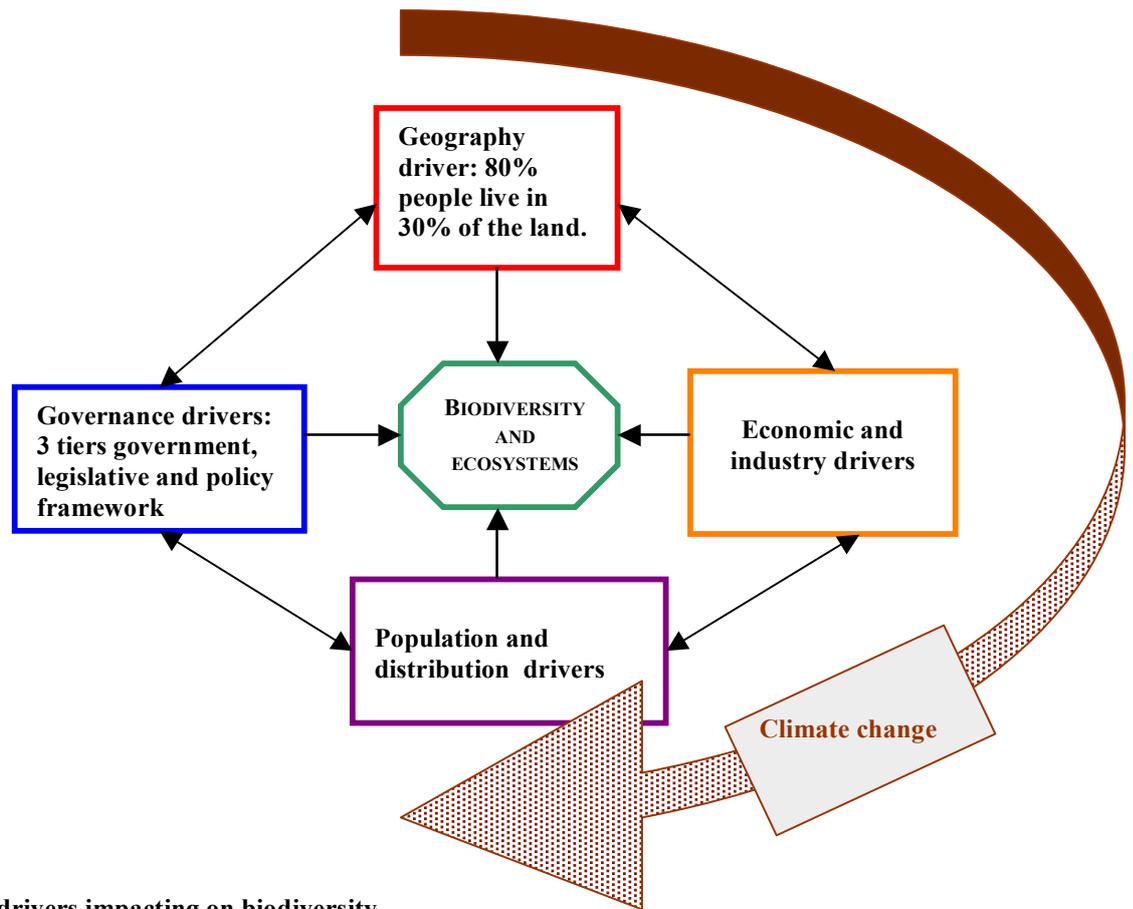
Australia's legislative framework, especially legislation designed to protect biodiversity such as the Federal Environment Protection and Biodiversity Conservation Act (EPBC) and provisions in the states' planning schemes are manifestly failing to protect biodiversity. A measure of this is the surging level and rate of species extinctions and of vulnerable and threatened populations as documented by the Australian Bureau of Statistics in reports such "Measures of Australia's Progress", catalogue no.1370.0 and "Australia's environment: issues and trends", catalogue no. 4613.0.

Extensive evidence based data gathering on the state of Australia's biodiversity has been undertaken through Federal government funding but financial support for vital projects such as the Australian Natural Resources Atlas (ANRA) has been withdrawn. Although monitoring has been devolved to other bodies, the systematic auditing, benchmarking and documentation of ongoing changes to the natural environment at a national level, provided by ANRA, has been abandoned.

### **3. KEY DRIVERS IMPACTING ON BIODIVERSITY**

#### **Summary of sections**

<b>Section</b>	<b>Title</b>	<b>Section</b>	<b>Title</b>
3.1	Geography driver	3.4	Climate change driver
3.2	Population driver	3.5	Governance driver
3.3	Economic and industry drivers	3.6	Announced changes to EPBC Act



**Diagram 1: Key drivers impacting on biodiversity**

The changing climate in its various manifestations pervades every aspect of the environment, including ecosystem communities, habitat condition and species' adaptation. It is important to recognise that it is one among several key drivers impacting on biodiversity, and as these impacts converge in specific areas, the complexity arising from the convergence on ecosystems, can defeat their capacity to function effectively. The key drivers affecting biodiversity and ecosystems are identified below:

- (a) Australia's geography and high proportion of desert land mass;
- (b) population levels, growth rates, uneven distribution and cluster in coastal capital cities; and
- (c) a range of economic drivers: (i) Australia's core industry sectors which are heavily reliant on raw material extraction, natural assets harvesting, primary production and retail consumption; (ii) planning decisions involving regular extensions to the urban growth boundary and associated land clearance and fragmentation. (Diagram 1 refers). A discussion of the power of these drivers follows.

### 3.1 AUSTRALIA'S GEOGRAPHY DRIVER

#### Summary of paragraphs

Paragraph	Title	Paragraph	Title
3.1.1	Land mass predominance of desert		(c) Arid land regions
	(a) Definition of desert		(d) Semi-arid land regions
	(b) Scope of arid and semi-arid land	3.1.2	Coastal, temperate, tropical and sub tropical areas - population convergence

Australia's predominant desert land mass has had the effect of skewing its population distribution to the smaller temperate, coastal, tropical and sub tropical areas with the effect of high levels of vegetation clearance in these areas.

#### 3.1.1 Land mass predominance of desert

It is not well acknowledged in Australian governance arrangements, including legislation, policy and planning schemes, that approximately 70 per cent of the Australian land mass of 7.69 million sq km comprises a desert footprint. This desert footprint is made up of arid and semi arid land (refer to Figure 1). The combined arid and semi-arid regions comprise a total area of approximately 5.3 million sq km.

##### *(a) Definition of desert*

Although there is no single definition of desert, land referred to as "desert" can comprise either arid land alone or both arid and semi-arid land which provides a wider concept. The key defining characteristics involve a very low rainfall median of 250 to 350mm per annum (arid), up to 500 to 600mm per annum (semi arid), sparse vegetation cover, and in the case of much of the Australian deserts, daily temperatures in excess of 35°C.

##### *(b) Scope of arid and semi-arid land*

The substantial scope of Australia's desert (arid and semi arid regions) makes Australia the world's second driest continent, following the Antarctic - see Figure 1. According to the Australian Bureau of Statistics, over 80 per cent of the Australian continent has an average (mean) annual rainfall below 600 millimetres (mm) of which over 50 per cent is below 300 mm.<sup>2</sup> Appendix D provides a satellite image<sup>3</sup> showing the world's desert regions and places Australia's deserts into context with regard to its scope and the distribution of deserts across the world.

##### *(c) Arid land regions*

Australia's arid region is made up of 10 flat, lowland ecoregions and comprises 45 per cent of Australia's landmass amounting to 3.5 million sq km of terrain consisting of desert uplands, salt lakes, stony desert, sand plain and dune fields. The arid core of Australia centres on Lake Eyre in the far north of South Australia. Australia's arid ecoregions receive only sporadic rain and carry sparse vegetation. A distinctive feature is extreme variability in rainfall. Appendix C shows the distribution of Australia's arid regions.

<sup>2</sup> 2006 Year Book Australia, Number 88, Australian Bureau of Statistics, Canberra, ABS Catalogue No. 1301.0, p39.

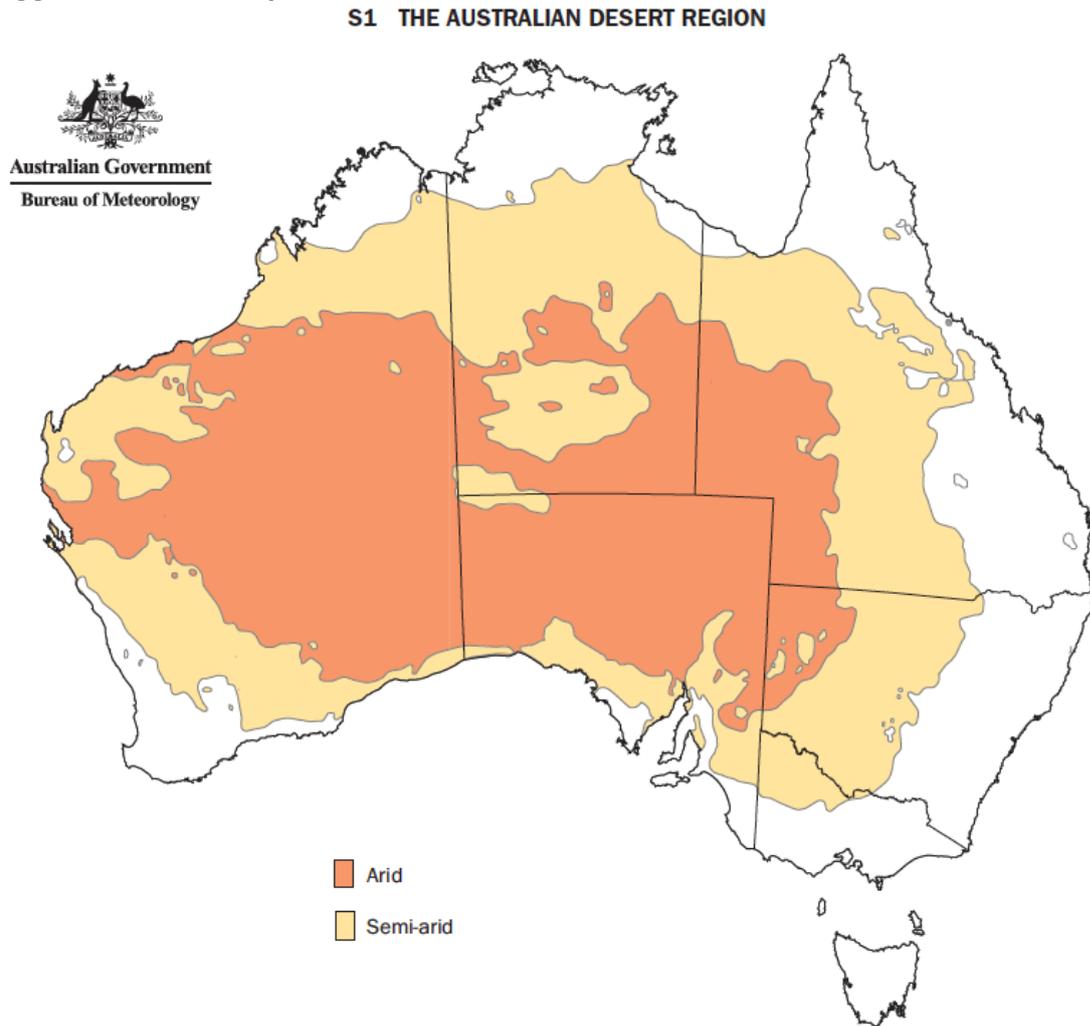
<sup>3</sup> Source: United Nations Environment Program, Global Deserts Outlook Report 2006, Chapter 1: The Desert

Biome: A Global Perspective.

**(d) Semi-arid land regions**

The semi-arid region comprises a further 24 percent of the Australian landmass amounting to 1.79 million sq km. The semi-arid lands lie approximately but not exclusively between 250mm and 500mm isohyets. The semi-arid lands extend north to Wyndham in the Kimberley and the Roper Valley in the Northern Territory, east to the slopes of the Great Dividing Range in Queensland and New South Wales, south to the Murray and Mallee in Victoria and south-west to the edge of the wheat belt in Western Australia.

**Figure 1: Distribution of Australian desert regions (arid and semi arid) based on a modified Köppen classification system.**



Note: Based on a modified Köppen classification system (see Endnote 2).  
Source: Australian Bureau of Meteorology.

Source: 2006 Year Book Australia, Number 88, Australian Bureau of Statistics, Canberra, ABS Catalogue No. 1301.0, p3.

**3.1.2 Coastal, temperate, tropical and sub tropical areas - population convergence**

The remaining 30 per cent of the total land mass comprises approximately 2.4 million sq km. This portion includes coastal, temperate, sub tropical and tropical regions made up primarily of the Eastern Highlands, Eastern Alluvial Plains and Lowlands and the South Australian Highlands.

The intensive concentration of populations in the coastal, temperate, tropical and sub tropical areas has entailed extensive land clearance and fragmentation of native vegetation in these areas. The process of urbanisation around capital cities is exacerbated through continual extensions to the urban growth boundaries of capital cities. The associated habitat loss and fragmentation has placed significant pressure on biodiversity in these areas.

### 3.2 AUSTRALIA'S POPULATION DRIVER

#### Summary of paragraphs

Para graph	Title	Para graph	Title
3.2.1	European settlement patterns - impact on biodiversity	3.2.4	Natural increase and net overseas migration
3.2.2	Population distribution and population projections	3.2.5	Australia's ecological footprint
3.2.3	Population growth and projections		

Population settlement patterns are concentrated in specific geographic bands, predominantly in the coastal, temperate, tropical and sub tropical areas which also have higher levels of water availability - see Appendix F. This has led to substantial and indiscriminate vegetation clearance in the areas.

The vegetation types in coastal and temperate climates is not replicated in the arid and semi arid regions and consequently the species adapted to these climates and habitat types, cannot relocate. Substantial species loss, vulnerability and threats are attributable to the process of indiscriminate clearance.

#### 3.2.1 European settlement patterns - impact on biodiversity

The predominantly hot and dry characteristics of the arid and semi arid regions of Australia meant that most of the available land was not suited to European settlement. Accordingly settlement has focussed on specific parts of the remaining 30 per cent of land in mainly coastal, temperate, tropical and sub tropical areas, leaving 70 per cent of the land mass with a very sparse settlement pattern.

It is within these coastal, temperate, tropical and sub tropical areas that more than 80 per cent of Australia's 22.3 million people are concentrated<sup>4</sup> and approximately 64 per cent of Australia's population, or 14.3 million people are located in capital cities. See Figure 2 showing the distribution of population density across Australia. This driver is ongoing and directly relates to biodiversity clearance.

The most intensive land use in these areas is the built environment which comprises some 24,000 sq km encompassing urban, periurban areas and open cut mines.

#### 3.2.2 Population distribution and population projections

Figure 2 demonstrates that most of Australia's population is concentrated in two widely separated coastal regions: the south-east and east, and the south-west. Of the two regions, the south-east and east are by far the largest in area and population. The population within these regions is clustered in urban centres, particularly in capital cities. Approximately 64

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<sup>4</sup> Estimated resident population at June 2010 based on ABS data in 2012 Year Book, Catalogue no. 1301.0. Federal Parliamentary Inquiry by House of Representatives into Australia's biodiversity in a changing climate. Submission by Liz Burton, Planning and Environment Advocate © 2012. 12

per cent of Australia's population, or 14.3 million people are located in capital cities.

Population numbers in the desert are very low and population density has a mean of 1 person per square kilometre<sup>5</sup>. In 2001 about 180,000 people lived in the centrally located arid zone of Australia. The Australian semi-arid zone supported a further 394,000 people. Overall the desert region of Australia is occupied by less than 600,000 people (or fewer than 3% of the total population) (Taylor).

### **3.2.3 Population growth and projections**

Australia's population growth rate is now higher than long term historical averages. In the year ending 31 December 2009, Australia's estimated resident population (ERP) had increased by 433,000 people to 22.2 million, a 2.0% increase from December 2008. This follows a peak rate of 2.2% or 460,000 people for the year ended 31 December 2008.

The rate of population growth has become considerably faster since the mid-2000s. Over the two decades prior to 2006, the annual growth rate had averaged 1.3%, adding an average of 234,000 people per year in that period. The recent growth rate of around 2% per year is faster than at any other time in the past several decades, and faster than nearly all other developed countries.<sup>6</sup> Following the peak growth rate for the year ended 31 December 2008, a correction back towards a longer term average has taken place with growth of 1.4% remaining steady for the last four quarters to September 2011.<sup>7</sup>

Australia's population is projected to increase to between 30.9 million and 42.5 million in 2056, and reach between 33.7 million and 62.2 million by 2101, depending on scenario modelling. At the lower end of the scale, a population of 30.9 million in 2056 entails growth of 38.56 per cent over 44 years, while at the higher end, a population of 42.5 million in 2056 entails growth of 90.58 per cent over 44 years, almost double the current population.

### **3.2.4 Natural increase and net overseas migration**

Australia's population growth has two components: natural increase and net overseas migration. Although the natural increase has grown since the early 2000s, growth in net overseas migration (NOM) has been the main driver of population growth over the last few years. In the three years to December 2009, NOM made up almost two-thirds (64%) of population growth. This compares with the longer term average where NOM has contributed to less than half of the population increase.

### **3.2.5 Australia's ecological footprint**

An independent report to the Minister for Sustainability, Environment, Water, Population and Communities, entitled: State of the Environment 2011, draws attention to Australia's large ecological footprint. It comments that a range of measures of a society's ecological footprint are available. These measures take into account the amount of natural resources consumed by people and area of land required to support that consumption.

One of these is the Global Footprint Network, which ranks Australia's ecological footprint

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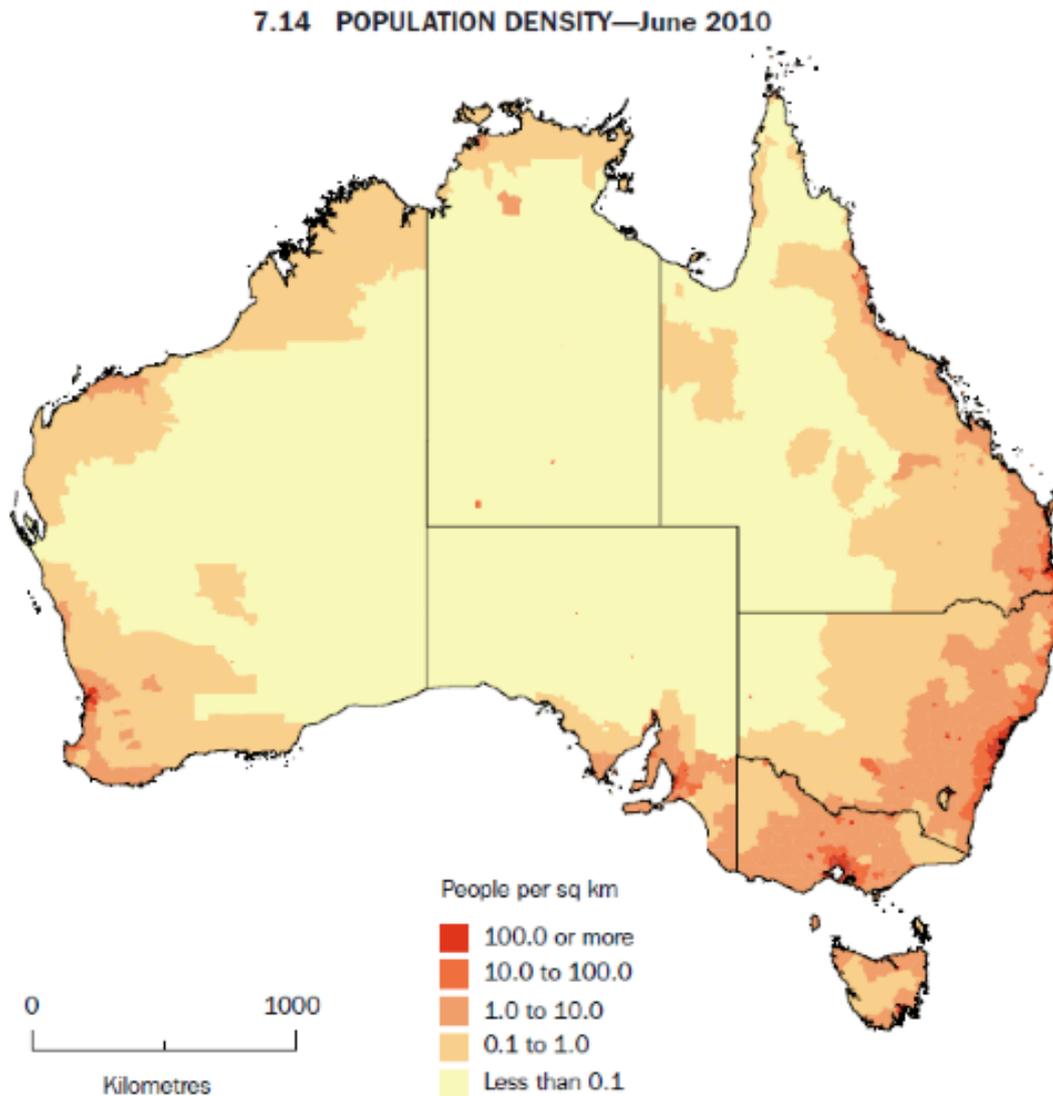
<sup>5</sup> United Nations Environment Programme, Global Deserts Outlook Report, 2006, Executive summary.

<sup>6</sup> Australian Bureau of Statistics, Canberra, ABS Catalogue No.4102.0, Australian Social Trends, Jun 2010.

<sup>7</sup> Australian Bureau of Statistics, Canberra, ABS Catalogue No. 3101.0 - Australian Demographic Statistics, Sep 2011.

as the eighth largest of all nations. This high footprint is mainly attributable to Australian lifestyles which use high levels of natural resources inefficiently. The footprint of the non Indigenous population is around 9 global hectares per person<sup>8</sup> while the average ecological footprint of the Indigenous population is 6.4 global hectares per person.

Figure 2: Australian population density and distribution - 2010



Source: *Regional Population Growth, Australia (3218.0)*.

Source: Australian Bureau of Statistics, *Regional Population Growth Australia*, Catalogue No. 3218.0

The impact of this on biodiversity is not readily translatable for the following reasons: (a) people in other countries obtain their resources from Australia; (b) the land from which Australians obtain their resources is not restricted to Australia and (c) the

<sup>8</sup> "Global hectares are a measure of biocapacity - one global hectare is an average of all hectare measurements of biologically productive areas on Earth". Chapter 8 "Biodiversity" in *State of the Environment 2011*. Report to Federal Minister of Sustainability, Environment, Water, Population and Communities, prepared by an independent committee of experts.

calculations do not reveal in details which resources are taken from which ecosystems and which species are affected. Nevertheless documented impacts on biodiversity depletion and its relationship to areas of high population is evident. Figure 3 provides threatened species by biogeographic regionalisation of the Australia subregion.

### 3.3 ECONOMIC AND INDUSTRY DRIVERS

#### Summary of paragraphs

Para graph	Title	Para graph	Title
3.3.1	Planning and development	3.3.3	Recommendations
	(a) Planning inconsistencies and lack of cross-sectoral coordination		(a) Mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate
	(b) Extensions to urban growth boundaries and low population density		(b) Governance arrangements
	(c) Monitoring the outcomes of land clearance		(c) Australian industry sectors
3.3.2	Australian industry sectors		

Australia's economic reliance on raw material extraction and natural assets harvesting as core economic pillars is a major contributor to biodiversity decline. A transition to a knowledge based economy and one that generates greater innovation is necessary both to diversify the economy, to improve its competitiveness and to position it to take advantage of the opportunities created by climate change.

The World Economic Forum's "Global Competitiveness Report" 2011-2012 specifically cites innovation as a critical driver that is lagging in Australia.

"On a less positive note, Australia still lags behind the top performers of the GCI when it comes to innovation (22nd) and business sophistication (29th), two critical drivers of competitiveness for advanced economies". p28

Competing demands for land use has resulted in a range of ongoing pressures on biodiversity. These include pressures from planning and development and from the core Australian industry sectors.

#### 3.3.1 Planning and development

##### *(a) Planning inconsistencies and lack of cross-sectoral coordination*

The findings of research carried out by Griffith University and RMIT academics in a monograph series on peri-urban continuity and change in Australia,<sup>9</sup> highlight ongoing spatial fragmentation in the areas under investigation: the greater Melbourne region and south-east Queensland.

Attention is drawn to the inadequacy of planning tools and lack of cross-sectoral policy and planning responses leading to sub optimal planning outcomes. Case studies in Queensland and Victoria by researchers have identified a range of State based planning scheme drivers that result in land fragmentation.

<sup>9</sup> Buxton, M., Tieman, G., Bekessy, S., Budge, T., Butt, A., Coote, M., Mercer, D., O'Neill, D. and Riddington, C., (2007) Change and Continuity in Peri-urban Australia, Peri-Urban Case Study: Bendigo Corridor, Monograph 2 - Change and Continuity in Peri-Urban Australia, RMIT University, Melbourne.

"Available planning tools are often vague and difficult to apply, and land use policies inadequate. Similarly, catchment management policies are often general, difficult to apply and omit the full use of the land use planning system and other regulatory tools as means of implementation. The discretionary nature of planning tools has led to widespread misapplication of these tools. Regional planning is effectively non-existent. There is insufficient coordination between local councils, regional management authorities, and state government, and insufficient integration between state government agencies. Such extensive failure to achieve integrated cross-sectoral policy and planning responses points to serious institutional failure". (Buxton *et al*, 2007: 10).<sup>10</sup>

The structural inadequacies embedded in the States' planning provisions effectively ensure systemic failure in the management of land use and this is particularly evident in the sensitive peri urban areas when they are subdivided for housing.

***(b) Extensions to urban growth boundaries and low population density***

In the urban growth boundaries, the drivers of fragmentation are peri-urbanisation processes which involve the sale and split up of multi titled farms comprising small lots. In the case of south-east Queensland, Buxton *et al* found that each property split was below the regulated minimum of 100 hectares. Land use intensification accompanies land use fragmentation.

Extensions to the urban growth boundaries of capital cities are a significant source of biodiversity loss. The population density of these outer metropolitan suburbs is considerably lower than inner and medium band suburbs. According to Michael Buxton and Jan Scheurer of RMIT University, Governments across Australia are allowing outer urban areas to be developed at average densities that are among the lowest in the world.<sup>11</sup>

"The debate over urban consolidation in Australia has generally ignored the issue of density in the outer urban suburbs of Australian cities, an omission that has led to a serious inconsistency in policy".<sup>12</sup>

Melbourne population densities illustrate this point. In June 2011, population densities in inner Melbourne were 3500 or more people per sq km while outer Melbourne had densities ranging from 400 to 1500 and 1500 to 2500. There is a need to achieve a standard of at least 3000 people per sq km as a minimum level of density for growth areas to avoid significant disparities in the administration of the state planning scheme.

Attempts at restraining the boundaries of capital cities have been unsuccessful, particularly in Melbourne where the urban growth boundary has been extended on several occasions, despite the introduction in 2002 of the "Melbourne 2030" planning policy and its successors, including "Melbourne @ 5 million", which specifically aim to consolidate population growth within the existing urban boundary.

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<sup>10</sup> Buxton, M., Tieman, G., Bekessy, S., Budge, T., Butt, A., Coote, M., Mercer, D., O'Neill, D. and Riddington, C., (2007) Change and Continuity in Peri-urban Australia, Peri-Urban Case Study: Bendigo Corridor, Monograph 2 - Change and Continuity in Peri-Urban Australia, RMIT University, Melbourne, p 97.

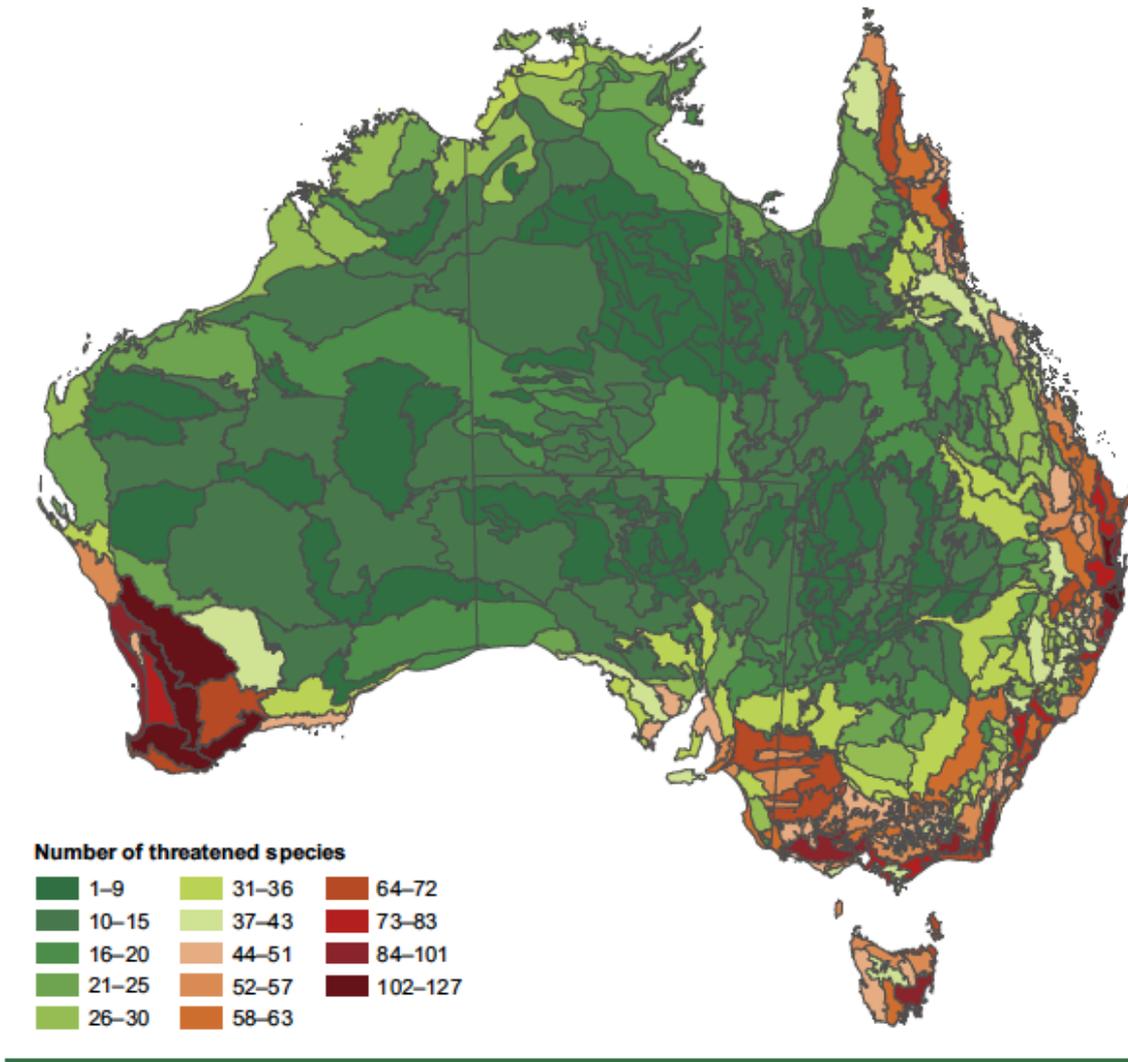
<sup>11</sup> Buxton, M. and Scheurer, J. 'Density and Outer Urban Development in Melbourne', in City Structures 07, p1.

<sup>12</sup> Buxton, M. and Scheurer, J. 'Density and Outer Urban Development in Melbourne', in City Structures 07, p1.

*(c) Monitoring the outcomes of land clearance*

Planning schemes do not contain provision for the monitoring and verification of assertions made by consultants to justify land clearance. Projections about the effects on neighbouring biodiversity and ecosystems are never evaluated for verification and monitoring is not a requirement for the approval of any project.

**Figure 3: Threatened species by biogeographic regionalisation of the Australia subregion**



Source: Chapter 8 "Biodiversity" in State of the Environment 2011. Report to Federal Minister of Sustainability, Environment, Water, Population and Communities, prepared by an independent committee of experts.

Each project is assessed separately and as there is no data collected of the environmental effects of previous decisions, adverse impacts on biodiversity have scope to be repeated across each state and territory. The state planning schemes contain significant gaps in their processes regarding biodiversity outcomes and the lack of decision monitoring and evaluation is an important deficit in accountability for outcomes.

### 3.3.2 Australian industry sectors

There is an absence of vision for the Australian economy to contribute to the Asian region

as the leading knowledge based democracy. Australia has the capacity to diversify its economy towards a knowledge base but the vast supply of natural resources acts as a disincentive for change.

As noted under the Preface above, the Australian economy is heavily reliant on raw material extraction, natural assets harvesting, primary production and the consumption of goods and services, all of which impact on land and coastal use.

The Australian economy is skewed towards the delivery of tangible assets rather than focusing on innovation, intellectual property and invention, although it has the capacity to develop in this direction. For example Australia is well placed to develop partnerships between business, industry and university researchers and build regional networks to develop innovation in high technology industries such as information technology, telecommunications and biotechnology.

A current example of the fierce contest between economic activity in the form of raw material extraction and biodiversity clearance is the proposed CoalPac Consolidation Project (New South Wales). The proposed \$123 million expansion and consolidation of two open-cut and high wall coal mines, near Cullen Bullen in central-western NSW was exhibited in March 2012. The data contained in the environmental impact assessment documents is extensive and demonstrates vast removal of native vegetation and associated disturbance of native fauna.

The project will clear woodland and open forest. Among the wide ranging impacts of habitat removal, a bird, the brown tree creeper, is identified as being threatened by the clearance. Full details of this extensive clearance proposal and its biodiversity implications are provided in the EIS, Appendix J, Ecological Impact Assessment available at the following website:

<https://majorprojects.affinitylive.com/public/d7caed36740f06922557e55dc5d9a780/20.%20Coalpac%20Consolidation%20Project%20-%20Appendix%20J.pdf>.

A number of barriers stifle innovation and while this is outside the Committee's Terms of Reference, it is possible to consider reference in its report to the relevance of industry sectors on placing continuing pressure on land use.

### **3.3.3 Recommendations**

#### ***(a) Mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate***

That a national approach to protection of vegetation corridors and biomass be initiated to protect the capacity of native vegetation to perform high quality bioservices and the selected areas be gazetted for conservation and included in the EPBC Act and / or other relevant legislation;

#### ***(b) Governance arrangements***

That consideration be given to referring to the Council of Australian Governments (COAG) the following proposals concerning biodiversity policy reforms of national significance:

- That the population density in urban growth corridors be regulated to ensure comparability with the inner to medium band metropolitan areas with minimum

densities ranging between 2500 to 3500 people per sq km to limit the need for the cycle of urban growth boundary extensions;

- that state planning schemes be amended to require planning authorities to monitor, evaluate and report on biodiversity outcomes involving land clearing, particularly for extensions to the urban growth boundaries of capital cities;
- that the information gained through monitoring and reporting on planning decisions concerning biodiversity be applied by state planning authorities to reviewing planning policies aimed at improving biodiversity conservation;
- that the responsible planning authorities (local governments) be required to include in their annual Council plans, a plan and annual targets on the condition of biodiversity in their municipalities;
- that a biodiversity plan and funding contribution scheme be introduced into state subdivision legislation applying to native vegetation clearance on sites of 0.2 of a hectare or more and that developers be required to: (a) develop and implement a plan to address the biodiversity loss through advancing biodiversity in other parts of the municipality; and / or (b) to contribute to a state fund established to fund biodiversity projects and research.

***(c) Australian industry sectors***

That consideration be given to including reference in the Committee's report to the relevance of Australia's industry sectors on placing continuing pressure on land use and therefore on biodiversity.

**3.4 PROJECTED EFFECTS OF CLIMATE CHANGE AND GOVERNANCE**

**Summary of paragraphs**

Para graph	Title	Para graph	Title
3.4.1	Climate change governance	3.4.3	Climate change and Australian deserts
3.4.2	Climate change projections		

**3.4.1 Climate change governance**

Australia's response to climate change currently relies on a number of relatively uncoordinated, individual programs, including introduction of the carbon tax, carbon pollution reduction targets, renewable energy targets, building code minimum requirements for energy efficiency and coastal planning scheme amendments in response to sea level rises but there is currently an absence of a national strategic framework response to climate change. Accordingly, performance outcomes lack a coherent framework, accountability structures are vague and indeterminate and funding priorities uncoordinated.

**3.4.2 Climate change projections**

The 2007 report on Australia and New Zealand for the Intergovernmental Panel on Climate Change, "Australia and New Zealand. Climate Change 2007: Impacts, Adaptation

and Vulnerability"<sup>13</sup>, outlines a number of projected significant climate change impacts including increased weather turbulence and extreme events, droughts, heatwaves, coastal inundation, wildfires, adverse economic impacts, species threats and high levels of vulnerability in named specific hot spots.

Additionally it warns that significant loss of biodiversity is projected to occur as early as 2020 in some ecologically rich sites, including the Great Barrier Reef, Queensland Wet Tropics, Kakadu wetlands, south-west Australia and the alpine areas.

It is observed in the Report that natural systems have limited adaptive capacity and that projected rates of climate change are very likely to exceed rates of evolutionary adaptation in many species. Habitat loss and fragmentation are very likely to limit species migration in response to shifting climatic zones.

The wide-ranging projections contained in the Report, many of which are assessed in terms of high levels of confidence regarding likelihood of occurrence, appear to warrant immediate and robust responses involving all levels of government. However action is often taken retrospectively, for example floods in Queensland in 2010, wildfires in Victoria in 2009, or not at all, for example the Great Barrier Reef.

In March 2012, a mission from the UNESCO World Heritage Centre's Marine Program took the remarkable step of attending Australia over concerns about coal and gas port expansions in the vicinity of the Great Barrier Reef. Threats to the reef include industrial and port development, ocean acidification and climate change and a projected 40 per cent population increase in the reef catchment area.

Concerns were raised about the cumulative effect of decisions taken individually without a strategic context for the reef and that a precautionary approach was not being exercised. It was noted that the UN mission was to recommend in May 2012 as to whether the Great Barrier Reef should be declared "in danger".

### **3.4.3 Climate change and Australian deserts**

With the expected warming of global temperatures over the next century owing to increased levels of greenhouse gases in the atmosphere, Australia's deserts are expected to warm. CSIRO projections indicate that the warming rate in the arid zone is likely to be comparable with global average levels, which are expected to be between 1.4°C and 5.8°C higher than current temperature averages, by 2100<sup>14</sup>. Rainfall projections are more uncertain and differences may occur between the northern and southern parts of the arid zone.

Rainfall is more likely to decrease in the southern part of the arid zone, especially in Western Australia where a decrease is highly probable. There is no clear tendency towards either significantly drier or wetter conditions in the northern half of the arid zone although much of it has experienced a rainfall increase since 1960.

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<sup>13</sup> Hennessy, K., B. Fitzharris, B.C. Bates, N. Harvey, S.M. Howden, L. Hughes, J. Salinger and R. Warrick, 2007: Australia and New Zealand. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 507-540.

<sup>14</sup> 2006 Year Book Australia, Number 88, Australian Bureau of Statistics, Canberra, ABS Catalogue No. 1301.0, p9.

The boundaries of the deserts have not been stable. Shifts in global climate have caused the southern deserts to expand or contract. The margins of the deserts often provide the clearest evidence for environmental change. Examples include the fossil linear dunes which occur well beyond the margins of the Australian arid zone, extending in southern mainland Australia into north-eastern Tasmania and beneath King Sound in the north of Western Australia.

Considering the desert in terms of a climatic definition rather than in terms of the process of "desertification", mid range CSIRO projections suggest that by 2070 the southern boundary of the Australian desert would be expected to move south by 100-200 km with the northern boundary moving less than 50 km<sup>15</sup>.

*Considering the desert in terms of a climatic definition rather than in terms of the process of "desertification", mid range CSIRO projections suggest that by 2070 the southern boundary of the Australian desert would be expected to move south by 100-200 km with the northern boundary moving less than 50 km<sup>1</sup>.*

### 3.5 GOVERNANCE

#### Summary of paragraphs

Para graph	Title	Para graph	Title
3.5.1	Natural asset accounting framework	3.5.2	Recommendation

#### 3.5.1 Natural asset accounting framework

It would be fair to comment that managing Australia's natural resources in the context of climate change, the resources boom, global energy demand and Australia's capacity to generate wealth from its mineral and energy resources, present significant challenges in terms of economic and public policy decisions.

The absence of a national strategic vision for Australia militates against prioritising natural resources over short-term economic benefits and advances decisions in favour of perceived economic gains.

Australia's natural resource assets have been valued but as these are not traded they tend to be discounted when decisions impacting on them are taken. The emphasis in approving projects where impacts on biodiversity are identified and documented, tends to be on managing the risk of environmental impacts. Since all projects referred to above involve environmental impacts it is reasonable to introduce an environmental levy, based on a percentage of the projected project revenue, to assist with rehabilitation and research.

Additionally, an accounting framework such as the one prepared by the Australian Natural Resources Atlas, (see <http://www.anra.gov.au/topics/economics/accounting-framework/index.html>) needs to be developed as part of a national strategy on natural resource management.

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<sup>15</sup> 2006 Year Book Australia, Number 88, Australian Bureau of Statistics, Canberra, ABS Catalogue No. 1301.0, p9.

### **Recommendation**

That an environmental regeneration levy be introduced, to be paid by major development projects, based on a percentage of the projected value of operations. The levy to apply to operations that have a direct environmental impact. These include: mining, coal seam gas extraction, housing (land clearance), forest logging, agriculture (involving land clearance). The funds generated are to form a national environmental fund intended for environmental rehabilitation and research.

### **3.5.2 ANNOUNCED CHANGES TO ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT)**

The set of changes to the Act announced by the Federal Minister for the Environment has several elements that are likely to ensure further declines and increase their rate. These include:

- (a) the Commonwealth has agreed to enter into fast-tracked agreements with each State to transfer its powers of assessment and approval under the EPBC Act to the States. This will cover all developments apart from those that affect world heritage, commonwealth marine waters and nuclear actions;
- (b) the proposed streamlining of the assessment process for business to cut red tape without providing resources to deliver decisions within 35 business days;
- (c) introducing the concept of nationally significant ecosystems for protection (the subject of the Committee's Terms of Reference) which raises questions about the treatment of those that are not considered significant and appears to underestimate the system of interconnections between them;
- (d) advancing the concept of offsets which assumes that further biodiversity loss can be offset.

The transfer of powers to the states means that the entity advancing a development project is also responsible for evaluating its environmental impacts. This system removes the checks and balances needed for impartial and rigorous assessment. Additionally, the states have lower levels of environmental protection standards than the federal government and the transfer of powers to the states increases the likelihood of further reduction of environmental protection standards.

The changes make no provision for the monitoring of development projects that impact on biodiversity in terms of comparing predicted impacts to actual. This lack of monitoring ensures that failures in decision making can be replicated because knowledge is not being gathered and used to inform subsequent decisions.

It is evident that the range of State and Federal legislative environmental protection provisions and policies are not containing species loss and threats, such that Australia is recognised as having one the highest rates of extinction in the world. According to the ABS Yearbook Australia 2009:

"Australia has experienced the largest documented decline in biodiversity of any continent over the past 200 years. Under the EPBC Act (End note 7), more than 50 species of Australian animals have been listed as extinct, including 27 mammal species, 23 bird species, and 4 frog species. The number of known extinct Australian plants is 48.

Australia's rate of species decline continues to be among the world's highest, and is the highest in the OECD."<sup>16</sup>

**Recommendation**

That the Committee reject the changes proposed to the EPBC Act on the grounds that:

- (a) the entity advancing a development project (ie the state) is also responsible for evaluating its environmental impacts;
- (b) the system removes the checks and balances needed for impartial and rigorous assessment; and
- (c) the states have lower levels of environmental protection standards than the federal government and the transfer of powers to the states increases the likelihood of further reduction of environmental protection standards.

**4. AUSTRALIAN BIODIVERSITY TRENDS**

**Summary of sections**

Section	Title	Section	Title
4.1	Australian Bureau of Statistics tracking	4.2	Australian Natural Resources Atlas

**4.1 AUSTRALIAN BUREAU OF STATISTICS TRACKING**

The Australian Bureau of Statistics (ABS) in its "Issues and Trends" and several other reports, tracks Australia's environment. A report in 2010 identifies that loss of native vegetation and habitat is a major threat to Australia's environment.<sup>17</sup> The Report notes that almost two-thirds of land in Australia has been modified for human uses and clearing of native vegetation continues to occur for urban development, agriculture and plantation forestry.

The 2010 ABS "Measures of Australia's Progress", under the topic "Biodiversity, Threatened fauna", makes compelling observations about trends regarding Australia's fauna:

"Since 2000, when the EPBC Act was introduced, the total number of listed threatened fauna species has increased by 37%, rising from 312 in 2000 to 427 in 2009. These increases may reflect taxonomic revisions and improved reporting in conservation status and do not necessarily mean a change in the conservation status of the fauna.

Of the list of threatened fauna species in 2009, just under half (46%) were listed as vulnerable, around two-fifths (41%) were listed as endangered or critically endangered, and just over one in ten (13%) were listed as extinct. The EPBC Act notes that species listed as either Extinct in the wild, Critically endangered, Endangered or Vulnerable are matters of national environmental significance.

Birds and mammals accounted for over half (54%) of the vulnerable, endangered or critically endangered species in 2009, while close to half of the extinct species were mammals (48%) and a further 41% were birds".<sup>1</sup>

<sup>16</sup> Australian Bureau of Statistics, ABS Statistics Category 1301.0 Year Book Australia 2009-10, p8

<sup>17</sup> Australian Bureau of Statistics, Data Category 4613.0 Australia's environment: Issues and Trends, Jan 2010

This data highlights the ineffectiveness of the EPBC Act's provisions and as noted under paragraph 3.5.2 above, the provisions of the Act are set to be further weakened through the withdrawal of Federal involvement in the approval of environmentally sensitive developments through delegation to the states.

#### **4.2 AUSTRALIAN NATURAL RESOURCES ATLAS**

The Australian Natural Resources Atlas, developed by the National Land and Water Resource Audit,<sup>18</sup> provides detailed research and documentation on Australia's native vegetation and biodiversity assets, their condition and history. The Native Vegetation Assessment component, applicable to conditions in 2001, includes documentation on the amount of native vegetation cleared and/or modified by state and territory in terms of area by square kilometres. For example in the case of New South Wales the amount of native vegetation clearance/modification at 2001 was 234,527 sq km while in Western Australia it was 183,887 sq km.

It identifies key impacts on native vegetation over the last 200 years. These are:

- clearing for broadacre agriculture and grazing on improved pastures
- logging, harvesting or disturbing selected forest species
- grazing native pastures
- changing fire regimes
- weeds and feral species, or exotic plants
- filling of wetlands in urban areas and clearing for transport corridors.

According to the National Land and Water Resources Audit's Australian Native Vegetation Assessment report, 2001, native vegetation clearance is focussed in areas of intensive land use and these areas coincide with major areas of population concentration and agriculture. Since European settlement approximately 32 per cent of native vegetation in the intensively used areas (mainly the agricultural and urban zones) has been cleared or highly modified.

##### **4.2.1 Land clearance**

Land clearance levels vary from state to state but the highest level of clearance has taken place in Victoria. As benchmarked in 1997, the area of native vegetation remaining in the intensively used areas was 37 per cent. In Western Australia the area remaining at that time was 56 per cent.

Major vegetation groups have been cleared for a variety of purposes including agriculture, mining, urban development, pastoralism, forestry, grazing. At 2001 the area of cleared/modified major native vegetation groups amounted to 982,051 sq km.

As significant land clearance is ongoing, there is a need for a national approach to protect vegetation corridors and biomass, particularly in the 30 per cent of land occupied by 80% of the population. The purpose of this is to ensure that ecosystem services are able to continue performing at a high standard and to conserve biodiversity. The Committee's Terms of Reference refers to "nationally important ecosystems", but this proposal seeks to

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<sup>18</sup> The Australian Natural Resources Atlas developed by the National Land and Water Resources Audit was administered by the Department of Environment, Water, Heritage and the Arts. The Atlas resources are online but are no longer being updated.

protect ecosystems that are good condition, performing well, contain species diversity and are desirable to conserve by virtue of their performance and delivery of ecosystem services. Additionally it is proposed that these areas be identified in the EPBC Act as not being available for land clearance and that this be not negotiable.

Auditing data is already available through the Australian Natural Resources Data Library, administered by the Department of Agriculture, Fisheries and Forestry. An analysis of regions is required to identify and evaluate ecosystems, the interconnections between them, the species in them, species behaviour and their movements across and between regions.

Although national parks may be viewed as serving this purpose, this is not necessarily the case. The above proposal relates to the identification of: (a) important areas of bioservices from native vegetation, ensuring the preservation of corridors across sections of the landscape in the coastal, temperate, tropical and sub tropical areas; and (b) the interrelationships and connectivity between them.

The table in Appendix B provides a summary of native vegetation groups affected by clearance and the reasons for clearance.

### **Recommendations**

1. That summaries of biodiversity tracking and time series comparisons be provided to members of parliament annually and that they be mandated to initiate strategies in their electorates to promote biodiversity conservation;
2. That disincentives to land clearance be introduced through the application of a clearance levy;
3. That the system of biodiversity loss offsets be discontinued on the grounds that the magnitude of vegetation and biodiversity loss in the one third of Australia outside the desert regions is too high to allow continued clearance, based on demonstrable evidence.

## **5. PROPOSED NATIONAL STRATEGY ON BIODIVERSITY IN A CHANGING CLIMATE**

### **Summary of sections**

<b>Section</b>	<b>Title</b>	<b>Section</b>	<b>Title</b>
5.1	Objectives for the introduction of a national strategy	5.2	Recommendations on national strategy

### **National strategy**

It is considered essential for Australia to develop a national strategy integrating the core drivers impacting biodiversity. Without an integrated strategy, conflicting priorities are likely to militate against measures aimed at biodiversity conservation.

#### **5.1 OBJECTIVES FOR THE INTRODUCTION OF A NATIONAL STRATEGY**

Biodiversity in a changing climate needs to be considered not as a stand alone subject but in the context of a coordinated national strategy on climate change. It is proposed that the objectives of the strategy are to address the convergence of three major impact forces on the natural environment, namely:

- (a) climate change;

- (b) structure of the Australian economy and impacts on biodiversity of natural resource commercial exploitation;
- (c) population growth and ongoing and indiscriminate native vegetation clearance

and to recommend opportunities to transition the Australian economy towards a knowledge and innovation base, as recommended by key business leaders and economists.

## **5.2 RECOMMENDATIONS ON NATIONAL STRATEGY**

### ***1. Mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate***

(a) That consideration be given to recommending to the Federal Government: (a) to prepare a national strategy on biodiversity asset conservation in a changing climate by establishing an independent multidisciplinary centre at a G8 university; (b) that the centre be headed by an internationally recognised professorial level scientist in the field of climate science, appointed to an Australian university and with senior management experience; (c) that the head of the centre lead the development of a national strategy plan and to identify the changes required in legislation and public policy aimed at managing the core drivers impacting on biodiversity, including:

- economic initiatives and structure of Australian economy;
- population growth rates and distribution;
- climate change vulnerabilities identified by organisations such as the IPCC and CSIRO as likely to affect Australia.

(b) The scope of the proposed brief for the national strategy is outlined below.

#### *(i) Scope for National Strategy brief*

- Prepare a draft national strategy on biodiversity asset conservation and the sustainable use of natural resources;
- Identifying key stakeholders and establishing a consultation framework;
- Identifying participants within the three tiers of government who would have portfolio accountability for implementation of the plans and engaging business, industry and stakeholder groups;
- Develop pathways to transition the economy away from natural asset exploitation towards strengths in knowledge and innovation and to develop pathways for capacity building;
- Undertaking global benchmarking to identify best practice climate change mitigation programs and evaluating and prioritising them for application in the Australian context.

#### *(ii) Assessment of vulnerabilities and public policy action:*

- Undertaking literature reviews, including the IPCC and CSIRO reports on climate change and systematically identifying the full range of climate change vulnerabilities considered to affect Australia and recommending to Federal

government on measures needed to mitigate impacts and on associated public policy development and public policy revision.

*(iii) Community engagement:*

- Setting up a framework for community engagement using focus groups from members of community groups to develop appropriate programs aimed at climate change mitigation and biodiversity conservation;
- Considering appointing voluntary role models at various age groups with defined roles and responsibilities to engage with community groups and organisations such as schools, TAFEs, universities, clubs and societies, aimed at facilitating local mitigation measures and biodiversity conservation;
- Setting up public acknowledgement of effective community based measures and acknowledgement of key individuals, schools, groups, organisations;
- Investigating ways in which technology and applications can be applied for communication including reporting on activities, participant contributions, online/multi-media fora engagement;
- Identifying appropriate international "sister cities" that have implemented best practice climate mitigation measures and biodiversity conservation to establish linkages for community collaboration.

*(iv) Best practice and benchmarking*

- Identifying and publishing world's best practice standards in climate change mitigation and applying them to key areas of public policy.

*(v) Training and resources*

- Developing a range of resources for all levels of government, aimed at climate change mitigation, risk assessment, management planning and auditing, including an analysis, management and documentation tool;
- Developing training programs for managers in all levels of government responsible for the delivery of climate change risk assessment;
- Developing the resources in (iv) and (v) above for Internet delivery;

**2. Proposed areas of research**

(a) It is recommended that areas to be researched for policy implementation include the following:

- (i) the need for diversification of Australia's key industry sectors and to transition to a knowledge-based and innovative economy aimed at substantial reduction of environmental impact than occurs with the current key sectors;
- (ii) investigation and modelling of native vegetation clearance in the temperate, tropical and sub tropical regions of Australia with attention to:
  - urban development patterns and determining the amount of clearance that can be tolerated within these areas before their environmental systems are endangered;

- the amount of clearance overall that can be tolerated before the system is impacted by the Australian desert hinterland;
- (iii) review of state planning policies with particular emphasis on the need to prevent extensive land clearance and fragmentation; coordination across the three tiers of government; and introduction of monitoring and accounting processes involving biodiversity loss in relation to biodiversity assets;
- (iv) legislative framework at federal, state and local government levels and adequacy of relevant legislation in preventing biodiversity loss and have potential to exacerbate the impacts of climate change;
- (v) the trend to globalisation of business investment and its projected implications for land use and environmental impact in Australia;
- (vi) carbon trading and bio banking and an assessment of how these policies are likely to impact on land clearance and fragmentation.

## **6. CONCLUSION**

The scientific research and published projections on climate change highlight a range of significant impacts on Australia but policy addressing these impacts is inadequate and lacks targets and accountability measures.

Biodiversity in a changing climate needs to be considered not as a stand alone subject but in the context of a coordinated national strategic framework.

Australia's three tiered government structure delivers a fragmented approach to native vegetation clearance. There appears to be an underlying assumption by government at all levels and by business and industry, that increasing levels of vegetation clearance and fragmentation in the 30 per cent of area outside Australia's desert regions, does not matter.

The convergence of three major impact forces:

- (a) climate change;
- (b) ongoing and indiscriminate native vegetation clearance; and
- (c) the impacts of natural resource commercial exploitation

are not well addressed in public policy and legislation despite the rigorous scientific assessments of their impacts.

There is significant need for a fundamental shift in the conceptualisation of our relationship to natural resources in the 30 per cent of coastal, temperate and tropical land which supports 80 per cent of the Australian population. It is in these non arid, mainly coastal and temperate areas of Australia, that the contest for territory is at its most ferocious, particularly in relation to biodiversity.

Australia's long standing reliance on agriculture and raw material extraction as core components of the economy needs to be reviewed with a new direction towards a knowledge and innovation based economy. The main driver of biodiversity loss involves

Australia's current major economic sectors and unless these are addressed, the protection of biodiversity can only be marginal.

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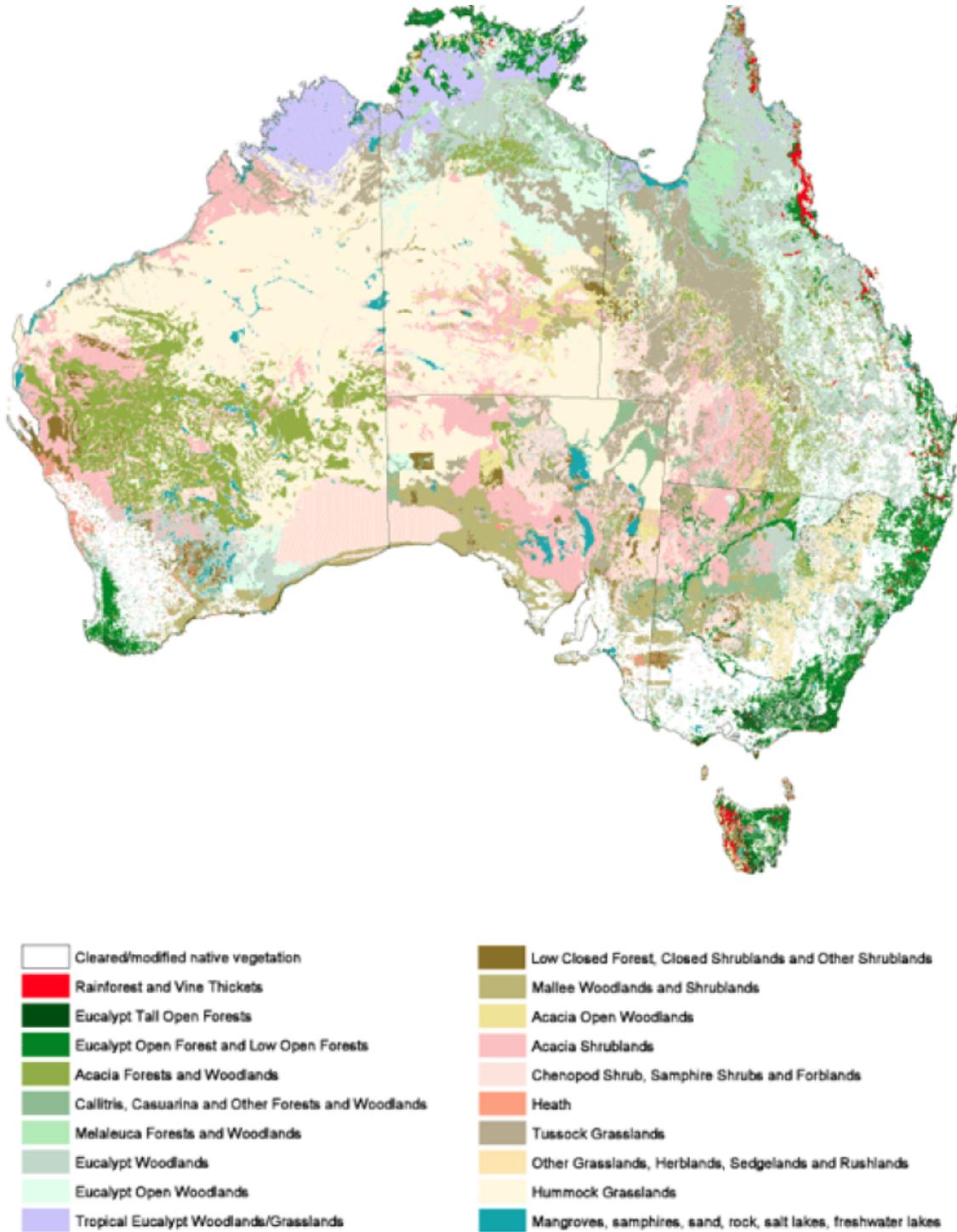
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8. APPENDICES

APPENDIX A

MAJOR VEGETATION GROUPS IN AUSTRALIA CIRCA 1997



Source: Major vegetation groups, National Land and Water Resources Audit 2001. Map was compiled from data collected at different scales by different organisations

**APPENDIX B**

**MAJOR VEGETATION GROUPS AFFECTED BY CLEARING AND REASONS FOR CLEARING AS MAPPED AT 2001**

<b>Major vegetation group</b>	<b>Purpose for clearing</b>	<b>Percent of pre-European extent cleared (%)</b>	<b>As a percent of all vegetation clearing in Australia (%)</b>
<b>Heath</b>	Heavily impacted by clearing for sand mining, agriculture, grazing or development mainly in southern coastal areas. Mallee communities, that occur in association with some heath communities, have similarly had extensive areas cleared, mainly for pastoral development in Victoria and South Australia.	45	2
<b>Low closed forests and closed shrublands</b>	Heavily impacted in coastal areas often as a result of urban development and clearing for agriculture.	45	0.7
<b>Mallee woodlands and shrublands</b>	Clearing of temperate mallee woodlands was encouraged by government over the last 50 years as part of the development drive for cereal cropping and pastoralism.	35	14
<b>Eucalypt tall open forests</b>	Largely cleared for forestry activities, agriculture, grazing and dams particularly where they occurred on flatter land in areas associated with better agricultural soils.	33	1.5
<b>Eucalypt woodlands</b>	An important remnant component of cereal cropping and pastoral zones. Cleared areas are very extensive, with the broad fabric of the landscape from a native vegetation perspective lost.	31	32
<b>Rainforest and vine thickets</b>	Most lowland occurrences have been cleared. The broad range of communities across Australia found within this major vegetation group masks the level of regional depletion of some rainforest and vine thicket communities.	30	1

**APPENDIX B**  
**(Continued)**

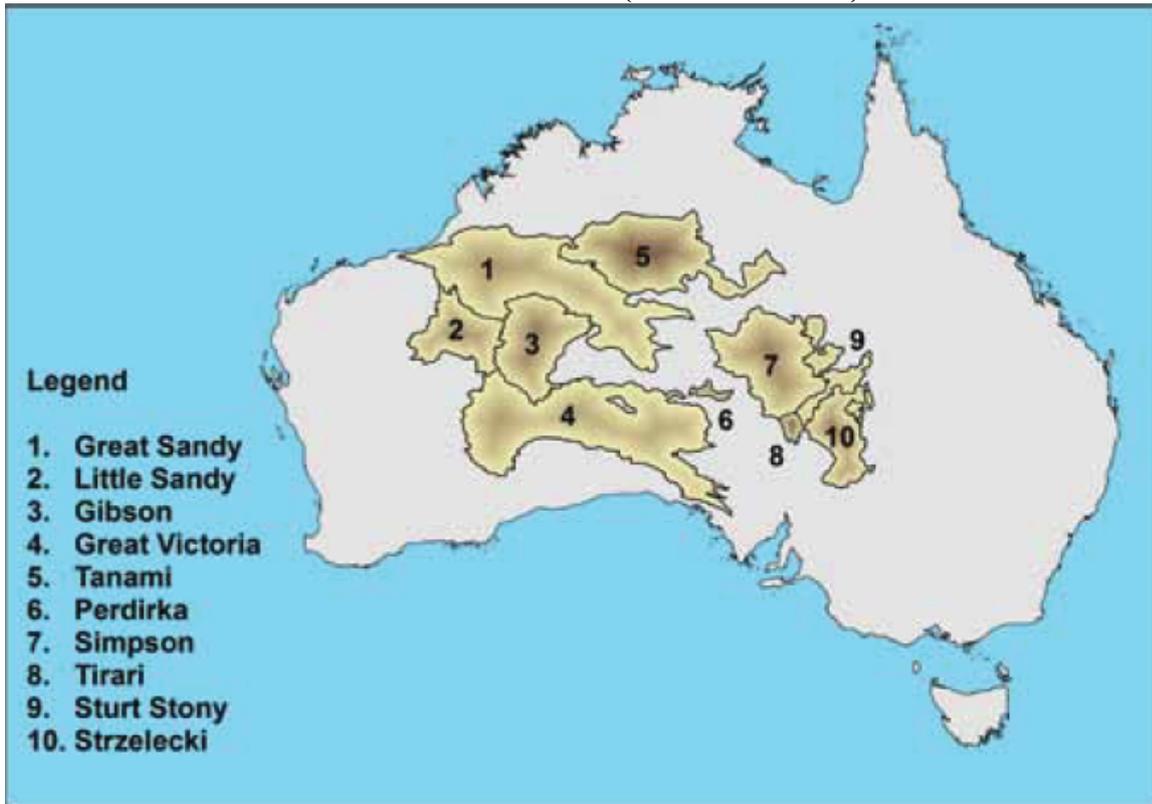
**MAJOR VEGETATION GROUPS AFFECTED BY CLEARING AND REASONS FOR CLEARING AS MAPPED AT 2001**

<b>Eucalypt open forests</b>	Clearing for grazing and agriculture in the major agricultural zones of eastern Australia and the south-west of Western Australia has been widespread.	29	10
<b>Eucalypt open woodlands</b>	An important remnant component of cereal cropping and pastoral zones. Cleared areas are extensive, with the broad fabric of the landscape from a native vegetation perspective lost.	25	13
<b>Inland acacia forests and woodlands</b>	Agricultural and pastoral development has led to major changes in extent and condition of these landscapes, especially in brigalow ( <i>Acacia harpophylla</i> ) and mulga ( <i>A. aneura</i> ) communities.	15	10
<b>Tussock grasslands</b>	Many of the tussock grasslands of eastern Australia have been either substantially cleared or heavily modified by grazing. The mapping of this vegetation type reflects where there is good information on native grasslands. There are known to be many other areas either not mapped or subject to change through grazing and introduced pasture grasses.	10	6

Source: Australia's Native Vegetation. A summary of the National Land and Water Resources Audit's Australian Native Vegetation Assessment 2001, Natural Heritage Trust.

APPENDIX C

DISTRIBUTION OF AUSTRALIAN DESERTS (ARID REGIONS)

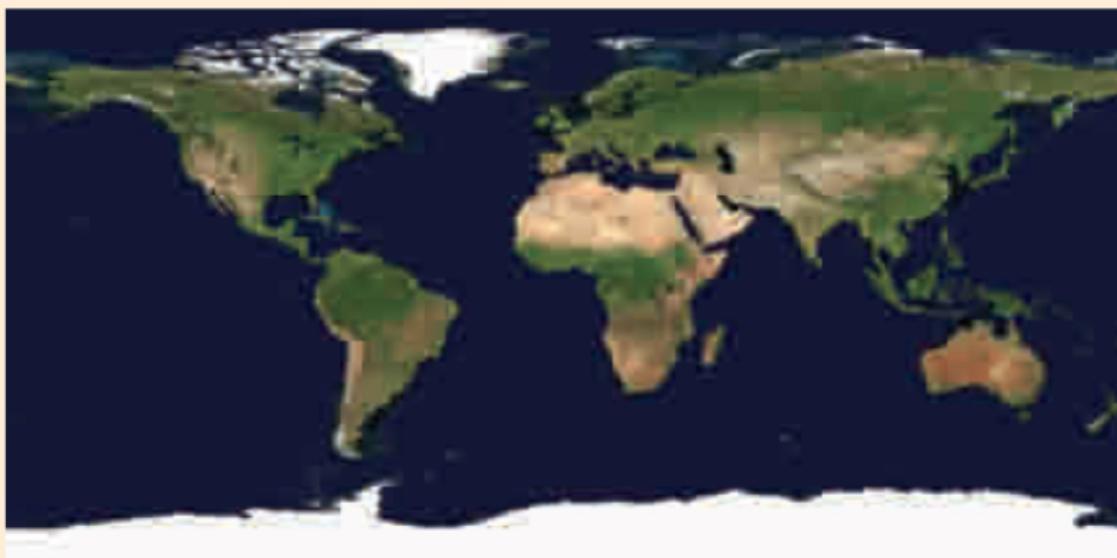


Source: International Year of Deserts and Desertification: Deserts in Australia. Distribution of Australian deserts (Produced by Environmental Resources Information Network - Australian Government Department of Environment and Heritage, 2006)

APPENDIX D

SATELLITE IMAGE SHOWING WORLD'S DESERTS

Figure 1.1: Vegetation - barren areas of the world



The vegetation-barren areas of the desert biome are clearly discernible in this satellite image of the earth, both north and south of the equator.

Source: NASA 2004

Source: United Nations Environment Program, Global Deserts Outlook Report 2006, Chapter 1: The Desert Biome: A Global Perspective.

## PROJECTIONS OF CLIMATE CHANGE IMPACTS ON AUSTRALIA AND NEW ZEALAND

SELECTED EXTRACTS FROM "CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE", CHAPTER 11, EXECUTIVE SUMMARY

### **Australia and New Zealand are already experiencing impacts from recent climate change (high confidence).**

These are now evident in increasing stresses on water supply and agriculture, changed natural ecosystems, reduced seasonal snow cover .... [11.2.1, 11.2.3]

### **The climate of the 21st century is virtually certain to be warmer, with changes in extreme events.**

Heatwaves and fires are virtually certain to increase in intensity and frequency (high confidence). Floods, landslides, droughts and storm surges are very likely to become more frequent and intense, and snow and frost are very likely to become less frequent (high confidence). Large areas of mainland Australia and eastern New Zealand are likely to have less soil moisture, ...(medium confidence) [11.3.1].

### **Potential impacts of climate change are likely to be substantial without further adaptation.**

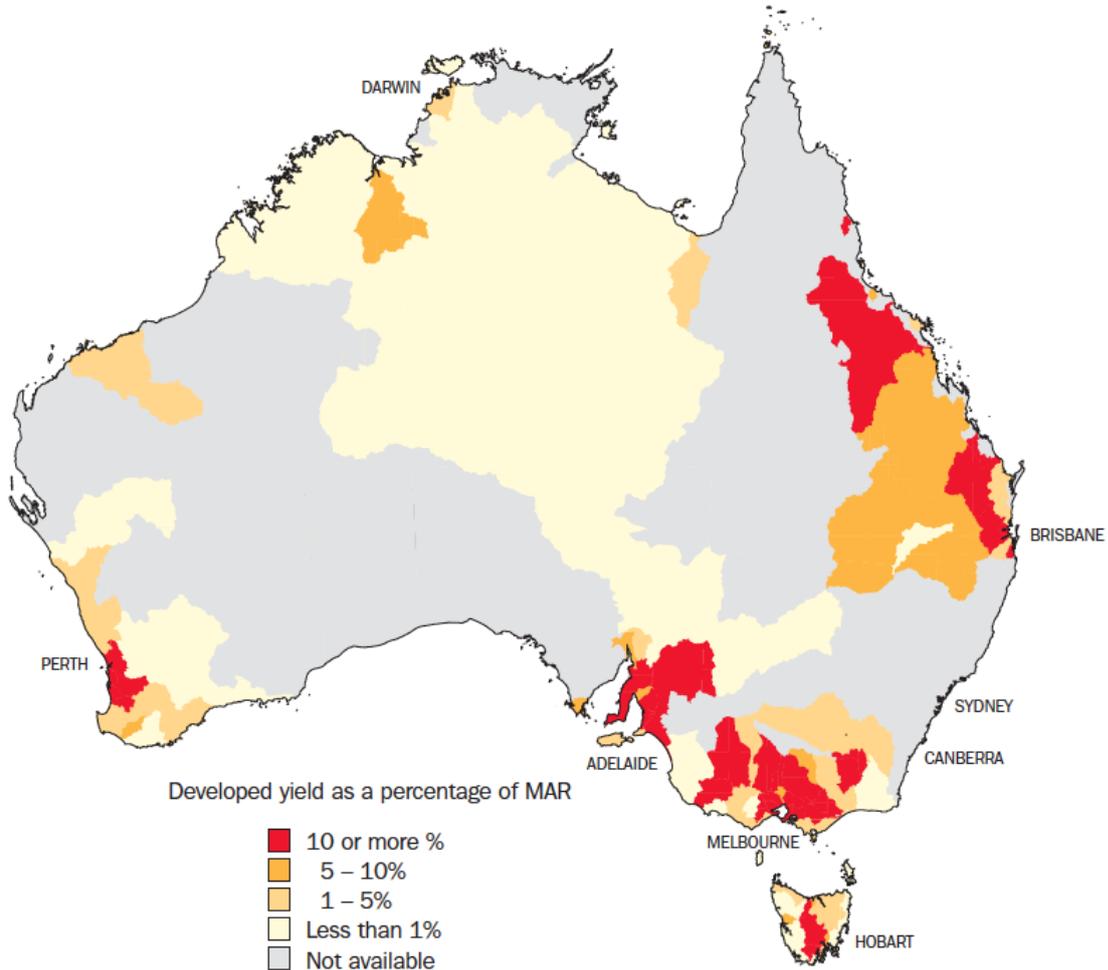
- As a result of reduced precipitation and increased evaporation, water security problems are projected to intensify by 2030 in southern and eastern Australia and, in New Zealand, in Northland and some eastern regions (high confidence) [11.4.1].
- Ongoing coastal development and population growth, in areas such as Cairns and south-east Queensland (Australia) and Northland to Bay of Plenty (New Zealand), are projected to exacerbate risks from sea-level rise and increases in the severity and frequency of storms and coastal flooding by 2050 (high confidence) [11.4.5, 11.4.7].
- Significant loss of biodiversity is projected to occur by 2020 in some ecologically rich sites, including the Great Barrier Reef and Queensland Wet Tropics. Other sites at risk include Kakadu wetlands, south-west Australia, sub-Antarctic islands and alpine areas of both countries (very high confidence) [11.4.2].

### **Vulnerability is likely to increase in many sectors but this depends on adaptive capacity**

- *Natural systems have limited adaptive capacity:* Projected rates of climate change are very likely to exceed rates of evolutionary adaptation in many species (high confidence) [11.5]. Habitat loss and fragmentation are very likely to limit species migration in response to shifting climatic zones (high confidence) [11.2.5, 11.5].
- *Vulnerability is likely to rise due to an increase in extreme events:* Economic damage from extreme weather is very likely to increase and provide major challenges for adaptation (high confidence) [11.5].
- *Vulnerability is likely to be high by 2050 in a few identified hotspots:* In Australia, these include the Great Barrier Reef, eastern Queensland, the South-West, Murray-Darling Basin, the Alps and Kakadu wetlands; (medium confidence) [11.7].

**SURFACE WATER, DEVELOPED YIELD, AUSTRALIAN CONTINENT**

24.10 SURFACE WATER, DEVELOPED YIELD, By river basin — 2000



Source: Adapted from AWRC; NLWRA 2001.

Source: 2006 Year Book Australia, Number 88, Australian Bureau of Statistics, Canberra, ABS Catalogue No. 1301.0, p575