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The Parliament of the Commonwealth of Australia

# Managing our coastal zone in a changing climate

***The time to act is now***

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

October 2009  
Canberra

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## Foreword

When the Committee received the terms of reference for this inquiry, little did we appreciate the level of interest and engagement it was to generate. Although it has taken some 18 months to conclude our report, it was time well spent.

The issues of concern raised in over 100 written submissions and 180 exhibits are reflected in the contents of our report. Our appreciation goes to everyone who engaged in that process either by written submissions or as witnesses at one of the 28 public hearings held around Australia. We also thank those who took the time to organise a range of informative site visits.

One clear message emerged – and that is the need for national leadership in managing our precious coastal zone in the context of climate change. I am optimistic that the Australian Government will meet that challenge. Indeed, many of the initiatives already instituted by the Department of Climate Change head in that direction.

Our 47 recommendations go to the heart of how national leadership can be provided in a collaborative framework with state and local government and how we can better engage the community in this endeavour.

I thank Committee Members for their bipartisan support on an issue of such national importance. The Committee secretariat, headed by Julia Morris, provided excellent administrative and research support. Thanks go to Dr Kate Sullivan, Inquiry Secretary, for her commitment, knowledge and enthusiasm.

It's one thing to read about the science but another to see first hand, as we did, the obvious and early negative consequences of climate change on our coastal zone. We trust our recommendations chart the way forward in better managing our coastal zone and giving practical expression to the theme: *'The time to act is now.'*

Jennie George MP  
Chair





## Membership of the Committee

Chair	Ms Jennie George MP
Deputy Chair	Dr Mal Washer MP
Members	The Hon John Cobb MP Mrs Yvette D' Ath MP (to 16/3/09) Mr Mark Dreyfus QC, MP Mrs Julia Irwin MP Ms Kirsten Livermore MP Ms Nola Marino MP (from 10/11/08) The Hon John Murphy MP (from 16/3/09) The Hon Bruce Scott MP Mr Jason Wood MP (to 10/11/08) Mr Tony Zappia MP

## Committee Secretariat

Secretary	Ms Julia Morris (from 25 May 2009) <sup>1</sup>
Inquiry Secretary	Dr Kate Sullivan
Senior Research Officer	Ms Sophia Nicolle (from 22 June 2009)
Research Officer	Ms Adrienne Batts (to 19 June 2009)
Administrative Officers	Ms Kane Moir (from 4 May 2009) Ms Jazmine Rakic (to 12 June 2009)

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<sup>1</sup> Ms Janet Holmes, Mr Richard Selth and Mr Peter Keele also held the position of Secretary for various periods from January 2008 through to April 2009. Ms Natalya Wells provided research support for the secretariat for a six-week period in mid 2009.



## Terms of reference

The Committee will inquire into and report on issues related to climate change and environmental pressures experienced by Australian coastal areas, particularly in the context of coastal population growth. The inquiry will have particular regard to:

- existing policies and programs related to coastal zone management, taking in the catchment-coast-ocean continuum
- the environmental impacts of coastal population growth and mechanisms to promote sustainable use of coastal resources
- the impact of climate change on coastal areas and strategies to deal with climate change adaptation, particularly in response to projected sea level rise
- mechanisms to promote sustainable coastal communities
- governance and institutional arrangements for the coastal zone



# List of recommendations

## 1 Introduction

### Recommendation 1

The Committee recommends that the Australian Government commission a study on international coastal zone governance arrangements, policies and programs for addressing coastal climate change impacts, and adaptation strategies. The completed study should be made public.

## 2 Climate change and the coastal zone: the science and the impacts

### Recommendation 2

The Committee notes the importance of mitigation measures in addressing climate change impacts and accordingly recommends that the Australian Government continue to take urgent action to ensure that Australia can best contribute to a reduction in global greenhouse gas emissions.

### Recommendation 3

The Committee recommends that the Australian Government increase its investment in coastal based climate change research on:

- sea level rise projections and the dynamics of polar ice sheets, particularly in the Antarctic
- extreme sea level events, including as a result of storm surge and tropical cyclones
- regional variations in sea level rise
- ocean acidification, particularly impacts on Australia's coral reefs, higher ocean temperatures and changing ocean currents

#### Recommendation 4

The Committee recommends that the coastal zone component of the National Climate Change Science Framework and proposed National Climate Change Science strategy be clearly identified by the proposed high level coordination group and involve key coastal stakeholders.

### 3 Climate change and the coastal zone: adaptation strategies and practices to promote resilience

#### Recommendation 5

The Committee recommends that the Department of Climate Change continue to fund research to:

- establish the wave climate around the coast so as to identify those locations most at risk from wave erosion
- examine how the wave climate nationally interacts with varying landform types

#### Recommendation 6

The Committee recommends that the Australian Government continue funding under the Climate Change Adaptation Skills for Professionals Program. In addition, the Australian Government should liaise with tertiary institutions to ensure an adequate supply of appropriately skilled coastal planners and engineers.

#### Recommendation 7

The Committee recommends that the Australian Government:

- continue the Local Adaptation Pathways Program as a competitive funding program
- review the program's guidelines to secure better outcomes by:
  - ⇒ use of consistent methodology for vulnerability assessments
  - ⇒ evaluation of the outcomes of the projects that are undertaken with the grants
  - ⇒ encouraging regional applications from local councils whenever possible

#### Recommendation 8

The Committee recommends that the Department of Climate Change share all data collected through vulnerability assessments undertaken as part of the Australian Government Local Adaptation Pathways Program on the proposed National Coastal Zone Database (see also recommendation 42).

#### Recommendation 9

The Committee recommends that the Australian Government establish a coastal zone research network within the National Climate Change Adaptation Research Facility and that it complete a coastal zone research plan.

#### Recommendation 10

The Committee recommends that:

- the Department of Infrastructure, Transport, Regional Development and Local Government undertake a study into the human and resourcing needs of local governments to effectively plan for and adapt to the impacts of climate change
- this study be carried out in conjunction with the Australian Local Government Association and the National Sea Change Taskforce

#### Recommendation 11

The Committee recommends that the Australian Government establish a National Coastal Zone Database to improve access to and consistency of information relevant to coastal zone adaptation. The National Coastal Zone Database should be an online portal that allows ready access to:

- 'first pass' National Coastal Vulnerability Assessment data
- state and local Digital Elevation Modelling
- National Climate Change Adaptation Research Facility reports
- federal Local Adaptation Pathways Program reports
- state and local coastal vulnerability assessment results

#### Recommendation 12

The Committee recommends that, following the completion of the 'first pass' National Coastal Vulnerability Assessment, the Australian Government consider the resourcing and financing of second and third pass assessments, in conjunction with state, territory and local government authorities.



### Recommendation 13

The Committee recommends that the Australian Government take urgent action to protect Australians from the threats of dengue fever and chikungunya virus. The knowledge gaps identified by the National Climate Change Adaptation Research Facility research plan with regards to the relationship between climate variation and vector-borne disease should be urgently addressed. The Australian Government should:

- undertake research into the relationship between climate change and vector-borne disease
- produce modelling to allow for advanced early warning of impending threats from vector-borne disease
- continue to work towards producing a structured national framework for dealing with mosquito outbreaks in Australia
- increase biosecurity measures to better protect against chikungunya virus entering Australia

### Recommendation 14

To further enhance Australia's disaster mitigation, preparedness, response and recovery arrangements in the event of possible major coastal disasters, the Committee recommends that the Australian Government establish a grants program, the Coastal Natural Disaster Mitigation Program, to fund natural disaster mitigation projects in the Australian coastal zone.

The Committee also recommends that the Australian Emergency Management Committee (AEMC) consider the following issues:

- improved data on coastal disaster risk assessment and vulnerable coastal sites
- improved access and evacuation routes for coastal communities
- improved coastal community awareness of and resilience to natural disasters
- improved coordination of coastal disaster mitigation arrangements with other initiatives currently underway, such as reviews of the Australian Building Code and land use planning policies to take into account climate change impacts
- improved early warning systems for coastal areas in the event of an extreme sea level event (storm surge, erosion, flooding)

The Committee further recommends that the AEMC provide a report on these matters to the Ministerial Council for Police and Emergency Management.

#### Recommendation 15

The Committee recommends that the Australian Government, through the Ministerial Council for Police and Emergency Management, recognise the extensive Surf Life Saving Australia network and take appropriate steps to integrate this network into emergency services preparedness, planning, and response systems and activities.

#### Recommendation 16

The Committee notes that major initiatives relating to climate change adaptation risk assessment and infrastructure are currently in progress. Given that much of Australia's infrastructure is in the coastal zone and the particular threats facing the coastal zone from climate change, involving significant socioeconomic costs, the Committee recommends that the Australian Government ensure there is a comprehensive national assessment of coastal infrastructure vulnerability to inundation from sea level rise and extreme sea level events.

#### Recommendation 17

The Committee recommends that the Department of Climate Change, in collaboration with the Queensland Government, CSIRO and Indigenous communities in the Torres Strait, undertake a major study into the vulnerability of the Torres Strait to the impacts of climate change and provide assistance in the development of an adaptation plan.

#### Recommendation 18

The Committee recommends that the Australian Government give the five recommendations calling for information, studies and data, as proposed by the Torres Strait Regional Authority, early and urgent consideration with a view to their implementation.

### 4 Key emerging issues: insurance, planning and legal matters relating to the coastal zone

#### Recommendation 19

The Committee recommends that the Australian Government request the Productivity Commission to undertake an inquiry into the projected impacts of climate change and related insurance matters, with a particular focus on:

- insurance coverage of coastal properties, given the concentration of Australia's population and infrastructure along the coast
- estimates of the value of properties potentially exposed to this risk
- insurance affordability, availability and uptake
- existing and emerging gaps in insurance coverage, with a particular focus on coverage of coastal risks such as storm surge/inundation, landslip/erosion and sea level rise (including the combined effects of sea inundation and riverine flooding)
- the need for a clear definition of the circumstances under which an insurance claim is payable due to storm surge/inundation, landslip/erosion and sea level rise, as well as due to permanent submersion of some or all of the land
- the possibility of a government instrument that prohibits continued occupation of the land or future building development on the property due to sea hazard
- gaps in the information needed to properly assess insurance risk and availability of nationally consistent data on climate change risks
- examining the key actions for governments proposed by the Insurance Council of Australia and the Insurance Australia Group in their submissions to this inquiry
- possible responses to a withdrawal of insurance for certain risks or regions, noting the increased burden this could place on government and taxpayers

#### Recommendation 20

The Committee notes the Council of Australian Governments initiative (through the Local Government and Planning Ministers Council) to develop state-specific climate change planning policies by mid 2011, to inform local governments and regional planning responses to climate change. The Committee recommends that the Australian Government ensure that the outcomes of this initiative are included as part of the action plan under the proposed new Intergovernmental Agreement on the Coastal Zone.

### Recommendation 21

The Committee recommends that the Australian Government consider the benefits of adopting a nationally consistent sea level rise planning benchmark and, if so, whether this be done on a statutory basis or otherwise. The outcomes of this consideration should then be included as part of the action plan for the proposed Intergovernmental Agreement on the Coastal Zone.

### Recommendation 22

The Committee recommends that the Building Code of Australia, including cyclone building codes, be revised with the objective of increasing resilience to climate change.

### Recommendation 23

Noting the gap in research on legal issues and climate change impacts on the coastal zone, the Committee recommends that the Australian Government request that the Australian Law Reform Commission undertake an urgent inquiry into this area, with particular focus on:

- clarification of liability issues with regard to public authorities acting or not acting in terms of climate change adaptation and possible coastal hazards (eg legal basis to implement adaptation strategies of protect, redesign, rebuild, elevate, relocate and retreat)
- clarification of liability issues with regard to private property holders acting to protect their properties from the impacts of climate change
- legal issues associated with the impacts of climate change on existing developments, as opposed to planned new developments
- mechanisms to ensure mandatory risk disclosure to the public about climate change risks and coastal hazards (eg legislation harmonised across all states requiring mandatory disclosure of all known and predicted risk data by state and local governments to property purchasers during property conveyance and title search processes)
- whether there should be broader indemnification of local government authorities

## 5 Sustainable coastal communities and environmental impacts on the coastal zone

### Recommendation 24

The Committee recommends that the Australian Government, through the Council of Australian Governments process, examine the establishment of a system of national coastal zone environmental accounts, employing the model developed by the South East Queensland Healthy Waterways Partnership.

### Recommendation 25

The Committee recommends that the Australian Government, through the Australian Bureau of Statistics, ensure that:

- accurate and consistent methods of measuring the numbers and the impact of tourists and other non-residents in coastal areas are undertaken to enable resources to be better matched with demand for infrastructure and services
- improved data on long-term demographic trends in coastal areas is made available to assist in coastal zone planning and management

### Recommendation 26

The Committee recommends that the Australian Government:

- expand the list of national priority areas identified under the Caring for our Country program to include climate change impacts on biodiversity
- give consideration in future funding rounds to projects that:
  - ⇒ involve working with state/territory and local governments to improve coastal land use planning
  - ⇒ seek to address loss of coastal habitat as a result of coastal development and population pressures

### Recommendation 27

The Committee recommends that, in seeking to expand the area protected within Australia's National Reserve System (NRS) under the Caring for our Country program, the Australian Government focus on high biodiversity coastal habitat, including more effective off-reserve coastal zone conservation and expanded coastal reserves that provide larger buffer zones. In undertaking this initiative, the Australian Government should continue to work with state/territory and local governments, Indigenous groups, conservation organisations, private landholders and other stakeholders to ensure that these protected areas are added to the NRS in a timely manner.

### Recommendation 28

The Committee recommends that the Australian Government, in considering its response to the Independent Review of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), take into account concerns about the EPBC Act and coastal zone management raised as part of this inquiry – in particular, the need to address the cumulative impacts of coastal development. This could be achieved by numerous means, including:

- a land clearing trigger
- defining coastal ecosystems as a matter of national environmental significance
- making more use of landscape-scale assessments through strategic assessments or bioregional plans

### Recommendation 29

The Committee recommends that the Australian Government:

- continue working with the Queensland Government and local councils under the existing Great Barrier Reef Intergovernmental Agreement to improve land use planning in the catchment
- commission analysis of the Great Barrier Reef as a case study for integrated coastal zone management (ICZM) in Australia. The study should draw out possible directions for ICZM in Australia with regard to:
  - ⇒ addressing challenges associated with climate change impacts on biodiversity

- 
- ⇒ declining water quality from catchment runoff and loss of coastal habitat from coastal development and population pressures
  - ⇒ building cooperative partnerships between Commonwealth, state and local government, and other stakeholders
  - ⇒ establishing governance and institutional frameworks

### Recommendation 30

The Committee recommends that the Australian Government urgently commission a detailed climate change vulnerability assessment for Kakadu National Park, in consultation with the park's traditional owners and other stakeholders and drawing on the results of the 'first pass' National Coastal Vulnerability Assessment of the park. This assessment should specifically focus on the vulnerability of Kakadu's freshwater wetland systems to saltwater intrusion. A key outcome of the assessment should be the development of a Climate Change Action Plan for Kakadu National Park, with coordinated input from the Australian Government and Northern Territory Government, Indigenous land owners, researchers and other stakeholders.

### Recommendation 31

The Committee recommends that the Australian Government:

- require that all Ramsar listed wetlands have effective and operational management plans and that resources are allocated by governments to monitor the implementation of these plans
- increase the number of coastal wetlands classified as Ramsar sites, particularly those classified as Nationally Important wetlands
- work with state and territory governments through the Natural Resource Management Ministerial Council, and in consultation with other stakeholders, to improve the management and monitoring of coastal wetlands, particularly Ramsar sites located in close proximity to development
- improve public awareness about what actions impacting on a Ramsar wetland should be referred to the Minister under the *Environment Protection and Biodiversity Conservation Act 1999*
- ensure that the National Guidelines for Ramsar Wetlands also include modules on the process for nominating Ramsar wetlands

- develop a climate change action plan for coastal Ramsar wetlands and Nationally Important wetlands

### Recommendation 32

The Committee recommends that the Australian Government:

- work through the Natural Resource Management Ministerial Council and in consultation with Birds Australia and other stakeholders to implement a National Shorebirds Protection Strategy. The strategy should focus on tightening restrictions on beach driving and access to bird breeding habitat, preserving habitat, identifying suitable buffer zones for migration of coastal bird habitat, managing pest animals and increased public education
- provide further funding to Birds Australia and other research groups to ensure continued monitoring and data collection with regard to migratory and resident shorebirds
- provide funding to strengthen partnerships between domestic and international shorebird conservation groups to increase awareness and conservation efforts in other countries
- commission a detailed climate change impact study on Australia's migratory and resident shorebirds
- in its consideration of amendments to the *Environment Protection and Biodiversity Conservation Act 1999* following the independent review, give consideration to the formal listing of coastal shorebird and sea bird communities as threatened species/ecological communities under the act

### Recommendation 33

The Committee recommends that the Australian Government:

- work with the Natural Resource Management Ministerial Council and other stakeholders to develop an action plan to:
  - ⇒ ensure that coastal buffers, coastal habitat corridors and high ecological value areas are identified and included in Commonwealth, state and local government management processes
  - ⇒ ensure appropriate infrastructure planning and that land is made available to allow for the migration of coastal ecosystems



- ⇒ promote cooperative ecosystem-based planning and management approaches across jurisdictions
- ⇒ implement a nationally consistent coastal and marine biodiversity monitoring and reporting framework
- ⇒ develop a targeted strategy to address key gaps in knowledge of coastal and marine biodiversity and improve access and sharing of knowledge and data
- ⇒ develop regional climate change adaptation policies and plans and integrate them into coastal and marine bioregional planning processes
- ensure that all future national coastal zone policy incorporates these priorities, as well as future revised national sustainability, biodiversity, climate change and environmental policy frameworks

#### Recommendation 34

The Committee recommends that coastal based Natural Resource Management bodies seeking funding under the Caring for our Country program have coastal and marine priorities, as well as coastal zone management principles integrated in their management plans.

#### Recommendation 35

The Committee recommends that the Australian Government, in consultation with Indigenous Australians and other coastal stakeholders, commission work to provide a national repository identifying Indigenous and non-Indigenous cultural heritage sites in vulnerable coastal areas.

#### Recommendation 36

The Committee recommends that the Australian Government urgently commission further research on socioeconomic vulnerability to climate change impacts, particularly in coastal communities.

### Recommendation 37

The Committee recommends that the Australian Government:

- consider the Victorian Government's model of a sustainable coastal community as part of the proposed Intergovernmental Agreement on the Coastal Zone to be concluded through the Council of Australian Governments
- ensure an early response to the recommendations provided in the Sustainability for Survival: Creating a Climate for Change – Inquiry into a Sustainability Charter report and the Sustainable Cities report

## 6 Governance arrangements and the coastal zone

### Recommendation 38

The Committee recommends that the Australian Government request that the Centre for Excellence for Local Government ensure a particular focus on capacity building for coastal local councils. Capacity building should focus on addressing issues relating to:

- population growth pressure
- planning and design of new infrastructure
- integrated coastal zone management
- climate change impacts and adaptation

### Recommendation 39

The Committee recommends that the Australian Government give consideration to establishing a separate funding program for infrastructure enhancement in coastal areas vulnerable to climate change. Such funding should be provided according to a formula requiring contributions, either financial or in-kind, from state governments and relevant local government authorities.

### Recommendation 40

The Committee recommends that the Australian Government undertake an awareness campaign to alert coastal communities to the key challenges facing the coastal zone and the value of community engagement in addressing these challenges. The campaign should aim to build understanding and awareness of coastal management issues to encourage the continued membership and support of volunteer networks in the coastal zone.

#### Recommendation 41

The Committee recommends that the Australian Government nominate 2012 as the Year of the Coast, to further build community awareness about the issues facing the coastal zone. The Australian Government should work with coastal stakeholders, volunteer groups and the general community in determining key activities as part of this initiative.

#### Recommendation 42

The Committee recommends that the National Coastal Zone Database be expanded over time to include information on environmental data and management and planning information relevant to the coastal zone.

#### Recommendation 43

The Committee recommends that the Australian Government provide funding support for the ongoing activities of the Australian Coastal Alliance in providing a national information and communication interface between research organisations and local government authorities and other coastal stakeholders.

#### Recommendation 44

The Committee recommends that the Australian Government, in cooperation with state, territory and local governments, and in consultation with coastal stakeholders, develop an Intergovernmental Agreement on the Coastal Zone to be endorsed by the Council of Australian Governments. The intergovernmental agreement should:

- define the roles and responsibilities of the three tiers of government – federal, state and local – involved in coastal zone management
- include a formal mechanism for community consultation
- incorporate principles based on strategic regional coastal planning and landscape scale/ecosystem based coastal zone management
- include an effective implementation plan with resources allocated to ensure that objectives are realised
- be overseen by a new Coastal Zone Ministerial Council
- be made public

#### Recommendation 45

The Committee recommends that the Australian Government:

- ensure that the Intergovernmental Agreement on the Coastal Zone forms the basis for a National Coastal Zone Policy and Strategy, which should set out the principles, objectives and actions that must be undertaken to address the challenges of integrated coastal zone management for Australia
- establish a broad based National Catchment-Coast-Marine Management program to provide funding for initiatives relating to:
  - ⇒ sustainable coastal communities
  - ⇒ climate change and biodiversity
  - ⇒ implementation of projects to progress integrated coastal zone management
- establish a National Coastal Zone Management Unit within the Department of Environment, Water, Heritage and the Arts to support the implementation of these national initiatives
- develop a Coastal Sustainability Charter based on the Victorian Government model

#### Recommendation 46

The Committee recommends that the Australian Government establish a National Coastal Advisory Council to:

- provide independent advice to government
- advise the new coastal unit within the Department of the Environment, Water, Heritage and the Arts
- ensure community input into national coastal zone policy, planning and management

#### Recommendation 47

The Committee recommends that proposals for a National Oceans and Coast Act and a statutory Coastal Council be the subject of ongoing consideration once the Intergovernmental Coastal Zone Agreement is determined.

## Introduction

*The Australian coastline represents one of our most iconic treasures.<sup>1</sup>*

*There is currently no collective long-term vision for our coast.<sup>2</sup>*

- 1.1 Australia's coastal zone is a significant national environmental asset that is also fundamentally important to our lifestyle and economy.<sup>3</sup> The majority of Australians – some 80 per cent of the population – live in the coastal zone.<sup>4</sup>
  - 1.2 However, as evidence presented to the inquiry demonstrates, the coastal zone is facing major pressures.
  - 1.3 Firstly, many thousands of kilometres of the Australian coastline have been identified as at risk from the threat of rising sea levels and extreme weather events due to the impacts of climate change. The concentration of Australia's population and infrastructure along the coast makes our nation particularly vulnerable to the coastal erosion and inundation that will accompany increases in sea level.
  - 1.4 Secondly, the growth in population along the Australian coastline and resulting intensification of land use is increasing pressure on the environment in many areas.
  - 1.5 Finally, governance arrangements for the Australian coastal zone have tended to be complex and highly fragmented across jurisdictions, sectors (environment, resource management, urban planning) and agencies.
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1 Professor Woodroffe, *Submission 24*, p. 8.

2 Professor Tomlinson and Mr Lazarow, *Submission 58*, p. 4.

3 The terms 'coastal zone' and 'coast' are used interchangeably in this report and refer to the catchment-coast-marine continuum, unless otherwise specified. (The 'coastal zone' can be variously defined according to linear boundaries such as the mean high water mark, local government administrative boundaries or biophysical features.)

4 Department of Climate Change, *Submission 85*, p. 3.

1.6 With responsibility for management of coastal areas shared between all levels of government, it has been widely argued that there is a need for national leadership to promote sustainable use of Australia's coastal zone and address growing concerns about climate change impacts on the coast.

1.7 As Professor Bruce Thom, a coastal geomorphologist and leading researcher in Australian coastal management, observed in his submission to the inquiry:

we have reached a stage when Commonwealth leadership in CZM [coastal zone management] is vital. Coastal problems are national, not just state or local. They do have, of course, state, regional and local manifestations. However, the implications of climate change, population growth and demographic change, and infrastructure needs do require, in my view, national direction and technical and financial support ... sustainable solutions for many of these problems risk being limited in time and location unless the Commonwealth can offer leadership in the form of consistent guidance and support to achieve sustainable outcomes of benefit to local economies, environments and social interests.

State, regional NRM [natural resource management] entities, and especially local councils, do not have the resources to provide continuity of policy thinking, of technical and information back-up, and of funding to meet the challenges of population growth, infrastructure needs and how best their communities can adapt to climate change, especially the insidious effects of rising sea levels.<sup>5</sup>

1.8 In their evidence to the inquiry, most state and territory governments called on the Australian Government to provide national leadership in coastal zone management through a cooperative approach. This view was summed up by the following submissions from the states and the Northern Territory:

National governance frameworks are essential to implementing a cross jurisdictional and national approach to coastal management and particularly, climate change ... there is a need for stronger national leadership on coastal management, particularly if the challenge of climate change is to be addressed effectively.<sup>6</sup>

The Federal Government has a key role in facilitating partnerships and showing leadership on issues of national importance.<sup>7</sup>

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5 Professor Thom, *Submission 6*, pp. 1-2.

6 Northern Territory Government, *Submission 106*, p. 26.

7 Victorian Government, *Submission 90*, p. 9.

Nationally consistent guidelines on how councils can adequately respond to climate change risks, such as potential sea-level rise would provide guidance for private sector investors and coastal communities.<sup>8</sup>

our submission ... calls for national leadership through an arrangement that respects and enhances individual jurisdictional roles and responsibilities empowered and guided by a cooperatively designed strategic framework for policy and action.<sup>9</sup>

There are ... a number of key challenges and information gaps that need to be addressed to meet the growing challenge of dealing with climate change impacts in the coastal zone ... further assistance and/or policy guidance would be beneficial at the national level.<sup>10</sup>

- 1.9 The Committee welcomes the cooperation of state and territory governments and support from local government for a national cooperative approach to integrated coastal zone management, driven by national leadership. The Committee agrees that this is an issue of national importance and that the time to act is now.

## Key coastal issues

### Climate change impacts

- 1.10 The Department of Climate Change notes that climate change impacts on the coastal zone 'will affect a majority of Australians and associated infrastructure because 80% of the Australian population lives in the coastal zone, and approximately 711,000 addresses are within 3km of the coast and less than 6m above sea level'.<sup>11</sup>
- 1.11 The Intergovernmental Panel on Climate Change (IPCC) estimates that a global rise in sea level of some 80cm is possible by 2100.<sup>12</sup> However, current models may have underestimated the rate of future sea level rise due to polar ice melt, and there will also be significant regional variations

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8 NSW Government, *Submission 55*, p. 5.

9 Western Australian Department of Planning and Infrastructure, *Submission 89*, p. 1.

10 Queensland Government, *Submission 91*, p. 5.

11 Department of Climate Change, *Submission 85*, p. 3.

12 See further discussion on IPCC sea level rise projections in Chapter 2.

to sea level rise.<sup>13</sup> Emerging research on extreme sea level events as a result of climate change (eg storm surge, wave changes, changes to rainfall and runoff) is another factor to be taken into account.

- 1.12 Past greenhouse gas emissions will lead to ongoing climate change and sea level rise over the 21st century, regardless of current and future mitigation action. Effective reduction in greenhouse gas emissions is essential to minimising future impacts and limiting temperature increases but adaptation measures must also be implemented to ensure that the unavoidable impacts of climate change are addressed.
- 1.13 On 20 December 2007, the Council of Australian Governments (COAG), under the leadership of the Prime Minister, the Hon Kevin Rudd MP, identified key areas for its 2008 work agenda, including 'climate change and water'.<sup>14</sup> One of the identified objectives of the COAG Working Group on Climate Change and Water is to ensure 'a national cooperative approach to long-term adaptation to climate change', including 'accelerating implementation of actions' under the National Climate Change Adaptation Framework across all jurisdictions.<sup>15</sup>
- 1.14 COAG endorsed the National Climate Change Adaptation Framework in April 2007 as the basis for collaboration between governments to respond to climate change impacts. The framework sets out actions to assist the most vulnerable sectors and regions to adapt to the impacts of climate change. The coastal zone is identified as one of eight key vulnerable sectors and regions:

The coastal zone is vulnerable to sea level rise, increased sea surface temperature, increased storm intensity and frequency, ocean acidification and changes to rainfall, run-off, wave size and direction and ocean currents ...

The combined influence of sea level rise, storm surge and storm events (including cyclones) may pose severe localised threats and result in damage from shoreline erosion, salt water inundation, flooding, and high velocity winds. Increasing sea surface

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13 See Professor Steffen, *Submission 45*; and Antarctic Climate and Ecosystems Cooperative Research Centre, *Submission 46*.

14 COAG meeting outcomes, 20 December 2007, COAG website accessed on 17 July 2009 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2007-12-20/index.cfm](http://www.coag.gov.au/coag_meeting_outcomes/2007-12-20/index.cfm)>

15 COAG meeting outcomes, 20 December 2007, COAG website accessed on 17 July 2009 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2007-12-20/index.cfm](http://www.coag.gov.au/coag_meeting_outcomes/2007-12-20/index.cfm)>



temperatures can lead to the spread of marine pests, changes in fish stocks and bleaching of coral reefs.<sup>16</sup>

- 1.15 Federal, state and local government policies and programs addressing climate change risk analysis, adaptation strategies and practices to promote resilience in coastal communities are gradually being developed and implemented. In this regard, climate change risk analysis and adaptation strategies for the coastal zone are still at a relatively early stage of development across the various jurisdictions. As Manly Council commented:

Climate Change is a global issue that requires governments to move beyond traditional approaches and boundaries of governance and environmental response. At present, governance and institutional arrangements concerning climate change and the coastal zone are significantly disjointed, lack leadership and accountability.<sup>17</sup>

- 1.16 This again reinforces the value of this inquiry and the need for urgent action in this area. Early planning for the impacts of climate change and appropriate adaptation strategies that reduce the vulnerability of natural ecosystems and infrastructure to these impacts are likely to bring considerable cost advantages.
- 1.17 Climate change impacts and adaptation strategies relating to the coastal zone are discussed in Chapters 2-4.

## Environmental impacts

- 1.18 The latest national State of the Environment report (2006), in its 'coasts and oceans' section, noted that Australia's coasts:

are at risk of serious degradation because of the pressures on them, including fishing, population growth and urbanisation, pollution, mining, tourism, species invasion from ballast waters, and climate change. There is also an alarming lack of knowledge because there is no systematic national monitoring of many important aspects of Australia's coastal and ocean systems.<sup>18</sup>

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16 COAG, National Climate Change Adaptation Framework, COAG website accessed on 17 July 2009 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2007-04-13/docs/national\\_climate\\_change\\_adaption\\_framework.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2007-04-13/docs/national_climate_change_adaption_framework.pdf)>

17 Manly Council, *Submission 72*, p. 11.

18 Australian State of the Environment Committee, *Australia: State of the Environment 2006*, Independent Report to the Commonwealth Minister for the Environment and Heritage, Commonwealth of Australia, 2006.

- 1.19 The Northern Territory Government pointed to the need to improve institutional arrangements for environmental management of the coastal zone established across various jurisdictions:

Current institutional and national cooperative frameworks for the environment – particularly on water quality, protected species, migratory wildlife, fisheries and habitat management – need to be reviewed to ensure a national, coordinated and cost effective approach to coastal management.<sup>19</sup>

- 1.20 Over six million people live in coastal areas outside the capital cities, with the rate of population growth in these areas being consistently higher than the national average:

Analysis of the latest population data from the Australian Bureau of Statistics shows that at the end of June 2007 there were 6.26 million people living in Australia's non-metro coastal areas, an increase of 1.27 million people since June 1997. This increase is equivalent to approx 6% of Australia's total population ...

Average annual growth in Australia's non-metro coastal areas is approximately 2%, which tends to be 50% or 60% above the national average.<sup>20</sup>

- 1.21 This population growth is creating significant environmental pressures. The impact of the non-resident population is a further issue – for example, during the holiday season the number of temporary residents in some coastal areas can often exceed the number of permanent residents. Rapid population growth in coastal areas also has significant social and economic implications that need to be managed through a broader focus on ecological sustainable development and sustainable coastal communities.
- 1.22 Environmental impacts on the coastal zone and sustainable coastal communities are discussed in Chapter 5.

## Governance arrangements

- 1.23 Many coastal stakeholders who contributed to the inquiry pointed to the 'fragmentation, overlaps, complexity and lack of coordination in coastal policy and management' in Australia.<sup>21</sup> As Professor Woodroffe, a lead

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19 NT Government, Submission 106, pp. 26-27.

20 National Sea Change Taskforce (NSCT), *Submission 79*, pp. 7-8.

21 NSCT, *Submission 79*, p. 30.

author of the coastal systems chapter of the IPCC Fourth Assessment Report, summed up the problem:

Decision making is particularly fragmented in relation to the coastal zone, and national coordination is needed, with wider availability of coastal data ... Although there are an increasing number of policies and programs related to coastal zone management at state and federal level in Australia, these are fragmented, and have evolved in a piecemeal way.<sup>22</sup>

1.24 The lead federal agency responsible for the 'development and implementation of Australian Government initiatives to protect and conserve Australia's coasts and ocean', the Department of the Environment, Water, Heritage and the Arts, commented that this 'critical area needs greater coordination between agencies and across jurisdictions to ensure that these communities are able to address the challenges posed by population growth and increasing environmental pressures, including climate change'.<sup>23</sup>

1.25 Under the Australian Constitution, the responsibility for coastal land use planning rests with state government. The states have legislated to create local government authorities with planning functions. This raises questions about what role the federal government might play in coastal zone management. Dr Wescott, a leading researcher in coastal policy, commented that:

the federal government does have a role in implementing ICZM [integrated coastal zone management] in Australia because of the critical economic, social and ecological importance of the coast to the nation as a whole. The question then becomes: To what extent, and in what areas, is the federal government to be involved? And hence: What form should this involvement take?<sup>24</sup>

1.26 Mr Stokes, Executive Director of the National Sea Change Taskforce, summed up this matter, stating that:

there needs to be a review of the current institutional arrangements as they affect the coast because all levels of government, at this stage, have a finger in the governance pie. The existing institutional arrangements are confusing. There is a lot of

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22 Professor Woodroffe, *Submission 24*, p. 1, p. 3.

23 Department of the Environment, Water, Heritage and the Arts, *Submission 103*, p. 2.

24 Dr Wescott, *Submission 60*, p. 6.

duplication. Sometimes it is unclear who is responsible for what in terms of the planning and management along the coast.<sup>25</sup>

1.27 Governance arrangements for the coastal zone are discussed in Chapter 6.

## Previous coastal inquiry reports

1.28 Leaving aside the various inquiries into specific aspects of the coast (eg coastal pollution, marine reserves, the Great Barrier Reef) and state based inquiries into the coastal zone, there have been three major national inquiries into the coastal zone over the last 30 years:

- *Management of the Australian Coastal Zone*, House of Representatives Standing Committee on Environment and Conservation, 1980
- *The Injured Coastline: Protection of the Coastal Environment*, House of Representatives Standing Committee on Environment, Recreation and Arts, 1991
- *Coastal Zone Inquiry: Final Report*, Resource Assessment Commission, 1993

1.29 Professor Thom recommended that the Committee ‘closely examine the relevance of the findings and recommendations’ of these reports.<sup>26</sup> While there is not scope in this report to analyse the recommendations of these inquiries in detail, it is useful to consider their key findings.

1.30 The *Management of the Australian Coastal Zone* report (1980) concluded that coastal zone management involved ‘a vast number of competing users’, making decisions on ‘an individual ad hoc basis rather than on a regional level’. It also pointed to the lack of coordination in coastal zone research, need to improve dissemination of information and absence of a Commonwealth coastal policy. Of further concern was that there was ‘no agency or unit within the Commonwealth public service responsible for co-ordination of Commonwealth activities in the coastal zone’.<sup>27</sup> Major report recommendations included that the Commonwealth Government develop a national coastal policy; establish an Australian Coastal Management Council to encourage cooperation between agencies with functions relating to the coastal zone and coordinate coastal zone research;

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25 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 2.

26 Professor Thom, *Submission 6*, p. 6.

27 House of Representatives Standing Committee on Environment and Conservation, *Management of the Australian Coastal Zone*, 1980, p. ix.

and use some form of agreed guidelines for the allocation of national funds – see Figure 1.1.

Figure 1.1 *Management of the Australian Coastal Zone (1980)—key report recommendations*

1. The Commonwealth Government, in consultation with the States, develop and promulgate national policies and objectives for the conservation and preservation of the Australian coastline
2. The Commonwealth Government, jointly with the States, establish an Australian Coastal Management Council to: encourage collaboration and co-operation between agencies and institutions with functions relating to the coastal zone; assess the information requirements necessary to implement management policies; and establish research priorities and co-ordinate and promote related research programs
3. The Australian Coastal Management Council convene biennial national conferences on coastal planning and management; and encourage regular regional workshops and seminars on coastal planning and management ...
5. The Australian Coastal Management Council secretariat establish a central register of information relating to the coastal zone; and prepare and distribute a regular newsletter providing information on coastal zone research
6. The Australian Coastal Management Council, as a matter of priority, establish criteria for the funding of research programs
7. The Australian Coastal Management Council determine guidelines for allocation of any Commonwealth funds that may become available to the States for programs in accordance with national policies

Source *Management of the Australian Coastal Zone, House of Representatives Standing Committee on Environment and Conservation (1980), p. vii*

- 1.31 The *Injured Coastline* report (1991) found that ‘existing coastal management arrangements are fragmented and poorly coordinated and fail to encompass a holistic approach’ and that there was ‘a pressing need for improved co-ordination of all levels of government’.<sup>28</sup> Major report recommendations included that the Commonwealth Government enact a Coastal Zone Management Act, and develop a national coastal zone management strategy to coordinate coastal management throughout Australia and performance based Commonwealth funding for regional coastal management plans by state and local government – see Figure 1.2.
- 1.32 Major report recommendations of the Resource Assessment Commission (RAC) report, *Coastal Zone Inquiry: Final Report (1993)*, included that a National Coastal Action Program be adopted by COAG; the Commonwealth Government enact a Coastal Resource Management Act

28 House of Representatives Standing Committee on Environment, Recreation and the Arts, *The Injured Coastline: Protection of the Coastal Environment*, 1991, p. xiii.

and establish a National Coastal Management Agency; and regional coastal zone strategies, following nationally accepted objectives, be developed by state and local governments – see Figure 1.3.

- 1.33 These inquiry reports and their recommendations have informed the Committee’s deliberations, as discussed in Chapter 6.

Figure 1.2 *The Injured Coastline: Protection of the Coastal Environment (1991)*—key report recommendations

1. The Commonwealth develop without further delay a national coastal zone management strategy in co-operation with the States and Territories and local governments to provide a framework for the co-ordination of coastal management throughout Australia. The strategy should incorporate agreed national objectives, goals, priorities, implementation and funding programs and performance criteria.
2. Responsibility for developing the national coastal strategy in cooperation with the States and Territories and local governments should be vested with the existing National Working Group on Coastal Management. However, the composition of the NWG should provide for a broader representation of interested parties, involving local government.
3. The Commonwealth provide financial assistance to State and local governments as part of a National Coastal Zone Management Strategy. The provision of such funding would be based upon fulfilment of certain performance criteria, which ensure that State, regional and local plans are consistent with the agreed national objectives and work towards achieving those objectives ...
5. Following preparation and development of a national coastal zone management strategy the Commonwealth enact legislation which sets out a federal interest in the coastal zone; agreed national objectives; agreed national environmental guidelines and standards (including standards for water quality and industrial waste discharges); and financial assistance schemes to assist the States and local governments to formulate coastal management plans and policies that are consistent with the objectives and goals of the national strategy ...
11. Effective public participation in coastal zone management be encouraged at the local government level by a variety of mechanisms, such as the preparation of local zoning plans in consultation with the community, environmental mediation procedures and the establishment of local consultative committees on specific projects and issues.
12. One of the existing Commonwealth databases should be the prime repository of such information concerning the coastal zone as has been prepared and collected by the various Commonwealth agencies. Arrangements for the transfer of information between Commonwealth agencies should to be improved and upgraded.

Source *The Injured Coastline: Protection of the Coastal Environment, House of Representatives Standing Committee on Environment, Recreation and the Arts (1991), pp. xiii-xviii*

**Figure 1.3** *Coastal Zone Inquiry: Final Report (1993)—key report recommendations*

R.01 The Inquiry recommends that the National Coastal Action Program for management of the resources of Australia's coastal zone be adopted by the Council of Australian Governments and implemented by the three spheres of government in consultation with community and industry groups that have responsibility for and interests in coastal zone management.

R.02 The Inquiry recommends that the Council of Australian Governments agree to and adopt the national objectives and principles for coastal zone management proposed by the Inquiry.

R.03 The Inquiry recommends that all governments with coastal zone responsibilities develop local and regional coastal zone management objectives that are consistent with the agreed national objectives and that provide firm guidelines for integrated management of resources within each government's jurisdiction ...

R.07 The Inquiry recommends that the Commonwealth enact a Coastal Resource Management Act, which, among other things, would provide that Commonwealth funding of coastal resource management activities—whether in the form of direct expenditure by Commonwealth agencies on coastal zone management or as grants to state and local governments for specific elements of coastal zone management—be confined to activities consistent with the objectives and principles of the National Coastal Action Program.

R.08 The Inquiry recommends that a National Coastal Management Agency be established, with a board representing the interests of Commonwealth, state and local governments and Australia's indigenous people, and a full-time secretariat; an independent chairperson of outstanding stature and with exceptional leadership qualities be appointed. The chairperson would also be the Agency's chief executive officer; that the Agency report to the Council of Australian Governments.

R.09 The Inquiry recommends that a National Coastal Consultative Council be established, to advise the National Coastal Management Agency. The Council should include representatives selected from nominees of peak bodies, research institutions and other bodies with major interests in the management of coastal zone resources.

R.10 The Inquiry recommends that all state governments review the composition and roles of their coastal coordinating committees in light of the characteristics proposed by the Inquiry, to ensure that the committees are in the best position to manage state participation in the National Coastal Action Program; the review include arrangements for the coordination of local and regional groups participating in the development and implementation of strategies to implement the Program; each state establish a coastal advisory committee comprising representatives of non-government groups; all state governments review the existing distribution of coastal management functions between agencies, with a view to incorporating similar or complementary functions in single ministries.

R.11 The Inquiry recommends that all local authorities review existing arrangements for dealing with coastal zone management issues, using the models identified by the Integrated Local Area Planning approach ...

R.13 The Inquiry recommends that a Coastcare program be established by the Commonwealth Government to deal with the particular needs of coastal areas for soil conservation, maintenance of biodiversity, revegetation, and management and monitoring of the shoreline and near-shore environment; the Coastcare

program provide funds for the appointment of local and regional coastal community facilitators and extension services; the Coastcare program be designed to extend and complement existing initiatives for community involvement in integrated catchment management ...

R.34 The Inquiry recommends that regional coastal zone strategies be developed, principal responsibility for their promotion and implementation resting with state governments; the regional strategies be developed by groups comprising representatives of regional communities and industries, local authorities, and relevant state and Commonwealth government agencies.

R.35 The Inquiry recommends that all states review existing regional boundaries, in consultation with local governments, to ensure that they provide a sound basis for implementing coastal resource management on a regional basis, incorporating both land and marine resources ...

R.65 The Inquiry recommends that the proposed Coastal Resource Management Act provide for agreements between the Commonwealth and state governments in relation to the funding of the National Coastal Action Program, including funding for the National Coastal Management Agency and other parts of the Program; such agreements should include provision for funding according to well-defined criteria and provision for ongoing evaluation of outcomes; expenditures on the National Coastal Action Program by each sphere of government be conditional on programs and policies being designed and implemented in accordance with objectives agreed by the Council of Australian Governments and incorporated in the proposed Coastal Resource Management Act.

*Source Coastal Zone Inquiry: Final Report, Resource Assessment Commission (1993), pp. 357-396*

## Outcomes of previous coastal inquiries

- 1.34 The concern of some inquiry participants was not so much about the number of coastal inquiries but that the recommendations of these inquiries had not been taken up: '[m]ajor difficulties arise when the many recommendations of these inquiries have not been acted upon by successive federal governments'.<sup>29</sup> However, it is important to be clear here about what recommendations have and have not been acted upon in the past. While inquiry recommendations for a national coastal act and national coastal agency have not been taken up, recommendations for a national coastal policy and a national coastal program, involving state, regional and local performance based funding, have been variously taken up by successive federal governments – see Figure 1.4 for a brief overview of past federal government coastal initiatives.
- 1.35 It needs to be said, however, that while some recommendations have been taken up, subsequent action in this regard has often not been *sustained* – for example, the Commonwealth coastal policy (1995). Rather than being

<sup>29</sup> Professor Thom, *Submission 6*, p. 1.



part of a specific coastal policy, coastal initiatives have also at various times been subsumed within general environmental policy – perhaps creating an impression that coastal policy has been submerged or ‘lost’.

**Figure 1.4** Brief overview of past federal government coastal initiatives

The RAC Coastal Zone inquiry (1993) led to the development of the 1995 Commonwealth Coastal Policy and the associated implementation package called the National Coastal Action Plan (NCAP). Key programs included Coastcare, which supported community volunteer engagement, partnership development and capacity building. ‘All States and the Northern Territory, together with Local Government Associations, negotiated and signed a tripartite Memorandum of Understanding (MOU) to implement NCAP’, including an agreed shared funding arrangement, particularly for Coastcare. ‘NCAP was therefore a cooperative, jointly funded initiative that reflected national, state and local government coastal and marine priorities’, with an agreed policy underpinning it.

‘In 1996, the MOUs were retained by the incoming federal government’ but rebadged as the Coasts and Clean Seas program. ‘Although the Commonwealth Coastal Policy was dropped, the Principles and Objectives for coastal zone management it contained were retained in the MOUs’. Commonwealth funding was brought under the Natural Heritage Trust (NHT1).

These MOUs, the Coasts and Clean Seas program and Coastcare were abolished in 2002, following the introduction of NHT2 and a new regional Natural Resource Management (NRM) delivery approach. Envirofund was established as a more generic program for funding small community projects. The Coastal Catchment Initiative was also established at this time.

In 2008, the incoming federal government established the new Caring for our Country initiative, which brought together various NRM and environmental funding programs, including coastal initiatives, under the one major program.

*Source* Department of Environment, Parks, Heritage and the Arts Tasmania, Submission to Senate Rural and Regional Affairs and Transport Committee Inquiry into Natural Resource Management and Conservation Challenges, p. 3  
<[http://www.aph.gov.au/Senate/committee/rrat\\_ctte/natural\\_resource/submissions/sub55.pdf](http://www.aph.gov.au/Senate/committee/rrat_ctte/natural_resource/submissions/sub55.pdf)>

## Changing climate and changed policy framework

1.36 In recent years, climate change has added a new dimension to the debate about the coastal zone. This was not the case when the previous coastal inquiries were undertaken, although the RAC report did briefly acknowledge issues relating to ‘global warming and the coastal zone’.<sup>30</sup>

30 RAC, *Coastal Zone Inquiry: Final Report*, Commonwealth of Australia, 1993, p. 13.

- 1.37 Climate change brings with it a changed dynamic. There is a need to address growing concerns about climate change impacts on the coastal zone and this issue impacts on the question of what role the Australian Government should play in coastal zone governance arrangements. Action in this area is urgently required.

## **Integrated coastal zone management and the catchment-coast-marine continuum**

- 1.38 In 1992 the United Nations Conference on Environment and Development recognised the international importance of coastal states to committing themselves to 'integrated management and sustainable development of coastal areas'.<sup>31</sup> In 2002, the World Summit for Sustainable Development emphasised the need to promote the implementation of programs to achieve integrated coastal zone management.
- 1.39 Integrated coastal zone management (ICZM) is therefore a well-established and internationally accepted concept. It has emerged as the main approach to improving the governance of coastal areas. ICZM reflects:
- the broader principles of environmentally sustainable development, focusing on integration across and between sectors, agencies, and levels of government, between science and management, across the land/sea interface, and inclusive of the needs of all stakeholder groups.<sup>32</sup>
- 1.40 The 'land-sea interface' or 'catchment-coast-marine continuum' therefore underpins ICZM, and integration of policies and actions across this continuum is a priority. ICZM is characterised by an emphasis on:
- coordinated decision-making across various levels of government
  - a focus on an entire ecosystem rather than separate management of each component
  - development of long-term goals, with broad consultation across interest groups

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31 *Agenda 21*, UNCED, Rio de Janeiro, 3-14 June 1992, para 5, chapter 17.

32 N Gurrán et al, *Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities* (Report No. 2 for the NSCT), University of Sydney Planning Research Centre, 2006, p. 7 – *Exhibit 20*.

- a focus on long-term protection and conservation of the environment, consistent with the principles of ecological sustainable development

1.41 Dr Wescott noted that:

catchment policies have been the major focus of NRM for a decade and are quite well developed, the Oceans Policy still exists (even if it is in need of a revamp) but the missing link between them is the national policy vacuum around coastal policy.<sup>33</sup>

1.42 In 2006, the Natural Resource Management Ministerial Council (NRMMC)<sup>34</sup> endorsed the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*. The plan sets out the ‘importance of ICZM to Australia’:

Forward thinking is required to initiate a nationally cooperative focus on achieving ecologically sustainable development through integrated coastal zone management (ICZM) ... The fundamental goal of ICZM is to maintain, restore or improve the quality of coastal ecosystems and the societies they support. A defining feature of ICZM is that it seeks to address both development and conservation needs within a geographically specific place – a single community, estuary or nation – and within a specified timeframe ...

Governments have a responsibility and interest in the coastal zone and recognise the importance of ICZM as a tool for managing challenges that are of national scale and scope.<sup>35</sup>

1.43 There was broad acceptance of the ICZM principle among those giving evidence to the inquiry. Professor Thom, for example, recommended that ‘the inquiry considers adopting the principle of ICZM as developed and agreed to by all parties to the Framework ... and Implementation Plan’.<sup>36</sup>

1.44 The Committee agrees that the ICZM principle is essential to encouraging a national cooperative approach to coastal zone management and a focus on the catchment-coastal-marine continuum.

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33 Dr Wescott, *Submission 60*, p. 2.

34 The NRMMC was established in 2001 under the auspices of COAG. It consists of the Commonwealth and state/territory government ministers responsible for primary industries, natural resources, environment and water policy.

35 NRMMC, *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, Commonwealth of Australia, 2006, pp. 6-7 – *Exhibit 79*.

36 Professor Thom, *Submission 6*, p. 10.

- 1.45 While generally recognising that the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* provided a useful first step towards the development of a broader policy framework in this area, a number of inquiry participants raised serious concerns about progress with implementation of the plan:

[the] Natural Resource Management Ministerial agreement on a national co-operative approach has not led to any significant new investment or commitments by federal or state governments ...

groups designated to implement actions in the Implementation Plan included a range of committees that had little interest or 'ownership' of the issues.

Thus there were no incentives or direct leadership from the Commonwealth to support state and local councils in ICZM by making the Framework and Implementation Plan operational ... Furthermore, there is evidence that State governments have simply ignored the agreement on the document that was endorsed by the NRM Ministerial Council.<sup>37</sup>

- 1.46 The National Sea Change Taskforce also pointed to major gaps in the plan:

a much broader approach is required to the social and economic issues related to the coastal zone ...

it lacks 'climate change adaptation plans for managing rapid urban growth on the coast. It also lacks a risk management plan, particularly where significant urban development or key installations are located in low-lying coastal areas, and a set of agreed COAG principles that outline the responsibilities of Federal, State and Local government'.<sup>38</sup>

- 1.47 The *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* will be further discussed in Chapter 6.

## Support for a coastal zone inquiry

- 1.48 As discussed above, the serious risks posed by climate change and environmental impacts on the coastal zone, combined with existing complex coastal governance arrangements and lack of progress in the implementation of the *National Cooperative Approach to Integrated Coastal*
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37 Professor Thom, *Submission 6*, p. 1, p. 10.

38 NSCT, *Submission 79*, p. 9, p. 10.

*Zone Management: Framework and Implementation Plan*, have resulted in calls for greater national leadership in coastal zone management. Groups and individuals providing evidence to the Committee widely welcomed the inquiry and emphasised its timeliness and importance:

The [National Sea Change] Taskforce welcomes the inquiry and believes it can make a significant contribution to the development of a national policy framework for coastal Australia ... it is timely and important to undertake a broad scale review of governance and institutional settings for the Australian coast.<sup>39</sup>

## International context

- 1.49 Important lessons can be learnt from how other countries are addressing climate change and environmental impacts on the coastal zone, including coastal sustainability initiatives and adaptation strategies, and coastal zone governance arrangements. Valuable parallels can be drawn between the policies and programs in these countries and the Australian situation.
- 1.50 For example, the NSCT commented that there are coastal planning models 'in the United Kingdom, the United States and the European Commission worthy of consideration in the Australian context'.<sup>40</sup> Of interest in this regard is that the UK has a national coastal planning policy, the US has federal coastal zone legislation and the EU has a comprehensive trans-national approach to coastal management, through its adoption of an Integrated Coastal Zone Management Strategy for the EU.<sup>41</sup>
- 1.51 Other inquiry participants similarly pointed to international developments in coastal zone management, particularly in the US, which has a similar federal system to Australia,<sup>42</sup> and urged the Committee to consider international best practice.
- 1.52 The *Coastal Zone Management Act 1972* in the US provides the national framework for coastal planning at the state and local level, and is currently being revised. The US Coastal States Organization recently

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39 NSCT, *Submission 79*, p. 4, p. 30.

40 NSCT, *Submission 79*, p. 12.

41 N Gurrán et al, *Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities* (Report No. 2 for the NSCT), University of Sydney Planning Research Centre, 2006, pp. 8-9 – *Exhibit 20*.

42 See, for example, Professor Thom, 'the US system works well in a federation and needs to be ... considered by this Inquiry', *Submission 6*, p. 4.

adopted a draft bill, the Coastal Management Bill 2009, which identifies four national priorities for effective coastal management and calls for a comprehensive planning effort by the states and increased coordination of federal, state and local actions. The bill provides a useful reference point in terms of key priorities in coastal zone management – see Figure 1.5.

Figure 1.5 US Coastal Management Bill

<p>The Congress finds and declares that it is national policy—</p> <ol style="list-style-type: none"> <li>(1) to preserve, protect, restore, enhance and manage the resources of the Nation's coastal region for this and succeeding generations while enabling compatible, sustainable, and appropriate development.</li> <li>(2) to encourage and assist the states in exercising their coastal stewardship and management responsibilities by maintaining the authorities and essential program services of state coastal management programs and to provide incentives to states to develop and implement programs to address national coastal management priorities to:             <ol style="list-style-type: none"> <li>(A) support healthy, resilient coastal communities and economies;</li> <li>(B) protect and restore coastal ecosystems, habitats, waters, and unique resources including historic, cultural, aesthetic, and recreational resources;</li> <li>(C) prepare for effects of climate change on the nation's coasts and coastal communities; and,</li> <li>(D) ensure that local, state, regional, and federal coastal programs are coordinated and integrated at all appropriate scales ...</li> </ol> </li> <li>(4) to encourage the participation and cooperation of the public, non-governmental organizations, businesses, educational institutions, and others in carrying out the purposes of this Act ...</li> </ol> <p>Source CSO Coastal Management Bill, 23 October 2008  <a href="http://www.coastalstates.org/uploads/PDFs/CSO%20Coastal%20Mgmt%20Bill%2010-31-08.pdf">http://www.coastalstates.org/uploads/PDFs/CSO%20Coastal%20Mgmt%20Bill%2010-31-08.pdf</a></p>
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1.53 The Victorian Government also drew the Committee's attention to a recent comparative study of international and national approaches to planning for coastal climate change.<sup>43</sup>

1.54 A review of how other countries are addressing climate change and environmental impacts on the coastal zone and of their coastal zone governance arrangements is beyond the scope of this report and also outside the inquiry terms of reference. However, the Committee is not aware of any comprehensive research having been undertaken and believes that such a study, in adding to our knowledge base in this area, would contribute to the development of effective responses to the long-term management of Australia's coastal zone.

43 See B Norman, *Planning for Coastal Climate Change: an Insight into International and National Approaches*, Victorian Department of Sustainability and Environment and Department of Planning and Community Development, 2009 – *Exhibit 176*.

## Recommendation 1

- 1.55 **The Committee recommends that the Australian Government commission a study on international coastal zone governance arrangements, policies and programs for addressing coastal climate change impacts, and adaptation strategies. The completed study should be made public.**

## Regional issues

- 1.56 As identified by the IPCC, coastal zones across the world are facing increasing environmental pressures from population growth and intensification of land use, and increasing threats from climate change impacts:

Coasts will be exposed to increasing risks, including coastal erosion, over coming decades due to climate change and sea-level rise ... The impact of climate change on coasts is exacerbated by increasing human-induced pressures ...

Coastal population growth in many of the world's deltas, barrier islands and estuaries has led to widespread conversion of natural coastal landscapes to agriculture, aquaculture, silviculture, as well as industrial and residential uses ...

The attractiveness of the coast has resulted in disproportionately rapid expansion of economic activity, settlements, urban centres and tourist resorts. Migration of people to coastal regions is common in both developed and developing nations.<sup>44</sup>

- 1.57 Countries across our region face similar challenges to Australia in dealing with these impacts on the coastal zone.
- 1.58 Developing countries will be particularly vulnerable to climate change impacts as they have limited adaptive capacities and are more dependent on climate-sensitive resources such as local water and food supplies.
- 1.59 Low-lying island nations, including Pacific Island countries, face particular challenges from rising sea levels. Sea level rise is a critical issue for low-lying atoll states such as Kiribati, Tuvalu and the Maldives.

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44 IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Cambridge University Press, Cambridge, 2007, p. 317, p. 319.

- 1.60 While these concerns are noted, it is outside the scope of the inquiry terms of reference to further investigate these broader international and regional issues. However, the Committee points out that the Australian Government's climate change policy includes 'action to help shape a global solution' to the problems of climate change.<sup>45</sup> Under this broader policy, Australia is seeking to work with the international community – including countries in our region, low-lying island nations and developing economies – to develop a global response to climate change that is effective and fair.
- 1.61 Further, the Australian Government's International Climate Change Adaptation Initiative aims to meet high priority climate change adaptation needs in vulnerable countries in Australia's region. Some \$25 million of this \$150 million initiative has been allocated to help implement practical adaptation programs in Pacific Island countries, including improving coastal zone management to increase the resilience of coastal areas and community settlements to climate change, and supporting disaster preparedness and disaster risk reduction programs. A further \$12 million has been provided for the Pacific Adaptation Strategy Assistance Program to strengthen the capacity of Pacific Island countries to assess their vulnerabilities to climate change and develop adaptation strategies.<sup>46</sup>
- 1.62 In August 2009, the Australian Government also released the policy document, *Engaging our Pacific Neighbours on Climate Change: Australia's Approach*. This document consolidates the Australian Government's policy approach to working with Pacific island countries on climate change to 2015.<sup>47</sup>

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45 Department of Climate Change, *Australian Climate Change Science: A National Framework*, May 2009, p. 1, DCC website accessed on 24 July 2009  
<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>

46 Media release by Senator the Hon Penny Wong, Minister for Climate Change and Water, and the Hon Stephen Smith MP, Minister for Foreign Affairs, 'Australia announces funding priorities for Pacific climate change adaptation', 6 August 2009.

47 DCC website accessed 25 August 2009  
<<http://www.climatechange.gov.au/international/index.html>>



## Other matters

### Other reviews and inquiries currently being conducted

- 1.63 The Department of Climate Change is undertaking a detailed 'first pass' National Coastal Vulnerability Assessment of Australia's coastal zone. The assessment involves digital elevation modelling to assess the impact of sea level rise and covers coastal assets including infrastructure, biodiversity, human settlements and coastline stability. It is being supplemented by a series of case studies, as well as research into socioeconomic risks and governance issues arising from climate change impacts.<sup>48</sup>
- 1.64 The department indicated that it would be releasing a detailed report on this work and hosting 'a national forum on the challenges of climate change to coastal communities' towards the end of 2009.<sup>49</sup>
- 1.65 The department's report was due to be released at the same time as this report went to print. Accordingly, the information in the department's report was not available to the Committee in finalising its report. However, the Committee is pleased that the department was able to be informed by the evidence received as part of this inquiry, in the form of public submissions and transcripts of public hearings, in finalising the departmental report.
- 1.66 Major reviews of Australia's national environmental policies and legislation were also underway at the same time as this inquiry, including a review of the *Environment Protection and Biodiversity Conservation Act 1999*, the Australian Government's central piece of environmental legislation, and the National Strategy for the Conservation of Australia's Biological Diversity, Australia's premier biodiversity conservation policy statement. These policies and legislation form the national framework for environmental governance in Australia.
- 1.67 The revised policy and legislative framework that eventuates from these major reviews will result in new approaches to managing the environment, which will also flow through to new approaches to integrated coastal zone management. The Committee believes that these major changes to Australia's sustainability and environmental policy frameworks further reinforce the need for action in developing a national coastal zone policy.

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48 Department of Climate Change, 'Assessing the vulnerability of Australia's coasts to climate change', fact sheet, DCC website <<http://www.climatechange.gov.au>>

49 Department of Climate Change, *Submission 85*, p. 7.

## A note on the report structure

- 1.68 This report comprises six chapters focusing on issues relating to coastal zone management across the broad themes of climate change, the environment and governance arrangements.
- 1.69 However, it is acknowledged that there are important issues concerning coastal zone management that cut across these broad themes. This report seeks to avoid creating 'silos' in discussing these themes and to emphasise that integrated coastal zone management is about building linkages across sectors (climate change, environment, governance), as well as across institutions and levels of government and across the catchment-coastal-marine continuum.
- 1.70 To link the discussion in each of the chapters and encourage dialogue in terms of the issues raised, the report includes:
- a discussion on planning and the coastal zone across several chapters, recognising that planning is a key linking theme in looking at climate change and environmental impacts on the coast and governance arrangements for the coastal zone
  - a section on climate change impacts on coastal biodiversity in the chapter on the environment, to bring together the important themes of climate change and the environment
- 1.71 The final chapter on governance arrangements for the coastal zone also serves as a concluding chapter, to draw all the themes together.

# 2

## Climate change and the coastal zone: the science and the impacts

*There is an urgent need to nationally coordinate and increase research on the impacts of sea level rise to improve our capacity to devise and apply appropriate, robust and cost-efficient adaptation strategies.<sup>1</sup>*

### Introduction

- 2.1 Chapter 2 focuses on the Committee's terms of reference to investigate the impact of climate change on coastal areas, with particular emphasis on developments in climate change science.
- 2.2 The Australian Government recently adopted a National Climate Change Science Framework to set directions for climate change science over the next decade, following a review of the Australian Climate Change Science Program. The framework identifies 'coasts and oceans' as one of five key challenges in climate change science.
- 2.3 Federal, state and local government clearly play a crucial governance role in implementing climate change policy. Industry, academic and community sectors are also involved in important work on climate change risk analysis and adaptation, and, along with the general public, have a key role to play in promoting community resilience to climate change.
- 2.4 At a federal level, the Australian Government's climate change policy has been formulated on the basis of three 'pillars': 'action to reduce

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1 Antarctic Climate and Ecosystems Cooperative Research Centre, *Submission 46*, p. 5.

greenhouse gas emissions, action to adapt to climate change that we cannot avoid, and action to help shape a global solution'.<sup>2</sup>

- 2.5 The Council of Australian Governments (COAG), the peak intergovernmental forum in Australia, brings together federal, state and local governments and has initiated significant policy reforms with regard to climate change issues that require cooperative action, such as the National Climate Change Adaptation Framework.
- 2.6 The recently formed Australian Council of Local Governments (ACLG) similarly provides a forum for the Australian Government and local government, including the Australian Local Government Association, to consider policies and initiatives in areas of mutual interest. One of the priorities of ACLG is climate change and local government.
- 2.7 The coastal zone, of all regions and sectors in Australia, would appear to be worst hit by projected climate change impacts – firstly, because of its population and economic significance; and, secondly, because it is forecast to be not just affected by more severe droughts, heatwaves, floods and bushfires (which will impact on the whole of Australia) but also uniquely affected by sea level rise, tropical cyclones of increasing intensity, ocean acidification and higher ocean temperatures.

## **Recent developments in climate change science**

### **Intergovernmental Panel on Climate Change: Fourth Assessment Report**

- 2.8 The Intergovernmental Panel on Climate Change (IPCC) is the authoritative international scientific advisory body on human-induced climate change science. The IPCC produces regular reports dealing with the science of climate change, most recently the Fourth Assessment Report (AR4) released in 2007.<sup>3</sup> This report summarised the state of climate change science up to 2005-06, with strong scientific consensus on the following core aspects of climate change science:

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2 Department of Climate Change, *Australian Climate Change Science: A National Framework*, May 2009, p. 1, DCC website accessed on 24 July 2009  
<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>

3 IPCC, *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the IPCC, Cambridge University Press, Cambridge, 2007. (The comprehensive information in the IPCC reports is based on peer-reviewed, published scientific evidence from relevant experts from all regions.)

- Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level ...
- At continental, regional and ocean basin scales, numerous long-term changes in climate have been observed. These include changes in Arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heatwaves and the intensity of tropical cyclones ...
- Palaeoclimate information supports the interpretation that the warmth of the last half century is unusual in at least the previous 1,300 years. The last time polar regions were significantly warmer than at present for an extended period (about 125,000 years ago), reductions in polar ice volume led to 4 to 6 m of sea-level rise ...
- Most of the observed increase in global average temperatures since the mid 20th century is *very likely*<sup>4</sup> due to the observed increase in anthropogenic greenhouse gas concentrations. ... Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns ...
- Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.<sup>5</sup>

2.9 Greenhouse gases listed under the Kyoto Protocol include carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons. The 'greenhouse effect' involves the sun's light energy travelling through the Earth's atmosphere to reach the planet's surface, where some of it is converted to heat energy and radiated back towards space. Some of that heat energy is absorbed by greenhouse gases in the lower atmosphere and re-emitted in all directions. Thus, some of this re-emitted heat is radiated back towards the ground. This keeps temperatures higher than they would otherwise be. Human activities, such as burning fossil fuels, release large quantities of greenhouse gases into the atmosphere, particularly CO<sub>2</sub>, which trap more heat and further raise the Earth's surface temperature.

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4 'Very likely' is defined by the IPCC to mean >90% probability of the occurrence or outcome.

5 IPCC, 'Summary for policymakers', *Climate Change 2007: The Physical Science Basis*, pp. 5-13.

## Research findings since the IPCC Fourth Assessment Report

2.10 The Committee received submissions from internationally recognised climate change scientists, including Professor Will Steffen, Executive Director of the Climate Change Institute at the Australian National University (ANU), and Dr John Church, Principal Research Scientist with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Leader of the Sea Level Rise Program with the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC). These experts support the IPCC's conclusions. However, as Professor Steffen and Dr Church noted in their evidence, climate change science is a rapidly evolving field of study and much important research has been published since the IPCC AR4 was released in 2007:<sup>6</sup>

The science surrounding the sea-level rise issue is in a state of rapid change, and, in fact, has progressed significantly since the publication of the IPCC AR4.<sup>7</sup>

2.11 Figure 2.1 provides a summary of recent developments in climate change science since the IPCC AR4. As this summary indicates, more rapid climate change is occurring – anthropogenic emissions of CO<sub>2</sub> and sea levels have been rising at or near the upper limit of the envelope of the IPCC projections – and more costly and dangerous impacts are associated with this faster change. Figures 2.2-2.5 set out recent data on anthropogenic CO<sub>2</sub> emissions, surface air temperature, sea level change and Arctic sea-ice extent.

2.12 While much more needs to be understood about these aspects of climate science, the Committee notes that they have significant consequences for climate change policy and management of the coastal zone.

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6 The IPCC's Fifth Assessment Report will be finalised in 2014.

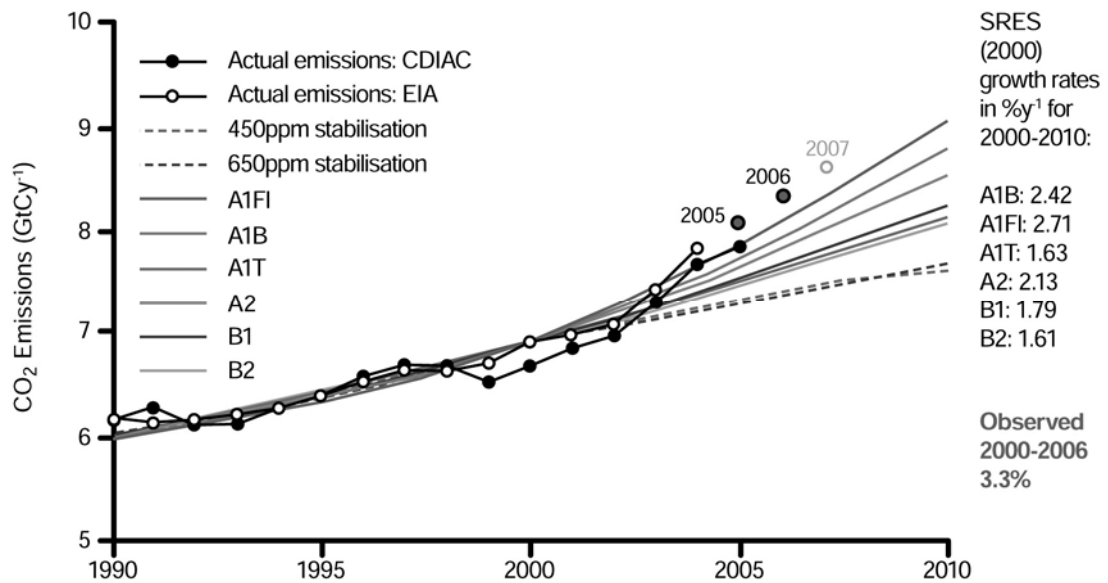
7 Professor Steffen, *Submission 45*, p. 1. See also Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 5.

**Figure 2.1 Summary of recent developments in climate change science post-IPCC AR4**

[C]limate science is a rapidly moving field as researchers respond to the challenges laid out by the IPCC and the needs of governments and other groups for even better knowledge about climate change. Over the past three to four years, many new developments have occurred and many significant new insights have been gained. The most important of these are:

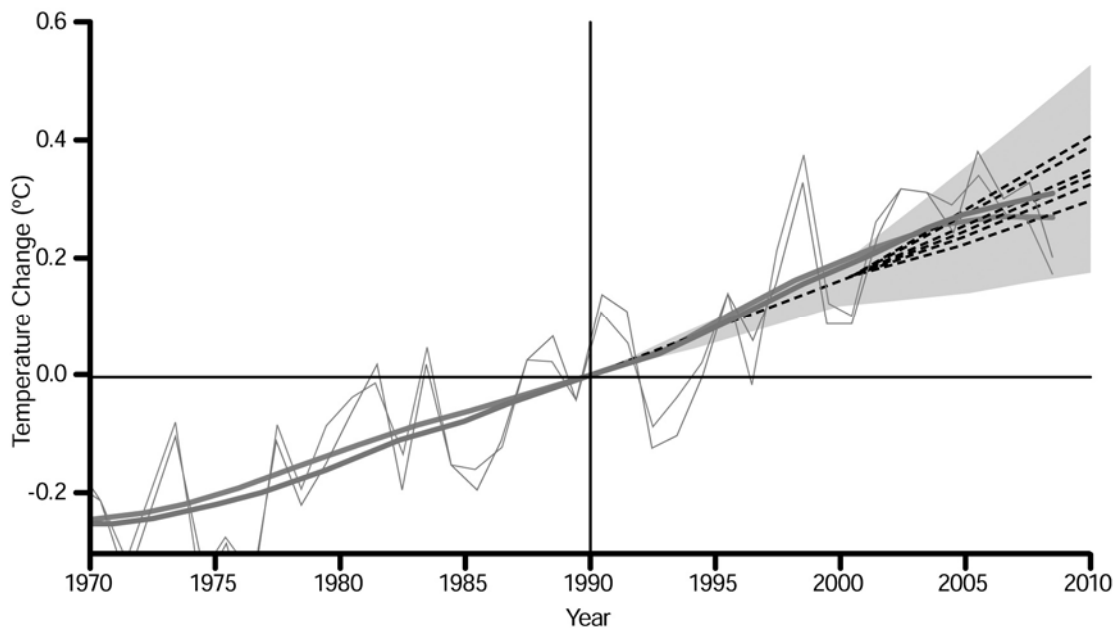
- The climate system appears to be changing faster than earlier thought likely. Key manifestations of this include the rate of accumulation of carbon dioxide in the atmosphere, trends in global ocean temperature and sea level, and loss of Arctic sea ice.
- Uncertainties still surround some important aspects of climate science, especially the rates and magnitudes of the major processes that drive serious impacts for human societies and the natural world. However, the majority of these uncertainties operate in one direction—towards more rapid and severe climate change and thus towards more costly and dangerous impacts.
- The risk of continuing rapid climate change is focusing attention on the need to adapt, and the possible limits to adaptation. Critical issues in the Australian context include the implications of possible sea-level rise at the upper end of the IPCC projections of about 0.8 m by 2100; the threat of recurring severe droughts and the drying trends in major parts of the country; the likely increase in extreme climatic events like heatwaves, floods and bushfires; and the impacts of an increasingly acidic ocean and higher ocean temperatures on marine resources and iconic ecosystems such as the Great Barrier Reef.
- Climate change is not proceeding only as smooth curves in mean values of parameters such as temperature and precipitation. Climatic features such as extreme events, abrupt changes, and the nonlinear behaviour of climate system processes will increasingly drive impacts on people and ecosystems. Despite these complexities, effective societal adaptation strategies can be developed by enhancing resilience or, where appropriate, building the capacity to cope with new climate conditions. The need for effective reduction in greenhouse gas emissions is also urgent, to avoid the risk of crossing dangerous thresholds in the climate system.
- Long-term feedbacks in the climate system may be starting to develop now; the most important of these include dynamical processes in the large polar ice sheets, and the behaviour of natural carbon sinks and potential new natural sources of carbon, such as the carbon stored in the permafrost of the northern high latitudes. Once thresholds in ice sheet and carbon cycle dynamics are crossed, such processes cannot be stopped or reversed by human intervention, and will lead to more severe and ultimately irreversible climate change from the perspective of human timeframes

Source *W Steffen, Climate Change 2009: Faster Change and More Serious Risks, Department of Climate Change, Commonwealth of Australia, 2009, p. 1*

Figure 2.2 Observations of anthropogenic CO<sub>2</sub> emissions from 1990 to 2007

Source W Steffen, *Climate Change 2009: Faster Change and More Serious Risks*, Department of Climate Change, Commonwealth of Australia, 2009, p. 4 (Note: see IPCC Special Report on Emissions Scenarios (SRES) for description of six scenarios: A1B, A1F1, A1T, A2, B1, B2; Carbon Dioxide Information Analysis Center (CDIAC); Energy Information Administration (EIA))

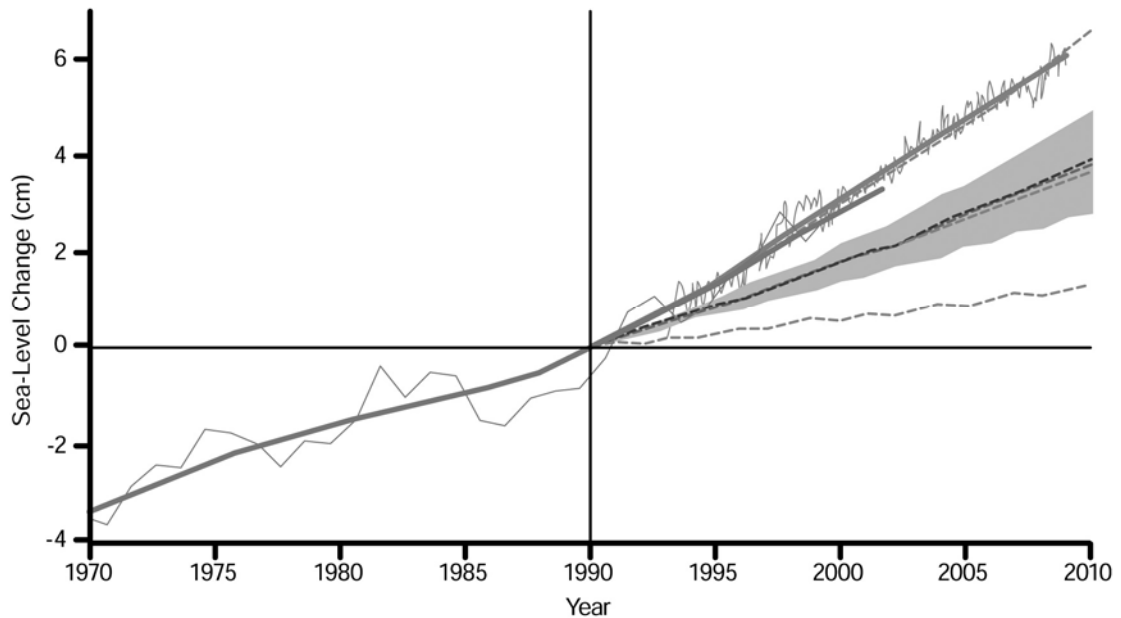
Figure 2.3 Global average surface air temperature (smoothed over 11 years)



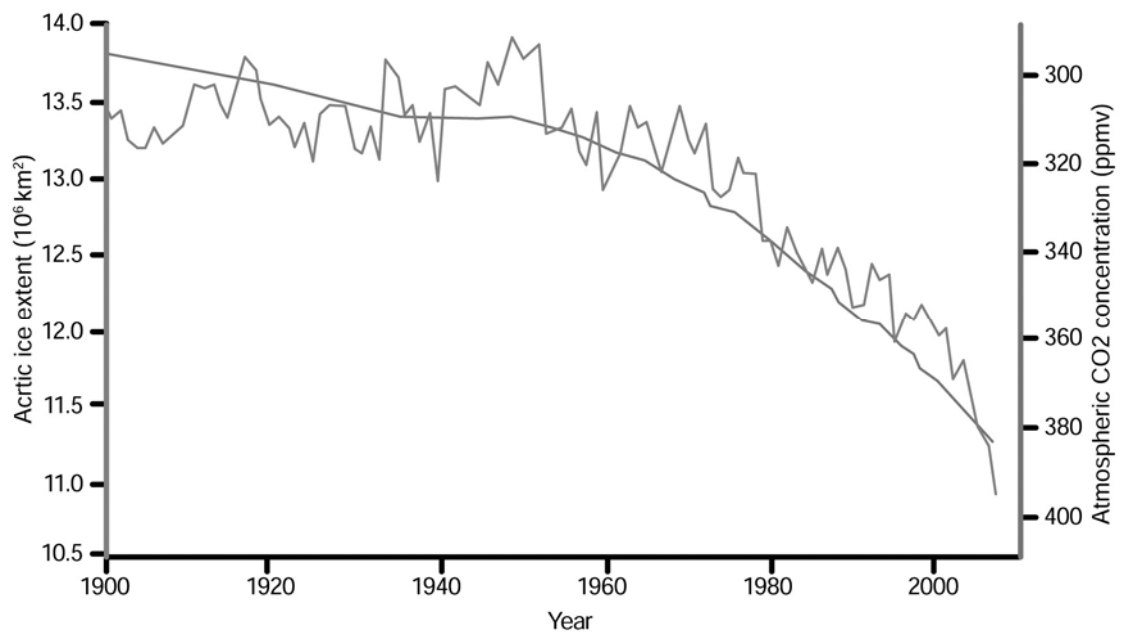
Source W Steffen, *Climate Change 2009: Faster Change and More Serious Risks*, p. 5 (The broken lines are projections from the IPCC, with shading indicating uncertainties around the projections; other data from the Hadley Center and Goddard Institute for Space Studies (GISS))



Figure 2.4 Sea level change from 1970 to 2008



Source W Steffen, *Climate Change 2009: Faster Change and More Serious Risks*, p. 5 (Note: the envelope of IPCC projections is shown for comparison (broken lines with shading showing the uncertainty levels. Solid lines are data from satellite altimetry and tide gauges; broken lines are model projections)

Figure 2.5 Arctic sea ice extent and CO<sub>2</sub>

Source W Steffen, *Climate Change 2009: Faster Change and More Serious Risks*, p. 6 (Note: time series of annual Arctic sea ice extent and atmospheric concentrations of CO<sub>2</sub> for the period 1900-2007; the CO<sub>2</sub> scale is inverted)

## Kyoto Protocol and future international climate change negotiations

- 2.13 Australia is a party to the United Nations Framework Convention on Climate Change (UNFCCC), which came into force on 21 March 1994. The UNFCCC sets out the broad framework for international cooperation to address climate change, including differentiated responsibilities for developed and developing countries. The objective of the UNFCCC is to stabilise 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'.<sup>8</sup> A negotiating body, known as the Conference of the Parties, has been established as the highest decision-making authority of the UNFCCC and meets annually.
- 2.14 The Kyoto Protocol, an international agreement setting legally binding greenhouse gas emissions reduction targets for developed countries, was adopted at the third meeting of the UNFCCC Conference of Parties on 11 December 1997 and entered into force on 16 February 2005.
- 2.15 Australia signed the Kyoto Protocol on 24 April 1998 but it was not ratified until December 2007, following the change of government at the November 2007 election.
- 2.16 The Kyoto Protocol serves to give effect to the UNFCCC's objective of reducing human-induced greenhouse gases in an effort to address climate change. Under the protocol, Australia is committed to reducing its average annual greenhouse gas emissions to 108 per cent of 1990 emissions, over the 2008-2012 commitment period.<sup>9</sup>
- 2.17 Negotiations on a successor to the Kyoto Protocol are due to be completed in December 2009 at the 15th Conference of Parties to the UNFCCC in Copenhagen, Denmark.
- 2.18 The White Paper on *Australia's Low Pollution Future* sets a target to reduce greenhouse gas emissions by 60 per cent on 2000 levels by 2050.<sup>10</sup> In May 2009, the Australian Government committed to 'reduce Australia's carbon pollution by 25 per cent below 2000 levels by 2020 if the world agrees to an ambitious global deal to stabilise levels of CO<sub>2</sub> equivalent at 450 parts per million'. Further, the government announced:

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8 Article 2, United Nations Framework Convention on Climate Change, 1992.

9 See Annex B, Kyoto Protocol to the UNFCCC, 1998.

10 *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future*, White Paper, Volume 1, Commonwealth of Australia, 2008, p. xix.

- an unconditional commitment to reduce carbon pollution by 5 per cent by 2020; and
- a commitment to reduce carbon pollution by 15 per cent by 2020 if there is an agreement where major developing economies commit to substantially restrain emissions and advanced economies take on commitments comparable to Australia's.<sup>11</sup>

## Reducing Australia's greenhouse gas emissions and helping shape a global solution

- 2.19 Scientific evidence indicates that climate change is already occurring and will continue to occur for some time even if greenhouse gas emissions were reduced immediately. Past greenhouse gas emissions will lead to ongoing climate change and sea level rise over the 21st century, regardless of current and future mitigation action. As the Department of Climate Change noted, '[s]ome degree of impact is unavoidable because of the elevated levels of greenhouse gases already in the atmosphere'.<sup>12</sup>
- 2.20 While a key focus of this inquiry is therefore to investigate what adaptation measures need to be implemented to ensure that the unavoidable impacts of climate change are addressed, the Committee supports the call for urgent action to reduce Australia's greenhouse gas emissions, while preserving growth in incomes and employment across the economy, to minimise more severe future impacts.
- 2.21 Many of those who gave evidence to the inquiry emphasised the need for urgent action in this regard:

It is very important that Australia take an active part in efforts to mitigate climate change. Australia, with particularly high emissions per capita, must reduce greenhouse emissions and join, indeed lead, international initiatives to stabilise greenhouse gas concentrations.<sup>13</sup>

Addressing climate change has to be the Australian government's highest priority in order to mitigate unavoidable impacts such as rising sea levels, wild and unpredictable weather events, increasing drought and high temperatures.<sup>14</sup>

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11 Media release by the Treasurer and the Minister for Climate Change and Water, 'A new target for reducing Australia's carbon pollution', 4 May 2009.

12 Department of Climate Change, *Submission 85*, p. 3.

13 Professor Woodroffe, *Submission 24*, p. 7.

14 Ms Brooke, Climate Action Newcastle, *Transcript of Evidence*, 26 March 2009, p. 68.

reducing greenhouse gas emissions should be core business. We need to act on this. We can act now. Everything we do to reduce greenhouse gas emissions will ultimately assist with reducing the impacts of climate change on the coast.<sup>15</sup>

- 2.22 Two recent major reports on climate change have argued that the benefits of acting early to reduce greenhouse gas emissions far outweigh the long-term economic costs of allowing climate change to take its course. Lord Nicholas Stern, in the *Economics of Climate Change: the Stern Review* (2006), the most comprehensive review conducted to date on the economics of climate change, commented that:

The scientific evidence is now overwhelming: climate change is a serious global threat, and it demands an urgent global response. This Review has assessed a wide range of evidence on the impacts of climate change and on the economic costs, and has used a number of different techniques to assess costs and risks. From all of these perspectives, the evidence gathered by the Review leads to a simple conclusion: the benefits of strong and early action far outweigh the economic costs of not acting.<sup>16</sup>

- 2.23 Professor Ross Garnaut, in the *Garnaut Climate Change Review* (2008), similarly noted that '[t]he weight of scientific evidence tells us that Australians are facing risks of damaging climate change. The risk can be substantially reduced by strong, effective and early action by all major economies'.<sup>17</sup>

- 2.24 According to the White Paper on *Australia's Low Pollution Future*, the Australian Government is seeking to manage the transformation to a low-carbon economy:

through the implementation of the Carbon Pollution Reduction Scheme,<sup>18</sup> an expanded national Renewable Energy Target, investment in renewable energy technologies and in the

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15 Mr Clarke, Great Ocean Road Coast Committee, *Transcript of Evidence*, 20 May 2009, pp. 71-72.

16 N Stern, *The Economics of Climate Change: the Stern Review*, 2006, p. vi, UK Treasury website accessed on 20 July 2009 <[http://www.hm-treasury.gov.uk/stern\\_review\\_report.htm](http://www.hm-treasury.gov.uk/stern_review_report.htm)>

17 R Garnaut, *The Garnaut Climate Change Review: Final Report*, Cambridge University Press, Cambridge, 2008, p. xvii.

18 The Carbon Pollution Reduction Scheme (CPRS) is a cap-and-trade emissions trading scheme designed as Australia's contribution to limiting the global emissions of greenhouse gases so as to contain global warming and climate change. The Australian Government released Green and White Papers on the scheme in July and December 2008 respectively. Exposure drafts of the bills to introduce the CPRS were released in March 2009 and the bills were introduced into Parliament on 14 May 2009.

demonstration of carbon capture and storage and action on energy efficiency ...

Together, these elements comprise the four arms of the Government's climate change emissions reduction strategy, and will ensure that Australia has the incentives to reduce its emissions, can develop the technologies to help reduce greenhouse gas emissions both here and abroad, and can contribute to helping the international community to reach a global solution.<sup>19</sup>

- 2.25 As inquiry participants noted, while adaptation strategies can be developed to enhance the resilience of coastal communities to climate change impacts, the need for effective reduction in greenhouse gas emissions is also urgent, to avoid the risk of crossing dangerous thresholds or 'tipping points' in the climate system. As Dr Church stated:

There is an important issue of thresholds. We are likely to cross a threshold leading to an ongoing disintegration of the Greenland icesheet – and remember that the Greenland icesheet contains the equivalent of seven metres of sea level rise. We could cross that threshold late this century. At a 550 ppm CO<sub>2</sub> equivalent level there is approximately a 50 per cent risk of crossing that threshold. That is not to say that the Greenland icesheet will disappear as soon as we cross that threshold, but unless we substantially reduce levels below that value there will be an ongoing disintegration of the icesheet ...

and if we cross that threshold there will be major impacts over many centuries or perhaps even millennia. To avoid the impacts that would result from that requires ... significant, urgent and sustained mitigation.<sup>20</sup>

- 2.26 Similarly, Professor Steffen noted that:

Mitigation, as vigorously and rapidly as we can, is the best insurance against the worst of the projected coastal impacts. Obviously this is a global task, but as a country with a very high percentage of population and infrastructure in the coastal zone, it should be a high priority for Australia that the international community achieves an effective mitigation strategy at Copenhagen.<sup>21</sup>

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19 *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future*, White Paper, Volume 1, pp. 1-8.

20 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 2, p. 11.

21 Professor Steffen, *Submission 45*, p. 3.

2.27 The Committee agrees that the earlier Australia acts to reduce emissions, the lower the cost of action will be. Conversely, the longer we delay, the more damage we risk to the Australian economy, society and environment. A report on the Great Barrier Reef, an Australian and international icon, released just before the Committee completed its report reinforces this message:

the overall outlook for the Great Barrier Reef is poor and catastrophic damage to the ecosystem may not be averted. Ultimately, if changes in the world's climate become too severe, no management actions will be able to climate-proof the Great Barrier Reef ecosystem.<sup>22</sup>

2.28 The Committee therefore shares the concerns raised by leading climate change scientists and others who gave evidence to the inquiry about more rapid climate change and the particular threat this poses to the Australian coastal zone.

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## **Recommendation 2**

2.29 **The Committee notes the importance of mitigation measures in addressing climate change impacts and accordingly recommends that the Australian Government continue to take urgent action to ensure that Australia can best contribute to a reduction in global greenhouse gas emissions.**

## **Climate change science and the coastal zone**

2.30 The IPCC Fourth Assessment report, released in 2007, included sections on 'Coastal systems and low-lying areas'<sup>23</sup> and on 'Australia and New Zealand'.<sup>24</sup> The major findings of the coastal section were that:

- Coasts are experiencing the adverse consequences of hazards related to climate and sea level (very high confidence) ...

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22 *Great Barrier Reef Outlook Report 2009: In Brief*, Great Barrier Reef Marine Park Authority, Commonwealth of Australia, 2009, p. ii.

23 RJ Nicholls et al, 'Coastal systems and low-lying areas', *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Cambridge University Press, Cambridge, 2007, pp. 315-356.

24 K Hennessy et al, 'Australia and New Zealand', *Climate Change 2007: Impacts, Adaptation and Vulnerability*, pp. 507-540.

- Coasts will be exposed to increasing risks, including coastal erosion, over coming decades due to climate change and sea-level rise (very high confidence) ...
- The impact of climate change on coasts is exacerbated by increasing human-induced pressures (very high confidence) ...
- Adaptation costs for vulnerable coasts are much less than the costs of inaction (high confidence) ...
- The unavoidability of sea-level rise, even in the longer-term, frequently conflicts with present-day human development patterns and trends (high confidence).<sup>25</sup>

2.31 As inquiry participants noted, climate change impacts on the Australian coastal zone include 'rising sea level, more intense storms, larger wave and storm surges, altered precipitation/runoff and ocean acidification'.<sup>26</sup>

2.32 Dr Hunter explained 'the rule of thumb' for the effects of sea level rise on erosion:

if you get one metre of sea level rise – which is pretty well the upper limit of what we expect this century – that will give us a shoreline recession of between 50 and 100 metres. In other words, the shoreline on average will move back 50 to 100 metres. So if we take a middle of the range projection of half a metre for this century then we are talking about a recession of the shoreline, on average, of between 25 and 50 metres back.<sup>27</sup>

2.33 This approximates the so-called 'Bruun rule' – '[a]n oft cited rule of thumb is the "Bruun rule" which states that each 1cm of rise in sea level results in about 1m of coastal recession'. However, as ACE CRC further clarified:

The actual amount of coastal recession because of sea level rise is variable ... depending on the wind and wave environment in a region, the longshore currents, the nearshore topography and the nature of the sediments on the coast. Hence, each cm of sea level rise will likely result in considerably more than 1m of coastal recession in some places and less than 1m in others.<sup>28</sup>

2.34 Figure 2.6 sets out the potential impacts of climate change on the coastal zone by state and territory, and associated costs. This summary provides

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25 Nicholls et al, 'Coastal systems and low-lying areas', *Climate Change 2007: Impacts, Adaptation and Vulnerability*, p. 317.

26 Australian Bureau of Meteorology, *Submission 15*, p. 1.

27 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 4.

28 ACE CRC, *Submission 46*, p. 2.

an indication of the potentially severe impacts of climate change on all coastal regions around Australia.

- 2.35 The discussion below focuses on two major areas of concern with regard to climate change and the coastal zone: rising sea levels, melting ice and increasing frequency of extreme sea level events; and ocean acidification, higher ocean temperatures and changing ocean currents. The Committee's attention was drawn to a number of significant publications by ACE CRC on recent developments in climate change science relating to these areas.<sup>29</sup>

Figure 2.6 Climate change and the coastal zone: potential impacts and costs, by state and territory

<p>Department of Climate Change fact sheet</p> <p><b>NSW</b></p> <p>Coastal flooding, erosion and other hazards currently cost New South Wales around \$200 million a year.</p> <p>It is plausible that uncontrolled climate change could see global sea level rise of 1 metre or more by 2100 and more intense storms threatening coastal housing and infrastructure.</p> <p>More than 200,000 buildings along the State's coast are vulnerable. For example a sea-level rise of just 20 centimetres together with a 1-in-50 year storm surge could push the coastline at Narrabeen back by 110 metres and cause local damage of around \$230 million.</p> <p>If sea-levels rose by 0.9 metres, 4700 residential building lots along the Lake Macquarie waterway foreshore would be inundated. A 1-in-100 year flood, compounded by such sea-level rise, would inundate an additional 3700 lots along Lake Macquarie waterways.</p> <p><b>NT</b></p> <p>... Nearly 900 coastal buildings, together with harbour and port facilities, are vulnerable to sea-level rise and associated changes.</p> <p><b>QLD</b></p> <p>... Queensland's highly developed and populated coastal communities, such as the Gold Coast and the Sunshine Coast, will be particularly affected by the predicted increase of sea level rise and floods.</p> <p>With almost 250,000 vulnerable coastal buildings, Queensland is at the highest risk from all Australian states from projected sea level rise, coastal flooding and erosion.</p>
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29 See J Church et al, 'Briefing: a post-IPCC AR4 update on sea level rise', ACE CRC, 2008; 'Position analysis: climate change, sea-level rise and extreme events – impacts and adaptation issues', ACE CRC, 2008; Position analysis: polar ice sheets and climate change – global impacts', ACE CRC, 2009; Position analysis: changes to Antarctic sea ice – impacts', ACE CRC, 2009; and Position analysis: CO<sub>2</sub> emissions and climate change – ocean impacts and adaptation issues, ACE CRC, 2008. ACE CRC website accessed on 28 July 2009  
<<http://www.acecrc.org.au/drawpage.cgi?pid=publications&aid=797037>>



A doubling of carbon dioxide concentrations could increase the flood level associated with a 1-in-100 year flood in Cairns by 0.4 metres.

### **SA**

... More than 60,000 buildings along the State's coast are likely to be at risk from sea-level rise, coastal flooding and erosion.

A subsiding coastline across Lefevre Peninsula and Barker Inlet will exacerbate the impacts of rising sea levels.

### **TAS**

Over 20 per cent of the Tasmanian coastline will be at risk from sea level rise and more severe storm surges associated with climate change.

Within the next 50-100 years, 21 per cent of Tasmania's coast is at risk of erosion and recession from sea-level rise affecting 17,000 coastal buildings.

### **VIC**

... More than 80,000 coastal buildings and infrastructure are at risk from the projected sea level rise, coastal flooding and erosion.

Sea level rise, more frequent and severe storm surges will damage the coastal environment and coastal infrastructure in the Western Port region.

Eighteen per cent of the Western Port Region is likely to be affected by inundation or overland flow paths. It is estimated that 18,000 properties, valued at almost \$2 billion, are vulnerable to flood events.

The area of land subject to inundation by storm surge is likely to increase by 4-15 per cent by 2030 and 16-63 per cent by 2070. It could affect more than 2000 individuals, more than 1000 dwellings and approximately \$780 million in improved property value.

A 1-in-100 year storm surge is likely to happen every 1 to 4 years by 2070.

### **WA**

... Coastal housing and infrastructure will be at risk as sea levels rise and storms become more intense.

In coastal areas, more than 94,000 coastal buildings are at risk from projected sea level rise, coastal flooding and erosion.

Between Fremantle and Mandurah, an estimated 28,000 buildings and 641 kilometres of road are at risk from erosion due to rising sea levels.

*Source* 'Climate change—potential impacts and costs: fact sheet', DCC website accessed on 27 July 2009  
<<http://www.climatechange.gov.au/impacts/costs.html>>

## Rising sea levels, melting ice and increasing frequency of extreme sea level events

2.36 Global atmospheric temperature rise has resulted in sea level rise through warming of the oceans (thermal expansion) and melting of ice on land (non-polar glaciers and icecaps).<sup>30</sup> There are also increasing concerns about the potential instability of the Greenland and West Antarctic ice sheets leading to more rapid sea level rise. Climate change will further see an increase in storm frequency and intensity, which will exacerbate the impacts of sea level rise (eg through storm surge). Impacts of sea level rise as a result of both changes in mean sea level and increases in the frequency and intensity of extreme events include inundation of coastal areas, coastal erosion, saltwater intrusion into aquifers and loss of coastal biodiversity.

### Past and present rates of sea level rise

2.37 To provide some context to modern day sea level rise, it is useful to look at the historical record. As Dr Church noted in his evidence, 'sea level has varied dramatically in the past – over 100 metres':

At the last interglacial – the last time temperatures were similar to today's – sea level was four to six metres higher than today's sea level, at temperatures we would expect by the end of this century under a continued global warming. The rates of rise at this time were large: 1½ metres per century – with considerable error bars, but that is the estimate.<sup>31</sup>

2.38 Over the last 2,000 years, however, when many of our coastal cities became established, sea level has been relatively steady – 'sea level rise was less than 0.2 mm/year on average'. However, the rate of sea level rise increased from the 19th to the 20th century, 'when it reached an average rate of about 1.7 mm/year'. Recent estimates suggest that 'the average rate of sea level rise from 1961 to 2003 was 1.8 mm/year and increased to 3.1 mm/year from 1993 to 2003'.<sup>32</sup>

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30 See Church et al, '[o]bservations since 1961 show that widespread decreases in glaciers and ice caps (excluding the Greenland and Antarctic Ice Sheets) have contributed significantly to sea-level rise. These areas are estimated to contain only enough water to raise global average sea level by less than about 40 cm,' 'Briefing: a post-IPCC AR4 update on sea level rise', p. 5.

31 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 2.

32 Church et al, 'Briefing: a post-IPCC AR4 update on sea level rise', p. 5.

## Projected rates of sea level rise: IPCC and beyond

2.39 The IPCC's Third Assessment Report in 2001 estimated that global rises in sea level of between 0.09m and 0.88m are possible by 2100.<sup>33</sup> However, the IPCC's Fourth Assessment Report (AR4) in 2007 estimated that global rises in sea level of between 0.18m and 0.59m are possible by 2100.<sup>34</sup> The Committee notes that these AR4 sea level rise projections have been the cause of some confusion:

When you first looked at the IPCC fourth assessment report, it appeared that they had downgraded the projections because the upper limit was only about 0.59 ... In fact, the confusion that arose has to do with the large ice sheets ... All the big ice sheets, in Greenland and west Antarctica, were taken out of the model projections.<sup>35</sup>

2.40 The Committee understands that the Third Assessment Report estimated the potential contributions from the dynamics of polar ice sheets and included this in the projections to 2100, while AR4 excluded estimates of the contributions from polar ice sheet dynamics from its projections on the basis that these figures could not yet be modelled quantitatively with confidence. However, as both Professor Steffen and Dr Church explained, the sea level projections for the Third Assessment Report and AR4 are not significantly different when qualifying statements in the AR4 are considered<sup>36</sup> and estimates from the contributions from polar ice sheet dynamics are therefore included:

in the fine print you can find an estimate of the contributions of these large ice sheets ... That brings the upper limit to about 0.8 metres.<sup>37</sup>

You can look at either the third assessment report or the fourth assessment report, and, when you consider the icesheet

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33 '[W]e project a sea level rise of 0.09 to 0.88 m for 1990 to 2100, with a central value of 0.48 m', IPCC, *Climate Change 2001: The Scientific Basis*, p. 642.

34 IPCC, *Climate Change 2007: The Physical Science Basis*, p. 13.

35 Professor Steffen, *Transcript of Evidence*, 23 October 2008, p. 1.

36 The IPCC noted that higher sea level rises could not be ruled out: '[m]odels used to date do not include ... the full effects of changes in ice sheet flow, because a basis in published literature is lacking ... Larger values cannot be excluded, but understanding of these effects is too limited to assess their likelihood or provide a best estimate or an upper bound for sea level rise', IPCC, *Climate Change 2007: The Physical Science Basis*, p. 14.

37 Professor Steffen, *Transcript of Evidence*, 23 October 2008, p. 2.

contributions from Greenland and Antarctica, the limits of these two projections are actually fairly similar.<sup>38</sup>

2.41 The Committee notes that IPCC projections therefore indicate that global average sea level might be up to about 0.8m higher at the end of the 21st century than at the end of the 20th century.

2.42 However, as discussed earlier, climate change science has moved on since IPCC AR4. In his evidence to the inquiry, Professor Steffen noted the progress in climate change science on sea level rise and that sea level rise was currently tracking at or near the upper limits of IPCC projections:

The science surrounding the sea-level rise issue ... has progressed significantly since the publication of the IPCC AR4 last year. The most important features of recent scientific advances are:

- The observed rate of sea-level rise (ca. 20 cm over the past century or so, but with an acceleration since the 1990s) is tracking at or near the upper limits of the envelope of IPCC projections ...
- More recent studies of the rate of sea-level rise in the past (e.g., when the Earth shifted from a glacial state (ice age) to an interglacial state (such as now) suggest that rates of ca. 1 m/century are not unusual and that a rate of 4 m/century is possible.
- The biggest uncertainty in the projected rates of sea-level rise is associated with the behaviour of the large polar ice sheets (Greenland, West and East Antarctica) ...
- The other critical factor associated with sea-level rise is the coincidence of storm surges that accentuate the impacts of sea-level rise itself.<sup>39</sup>

2.43 It is useful to look more closely at the recent research on polar ice sheets and their potential contribution to sea level rise.

### **Uncertainty about contribution of polar ice sheets to sea level rise**

2.44 As discussed, there is increasing concern about the potential instability of both the Greenland and the West Antarctic ice sheets leading to a more rapid rate of sea level rise than the current model projections. A change in the mass of freshwater locked up as ice in Antarctica and Greenland has

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38 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 2.

39 Professor Steffen, *Submission 45*, pp. 1-2. See also Dr Church, '[t]he current rate of rise, as observed both from satellite altimeters and in situ tide gauges, is tracking along the upper limit of those projections ... that upper limit leads to a sea level rise in the order of 80 to 90 centimetres, by 2100, relative to 1990', *Transcript of Evidence*, 28 January 2009, p. 2.

the greatest potential to affect global sea level. As Professor Steffen explained, we need to differentiate here between surface melting – ‘which is an ongoing but very slow process’ that ‘would not lead to a large increase in the rate of sea-level rise on its own’<sup>40</sup> – and dynamic changes in the ice sheets and shelf ice.

2.45 Dynamic changes in the icesheet mean that:

the outlet glaciers, the glaciers that drain the big interior of the icesheet, seem to be accelerating and seem to be calving off blocks of ice which then slide from the bedrock into the sea. Once you take grounded ice and move it into the sea you get a sea-level rise from that effect, and that has only been estimated very crudely in the IPCC estimates. We believe that we are beginning to understand some of the processes that lie behind the acceleration. Some of them in fact are linked to the surface melting, in that you get surface streams of water as the ice melts on the surface and some of those run down through crevasses that run all the way to the base of the glacier and lubricate it as it is attached to the bedrock. That makes it easier for the ice, particularly when it is near the sea coast and probably on a downward slope, to break off, slide and go into the sea.<sup>41</sup>

2.46 In terms of the impact on sea level rise of this phenomenon, as Professor Steffen noted, ‘you get a very different range. You get a lower range of about half a metre, which was our median range a year or so ago, you get an upper range of about 1.4 metres and you get a median of around 0.9 metres, somewhere close to a metre’.<sup>42</sup>

2.47 Shelf ice, which is in the seawater already and so does not itself contribute to sea level rise, is what ‘buffers a lot of Antarctica’:

We are seeing now that some of these ice shelves are breaking up and disintegrating, particularly around the Antarctic Peninsula, which is warming more than the bulk of the continent. That gives you a sort of ‘cork in the bottle’ effect. As this shelf ice breaks up and it moves away from the coast, the outlet glaciers then accelerate – it is like pulling the cork out of a bottle – and so you get faster drainage ... the concern is that if we see this phenomenon more generally around the big icesheets on Antarctica west and

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40 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

41 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

42 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

east, particularly west, you could see accelerated sea-level rise there'.<sup>43</sup>

2.48 In terms of the impact on sea level of this phenomenon, as Professor Steffen noted, 'if all of the Greenland icesheet were to be lost that is equivalent to approximately seven metres of sea-level rise. West Antarctica is equivalent to about six metres of sea-level rise. So that is a total of about 13 metres that is locked up in those two icesheets'.<sup>44</sup>

2.49 The Committee notes that there are uncertainties about sea level rise projections associated with these ice sheet processes, but these uncertainties do not mean that these projections can be disregarded. As Dr Church noted, '[i]t is important to recognise that these uncertainties associated with the icesheets are essentially one-sided – that is, they could lead to a substantially greater amount of sea level rise, or at a higher rate than in the current projections, but not at a significantly lower rate'.<sup>45</sup>

2.50 It is also important to emphasise at this point that current scientific estimates 'do not support contentions of many metres of sea-level rise during this century, although such values might apply over several centuries'.<sup>46</sup>

### What sea level rise figures should Australia be working from?

2.51 Against this background, the Committee was therefore concerned to establish what sea level rise figures Australian scientists were working from, and what figures Australia should be depending on, particularly given the uncertainties in the projected rates of sea level rise associated with the behaviour of the large polar ice sheets and that allowances for this are not currently included in the IPCC projections. As Professor Steffen commented, '[t]he real question we have in the scientific community is the rate at which we could, through these dynamical processes, lose the icesheets. There is a lot of debate on that; there is really no consensus'.<sup>47</sup>

2.52 Dr Church argued that we should 'stick to the IPCC projections' that global average sea level might be up to about 0.8m higher at the end of the 21st century than at the end of the 20th century:

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43 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

44 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

45 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 2.

46 J Church et al, 'Briefing: a post-IPCC AR4 update on sea level rise', ACE CRC, 2008, p. 4.

47 Professor Steffen, *Transcript of Evidence*, 23 October 2009, p. 2.

they are the most robust estimates that we have – but we should note that there are other statistical predictions which include estimates above the IPCC estimates. There are a number of uncertainties. These relate particularly to the sliding of the icesheets, the dynamic response of them, which we inadequately understand ...

we should stick to that IPCC limit because there is a sound basis for making those projections. There have been larger projections than that made in reputable journals by reputable scientists ... we could well exceed the IPCC projections, but there is a sound basis on which those projections have been made.<sup>48</sup>

2.53 Similarly Professor Steffen stated:

looking at some of the most recent papers that have come out in the last month or two, there seems to be a consensus emerging around a most likely rate this century of somewhere between half a metre and a metre. This particular estimate, which I think is pretty good, is 0.8 of a metre. My best guess, if you asked me, would be somewhere around 0.8 or 0.9 of a metre by 2100.

So, basically, my advice to coastal communities and so on is to say that I think we will be lucky to get away with 0.5 of a metre, as we thought a year or two ago. I think it is unlikely that it will go over a metre ...

I think you are seeing a reasonable consensus with our best knowledge at the moment of somewhere around 0.8 to 0.9 metres by 2100.<sup>49</sup>

2.54 In his evidence, Professor Steffen also referred to a report he was then drafting which sought to update climate change science since the IPCC AR4. This report was recently published. Professor Steffen concluded that:

the maximum possible increase in sea-level rise by 2100 is around 2 m, but only under the most extreme levels of forcing ... A more plausible estimate of total sea-level rise by 2100 is around 0.8 m. This value lies at the upper end of the IPCC projections ...

*In summary, there is a considerable body of evidence now that points toward a sea-level rise of 0.5 to 1.0 m by 2100 compared to 1990 values. The main lines of argument include: (i) recent observations have confirmed the conclusion that sea level has been rising near the*

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48 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 3, 5.

49 Professor Steffen, *Transcript of Evidence*, 23 October 2009, pp. 2-3, p. 4.

upper bound of the IPCC projections since 1990 ... (iii) recent observations show increasing net mass loss from the Greenland ice sheet ... and the West Antarctic Ice Sheet ... (iv) physically based estimates of sea-level rise due to dynamical loss of ice from the polar ice sheets suggest that a 0.8 m rise is plausible ... Sea-level rise larger than the 0.5-1.0 m range – perhaps towards 1.5 m ... – cannot be ruled out. There is still considerable uncertainty surrounding estimates of future sea-level rise.<sup>50</sup>

2.55 Dr Church also commented that:

These estimates will be updated. They are projections which are dependent, at least to some extent, on decisions that our society makes and scientific uncertainties. One of the great things about the IPCC is they try to define what those uncertainties are and what the limits are. Those numbers will evolve with time. We would expect them to stay within the IPCC range but they may well not – particularly if we learn more about the icesheets. All the information that we have learnt about the icesheets over the last five years – both glaciologists, who are the specialists in the field, and people like me, who are specialists in sea level and have a working familiarity with the glaciology – is that there is greater reason for concern today than when we wrote, for example, the third assessment report, which was published in 2001.<sup>51</sup>

2.56 The Committee notes the continuing uncertainty surrounding estimates of future sea level rise as a result of uncertainty about the contribution of polar ice sheets but acknowledges that the scientific consensus on sea level rise, based on current knowledge and underpinned by the IPCC projections, could be in the range of 0.5m and 1m by 2100, compared to 1990 values.

2.57 However, the Committee emphasises that other factors also need to be taken into account here – in particular, extreme sea level events and regional variances to sea level rise. As Dr Church observed:

Like all other aspects of managing our economy and our environment, to combine these different issues, particularly the extreme events such as the storm surges and the cyclones, with the sea level rise is a risk management issue and needs to be put in a risk management framework ...

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50 W Steffen, *Climate Change 2009: Faster Change and More Serious Risks*, Department of Climate Change, Commonwealth of Australia, 2009, p. 11 (emphasis added).

51 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 13.



sea level rise will not stop in 2100. This is a time-evolving issue, and that requires us to change our thinking rather than specify a single number ... It is the different lifetimes of different infrastructure and the different risks associated with different infrastructure that I think we need to be a little more sophisticated about.<sup>52</sup>

- 2.58 The Committee notes that the rate of projected rise in sea level is critical for estimating the severity of potential impacts, and that several state governments have recently established sea level rise planning benchmarks to serve as guidance in this area. This matter is further discussed in Chapter 4, in the section on planning issues relating to climate change and the coastal zone.
- 2.59 Noting Dr Church's point, the Committee also emphasises that, while current estimates of sea level rise are generally projected out to 2100, sea level will continue to rise thereafter. It is therefore important to maintain a longer-term outlook in terms of policy development in this area.

### Extreme sea level events

- 2.60 Climate change is projected to have an impact on the frequency and intensity of extreme weather events such as storms, bushfires, drought and heatwaves. The focus on this inquiry is on the impacts of coastal storms and tropical cyclones, with flooding and storm surges creating extreme sea level events resulting in coastal inundation and erosion. Sea level rise will exacerbate the existing problems of erosion or inundation of coastal land caused by high tides, storm surges and cyclones. As ACE CRC noted in their submission to the inquiry:

Sea level rise will affect our coasts progressively over coming decades more than is generally inferred from the rise in mean sea level because of significant and accelerating changes in the frequency of extremes of sea level ...

Mean sea level ... is not usually the source of greatest concern for effects of the sea on coastal environments, communities and infrastructure. It is the 'extreme sea levels' that cause greatest concern, especially the high extremes associated with large tides, storm surges, severe waves and low pressure systems.<sup>53</sup>

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52 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 7, p. 13.

53 ACE CRC, *Submission 46*, p. 1, p. 2.

- 2.61 The gradual rise of sea level will continue to be ‘almost imperceptible’ and it will therefore be the occurrence of occasional extreme events that will cause the ‘greatest concern’.<sup>54</sup> Elevated sea levels will lead to an increase in the potential impact of extreme sea level events caused by storm surges and heavy rainfall. In addition, the intensity of wind and waves<sup>55</sup> in some regions may increase with climate change, further increasing the frequency and intensity of extreme sea level events. Extreme sea level events result in increased flooding (inundation) and increased erosion of ‘soft’ (sandy and muddy) coastlines.



Warning signs on coastal dune at Busselton, WA, as inspected by Committee members

- 2.62 Dr Hunter, from the ACE CRC, therefore made the important point that, while sea level is going to rise by what some might think is a modest amount, that small amount is going to cause a disproportionately large increase in the frequency of flooding events from the sea associated with high tides and storm surges:

54 Professor Woodroffe, *Submission 24*, p. 5.

55 Changing ocean waves have the potential to add to extreme sea level events through large wave events or changes in wave direction—see MA Hemer et al, *Variability and Trends in the Australian Wave Climate and Consequent Coastal Vulnerability*, Final Report for Department of Climate Change Surface Ocean Wave Variability Project, CSIRO, 2008.

The rule of thumb is that on average in Australia – and we get these numbers from looking at the present tidal observations and also at the projections of climate change – if you get a sea level rise of only 20 centimetres, which was pretty well what we got last century, that will increase the frequency of extreme events by a factor of about 10 ... The events will happen 10 times more often, and this compounds ... If you get a 50-centimetre increase, or half a metre, which is about the middle of the projections for this coming century, then you get a factor of about 300 on average for Australia.<sup>56</sup>

- 2.63 What this means is that, ‘if you have a flooding event which only happens every year at the moment, by the end of the century it will be happening ... every day’.<sup>57</sup> As Professor Steffen also observed:

You may think that a sea-level rise of 20 centimetres or half a metre is not a whole lot, but when you couple it with a wall of water created by a storm coming in at you, it leads to a much bigger area of inundation. That is particularly true where you have urban areas with fairly large low-lying tracts. The classic one for us is Cairns in North Queensland. If you look at the mapping done with a storm surge of, say, half a metre of sea-level rise, you get a very large increase in the area that is actually flooded from the same event that you had earlier.<sup>58</sup>

- 2.64 Similarly, the Australian Bureau of Meteorology noted that an ‘analysis of the increase in frequency of extreme events for a rise of ten centimetres in sea levels at 28 locations around Australia shows that Darwin, Brisbane, Sydney and Melbourne will experience four to six times as many as currently observed’.<sup>59</sup>

- 2.65 Cyclones clearly pose a major threat in this regard, particularly given the possible increase in the intensity and changing geographical distribution of cyclones due to climate change. Inquiry participants noted that there was a need for more research on tropical cyclones:

The other thing we need to understand better is tropical cyclones. Certainly for Northern Australia we know that they create a

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56 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, pp. 3-4.

57 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 4.

58 Professor Steffen, *Transcript of Evidence*, 23 October 2008, p. 7.

59 Australian Bureau of Meteorology, *Submission 15*, p. 3.

problem with storm surges, and that is going to change in the future.<sup>60</sup>

## Regional variances in sea level rise

2.66 The Committee was concerned about the difficulties of moving from global sea level rise projections to regional and local projections. The amount by which sea level rises may vary regionally because of atmospheric and oceanographic conditions, and interactions with ocean and land topography. As Professor Woodroffe stated:

it is clear that there will be regional variations which are not captured with any great precision in global climate models. The patterns and the consequences of sea-level variations will differ around the Australian coast because of a range of complex factors, such as oceanographic processes, complex tidal variations and the subtle topographic configurations of different coastal landscapes.<sup>61</sup>

2.67 As discussed in Chapter 3, the National Coastal Vulnerability Assessment, or 'first pass' assessment, being coordinated by the Department of Climate Change will provide more information on this area, as will more detailed second and third pass assessments, which bring together the regional information critical for local adaptation strategies.

2.68 Dr Sloss, from the Australasian Quaternary Association (AQA), also emphasised the importance of geological history in understanding future impacts of sea level rise on a regional basis:

At this time we are in a period where we are potentially going to be having a more rapid sea level rise than we have experienced in the geological past, but we can use that geological past as a framework to help us to accurately model the way these environments will impact in the future ...

By looking at the sedimentary records and how those environments have been affected by different rates of change ... we can say, 'This particular environment has responded in this way to a rapid sea level rise and over here it has been subsiding.' We can then look at the difference in variability on a regional scale right across Australia and, in fact, compare it to international records as well.<sup>62</sup>

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60 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 7.

61 Professor Woodroffe, *Submission 24*, p. 5.

62 Dr Sloss, AQA, *Transcript of Evidence*, 28 April 2009, p. 23, p. 24.

2.69 The AQA observed that a deficiency in our current knowledge base is the integration of past geological history into projections and modelling:

there is nothing putting it together, and I think they would aid, in terms of a model, putting together what the coastal environment was like 6,000 or 7,000 years ago, when we had a sea level similar to what is expected for the 21st century.<sup>63</sup>

## Ocean acidification, higher ocean temperatures and changing ocean currents

2.70 The increased concentration of CO<sub>2</sub> from anthropogenic emissions has increased ocean acidity. These emissions first enter the atmosphere but a proportion of them are then absorbed into the ocean as part of the natural carbon cycle. The term 'ocean acidification' refers to the fact that the CO<sub>2</sub> forms a weak acid (carbonic acid) in water, making the ocean more acidic. This causes a change in ocean carbonate chemistry,<sup>64</sup> with consequences for marine organisms that form shells, such as corals, oysters, sea urchins, mussels, crustaceans and some forms of plankton.

2.71 Higher ocean temperatures are caused by the oceans absorbing more heat: '[o]bservations since 1961 show that the oceans have warmed as the result of absorbing more than 80% of the heat added to the climate system largely because of the enhanced greenhouse effect'.<sup>65</sup> Ocean currents may be influenced by climate change and cause local changes in climate systems, including rainfall patterns.

2.72 Ocean warming, ocean acidification and changing ocean currents increase the stresses on marine species, changing their distribution and putting many marine ecosystems at risk. The Reef and Rainforest Research Centre commented that:

Ocean acidification is probably the major climate change related risk that we do not currently know enough about to manage effectively. It is recommended that urgent investment be made

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63 Dr Sloss, AQA, *Transcript of Evidence*, 28 April 2009, p. 25.

64 See Steffen, '[b]ecause the concentration of carbonate ions is related to the acidity of seawater, marine organisms that use dissolved carbonate ions to build solid calcium carbonate shells ... are sensitive to the pH of the ocean. Higher acidity (lower pH) reduces the saturation state of aragonite (a form of calcium carbonate) and makes it more difficult for these organisms to form shells ... The effects of the increased acidity in the ocean can already be observed in some biological systems', *Climate Change 2009: Faster Change and More Serious Risks*, p. 22.

65 Church et al, 'Briefing: a post-IPCC AR4 update on sea level rise', p. 5.

into research that can generate viable options for managing this risk.<sup>66</sup>

## **National climate change science policy and programs relevant to the coastal zone**

2.73 The Department of Climate Change is charged with leading the development and coordination of Australia's climate change policies. Other federal agencies with a key role in climate change science include CSIRO<sup>67</sup> and the Australian Bureau of Meteorology.<sup>68</sup> Australia's universities further contribute to climate change research.<sup>69</sup> In terms of climate change science relating specifically to the coastal zone, ACE CRC also plays a key role.<sup>70</sup> Major national research infrastructure is provided through initiatives managed by the Department of Innovation, Industry, Science and Research.

### **Department of Climate Change**

2.74 The Australian Climate Change Science Program is administered by the Department of Climate Change and conducted in partnership with leading science agencies, notably CSIRO and the Bureau of Meteorology. The program addresses six key themes:

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66 Reef and Rainforest Research Centre, *Submission 30*, p. 13. See also Professor Woodroffe, '[r]esearch on this topic is in its infancy, and more needs to be undertaken', *Submission 24*, p. 5.

67 CSIRO Marine and Atmospheric Research (CMAR) aims to advance Australian climate, marine, and earth systems science. CMAR's research is delivered largely through research themes in CSIRO's Wealth from Oceans Flagship and, with the Bureau of Meteorology, through the Centre for Australian Weather and Climate Research. CSIRO is also involved in sea level research through the ACE CRC.

68 The Bureau of Meteorology seeks to observe and understand Australian weather and climate and provide meteorological, hydrological and oceanographic services in support of Australia's national needs and international obligations. The House of Representatives Standing Committee on Industry, Science and Innovation is currently inquiring into long-term meteorological forecasting in Australia, including potential applications for emergency response to natural disasters – Parliament of Australia website accessed 4 August 2009 <<http://www.aph.gov.au/house/committee/isi/weather/tor.htm>>

69 For example, a consortium of four major universities undertaking significant climate research have recently integrated their research and education programs under the Universities Climate Consortium. The consortium works in collaboration with CSIRO, the Bureau of Meteorology and other universities – ANU website accessed on 22 July 2009 <<http://www.anu.edu.au/climatechange/current-events/aucc>>

70 ACE CRC is funded under the Australian Government's Cooperative Research Centres Program. One of the centre's science programs is dedicated to research on sea level rise and its implications for the Australian coastal zone.

- understanding the key drivers of climate change in Australia
  - improved climate modelling system
  - climate change, climate variability and extreme events
  - regional climate change projections
  - international research collaboration
  - communications<sup>71</sup>
- 2.75 The National Climate Change Science Framework (May 2009) sets directions for climate change science over the next decade, following a review of the Australian Climate Change Science Program. The framework identifies five challenges in climate change science, including climate change influences on coasts and oceans.<sup>72</sup> The Committee is pleased to note the inclusion of the coastal zone as a priority area for attention.

## Conclusion

- 2.76 As the Australian Climate Change Science Framework states:

Australian science provides the foundation for climate change policy development and international leadership in several areas of climate change science, particularly in the southern hemisphere. An Australian capability is important because science generated in the northern hemisphere, where most research is done, will not provide all the information needed for Australian decision making.<sup>73</sup>

- 2.77 Climate change science is entering a new phase of complexity as decision makers and the general community demand greater insight into projected impacts and action required for adaptation. Climate change science on the Australian coastal zone, in particular, must deliver information to inform important decisions over the next decade. This will require:
- continued investment in research across a number of key areas
  - national coordination of research

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71 DCC website accessed on 22 July 2009

<<http://www.climatechange.gov.au/science/accsp/index.html>>

72 DCC, *Australian Climate Change Science: A National Framework*, May 2009, p. 1

<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>

73 DCC, *Australian Climate Change Science: A National Framework*, p. 1

<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>

- improved communication of research outcomes

## Continued investment in research

2.78 The Committee concludes that there needs to be continuing investment in research on:

- sea level rise projections and the dynamics of polar ice sheets, particularly in the Antarctic
- extreme sea level events
- regional variations in sea level rise
- ocean acidification, higher ocean temperatures and changing ocean currents

2.79 Climate science needs to continue to provide information on the factors that influence the magnitude and rate of sea level rise, including the dynamics of the large polar ice sheets under prolonged global warming. Australian science has a critical role to play in the study of the Antarctic ice sheets, given our location and that northern hemisphere countries are increasingly focused on the future of Arctic ice cover and the Greenland ice sheet. The Committee agrees that improving our monitoring, understanding and modelling of ice sheet responses to global warming is urgent.

2.80 Research agencies will also need to continue to provide quality information about likely changes in sea level as a result of extreme events, to ensure effective management of the coastal zone that acknowledges the risks and minimises the consequences of climate change. The Committee notes that of particular concern here is research progress on the effects of climate change on the intensity of tropical cyclones and how they will track along our coasts.

2.81 Further research into sea surface temperature changes and changes in ocean currents is also necessary, as is continued research on ocean acidification, particularly in terms of monitoring its impacts on coral reefs in our tropics.

2.82 The Committee also notes Dr Church's point that:

The climate issue – sea level rise ... et cetera – is a global issue. No one nation can address the research side of this problem on its own. The World Climate Research Programme provides 90 per



cent of the physical information that is required. So support for participation in international programs is absolutely critical.<sup>74</sup>

- 2.83 The Committee acknowledges the outstanding research being undertaken by CSIRO and the ACE CRC in these areas, particularly on sea level rise projections and extreme sea level events.

### Recommendation 3

- 2.84 **The Committee recommends that the Australian Government increase its investment in coastal based climate change research on:**
- **sea level rise projections and the dynamics of polar ice sheets, particularly in the Antarctic**
  - **extreme sea level events, including as a result of storm surge and tropical cyclones**
  - **regional variations in sea level rise**
  - **ocean acidification, particularly impacts on Australia's coral reefs, higher ocean temperatures and changing ocean currents**

### National coordination of research

- 2.85 At a broader policy level, the Committee notes that the National Climate Change Science Framework emphasises the need for 'national direction and coordination of climate change research efforts'.<sup>75</sup>
- 2.86 Several inquiry participants called for improved coordination of climate change science on the coastal zone and a consistent mechanism for data sharing among researchers, government agencies and communities across Australia:

the Federal Government [should] work with the relevant research and academic providers as well as State and Local Government practitioners on a process and framework that allows for the consistent integration and application of climate change science

74 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 15.

75 DCC, *Australian Climate Change Science: A National Framework*, p. 17  
<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>  
See also *Powering Ideas: An Innovation Agenda for the 21st Century*, Commonwealth of Australia, 2009; and *Review of National Innovation report, Venturous Australia: Building Strength in Innovation*, Cutler and Company Pty Ltd, 2008.

and research in policy and strategies for all spheres of Government.<sup>76</sup>

- 2.87 Similarly, ACE CRC observed that there is an 'urgent need to nationally coordinate ... research on the impacts of sea level rise to improve our capacity to devise and apply appropriate, robust and cost-efficient adaptation strategies'.<sup>77</sup> Dr Hunter, from the ACE CRC, also noted the need to 'coordinate better the existing sea level monitoring around Australia'.<sup>78</sup>
- 2.88 The National Climate Change Science Framework, which identifies coasts and oceans as key challenge in climate change science, proposes that a National Climate Change Science strategy be established to provide national direction and coordination of climate change research efforts. The strategy would have the following features:
- A high level coordination group comprising major funding bodies, key research organisations and senior scientists and chaired by the Chief Scientist. The coordination group will develop and oversee execution of an implementation plan for this Framework.
  - The implementation plan will draw on the resources of all relevant organisations. Where necessary, the high level coordination group will facilitate formation of cross-institutional teams to advance key elements of climate change science.
  - The Chief Scientist will report annually to the Minister for Climate Change and Water and the Minister for Innovation Industry Science and Research on progress in implementing this Framework.
  - The Department of Climate Change will establish a mechanism to liaise with States and Territories and other stakeholders on climate change science, with a particular emphasis on ensuring the national program delivers useful information about likely future climate change.<sup>79</sup>
- 2.89 While it is early days for implementation of the framework, the Committee supports such a model for coordinating Australian climate change science and believes an agreed framework and strategy should be
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76 Sydney Coastal Councils Group, *Submission 77*, p. 9.

77 ACE CRC, *Submission 46*, p. 5.

78 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 14. See also Dr Church, 'we ... require more coordinated studies, particularly on the issues of inundation and erosion', ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 34.

79 DCC, *Australian Climate Change Science: A National Framework*, p. 17  
<<http://www.climatechange.gov.au/science/publications/pubs/cc-science-framework.pdf>>

implemented as soon as possible. The Committee emphasises that the coastal zone component of this framework and strategy should be clearly identified. The proposed high level coordination group, which will develop and oversee execution of the implementation plan for the framework, should also include representation from key coastal stakeholders.

#### **Recommendation 4**

- 2.90 **The Committee recommends that the coastal zone component of the National Climate Change Science Framework and proposed National Climate Change Science strategy be clearly identified by the proposed high level coordination group and involve key coastal stakeholders.**

#### **Improved communication of research outcomes**

- 2.91 Several inquiry participants emphasised the need for improved communication of climate change research on the coastal zone and improved access to data:

the Federal Government [should] take responsibility for the development of a central information source that allows for timely access to regionally and locally relevant climate change projections and scientific research.<sup>80</sup>

what is critically needed is a national approach to coastal marine climate change research, monitoring and data management. This includes national data [and] monitoring and reporting systems ... The Commonwealth Government should facilitate a strategic approach to identify and address the national and regional gaps in research knowledge and develop monitoring and data management systems so as to improve and sustain coastal zone management in the face of climate change. Currently, there are limited mechanisms to assist or encourage information sharing.<sup>81</sup>

A nationally consistent approach to the collection, storage and accessible retrieval of data will serve to provide Local Government with consistent base line data to undertake risk assessment and project the impact of storm surge, coastal inundation and sea level rise on coastal communities. Once obtained, this data can be scaled

80 Sydney Coastal Councils Group, *Submission 77*, p. 9.

81 NT Government, *Submission 106*, p. 4.

down to address climate change issues at the regional and local level.<sup>82</sup>

2.92 ACE CRC further commented that:

Research on the specific and local effects of sea level rise and changes in ocean properties is in its infancy and being done in a relatively fragmented way around Australia. Understanding of the consequences of these effects by policy makers, decision makers, regulators, investors and the broader community lags significantly behind the knowledge in the research community, meaning that proposed adaptation responses are often poorly informed, inadequate or even dangerous.<sup>83</sup>

2.93 The Committee believes that a national coastal zone database, which includes information on developments in climate change science – as well as information on climate change impacts and adaptation strategies – will improve information access, consistency and information sharing, and build public awareness of developments in this area. It will enable coastal stakeholders to share nationally consistent data on climate change risks and impacts.

2.94 The Committee notes that work on the ‘first pass’ National Coastal Vulnerability Assessment was still underway at the time of this report being printed and that work on adaptation strategies relating to the coastal zone by the National Climate Change Adaptation Facility was also still in train. However, as is further discussed below, there is an urgent need to better communicate the outcomes of these and other research initiatives and coordinate this information on a central database.

2.95 Currently, information on the outcomes of coastal climate change research initiatives is scattered across several websites. For example, details of ACE CRC research outcomes on extreme sea level events are currently available on the ACE CRC website and its ‘sea level rise’ website. CSIRO also maintains a ‘sea level rise’ website. Similarly, research outcomes of several coastal climate change projects commissioned by the federal Department of Climate Change are variously available on the department’s website or the OzCoasts website, which is maintained by Geoscience Australia. It would be helpful for all of this information to instead be available from one national coastal zone database. Whenever possible, scientific data should be presented in a nationally consistent manner.

2.96 The Committee makes a recommendation about this in Chapters 3 and 6.

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82 Local Government Association of Tasmania, *Submission 86*, p. 9.

83 ACE CRC, *Submission 46*, p. 5.

## Climate change and the coastal zone: adaptation strategies and practices to promote resilience

*adaptation is a long-term agenda and it will take time to quantify risks of climate change impacts and to build capacity to minimise costs and to take advantage of any benefits.<sup>1</sup>*

### Introduction

- 3.1 Chapter 3 focuses on the Committee's terms of reference to investigate the impact of climate change on coastal areas, with particular emphasis on climate change adaptation. Adaptation is defined in the Council of Australian Governments (COAG) National Climate Change Adaptation Framework as 'the principal way to deal with the unavoidable impacts of climate change. It is a mechanism to manage risks, adjust economic activity to reduce vulnerability and to improve business certainty'.<sup>2</sup>
- 3.2 Australia is in the very early stages of adapting to climate change. As the National Climate Change Adaptation Framework notes 'adaptation is a long-term agenda and it will take time to quantify risks of climate change impacts and to build capacity to minimise costs and to take advantage of any benefits'.<sup>3</sup>

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1 COAG National Climate Change Adaptation Framework, p. 3.

2 COAG National Climate Change Adaptation Framework, p. 3.

3 COAG National Climate Change Adaptation Framework, p. 3.

- 3.3 Chapter 3 looks at the National Climate Change Adaptation Framework and major initiatives as part of the National Coastal Vulnerability Assessment or 'first pass' assessment. It also discusses a number of federal climate change adaptation programs, and the role of state and local government in climate change adaptation in the coastal zone. The chapter then provides an overview of climate change adaptation issues for a range of sectors relevant to the coastal zone, such as water resources, health, industry, disaster management and infrastructure. The chapter concludes with a discussion on coastal Indigenous communities and climate change adaptation.

## **COAG National Climate Change Adaptation Framework**

- 3.4 The National Climate Change Adaptation Framework, endorsed by COAG at its meeting on 13 April 2007, was designed to provide a nationally consistent focus for climate change adaptation action for the next five to seven years.<sup>4</sup>
- 3.5 The framework rests on the acknowledgment that, regardless of mitigation action undertaken with respect to reducing greenhouse gas emissions, changes to the climate are already observable and in order to minimise their impacts in Australia, a coordinated strategy for adapting to them is required.
- 3.6 The Australian Standard for Risk Management (AS/NZS 4360: 2004) provides a generic framework for identifying, analysing and communicating risk. This standard has been adopted throughout Australia.<sup>5</sup> As the Victorian Department of Sustainability and Environment noted:

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4 Department of Climate Change website accessed on 22 July 2009 <<http://www.climatechange.gov.au/impacts/about.html>> The National Climate Change Adaptation Program, established in 2005, was an early federal government initiative predating the COAG National Climate Change Adaptation Framework.

5 The Department of Climate Change recently updated the report, *Climate Change and Adaptation Actions for Local Government*, which adopts the Australian Standard for Risk Management (AS/NZS 4360: 2004) as a means of addressing and managing the risks posed by climate change, and assessing what adaptation work is required. See Department of Climate Change, *Climate Change and Adaptation Actions for Local Government*, 2009, p. 15. See also Australian Academy of Technological Sciences and Engineering, *Submission 28*; Attorney-General's Department and Emergency Management Australia, *Submission 56*; and Surf Life Saving Australia, *Submission 57*.

Whilst there is some variation in methodologies used by agencies to assess risk, recent models developed to better understand the coastal impacts of climate change have drawn on both the national standard AS/NZS 4360:2004 and on national policy frameworks and risk methodologies. In this sense there is some degree of consistency but importantly there has also been modification of standardised methodologies to accommodate local circumstances and specific planning exercises.<sup>6</sup>

- 3.7 The National Climate Change Adaptation Framework establishes principles for understanding and building on Australia's adaptive capacity and highlights themes that are identified as priority areas where vulnerability to climate change impacts should be reduced.
- 3.8 The following themes are identified under the framework for reducing sectoral and regional vulnerability to climate change:
- water resources
  - *coastal regions*
  - biodiversity
  - agriculture, fisheries and forestry
  - human health
  - tourism
  - settlements, infrastructure and planning
  - natural disaster management
- 3.9 As the only regional priority area amongst a list of sectoral themes, 'coastal regions' is relatively incongruous in the list. The coastal zone is at risk not only from the direct impacts of climate change on the environment but also from the threats to all other identified priority areas. As such, adaptation work in other areas is also significant with respect to the coast. This chapter will later examine adaptation work being carried out with respect to the other themes identified in the framework, as relevant to the coastal zone.

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6 Victorian Department of Sustainability and Environment, *Submission 90b*, p. 1.

## Coastal adaptation in the National Climate Change Adaptation Framework

- 3.10 The National Climate Change Adaptation Framework identifies that coastal regions are:
- vulnerable to sea level rise, increased sea surface temperature, increased storm intensity and frequency, ocean acidification and changes to rainfall, run-off, wave size and direction and ocean currents.<sup>7</sup>
- 3.11 The framework notes that the threats to the coastal zone from climate change are intensified by the significance of the zone to Australia more generally. Coastal regions incorporate the most densely populated areas of the country – holding the vast majority of our population, infrastructure and industry.<sup>8</sup>
- 3.12 The framework recognises the need to assess the vulnerability of Australia’s coastal zone, so that effective adaptation strategies can be implemented, and calls for nationally consistent action on this assessment.

## National Coastal Vulnerability Assessment—the ‘first pass’ assessment

- 3.13 The National Coastal Vulnerability Assessment (NCVA) or ‘first pass’ assessment is being undertaken by the Department of Climate Change in response to the National Climate Change Adaptation Framework’s call for a national vulnerability assessment. The ‘first pass’ NCVA is designed to:
- identify national priorities in supporting effective adaptation policy responses in the coastal zone
  - identify key elements of a national coordinated approach to reducing climate risk in the coastal zone
- 3.14 The results will ensure a clearer picture of the level of vulnerability around Australia’s coastline. This will provide a coordinated, national representation of Australia’s coastal vulnerability from which more localised decisions can be made with regard to adaptation.<sup>9</sup> The work is

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7 COAG National Climate Change Adaptation Framework, p. 12.

8 COAG National Climate Change Adaptation Framework, p. 12.

9 Department of Climate Change, ‘Fact Sheet: Assessing the Vulnerability of Australia’s Coasts to Climate Change’ <<http://climatechange.gov.au/impacts/coasts.html#research>>



being undertaken to address the current shortfall in information regarding our coastal vulnerability. The Department of Climate Change's submission to the inquiry noted that:

The current 'first pass' National Coastal Vulnerability Assessment (NCVA) of key assets within Australia's coastal zone will begin to address our knowledge deficit. The NCVA will provide the first, whole of nation understanding of the magnitude and spatial extent of risk and will drive the national development of essential tools for climate change adaptation.<sup>10</sup>

3.15 The Department of Climate Change website states the three aims of the assessment as being:

- To identify the risks to Australia's coastal zone from climate change (including the implications of sea-level rise);
- To provide decision makers with a better understanding of the potential risks; and
- To identify priority areas for research.<sup>11</sup>

3.16 The department identifies the components of the first pass assessment as follows:

- digital elevation modelling (DEM)
- national shoreline mapping: the 'Smartline' project
- assessing the vulnerability of coastal biodiversity
- six case studies that have been selected to assess particular issues caused by specific vulnerabilities:
  - ⇒ Kakadu National Park (NT)
  - ⇒ Pilbara Coast (WA)
  - ⇒ Yorke Peninsula (SA)
  - ⇒ East coast of Tasmania (Tas)
  - ⇒ Central and Hunter Coasts (NSW)
  - ⇒ Pimpama catchment, Gold Coast (Qld)

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10 Department of Climate Change, *Submission 85*, p. 2.

11 Department of Climate Change website accessed on 30 July 2009  
<<http://www.climatechange.gov.au/impacts/coasts.html#research>>

## Digital elevation modelling

- 3.17 A digital elevation model (DEM) provides a digital depiction of the topography and elevation of terrain. Digital elevation modelling is used in assessing coastal vulnerability to sea level rise.
- 3.18 The Department of Climate Change is undertaking two DEM projects under the NCVA:
- the National Elevation Data Framework
  - a high-resolution urban DEM

## National Elevation Data Framework

- 3.19 The Department of Climate Change, through the Spatial Information Council (ANZLIC),<sup>12</sup> is working to develop a mid-resolution DEM for the entire Australian coastline through the establishment of a National Elevation Data Framework (NEDF).
- 3.20 To date, DEM work has been undertaken in isolation by local and state governments or for specific projects, without any method for sharing this information nationally. The NEDF will allow all this modelling, as well as modelling undertaken in the future, to be more widely available in one place. As representatives of the Department of Climate Change explained to the Committee:
- the issue is to try to get all of the state, territory and local governments on board with this process so that all the work that they do is consistent with this framework and can be integrated into the framework.<sup>13</sup>
- 3.21 ANZLIC is producing a set of tools or specifications that will allow data collected from future DEM work by state, territory or local governments to be consistent with the framework so that the data will be more widely available. In evidence to the Committee, departmental representatives described the proposed NEDF as follows:

If you think about something like Google Maps, for example, you are able to look at the data and slowly drill down through the data layers until you get more and more resolution. That is the intention.<sup>14</sup>

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12 The Spatial Information Council is also commonly known as ANZLIC from its former name the Australian and New Zealand Land Information Council.

13 Mr Hopkins, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 3.

14 Mr Hopkins, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 3.

- 3.22 The data available from the NEDF will be mid-resolution (five to 10 metres). This mid-resolution DEM is designed to give consistent coverage of the whole of Australia. However the department admits that this model will 'not give us the level of detail we need in terms of elevation rise'.<sup>15</sup>
- 3.23 The Committee welcomes the NEDF initiative, as it will allow for greater national consistency. The availability of an overall picture of the topography of Australia's coastline will be highly valuable. The Committee notes, however, that this mid-resolution modelling is not to the resolution quality required for local application. The Committee also notes the concerns raised by Engineers Australia relating to the NEDF, including:
- the updating of data included in the NEDF – Engineers Australia noted that a 'collect once, use many times' principle was initially adopted<sup>16</sup>
  - the slow progress of work relating to the NEDF
  - the quality of data utilised in the NEDF

### High-resolution urban DEM

- 3.24 The second DEM project that the Department of Climate Change is undertaking as part of the NCVA is a high-resolution urban DEM. This will map the vulnerability to inundation of priority urban areas in the coastal zone. The CRC for Spatial Information was commissioned in June 2008 to compile all the high resolution DEM data for major Australian cities (all of which are located in the coastal zone) into a framework. Initial work will focus on Perth, Adelaide, Sydney, Brisbane, Melbourne, the Gold Coast and the NSW Central Coast. The Committee understands that the CRC is:
- buying access to existing datasets and recompiling those datasets so that they are consistent with this framework. Those datasets will be available publicly to all levels of government for non-commercial purposes.<sup>17</sup>
- 3.25 The Committee draws attention to the need for this information to be made available and accessible to key stakeholders. This data will be of particular assistance in shaping local adaptation plans.

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15 Mr Hopkins, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 3.

16 Engineers Australia, *Submission 29*, p. 4.

17 Mr Hopkins, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 3.

## National shoreline mapping: the 'Smartline' project

3.26 Another significant element of the first pass assessment is the mapping of Australia's coastal geomorphology. The National Coastal Landform and Stability Mapping tool (dubbed the 'Smartline' project), released on 4 August 2009, was undertaken in collaboration between the Department of Climate Change and Geoscience Australia. The mapping tool visually displays the geology of Australia's coastline, allowing for better understanding of the vulnerability to climate change impacts. So-called 'softer' geology is more susceptible to coastal erosion than 'harder' geology, and therefore the vulnerability to climate change impacts of these areas of the coast is greater. The department explained:

We are collecting information on the littoral and sub littoral zones – so just off the beach and also behind the beach up to 500 metres. We are interested in knowing, for example, what is behind the beach. If it is a low-lying flat plain, it would be easily flooded; if it is a sequence of high dunes, it is better protected.<sup>18</sup>

3.27 The Smartline project, for the first time, provides an entire geomorphic map of the Australian coastline. The project was undertaken under contract at the University of Tasmania, coordinated by Mr Chris Sharples. The submission to the inquiry from the University of Tasmania sets out the value of a National Coastal Landform and Stability Mapping tool:

whilst a great deal of relevant geological, geomorphic, topographic and other mapping exists for the Australian coast, this mapping has been prepared for various parts of the coast in numerous different formats, for different purposes, at different scales and using different classifications. There is no one nationally-consistent geomorphic map of the Australian coast suitable for sensitivity assessment, except at scales too coarse to be of real use. This meant it would be very difficult and confusing to consistently assess coastal vulnerability at a national level using the hundreds of disparate data sets in existence.

The 'Smartline' project has been undertaken ... to remedy this problem by combining several hundred relevant mapped datasets into a single nationally-consistent map, using a mapping format previously trialled successfully in Tasmania.<sup>19</sup>

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18 Mr Hopkins, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 3.

19 University of Tasmania, *Submission 104*, p. 2.

3.28 On announcing the completion of the mapping tool in August 2009, the Minister Assisting the Minister for Climate Change, the Hon Greg Combet, said:

The mapping tool contains detailed coastal landform information, so it will be of immediate benefit to local planners and decision makers as they make coastal planning decisions.<sup>20</sup>

3.29 The Committee commends the Australian Government for its work on this important mapping tool, and believes that it will be of great significance in better assessing national coastal vulnerability. Greater understanding of the geological make up of the coastline will also allow better understanding of the risks involved when making planning decisions in the coastal zone. (Planning issues will be discussed in more detail in Chapter 4.)

3.30 The Committee believes this important mapping tool could be better presented and made more accessible and useful to a range of stakeholders. At present, the Smartline maps are hosted on the OzCoasts website.<sup>21</sup> The website offers very limited explanation of the purpose of the maps, and the instructions are difficult to find and assume prior knowledge.<sup>22</sup> The National Climate Change Adaptation Framework highlights the need for not only national coordination of vulnerability data but also effective communication of that data so that best practice adaptation decisions can be made nationally.

3.31 Mr Sharples, in evidence to the Committee, noted the importance of moving beyond the first pass assessment to more detailed second and third pass assessments:

once you have looked at where the soft parts of the coast are – which is the first pass – and where the wave energy is likely to cause erosion – which is the second pass – then, at the next most detailed level – what I call the third pass, which is looking at all the other local variables.<sup>23</sup>

3.32 In terms of the second pass assessment, Mr Sharples further commented that:

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20 Media release by the Hon Greg Combet AM MP, Minister Assisting the Minister for Climate Change, 'Erosion Potential of Australia's Coasts with a Changing Climate', 4 August 2009.

21 See <<http://www.ozcoasts.org.au>>

22 See <<http://www.ozcoasts.org.au/coastal/smartline.jsp>>

23 Mr Sharples, *Transcript of Evidence*, 28 January 2009, p. 26. See also C Sharples, C Attwater, J Carley, *Exhibit 67*, p. 3.

we should have a look at how the wave climate nationally interacts with those landform types and model the wave climate around the coast to pick the real hot spots.<sup>24</sup>

### **Recommendation 5**

- 3.33 **The Committee recommends that the Department of Climate Change continue to fund research to:**
- **establish the wave climate around the coast so as to identify those locations most at risk from wave erosion**
  - **examine how the wave climate nationally interacts with varying landform types**

### **Assessing the vulnerability of coastal biodiversity**

- 3.34 A further component of the NCVA is an assessment of the impacts of climate change on biodiversity in the coastal zone. CSIRO is establishing a coastal/marine ecosystems vulnerability framework assessment. The assessment will analyse nine habitats, covering geomorphic (beaches, estuaries, wetlands), supratidal (dune vegetation, mangrove, saltmarsh) and subtidal (sea grass, coral reef, macroalgae) habitats. The framework assessment will use indicators regarding exposure, sensitivity and adaptive capacity which have been developed to create a vulnerability index for each habitat.
- 3.35 The Committee is pleased to see an assessment of the impacts on biodiversity as an element of the first pass assessment, although it did not receive a great deal of evidence on this particular study. The impact of climate change on biodiversity is discussed in more detail in Chapter 5.

### **Case studies**

- 3.36 The last major element of the NCVA is the six case studies. Six different geographical locations around Australia's coastline have been selected for analysis, each to examine particular impacts of climate change on the various coastal environments. The locations selected will provide information regarding specific climate change impacts on activities which occur in the coastal zone. The case studies are as follows:

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24 Mr Sharples, *Transcript of Evidence*, 28 January 2009, p. 26.

- Kakadu National Park – Investigating impacts on river system dynamics and management implications
- Pilbara Coast – Investigating impacts on oil and gas infrastructure as well as local communities
- Yorke Peninsula – Investigating impacts on urban development in the coastal zone and identify and evaluate trade offs between development pressures and mitigation costs, and future liabilities.
- East coast of Tasmania – Investigating impacts on the southern rock lobster, as well as associated fisheries and local communities. In particular, examination of the impacts of temperature increases on lobster breeding.
- Central and Hunter Coasts – Investigating land use planning issues around estuaries which are subject to increased flooding and sea level rise, as well as community awareness and resilience.
- Pimpama Catchment, Gold Coast – Investigating ecosystem vulnerability to sea level rise.

3.37 The Committee observes that the six projects will provide a broad scope of data regarding the regional variances in Australia’s coastal vulnerability with respect to various economic and social impacts of climate change.

## **Australian Government and coastal climate change adaptation programs in the coastal zone**

3.38 Of interest to the Committee was the range of national climate change adaptation programs in the coastal zone. The corporate plan for the Department of Climate Change sets out the three ‘pillars’ under which the department operates, including ‘adapting to the impacts of climate change we cannot avoid’.<sup>25</sup> The Australian Government administers four programs and facilities in relation to climate change adaptation:

- Climate Change Adaptation Skills for Professionals Program
- Local Adaptation Pathways Program

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25 The Department of Climate Change’s three pillars are: reducing Australia’s greenhouse gas emissions, *adapting to the impacts of climate change we cannot avoid* and helping to shape a global solution. The work of the department is focused around these three priorities.

- National Climate Change Adaptation Facility
- CSIRO Climate Adaptation National Research Flagship

## Climate Change Adaptation Skills for Professionals Program

3.39 The Department of Climate Change administers the Climate Change Adaptation Skills for Professionals Program, which provides small grants to tertiary education and training institutions as well as professional associations, to revise or develop professional development and accreditation programs for architects, engineers, natural resource managers and planners. This program acknowledges the crucial role these professions will play in supporting Australia's capacity to adapt to the impacts of climate change. The Committee commends the government's support of these important professions via this program, and would like to see continued support. The initial round closed in December 2007, with successful applicants announced in May 2008.<sup>26</sup> The Committee notes that the department's website has no information as to whether a second round of funding will take place under the program.

3.40 A number of inquiry participants raised the issue of a shortage of coastal planners and engineers and the consequences of this for ensuring robust climate change adaptation strategies for the coast in the future:

I would make the point that we do need to think about how we will train up professionals or existing professionals with ongoing professional development to deal with these issues in the future ... I could name on one hand how many courses there are in Australia in coastal planning. Similarly, I have heard from the engineering institute that there is a critical shortage of coastal engineers. If we do not have any coastal planners or coastal engineers in the context of planning for climate change on the coast then we have a looming skills problem in the future.<sup>27</sup>

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26 Department of Climate Change website accessed 7 August 2009  
<<http://www.climatechange.gov.au/impacts/about.html#professionals>>

27 Ms Norman, *Transcript of Evidence*, 20 May 2009, p. 33. See also PIA, 'skill shortages exist in the planning profession and related professions especially in Local Governments', *Submission 51*, p. 4.



## Recommendation 6

- 3.41 **The Committee recommends that the Australian Government continue funding under the Climate Change Adaptation Skills for Professionals Program. In addition, the Australian Government should liaise with tertiary institutions to ensure an adequate supply of appropriately skilled coastal planners and engineers.**

### Local Adaptation Pathways Program

- 3.42 The Department of Climate Change also administers the Local Adaptation Pathways Program (LAPP) which provides funding for local governments to undertake climate change risk assessments at the local level and develop action plans so that results of assessments may be integrated into broader decision-making to thereby build regional capacity to respond to the impacts of climate change.<sup>28</sup>
- 3.43 In order for effective climate change adaptation to take place, detailed local vulnerability assessments will be required. The Committee strongly supports the Australian Government's Local Adaptation Pathways Program. As noted by the Sydney Coastal Councils Group (SCCG), the program 'offers Local Government the opportunity to identify, trial and implement adaptation actions within a risk management framework.'<sup>29</sup> During the course of the inquiry, constructive suggestions were made to strengthen the program's outcomes.
- 3.44 The Local Government Association of NSW argued that information sharing should be made a formal requirement for funding under the program:

Ideally, funding for adaptation action plans should be delivered in such a way as to promote dissemination of the learning and experiences gained from preparing the plans and to promote a regional approach to adaptation planning. The Local Adaptation Pathways grant application required applicants to 'Demonstrate a commitment to provide and share information relevant to the process.' We respectfully suggest that such information sharing should involve a formal, organised dissemination of the outputs

28 Department of Climate Change website accessed 7 August 2009  
<<http://www.climatechange.gov.au/impacts/localgovernment/index.html>>

29 SCCG, *Submission 77*, p. 3.

and outcomes of the grant funded projects and the sharing of experiences with processes employed during the projects.

... Without such dissemination there is a danger of duplication of effort, and sub-optimal use of time and resources across councils and communities and a risk that key areas for attention could be overlooked. Conversely, sharing information and insights can lead to more effective, efficient and innovative outcomes for other projects.<sup>30</sup>

- 3.45 As well as the issue of disseminating and sharing information, concern was expressed about possible fragmentation of outcomes in the absence of a strategic approach to these assessments. Mr Townsend, Immediate Past Chair of the National Committee on Coastal and Ocean Engineering from Engineers Australia, commented that:

Fragmentation is a serious concern. We are seeing overlap in tasks that are being conducted. We are also seeing a non-strategic approach being taken in some levels.<sup>31</sup>

- 3.46 A further concern is that the Local Adaptation Pathways Program does not call for standardised approaches in climate change vulnerability assessments. Councils are not required to undertake any specific assessments with the funding they receive. The Department of Climate Change acknowledged this in evidence to the Committee:

there would be value in trying to give them some standardised approaches to conducting risk assessments in local government.<sup>32</sup>

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30 Local Government Association of NSW, *Submission 31a*, p. 1.

31 Mr Townsend, Engineers Australia, *Transcript of Evidence*, 12 March 2009, pp. 10-11. Representatives of the Western Australian Government, in evidence to the Committee, also raised concerns regarding the program, calling for greater collaboration between state and federal government and pointing to a lack of coordination in the program – see *Transcript of Evidence*, 7 April 2009, pp. 11-12.

32 Mr Carruthers, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 6.

## **Recommendation 7**

- 3.47 **The Committee recommends that the Australian Government:**
- **continue the Local Adaptation Pathways Program as a competitive funding program**
  - **review the program's guidelines to secure better outcomes by:**
    - ⇒ **use of consistent methodology for vulnerability assessments**
    - ⇒ **evaluation of the outcomes of the projects that are undertaken with the grants**
    - ⇒ **encouraging regional applications from local councils whenever possible**

## **Recommendation 8**

- 3.48 **The Committee recommends that the Department of Climate Change share all data collected through vulnerability assessments undertaken as part of the Australian Government Local Adaptation Pathways Program on the proposed National Coastal Zone Database (see also recommendation 42).**

## **National Climate Change Adaptation Research Facility**

- 3.49 The National Climate Change Adaptation Facility (NCCARF), established in 2007, is a collaboration of academic facilities addressing broad issues of adaptation from a research perspective. It is hosted by Griffith University, with funding from the Department of Climate Change. NCCARF leads the national interdisciplinary research effort to 'generate the information needed by decision-makers in government and in vulnerable sectors and communities to manage the risks of climate change impacts.'<sup>33</sup>
- 3.50 The National Climate Change Adaptation Framework identified a need for the establishment of a body that would coordinate Australia's research resources to produce targeted research to assist in adaptation decision making, which led to the establishment of NCCARF.
- 3.51 NCCARF outlines its key roles as:

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33 National Climate Adaptation Research Facility website accessed on 7 August 2009 <<http://www.nccarf.edu.au>>

- developing National Adaptation Research Plans to identify critical gaps in the information available to decision-makers
- synthesising existing and emerging national and international research on climate change impacts and adaptation and developing targeted communication products
- undertaking a program of integrative research to address national priorities, and
- establishing and maintaining adaptation research networks to link together key researchers and assist them in focussing on national research priorities.<sup>34</sup>

3.52 NCCARF will produce a research plan on various themes. Each plan will be produced by a network of academics coordinated by various research bodies, as follows:

- Terrestrial Biodiversity – James Cook University
- Water Resources and Freshwater Biodiversity – Griffith University
- Marine Biodiversity and Resources – University of Tasmania
- Settlements and Infrastructure – University of NSW
- Disaster Management and Emergency Services – RMIT University
- Social, Economic and Institutional Dimension – University of Melbourne
- Health – Australian National University
- Primary Industries – Land and Water Australia<sup>35</sup>

3.53 The work of the NCCARF is supported by the Committee. At the time of writing only the health research plan<sup>36</sup> has been finalised and released by NCCARF and announced by the Minister for Climate Change.<sup>37</sup> The Committee looks forward to the release of further plans.

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34 National Climate Adaptation Research Facility website accessed on 7 August 2009 <<http://www.nccarf.edu.au/about-facility>>

35 The Australian Government has announced that as part of the 2009-10 Budget, it will be abolishing Land and Water Australia (LWA). LWA will be fully wound-up by December 2009. In that context, LWA is currently negotiating the completion or transfer of projects it administers. LWA website accessed 14 September 2009 <<http://lwa.gov.au/land-and-water-australia/closure-and-wind-information>>

36 NCCARF, *Human Health and Climate Change: National Adaptation Research Plan*, December 2008.

37 Media release by Senator the Hon Penny Wong, Minister for Climate Change; the Hon Nicola Roxon MP, Minister for Health and Ageing; and Senator the Hon Kim Carr, Minister for Innovation, Industry, Science and Research, '\$10 million for research into health and climate change', 27 January 2009.

- 3.54 The Committee was surprised to learn that there is not a coastal research network within NCCARF. Most of the other themes highlighted in the National Climate Change Adaptation Framework are covered by the work of the research facility. This omission should be rectified.

### **Recommendation 9**

- 3.55 **The Committee recommends that the Australian Government establish a coastal zone research network within the National Climate Change Adaptation Research Facility and that it complete a coastal zone research plan.**

### **CSIRO—Climate Adaptation National Research Flagship**

- 3.56 CSIRO has established the Climate Adaptation National Research Flagship to address the national challenge of climate change adaptation in Australia. The flagship is working to develop adaptation responses to counter the expected effects of climate change in Australia and deliver strategies to manage their impact, as well as develop new ways to combat and potentially benefit from these challenges.<sup>38</sup>
- 3.57 Research at the flagship is being conducted under four themes designed to help increase Australia's adaptive capacity. They are:
- Pathways to adaptation
  - Sustainable cities and coasts
  - Managing species and natural ecosystems
  - Adaptive primary industries and communities
- 3.58 Under the 'Sustainable cities and coasts' theme, the flagship is addressing climate change adaptation in the coastal zone. The flagship's website states that:

Researchers are developing planning, design, infrastructure and management solutions to help Australia's cities and coasts adapt to a changing climate.<sup>39</sup>

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38 CSIRO Climate Change Adaptation National Research Flagship website accessed 10 August 2009 <<http://www.csiro.au/org/ClimateAdaptationFlagship.html>>

39 CSIRO Climate Change Adaptation National Research Flagship website accessed 10 August 2009 <<http://www.csiro.au/org/ClimateAdaptationFlagshipOverview.html>>

- 3.59 The Committee is pleased to see this scientific focus on adaptation in Australia's coastal zone, and believes there is a great need for further scientific engagement in developing Australia's coastal adaptive capacity.

### **Role of state and local government in climate change adaptation in the coastal zone**

- 3.60 State and local governments play a vital role in climate change adaptation. The COAG National Climate Change Adaptation Framework states that:

risks should be managed by those best equipped to understand the context and likely consequences of action, and there is a clear need to build capacity at local and regional scales. There is an important role for business and the community in addressing climate change risks, and governments will pursue a partnership approach to adaptation to manage risks and identify any opportunities.<sup>40</sup>

- 3.61 As Mr Sharples explained, there are significant factors of 'regional and local variability' such as 'climatic, oceanographic, geological, geomorphic and topographic factors' that define the Australian coastal zone and will significantly determine the regional impacts of climate change around the coast.<sup>41</sup> The Committee strongly endorses the framework's statement that adaptation is most effectively carried out by those best placed to do so.
- 3.62 The Committee notes that the first pass NCVA will provide a broad national vulnerability assessment of the Australian coast, with a selection of more in depth analyses of the local impacts of climate change drawn from the six case studies.
- 3.63 The Committee believes that it is these more detailed, localised assessments of the coastal zone that will be of greatest value into the future. The Committee also notes the Integrated Assessment of Climate Change Impacts on Human Settlements and Infrastructure initiative being funded in part by the Department of Climate Change, in collaboration with state, territory and local governments, as well as research institutions and local communities. Case studies have taken place in Western Port,

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40 COAG National Climate Change Adaptation Framework, p. 4.

41 C Sharples, for Tasmanian Department of Primary Industries and Water, *Indicative Mapping of Tasmanian Coastal Vulnerability to Climate Change and Sea-Level Rise: Explanatory Report* (second edition), May 2006, p. 4.

Victoria; Clarence, Tasmania; Gold Coast, Queensland and Sydney, NSW.<sup>42</sup>



Committee members with Town of Cottesloe council officials at a site inspection of Cottesloe foreshore, WA

3.64 The study entitled, 'Three pass approach to coastal risk assessment,' highlights the need not only for a first pass assessment which establishes coastal 'sensitivity' to climate change impacts but also for second and third pass assessments. These further assessments involve looking at the 'exposure' of different regions of the coast to the impacts of climate change (second pass) and then undertaking site-specific assessments of vulnerable locations (third pass).<sup>43</sup> The Committee is aware that a large number of coastal councils and state governments are already undertaking their own vulnerability assessments, and have been doing so for some time. While it is beyond the scope of this report to consider these local coastal adaptation

42 See Western Port Greenhouse Alliance, *Impacts of Climate Change on Settlements in the Western Port Region*, October 2008; Clarence City Council, *Exhibit 97*; Griffith University, *Climate Change, Health Impacts and Urban Adaptability: Case Study of Gold Coast City*, February 2009; and Sydney Coastal Councils Group – *Exhibit 105*.

43 C Sharples, C Attwater, J Carley, *Exhibit 67*, p. 3.

studies in detail, several that were drawn to the attention of the Committee during the inquiry are listed in Figure 3.1.

- 3.65 The Committee would like to highlight the Victorian Government's 'Future Coasts' project. They noted:

Victoria is undertaking a major project, Future Coasts, to develop comprehensive vulnerability assessments for the whole Victorian coastline worth in excess of \$8 million. This project will also develop planning and policy guidance and adaptation strategies for decision making. The Victorian State Government will be working closely with land managers and local government on this work.<sup>44</sup>

- 3.66 Through this project, the Victorian Department of Sustainability and Environment is collecting high resolution DEM data for both sea depth and topographic elevation – within a range of 20m below and 10m above sea level. The topographic DEM is currently available for the entire Victorian coastline.<sup>45</sup> 'Future Coasts' also involves a coastal policy and planning project, focused on how planning and management of coastal areas could better incorporate the impacts of climate change. The project will involve engagement with coastal stakeholders to identify the policy and decision-making guidance needed to support better planning and management outcomes on the coast. The third element of 'Future Coasts' is a coastal asset database that will seek to provide an inventory of the key assets and infrastructure located within the Victorian coastal zone.<sup>46</sup>

Figure 3.1 Examples of local coastal adaptation studies

#### Sydney Coastal Councils, NSW

The Sydney Coastal Councils Group (SCCG) received funding from DCC to commission CSIRO to work in collaboration with the University of the Sunshine Coast to undertake a 2 year research project on regional approaches to managing climate vulnerability in the Sydney region.

The goal of the 'Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises' project was to explore climate change risk management, specifically in relation to climate change adaptation in the SCCG region. The project focuses on the capacity of the 15 SCCG member councils to adapt to climate change.

44 Victorian Government, *Submission 90*, pp. 9-10.

45 Victorian Government website accessed 19 August 2009  
<<http://www.climatechange.vic.gov.au/futurecoasts>>

46 Victorian Government, *Future Coasts Newsletter*, December 2008, p. 2.



The project involved the production of a report mapping the climate change vulnerability in the SCCG region.<sup>47</sup>

#### **Gippsland Coastal Board, VIC**

In 2005-06, commissioned CSIRO, with funding assistance from National Heritage Trust, to undertake three reports on impacts of climate change on weather patterns, storm surges, and extreme sea levels in Gippsland region.<sup>48</sup>

The studies have been used to assist communities and coastal managers in understanding and preparing for more extreme storm events which are likely to occur in that region.

The Board has also commissioned a final report which gives greater detail regarding the location of the most vulnerable communities and assets in the Gippsland region.<sup>49</sup>

#### **Lake Macquarie City Council, NSW**

One of the first local government areas to establish and implement coastline and estuary management plans based on draft NSW state government estuary and coastal management manuals.

In 2008, council also resolved to exhibit a proposal to adopt a sea level rise figure for the year 2100 of 0.91m, based on NSW Department of Environment and Climate Change projected upper level sea level rise figure.<sup>50</sup>

#### **Tasmanian State Government**

In 2006, Chris Sharples released a report, commissioned by the Department of Primary Industries and Water, outlining the vulnerability of the Tasmanian coastline to the impacts of climate change and sea-level risk.<sup>51</sup>

Subsequent to Sharples' report, the Tasmanian Government is conducting the Climate Change and Coastal Risk Assessment Project, to develop tools and resources to assist with risk-based management and planning for various assets and values in the coastal zone.<sup>52</sup>

47 Sydney Coastal Councils Group, *Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises: Mapping Climate Change Vulnerability in the Sydney Coastal Councils Group*, 2008 – Exhibit 105.

48 Gippsland Coastal Board, *Climate Change in Eastern Victoria: the Effect of Climate Change on Coastal Wind and Weather Patterns – Stage 1 Report*, June 2005; Gippsland Coastal Board, *Climate Change in Eastern Victoria: the Effect of Climate Change on Storm Surges – Stage 2 Report*, June 2005; Gippsland Coastal Board, *Climate Change in Eastern Victoria: the Effect of Climate Change on Extreme Sea Levels in Corner Inlet and the Gippsland Lakes – Stage 3 Report*, August 2006.

49 Gippsland Coastal Board, *Exhibit 44*.

50 Lake Macquarie City Council, *Submission 44*, p. 5. See also NSW Department of Planning, *Exhibit 37*.

51 Tasmanian Department of Primary Industries and Water, *Indicative Mapping of Tasmanian Coastal Vulnerability to Climate Change and Sea Level Rise: Explanatory Report* (second edition), May 2006.

52 Tasmanian Department of Primary Industries, Parks, Water and Environment website accessed on 12 August 2009 <<http://www.dpiw.tas.gov.au/inter.nsf/WebPages/PMAS-6B56BV?open>>

3.67 The Australian Government intends to hold a 'National Coastal Climate Change Forum' on completion of the first pass assessment.<sup>53</sup> The Department of Climate Change states that the forum will:

bring together the key stakeholders and provide the information and tools so that the participants can develop a clear and consistent set of guidelines that coastal communities can use in adapting to climate change impacts.<sup>54</sup>

3.68 The Committee supports the involvement of coastal councils, local government associations and state governments in this forum, as dialogue between jurisdictions is paramount in ensuring the best coastal climate change adaptation guidelines are set. Mr Beresford-Wylie, ALGA Chief Executive, noting that there are several hundred coastal councils, observed that:

Councils in a forum will be able to articulate exactly what it is that they, as individual councils, will be looking for, and there will be a whole variety of different experiences they put on the table. ... Then, in a sense, it will hopefully be up to the Australian government to identify what it might do, and what it might contribute, in terms of helping councils address the issues that come forward.<sup>55</sup>

3.69 The Committee believes that a regional approach to climate change adaptation in the coastal zone is an efficient method of undertaking vulnerability assessments and implementing adaptation plans. Cooperation between local government areas can be particularly beneficial as the climate change threats to neighbouring areas are often similar and may be more efficiently addressed through a collaborative approach.

3.70 The Summary of Outcomes from the June 2009 meeting of the Australian Council of Local Governments (ACLG) supports this approach:

Across the board, councils stressed the need to work in a more coordinated way with state and federal governments and their communities to adapt to climate change. Areas for greater coordination included managing risk and liability and agreement between different spheres of government on roles and responsibilities.<sup>56</sup>

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53 Department of Climate Change, *Submission 85*, p. 2.

54 Department of Climate Change, *Submission 85*, p. 2.

55 Mr Beresford-Wylie, ALGA, *Transcript of Evidence*, 16 October 2008, p. 5.

56 Australian Council of Local Governments, *Summary of Outcomes, June 2009*  
<[http://www.aclg.gov.au/meetings/jun\\_09/session\\_outcomes.aspx](http://www.aclg.gov.au/meetings/jun_09/session_outcomes.aspx)>

3.71 While the initial first pass assessment is rightly being undertaken federally, it is the states and local governments that will be most active in coastal climate change adaptation plans.

3.72 The National Sea Change Taskforce recommended that ‘a mechanism be established to encourage and enable collaboration between neighbouring local councils in responding to climate change.’ This will become yet more significant once the ‘second’ and ‘third’ pass data becomes available in greater volume.

3.73 In its submission to the inquiry, CSIRO discussed the benefits of a coordinated national approach:

Development of adaptation options needs to be done in partnership with policy makers, industry and communities to avoid perverse outcomes. The costs of adaptation will in many instances be significant, and uncoordinated or inappropriately targeted adaptation will consequently cost the economy severely in inefficiencies, costs of missed opportunities and downside risk. The development of a common and consistent conceptual approach to adaptation across agencies, tiers of government and in the research community will greatly reduce these costs.<sup>57</sup>

3.74 The Queensland Government raised the concern about the capacity of some local government bodies to plan for and adapt to climate change impacts, noting:

not all local governments have the capacity, expertise and resources to adequately address the impacts of climate change through the planning process, management activities and capital works. In particular, there are likely to be significant financial costs associated with the need to undertake ‘coastal hardening’ (build or upgrade shoreline protective structures to protect infrastructure and other development from increased erosion as a result of climate change).<sup>58</sup>

3.75 Dr Townsend, Immediate Past Chair of the National Committee on Coastal and Ocean Engineering, Engineers Australia, commented that:

The capacity for various jurisdictions to deal with [climate change adaptation] varies widely across the country ... when you delve down [to]... various local government districts ... Some are

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57 CSIRO, *Submission 49*, p. 17.

58 Queensland Government, *Submission 91*, p. 9.

extraordinarily well equipped and raring to go to take on these issues whereas others are dealing with large areas of coast, very small ratepayer bases and very small populations. They have almost no ability to take on any additional issues. The cost to some local governments is well above their capacity to deal with these matters.<sup>59</sup>

3.76 The Committee notes the importance of building capacity in local government for effective climate change adaptation. The Department of Climate Change, in a June 2009 report, acknowledged this need, calling for improvement in public sector capabilities through capacity building activities for local government.<sup>60</sup> Professor McIlgorm, of the National Marine Science Centre, suggested in his submission that:

A study is required of the human capacity needs in local government and the requirements to assist local government staff to plan and to face climate change impacts. This is a priority. Scholarship programs could be offered.<sup>61</sup>

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## Recommendation 10

3.77 The Committee recommends that:

- the Department of Infrastructure, Transport, Regional Development and Local Government undertake a study into the human and resourcing needs of local governments to effectively plan for and adapt to the impacts of climate change
- this study be carried out in conjunction with the Australian Local Government Association and the National Sea Change Taskforce

## Concluding remarks

3.78 As discussed above, a significant concern raised repeatedly throughout the course of the Committee's inquiry is the current lack of coordination of vulnerability assessments in Australia. Stakeholders were supportive of

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59 Mr Townsend, Engineers Australia, *Transcript of Evidence*, 12 March 2009, p. 3.

60 Department of Climate Change, *Climate Change Adaptation Actions for Local Government*, 2009, p. 52.

61 Professor McIlgorm, *Submission 47*, p. 1.

the Australian Government's activities in beginning to assess coastal vulnerability to climate change, calling for national coordination to ensure best practice, to prevent duplication and reduce costs.

3.79 The Committee notes the key challenge identified in Working Paper 2 of CSIRO Climate Change Adaptation Flagship that:

At present, we have too many case studies using different methods in different regions/sectors, but not the same methods in multiple cases or different methods in the same case, thus hindering generalisation.<sup>62</sup>

3.80 The WA Government noted that:

There is currently no dedicated central repository of the various coastal assessments and hence there has been limited comparative analysis to date.<sup>63</sup>

3.81 The Committee believes that these issues of communication and coordination of the first pass NCVA data, as well as the vulnerability assessment data from the states and NT, could be effectively rectified by the establishment of an online coastal database. The database would include all information collected through the NCVA, as well as other coastal adaptation information collected from various sources. All data should be loaded to the new national coastal zone database, and should be made fully accessible to all, with clear instructions and explanations of the available tools and data.

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62 CSIRO Climate Adaptation Flagship, *Working Paper 2*, 2009, p. 30.

63 WA Government, *Submission 89*, p. 15.

**Recommendation 11**

3.82 **The Committee recommends that the Australian Government establish a National Coastal Zone Database to improve access to and consistency of information relevant to coastal zone adaptation. The National Coastal Zone Database should be an online portal that allows ready access to:**

- **'first pass' National Coastal Vulnerability Assessment data**
- **state and local Digital Elevation Modelling**
- **National Climate Change Adaptation Research Facility reports**
- **federal Local Adaptation Pathways Program reports**
- **state and local coastal vulnerability assessment results**

3.83 The Committee notes that the first pass NCVA is indeed the *first* national assessment of Australia's coastal vulnerability, and that more in depth, regional assessments should be undertaken. As representatives of the Department of Climate Change pointed out:

The current 'first pass' National Coastal Vulnerability Assessment (NCVA) of key assets within Australia's coastal zone will begin to address our knowledge deficit. The NCVA will provide the first, whole of nation understanding of the magnitude and spatial extent of risk and will drive the national development of essential tools for climate change adaptation.<sup>64</sup>

3.84 The Committee believes that, once the first pass assessment has addressed that initial 'knowledge deficit', Australia will require greater detail of vulnerability assessment data to allow for the best adaptation decisions to continue to be made throughout the coastal zone. The Committee believes that the completion of the first pass assessment should not mark the end of Australia's efforts to assess coastal vulnerability to climate change impacts but rather the beginning. The question therefore posed is that, once the first pass assessment is complete, what comes next?

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64 Department of Climate Change, *Submission 85*, p. 2.

## Recommendation 12

3.85 **The Committee recommends that, following the completion of the ‘first pass’ National Coastal Vulnerability Assessment, the Australian Government consider the resourcing and financing of second and third pass assessments, in conjunction with state, territory and local government authorities.**

3.86 The Committee notes that the vast majority of responses to its term of reference examining climate change adaptation in the coastal zone have focused on coastal vulnerability assessment rather than implementing possible strategies or solutions. As Engineers Australia made clear in its submission to the inquiry:

Research dominates the climate change policy landscape and for good reason. There are many issues where further information is required. However, action using what is known can proceed in parallel with research.<sup>65</sup>

3.87 Assessment is, of course, a crucial element in establishing a good climate change adaptation policy; however, it is only the initial step. Acknowledging that *climate change is happening now*, the Committee is concerned about any delay in moving from the vulnerability assessment phase of adaptation to the implementation of adaptation solutions around the coastal zone. As a representative of the Western Australian Department of Planning and Infrastructure observed, the move to the implementation phase is not likely to be an easy one but is nonetheless an urgent one:

the last stage is the policy, the adaptation, the adoption of change. That is a very difficult step, as you would probably all understand, because that actually requires change. One of the problems which I see is that very few people actually get into the last step of this process. On a Commonwealth scale, from the work that I see, there is data collection and there are frameworks in place to that. There is classification and seeing what are vulnerable areas. ... As we get down to the end and are setting up frameworks for policy, having adaptation and actually doing change, these are very difficult things, and this goes down to a local level.<sup>66</sup>

65 Engineers Australia, *Submission 29*, p. 1.

66 Mr Bicknell, WA Department of Planning and Infrastructure, *Transcript of Evidence*, 7 April 2009, pp. 5-6.

- 3.88 Coastal adaptation is of course a subset of a broader climate change adaptation framework. Larger issues exist, for example, regarding resourcing for the significant technological and skills requirements in carrying out a 'protect, redesign, rebuild, elevate, relocate or retreat' policy.<sup>67</sup> There is clearly a need for a national climate change adaptation policy, which would seem to be the logical outcome of the work being conducted to date by the Department of Climate Change. This is a larger issue than just the coastal zone and therefore beyond the scope of this inquiry.
- 3.89 The Committee commends the Australian Government for beginning to provide the information and tools that will be required for coastal adaptation, through the National Climate Change Adaptation Framework and the first pass NCVA. The Committee points to the need for definition of the roles and responsibilities of different levels of government and other stakeholders in coastal adaptation and notes that at present there is no formal mechanism for monitoring and evaluation of adaptation policies.

## **Other themes identified in the National Climate Change Adaptation Framework relevant to the coastal zone**

### **Coastal water resources**

- 3.90 The National Climate Change Adaptation Framework, as discussed above, has identified 'water resources' as a key sector for attention. Climate change will severely impact Australia's already limited water resources. Increased droughts will lead to a decline in replenishment of groundwater aquifers, which provide a large amount of Australia's water. Rainfall is also likely to be concentrated in more extreme rainfall events, affecting water availability and quality.<sup>68</sup>
- 3.91 The Committee notes that the National Climate Change Adaptation Research Facility is facilitating an Adaptation Network on Water Resources and Freshwater Biodiversity, hosted by Griffith University. The network brings together water scientists with interests and skills in water resources and freshwater biodiversity, and the implications of climate change.<sup>69</sup> The network has identified an urgent need to understand the

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67 Victorian Coastal Council, *Submission 83*, p. 9.

68 COAG National Adaptation Framework, p. 10.

69 NCCARF website accessed 13 August 2009 <<http://www.nccarf.edu.au/water>>



risks to Australia's surface and groundwater resources due to climate change as well as the technical and policy interventions that will be required to meet future human water needs.<sup>70</sup> The network is, at the time of writing, drafting a national adaptation research plan which will identify critical gaps in the information available to decision-makers, set national research priorities and identify science capacity that could be harnessed to conduct priority research.<sup>71</sup> The Committee looks forward to the findings of this research plan.

3.92 The Committee's particular interest is in coastal water resources in terms of climate change impacts and adaptation strategies. Coastal water resources are of particular concern in Australia because of the potential for sea level rise to cause salt water intrusion into freshwater aquifers, jeopardising our already restricted water supply. Indeed, water supplies, storage and infrastructure may be susceptible to extreme sea level and rainfall events and upgrading of water delivery systems may be required to protect against sea level rise impacts.

3.93 Salt water intrusion into fresh groundwater was raised by several inquiry participants. The submissions from SGS Economics and CSIRO noted that '[s]alt water intrusion into fresh groundwater can make water supplies unusable'<sup>72</sup> and that 'impairment of water quality' is a significant potential risk.<sup>73</sup> The Australian Network of Environmental Defender's Offices (ANEDO) commented on the potentially damaging impacts of salt water intrusion to the biodiversity and ecology of the coastal zone:

increased salt water intrusion into aquifers has the potential to impact not only on freshwater reserves (used to support the environment and the increasing population), but additionally cause major shifts in coastal ecosystem dynamics. Tomago Sands Beds provides much of the water supply for the Newcastle area, and has been identified as being vulnerable to saltwater intrusion from rising sea levels.<sup>74</sup>

3.94 A number of inquiry participants also highlighted that the low-lying coastal plains in Kakadu National Park are particularly vulnerable to

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70 NCCARF website accessed 13 August 2009 <<http://www.nccarf.edu.au/water>>

71 NCCARF website accessed 13 August 2009 <<http://www.nccarf.edu.au/national-adaptation-research-plans>>

72 SGS Economics and Planning, *Submission 105*, p. 17.

73 CSIRO, *Submission 49*, p. 14.

74 ANEDO, *Submission 73*, p. 36.

saltwater intrusion, posing a significant threat to its freshwater wetland systems. This issue is further discussed in Chapter 5.

- 3.95 The Committee notes that the issue of climate change and water is a significant area of national policy concern, with several specific initiatives underway in this area, including work to address climate change adaptation with respect to water resources. The Australian Government's \$12.9 billion Water for the Future program highlights 'Taking Action on Climate Change' as the first of its four base principles, noting that there is a need for 'scientific and technical expertise to understand how much water Australia's river and groundwater systems are capable of providing into the future.'<sup>75</sup>
- 3.96 The Committee notes this significant government initiative and the extent to which it is addressing climate change adaptation with respect to water resources.
- 3.97 As the driest inhabited continent, Australia's water resources are precious and limited. Any added threat to water resources from salt water intrusion due to sea level rise in the coastal zone is therefore highly significant. The Committee is pleased to see the focus on adaptation to climate change impacts on water resources through the publication of the research plan on Water Resources and Freshwater Biodiversity from NCCARF, and in particular the emphasis on climate change and water in government programs such as the National Water Initiative, being advanced by the Water for the Future program. The Committee believes that these government initiatives must focus specific attention on the issues surrounding water adaptation in response to climate change in coastal regions.

## Health in coastal communities

- 3.98 Human health is identified in the National Climate Change Adaptation Framework as a key sector for attention. Health can be impacted by climate change through increases in mortality from thermal stress due to increased temperatures (in particular during heat waves), extreme weather events, and food-borne and vector-borne diseases. Changes in climate events like droughts have also been identified as causing mental health problems in rural communities.<sup>76</sup> The National Climate Change Adaptation Framework called for a National Action Plan on Climate

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75 DEWHA, website accessed 13 August 2009  
<<http://www.environment.gov.au/water/australia/priorities.html>>

76 COAG National Climate Change Adaptation Framework, p. 16.

Change and Health, which is underway at the time of writing.<sup>77</sup> Figure 3.2 below shows the expected impacts on human health from climate change.

Figure 3.2 Expected climate change impacts on human health

- Mortality and morbidity are likely to increase due to more frequent and intense extreme weather events including storm surges, cyclones and bushfires.
- Drought is likely to lead to an increase in mental health problems, particularly in rural communities.
- Morbidity and mortality associated with more frequent and severe heatwaves is likely to increase affecting the elderly in particular.
- Morbidity and mortality from increased exposure to ground-level ozone and other air pollutants (eg nitrogen oxides, particulate matter) and aeroallergens such as pollens is likely to increase. People with pre-existing illness, particularly respiratory and cardiac, will be at particular risk.
- Vector-borne infectious diseases are likely to increase due to changing conditions for vectors and hosts. Geographic ranges of some diseases are likely to change, putting new populations at risk.
- Food- and water-borne disease outbreaks are likely to increase, including, for example, diarrhoeal disease following floods and increased temperature-sensitive food-borne diseases such as salmonellosis. Algal blooms that cause human disease are also likely to increase.
- Water scarcity is likely to increase and reduce food availability, particularly fresh fruit and vegetables.
- Internal migration and immigration, particularly from neighbouring island countries, is likely to increase, most likely from coastal areas that are inundated by sea level rise.

Source Department of Health and Ageing, *Submission 100*, p. 1

### 3.99 The IPCC AR4 report identifies the health vulnerabilities of coastal communities:

Climate change could affect coastal areas through an accelerated rise in sea level; a further rise in sea-surface temperatures; an intensification of tropical cyclones; changes in wave and storm surge characteristics; altered precipitation/runoff; and ocean acidification. These changes could affect human health through coastal flooding and damaged coastal infrastructure; saltwater intrusion into coastal freshwater resources; damage to coastal ecosystems, coral reefs and coastal fisheries; population displacement; changes in the range and prevalence of climate-sensitive health outcomes; amongst others. Although some Small

77 COAG National Climate Change Adaptation Framework, p. 16; and see Mr Coburn, Department of Health and Ageing, *Transcript of Evidence*, 14 May 2009, p. 5.

Island States and other low-lying areas are at particular risk, there are few projections of the health impact of climate variability and change. Climate-sensitive health outcomes of concern in Small Island States include malaria, dengue, diarrhoeal disease, heat stress, skin diseases, acute respiratory infections and asthma.<sup>78</sup>

3.100 The Committee received evidence from the Department of Health and Ageing, which identified key health issues in coastal regions as:

- Mosquito-borne disease

- ⇒ In particular, the re-emergence of *Aedes albopictus* and *Aedes aegypti* in Northern Territory. These mosquitos are capable of carrying dengue fever and have normally only appeared in Queensland.

- ⇒ The Northern Territory Department of Health and Community Services confirmed in late February 2004 that *Aedes aegypti* were breeding in Tennant Creek, NT. This was the first time in 50 years that this mosquito has established breeding sites in the NT. Some \$1.3 million of federal funds were used to eradicate this infestation.

- ⇒ Subsequent discoveries of this mosquito have been recorded on Groote Eylandt, NT and the Torres Strait.<sup>79</sup>

- Mental health

- ⇒ Mental health issues caused by drought in rural coastal areas have been identified by the department as an issue of concern.

3.101 The National Climate Change Adaptation Research Facility, hosted by Griffith University, is facilitating a network on 'Human Health', hosted by Australian National University (ANU). As mentioned earlier in this chapter, the network has finalised its national adaptation plan for human health, entitled *Human Health and Climate Change: National Adaptation Research Plan*. The plan highlights current knowledge gaps in Australia's vulnerability to the health implications of climate change. In areas significant to health of coastal communities, the plan identifies knowledge gaps in dealing with:

- Vector-borne disease

- ⇒ The plan identified current threats from: Ross River Virus, dengue fever, chikungunya fever<sup>80</sup> and malaria.

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78 IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Chapter 8: Human Health, p. 414.

79 Department of Health and Ageing, *Submission 100*, p. 4.

- ⇒ The plan identified gaps in:
  - ... understanding of baseline relations between climate and infectious disease incidence; the need for better predictive models agreed to by all professional groupings involved in the area; and methodologies for the assessment of adaptive strategies for changes in the range, seasonality or incidence of infectious disease under climate change.<sup>81</sup>
- ⇒ The Committee notes the National Adaptation Plan also discusses the need for surveillance and early warning systems for vector-borne disease. The plan highlights the need to 'improve current short term forecasting, while also creating capacity to develop longer-term scenario-based predictive modelling.'<sup>82</sup>
- Mental health
  - ⇒ The plan identifies climate change impacts on human health from an increase in natural disasters (such as storm surges, cyclones or floods, for example) as well as the socioeconomic effects of drought on rural communities, and the implications this can have on mental health.

3.102 Departmental representatives, in evidence to the Committee, outlined current responses to these health issues:

- Vector-borne disease
  - ⇒ The department is working with the states and territories towards a more structured framework in response to mosquito outbreaks.<sup>83</sup>
- Mental health
  - ⇒ The department funds the Mental Health Services in Rural and Remote Areas program which covers coastal areas, providing mental health assistance to those affected by severe weather events and droughts.<sup>84</sup>

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80 Chikungunya fever is a tropical disease not yet present in Australia. The first non-tropical outbreak of the disease was in Italy in 2007. This has implications for Australia, as the *Aedes albopictus* and *Aedes aegypti* mosquitos can carry this disease as well as dengue, and are becoming more prevalent in northern Australia and the Torres Strait.

81 *Human Health and Climate Change: National Adaptation Research Plan*, 2008, p. 24.

82 *Human Health and Climate Change: National Adaptation Research Plan*, 2008, p. 24.

83 Ms Halbert, Department of Health and Ageing, *Transcript of Evidence*, 14 May 2009, p. 3.

84 Ms Krestensen, Department of Health and Ageing, *Transcript of Evidence*, 14 May 2009, pp. 11-12.

- 3.103 Finally, the Committee notes the large quantity of evidence suggesting that Indigenous communities may be more at risk from climate change related health concerns than other sectors of society due to their remoteness and socioeconomic conditions.<sup>85</sup>
- 3.104 The Committee believes that immediate action should be taken to provide for better early warning of threats from vector-borne disease, as well as long term modelling for earlier forecasting of threats. The significant outbreak, in early 2009, of dengue fever in Cairns, Queensland, with over 1,000 cases marks a cause for concern. The Committee believes that the increased likelihood of chikungunya virus entering Australia should be combated with increased biosecurity measures.

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### **Recommendation 13**

- 3.105 **The Committee recommends that the Australian Government take urgent action to protect Australians from the threats of dengue fever and chikungunya virus. The knowledge gaps identified by the National Climate Change Adaptation Research Facility research plan with regards to the relationship between climate variation and vector-borne disease should be urgently addressed. The Australian Government should:**
- **undertake research into the relationship between climate change and vector-borne disease**
  - **produce modelling to allow for advanced early warning of impending threats from vector-borne disease**
  - **continue to work towards producing a structured national framework for dealing with mosquito outbreaks in Australia**
  - **increase biosecurity measures to better protect against chikungunya virus entering Australia**

## **Coastal industry**

- 3.106 The Committee received limited evidence relating to climate change adaptation in coastal industries. The potential impacts of climate change on industries like tourism, agriculture, and fisheries and aquaculture were

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85 See Department of Health and Ageing, *Submission 100*; ANEDO, *Submission 73*; and Western Australian Local Government Association, *Submission 53*.

noted by the Committee.<sup>86</sup> The National Climate Change Adaptation Framework identifies agriculture, fisheries and tourism as key industry sectors for attention. Agriculture will be affected by greater seasonal weather variability, while fisheries will be impacted by rising ocean temperature, changes to ocean currents and changed rainfall patterns. Tourism is likely to be significantly affected by the impacts of climate change on infrastructure and the natural environment.<sup>87</sup>

- 3.107 The National Climate Change Adaptation Research Facility, hosted by Griffith University, is facilitating a Primary Industries Research Network hosted by Land and Water Australia<sup>88</sup> and a Marine Biodiversity and Resources Research Network hosted by the University of Tasmania.
- 3.108 The Adaptation Research Networks for both Primary Industries and Marine Biodiversity and Resources are bringing together researchers and stakeholders with an interest in the impacts of climate change on these significant industry sectors. The Committee notes that both networks are working towards the finalisation of Adaptation Research Plans which will identify critical gaps in the information available to decision makers in this sector and set national research priorities for greater understanding of the threats to these industries from climate change.<sup>89</sup>
- 3.109 The CSIRO Climate Adaptation Flagship is also undertaking research in this area. Under the research theme 'Adaptive primary industries, enterprises and communities', the Flagship is developing adaptation options for Australia's primary industry and resource sectors to reduce the vulnerabilities and enhance opportunities created by climate change and variability.<sup>90</sup>

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86 *Submissions 18* (Ports Australia), 32 (Port of Melbourne Corporation) and 80 (Maritime Union of Australia) also highlighted issues relating to ports and shipping. The Committee received a submission from the National Farmers Federation highlighting the impacts of climate change on agriculture in Australia – see *Submission 92*.

87 COAG National Climate Change Adaptation Framework, p. 16.

88 The Australian Government has announced that as part of the 2009-10 Budget, it will be abolishing Land and Water Australia (LWA). LWA will be fully wound-up by December 2009. In that context, LWA is currently negotiating the completion or transfer of projects it administers. Website accessed 14 September 2009 <<http://lwa.gov.au/land-and-water-australia/closure-and-wind-information>>

89 NCCARF website accessed 15 August 2009 <<http://www.nccarf.edu.au>>

90 CSIRO Climate Adaptation Flagship website accessed 17 August 2008 <<http://www.csiro.au/science/AdaptivePrimaryIndustries.html>>

## Tourism

3.110 The tourism sector in Australia's coastal zone is a highly significant contributor to Australia's economy. The Great Barrier Reef alone contributes a \$6.1 billion tourism industry and an estimated 63 000 jobs.<sup>91</sup>

3.111 The submission from the Great Barrier Reef Marine Park Authority (GBRMPA) outlines the impacts of climate change on the tourism industry, centred on the Great Barrier Reef:

Within the Great Barrier Reef, the marine tourism industry are particularly susceptible to the effects of climate change, namely loss of coral reef due to bleaching, and changes to abundance and location of fish, marine mammals and other iconic species.

Increasing intensity of storms and cyclones will impact passenger and tourism operator safety, industry seasonality (and opportunities for Great Barrier Reef experiences), tourism infrastructure and associated tourism industry development.<sup>92</sup>

3.112 The Quicksilver Group of Companies listed the impacts as:

- Water quality – our industry believes this is the single largest issue impacting the Great Barrier Reef. In simplistic terms, nutrient-enriched run-off from rivers has a deleterious impact on the reef systems, making them less resilient to environmental changes, such as climate change, coral bleaching or outbreaks of pests or diseases.
- Coastal Development and the potential impact this has on declining water quality.
- Climate change, the potential impact of rising sea temperatures and sea levels, and most recently, ocean acidification.
- Conflict with the growing numbers of recreational users - as indicated above, the tourism industry (which accounts for approximately 1.9 million visitors to the reef) is one of the most regulated/managed user groups within the Great Barrier Reef. Compare this to recreational users (approximately 2.1 million visitors) who are far less managed but growing rapidly in numbers and there is a high potential for conflict, particularly in areas like the Whitsunday's.
- The ability of the Great Barrier Reef Marine Park Authority (GBRMPA) to effectively enforce compliance.
- The ability of industry to access funds quickly to assist in addressing outbreaks of marine pests/diseases such as Crown-

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91 GBRMPA, *Submission 81*, p. 2.

92 GBRMPA, *Submission 81*, p. 11.



of-thorns Starfish (COTS), Drupella Snails and coral disease (White-band Syndrome) when they occur.<sup>93</sup>

- 3.113 The Committee notes the Tourism and Climate Change Action Framework, endorsed by the Tourism Ministers Council in July 2008. The framework was designed to reduce the tourism industry's contribution to climate change and also to prepare the tourism industry to respond to the physical, economic and social impacts of climate change.<sup>94</sup>
- 3.114 The Committee notes in particular the 'Destinations Adaptation Project', which is one element of the research underpinning the tourism framework. The project is being undertaken through the Sustainable Tourism CRC and was designed to increase understanding of climate change impacts (economic and noneconomic) on regional tourism destinations and to inform and prioritise adaptation strategies which can be undertaken by destinations and by tourism businesses for the next 10, 40 and 60 years.<sup>95</sup> The project is examining five regional tourism destinations, including the Cairns region and Kakadu National Park in the coastal zone, in order to make projections about the impacts of climate change over these time periods. The Committee welcomes this vital study and notes that the final reports have yet to be released.

### Agriculture, fisheries and aquaculture

- 3.115 The Committee notes the National Climate Change Adaptation Research Facility's Network on Primary Industries and Marine Biodiversity and Resources, and looks forward to the release of the research plans in these areas.<sup>96</sup>

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93 Quicksilver Group of Companies, *Submission 11*, p. 2.

94 Department of Resources, Energy and Tourism website accessed 15 August 2009 <[http://www.ret.gov.au/tourism/policy/tourism\\_climate\\_change\\_framework\\_for\\_action/Pages/TourismandClimateChangeAFrameworkforAction.aspx](http://www.ret.gov.au/tourism/policy/tourism_climate_change_framework_for_action/Pages/TourismandClimateChangeAFrameworkforAction.aspx)>

95 'The impact of climate change on Australian tourism destinations – developing adaptation and response strategies', Sustainable Tourism website accessed 15 August 2009 <<http://www.crctourism.com.au/Page/Research/Innovations/Climate+Change+Project.aspx?p=destinations%20OR%20adaptation>>

96 CSIRO Wealth from Oceans Flagship is also undertaking research under five research themes, including 'The dynamic ocean: building foundations for climate, national security and sustainable marine industries', which is researching the impacts of climate change on marine industries and methods for adaptation in this area. CSIRO Wealth from Oceans Flagship website accessed 15 August 2009 <<http://www.csiro.au/science/TheDynamicOcean.html>>

- 3.116 The Committee is aware that the CSIRO Climate Adaptation Flagship released a preliminary assessment of the impacts of climate change on fisheries and aquaculture.<sup>97</sup>
- 3.117 The Committee also notes that a major House of Representatives inquiry into agriculture and climate change is currently underway, examining the extent to which climate change will impact on the agricultural sector. The Committee looks forward to the findings of this report.
- 3.118 The GBRMPA submission highlighted the impacts of climate change on the fishing and other industry:
- The fishing industry is also heavily dependent on climatic conditions. Changes in ocean circulation, wave generation, cyclones and air and sea temperature may impact productivity with resultant effects for the fishing industry and aquaculture. In addition, declining water availability will greatly impact catchment industries such as agriculture, horticulture and mining, as well as urban centres.<sup>98</sup>
- 3.119 The Committee also received evidence from the Fisheries Research and Development Corporation (FRDC), highlighting two initiatives currently underway:
- the National Climate Change Research Strategy for Primary Industries
  - the National Climate Change and Fisheries Action Plan

## Coastal disaster and emergency management

- 3.120 The National Climate Change Adaptation Framework identifies 'natural disaster management' as a key sector for attention.<sup>99</sup> The Committee notes that COAG recently agreed on the:

urgent need for governments to re-examine Australia's arrangements for managing natural disasters and identify any further strategies aimed at building greater resilience. COAG noted such efforts would be critical to Australia's ability to deal with the expected increase in the frequency and severity of natural

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97 A Hobday, E Poloczanska, and R Matear, CSIRO Climate Adaptation Flagship, *Implications of Climate Change for Australian Fisheries and Aquaculture: a Preliminary Assessment*, Report to the Department of Climate Change, August 2008.

98 GBRMPA, *Submission 81*, p. 11.

99 COAG National Climate Change Adaptation Framework, p. 19.

disasters arising from extreme weather events linked to climate change.<sup>100</sup>

- 3.121 Emergency Management Australia (EMA) is positioned within the Commonwealth Attorney General's Department. The Director-General of EMA explained to the Committee:

State and territory governments have primary responsibility for emergency management in their jurisdiction and providing response in that context. The Australian government's role is to provide leadership and coordination.<sup>101</sup>

- 3.122 The Committee is concerned that Australian coastal communities are equipped to manage the threat posed by more severe and frequent extreme weather events.

- 3.123 The National Climate Change Adaptation Framework identifies the threat of natural disasters in the coastal zone as of special importance, stating:

The high concentration of people and infrastructure in urban areas, especially along the coast and coastal lowlands are likely to result in severe economic losses with changing exposure to extreme events. Remote settlements can be particularly vulnerable to natural disasters.<sup>102</sup>

- 3.124 The National Climate Change Adaptation Research Facility is facilitating a network on 'Emergency Management', hosted by RMIT University. The network is working on a national adaptation plan for emergency management which will examine Australia's disaster mitigation, preparedness, response and recovery procedures in light of the likely changes, due to climate change, in the frequency and intensity of extreme weather events.

- 3.125 The Natural Disaster Mitigation Program (NDMP), designed to build community resilience to natural disasters, was described in EMA's

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100 COAG, Communique, 30 April 2009, p. 2.

101 Mr Pearce, Emergency Management Australia, Attorney-General's Department, *Transcript of Evidence*, 18 September 2009, p. 1. See also Attorney-General's Department website: 'While recognising that the Constitutional responsibility for the protection of lives and property of Australian citizens lies predominantly with the States and Territories, the Australian Government accepts that it has a broad responsibility to support the States in developing emergency management capabilities'  
<[http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/AboutEMA\\_PolicyInitiatives\\_AustralianGovernmentEmergencyManagementPolicyStatement](http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/AboutEMA_PolicyInitiatives_AustralianGovernmentEmergencyManagementPolicyStatement)>

102 COAG National Climate Change Adaptation Framework, p. 19.

submission to the inquiry.<sup>103</sup> The program offers grants to communities to be better able to withstand the effects of floods, storms, bushfires, earthquakes, cyclones and other rapid onset natural disasters. Projects that qualify for funding include risk management studies, early warning systems, community awareness and readiness measures, property buy-back schemes and structural works to protect against damage.<sup>104</sup>

3.126 EMA also highlighted the potential benefits of their Critical Infrastructure Protection Modelling and Analysis (CIPMA) program for disaster management in the coastal zone. Critical infrastructure includes energy, communications, water, health, banking and finance. The CIMPA program is:

a computer based capability which uses an 'all hazards' approach to undertake computer modelling to determine the consequences of different disasters and threats (human and natural) in critical infrastructure. The extensive amount of data held under this capability could assist analysis of the impact of climate change on key infrastructure that coastal communities rely on each day.<sup>105</sup>

3.127 The CIPMA program is the flagship of the Critical Infrastructure Protection (CIP) initiative. CIP works by bringing together:

existing strategies and procedures that deal with prevention, preparedness, response and recovery arrangements for disasters and emergencies ... a blending of existing specialisations such as law enforcement, emergency management and national security and defence. CIP relies on the active participation of the owners and operators of infrastructure, regulators, professional bodies, industry associations, all levels of Government and the public to identify critical infrastructure, analyse vulnerability and interdependence to protect from and prepare for all hazards.<sup>106</sup>

3.128 The CIPMA program uses this information to model for vulnerabilities of critical infrastructure and can test the business continuity planning of industry and government at all levels.<sup>107</sup> EMA state that CIPMA could be used for assessing:

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103 The Committee notes that as part of the 2009-10 Budget, the Australian Government announced the new Disaster Mitigation Program to amalgamate the National Disaster Mitigation Program (NDMP), the Bushfire Mitigation Program (BMP) and the National Emergency Volunteer Support Fund (NEVSF).

104 Attorney-General's Department, *Submission 56*, p. 3.

105 Attorney-General's Department, *Submission 56*, p. 2.

106 Attorney-General's Department, *Submission 56*, p. 2.

107 Attorney-General's Department, *Submission 56*, p. 2.

- the impacts on infrastructure from coastal population growth;
  - the impact of climate change on coastal area critical infrastructure to inform strategies to deal with climate change adaptation, particularly in response to projected sea level rise; and
  - governance and institutional arrangements for the coastal zone.<sup>108</sup>
- 3.129 The Committee strongly advocates the use of the CIPMA program in analysing coastal disaster management capacity.
- 3.130 The Committee received evidence from the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA), the lead agency for disaster recovery, concerning its Community Resilience Strategy currently being considered by government. The strategy will aim to promote community, organisational and individual resilience.<sup>109</sup>
- 3.131 The department also raised with the Committee the concern that Indigenous communities may be more at risk than others from extreme events, due to their location and socioeconomic conditions. The impacts of climate change on coastal Indigenous communities will be addressed in more detail in the section below. However, it is worth highlighting the 2007 National Emergency Management Strategy for Remote Indigenous Communities, *Keeping our Mob Safe*.<sup>110</sup> The document, prepared by the Remote Indigenous Communities Advisory Committee (RICAC), a sub-committee of the Australian Emergency Management Committee, sets five strategic objectives, to:
- Develop knowledge and skills in Indigenous people and organisations to enhance emergency management in remote communities.
  - Improve the level and appropriateness of emergency management-related services in the area of prevention, preparedness, response and recovery provided by relevant agencies in remote Indigenous communities.
  - Build the capacity of remote Indigenous communities to improve community safety through sustainable emergency management.

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108 Attorney-General's Department, *Submission 56*, p. 1.

109 Ms Hunt, FaHCSIA, *Transcript of Evidence*, 19 March 2009, p. 2.

110 Remote Indigenous Communities Advisory Committee, *Keeping our Mob Safe: a National Emergency Management Strategy for Remote Indigenous Communities*, 2007.

- Increase government commitment and accountability to address issues impacting on effective emergency management in remote Indigenous communities.
- Promote effective partnerships between emergency management agencies, Indigenous organisations, government and other agencies to improve community safety outcomes for remote Indigenous communities.<sup>111</sup>

3.132 The Committee supports the strategy and its continued implementation in remote Indigenous communities.

3.133 The submission to the inquiry from the Territories and Native Title division of the Attorney-General's Department raised a particular issue relevant to Jervis Bay. The submission points out that there is:

only one access road into the Jervis Bay Territory. If this road was closed due to wildfire or storm damage, residents would be unable to evacuate via the road into New South Wales.<sup>112</sup>

3.134 This issue is of significant concern to the Committee in that many regional coastal communities would have single access roads. The Committee notes that during the recent Black Saturday bushfire disaster in rural Victoria, evacuation routes were a significant contributing factor to the extent of the tragedy. A reliable evacuation route is vital in a disaster management strategy. It is therefore imperative that evacuation routes and methods be examined when developing community emergency responses.

3.135 The Committee concurs with Geoscience Australia (GA) that a further matter of critical importance is the need for data to be updated in technical risk assessments. Dr Schneider of GA explained that once an analysis of the risk at a particular site is undertaken, the data upon which the risk was assessed is not updated unless expressly requested:

If we do an analysis of the potential for waves to hit a particular community, the potential impact on houses and the potential loss of life, and if there are then changes in demographics, changes in the underlying data or even a refinement in the model, it is in the best interests of everyone that we be able to provide updates for that. But there is not necessarily a mechanism for that to be done.

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111 Emergency Management Australia website accessed 18 August 2009  
<[http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/EmergencyManagement\\_Communities\\_NationalEmergencyManagementStrategyforRemoteIndigenousCommunities](http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/EmergencyManagement_Communities_NationalEmergencyManagementStrategyforRemoteIndigenousCommunities)>

112 Territories and Native Title Division, Attorney-General's Department, *Submission 40*, p. 3.

So a report is done but we are not necessarily in a position to update the models continually.<sup>113</sup>

- 3.136 The submission to the inquiry from the Insurance Council of Australia (ICA) focuses on the issue of promoting resilient coastal communities in the light of extreme weather events due to climate change. The submission raises the importance of ‘risk disclosure’ to community members in promoting more resilience in the community. The ICA wishes to see greater sharing of the best known risk data to communities, allowing individuals to make informed decisions regarding ‘the weather risks they are prepared to tolerate in a location and most importantly, decisions regarding the adaptive behaviours they may undertake to accommodate those risks.’<sup>114</sup>
- 3.137 The Committee notes the severity of the potential impact from climate change on Australia’s emergency response, particularly in the coastal zone. As Professor Woodroffe remarked, ‘the impact of such catastrophes seems certain to increase in the future, primarily because ... the growing coastal populations mean larger numbers of people and more intense development concentrated in the coastal zone’.<sup>115</sup> There is therefore a desperate need to build resilience in coastal communities to the increased severity and frequency of extreme weather events.
- 3.138 Issues such as access and evacuation routes in the event of a storm surge or extreme sea level rise require urgent examination, as does the need for accurate and up-to-date assessments of vulnerable sites. The Committee supports the promotion of early warning systems through the NDMP and believes this should be a national requirement in all vulnerable communities.
- 3.139 The Committee notes the intergovernmental Bushfire Mitigation Program (BMP), which aims to identify and address bushfire mitigation risk priorities for Australia,<sup>116</sup> and believes that a similar program should be established for extreme weather events specifically on the coast. As made clear by EMA in its submission to the Committee, with over 80 per cent of the country’s population and 25,000 properties located in the coastal zone,

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113 Dr Schneider, Geoscience Australia, *Transcript of Evidence*, 4 September 2008, p. 8.

114 ICA, *Submission 12*, p. 7.

115 Professor Woodroffe, *Submission 24*, p. 2.

116 EMA, Attorney-General’s Department, *Submission 56*, p. 3.

there could be more than \$25 billion of assets at risk from natural disasters.<sup>117</sup>

- 3.140 The Committee believes that *all* the climate change vulnerability assessments and adaptation work currently underway will go towards producing greater resilience in coastal communities. However, the emergency response must be adequate to defend against the worst case scenarios. It is therefore imperative that a specific program be established to identify risk and bolster emergency responses in the coastal zone.
- 3.141 The Committee notes that the Australian Government – through agencies such as Emergency Management Australia, FaHCSIA and Geoscience Australia – and state, territory and local governments have comprehensive arrangements in place for disaster and emergency management. The Committee also recognises the important role of the Australian Emergency Management Committee (AEMC) in providing advice and direction on national, strategic emergency management issues. The AEMC reports to the Ministerial Council for Police and Emergency Management.
- 3.142 The Committee also understands that the Department of Climate Change is currently ‘updating and improving the Australian Disaster Mitigation Package to take into account severe weather and storms due to climate change’.<sup>118</sup> The package focuses on disaster risk assessments, nationally consistent data and research, disaster mitigation strategies, resilient infrastructure, and community awareness and warnings. It incorporates the Natural Disaster Mitigation Program, the Natural Disaster Relief and Recovery Arrangements, the Regional Flood Mitigation Program and the Bushfire Mitigation Program.
- 3.143 The Committee’s particular concern is Australia’s preparedness to deal with sudden onset coastal natural hazards as a result of extreme weather events combined with sea level rise. As discussed earlier, sea level rise will cause a disproportionately large increase in the frequency of flooding, inundation and erosion in association with high tides and storm surges.
- 3.144 The Committee concludes that, while there are some significant programs already in place to build resilience, such as the Natural Disaster Mitigation Program, more needs to be done, and quickly, to adequately equip our coastal communities to manage the increased risks due to climate change. The Committee notes that the success of these initiatives will depend on continued effective collaboration between Australian, state, territory and local governments.
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117 EMA, *Submission 56*, p. 1.

118 Department of Climate Change, *Submission 85*, p. 7.



## **Recommendation 14**

**3.145 To further enhance Australia’s disaster mitigation, preparedness, response and recovery arrangements in the event of possible major coastal disasters, the Committee recommends that the Australian Government establish a grants program, the Coastal Natural Disaster Mitigation Program, to fund natural disaster mitigation projects in the Australian coastal zone.**

**The Committee also recommends that the Australian Emergency Management Committee (AEMC) consider the following issues:**

- **improved data on coastal disaster risk assessment and vulnerable coastal sites**
- **improved access and evacuation routes for coastal communities**
- **improved coastal community awareness of and resilience to natural disasters**
- **improved coordination of coastal disaster mitigation arrangements with other initiatives currently underway, such as reviews of the Australian Building Code and land use planning policies to take into account climate change impacts**
- **improved early warning systems for coastal areas in the event of an extreme sea level event (storm surge, erosion, flooding)**

**The Committee further recommends that the AEMC provide a report on these matters to the Ministerial Council for Police and Emergency Management.**

**3.146** In its submission, Surf Life Saving Australia (SLSA) highlighted that access to and use of beaches for recreation ‘will be impacted by ongoing extreme weather events. Beach hazards will change and will pose a greater risk of injury unless monitored, mapped and communicated’.<sup>119</sup> SLSA suggested that the integration of the SLSA network into emergency services system in states and across Australia would ‘enhance Australia’s capacities and capabilities in responding to domestic and international disasters’.<sup>120</sup>

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119 SLSA, *Submission 57*, p. 5.

120 SLSA, *Submission 57*, p. 11.

3.147 SLSA explained that it has an 'extensive network of 305 volunteer lifesaving services, 50 support services that includes rescue helicopters and jet rescue boats and a further 66 lifesaving services through its Australian Lifeguard Service network across Australia'.<sup>121</sup> SLSA's membership base is 'now in excess of 140,000, 40,000 of whom are trained lifesavers able to respond in an emergency'.<sup>122</sup>

3.148 SLSA noted that a number of opportunities existed for this extensive network to be engaged in coastal zone management and monitoring, emergency preparedness, response and care. However, 'the integration of this network into governmental emergency service networks is ad hoc in some areas and non existent in others'.<sup>123</sup> As Mr Farmer from SLSA commented:

I think we have a growing capacity and capability to harness those networks to be involved in preparing communities for climate change and its water safety aspects.

It is not widely known that our membership often responds to disasters, although very much in an unofficial way as surf lifesaving is not recognised in a number of states by legislation as a formal emergency service. But we do respond to emergencies ... We could use that capacity and capability in a greater sense if there were some formality about the inclusion of it within the network of emergency services operations.<sup>124</sup>

3.149 The Committee recognises the value of SLSA's coastal safety services to coastal communities and visitors and the increasing role that SLSA could potentially play in responding to coastal emergencies as a result of climate change impacts. The Committee also notes SLSA's role in monitoring and mapping the changing conditions of Australia's beaches and coastline through Coastwatch and the Australian Beach Safety and Management Program. For example, the Committee understands that SLSA 'has completed an extensive mapping of all known beaches in Australia, which to date number 11,748, each of which has been given a modal beach hazard rating'.<sup>125</sup>

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121 SLSA, *Submission 57*, p. 3.

122 Mr Farmer, SLSA, *Transcript of Evidence*, 19 August 2009, p. 19.

123 SLSA, *Submission 57*, p. 11.

124 Mr Farmer, SLSA, *Transcript of Evidence*, 19 August 2009, p. 19.

125 SLSA, *Submission 57*, p. 11.

## Recommendation 15

- 3.150 **The Committee recommends that the Australian Government, through the Ministerial Council for Police and Emergency Management, recognise the extensive Surf Life Saving Australia network and take appropriate steps to integrate this network into emergency services preparedness, planning, and response systems and activities.**

## Coastal infrastructure

- 3.151 NCCARF, as discussed above, has identified infrastructure<sup>126</sup> as a key sector for attention. Climate change impacts such as rising sea level and extreme weather events will impact infrastructure by accelerating degradation of materials and structures and increasing damage and repair costs.
- 3.152 The Australian Academy of Technological Sciences and Engineering report, *Assessing the Impacts of Climate Change on Australia's Physical Infrastructure* (July 2008), pointed to 'significant challenges arising from the effects of climate change for security and operation of various categories of Australia's physical infrastructure'.<sup>127</sup>
- 3.153 Coastal infrastructure is of particular concern as much of Australia's population and infrastructure is in the coastal zone, increasing vulnerability to climate change.
- 3.154 The Committee notes that several major initiatives are currently underway to provide more information on the tolerance of existing and planned infrastructure, including coastal infrastructure, to climate change impacts to ensure appropriate and cost-efficient adaptation strategies. These include:
- the Department of Climate Change's National Infrastructure Climate Change Adaptation Risk Assessment

126 This encompasses commercial and domestic buildings, as well as energy (gas, electricity, oil and coal), transport (road, rail, airports, sea ports), water and telecommunication structures.

127 Australian Academy of Technological Sciences and Engineering, *Assessing the Impacts of Climate Change on Australia's Physical Infrastructure*, 2008, p. i. See also Engineers Australia, *Guidelines for Responding to the Effects of Climate Change in Coastal and Ocean Engineering: 2004 Update*, National Committee on Coastal and Ocean Engineering (NCCOE), 2004 – *Exhibit 100*; and Engineers Australia, *Coastal Engineering Guidelines for Working with the Australian Coast in an Ecologically Sustainable Way*, NCCOE, 2004 – *Exhibit 99*.

- ⇒ the Australian Government is assessing the magnitude of national risks to build the capacity of infrastructure owners, operators and planners in identifying, avoiding and managing the impacts of climate change. The assessment is the first stage in the process of building understanding of the impacts of climate change on infrastructure of national significance. The project will consider the exposure, planning and regulatory settings, and adaptive capacity of water, power, transport, communications infrastructure, buildings and settlements across Australia.<sup>128</sup> It seeks to improve information on the number and type of buildings in the coastal zone, their proximity to the coast, elevation and erodability.
- NCCARF is facilitating a network on Settlements and Infrastructure, hosted by the University of NSW. This will bring together researchers and stakeholders with an interest in the impacts of climate change on settlements, and public and private infrastructure (including building design and construction).<sup>129</sup> It is drafting a National Adaptation Research Plan for Settlements and Infrastructure, which will identify critical gaps in the information available to decision-makers in this sector, set national research priorities and identify science capacity that could be harnessed to conduct priority research.
- the Australian Government is funding the Australian Building Codes Board to review and, as appropriate, revise the Building Code of Australia to ensure that the risks of future climate change are recognised in building practices, and possible climate change adaptation measures are considered.<sup>130</sup>
- Australian Government funding of Engineers Australia to update the *Australian Rainfall and Runoff* handbook<sup>131</sup> to ensure that all future construction takes into account future changes to heavy rainfall and flooding events. The update will be completed in three stages over four years.<sup>132</sup>

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128 DCC website accessed 7 August 2009

<<http://www.climatechange.gov.au/impacts/settlements.html>>

129 NCCARF website accessed 7 August 2009 <<http://www.nccarf.edu.au/adaptation-research-network-settlements-infrastructure>>

130 Department of Climate Change, *Submission 85*, p. 6.

131 *Australian Rainfall and Runoff*, Engineers Australia, 4th edition.

132 Department of Climate Change, *Submission 85*, p. 6.

- 3.155 The Committee is also aware that the Building Ministers Forum, which reports to COAG, has been engaged in work on the 'building design aspects of responding to climate change'.<sup>133</sup>
- 3.156 The Committee commends all these initiatives and notes that, at the time of finalising this report, these projects were still in progress.

### Recommendation 16

- 3.157 **The Committee notes that major initiatives relating to climate change adaptation risk assessment and infrastructure are currently in progress. Given that much of Australia's infrastructure is in the coastal zone and the particular threats facing the coastal zone from climate change, involving significant socioeconomic costs, the Committee recommends that the Australian Government ensure there is a comprehensive national assessment of coastal infrastructure vulnerability to inundation from sea level rise and extreme sea level events.**

### Coastal Indigenous communities

- 3.158 The impacts of climate change on coastal communities will be intensified still further in remote, low-lying communities in the coastal zone. As such, the impacts of climate change on remote coastal Indigenous communities are likely to be severe. As already discussed with regard to health and emergency management, Indigenous communities are more exposed to both health concerns and the impacts of natural disasters.
- 3.159 As custodians of some of Australia's most remote coastal areas, Indigenous peoples have a unique affiliation with the land, the coast and the climate. Impacts such as sea level rise threaten a great many remote coastal Indigenous communities, and with them, a wealth of traditional practices and culture. The submission from FaCHSIA to the inquiry lists some 290 Indigenous communities in very remote Australia which are within 10km from the coastline.<sup>134</sup>
- 3.160 The National Climate Change Adaptation Framework highlights that there are likely to be greater implications for remote and Indigenous communities from climate change, and that these communities may have

<sup>133</sup> Department of Infrastructure, Transport, Regional Development and Local Government, *Submission 94*, p. 2.

<sup>134</sup> FaHCSIA, *Submission 99*, Appendix A.

‘more limited capacity to adapt’.<sup>135</sup> As such, it is imperative that engagement take place with threatened Indigenous communities to build resilience.

- 3.161 NCCARF is facilitating a ‘Social, Economic and Institutional Dimensions’ Research Network hosted by the University of Melbourne. The network brings together researchers and stakeholders with an interest in developing adaptation strategies for vulnerable communities, particularly Indigenous and remote communities, as well as analysis of issues such as methods for understanding whole of economy impacts of climate change, the effect of social and economic trends on vulnerability to climate change, and institutional challenges in adapting to climate change.<sup>136</sup> The Committee looks forward to the finalisation of the network’s National Adaptation Research Plan, which will identify critical gaps in the information available to decision-makers on the vulnerability of remote Indigenous communities.
- 3.162 The Committee is also aware that the Department of Climate Change is undertaking a major study into the impacts of climate change on northern Indigenous communities to identify knowledge gaps and priorities for future research and action for Indigenous communities in response to climate change.<sup>137</sup> The study, being undertaken by the University of New South Wales together with CSIRO, the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) and other research organisations, is being co-funded by the Department of Climate Change, the Western Australian Department of Environment and Conservation and the Northern Territory Department of Natural Resources, Environment and the Arts. The Committee notes that the study will draw upon valuable Indigenous knowledge to assist in adaptation.<sup>138</sup> Representatives of the Department of Climate Change outlined the work in evidence to the Committee:

My understanding of the research ... is that it is to have a conversation with Indigenous communities about both their perception of and their experience in dealing with climate change risk, realising that they are holders of a great wealth of historical information, as well as working with Indigenous communities to

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135 COAG National Climate Change Adaptation Framework, p. 8.

136 NCCARF website accessed 18 August 2009 <<http://www.nccarf.edu.au/adaptation-research-network-social-economic-institutional-dimensions>>

137 Media release by Senator the Hon Penny Wong, Minister for Climate Change and Water, ‘New climate change study for northern Indigenous communities’, 8 September 2008.

138 Media release by Senator the Hon Penny Wong, Minister for Climate Change and Water, ‘New climate change study for northern Indigenous communities’, 8 September 2008.

discuss how they have responded in the past and would look to respond to the impacts of climate change. In relation to the Torres Strait, we would be looking to see what the culture of responding to changes in the climate is, but I think that will need to be supplemented as we move forward with this work on the coast, specifically with some of the more technical details and technical work that will follow on from the first pass national coastal vulnerability assessment. While I think that information is useful for setting a baseline, it will not be sufficient in and of itself to manage the risks going forward.<sup>139</sup>

3.163 The Committee welcomes this study, but notes that the initial deadline for the final report, scheduled for April 2009, has now passed without publication. The Committee wishes to reinforce the significance of the issue and requests that the Department of Climate Change finalise this vital research project at the earliest opportunity.

3.164 In the Committee's view, the communities of the Torres Strait will require greater attention and resource allocation to deal with the impacts of climate change. The Torres Strait Regional Authority (TSRA) called for 'immediate remedial action' to address issues surrounding coastal management and climate change in the Torres Strait, as well as a program to investigate and address the impacts of climate change and coastal issues more thoroughly across the islands.<sup>140</sup> The TSRA submission outlines significant impacts facing communities in the Torres Strait:

The low lying nature of several islands and the extent of current inundation problems suggests that any significant sea level rise due to climate change could potentially threaten the viability of these communities. In addition other potential impacts of climate change including changes to rainfall patterns, ecosystems as well as the spread of disease may significantly impact Torres Strait Island communities.<sup>141</sup>

3.165 The 2007 PMSEIC Independent Working Group report 'Climate Change in Australia: Regional Impacts and Adaptation – Managing the Risk for Australia' stated that:

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139 Dr Greg Picker, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, pp. 9-10.

140 TSRA, *Submission 7b*, p. 1.

141 TSRA, *Submission 7b*, p. 2.

Torres Strait islanders and remote Indigenous communities have the highest risks and the lowest adaptive capacity of any in our community because of their relative isolation and limited access to support facilities.<sup>142</sup>

3.166 The Reef and Rainforest Research Centre (RRRC) outlined the challenges faced by the Torres Strait:

Torres Strait Islanders' capacity to adapt to rapid environmental change is limited by pre-existing social and economic constraints. Cultural issues, such as Islanders' belief in the connections between the health of their 'land' and 'sea' country and their own well-being, significantly increase the complexity of managing climate change impacts on communities in the Torres Strait.<sup>143</sup>

3.167 The submission continues:

The 7000 Australians living on the low-lying islands of the Torres Strait are amongst the most vulnerable in the country to sea level rise. Pre-existing social and economic disadvantages, as well as their cultural connections to country, severely limit these communities' capacity to cope with change. Despite this, there appear to be few strategies at federal or state government level specifically addressing the problems faced by communities in the Torres Strait in adapting to climate change.<sup>144</sup>

3.168 TSRA listed a number of studies currently being undertaken, in the Torres Strait, including:

- a rapid assessment shoreline erosion project, examining causes of coastal erosion in the Torres Strait – undertaken by the Environmental Protection Agency (EPA)
- a sustainable land use planning project, education communities on the impacts of development on the natural environment in the Torres Strait
- a Marine and Tropical Research Facility project 'Climate change impacts in the Torres Strait: Building resilience and planning adaptation strategies', which aims to integrate scientific and traditional knowledge for a regional workshop on adaptation

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142 Prime Minister's Science, Engineering and Innovation Council (PMSEIC), Independent Working Group, *Climate Change in Australia: Regional Impacts and Adaptation – Managing the Risk for Australia*, 2007, p. 28.

143 RRRC, *Submission 30*, p. 10.

144 RRRC, *Submission 30*, p. 14.



- a research project by James Cook University and University of Wollongong ‘Understanding sea-level change in Torres Strait’, which will survey, sample and date material from reef flat corals to examine sea level changes over time<sup>145</sup>
- 3.169 While all these studies are welcomed, the Committee is concerned that no major study is currently focusing predominantly on the Torres Strait.<sup>146</sup>
- 3.170 The Committee received compelling evidence from TSRA describing the plight of communities on the islands, and the connection between land and people. Figure 3.3 provides a brief snapshot of the evidence heard by the Committee.
- 3.171 TSRA listed the challenges faced by the Torres Strait communities as a result of climate change:
- Erosion and inundation is already a major hazard threatening communities, cultural heritage sites and infrastructure in the region.
  - The impact of sea level rise in combination with extreme weather events leading to tidal inundation and island erosion is of significant concern for residents of the Torres Strait.
  - Impacts of climate change on marine ecosystems and fisheries and flow on effects to local communities, economy and culture.
  - Impacts of climate change on water supply.
  - Impacts of climate change on health including the potential spread of disease.<sup>147</sup>
- 3.172 TSRA also raised the concern with the Committee that the Torres Strait is not included in the first pass NCVA, and valuable DEM work is not occurring at the islands either.<sup>148</sup> The Committee raised these matters with the Department of Climate Change during a public hearing. The department responded that:

Certainly one of the issues that we are mindful of in the NCVA is that we have not looked at islands, for example, particularly in that northern part of Australia. It is obviously a very critical issue for the populations that live there.<sup>149</sup>

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145 TSRA, *Submission 7*, p. 5.

146 Dr Greg Picker, Department of Climate Change, *Transcript of Evidence*, 25 September 2008, p. 10.

147 TSRA, *Submission 7a*, p. 19.

148 TSRA, *Submission 7*, p. 2.

149 Dr Wilson, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 10.

**Figure 3.3 Evidence to the Committee from Mr Walter Mackie, Member for Iama Island and Portfolio Member for Health and Environment, Torres Strait Regional Authority**

The Torres Strait consists of the top western islands, which are Boigu, Saibai and Dauan, the western islands of Mabuiag, Badu, Moa and the inner island of Hammond Island, and extend out to the central island where I come from, Iama and Warraber, Poruma and Masig. Extending out further to the Barrier Reef, we have Ugar, Erub and Mer. As you can see by what the map portrays, we have a lot of reefs up there and that is what we refer to as our supermarket. That is where our lifestyle evolved. This is our world I am looking at. This is my world, my people ...

It never crosses our mind to relocate. Relocation is the last avenue for us. You have to understand who we are. I mentioned that this is our world ...

We are keenly aware of the challenges that face us; however, we are also fearful of the loss of our homes—our family homes. Each individual island has its own unique attributes. As an Iama Island person, I cannot live on Saibai, because I will not fit in. We identify with our area. I do not know if you understand, but that is where our identity and everything are derived from. So it would be the last resort for us to leave, because our roots are there.

For generations we have had embedded in our sense of pride that unique identity in our island home. We have found ways to hold onto our traditional practices and our unique culture in this modern day and age. We also have embraced challenges and have adapted to changes in order to protect our island. We have taken whatever steps are needed to ensure our sustainability. We have a traditional saying in the Torres Strait which originated in 1970 during the PNG push for independence: 'Not for one teaspoon of saltwater, not one grain of sand, will we surrender. Border not change.' This determination has ensured a continued existence for each community so far, and I have no doubt that it will do so into the future.

Our region is the frontline in many ways—significantly so due to rising sea levels. We do recognise the urgent need to address climate change and find long-term solutions. Our people are very much aware of the social issues we have—overcrowding, disease and damages and our traditional fishing practices—and we welcome the chance to become involved in a long-term strategy to ensure the protection of our beautiful islands.

In the community of Warraber back in the 1990s, they had to take into their own hands the building of a seawall because the tides were taking skeletal remains from the cemeteries out onto the reefs. They said to themselves, 'We're not going to sit here and wait for research and studies; we've got to take some action; we've got to do something'—and that is what they did. Even with the sea level today the seawall does its job, and it was built 20 or so years ago.

*Source Mr Mackie, TSRA, Transcript of Evidence, 20 August 2008, pp. 17-21*

**3.173 The department also noted the complexity of the issues in the Torres Strait and remote Indigenous communities:**

The issues that apply to the Indigenous communities are going to be complex. It is not just about where they are; it is also the current state of infrastructure and the services and the lifestyles that they

would like to maintain. So it is relatively early in our understanding...<sup>150</sup>

- 3.174 The Committee agrees that it is 'early in our understanding' but believes that there is little time to waste in increasing our understanding of the impacts of climate change on the islands of the Torres Strait.<sup>151</sup> The impacts are already being felt by these communities.

### **Recommendation 17**

- 3.175 **The Committee recommends that the Department of Climate Change, in collaboration with the Queensland Government, CSIRO and Indigenous communities in the Torres Strait, undertake a major study into the vulnerability of the Torres Strait to the impacts of climate change and provide assistance in the development of an adaptation plan.**
- 3.176 The Committee supports the five recommendations proposed in the TSRA submission to the inquiry:
- That there is further support for all Torres Strait Island communities and regional institutions to access information about projected climate change impacts at a locally and regionally relevant scale, to enable informed decision making and adaptive planning.
  - That there are further studies of island processes and projected climate change impacts on island environments, including uninhabited islands with problems such as turtle nesting failures.
  - That reliable data is obtained on island interior heights and elevations to support more accurate predictions of inundation levels.
  - That a feasibility study be undertaken to investigate and recommend the most suitable renewable energy systems for servicing the Torres Strait region, including the investigation of tidal, wind, solar and other systems suitable for the region's environmental conditions and demand for power.
  - That the Torres Strait region is considered as a potential case study for small-scale trials of solutions to coastal erosion and

150 Dr Wilson, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 10.

151 The Committee notes that this issue was brought to the attention of relevant departmental representatives prior to the report being tabled, due to its urgency. See Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 10.

inundation problems, as well as sustainable housing and building design and construction for remote communities in tropical environments.<sup>152</sup>

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**Recommendation 18**

- 3.177 **The Committee recommends that the Australian Government give the five recommendations calling for information, studies and data, as proposed by the Torres Strait Regional Authority, early and urgent consideration with a view to their implementation.**

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<sup>152</sup> TSRA, *Submission 7*, p. 3.

## Key emerging issues: insurance, planning and legal matters relating to the coastal zone

*we know we are heading for trouble in terms of more exposure to extreme weather events and we will need to upgrade our building standards. The Insurance Council does meet with us occasionally and their constant request is that we do this. Their argument is that if we do not have higher minimum standards then insurance will become unaffordable for communities because damage will be so frequent and expensive.<sup>1</sup>*

*At present there is a high degree of uncertainty in relation to current and future climate change liability. If left unaddressed this uncertainty will continue to have a significant impact on decision making processes and information disclosure in relation to climate change hazards.<sup>2</sup>*

### Introduction

- 4.1 Chapter 4 looks at some key emerging issues relevant to the coastal zone relating to insurance, planning and legal matters. These issues were frequently raised by inquiry participants over the course of the inquiry, particularly in the context of projected climate change impacts on the coastal zone.

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1 Mr Smith, NSW Department of Environment and Climate Change, *Transcript of Evidence*, 25 March 2009, p. 9.

2 Sydney Coastal Councils Group, *Submission 77*, p. 3.

## Climate change and coastal insurance issues

- 4.2 The insurance industry helps manage society's risk from weather related damages. In Australia, '19 of the 20 largest property insurance losses since 1967 have been weather related'. Insured losses from these events are 'expected to total billions of dollars':

Between 1967 and 1999, bushfires cost the Australian economy around \$2.5 billion. From 1960 to 2001, there were 224 fire-related deaths and 4505 injuries.

The 1999 Sydney hailstorm resulted in \$1.7 billion in insured losses, 1 death and 500 injuries. 500 people were made homeless, and 24,000 homes and 70,000 motor vehicles were damaged.<sup>3</sup>

- 4.3 It is in this context that general insurance products provide essential risk cover for Australians:

The industry provides a financial recovery mechanism from weather related catastrophes by evaluating, pricing and spreading the risk of such events, and then paying claims when they arise.<sup>4</sup>

- 4.4 Climate change is projected to have a major impact on the frequency of extreme weather events, with the coastal zone being particularly vulnerable in this regard because of the combined effects of sea level rise and storm surge/flooding events. In its submission to the inquiry, the peak body for the insurance industry, the Insurance Council of Australia (ICA),<sup>5</sup> noted that:

more than 425,000 Australian addresses are below 4 metres above mean sea level and within 3km of the current shoreline. Within the Greater Sydney region (Newcastle to Wollongong), 46,000 addresses are identified as being within 1km of the shoreline and with elevations less than 3m.<sup>6</sup>

- 4.5 The ICA further observed that the majority of these vulnerable addresses are located near ocean-connected coastal waters – that is, alongside lakes,
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3 Department of Climate Change (DCC) fact sheet, 'Climate change: potential impacts and costs', DCC website accessed 28 September 2009  
<<http://www.climatechange.gov.au/impacts/publications/pubs/fs-national.pdf>>

4 Insurance Council of Australia (ICA), 'Improving community resilience to extreme weather events', April 2008, p. 4 – attachment to ICA, *Submission 12*.

5 The ICA is the representative body of the general insurance industry in Australia. The ICA notes that its members represent 'more than 90 percent of total premium income written by private sector general insurers', *Submission 12*, p. 1.

6 ICA, *Submission 12*, p. 1.

river banks and estuaries – and that properties in coastal settlements which are also on inland floodplains ‘can be liable to both river and ocean inundation, often concurrently’.<sup>7</sup>

4.6 Climate change could have adverse impacts on insurance affordability and availability, compounding the problem of under-insurance:

Around 23 per cent of Australian households (1.8 million) are currently without building or contents insurance. As insurance premiums rise, more households may opt out of insuring, putting an added burden on governments and communities when disasters occur.<sup>8</sup>

4.7 A number of submissions to the inquiry noted concerns about insurance coverage for coastal areas: ‘I think inevitably we are going to see major changes in the extent to which the insurance industry is prepared to cover these properties in the future’.<sup>9</sup> In particular, the Queensland Government commented that:

There are growing concerns that the scope of insurance coverage is being reduced in some coastal areas of Australia because of climate change, particularly the increased threat of sea inundation and riverine flooding. There are already examples from Britain and the United States where insurance had been withdrawn or not been renewed in areas deemed prone to climate change impacts. If insurers come to the conclusion that some areas are not insurable then these communities will have a greater reliance on government relief, ultimately placing an additional burden on government and tax payers.<sup>10</sup>

4.8 Against this background, the Committee was particularly interested in identifying any emerging gaps in insurance coverage for the coastal zone<sup>11</sup>

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7 ICA, *Submission 12*, p. 1.

8 DCC, ‘Climate change – potential impacts and costs: fact sheet’, p. 2; DCC website accessed 7 August 2009  
<<http://www.climatechange.gov.au/impacts/publications/pubs/fs-national.pdf>>

9 Mr Stokes, National Sea Change Taskforce, *Transcript of Evidence*, 26 March 2009, p. 12.

10 Queensland Government, *Submission 91*, p. 13.

11 A further complication here is that, if a person cannot get insurance for their property, they may not be successful in an application for a bank loan for that property. As Mr Sullivan, from the ICA, commented, ‘[l]ending practices in Australia do require generally a person seeking to borrow money to purchase insurance to cover the lender’s interest in that property or that asset ... If the person cannot get insurance for the risk that the lender requires then the lending will probably not occur’, *Transcript of Evidence*, 4 June 2009, p. 5.

and what action might be taken by the Australian Government and the insurance industry to address this matter.

## Gaps in insurance coverage for the coastal zone

4.9 The ICA confirmed that there are 'presently no red flagged areas for insurance in a geographic sense that [they] are aware of'.<sup>12</sup> No regions in Australia are therefore currently 'completely red-flagged' – in the sense that no insurance products are available:

insurers do adjust their risk profiles according to the history of loss in a region. If there is a high level of loss in a region, they would start to increase the cost of offsetting that risk. Some insurers may actually adjust their presence in a region, and by that I mean actually ceasing to write new policy in a region. That has happened around the world. An insurer might decide that they have had enough policy exposure in that region and are now going to focus on another market.

Are we seeing that in Australia? While there are micro adjustments all the time for insurers prudentially spreading their risk right across the nation, we are not seeing any huge trend at the moment where we might start to see areas that are red flagged, unable to get insurance or anything of that nature. There is still a good level of competition in the market ...

I think you will find that insurance will remain available in all areas.<sup>13</sup>

4.10 However, the ICA further clarified that, even though 'no areas are completely red-flagged', there are some things 'that you cannot insure for presently in Australia'.<sup>14</sup> Risks identified by ICA as not generally covered by insurance or as 'presently difficult to insure against' include 'Storm Surge, Landslip and Sea Level Rise'.<sup>15</sup>

4.11 In terms of storm surge, Mr Sullivan from the ICA commented that:

There are some insurers who will look at what are more commonly called saltwater risks. That could be a king tide on top of a storm surge on top of a coastal inundation problem. So I think the trend is there – the market is starting to look at those risks –

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12 ICA, *Submission 12a*, p. 1.

13 Mr Sullivan, ICA, *Transcript of Evidence*, 4 June 2009, p. 3.

14 Mr Sullivan, ICA, *Transcript of Evidence*, 4 June 2009, p. 3.

15 ICA, *Submission 12a*, p. 1.



but presently, no, you cannot get cover for that in any significant or competitive way.<sup>16</sup>

4.12 In terms of landslip, the Committee drew Mr Sullivan’s attention to some images of coastal erosion affecting properties at North Entrance on the Central Coast, NSW,<sup>17</sup> and queried whether coastal erosion of this sort is categorised as landslip and therefore not covered under insurance policies. Mr Sullivan responded as follows:

Presently not covered – that would be a landslip issue or a coastal erosion issue. You can see that with the level of exposure in Australia or the number of properties in that kind of predicament, that would be a very difficult product to develop, price and find a market for. So the person would still be able to get insurance for the house burning down, a burglary, storm damage and that sort of thing, but, in general, you would not be able to find a policy to cover you for a landslip issue like that. I would not envisage that changing into the future.<sup>18</sup>



Example of coastal dune erosion, North Entrance, Central Coast, NSW—see Submission 5

16 Mr Sullivan, ICA, *Transcript of Evidence*, 4 June 2009, p. 4.

17 Mr Craig Thomson MP, *Submission 5a*, pp. 2-3.

18 Mr Sullivan, ICA, *Transcript of Evidence*, 4 June 2009, pp. 8-9.

4.13 In terms of sea level rise, Mr Sullivan commented that:

You simply cannot get an insurance product at the moment for gradual sea level rise that at a future time prevents you using a parcel of land because it has become untenable ... globally that is not covered anywhere at the moment. Our most recent study shows there are 896,000 residential properties below six metres and within 3,000 metres of existing coastline, so that is a significant exposure that is out there.<sup>19</sup>

4.14 The Committee understands that a further complication here is that the definitions of these risks 'vary between insurers'.<sup>20</sup> However, in this context, it is important to note that 'there are no common definitions adopted within the general insurance industry on risk'.<sup>21</sup>

4.15 The ICA provided some examples of general exclusions in various policies relating to saltwater risks or action of the sea. Examples included:

*We will not pay for damage caused by erosion or subsidence – Caused by or as a result of erosion, vibration, subsidence, landslip, landslide, mudslide, collapse, shrinkage or any other earth movement*

and

*We will not pay for damage caused by actions or movements of the sea*

and

*We will not pay for Loss, damage, injury or death arising from:*

- *Actions of the sea, high water or tidal wave – unless the loss or damage is the result of a tsunami*
- *subsidence or landslide unless it happens immediately as a result of an earthquake or explosion*
- *hydrostatic pressure including loss or damage to swimming pools or similar structures.*

and

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19 Mr Sullivan, ICA, *Transcript of Evidence*, 4 June 2009, p. 4.

20 ICA, *Submission 12a*, p. 1. ICA further noted that insurers 'licensed to operate in Australia are required by ASIC regulation ... to provide product disclosure information to customers as a condition of their license', *Submission 12b*, p. 1.

21 ICA, *Submission 12b*, p. 1. ICA further noted that this position 'was reinforced in 2008 when the Australian Competition & Consumer Commission (ACCC) ruled against the industry's application for use of a common definition for flooding, the ACCC noting that it was "not likely to result in a public benefit that would outweigh the detriment to the public constituted by any lessening of competition arising from the arrangements". Definitions in insurance policies across the industry are only similar to the extent that they rely upon common plain language terms', *Submission 12b*, p. 1.

*We will not pay for damage caused by:*

- *the seas or tidal wave;*
- *river flood; 'river flood' means when water that is normally contained in a water catchment system increases because of rainfall or snow melt (whether in the immediate region or elsewhere) or is deliberately released by an authority, and the water overflows onto land that is not normally covered by water into your home.*
- *erosion or earth movement ... 'earth movement' means heavage, landslide, land-slippage, mudslide, settling, shrinkage or subsidence ... 'erosion' means being worn or washed away by water, ice or wind.*<sup>22</sup>

4.16 The ICA further noted that:

The majority of policies use planning language terms such as damage or loss caused by any actions or movements of the sea. Some insurers go further in defining damage from the sea that arises from sea level rise from storm or cyclone events.

Geotechnical issues may be variously defined by some insurers using plain terms such as damage or loss caused by erosion, landslide, collapse, vibration, settling, expansion, shrinkage or any earth movement (generally other than earthquake, which is often defined as a separate event).

The Insurance Council does not hold precise statistics regarding the prevalence or otherwise of exclusions on these matters. However, a scan of publicly available Product Disclosure Statements indicates that cover for damage or loss caused by action or movement of the sea is available in the Australian market, with some restrictions on the types of damage that will be covered as a result of the event. The majority of policies exclude, or have pre-defined limits on the extent of cover, for damage or loss caused by geotechnical matters which are defined using various plain language terms.<sup>23</sup>

4.17 Clearly, where land is inundated or eroded by rising sea levels, coastal landowners and lenders in the banking and finance sector could face significant losses:

Preliminary estimates of the value of property in Australia exposed to this risk range from \$50 billion to \$150 billion. The figure depends upon the extent of sea level rise assumed (in the

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22 ICA, *Submission 12a*, p. 1.

23 ICA, *Submission 12b*, pp. 1-2.

order of 1 metre to 3 metres) and the effectiveness or otherwise of potential mitigation measures. Even if paid for over 50 years this amounts to a cost to replace those assets of some \$1 billion to \$3 billion per annum in real terms.<sup>24</sup>

- 4.18 Given the estimated scale of economic exposure here, the Committee emphasises that insurance coverage of storm surge, landslip and sea level rise events is therefore a significant emerging issue that needs to be examined further. As one individual informed the Committee, with regard to insurance coverage when their home had to be demolished because of coastal erosion:

Nil coverage. See clause 34: anything from the sea, nothing at all ...  
No help with demolition.<sup>25</sup>

## Insurance industry recommendations to government

- 4.19 At a broader level, the ICA outlined a number of 'key actions' for governments to improve community resilience to extreme weather events – see Figure 4.1. While many of these key actions are relevant to all regions of Australia, they are particularly relevant to coastal communities, given the high exposure of the coastal zone to climate change risk.
- 4.20 In its submission to the inquiry, the Insurance Australia Group (IAG)<sup>26</sup> noted that 'Australia faces an "insurance gap" because land values are not currently insured'.<sup>27</sup> Land value forms a significant component of a property's overall value in coastal locations. However, whereas 'the value of coastal buildings may be protected to some extent by insurance, the land value of properties is not insured at all'.<sup>28</sup>

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24 Insurance Australia Group, *Submission 19*, p. 2.

25 Mr Keys, *Transcript of Evidence*, 26 March 2009, p. 64.

26 IAG is the 'leading general insurance group in Australia and New Zealand', *Submission 19*, p. 1.

27 IAG, *Submission 19*, p. 4.

28 IAG, *Submission 19*, p. 2.

Figure 4.1 Key actions for government, proposed by the ICA

<p><b>Community understanding of weather related risks</b></p> <p>Develop a concise public education campaign through an appropriate authority regarding specific climate change impacts and changes to extreme weather events for communities on a regional basis.</p> <p>Implement mandatory risk information disclosure and acceptance requirements as part of all State based property transfer regulations for all extant and predicted risks to a property.</p> <p><b>Risk appropriate land use planning and zoning</b></p> <p>Implement risk appropriate land use planning legislation harmonised across all states to prevent inappropriate development on land subject to inundation, specifically:</p> <ul style="list-style-type: none"><li>▪ No residential or commercial development should occur on land currently subject to or predicted to become subject to a 1 in 50yr return period of riverine flooding unless mitigation works have been carried out to maintain a 1 in 100yr risk exposure limit.</li><li>▪ No residential or commercial development should occur on land currently subject to or predicted to become subject to a 1 in 50yr return period for storm surge unless mitigation works have been carried out to maintain a 1 in 100yr risk exposure limit.</li></ul> <p>Implement a southerly expansion of cyclone and wind storm related building codes to counter the predicted southerly exposure of severe cyclones.</p> <p>Implement legislation harmonised across all states requiring mandatory disclosure of all known &amp; predicted risk data by state &amp; local governments to property purchasers during property conveyance and title search processes.</p> <p><b>Risk appropriate mitigation measures</b></p> <p>Review current funding and approval mechanisms for Disaster Mitigation works, with a view to expansion of the fund to allow for more rapid implementation of mitigation works in high priority areas.</p> <p>Expansion of the current National Disaster Mitigation Program to include upgrades and repairs to critical stormwater and drainage systems.</p> <p><b>Risk appropriate property protection standards</b></p> <p>Expand the Building Code of Australia to incorporate property protection as a fundamental basis for consideration in building design and construction.</p> <p><b>Community emergency and recovery planning</b></p> <p>Continuous best practice review and capability development by Australian emergency response &amp; recovery agencies, as the nature of extreme weather changes and new emergency response and recovery needs emerge.</p> <p><i>Source ICA, 'Improving community resilience to extreme weather events' (April 2008), pp. 7-18—see attachment to ICA, Submission 12</i></p>
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4.21 IAG recommended that the Australian Government consider the development of a coastal land value insurance scheme to manage risks in this area. This would involve establishing an insurance fund into which owners of low-lying coastal land would 'pay a regular levy so as to provide compensation when rising sea levels cause their land to become permanently unusable':

Such a scheme could be operated by government alone, or in conjunction with the private sector. IAG considers that, for several reasons, it is unlikely to be feasible for the private insurance sector alone to operate such a scheme. Most importantly, the globally synchronized nature of the risk of rising sea levels eliminates the scope for geographic diversification of risk on which insurers and global reinsurers normally rely.

An appropriately designed scheme of this nature would introduce a 'user pays' price signal to owners of vulnerable waterfront land that they should be responsible for funding the cost of potential compensation payable to them should that land become unusable rather than expecting future compensation to come from some other source.<sup>29</sup>

## Conclusion

- 4.22 The Committee understands that a changing, less predictable climate has the potential to reduce insurers' capacity to assess, price and spread weather-related risk, particularly in the coastal zone, and have adverse impacts on insurance affordability and availability. The Committee also appreciates that appropriate action needs to be taken by government and the insurance industry to improve community resilience to extreme weather events.
- 4.23 For example, the IAG pointed to the 'crucial role of government in providing a comprehensive and clearly defined regulatory framework that promotes community resilience to risk and facilitates more affordable premiums and more predictable claims costs'.<sup>30</sup>
- 4.24 As discussed, the Australian Government is providing leadership in this area through the National Climate Change Adaptation Framework, which is in the early stages of implementation.
- 4.25 That said, however, the Committee is not aware of any specific work having been undertaken or currently being undertaken by the Australian Government relating to insurance coverage in the coastal zone.
- 4.26 The Committee notes the importance of the insurance industry in managing society's risks from weather related damages and therefore the increasing significance of this sector, given the projected impacts of climate change. The Committee also notes the significant exposure of

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29 IAG, *Submission 19*, p. 6.

30 IAG, *Submission 19*, p. 23.

coastal regions to climate change risks such as storm surge, landslip and sea level rise.

4.27 Given the complex nature of this issue and the potentially significant social and economic costs involved, the Committee believes further investigation of this important matter is urgently required.

4.28 As the ICA emphasised, 'the significant implications for the Australian economy that flow from this hazard require serious consideration and treatment.'<sup>31</sup>

### **Recommendation 19**

4.29 **The Committee recommends that the Australian Government request the Productivity Commission to undertake an inquiry into the projected impacts of climate change and related insurance matters, with a particular focus on:**

- **insurance coverage of coastal properties, given the concentration of Australia's population and infrastructure along the coast**
- **estimates of the value of properties potentially exposed to this risk**
- **insurance affordability, availability and uptake**
- **existing and emerging gaps in insurance coverage, with a particular focus on coverage of coastal risks such as storm surge/inundation, landslip/erosion and sea level rise (including the combined effects of sea inundation and riverine flooding)**
- **the need for a clear definition of the circumstances under which an insurance claim is payable due to storm surge/inundation, landslip/erosion and sea level rise, as well as due to permanent submersion of some or all of the land**
- **the possibility of a government instrument that prohibits continued occupation of the land or future building development on the property due to sea hazard**

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31 ICA, *Submission 12*, p. 1.

- **gaps in the information needed to properly assess insurance risk and availability of nationally consistent data on climate change risks**
- **examining the key actions for governments proposed by the Insurance Council of Australia and the Insurance Australia Group in their submissions to this inquiry**
- **possible responses to a withdrawal of insurance for certain risks or regions, noting the increased burden this could place on government and taxpayers**

## **Climate change and coastal planning issues**

4.30 Land use planning is a complex area that touches on a broad range of issues relating to the environment and ecologically sustainable development, governance and institutional arrangements and, more recently, climate change impacts.

4.31 Over the course of the inquiry, the Committee observed substantial changes in the updating of state and local planning schemes to include specific provisions for climate change impacts and adaptation strategies. For example, in a 2008 study, the Australian Network of Environmental Defender's Offices (ANEDO) identified that 'only 7 pieces of Commonwealth and NSW legislation mention climate change'.<sup>32</sup> Similarly, in its June 2008 submission, the National Sea Change Taskforce (NSCT) commented that:

While climate change is increasingly recognised by Commonwealth and State governments in Australia as a critical issue for coastal communities, few local planning schemes include specific provisions for climate change adaptation.<sup>33</sup>

4.32 As Dr Church, from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), commented to the Committee:

Much of our previous planning has been done in a stable climate where sea level and other properties have not been changing. We

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32 ANEDO, *Submission 73*, p. 15.

33 NSCT, *Submission 79*, p. 23.



are no longer in that situation, and different planning views need to be taken.<sup>34</sup>

4.33 Legal imperatives, as discussed below, are also ensuring that planning schemes across Australia are gradually being revised to take into account projected climate change impacts.

4.34 Of particular interest here is the extent to which coastal planning schemes promote decisions that increase resilience to the impacts of climate change and discourage decisions that increase vulnerability. As a number of submissions to the inquiry emphasised:

There is pressing need to reconsider how we plan for coastal development, the criteria we apply to approve or reject development applications and the building regulations imposed for new structures to safeguard against risks of sea effects on coastal assets. These revisions will not be simple recasting of existing instruments but will need to be dynamic in nature to take into account the fact that the points of reference for planning (e.g., height above sea level, frequency of extreme sea levels) are now constantly changing and will continue to change for the foreseeable future. It is likely that appropriate guidelines, approval criteria and building regulations will necessarily be more complex than the existing, familiar, standards.<sup>35</sup>

## State coastal planning policies

4.35 A key point to emphasise at this point is that planning is a state responsibility. The Australian Government 'provides significant financial assistance to local government but does not have jurisdiction over local government operational decisions, including their planning decisions.'<sup>36</sup>

4.36 Some inquiry participants called for the Australian Government to provide national leadership and consistency in this area:

While land-use planning is a responsibility of the States and Territories, NSW considers a more collaborative and supportive relationship across all levels of government could assist in delivering targeted and economically appropriate regional

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34 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 3.

35 ACE CRC, *Submission 46*, p. 4.

36 Department of Infrastructure, Transport, Regional Development and Local Government, *Submission 94*, p. 1.

responses to the impacts of climate change on Australia's coastal communities.<sup>37</sup>

a nationally coordinated program [is required] to encourage states and territories to undertake a systematic review of all environmental planning instruments and legislation to ensure that adequate and nationally consistent approaches to consideration of climate change through development assessment.<sup>38</sup>

LGAT recommends a nationally consistent approach to planning policy and management, including set back provisions in coastal areas.<sup>39</sup>

- 4.37 However, as Mr Beresford-Wylie, Chief Executive of the Australian Local Government Association (ALGA), emphasised, national leadership and consistency on this issue:

does not necessarily mean the Australian government coming down with a model that is imposed ... National consistency can be read not so much as saying that the Australian government should be engaged but as saying that there should be a greater degree of consistency between the jurisdictions in how they deal with the issues facing councils and the planning on the coastal zones.<sup>40</sup>

- 4.38 Inquiry participants raised a number of concerns about state coastal planning policy and its treatment of climate change – in particular, that in some cases 'planning legislation and the policy framework had not kept up to date with current issues and information on climate change'<sup>41</sup> and that there are variations between state governments in terms of the levels of guidance provided to local government about how to deal with coastal planning issues and projected climate change impacts:

One of the things that we do find in local government – which is perhaps a little bit unfortunate – is that in the absence of consistent guidance from states about how to deal with coastal planning issues, particularly climate change, well-resourced councils will go off and do their own thing. They will try and fill the gap in and they will do the best they can by their communities and their environment. That does lead to criticism by those who have an interest – in, for instance, development on the coast – that there is

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37 NSW Government, *Submission 55*, p. 2.

38 Sydney Coastal Councils Group, *Submission 77*, p. 12.

39 Local Government Association Tasmania, *Submission 86*, p. 10.

40 Mr Beresford-Wylie, ALGA, *Transcript of Evidence*, 16 October 2009, pp. 3-4.

41 Planning Institute of Australia, *Submission 51*, p. 10.

no consistency between councils in the way these things are done.<sup>42</sup>

4.39 The Planning Institute of Australia (PIA) had a particular interest in this area and highlighted its concerns that:

- Planners will be faced with increasingly difficult land use and development scenarios reflecting population and settlement trends which will need to be managed within the context of climate change issues to reduce vulnerability [of] coastal communities and individuals and the environment
- Planners will be under pressure to manage coastal and hinterland areas in new ways in the future which may impact on the way that the community has traditionally used such spaces/places
- PIA and planners generally will be key agents for awareness raising and capacity building in the community generally and within this peak profession<sup>43</sup>

## State sea level rise planning benchmarks and risk management framework

4.40 The rate of projected rise in sea level is critical for estimating the severity of potential impacts, and several state governments have recently established sea level rise benchmarks in their coastal planning policies, to serve as guidance in this area – see Figure 4.2.

4.41 Several inquiry participants called on the Australian Government to provide a national benchmark for sea level rise:

there is an emerging need for an agreed sea level rise benchmark figure for planning purposes in Australia ... State and local governments would benefit from guidance as to what range of sea level rise would be considered most appropriate for planning purposes. Without such guidance, there will be inconsistency across jurisdictions in the application of sea level rise projections. The Queensland Government is therefore seeking the development of a set of nationally consistent default climate change scenarios for use in planning, particularly for sea level rise.<sup>44</sup>

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42 Mr Beresford-Wylie, ALGA, *Transcript of Evidence*, 16 October 2009, p. 4.

43 PIA, *Submission 51*, p. 2.

44 Queensland Government, *Submission 91*, p. 9.

Coastal communities may benefit from nationally consistent parameters for key indicators, including ... sea level rise (coastal inundation), where regional idiosyncrasies do not militate against such an approach.<sup>45</sup>

I was somewhat surprised, as a lot of other people were, to find the differences between projected sea level rises in different states all around Australia ... It goes to the heart of why there is a need for some collaborative national approach to address an issue as fundamental as the projected sea level rise by, say, the year 2100 ... I think that clearly demonstrates the need for greater cooperation and coordination between the jurisdictions, the states and territories, but also in a process which is initiated by the Commonwealth. I do not see that any other jurisdiction is in a position to be able to initiate that process.<sup>46</sup>

There are a range of opportunities for action where the Federal Government could assist states/territories [including] adopting a consistent sea level rise scenario across jurisdictions.<sup>47</sup>

The reason that I was proposing that there be some national consistency in respect of agreement around what level of sea level rise needs to be planned for – for example, New South Wales is saying 0.9 metres by 2100, Victoria is suggesting 0.8 metres, Queensland is still considering its position and so on – is that it is much easier for everyone to communicate the risk if everyone is obliged to communicate it and they are communicating the same level of risk.<sup>48</sup>

Another good area that we perceive could be dealt with on a national basis is, of course, what sea level scenarios and other climate change related scenarios we adopt for the coast. States are certainly going it alone at the moment. Some have been doing it for quite some time. Others are still getting on board. Some do not have any guidelines in their state planning policies at all. All of the numbers are different, well beyond what you would expect for regional variations across the country.<sup>49</sup>

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45 NSW Government, *Submission 55*, p. 4.

46 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 4.

47 Victorian Government, *Submission 90*, p. 6.

48 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 104-105.

49 Dr Townsend, Engineers Australia, *Transcript of Evidence*, 12 March 2009, p. 4.

Figure 4.2 Sea level rise benchmarks in state coastal planning policies

#### **South Australia**

The Coast Protection Board (2002) has adopted the median sea level predictions of the IPCC as part of its coastal planning policy—0.3m sea level rise by 2050, and 1 metre sea level rise by 2100. For major developments, the full range of possible climate change impacts should be considered.

#### **Tasmania**

Tasmania has developed an approach based on a 1% annual exceedance probability; that is the probability of a high sea-level event having a 1% chance of occurring once or more in any one year (2008). To determine exceedance probabilities Tasmania coastline is classified into a number of 'tidal zones' and sea level rise projections are based on the IPCC's upper emissions scenarios (A1FI). For any given height of a location, the risk of a high sea level event flooding that point can be determined and the risk over time (up to 2100) can also be identified.

#### **Queensland**

The State Coastal Management Plan (2002) identifies climate change adaptation principles that should be referenced in coastal planning. In assessing coastal erosion prone areas, a 0.3m rise in sea level over a 50 year planning period should be adopted (2005).<sup>50</sup>

#### **Western Australia**

The State Coastal Planning Policy (2006) suggests that coastal planning strategies should take into account coastal processes and sea level change. The Policy provides for a benchmark of 0.38m when assessing the potential for erosion on sandy shores.

#### **Victoria**

The Victorian Coastal Strategy (2008) provides a policy of planning for sea level rise of not less than 0.8m by 2100.

#### **New South Wales**

The draft Sea Level Rise Policy Statement (2009) indicates a sea level rise benchmark of 0.4m by 2050 and 0.9m by 2100, should be adopted in coastal planning.

*Source* DCC, *Climate Change Adaptation Actions for Local Government, Report by SMEC Australia, 2009, p. 57*

4.42 Dr John Hunter, from ACE CRC, suggested that a national framework for planning for sea level rise might be more useful than a national benchmark:

50 At the time of report drafting, the Queensland Government released its draft Queensland Coastal Plan, which provides for a benchmark of 0.3m by 2050 and 0.8m by 2100—see Queensland Department of Environment and Resource Management website accessed 9 August 2009 <<http://www.derm.qld.gov.au/coastalplan/index.html>>

we need to coordinate the ways in which we go about planning and policy making around Australia. It does not mean that we pick the same numbers but that we have the same framework by which we choose those numbers so that the developers would actually know what they are going to do when they go to a different part of Australia and there is just one uniform way of doing these things.<sup>51</sup>

4.43 Dr Andrew Ash, Director of the CSIRO Climate Adaptation Flagship, similarly commented that 'we get fixated on picking a number. We should really be taking a risk management approach rather than saying that that is the number and that we plan to that number'.<sup>52</sup> Professor Woodroffe also noted that '[n]o single value is likely to apply across the nation, but a framework is needed within which such an issue is considered'.<sup>53</sup>

4.44 The Committee agrees that it is crucial that the Australian Government provide national leadership in this area to resolve these issues relating to the establishment of a sea level rise benchmark and planning framework.

4.45 Dr John Church, from CSIRO, made the important point that sea level rise planning benchmarks need to be part of a risk management framework:

Like all other aspects of managing our economy and our environment, to combine these different issues, particularly the extreme events such as the storm surges and the cyclones, with the sea level rise is a risk management issue and needs to be put in a risk management framework ...

sea level rise will not stop in 2100. This is a time-evolving issue, and that requires us to change our thinking rather than specify a single number ... If you are building a changing shed, which has got a lifetime of 10 years, then you do not need to plan for 2100 when you are building that; but if you are building a city, which is going to have a much longer lifetime, then that number might be too low ... It is the different lifetimes of different infrastructure and the different risks associated with different infrastructure that I think we need to be a little more sophisticated about.<sup>54</sup>

4.46 Dr Hunter similarly observed that:

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51 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 14.

52 Dr Ash, CSIRO, *Transcript of Evidence*, 28 April 2009, p. 4.

53 Professor Woodroffe, *Submission 24*, p. 3.

54 Dr Church, CSIRO, *Transcript of Evidence*, 28 January 2009, p. 7, p. 13.

One problem we have is that planners tend to come to us and say, 'How much do we need to allow for sea level rise?' The retort I always give is, 'What kind of risks do you want to take?' I think this is a very important change in process that we need: to put the onus of the risk back onto the planners and the policymakers, not leave it to the scientists. What we can tell you is that if you build something at a certain height, when we take all the uncertainties into account this then is the probability that you will be flooded during the life of the asset that you have built ... We cannot make the decision about what risks you want to take. We can make the decision about what the probability of something happening is ... we really have to move into a risk assessment framework ... where we talk more about probabilities and the risks that we are prepared to take ...

It is a matter of deciding what the risk is that you want to take and then deciding on a number, rather than just picking one number.<sup>55</sup>

- 4.47 A risk management approach takes the IPCC sea level rise projections as a starting point and integrates these with information on local sea level history. As Professor Steffen commented:

I am generally very conservative on using projections. I would rather take an approach in terms of assessing vulnerability and planning adaptation. That is often referred to as a bottom-up approach. In other words, put the emphasis on the local region: what is its adaptive capacity; where are its vulnerabilities now; does it have a very low-lying shallowly angled coastline that is prone to inundation now, or does it have more rocky headlands and so on? You have got to sort that out first ...

I would prefer to see the government give probability ranges rather than best guesses ...

That is the sort of information I would like to give. What I would not like to give is: here is a median scenario – it came out of the black box of climate modelling – use this ... Most people are used to dealing with economic data that way because you cannot predict how an economy is going to go. The same is true with climate change. There are large uncertainties there.<sup>56</sup>

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55 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 4, p. 8, p. 13.

56 Professor Steffen, *Transcript of Evidence*, 23 October 2008, pp. 4-5.

4.48 Coastal planning guidelines have traditionally been based on a notion of static sea level both now and into the future, and that prior experience of extreme sea levels is therefore a good indicator of future risk. Planning and development guidelines for most coastal regions generally refer to expected return periods for 'unusual' sea level extremes – that is, the 1 in 100 year event.<sup>57</sup> However, as part of a climate altered future, high sea level extremes will become more frequent. Accordingly, even a modest rise in sea level would mean that events that happen only once a year now will happen every day by 2100, and 100-year events would happen annually:

if you have a flooding event which only happens every year at the moment, by the end of the century it will be happening about every day ... if we design things on the shoreline which we think are only going to get flooded once every 100 years, with a sea level rise of half a metre these events will be happening every few months ...

We tend to work to the 100-year return period, which is that you design things so that there is only going to be an event once every 100 years on average.

When you build in the uncertainty of the sea level rise estimates ... the statistics of just assuming things are going to come along at a regular rate just falls down. Instead of working in terms of how often you think things are going to happen, you have to ask the question: what is the probability of something happening during a certain time period? So you have to change the way in which most of these planning regulations are phrased.<sup>58</sup>

4.49 The Committee notes the serious implications of these more frequent flooding projections for coastal planning and the need for urgent action to amend coastal planning and development policies.

4.50 The Department of Climate Change has funded ACE CRC to develop an interactive web-based tool to enable planners, engineers and policymakers to incorporate IPCC projections of sea level rise into local scale planning

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57 This is sometimes used to refer to an exceedance event which, on average, happens once every 100 years (ie the height above mean sea level that might be exceeded on average by extreme sea levels only once in 100 years) and sometimes used to refer to an event that has a 1 in 100 chance of occurring in any one year (ie 1% annual exceedance probability). Exceedance statistics are commonly used in planning to define a level of acceptable risk, where the likelihood of occurrence is balanced against the costs of mitigating the risk.

58 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 8, pp. 3-4.



codes.<sup>59</sup> This initiative seeks to statistically combine recorded variations in today's sea level (through tides, storms and other meteorological events) with internationally IPCC agreed projections of future sea level rise. As Dr Hunter further explained:

We are combining the uncertainties of the present flooding events – that is, the fact that we do not know when the next storm is going to come or how big it will be. We have observations of the statistics of those from records that have been kept in ports over the last century. We are combining those statistics with the uncertain projections of sea level rise in the future, and in combining those statistics we can come up with numbers that will tell us, if we build at a certain level and expect something to last from, say, 2010 to 2050, what is the probability of a flooding event during that period.<sup>60</sup>

- 4.51 This information can be used by engineers and planning authorities to set risk guidelines for coastal development and infrastructure maintenance. The Committee notes that the ACE CRC has also been conducting a national program of workshops based on this research, targeted at infrastructure owners, planners, engineers and policymakers. The workshops provide training on this web-based tool.<sup>61</sup>
- 4.52 The Victorian Coastal Strategy sets out a comprehensive policy for incorporating climate change into coastal planning – see Figure 4.3. Tasmania also has comprehensive documentation supporting its sea level rise planning policies.<sup>62</sup>

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59 DCC website accessed 13 August 2009

<<http://www.environment.gov.au/minister/wong/2008/pubs/mr20080613.pdf>>

60 Dr Hunter, ACE CRC, *Transcript of Evidence*, 28 January 2009, p. 4.

61 ACE CRC website <<http://www.acecrc.org.au>>

62 See, for example, *Coastal Hazards in Tasmania: General Information Paper*, Department of Primary Industries and Water, Tasmania, 2008 – *Exhibit 91*; *Sea-Level Extremes in Tasmania: Summary and Practical Guide for Planners and Managers*, Department of Primary Industries and Water, Tasmania, 2008 – *Exhibit 92*; and *Background Report: Coastal Flooding – Review of the Use of Exceedance Statistics in Tasmania*, Department of Primary Industries and Water, Tasmania, 2008 – *Exhibit 94*.

**Figure 4.3 Victorian Coastal Strategy 2008: coastal planning policy**

1. Plan for sea level rise of not less than 0.8 metres by 2100, and allow for the combined effects of tides, storm surges, coastal processes and local conditions, such as topography and geology when assessing risks and impacts associated with climate change. As scientific data becomes available the policy of planning for sea level rise of not less than 0.8 metres by 2100 will be reviewed.
2. Apply the precautionary principle to planning and management decision-making when considering the risks associated with climate change.
3. Prioritise the planning and management responses and adaptation strategies to vulnerable areas, such as protect, redesign, rebuild, elevate, relocate and retreat.
4. Ensure that new development is located and designed so that it can be appropriately protected from climate change's risks and impacts and coastal hazards such as:
  - inundation by storm tides or combined storm tides and stormwater (both river and coastal inundation)
  - geotechnical risk (landslide)
  - coastal erosion
  - sand drift.
5. Avoid development within primary sand dunes and in low-lying coastal areas.
6. Encourage the revegetation of land abutting coastal Crown land using local provenance indigenous species to build the resilience of the coastal environment and to maintain biodiversity.
7. New development that may be at risk from future sea level rise and storm surge events will not be protected by the expenditure of public funds.
8. Ensure that climate change should not be a barrier to investment in minor coastal public infrastructure provided the design-life is within the timeframe of potential impact.
9. Ensure planning and management frameworks are prepared for changes in local conditions as a result of climate change and can respond quickly to the best available current and emerging science.
10. Ensure all plans prepared under the Coastal Management Act 1995 and strategies relating to the coast, including Coastal Action Plans and management plans consider the most recent scientific information on the impacts of climate change.

*Source Victorian Coastal Council, Victorian Coastal Strategy 2008, Victorian Government, 2008, p. 38—Exhibit 167*

4.53 Concerns were raised about the New South Wales draft sea level rise policy statement.<sup>63</sup> The policy states that '[t]here is no regulatory or statutory requirement for development to comply with this benchmark. The benchmark's primary purpose is to provide guidance to support consistent consideration of sea level rise impacts, within applicable

63 At the time of printing the report, the policy was yet to be finalised. Aspects of the policy discussed here may therefore be revised in the final policy.

decision-making frameworks'.<sup>64</sup> Some inquiry participants were concerned that the policy was not a mandatory (statutory) requirement. As Mr Smith from ANEDO commented:

I do not think that this document goes too far to solving the problems that councils and decision makers face ... To draw all those things together, this explicitly says, 'We're not mandating this. You don't have to take it into account. It is just the guidelines.' It does not seem like a huge advance to us in terms of dealing with the uncertainty that people are facing.<sup>65</sup>

4.54 There were also concerns about the policy's statements on liability:

Where assistance is provided to reduce the impacts of coastal hazards, the Government does not assume any responsibility for these hazards ...

Coastal hazards and flooding are natural processes and the Government considers that the risks to properties from these processes appropriately rest with the property owners, whether they be public or private. This will continue where these risks are increased by sea level rise. Under both statute and common law, the Government does not have nor does it accept specific future obligations to reduce the impacts of coastal hazards and flooding caused by sea level rise on private property.<sup>66</sup>

4.55 As Professor McDonald commented, the policy 'makes clear that the government asserts where responsibility will lie ... That is very different from making clear where liability will lie ... It is only a policy statement. Until they legislate to eliminate liability, that is still a point that is easily arguable in court in an appropriate case'.<sup>67</sup>

4.56 This issue opens up broader concerns relating to climate change and coastal legal issues.

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64 'Draft sea level rise policy statement', NSW Government, 2009, p. 3 – *Exhibit 124*. NSW Department of Environment, Climate Change and Water website accessed 13 August 2009 <<http://www.environment.nsw.gov.au/climateChange/sealevel.htm>>

65 Mr Smith, ANEDO, *Transcript of Evidence*, 26 March 2009, p. 30.

66 'Draft sea level rise policy statement', NSW Government, 2009, p. 4, p. 5 – *Exhibit 124*.

67 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 109.

## National building standards

4.57 The Department of Climate Change submission notes that the Australian Government has provided funding to the Australian Building Codes Board to review and, as appropriate, revise the Building Code of Australia (BCA) to ensure that the risks of future climate change are recognised in building practices and possible climate change adaptation measures are considered.<sup>68</sup> The Australian Building Codes Board develops and implements national standards for new buildings relating to health, safety, amenity and sustainability. The funding will be used to outline the major risks from climate change on Australia's building stock, investigate where nationally consistent or state-specific responses are required and identify areas for further research.

4.58 A number of inquiry participants raised concerns about the BCA:

there is a need for the introduction of new controls through the Building Code of Australia to ensure that buildings are designed and built to the standard necessary to withstand high wind and water damage.<sup>69</sup>

The Building Code of Australia ... sets the importance of structure and says that you will design that for a certain probability of, say, a one in 500-year return period; or an annual probability of one in 500 for the wind loading on that. What I believe the building code should do, and is doing, is to require that those probabilities should take into account future climate change impacts on wind speeds in tropical cyclone areas and on wind speeds in southern areas. It should also be concerned about the consequences – that is, the loading from the same wind speeds should be used. But you also should require that the building standards by which any building is constructed are going to be sufficiently robust ... to withstand extreme events above and beyond what might be regarded as currently the values. We need to be able to assess the capacity of structures.<sup>70</sup>

this is another area where the Commonwealth should play a role in looking to the building codes to decide what level of resilience is cost effective to include in the minimum requirements of the building code. I am currently involving in working with the

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68 Department of Climate Change, *Submission 85*, p. 6.

69 Manly Council, *Submission 72*, p. 8.

70 Professor Stevens, Australian Academy of Technological Sciences and Engineering, *Transcript of Evidence*, 21 May 2009, p. 23.

Commonwealth agencies on a national energy efficiency strategy, so time has come for a big upgrade in our building codes for commercial and residential buildings on energy efficiency. The case for that is overwhelming ... It is an area where we know we are heading for trouble in terms of more exposure to extreme weather events and we will need to upgrade our building standards. The Insurance Council does meet with us occasionally and their constant request is that we do this. Their argument is that if we do not have higher minimum standards then insurance will become unaffordable for communities because damage will be so frequent and expensive. That is a bad situation for Australia to be in if you cannot afford insurance because you will then get the call on taxpayers to bail people out and you do not get people managing their own risks. That is definitely an area where some further Commonwealth assistance would be useful. There is no point in each state individually researching these matters because they do not change from one side of the boundary to the other.<sup>71</sup>

- 4.59 The ICA recommended that the BCA be expanded to ‘incorporate property protection as a fundamental basis for consideration in building design and construction’. Currently, the BCA focuses on safety of life as the only fundamental requirement. The ICA also recommended implementation of ‘a southerly expansion of cyclone and wind storm related building codes to counter the predicted southerly exposure of severe cyclones’.<sup>72</sup>

## Local government coastal adaptation policies

- 4.60 While planning and development are governed by statutory frameworks established at state government level, local governments in all Australian jurisdictions have responsibility for preparing a range of legally binding statutory planning instruments such as planning schemes, codes and regulations.
- 4.61 Individual local council planning schemes generally place an obligation on councils to consider certain matters when dealing with applications for planning consent. This obligation provides an opportunity for councils to

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71 Mr Smith, NSW Department of Environment and Climate Change, *Transcript of Evidence*, 25 March 2009, p. 9.

72 ICA, ‘Improving community resilience to extreme weather events’ (April 2008), p. 14, p. 12—see attachment to ICA, *Submission 12*.

incorporate actions that may serve as a mechanism for local community adaptation to climate change.

4.62 Many local councils have responsibility for determining coastal adaptation practices for their local government area relating to so-called protect, redesign, rebuild, elevate, relocate and retreat policies.

4.63 This area proved to be a contentious one, with inquiry participants raising concerns relating to inconsistencies between different councils in the adaptation approaches adopted, lack of clarity about liability, and uncertainty about the effectiveness of the various approaches adopted and the circumstances under which they should be employed. As Professor McDonald commented:

When is planned retreat going to be appropriate or even feasible in some areas? In what circumstances should we regard hard engineering structures as actually preferable to planning and other approaches? How should planned retreat be implemented? There is an enormous range of approaches to that question. Who pays for hard structures, so the issues of costing when benefits flow to particular property owners. And then the question of how public amenity value should be valued as against infrastructure and private property values in making all of those decisions.<sup>73</sup>

4.64 Similarly, Ms Mears, Chair of the Victorian Coastal Council, commented that:

We have to have a framework for managing risk, which is not something we have at the moment. It is something that we need to work towards. It will include our adaptation to risk. What are the levels of risk for some areas? Can they be protected and managed or is it a retreat over time? This is really an important policy space that we are yet to fully develop. We are at the beginning of understanding the areas that are vulnerable. We need to understand within those areas what the assets are that are going to be at risk, what our response is and then who shares the role in managing those risks.<sup>74</sup>

4.65 A further issue here is what guidance on this matter is provided to local councils by state governments to ensure consistency in approach and to what extent local circumstances should determine the approach adopted. Byron Shire Council has a long established policy of planned retreat for

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73 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 102.

74 Ms Mears, Victorian Coastal Council, *Transcript of Evidence*, 20 May 2009, p. 15.

certain beach compartments within the shire. However, the council noted its difficulties in implementing aspects of this policy due to 'a lack of statutory support, at times' and recommended that:

Councils need statutory support from the state and federal governments for strategic planning policies of planned retreat and other climate change adaptation measures.<sup>75</sup>

- 4.66 The Victorian Government highlighted the significant future costs potentially associated with this area in terms of moving entire settlements and protecting major assets, flagging a possible role for the Australian Government in 'providing financial support and policy and engineering options for dealing with major "retreat" and "protect" options on the coast'.<sup>76</sup> Similarly, SGS Economics and Planning Pty Ltd commented that:

It is likely to be well beyond the means of local governments to meet the costs of risk management and reduction measures on their own, and equally inequitable for coastal councils to bear the costs of changes brought on by global changes. Councils may even require assistance to meet the costs of adapting their own infrastructure. Assistance from the State and Australian Governments will be required.<sup>77</sup>

- 4.67 Professor Thom also noted that:

We will reach 'tipping points' in each and every coastal community around our coast as sea level continues to rise. Each tipping point needs to be assessed in relation to the nation's capacity to pay. When will barrages be needed at Port Philip or Botany Bay? When will the very low third runway at Sydney Airport need to be elevated? When will houses around Swansea need to be relocated as here a 1m sea level rise will inundate 100% of properties adjoining Lake Macquarie? And when will levees, pumps and seawalls be demanded by property owners at risk of inundation or erosion?<sup>78</sup>

- 4.68 Other adaptation options proposed included providing development approval 'on the basis of a finite timeframe'<sup>79</sup> and defining 'coastal climate change buffer zones to keep development out of lands mapped as being at
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75 Byron Shire Council, *Submission 43*, p. 6.

76 Victorian Government, *Submission 90*, p. 7.

77 SGS Economics and Planning Pty Ltd, *Submission 105*, p. 5, p. 6, p. 7.

78 Professor Thom, *Submission 6*, p. 18.

79 WA Department of Planning and Infrastructure, *Submission 89*, p. 2.

risk of inundation'.<sup>80</sup> Wellington Shire Council described the possible use of covenants on property titles, with owners acknowledging that they will abide by actions stipulated in an approved climate change response plan:

Before the development starts, the owner of the land shall enter into an agreement with the Responsible Authority in accordance with Section 173 of the Planning and Environment Act, 1987 which will covenant that the owners acknowledge they will abide by actions stipulated in the approved climate change management plan.

The agreement will bind the applicant as the owner and shall run with the land so that all successors in title are bound by the agreement. This agreement will be prepared at the applicant's cost and to the satisfaction of the Responsible Authority, and shall be registered on the title in accordance with Section 181 of the Planning and Environment Act, 1987.<sup>81</sup>

4.69 A further important point to note here is that adaptation strategies are already being implemented to address the impacts of coastal erosion. As Professor Woodroffe highlighted, much could be learnt from past management practices in this area:

Over the past several decades the sea has risen a few centimetres along much of the coast of east Australia. Coastal management programs have not been designed to counter that rise, but in many cases have accommodated it without noticing. The impacts of large storms and the gradual recovery following those storms have been far more apparent. Much could usefully be learned from the behaviour of shorelines over this period. For example, the widespread introduction of dune management, incorporating dune fencing, dune access through walkways, exclusion of four-wheel drives, and revegetation would appear to have reduced and in places reversed retreat that might have been anticipated as a result of the gradual rise of mean sea level. These management procedures offer a good basis that could be expanded with further research as adaptive measures in the face of future sea-level rise.<sup>82</sup>

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80 Ms Norman, *Submission 20*, p. 8.

81 See Wellington Shire Council, *Submission 98*, p. 5 and Wellington Shire Council website accessed 1 September 2009  
<[http://www.wellington.vic.gov.au/Files/Climate\\_change\\_response\\_plan\\_guidelines.pdf](http://www.wellington.vic.gov.au/Files/Climate_change_response_plan_guidelines.pdf)>

82 Professor Woodroffe, *Submission 24*, p. 8.





Foreshore protection at Busselton, WA, as inspected by Committee members

## Conclusion

4.70 Subsequent chapters will revisit the issue of coastal planning. However, in terms of coastal planning and climate change, the Committee concludes that there is a need for:

- further work on ensuring a greater degree of consistency between jurisdictions in how they deal with issues facing climate change and planning in the coastal zone
- further work on resolving issues relating to the establishment of a sea level rise benchmark and planning framework
- further work on revising the BCA
- further investigation of liability issues with regard to coastal planning and climate change

- 4.71 The Committee commends the work of ACE CRC on sea level rise, risk management and coastal planning, including its national workshop program for policymakers, planners and engineers.
- 4.72 The Committee notes that the Local Government and Planning Ministers Council (LGPMC), which reports to COAG, is currently looking at state climate change planning policies. In May 2009, jurisdictions undertook to 'develop state-specific climate change planning policies to inform local governments and regional planning responses to climate change by mid 2011'. They further agreed to collaborate with the Climate Change and Water Working Group, Australian Transport Council and Ministerial Council on Police and Emergency Management to 'develop a national framework and tools for use by local government to inform planning for climate change mitigation and climate change adaptation'. There was also reference to 'Queensland work on establishing leading practice national planning system principles'.<sup>83</sup>
- 4.73 The NSW Government noted that COAG is currently:
- reviewing inter-jurisdictional arrangements relating to building, infrastructure and settlements through Working Groups on: Climate Change and Water; Infrastructure; Business Regulation and Competition (which considers planning and building reform); and Housing. It is envisaged that this work will address potential duplication and gaps in effective planning for coastal communities.<sup>84</sup>
- 4.74 Against that background, it is also important to note that the issues 'in relation to coastal settlement and climate change cannot be resolved by looking at the coastline in isolation to the broader challenge of a sustainable settlements strategy for managing urban growth in Australia'.<sup>85</sup> A strategic approach to settlement planning in the context of climate change is a major national issue. The Committee also draws the attention of all state governments and local government authorities to the scientific evidence about sea level rise outlined in Chapter 2.

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83 LGPMC, *Communique: eighth meeting – Sydney, 8 May 2009*, LGPMC website accessed 17 August 2009 <<http://www.lgpmcouncil.gov.au/communique/20090508.aspx>>

84 NSW Government, *Submission 55*, p. 1.

85 Ms Norman, *Submission 20*, p. 3.

### **Recommendation 20**

4.75 The Committee notes the Council of Australian Governments initiative (through the Local Government and Planning Ministers Council) to develop state-specific climate change planning policies by mid 2011, to inform local governments and regional planning responses to climate change. The Committee recommends that the Australian Government ensure that the outcomes of this initiative are included as part of the action plan under the proposed new Intergovernmental Agreement on the Coastal Zone.

### **Recommendation 21**

4.76 The Committee recommends that the Australian Government consider the benefits of adopting a nationally consistent sea level rise planning benchmark and, if so, whether this be done on a statutory basis or otherwise. The outcomes of this consideration should then be included as part of the action plan for the proposed Intergovernmental Agreement on the Coastal Zone.

### **Recommendation 22**

4.77 The Committee recommends that the Building Code of Australia, including cyclone building codes, be revised with the objective of increasing resilience to climate change.

## **Climate change and coastal legal issues**

4.78 Climate change law is a new legal discipline and, as commentators have observed, 'devising legal solutions to climate change is likely to involve profound changes to existing governance and regulatory frameworks, with reverberations felt in many other areas of law such as constitutional law, administrative law and property law'.<sup>86</sup>

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86 J Peel, 'Climate change law: the emergence of a new legal discipline', *Melbourne University Law Review*, 32(3), 2008, p. 924.

4.79 Uncertainties about legal matters relating to climate change and the coastal zone was one of the issues most frequently raised in evidence and documents provided to the Committee. As Mr Stokes, Executive Director of the National Sea Change Taskforce, commented, '[i]n many respects, councils are at a loss as to how to respond at the moment. What we are seeing is developments being approved right now that, if some of the projections coming out of the IPCC are proved correct, will be placed at risk in the future ... there are still properties being approved today which perhaps it would be prudent not to'.<sup>87</sup>

4.80 Key concerns raised by inquiry participants included:

- clarity about roles and 'who might be liable for what'

At present there is a high degree of uncertainty in relation to current and future climate change liability. If left unaddressed this uncertainty will continue to have a significant impact on decision making processes and information disclosure in relation to climate change hazards.<sup>88</sup>

The state's view [NSW] is that the risk to a property from sea level rise lies with the property owner, public or private, so whoever owns the land takes the risk. Whether it is the state or a private landowner, they gain the benefit of proximity to the ocean and they bear the risk of proximity to the ocean.<sup>89</sup>

- consistency of information, extent of risk disclosure to the public and 'who knew what, when'

There is ... debate about advising the public of climate change implications/risks ... with potential property de-valuing concerns versus people's right to know. It is necessary to have a clear policy direction on this from upper tiers of government so Councils have support and clear direction, without having to go through the courts to see where responsibility lies.<sup>90</sup>

- coastal planning policies taking into account the latest information on climate change and coastal hazards

It is a question of working with some degree of certainty. That is an issue. What we find at the moment is that an increasing number

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87 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 11.

88 Sydney Coastal Councils Group, *Submission 77*, p. 3.

89 Mr Smith, NSW Department of Environment and Climate Change, *Transcript of Evidence*, 25 March 2009, p. 9.

90 Manly Council, *Submission 72*, p. 9.

of local councils are making planning decisions in a state of great uncertainty about, say, the future impact of climate change and also in terms of a lack of clearly defined coastal policy either by the state or anyone else ... They are making decisions today based on information currently available to them that is not necessarily up to date.<sup>91</sup>

The liability issues that could be looming for decision makers agreeing to coastal canal estates today may be something that those decision makers might want to think about very carefully before agreeing to those proposals in future.<sup>92</sup>

- clarification about liability issues with regard to government authorities acting or not acting in terms of climate change adaptation and possible coastal hazards

I suppose the legal situation that local councils are in at the moment is that if they get a development application for an area of land they believe could be vulnerable in the future to sea level rise they are damned if they do and they are damned if they do not in terms of approving that development. If they approve it there could be a liability down the track if it becomes affected and inundated by the rising sea levels and the attendant severe weather events. If they do not approve it they are going to wind up before an appeals tribunal.<sup>93</sup>

- clarification about liability issues with regard to private property holders acting to protect their properties from the impacts of climate change and about who should bear the cost of adaptive strategies

soft engineering approaches [eg sand replenishment] ... will become increasingly expensive, and they raise issues about the extent to which public money should be spent to protect a few landholdings that occupy prime, though vulnerable, seafront.<sup>94</sup>

- legacy issues relating to past planning decisions that had allowed development in low-lying areas

we have essentially the very big question of the legacy risks that we are inheriting and our children will inherit. That is a very big

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91 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 11.

92 Ms Norman, *Transcript of Evidence*, 20 May 2009, p. 38.

93 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 7.

94 Professor Woodroffe, *Submission 24*, p. 8.

question. We are not going to solve that one overnight, so I think the first thing we need to do is understand, in a sound, evidenced based way, the nature of the risk that is arising from past decisions ... We will be presented with some big challenges. We need to make the right decisions, based on sound information. Beyond information, the question is: what practical steps do we take? That is a discussion which has barely begun at this point.<sup>95</sup>

Where we do have issues is twofold. The first is in the legacy of the past where councils over the years have approved developments in what will clearly be unsuitable locations into the future. That is a problem. The other area which is a big problem is the historic zonings, where over the years we have zoned land that is not yet developed in inappropriate coastal situations.<sup>96</sup>

- the legal basis underpinning strategies of protect, adapt and retreat and the permissible scope of adaptation strategies

if people are going to defend their property then the impacts of that defending of property may be transmitted to adjacent areas and cause other potentially detrimental effects in some cases.<sup>97</sup>

- compensation issues

it is a difficult issue to deal with the results of poor decisions from the past in terms of that vexed issue about compensation – who pays, who carries the risk?<sup>98</sup>

If current Climate Change predictions are realised significant numbers of properties will be adversely affected, many so much so as to become uninhabitable. In those circumstances it is inevitable that some property owners will look for compensation in return for any strategic actions any level of government may take to alleviate climate change risks. It is critical that planning for the financial implications of climate change, in terms of property compensation, commence without delay.<sup>99</sup>

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95 Mr Carruthers, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, pp. 7-8.

96 Mr Pearson, NSW Department of Planning, *Transcript of Evidence*, 25 March 2009, p. 5.

97 Mr Robinson, Queensland Department of Environment and Resource Management, *Transcript of Evidence*, 28 April 2009, p. 97.

98 Dr Wilson, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 8.

99 Byron Shire Council, *Submission 43*, p. 9.

- the lack of specific legislation in the area

at the moment, there are a lot of guidance notes and there is a lot of jurisdictional buck-passing.<sup>100</sup>

A climate change development control which is not discretionary for local governments to enforce may be the answer.<sup>101</sup>

- right of public access to beaches

Titles to land in Australia either have fixed 'right-line' property boundaries or boundaries based on some natural (usually water) feature. Right line property boundaries do not change even if the beach recedes into those properties. That is, in areas affected by coastal erosion, changing estuary mouth positions or sea level rise, the beach can end up on private properties. It is critical that the government have the ability to be able to amend property boundaries, or exercise powers of acquisition, in the event that erosion intrudes significantly into those private properties and the beach becomes privately owned.<sup>102</sup>

- indemnity issues

Indemnify local government for advice given in good faith regarding all natural hazards including those that may be caused or exacerbated by climate change including, but not necessarily limited to, landslide, bushfire, coastal erosion, coastal recession, flood and coastal inundation.<sup>103</sup>

the issue for us as a community and as a local government is that we should not go into defensive management mode and rely on some sort of statutory immunity and hide behind that in providing information across the counter. We need to educate our community and make them understand that this is a shared responsibility.<sup>104</sup>

- potential liability under the common law of negligence and nuisance

4.81 Several general principles emerge from the discussion above, pointing to some possible ways forward. These include:

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100 Mr Christensen, Sunshine Coast Environment Council, *Transcript of Evidence*, 28 April 2009, p. 67.

101 Gippsland Coastal Board, *Submission 38*, p. 2.

102 Byron Shire Council, *Submission 43*, p. 10.

103 Pittwater Council, *Submission 10*, p. 8.

104 Mr Wong, Manly Council, *Transcript of Evidence*, 25 March 2009, p. 74.

- preventing future harm
- improving the statutory framework
- considering broader indemnification for local authorities
- ensuring national consistency of information and mandatory risk information disclosure

4.82 In the discussion below, the Committee has often drawn on the evidence of Professor Jan McDonald. (Professor McDonald has published several significant legal studies in this area.<sup>105</sup> Her positions include Director of the Climate Change Response Program at Griffith University and Research Manager at the National Climate Change Adaptation and Research Facility.) However, as outlined below, Professor McDonald's comments were broadly supported by a number of inquiry participants.

## Preventing future harm

4.83 Several inquiry participants emphasised that the focus for coastal policymakers in taking into account climate change impacts should be on preventing future harm:

any interventions or regimes that are considered need to focus principally on approaches that prevent future harm rather than impose liability for it or establish principles of liability. That relates to preventing both maladaptive new development and harm where existing development has already occurred. The fact that a development is in place or infrastructure is in place does not automatically mean that there will necessarily be harm ensuing. Those approaches that are aimed at prevention I think need to recognise that there will always be a level of irreducible uncertainty ... We need to make sure that any response that is taken now to anticipate and prevent future harm is itself iterative, flexible and adaptive to build in upfront the triggers for a ramping up of increased protective measures when a certain event occurs – when the sea rises to a certain level, for example ... Our approach to dealing with climate impacts in the coastal zone should be based on trying to minimise adverse impacts on property, amenity

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105 See J McDonald, 'The adaptation imperative: managing the legal risks of climate change impacts', *Climate Law in Australia*, eds T Bonyhady and P Christoff, Sydney, Federation Press, 2007 – Exhibit 28; and J McDonald, 'A risky climate for decision-making: the liability of development authorities for climate change impacts', *Environment and Planning Law Journal*, 24, 2007 – Exhibit 27.



and human health. It should not be based on protecting ourselves from potential legal liability.<sup>106</sup>

ANEDO submits that one of the principles that should primarily be considered in all future coastal planning is 'First, do no more harm'. It is important to not compound the significant problems already faced by coastal communities by making further ill-considered planning and infrastructure which ignore looming biophysical realities. If decisions are made ignoring this principle, they will inevitably create even larger costs for future generations to bear, and undermine the concept of intergenerational equity which should inform true ecological sustainable development.<sup>107</sup>

- 4.84 The further point was made that these preventative measures should transfer the costs of adaptation to those who derive gain benefit from the development, with an emphasis on developers:

Those preventive measures also need to transfer or impose the costs of adaptation on those principally who derive benefit from the adaptation or the development in the first place or who are in the best position to pay for it. It has certainly been my observation over the last couple of years that the conversation has been around property owners on the one hand and government on the other hand, whether it is local, state or federal governments. The missing link in that is the role of the development industry and the incredible pressures that it places on local governments to approve developments on marginal lands without taking responsibility for any of the costs that may flow intergenerationally arising out of future impacts ...

My view is that the property developers will be the ones who derive the profit from the enterprise and therefore should be the ones who bear that risk for at least a reasonable time.<sup>108</sup>

- 4.85 In terms of how this mechanism might work, Professor McDonald commented that developers could be required to 'indemnify property owners for 10 years following the release of the land'. Alternatively, a 'performance bond' could be lodged that 'endures for 20 years' or the developer is required to insure the property – 'if the developer cannot get

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106 Professor McDonald, *Transcript of Evidence*, 28 April 2009, pp. 99-100, pp. 108-109.

107 ANEDO, *Submission 73*, p. 25.

108 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 100, p. 108.

insurance for a particular piece of land, that is a pretty good communication of risk to the market'.<sup>109</sup>

- 4.86 It was also noted that preventative approaches might usefully involve time-bound approvals:

The fact that we might take a preventative approach does not mean to say that all development will be constrained in vulnerable areas. Again I think the planning regime needs to rethink what it means to grant development approval in a certain area. It may be that we start considering time-bound approvals more in the nature of leasehold arrangements where an approval is granted for a development with a 40-year lifespan and then all bets are off until we rethink or reassess the nature of observations at that point to see whether the projections have actually materialised.<sup>110</sup>

## Improving the statutory framework

- 4.87 A number of inquiry participants highlighted the need for an improved legislative framework to clarify liability in respect of past and current coastal planning decisions and set out what is considered reasonable for various parties to have known at a certain time:

Local Government requires the legislative power to take climate change impacts into account when assessing development applications, as the risk of future litigation is real.<sup>111</sup>

we do need to have some kind of overarching framework that addresses liability or the scope for liability in respect of past decisions. It is critical that that be addressed using some form of legislative response rather than leaving it to the courts. I think it is going to be an extremely corrosive and stagnating influence on proactive decision making if we stay in this state of paralysis where local governments, and even to some extent state governments, are worried about the risks of exposure to liability ... A liability regime needs to, at the very least, specify what is reasonable for both potential plaintiffs and potential defendants to have known at a certain time. I think that is an absolute minimum.<sup>112</sup>

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109 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 107-108.

110 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 100.

111 Local Government Association Tasmania, *Submission 86*, p. 11.

112 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 100.

4.88 Professor McDonald pointed to the complexity of this issue, including that past coastal adaptation works undertaken by different parties may create additional problems or create expectations for other parties that these works will also be undertaken for them:

a lot of issues will arise in respect of protective structures that are already in place that will prove to have been inadequate, poorly constructed or poorly maintained or that are not located in the locations that they now need to be located in but which have created an expectation for neighbouring communities that they will get the same sort of protective structure. It is not just a case of having approved developments that put certain residents or property in harm's way. It is actually governments, whether departments of infrastructure or local governments, who have undertaken works that may create additional problems, exacerbate climate change related coastal hazards or create an expectation for other parties that those works will be done for them as well.<sup>113</sup>

4.89 It was further noted that, if there is going to be 'a liability regime imposed legislatively outside of the courts, there probably does need to be a fairly comprehensive articulation that transfers the risks and the liability back onto the individual property owner'.<sup>114</sup>

### Broader indemnification for local authorities?

4.90 Several inquiry participants commented on the benefits of broader indemnification of local authorities:

Federal and/or State statutory exemptions against 'climate change' litigation are imperative to the protection of public funds.<sup>115</sup>

there will probably need to be a far broader indemnification of local authorities, simply to manage the risk of liability in the future.<sup>116</sup>

4.91 Public authorities can be exposed to liability through both their statutory responsibilities and the requirement under common law to act with due regard to the rights of others. The forms of common law liability that

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113 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 100.

114 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 101.

115 Byron Shire Council, *Submission 43*, p. 9.

116 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 100.

public authorities are most commonly exposed to are claims in nuisance<sup>117</sup> or negligence.<sup>118</sup> However, under civil liability legislation in each state, public authorities (state governments, local councils and other government instrumentalities) are exempt from liability where it can be established that they have acted reasonably – that is, they are only liable if their actions or inactions are ‘so unreasonable’ that no other authority would consider them to be reasonable. An essential ingredient of any developing test of what is a reasonable response ‘must include a genuine attempt by local government officers to stay informed of current research applicable in their jurisdiction and of changes to relevant policies and regulations’.<sup>119</sup>

- 4.92 Civil liability legislation also exempts public authorities from liability for ‘obvious risks’. Obvious risks are those that, in relevant circumstances, would have been obvious to a reasonable person, including risks that are a matter of common knowledge. For example:

With the potential effects of climate change now widely known, there is a strong argument that a reasonable person who lives on the coast should be aware of the dangers posed, and therefore that damage from erosion and sea-level rise would be damage from an obvious risk ... Therefore, it would be difficult for a landholder to bring a negligence action against a local council for approving a development application in 2007 in a coastal area subject to erosion, since a reasonable landholder would have been well aware of the risks when submitting the application. No liability would arise in such a circumstance.<sup>120</sup>

- 4.93 Local governments and other authorities are therefore only at risk of civil liability for failing to account for the impacts of climate change if their actions or inactions constitute a wholly unreasonable response to the risk of climate change. Accordingly, civil liability legislation offers a degree of comfort and security for local government – noting, however, that judicial

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117 A nuisance action is an unlawful interference with a person’s use or enjoyment of land.

118 Three essential elements must be established in liability for negligence: duty of care, breach of that duty and damage as a result of that breach. Unlike claims in nuisance, in order to incur liability in negligence a duty of care must be found to exist.

119 P England, ‘Heating up: climate change law and evolving responsibilities’, *Local Government Law Journal*, 13(3), 2008, p. 222.

120 *Coastal Councils and Planning for Climate Change: an Assessment of Australian and NSW Legislation and Government Policy Provisions relating to Climate Change relevant to Regional and Metropolitan Coastal Councils*, p. 24 – Exhibit 106.

interpretation of civil liability legislation may vary and benchmarks may shift in defining what is manifestly unreasonable.<sup>121</sup>

- 4.94 A further key issue here is the need for local government to ensure they are informed about climate change information particular to their specific local government area:

While much of the scientific evidence about climate change impacts is highly generalised, it is without doubt that more specific and localised information will soon become available. It is questionable whether the defence of compliance with general procedures in s 42 of the *Civil Liability Act 2002* (NSW) and its equivalents in other states will be a reliable one if local governments' general procedures and applicable standards fail to take into account regionally applicable, authoritative predictions about climate change impacts as and when they become available. The duty on local government officers here, as in all other areas, is to ensure their state of knowledge and awareness remains at a level that it is reasonable to expect for a local government of such size and resources.<sup>122</sup>

- 4.95 New South Wales provides further protection from liability through its *Local Government Act 1979*. New South Wales is the only state that provides statutory protection for local government in this way. Section 733 of the act exempts councils from liability 'in respect of advice furnished, action taken, or anything done or omitted to be done which relates to *natural hazards in the coastal zone*, provided that the decision was taken in good faith'.<sup>123</sup> 'Good faith' is assumed if the council acts in accordance with the NSW Coastline Management Manual 1990, which in turn means councils must ensure that the potential effects of climate change are considered when conducting their activities. Professor McDonald commented that this is a provision 'that other states should consider adopting'.<sup>124</sup>

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121 As England comments, '[w]ith respect to civil liability claims, local governments seem less at risk of litigation. However, the applicable statutory defence is a relative one: as our state of knowledge on climate change issues grows, so too will the responsibility of local governments to take into account climate change considerations', 'Heating up: climate change law and evolving responsibilities', p. 219.

122 England, 'Heating up: climate change law and evolving responsibilities', p. 218.

123 *Coastal Councils and Planning for Climate Change: an Assessment of Australian and NSW Legislation and Government Policy Provisions relating to Climate Change relevant to Regional and Metropolitan Coastal Councils*, p. 21 – Exhibit 106.

124 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 109.

## National consistency of information and mandatory risk information disclosure

4.96 Much of the evidence to the inquiry emphasised the need for national consistency in information provided to the public about climate change risks. For example, Professor McDonald pointed to the need for:

consistency in the kind of information that has to be made available to property owners and prospective purchasers, the way in which that information is presented and over what timescales it is interpreted as being relevant and the form in which it is available. At the moment some of it is available on a certificate of title, in other circumstances you have to go and find it for yourself on the web. I think there is an important role for national consistency in what we expect every prospective purchaser will automatically be informed of when they are considering the purchase of property. A national approach to that is the only way in which you are going to be able to avoid the concerns about everyone's property value being affected. At the moment it is whoever blinks first, it is almost a game of chicken, because no-one is really willing to provide all that information in a way that will lay out in full, vivid detail the implications for certain locations ... consistency of information is a critical requirement across the country.<sup>125</sup>

4.97 Similarly, the ICA proposed implementation of 'legislation harmonised across all states requiring mandatory disclosure of all known and predicted risk data by state and local governments to property purchasers during property conveyance and title search processes'.<sup>126</sup>

4.98 The Committee notes the serious issues raised here, concerning consistent and comprehensive disclosure of climate change risks and coastal hazards. As Professor McDonald further commented:

I do not think it is satisfactory that at the moment a prospective purchaser has to go online and hope that their prospective local authority has flood maps that are online and then has to try and find out whether those flood maps take into account projected sea level rise and, if so, what level of sea level rise. It really does confer a very heavy burden on purchasers. Whilst some may be well equipped to do that, I suspect that a lot of people are not. It is a

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125 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 102, p. 104.

126 ICA, 'Improving community resilience to extreme weather events' (April 2008), pp. 7-18 – see attachment to ICA, *Submission 12*.

situation where at the moment we probably have an imperfect market, to use economics terminology, because people are not making fully informed decisions. People may still not make fully informed decisions, but they might be a little better informed.<sup>127</sup>

## Recent cases relating to climate change impacts on the coast

- 4.99 At the time of the inquiry, a number of legal cases concerning climate change and coastal planning had been decided through the courts. Many of these cases turned on the question of whether the decision maker had considered the potential impacts of climate change on proposed developments in vulnerable coastal areas. As the cases discussed below suggest, there is an emerging trend to consider climate change risks within the broader ambit of the concept of ecologically sustainable development (ESD). Many statutes require promotion of or regard to the principles of ESD. The principles of ESD most relevant to climate change impacts are the precautionary principle and the principle of intergenerational equity.
- 4.100 Reliance on ESD concepts to require a consideration of future climate change impacts was a feature of a decision issued by the Victorian Civil and Administrative Tribunal (VCAT) in *Gippsland Coastal Board v South Gippsland Shire Council & Ors*.<sup>128</sup> This is a significant case in that climate change factors were established as grounds to block a coastal development. Figure 4.4 provides a summary of this case.
- 4.101 Figure 4.4 also provides a brief summary of other recent cases in this area. These cases suggest that climate change considerations are increasingly likely to be seen as relevant, if not essential, to local government environmental assessment processes and the need for consent authorities to consider the impacts of climate change on coastal developments through their consideration of ESD: 'the only sensible strategy for local governments is to start incorporating climate change considerations into a wide range of their decisions and activities'.<sup>129</sup>

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127 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 104.

128 [2008] VCAT 1545.

129 England, 'Heating up: climate change law and the evolving responsibilities of local government', p. 210.

Figure 4.4 Recent cases relating to climate change impacts on coastal developments<sup>130</sup>

***Gippsland Coastal Board v South Gippsland Shire Council & Ors* [2008] VCAT 1545**

'VCAT refused consent for residential developments in a low-lying coastal region. The local council had previously approved permits for six residential developments in the Grip Road area of Toora, an area zoned for agricultural and mixed land uses. The Tribunal's refusal was primarily based on inconsistency with zoning and planning controls. Importantly, however, VCAT also applied precautionary ESD principles to find that development consent should not be granted in view of the "reasonably foreseeable risk of inundation" to the land and proposed dwellings due to sea level rise induced by climate change. This was despite the absence of specific provisions in the Victorian planning legislation requiring consideration of sea level risk. The Tribunal stated:

"We accept that there is growing evidence of sea level rises and risks of coastal inundation. While we acknowledge that there is uncertainty as to the magnitude of the sea level rise, it is evident that the consequences of such rises in level will be complex due to the dynamic nature of the coastal environment. Put plainly, rising sea levels are to be expected. The range of impacts may well be beyond the predictive capability of current assessment techniques. In the face of such evidence, a course of action is warranted to prevent irreversible or severe harm".<sup>131</sup>

***Walker v Minister for Planning* (2007) NSWLEC 741**

'Justice Biscoe found that the Minister for Planning had failed to consider ESD by failing to consider whether the impacts of the proposed development would be compounded by climate change. In particular, the Minister failed to consider whether potential flooding associated with climate change may impact the land at Sandon Point, which is located on flood prone land ... The Court has made it clear that consent authorities will be required to demonstrate that real regard was had to principles of ESD and to climate change impacts. As a result of this decision, councils should assume that there is the potential for greater flooding and inundation as a result of climate change in the coastal zone when considering coastal developments and take this into consideration. Councils must be able to demonstrate that they have taken into account the potential impacts that sea level rise and climate change on the proposed development and whether any mitigation measures could be put in place to lessen any future flooding impacts.'<sup>132</sup>

***Northcape Properties Pty Ltd v District Council of Yorke Peninsula* [2008] SASC 57**

In this case, 'the Yorke Peninsula District Council had taken a proactive approach to the likelihood of sea level rise caused by climate change. Its decision to refuse an application for residential development on the outskirts of Marion Bay was appealed by the developer. Council's decision to refuse the application was upheld in the Environment Court of South Australia and, on appeal, in the Supreme Court. Both decisions

130 See also *Aldous v Greater Taree City Council* [2009] NSWLEC 17 and *Charles & Howard Pty Ltd v Redlands Shire Council* [2007] QCA 200 (2007) 159 LGERA 349.

131 Peel, 'Climate change law: the emergence of a new legal discipline', pp. 954-955.

132 *Coastal Councils and Planning for Climate Change: an Assessment of Australian and NSW Legislation and Government Policy Provisions relating to Climate Change relevant to Regional and Metropolitan Coastal Councils*, pp. 19-20 – Exhibit 106. (This decision was appealed by the Department of Planning – see *Minister v Walker* [2008] NSWCA 224.)



relied on expert evidence that coastal erosion of 30-45 m could be expected in the next 100 years, taking sea level rise into account. Both decisions confirmed and endorsed the council's objectives for coastal development, stated in the applicable Development Plan. These gave consideration to sea level rise from climate change in the following terms:

"To promote development which recognises and allows for hazards to coastal development such as inundation by storm tides or combined storm tides and stormwater, coastal erosion and sand drift; including an allowance for changes in sea level due to natural subsidence and predicted climate change during the first 100 years of the development".<sup>133</sup>

## Existing coastal development and concerns of individual property holders

4.102 As legal commentators have noted, 'courts at this stage are only considering climate change impacts in the context of new developments and have not yet starting considering the complex issues associated with the impacts of climate change on existing developments'.<sup>134</sup> For example, the Sunshine Coast Environment Council pointed to existing development on flood-prone coastal floodplains adjacent to rivers and estuaries as being 'a recipe for litigation into the future'.<sup>135</sup>

4.103 Professor McDonald commented that:

something needs to be done to assist those people if in fact their properties are no longer habitable because of the frequency with which they are flooded or affected or because erosion has rendered them precarious. It does no good at all to say, 'Well, you should have thought about that and done something about it' if the alternative is that they are homeless. One way or another, some solution needs to be found to assist individuals in those circumstances.<sup>136</sup>

4.104 The complexity of these issues was made very clear in evidence to the Committee from a resident from Old Bar on the New South Wales Central Coast. This particular case raises issues about liability and existing

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133 P England, 'Doing the groundwork: state, local and judicial contributions to climate change law in Australia', *Environmental Planning and Law Journal*, 25, 2008, p. 372.

134 R Ghanem et cetera al, 'Are our laws responding to the challenges posed to our coasts by climate change?', *University of NSW Law Journal*, 31(3), 2008, p. 904.

135 Mr Christensen, *Sunshine Coast Environment Council*, Transcript of Evidence, 28 April 2009, p. 65.

136 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 106.

developments (in this instance, housing having recently been demolished) and alleged existing approvals for new developments.

- 4.105 By way of summary, the individual's home had to be demolished because of coastal erosion. They were then informed that they would have to wait for two years, for a council study to be completed, for confirmation on whether consent to rebuild, further back on their property, would or would not be granted – noting that the individual understood that consent to rebuild had already been given before their home was demolished. For the individual, this raised a series of issues relating to state and council coastal land use planning policies, accountability of officials, land values, insurance, home mortgages, compensation and liability – see Figure 4.5.
- 4.106 The future loss of people's homes to the sea as a result of coastal erosion and inundation was a major issue raised with the Committee. Concerns, for example, were raised about coastal properties in parts of NSW – at Narrabeen, along Belongil spit at Byron Bay and on the Central Coast:

At Norah Head coastal erosion has forced the local council to issue orders to residents to dismantle structures from the backyards of properties to reduce pressure on the seaward slope to assist in prevention of major land slippage. Heavy rain plus wave energy impact on the toe of this slope has placed a number of homes in the unenviable position of currently having no backyards plus the potential of losing their homes to the sea. Wyong Shire Council and the State Government have both committed extensive amounts of monies to try and minimise the rate of erosion of this slope. The reality is that these works may not prevent a loss of these properties if a severe storm were to impact onto this part of the Dobell coast line.<sup>137</sup>

locations like the Belongil in Byron and Collaroy-Narrabeen ... have development that is absolutely on the beach frontage where you are going to have a significant hazard impact from sea level rise.<sup>138</sup>

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137 Mr Craig Thomson MP, *Submission 5*, p. 2.

138 Mr Pearson, NSW Department of Planning, *Transcript of Evidence*, 25 March 2009, p. 14.

Figure 4.5 Excerpt of evidence from a coastal resident from Old Bar, NSW

My concerns are not just for myself but for all coastal residents who may face this in the future. If how our situation has been handled so far is to be a benchmark, basically it is embarrassing ... The failure to accept any sort of responsibility is just not acceptable for those involved ...

In 2001 we purchased our properties. There were no signs of any erosion. In 2002 minor erosion started. In 2003 we took the view that it was going to become an issue on our place. We applied for subdivision on our property ... On 14 June last year we had the highest tide in 22 years at Old Bar. ... It took close on six metres of lawn in four hours ... Two weeks after that I was served notice by the council to demolish which I abided by. I demolished my homes believing that we had a valid consent, that we could rebuild as they have put in writing to us; that was where our homes were supposed to go ...

I was told last week by council that that study that they are undertaking is still around two years away from finalisation, as in rezoning where it goes to. What do I do for the next two years is my point? I have lost my homes but council has now said, 'Well, you have lost your homes. You have put in an application to rebuild those homes. Even though we have said that is where you are supposed to build those homes, we are going to defer it' ...

So what do I do for two years? Who pays my mortgage? ...

In our particular case at Old Bar the state government and local council have been aware of the erosion issues in that particular piece of coastline since the 1940s. They have been quite happy to collect my land taxes ... If you cannot rebuild, what is it worth, really—nothing ... They have been quite happy to allow development in the last 50 years ...

All along I have played by the rules and believed that there was a policy in place. It is still current. It was implemented by a government department, local and state, and as soon as something goes wrong I have to hold the ball. Nobody else wants to know about it ...

How can no-one be accountable for that? It is just not about us. This is my story but if this is going to be such a big problem then surely there have to be some guidelines where everyone is in the same category, where landowners are made completely aware at time of purchase of whose liability it is going to be; what responsibility is going to be accepted by government or if it is up to the landowners themselves because then values on that land obviously apply accordingly ...

We contacted both state and federal governments regarding any sort of assistance, keeping in mind that we have had to pay to demolish our own homes. Because it was not declared a natural disaster by council, the best that we are told we are eligible for is welfare payments. Upon contacting welfare the first thing they do is say, 'What is the valuation on your house?' Then it is: bang, no, you are not entitled to welfare ...

We are sort of stuck in that time warp for two years until this is resolved. We do not have two years of mortgage payments left. We just do not know where to turn. Where do we go?

*Source Mr Keys, Transcript of Evidence, 26 March 2009, pp.61-65*

4.107 Mr Attwater from SGS Economics and Planning commented that:

There is a need to allow existing owners to re-evaluate their choices and to suffer minimal losses from the changing conditions, while ensuring in the future that coastal property owners factor in the costs associated with managing developing risk.<sup>139</sup>

4.108 Mr Attwater further proposed that, as existing owners 'were not aware of the developing risk and are not in control of the causes of this developing risk', for a 'period of 25 years, the cost of risk reduction and management measures be borne by the wider community':

After that time, the cost of further risk management measures would be the responsibility of those that benefit from coastal use or occupation. This condition should eventually be applied to all coastal property titles.<sup>140</sup>

4.109 There was also a proposal that for existing property subject to increasing risk, 'triggers be identified that would require an adaptation response to keep risks at acceptable levels':

In this way the community will respond to actual changes in risk as the sea level rises or erosion progresses, not to events forecast for the distant future. Triggers should be soon enough to plan action and respond before risk become excessive, not sooner. The action taken should manage the risk as it develops – it need not all be done immediately.<sup>141</sup>

## Conclusion

4.110 The Committee recognises that climate change raises many complex legal issues with regard to the coastal zone, as reflected in the many concerns raised by inquiry participants. The Committee also points to the high level of uncertainty about roles and responsibilities in terms of potential liabilities in this area.

4.111 Local councils are at the forefront of day-to-day coastal management and had major concerns in this area. As the evidence provided to the Committee underlines, councils need to develop clearly defined policies to deal with the impacts of climate change and make the risks of climate change impacts an explicit part of their decision-making criteria to assist in limiting their potential exposure to legal action. As the cases discussed

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139 SGS Economics and Planning Pty Ltd, *Submission 105*, p. 5.

140 SGS Economics and Planning Pty Ltd, *Submission 105*, p. 6.

141 SGS Economics and Planning Pty Ltd, *Submission 105*, p. 7.

above suggest, consent authorities also need to consider the impacts of climate change on coastal developments through their consideration of ESD.

4.112 That said, however, Professor McDonald emphasised that, in her view:

the trend now in the courts is to transfer personal responsibility back to individuals and, in respect of a prospective purchaser, for the most part, they probably could make appropriate inquiries now.<sup>142</sup>

4.113 Further, Professor McDonald commented that the ‘circumstances in which the common law holds governments liable in some circumstances ... will probably not apply in the future with respect to most coastal climate hazards because, for the most part, in 2009 prospective purchasers are in a position to protect themselves by making appropriate investigations’.<sup>143</sup>

4.114 However, concerns remain about liability and existing coastal developments. Further, there are clearly concerns about legal issues relating to climate change adaptation and the permissible scope of adaptation strategies at the local level. The legal challenges of climate change adaptation therefore require close monitoring and evaluation.

4.115 As discussed, the Australian Government has established the National Climate Change Adaptation Framework, which is at the early stages of implementation. However, the Committee is not aware of any specific work having been undertaken or currently being undertaken by the Australian Government on legal issues relating to climate change impacts and adaptation, particularly with regard to the coastal zone.

4.116 The Department of Climate Change confirmed that it had not at this point:

worked through a specific policy position on liability. I can say that, in the context of the COAG work, we have flagged the need to develop, on a national basis, a clear statement of roles and responsibilities between government and private sectors – whether that be businesses or communities, down to householders – and within government, between Commonwealth, state and local. We really do not have that blueprint at this time. So that proposition has been on the table in the COAG officials’ discussions, and I think it will continue as an immediate focus for how we move that forward. If there is a public policy position on

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142 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 107.

143 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 107.

roles and responsibilities then that will start to flow through in terms of liability in the exercise of those responsibilities.<sup>144</sup>

4.117 Given the complex nature of this area, the potentially significant social and economic costs involved and the significant exposure of coastal regions to climate change risks, the Committee believes further investigation of this matter is urgently required. As Professor Stevens from the Australian Academy of Technological Sciences and Engineering commented:

We realise this is a difficult problem. You can be in legal problems if you do not do something or if you do something ... The legal side needs to be examined much more closely than we have in the past ... I would rather see some research being done now rather than having it all developed by litigation in the courts.<sup>145</sup>

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### **Recommendation 23**

4.118 **Noting the gap in research on legal issues and climate change impacts on the coastal zone, the Committee recommends that the Australian Government request that the Australian Law Reform Commission undertake an urgent inquiry into this area, with particular focus on:**

- **clarification of liability issues with regard to public authorities acting or not acting in terms of climate change adaptation and possible coastal hazards (eg legal basis to implement adaptation strategies of protect, redesign, rebuild, elevate, relocate and retreat)**
- **clarification of liability issues with regard to private property holders acting to protect their properties from the impacts of climate change**
- **legal issues associated with the impacts of climate change on existing developments, as opposed to planned new developments**
- **mechanisms to ensure mandatory risk disclosure to the public about climate change risks and coastal hazards (eg legislation harmonised across all states requiring mandatory disclosure of all known and predicted risk data by state and local governments to property purchasers during property conveyance and title search processes)**
- **whether there should be broader indemnification of local government authorities**

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144 Mr Carruthers, Department of Climate Change, *Transcript of Evidence*, 18 June 2009, p. 7.

145 Professor Stevens, ATSE, *Transcript of Evidence*, 21 May 2009, p. 22.

## Sustainable coastal communities and environmental impacts on the coastal zone

*We have some of the best beaches and coastlines anywhere in the world ... How much more can we afford to lose in terms of coastal habitat and coastal environment, and how sustainable are the communities that live in many of Australia's regional coastal areas? Those are the issues that we are concerned about.<sup>1</sup>*

### Introduction

- 5.1 Chapter 5 focuses on the Committee's terms of reference to investigate the environmental impacts of coastal population growth and mechanisms to promote sustainable use of coastal resources and sustainable coastal communities.
- 5.2 The chapter provides an overview of environmental governance arrangements in Australia and the broader policy settings for environmental management, including the concept of ecological sustainable development (ESD), and some commentary on the important role that other stakeholders, such as environmental NGOs, Indigenous Australians and community groups, play in environmental management in Australia. The chapter then considers the issue of coastal population growth and demographic change and provides an overview of national environmental policy, legislation and programs relating to the coastal zone, including the Caring for our Country program and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The section on

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<sup>1</sup> Mr Stokes, National Sea Change Taskforce, *Transcript of Evidence*, 26 March 2009, p. 2.

the EPBC Act includes discussion on coastal World Heritage areas, Ramsar sites and the protection of coastal migratory species. The chapter concludes by looking at environmental threats to coastal and marine biodiversity and the socioeconomic impacts of coastal population change, national sustainability policies and programs relating to the coastal zone, and mechanisms to promote sustainable coastal communities.

- 5.3 It is important to note that major reviews of Australia's national environmental policies and legislation were underway at the same time as this inquiry, including a review of the EPBC Act, the Australian Government's central piece of environmental legislation, and the National Strategy for the Conservation of Australia's Biological Diversity, Australia's premier biodiversity conservation policy statement. These policies and legislation form the national framework for environmental governance in Australia.
- 5.4 The revised policy and legislative framework that eventuates from these major reviews will result in new approaches to managing the environment, which will also flow through to new approaches to integrated coastal zone management. The projected impacts of climate change on Australia's biodiversity further point to the urgency of developing innovative new ways of approaching environmental management and promoting ecologically sustainable development.

## **Current environmental governance arrangements**

- 5.5 Governance and institutional arrangements for environmental management under Australia's federal system are, at this stage, more clearly delineated than those for dealing with climate change impacts and adaptation, with federal environmental legislation, policies and programs having been established under longstanding cooperative federal, state and local government agreement through the Council of Australian Governments (COAG).
- 5.6 Environmental responsibility has been largely devolved to the states under the Australian Constitution. However, the Commonwealth has an important influence on environmental policy and planning through the EPBC Act and its funding, taxation, and international trade powers. It can play an important role in national policy making, by setting policies directly and through national government councils (such as COAG and the Natural Resource Management Ministerial Council).



5.7 In the 1980s, several key High Court judgments laid the foundation for the Commonwealth to expand its role into environmental matters:

these cases clarified the scope of the external affairs power in s.51(xxix) of the Constitution by confirming that under this provision the Commonwealth has jurisdiction to make laws for the purposes of implementing Australia's international obligations.<sup>2</sup>

5.8 In addition to the external affairs power, the Commonwealth has significant powers to protect the environment using its powers to make laws with respect to:

- international and interstate trade and commerce
- fisheries in Australian waters beyond territorial limits
- foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth

5.9 Within this context, it has been observed that 'the key issue is not so much whether the Commonwealth has the power to make environmental laws but when and how it should do so'.<sup>3</sup> However, as the recent interim review report on the EPBC Act importantly emphasises:

Maintaining an appropriate role for the Commonwealth with respect to the environment and heritage is important in the context of maintaining an appropriate division of responsibilities between the Commonwealth and the States and Territories.<sup>4</sup>

5.10 In 1992, COAG set out the agreement on the roles and responsibilities of each level of government in Australia with regard to the environment through the Intergovernmental Agreement on the Environment (IGAE). The IGAE provides that:

responsibilities and interests of the Commonwealth in safeguarding and accommodating national environmental matters include:

- (i) matters of foreign policy relating to the environment and, in particular, negotiating and entering into international agreements relating to the environment and ensuring that

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2 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, Commonwealth of Australia, 2009, p. 8.

3 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, p. 9.

4 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, p. 8.

international obligations relating to the environment are met by Australia

- (ii) ensuring that the policies or practices of a State do not result in significant adverse external effects in relation to the environment of another State or the lands or territories of the Commonwealth or maritime areas within Australia's jurisdiction ...
- (iii) facilitating the co-operative development of national environmental standards and guidelines.<sup>5</sup>

5.11 The IGAE further provides that the states have responsibility:

- for the development and implementation of policy in relation to environmental matters which have no significant effects on matters which are the responsibility of the Commonwealth or any other State ...
- for the policy, legislative and administrative framework within which living and non living resources are managed within the State ...
- in the development of Australia's position in relation to any proposed international agreements ... of environmental significance which may impact on the discharge of their responsibilities ...
- to participate in the development of national environmental policies and standards. (para 2.3)

5.12 The IGAE also provides that local government has a responsibility for 'the development and implementation of locally relevant and applicable environmental policies within its jurisdiction in cooperation with other levels of Government and the local community', and an interest in:

- the environment of their localities and in the environments to which they are linked ...
- the development and implementation of regional, Statewide and national policies, programs and mechanisms which affect more than one Local Government unit. (para 2.4)

5.13 The concepts in the IGAE were developed further in 1997 when COAG and representatives of local governments signed a Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment. The Heads of Agreement provided that the Commonwealth would apply its assessment and approval processes to meet its obligations on the following matters of national environmental significance:

- World Heritage properties

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5 IGAE, 1 May 1992 (para 2.2.1), Department of the Environment, Water, Heritage and the Arts (DEWHA) website <<http://www.environment.gov.au/esd/national/igae/index.html>>

- Ramsar listed wetlands
  - places of national significance
  - nationally endangered or vulnerable species and communities
  - migratory species and cetaceans
  - nuclear activities
  - management and protection of the marine and coastal environment<sup>6</sup>
- 5.14 The EPBC Act specifies the matters for which the Australian Government has regulatory responsibility, and is derived from the 1992 IGAE and the 1997 COAG Heads of Agreement.
- 5.15 The states and territories have extensive powers to make legislation related to environmental matters in their own jurisdiction. However, over the past two decades many environmental policies and approaches have been developed nationally through Commonwealth-state processes. There has also been a recent trend towards devolution of the delivery of natural resource management programs to the level of regional natural resource management groups, catchment management authorities and local Landcare groups.

## **Ecologically sustainable development and integrated coastal zone management**

- 5.16 The 1987 report of the World Commission on Environment and Development, *Our Common Future* (the Brundtland Report), provides the standard definition of 'sustainable development' as that which 'meets the needs of the present without compromising the ability of future generations to meet their own needs'.<sup>7</sup> Australia generally uses the term 'ecologically sustainable development' (ESD).
- 5.17 Sustainable development has become the dominant framework for environmental policy, both in Australia and internationally. Australia's national efforts towards advancing sustainability are embodied in the

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6 Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment, COAG, November 1997, DEWHA website  
<<http://www.environment.gov.au/epbc/publications/coag-agreement/attachment-1.html>>

7 World Commission on Environment and Development, *Our Common Future*, World Commission on Environment and Development, 1988, p. 43.

National Strategy for Ecologically Sustainable Development, which was endorsed by COAG in 1992.<sup>8</sup> This policy statement followed on from Australia's adoption of international policy statements on sustainable development – namely, Agenda 21, the global action plan for sustainable development, and the Declaration on the Principles of Sustainable development (the Rio Declaration).

- 5.18 ESD forms the foundation principles for the EPBC Act and this legislation therefore provides a useful standard definition of ESD:
- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
  - (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation [precautionary principle];
  - (c) the principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
  - (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
  - (e) improved valuation, pricing and incentive mechanisms should be promoted. (s3A)
- 5.19 ESD reflects a commitment to the so-called 'triple-bottom line' principles of environmental, social and economic considerations. As noted in the previous chapter, there is an emerging trend to consider climate change risks within the broader ambit of the concept of ESD, particularly with reference to the precautionary principle and the principle of intergenerational equity. The concept of ESD therefore brings together environmental and climate change considerations.
- 5.20 The principle of ESD underpins federal and state environment policy and therefore federal and state coastal policy. Integrated coastal zone management (ICZM) is a sub-set of sustainable development. The principles of ESD define the challenge of ICZM as well, in terms of integrating policy and management across jurisdictions and combining environmental, social and economic policy processes.

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8 National Strategy for Ecologically Sustainable Development, Ecologically Sustainable Development Steering Committee, COAG, 1992, DEWHA website  
<<http://www.environment.gov.au/esd/national/nсед/strategy/intro.html#WIESD>>

- 5.21 Many inquiry participants noted the critical importance of ESD in coastal zone management and problems in meeting sustainable development objectives:

pressures resulting from the rate of [population] growth and its cumulative impacts challenge the implementation of policies seeking to promote sustainable development. At present, all levels of government lack the ability to properly assess the social, economic and environmental consequences of coastal population growth and associated development and [this] is compromising our ability to deliver sustainable development on the coast.<sup>9</sup>

- 5.22 The concept of ESD also underlines the significance of ecosystem services. Some inquiry participants highlighted a lack of understanding of the coastal economy and concept of ecosystem services. Ecosystem services supply a range of goods and other support services and these services can therefore be costed and accounted for in the same way as any other service. As a number of coastal researchers observed:

The compilation of annual industry production values in national accounts is potentially deficient in not accounting for reduction in natural resource stocks and also inherits the limitations of national accounts data which insufficiently measures environmental values'.<sup>10</sup>

Our understanding of the both the importance and economic value of coastal ecosystems as well as the non-market value of the coast is currently quite limited. A federally led initiative to improve our understanding of the total economic value of the coastal systems is a significant imperative for improving the way in which we value and subsequently manage the coast.<sup>11</sup>

- 5.23 Professor Thom noted that the Wentworth Group had developed a detailed national environmental accounts model that would enable governments to 'determine where change is taking place to the conditions in the landscape or seascape'.<sup>12</sup> Such a model would seek to:

- Provide annual national, state/territory-wide and regional (catchment) scale reports which measure the health and change in condition of our major environmental assets;

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9 Western Coastal Board, *Submission 34*, pp. 1-2.

10 Professor McIlgorm, *Submission 47*, p. 2.

11 Professor Tomlinson and Mr Lazarow, *Submission 58*, pp. 5-6.

12 Professor Thom, *Transcript of Evidence*, 26 March 2009, p. 58.

- Underpin the long-term catchment management and land use planning decisions by Commonwealth, state/territory and local governments, and regional authorities; and
  - Improve the cost effectiveness of public and private investments in environmental management and repair.<sup>13</sup>
- 5.24 A set of national environmental accounts would 'enable us to track changes in our natural capital over time, just as financial balance sheets measure financial positions'.<sup>14</sup>
- 5.25 Professor Thom further commented that this system of national environmental accounts could also be 'modelled on the Healthy Waterways program in SEQ', particularly in terms of a template for delivering regional monitoring.<sup>15</sup>
- 5.26 The Committee undertook a site inspection of Moreton Bay in South-East Queensland (SEQ) as part of the inquiry process and was particularly impressed by the Ecosystem Health Monitoring Program report card, managed by the SEQ Healthy Waterways Partnership. The report card provides comprehensive monitoring of freshwater, estuarine and marine environments in SEQ waterways and catchments. It delivers a regional assessment of ecosystem health for 19 major catchments, 18 river estuaries, and Moreton Bay, highlighting where the health of these waterways is getting better or worse.
- 5.27 The Healthy Waterways Partnership Ecosystem Health Monitoring Program report card also represents an excellent example of ICZM, with established partnership arrangements between the Queensland Government, local councils, universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), local industries and community groups. The Committee encourages a closer inspection of this report card by visiting the relevant website.<sup>16</sup>
- 5.28 The report card enables ecosystem health to be monitored and reported in terms of measurable characteristics, and it provides an audit mechanism for management actions undertaken to protect SEQ's catchments and Moreton Bay. The report card provides an 'A to F' health rating for the
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13 *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*, Wentworth Group of Concerned Scientists, May 2008, p. 1, Wentworth Group website <[http://www.wentworthgroup.org/docs/Accounting\\_For\\_Nature.pdf](http://www.wentworthgroup.org/docs/Accounting_For_Nature.pdf)>

14 *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*, p. 1, Wentworth Group website <[http://www.wentworthgroup.org/docs/Accounting\\_For\\_Nature.pdf](http://www.wentworthgroup.org/docs/Accounting_For_Nature.pdf)>

15 Professor Thom, *Submission 6*, p. 21.

16 <<http://www.healthywaterways.org/EcosystemHealthMonitoringProgram/ProductsandPublications/AnnualReportCards.aspx>>

waterways of SEQ and is released annually. It represents the culmination of 12 months of scientific monitoring at 391 freshwater, estuarine and marine sites throughout the region. The ratings form a 'snapshot' of the ecosystem health of these waterways and help to identify issues affecting waterways and actions required to improve their health.<sup>17</sup>

- 5.29 The report card sets clear future objectives for coastal stakeholders to act upon, based on consistent monitoring, transparent data and public communication of information, with clear ownership of report card outcomes by those involved. Such monitoring and reporting is essential as without reliable, timely, rigorous information it is not possible to respond effectively to growing environmental threats. As the Chairman of the Great Barrier Reef Marine Park Authority (GBRMPA) commented:

I am a strong fan of the report card with public information on it, otherwise there is no way of knowing if you are getting better and there is no incentive to improve on it.<sup>18</sup>

- 5.30 The Committee notes Professor Thom's proposal for a national environmental accounts model. This could perhaps be trialled in the first instance as a set of national coastal zone environmental accounts, focusing on Australia's catchment, coastal and marine continuum, using indicators to measure the condition of fish stocks (both commercial and recreational), habitats (reefs, beaches, seagrass, mangroves) and water quality in catchments. As the Wentworth Group commented, 'if you can't measure it, you can't manage it'.<sup>19</sup>

- 5.31 The Northern Territory Government also emphasised the importance of standardised coastal reporting and monitoring, including the value of a national coastal zone database incorporating this information:

Species and habitat mapping and coastal monitoring in Australia is currently undertaken by various Natural Resource Management ... government, and university groups. There are currently no nationally consistent reporting and monitoring standards or protocols and significantly, no national databases to assess the status and condition of coastal species or habitats in Australia; this includes ecologically significant coastal habitats and wetlands (i.e.

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17 Healthy Waterways Partnership website <<http://www.healthywaterways.org/home1.aspx>>

18 Dr Reichelt, GBRMPA, *Transcript of Evidence*, 29 April 2009, p. 7.

19 *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*, p. 6, Wentworth Group website <[http://www.wentworthgroup.org/docs/Accounting\\_For\\_Nature.pdf](http://www.wentworthgroup.org/docs/Accounting_For_Nature.pdf)>

seagrasses, mangroves, salt marshes, reefs) and also, migratory and protected species and wildlife such as turtles, dugongs, cetaceans, sharks and rays, seabirds and shorebirds.<sup>20</sup>

### **Recommendation 24**

- 5.32 **The Committee recommends that the Australian Government, through the Council of Australian Governments process, examine the establishment of a system of national coastal zone environmental accounts, employing the model developed by the South East Queensland Healthy Waterways Partnership.**

## **Role of other stakeholders in environmental management of the coastal zone**

- 5.33 Australia's progress towards a healthier environment and the sustainable use of natural resources depends on the collective actions of many individuals, groups and communities whose actions need to be strategically supported and resourced. There is a need to promote a cooperative approach to the protection and management of the environment, involving research institutions, environmental groups, volunteer conservation organisations, Indigenous Australians, natural resource management (NRM) bodies, industry groups, landholders and the general community.
- 5.34 The Committee notes that a key national priority area of the Australian Government's Caring for our Country program is community skills, knowledge and engagement, including seeking to:
- Improve the access to knowledge and skills of urban and regional communities in managing natural resources sustainably and helping protect the environment.
  - Increase the engagement and participation rates of urban and regional communities in activities to manage natural resources and to help protect the environment.
  - Position all regional natural resource management organisations to deliver best-practice landscape conservation and sustainable land use planning to communities and land managers within their regions.

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20 NT Government, *Submission 106*, pp. 20-21.



- Ensure the continued use, support, and reinvigoration of traditional ecological knowledge to underpin biodiversity conservation.<sup>21</sup>
- 5.35 The focus here is on ensuring the public has access to information about the environmental challenges facing Australia and the state of its natural resources, contributing to enduring government-community partnerships in natural and cultural resource management, and providing more effective support to regional groups, landcare groups and community organisations that are working to improve environmental protection and the sustainable management of Australia's natural resources.
- 5.36 Indigenous Australians are key stakeholders in coastal biodiversity conservation and sustainable use of the coastal zone. The Committee recognises the role of Indigenous peoples in the conservation and ecologically sustainable use of Australia's coastal and marine biodiversity, and the importance of promoting the use of Indigenous peoples' traditional knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge. As the Northern Territory Government submission noted:
- The NT coastal environment necessitates management strategies that recognise Indigenous cultural interests and issues. Indigenous people have a unique and enduring connection with the sea and a multitude of benefits exists in developing complementary and cooperative marine research, monitoring and planning among Indigenous groups, governments at all levels, and the NT community.<sup>22</sup>
- 5.37 The Caring for our Country initiative seeks to train and employ up to 300 Indigenous Rangers to manage and conserve the natural and cultural features of Indigenous lands, including Indigenous Protected Areas. The Caring for our Country program also includes several targets which recognise the importance of traditional knowledge, including developing Indigenous land and sea country management projects and working with Indigenous communities to record and pass on traditional knowledge, and protect Indigenous cultural landscapes and culturally sensitive sites.<sup>23</sup>
- 5.38 The Committee commends these initiatives.

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21 *Caring for our Country: Outcomes, 2008-2013*, p. 39 – Exhibit 80.

22 NT Government, *Submission 106*, p. 22.

23 *Caring for our Country: Outcomes, 2008-2013*, p. 44 and p. 21 – Exhibit 80.

## Coastal population growth and demographic change

5.39 Coastal population growth, often as a result of what has been described as the 'sea change' phenomenon,<sup>24</sup> is creating significant environmental and socioeconomic pressures on the coastal zone.

5.40 Some six million people live in coastal areas outside the capital cities, with the rate of population growth in these coastal areas being consistently higher than the national average:

Analysis of the latest population data from the Australian Bureau of Statistics shows that at the end of June 2007 there were 6.26 million people living in Australia's non-metro coastal areas, an increase of 1.27 million people since June 1997. This increase is equivalent to approx 6% of Australia's total population.

Coastal population outside the capital cities now represents 30% of Australia's national population and 82% of the nation's regional population. In 2006-07 the number of people migrating to non-metro coastal communities exceeded the total number of people moving to all of Australia's capital cities ...

Average annual growth in Australia's non-metro coastal areas is approximately 2%, which tends to be 50% or 60% above the national average. Growth rates in individual Local Government Areas (LGAs) are often much higher ... These growth rates are based on estimated resident population figures released by the Australian Bureau of Statistics each year.<sup>25</sup>

5.41 The National Sea Change Taskforce (NSCT) also recently noted that:

Revised estimates of Australia's population growth over the next 40 years have dire implications for the nation's coastal communities ... After analysing the estimates, which were prepared by Federal Treasury, the Taskforce believes the projected growth is likely to increase the population in Australia's non-metro coastal areas by up to 90%. The revised Treasury projections indicate the national population will increase to 35 million by 2049 – 7 million higher than previously thought and 13 million higher than the current population ... "If you add in the million or more 'baby boomers' who plan to retire to the coast between 2010

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24 This concept describes migration away from metropolitan areas and larger regional cities to attractive, high amenity coastal locations. Internationally, the movement of people to such destinations is often described as 'amenity migration'.

25 National Sea Change Taskforce, *Submission 79*, pp. 7-8.

and 2026, this will expand the current population in non-metro coastal areas from 6.4 million to 12.2 million by 2049 ... That is the equivalent of adding more than 11 new Gold Coasts to the population of these communities which already have the highest growth rates in Australia".<sup>26</sup>

- 5.42 The impact of the non-resident population is a further issue – for example, during the holiday season the number of temporary residents in coastal areas can often exceed the number of permanent residents. As the NSCT pointed out, the standard statistical measure of population is based on the concept of usual residence and therefore changes in coastal population may not be well understood:

Current demographic data for the Australian coast is based on information from the census and from the annual Estimated Resident Population data released by the Australian Bureau of Statistics. This data does not reflect non-resident population peaks or the impact of part-time residents or other visitors. It is limited to an estimate of the number of usual residents within statistical and local government areas. It does not include people such as holidaymakers, workers in the area who live elsewhere and other temporary residents.<sup>27</sup>

- 5.43 A number of other submissions commented on the need for improved statistics in this area:

Future coastal planning and decision making should ensure the improvement of processes for gathering and sharing information and resources about cross jurisdictional population and long term demographic trends including tourism and visitation patterns. This will assist in preparing for long term population challenges on the coastal zone.<sup>28</sup>

- 5.44 As Mr Stokes, Executive Director of the NSCT, noted, these non-resident population peaks inevitably impact on the capacity of coastal councils to finance shortfalls in infrastructure and services:

If we look at a place like the Byron Shire in New South Wales, you have a population of just under 20,000 but that can frequently spike to over 40,000 during that Christmas holiday period. All of those people are coming in needing to use the facilities in place in

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26 NSCT media release, 'Population boom set to hit coastal areas', 28 September 2009.

27 NSCT, *Submission 79*, pp. 15-16.

28 NT Government, *Submission 106*, p. 12.

the town—the roads, water, sewerage and waste disposal systems.<sup>29</sup>

- 5.45 Similar views were expressed by representatives of the Broome Chamber of Commerce and Industry, and the Broome Shire, with regard to the rapid and temporary population increases in peak tourist seasons. Mr Tony Proctor, President of the Broome Chamber of Commerce, noted that the population of Broome in 1989 was approximately 4,000, and it currently has a population of between 16,000 and 17,000 people. When tourists are included, there may be approximately 30,000:

The caravan parks are full, and if you drive around Broome you will see caravans and tents in people's backyards and beside their driveways. Some people say at this time of year Broome's population gets to 34,000. I think it is probably less this year, but certainly it is still pretty full.<sup>30</sup>

- 5.46 The Northern Territory Government further suggested that, to better integrate population trends into coastal zone planning and management, 'the Australian Government should co-ordinate and share national research and information available about population change and long term demographic trends in coastal areas in a format which can be used by territory, regional and local planners'.<sup>31</sup>
- 5.47 The Committee agrees that there is a need to establish an accurate and consistent method of measuring the impact of tourists and other non-resident population groups in Australian coastal areas to ensure a clearer understanding of demand for infrastructure and services in these communities and enable resources to be better matched with that demand. As the NSCT suggested, this could be in the form of 'a supplementary data collection over the Christmas/New Year holiday period' by the Australian Bureau of Statistics.<sup>32</sup> The Committee also agrees that there is a need for improved data on long-term demographic trends in coastal areas, to assist in future planning.
- 5.48 Environmental and socioeconomic impacts of coastal population growth are discussed below.

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29 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 5.

30 Mr Proctor, Broome Chamber of Commerce, *Transcript of Evidence*, 26 August 2009, p. 13.

31 NT Government, *Submission 106*, p. 12.

32 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 5.

## **Recommendation 25**

- 5.49 **The Committee recommends that the Australian Government, through the Australian Bureau of Statistics, ensure that:**
- **accurate and consistent methods of measuring the numbers and the impact of tourists and other non-residents in coastal areas are undertaken to enable resources to be better matched with demand for infrastructure and services**
  - **improved data on long-term demographic trends in coastal areas is made available to assist in coastal zone planning and management**

## **National environmental policy and programs relating to the coastal zone**

- 5.50 National environmental policy for the coastal zone operates in the context of other national legislative regimes and government policy, including:
- National Strategy for Ecologically Sustainable Development (1992)
  - National Strategy for the Conservation of Australia's Biological Diversity (1996) (currently under review)
  - Australia's Oceans Policy (1998)
  - Guidelines for Establishing the National Representative System of Marine Protected Areas (1998) and marine bioregional planning
  - National Framework for the Management and Monitoring of Australia's Native Vegetation (2001) (Native Vegetation Framework)
  - National Water Initiative (2004)
  - Australian Weeds Strategy (2007) and identified Weeds of National Significance
  - Australian Pest Animal Strategy (2007)
  - Directions for the National Reserve System – a Partnership Approach (2005)

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth), including key threatening processes and threat abatement plans for invasive species under the act
- *Fisheries Management Act 1991* (Cth) and fisheries assessments under the EPBC Act
- Caring for our Country program (2008)
- Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions (2005)
- *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* (2006)
- National Strategy for the Management of Coastal Acid Sulfate Soils
- National Program of Action for the Protection of the Marine Environment from Land Based Activities (2006)

5.51 Some of these key initiatives are discussed in more detail below.

### **National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan**

5.52 In 2006, the Natural Resource Management Ministerial Council (NRMMC) endorsed the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*.<sup>33</sup> The plan ‘was developed in consultation with key stakeholders and has the support of Australian Government, state and territory jurisdictions’.<sup>34</sup> It could therefore be said to represent a national coastal policy of sorts, in place of the now lapsed Commonwealth Coastal Policy (1995).

5.53 As will be discussed further in Chapter 6, a number of inquiry participants raised serious concerns about progress in implementing the plan.

### **Caring for our Country program**

5.54 In March 2008, the Australian Government announced that it would invest \$2.25 billion over five years on ‘a new program to restore the health of Australia’s environment and build on improved land management

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33 NRMMC, *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, Commonwealth of Australia, 2006, pp. 6-7 – Exhibit 79.

34 *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, p. 10 – Exhibit 79.

practices'.<sup>35</sup> The Caring for our Country program focuses on six national priority areas:

- the National Reserve System
- biodiversity and natural icons
- *coastal environments and critical aquatic habitats*
- sustainable farm practices
- natural resource management in northern and remote Australia
- community skills, knowledge and engagement

5.55 The Caring for our Country program is therefore the major national funding program in terms of the coast. It sets the following five-year outcomes for the 'Coastal environments and critical aquatic habitats' national priority:

Reduce the discharge of dissolved nutrients and chemicals from agricultural lands to the Great Barrier Reef lagoon by 25 per cent.

Reduce the discharge of sediment and nutrients from agricultural lands to the Great Barrier Reef lagoon by 10 per cent.

Deliver actions that sustain the environmental values of:

- priority sites in the Ramsar estate, particularly sites in northern and remote Australia
- an additional 25 per cent of (non-Ramsar) priority coastal and inland high conservation value aquatic ecosystems including, as a priority, sites in the Murray-Darling Basin

Improve the water quality management in the Gippsland Lakes in Victoria, the Tuggerah Lakes Estuary in New South Wales and in all priority coastal hotspots

Increase the community's participation in protecting and rehabilitating coastal environments and critical aquatic habitats.<sup>36</sup>

5.56 The Committee notes that a new Community Action Grants program has also been established under the Caring for our Country program, to

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35 Media release by the Hon Peter Garrett, Minister for the Environment, Heritage and the Arts and the Hon Tony Burke, Minister for Agriculture, Fisheries and Forestry, 'Caring for our Country: better land management, less red tape', 14 March 2008.

36 *Caring for our Country: Outcomes, 2008-2013*, p. 17 – *Exhibit 80*. See also *Caring for our Country Business Plan: 2009-10*, Commonwealth of Australia, 2008.

support local environmental and land management work. Eligible community groups include:

- community groups involved in coastal rehabilitation, restoration and conservation
- groups of farmers or land managers working on sustainable farming or improving natural resource management
- Indigenous partnerships involved in protecting or improving the environment
- community groups involved in biodiversity conservation, environmental protection or managing natural resources<sup>37</sup>

5.57 The Committee supports the objectives of the Caring for our Country program and particularly its focus on coastal environments as a national priority area. Clearly there are benefits in keeping all major Australian Government environmental funding under the one program, to ensure a focus on the Australian environment as a whole. However, there is a risk that specific priorities for coastal environment funding may be lost within this broader program.

5.58 For example, it appears that financial support under the Community Coastcare program will in the future be available under the 'Coastal environments and critical aquatic habitats' national priority area of the Caring for our Country program:

In 2008-09 we ran that as a transition program, which we called Community Coastcare, and ran as a separate small grants process. As of this year, and in all future years, that program will be run as part of the annual Caring for our Country business plan process. So there will not be a separate call for Coastcare small grants, but people will still be able to apply to apply for the funding through their applications to the Caring for our Country business plan.<sup>38</sup>

5.59 The Committee will outline its proposal for a dedicated national coastal zone funding program in Chapter 6. It is envisaged that this program, in focusing on the coastal zone and promoting integrated coastal zone management, will be broader than the coastal environments priority of the Caring for our Country program.

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37 DEWHA website accessed 28 September 2009 <<http://www.nrm.gov.au/funding/cag.html>>

38 Ms Rankin, DEWHA, *Transcript of Evidence*, 18 June 2009, p. 16. See also *Caring for our Country Business Plan: 2009-10*, 'From now, financial support for community organisations will be available through the processes in the annual Caring for our Country business plan and there will not be a separate process for Community Coastcare', p. 74.



- 5.60 The Committee is concerned that climate change impacts on biodiversity is not listed as a national priority under the Caring for our Country program.

### **Recommendation 26**

- 5.61 **The Committee recommends that the Australian Government:**
- **expand the list of national priority areas identified under the Caring for our Country program to include climate change impacts on biodiversity**
  - **give consideration in future funding rounds to projects that:**
    - ⇒ **involve working with state/territory and local governments to improve coastal land use planning**
    - ⇒ **seek to address loss of coastal habitat as a result of coastal development and population pressures**

### **National Reserve System and the coastal zone**

- 5.62 The National Reserve System includes national parks, Indigenous lands, reserves run by non-profit conservation organisations and ecosystems protected by landholders on private property. The National Reserve System rests on a bioregional framework:

The Australian land mass is divided into 85 bioregions. Each bioregion is a large geographically distinct area of similar climate, geology, landform, vegetation and animal communities ...

The bioregions are described in a bioregional map, the Interim Biogeographic Regionalisation for Australia (IBRA). IBRA is the National Reserve System's planning framework, the fundamental tool for identifying land for conservation ...

The main priority for the National Reserve System is to address gaps in comprehensiveness at the national scale.<sup>39</sup>

- 5.63 As discussed above, the National Reserve System is a national priority area under the Caring for our Country program. The program seeks to 'expand the area that is protected within the National Reserve System to at

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39 DEWHA website accessed 24 August 2009  
<<http://www.environment.gov.au/parks/nrs/science/ibra.html>>

least 125 million hectares (a 25 per cent increase)<sup>.40</sup> The Department of the Environment, Water, Heritage and the Arts (DEWHA) website notes that the National Reserve System is Australia's 'natural safety net in the face of threats from climate change':

Healthy, functioning and resilient environments are our best defence against a changing climate. Protected areas build resilience by controlling other habitat threats such as weeds and feral animals, by managing water resources and regenerating vegetation. They form a buffer against the impacts of climate change, providing refuges for species to survive and adapt, reducing the extinction risk for our native species ...

along the agricultural zones of the south-western and eastern seaboard, the country is fragmented by land clearing, extensive pastoralism and intensive agriculture. Here the reserve system is building resilience by extending and linking protected areas to extend habitat ranges, to increase connectivity, protect water catchments and to reduce soil erosion.<sup>41</sup>

5.64 Several inquiry participants recommended that more coastal habitat be added to the National Reserve System:

A national target for coastal parks and reserves in terms of proportion of coastline (not land area) will help with the maintenance of amenity values, keeping in mind that the demand will be greatest in areas of population concentration.<sup>42</sup>

Immediate action must be taken to secure known coastal areas of high biodiversity value in protected areas, to contribute to the National Reserve System.<sup>43</sup>

Protection of the natural coastal environment through expansion of the National Reserve System must be at the centre of efforts to protect the coastal environment.<sup>44</sup>

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40 *Caring for our Country: Outcomes, 2008-2013*, p. 5—*Exhibit 80*.

41 DEWHA website accessed 24 August 2009

<<http://www.environment.gov.au/parks/nrs/about/protected-areas/climate-change.html>>

See also M Dunlop and P Brown, *Implications of Climate Change for Australia's National Reserve System: A Preliminary Assessment*, CSIRO, 2008; and DEWHA, *Australia's Strategy for the National Reserve System: 2009-2030*, Commonwealth of Australia, 2009.

42 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Submission 49*, p. 8.

43 Conservation Council of SA, *Submission 71*, p. 4.

44 Lake Wollumboola Protection Association, *Submission 84*, p. 8.

there remains substantial room in some states for more coastal national parks and reserves. Whereas New South Wales has 45% and Victoria 41% of their coast in national parks and reserves, all the other states have less than 30% of their coast in parks. Such parks are a very effective way of maintaining a natural coastline, which can fend for themselves in relation to climate change, as well as eliminating the demand for coastal development in the park areas.<sup>45</sup>

### **Recommendation 27**

- 5.65 **The Committee recommends that, in seeking to expand the area protected within Australia’s National Reserve System (NRS) under the Caring for our Country program, the Australian Government focus on high biodiversity coastal habitat, including more effective off-reserve coastal zone conservation and expanded coastal reserves that provide larger buffer zones. In undertaking this initiative, the Australian Government should continue to work with state/territory and local governments, Indigenous groups, conservation organisations, private landholders and other stakeholders to ensure that these protected areas are added to the NRS in a timely manner.**

## **Environment Protection and Biodiversity Conservation Act 1999 and the coastal zone**

- 5.66 The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) is the Australian Government’s central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the act as matters of national environmental significance. Actions require approval under the act only if they are likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance defined under the act are:

- World Heritage properties

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45 Professor Short, *Submission 4*, p. 2.

- national heritage places
- wetlands of international importance (Ramsar wetlands)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park<sup>46</sup>

## State of the Environment reports

- 5.67 Under the EPBC Act, every five years the Minister must instruct DEWHA to prepare a State of the Environment report for Australia, to be tabled in Parliament (the next report is due in 2011).
- 5.68 State of the Environment reporting seeks to provide accurate information on the major causal factors influencing Australia's environment and heritage and the effectiveness of responses to address change. Reporting covers eight major themes: atmosphere, land, inland waters, coasts and oceans, biodiversity, human settlements, natural and cultural heritage and the Australian Antarctic Territory. The regular production of State of the Environment information provides scope for changes in environmental pressures and impacts to be tracked over the long term.
- 5.69 The 2001 *State of the Environment Report*, in its 'coasts and oceans' section, highlighted that:
- Australian waters are more susceptible to exotic marine pests than previously thought, with threats to tropical habitats as well as to temperate habitats.
  - The management of the coastal environment, including catchments and estuaries, is still fragmented among many agencies at a local and state level.
  - Further loss of coastal habitat has occurred through the encroachment of human settlements and growth in pressures due to tourism in the coastal zone.
  - Pressures on Australia's coral reefs continue unabated from downstream effects of land use and other human activities.
  - Large nutrient loads of nitrogen and phosphorus are still being discharged to coastal and estuarine waters from both point sources and non-point sources.

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46 In addition, the act confers jurisdiction over actions that have a significant environmental impact on Commonwealth land or a Commonwealth marine area or that are carried out by a Commonwealth agency or if the action proposed is a nuclear action.

- Our national ability to measure the condition of coastal and marine waters through a system of standard indicators has not improved since SoE (1996) ...
- Our knowledge of the marine environment remains limited, particularly the status of many marine species and habitats and the deep sea environment.
- The environmental effects of aquaculture activities are still not fully understood. Some activities have the potential to adversely affect the marine environment.
- The coastal population continues to expand and the use of coastal resources is increasing. There is uncertainty in the ability of coastal ecosystems to absorb rising levels of sediment and pollutants from land uses in the coastal zone.<sup>47</sup>

5.70 The latest *State of the Environment Report* (2006), in its 'coasts and oceans' section, noted that Australia's coasts:

are at risk of serious degradation because of the pressures on them, including fishing, population growth and urbanisation, pollution, mining, tourism, species invasion from ballast waters, and climate change. There is also an alarming lack of knowledge because there is no systematic national monitoring of many important aspects of Australia's coastal and ocean systems ... Planning for adaptation to climate variability should be a priority.<sup>48</sup>

5.71 The 2006 State of the Environment report also highlights as 'key points' that:

- Australia still does not have a comprehensive, nationally consistent system for measuring the condition and trends of its coasts and ocean ecosystems and the key resources they support.
- While still uncertain, the current forecasts of climate change suggest that increasing ocean temperatures will cause major impacts on coral reefs and that changing ocean circulation patterns are likely to affect cold water, and thus planning for adaptation to climate variability should be a priority.
- Because Australian marine ecosystems remain at risk from exotic species being brought into Australian waters on ships'

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47 Australian State of the Environment Committee, *Australia State of the Environment 2001*, Independent Report to the Commonwealth Minister for the Environment and Heritage, Commonwealth of Australia, 2001, p. 6.

48 Australian State of the Environment Committee, *Australia State of the Environment 2006*, Independent Report to the Commonwealth Minister for the Environment and Heritage, Commonwealth of Australia, 2006, p. 49.

hulls and discharged in ballast water, measures to restrict transfer must continue both internationally and domestically.

- Trends in the status of fisheries' resources and in the bycatch are negative, and efforts to reverse these trends, such as improving management plans and introducing environmental management systems, should be enhanced and then communicated to the public to ensure progress is measured and evaluated.
- While there are no surprises or new issues since 2001, *the need to resolve existing problems remains as strong as ever in order to stem the slow decline of environmental quality.*<sup>49</sup>

5.72 The Committee regards the conclusions of the State of the Environment report as one of the major reasons for conducting this inquiry into the coastal zone and recommending a comprehensive program of action to address these areas.

## Independent review of EPBC Act

5.73 On 31 October 2008 the Minister for the Environment, Heritage and the Arts commissioned an independent review of the EPBC Act.<sup>50</sup> This is the first review of the EPBC Act since its commencement on 16 July 2000. The review will assess the operation of the EPBC Act and the extent to which its objects have been achieved.

5.74 As part of this review, a comprehensive public consultation process has been undertaken and an interim report on the review of the EPBC Act has been released. The report highlights key issues raised through the public consultation process. The final report is to be provided to the Minister for the Environment, Heritage and the Arts by 31 October 2009.

5.75 The Committee was particularly interested in whether the EPBC Act might be expanded to include coastal matters as a way of improving coastal zone management arrangements. As the review was conducted at the same time as this inquiry, the Committee believes it is instructive to note issues of relevance in the interim review report. Figure 5.1 sets out key issues raised by the report with relevance to the Committee's inquiry into the coastal zone.

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49 *Australia State of the Environment 2006* (emphasis added), p. 58.

50 Section 522A of the EPBC Act requires it to be reviewed every 10 years from its commencement. The review is being undertaken by Dr Allan Hawke, supported by a panel of experts.

Figure 5.1 Key issues raised in interim review report of the EPBC Act with relevance to the coastal zone

- the Act currently takes a reactive approach to biodiversity conservation ... the Act should be amended so that it takes a more proactive approach to protecting biodiversity ... [with] the Commonwealth becoming involved earlier in the planning or development process. (p. 31)
- [the Act should] shift away from the protection of individual species towards landscape-scale biodiversity planning and setting and overseeing implementation of regional targets and objectives on environmental matters (p. 31) ... The term 'landscape-scale assessments' is used to cover ideas associated with strategic and bioregional approaches, as opposed to species-by-species protection or project-by-project assessment. The EPBC Act provides for landscape-scale planning and assessment approaches along with project-specific assessments—available landscape-scale assessments include strategic assessments, bioregional plans and conservation agreements. To date there has been limited utilisation of landscape-scale planning provisions, but the number of these assessments is increasing. (p. 162)
- Submissions proposed the inclusion of several new matters of NES under the Act. The most commonly suggested matters were greenhouse gas emissions or climate change impacts, land clearance, water extraction, wild rivers or wetlands of national importance and wilderness areas. (p. 34)
- the adoption of a 'specified activity' or 'designated development' approach within the Act's triggers would diminish reliance on the 'significance' test and create much greater certainty as to what is covered by the Act. (p. 47)
- Many of the submissions ... claimed that many projects that should have been referred were 'slipping through the net'. (p. 55)
- A theme which came through in many submissions was that generally, the level of awareness of the EPBC Act in the community was low ... This lack of awareness was compounded by an absence of knowledge at the Local Government level which is a first point of contact for many developers and concerned individuals. (p. 77)
- A prevailing theme arising from public submissions was a concern that the EPBC Act does not consider cumulative impacts, or does not deal with them well ... These 'cumulative impacts', are often described as a process of 'death by 1,000 cuts', or the 'tyranny of small decisions'. (p. 86)
- Several submissions ... supported the insertion of a three-part land clearance trigger ... (i) the clearing of native vegetation over 100 ha in any two year period; (ii) the clearing of any area of native vegetation which provides habitat for listed threatened species or ecological communities, or listed critical habitat; and (iii) a schedule of activities that would trigger the Act regardless of the hectares proposed to be cleared (for example, major coastal resort developments). (p. 125)
- The potential need for providing habitat corridors across jurisdictional boundaries and the need to look at habitat diversity at a national scale ... lends strength to the argument that the EPBC Act should contain a better mechanism for managing the loss of nationally significant vegetation. (p. 128)
- 'the current Act does not provide a long-term basis for addressing biodiversity conservation in the context of climate change' ... a 'climate change vulnerability assessment' [should be] ... a required step when determining the listing of a species or ecological community ... in light of climate change, the future

feasibility of projects should be assessed— an example was provided of a dam that would not fill with water as a consequence of changing climate ... that increased biodiversity pressures from sea level rise needs to be considered ... 'Landscape connectivity becomes critically important in the face of uncertainty about future climate.' (p. 142, p. 143, p. 144)

- Submissions were critical of the level of transparency in the nomination process, in particular for listing of threatened species and ecological communities under the EPBC Act. The use of a conservation theme for nominations for listing of threatened species and ecological communities was viewed unfavourably in some submissions, as it appears to result in nominations outside of the theme being excluded from consideration. A number of submissions suggested changes to the current listing categories for threatened species and ecological communities and the inclusion of an 'emergency' or 'transitional' listing power in the Act. There is a lack of alignment between Commonwealth and State and Territory lists for threatened species and ecological communities and this can result in inconsistencies and duplications of processes. (p. 194)
- Recovery planning, especially species-by-species planning, is not as effective or as efficient as it could be. Concern is focussed on failure to prepare effective plans and failure to implement plans. There was support for outcomes-focused efforts and for multi-species and regional recovery planning approaches. Insufficient resourcing is provided to support the development and implementation of effective recovery actions. Decision-making is often supported by poor information or a limited knowledge base. There was support for a broader approach to biodiversity conservation such as at a landscape or ecosystem level. (p. 212)
- Landscape scale approaches to biodiversity conservation, as they were described in public submissions, would require greater engagement by the Australian Government in planning activities. This would generally involve close collaboration with State and Territory governments and agencies. Any expanded approach would need to allow for a range of land tenures and existing land uses ... If a landscape approach to protecting biodiversity was adopted in addition to the current provisions under the Act, there would also be a need to determine and subsequently define the units of scale that a landscape approach might operate at, including its boundaries and attributes ... In consideration of the issues raised above, there are a number of options available to the Australian Government in providing better management of impacts on biodiversity. These include: Addition of a new trigger such as 'ecosystems of national environmental significance'; Increasing the use of strategic assessments; and Expanding the provisions for bioregional assessments to include non-Commonwealth land. (p. 221)
- A common theme arising out of the submissions dealing with this issue was that the implementation of ESD principles in terms of decision-making was inadequate. (p. 300)
- There is a need for more proactive compliance and enforcement action under the Act. There is concern at the lack of Commonwealth 'on-ground' enforcement presence in regional areas leading to poor compliance, or lack of local knowledge, impacting on the quality of judgements ... There is a need for more proactive monitoring and audit and adequate resourcing to ensure that follow up monitoring of compliance with conditions of approval are carried out in a timely manner. (p. 328)

Source *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report, Commonwealth of Australia, 2009*



5.76 Key points made by inquiry participants about the EPBC Act and the coastal zone included that:

in a number of cases [the act] is not being properly enforced ... In a lot of cases in Tasmania the EPBC Act is not even considered when it should be, in my view.<sup>51</sup>

Species and Endangered Ecological Communities listed in [state] Threatened Species Conservation Act should be afforded protection under the Commonwealth Environment Protection and Biodiversity Conservation Act ... Reforms to the Environment Protection and Biodiversity Conservation Act should be considered to ensure that coastal sites of conservation significance are protected from degradation due to development.<sup>52</sup>

Things come in under the EPBC Act if you have got an endangered species, but the strip is so small now along the coast that vegetation, for example, does not even factor in as a significant regional ecosystem. There are actually quite a lot of pockets of remnant bushland that are high in biodiversity that should be able to be protected as well, but they do not seem to fit into any legislation.<sup>53</sup>

The reason the small decisions fail, or appear to be failing – a death of a thousand cuts-type problem – is a missing overlay ... It is the leadership that comes from having a widely accepted strategic plan or an accepted future vision. I would be quite in favour ... of provisions in the EPBC Act for a more strategic approach in planning.<sup>54</sup>

Because the act is framed as very much a reactive act it waits for someone to come up with an idea ... It is a very limited thing based pretty much around just the conservation values and trying to protect conservation values and struggles to deal with the integration of cross-sectoral issues in terms of fisheries, oil and gas, shipping and all the other sorts of uses of the ocean and coastal areas. Because it is very much based around species and

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51 Mr Dudley, North East Bioregional Network, *Transcript of Evidence*, 28 January 2009, p. 30.

52 Lake Wollumboola Protection Association, *Submission 84*, p. 17, p. 18.

53 Ms Warneminde, Coolum District Coast Care, *Transcript of Evidence*, 28 April 2009, p. 66.

54 Dr Reichelt, GBRMPA, *Transcript of Evidence*, 29 April 2009, p. 4.

communities, and you have to get those listed, it is also a great limitation.<sup>55</sup>

- 5.77 The failure of the EPBC Act to deal with cumulative impacts – the ‘death by a thousand cuts’ problem – as highlighted above, was a prevailing theme of submissions to the inquiry. A number of inquiry participants raised concerns about the broader failure of planning regimes to deal with the problem of cumulative impacts of coastal development:

It is 20 years on from the coastal zone inquiry ... and we talked about the tyranny of small decisions, so that you end up with ribbon development or inept small decisions that end up with destruction of wetlands and a whole range of things that gets rid of a lot of the opportunities for coastal buffers against issues that we face now, particularly with potential climate change and sea-level rise. It seems that in 29 years we have really not gone very much further in Australia.<sup>56</sup>

The planning tribunal might say, ‘If that land gets cleared, that is not necessarily going to have a big impact on the overall environment or ecological health of the area.’ The problem is, though, that it is death by a thousand cuts syndrome. It is not looked at in terms of an overall, long-term protection plan for the area, so you can just keep nibbling away at one piece after another. In each case, one particular development might not be that damaging but the cumulative effect over 10 or 20 years is that you have damaged the whole area and fragmented it and it is not ecologically viable anymore.<sup>57</sup>

While it is true that each individual development application can argue that its own cumulative impact on flood plains is minor, examination of the collective impacts of all development is staggering ... and there is no current (or convenient) mechanism to address this issue locally.<sup>58</sup>

- 5.78 The Great Barrier Reef Marine Park Authority pointed to the significant role that strategic (regional/landscape scale based) planning along the coast could play in overcoming problems in this area:

The reason the small decisions fail, or appear to be failing – a death of a thousand cuts-type problem – is a missing overlay ... It

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55 Mr Smyth, Australian Conservation Foundation, *Transcript of Evidence*, 25 March 2009, p. 51.

56 Dr Crossland, Coolum District Coast Care, *Transcript of Evidence*, 28 April 2009, p. 66.

57 Mr Dudley, North East Bioregional Network, *Transcript of Evidence*, 28 January 2009, p. 36.

58 Sunshine Coast Environment Council, *Submission 27*, p. 3.

is the leadership that comes from having a widely accepted strategic plan or an accepted future vision. I would be quite in favour ... of provisions in the EPBC Act for a more strategic approach in planning. My comment on that would be to make sure that every effort is made to bring the jurisdictions along with it. The 25-year positive relationship between Queensland Parks and Wildlife and the marine park authority is evidence that joint arrangements can work, but they cannot be unilateral. For instance, to make the park's management work on the water we have a joint committee. There are operational committees under it. There is a steering committee and then that reports to me and the head of the Premier's Department in Queensland. We give it a working infrastructure or we give it a governance structure and we use it. I think a strategic approach to the use of the coastline would need something similar, something to make it work and be accepted at the council level.<sup>59</sup>

- 5.79 DEWHA agreed that a 'limitation of the EPBC Act is the constraints on its ability to consider the cumulative effects of actions by multiple parties' and noted that it was attempting to 'address this shortcoming by taking new approaches to the protection of biodiversity at an ecosystem level':

For example, the implementation of the Marine Bioregional Planning framework ... and the current Strategic Assessment of Browse Basin liquefied natural gas reserves in the Kimberley are examples of using the provisions of the EPBC Act to assess threats at an ecosystem level, taking into account all of the uses that may impact on the resources and biodiversity of a particular area and all parties with a stake in a region.<sup>60</sup>

- 5.80 The importance of strategic/regional based planning for the coastal zone is further discussed in Chapter 6.
- 5.81 In terms of whether an amendment to the EPBC Act might be useful in providing specific protection for the coastal zone, Mr Smyth, from the Australian Conservation Foundation (ACF), commented:

I think there are ways in which that can be strengthened in terms of things like land clearing triggers in, say, coastal areas. There could also be triggers around sorts of activities in coastal marine areas which cause habitat damage. There could be clearing for

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59 Dr Reichelt, GBRMPA, *Transcript of Evidence*, 29 April 2009, p. 4.

60 DEWHA, *Submission 103*, p. 4.

coastal subdivisions or trawling and things like that which could actually have some impact on coastal marine environments.<sup>61</sup>

- 5.82 However, Mr Smyth concluded that, while the act might be amended in this way, better options existed to address problems with coastal zone management:

There are ways in which the EPBC Act could be amended and strengthened, but I think it is our view still that there needs to be something which is able to get across the various sectors across the jurisdictions and, in the case of Commonwealth and marine and coastal waters, the EPBC Act really struggles there.<sup>62</sup>

- 5.83 Similarly, Professor Thom commented that, 'if legislation is to be enacted, it should be new legislation and not simply amendments to the EPBC Act 1999'.<sup>63</sup> As the Nature Conservation Council of New South Wales commented, the EPBC Act is 'almost the last measure' and there is a 'need to start much more immediately in the planning process'.<sup>64</sup>

- 5.84 The Committee notes the interim findings of the EPBC Act review and looks forward to the final report recommendations. The Committee also notes that many of the concerns raised by inquiry participants about the EPBC Act match those raised in the interim review report. Amendments to the legislation along the lines proposed should assist in improving coastal zone management.

- 5.85 Of particular concern was the interim report finding that 'the level of awareness of the EPBC Act in the community was low' and that this was 'compounded by an absence of knowledge at the Local Government level which is a first point of contact for many developers and concerned individuals'.<sup>65</sup> As local government is at the frontline in terms of coastal zone management and planning, this level of awareness about the act needs to be urgently addressed.

- 5.86 The Committee agrees that the cumulative impacts of many small decisions taken along the coast are clearly not being dealt with effectively under current federal and state environmental protection regimes. This also requires urgent attention.

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61 Mr Smyth, ACF, *Transcript of Evidence*, 25 March 2009, p. 45.

62 Mr Smyth, ACF, *Transcript of Evidence*, 25 March 2009, p. 45.

63 Professor Thom, *Submission 6*, p. 20.

64 Ms Faehrmann, Nature Conservation Council of NSW, *Transcript of Evidence*, 25 March 2009, p. 65.

65 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, p. 77.

## Recommendation 28

5.87 **The Committee recommends that the Australian Government, in considering its response to the Independent Review of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), take into account concerns about the EPBC Act and coastal zone management raised as part of this inquiry – in particular, the need to address the cumulative impacts of coastal development. This could be achieved by numerous means, including:**

- a land clearing trigger
- defining coastal ecosystems as a matter of national environmental significance
- making more use of landscape-scale assessments through strategic assessments or bioregional plans

## Coastal World Heritage areas

5.88 The EPBC Act provides for the management and protection of Australia's World Heritage properties. Major coastal World Heritage sites include the Great Barrier Reef Marine Park and Kakadu National Park. As set out in a recent report on climate change impacts on World Heritage sites, both areas have been classified as extremely vulnerable to projected climate change impacts:

- The lowland parts of Kakadu are vulnerable to changed salinity as a result of sea level rise and saline intrusion into groundwater. Sea level rise will lead to a further extension of tidal rivers and pose a significant threat to freshwater wetland systems, resulting in conversion of freshwater wetlands to saline mudflats. Up to 80% of freshwater wetlands in Kakadu could be lost, with rises in average temperatures of 2–3 °C.
- Climate change impacts are already being observed in the Great Barrier Reef. Average annual rainfall has already declined over the past century and rainfall intensity has increased. The Great Barrier Reef ecosystem is highly vulnerable to climate change and impacts are already being observed on plants, animals and habitats; for example, coral bleaching events are occurring more frequently and consequential changes to the biodiversity are being observed.<sup>66</sup>

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66 Australian National University (ANU), *Implications of Climate Change for Australia's World Heritage Properties: A Preliminary Assessment*, p. 46, p. 55.

- 5.89 As part of the inquiry process, the Committee undertook site inspections of both areas and received briefings on park management issues, including environmental and climate change impacts. Government agencies and other bodies with interests in these areas also made detailed submissions to the inquiry.

### Great Barrier Reef Marine Park

- 5.90 The Great Barrier Reef is internationally renowned. Its network of reefs represents the largest and most complex coral reef system in the world. Figure 5.2 provides an overview of the significant features of the Great Barrier Reef. To date, the reef has suffered two significant mass coral bleaching and mortality events (1992 and 2002).<sup>67</sup>

- 5.91 The significant environmental values of the reef also provide the basis for substantial economic activity, particularly from tourism:

Around two million tourists visit the Reef each year, supporting an industry generating approximately \$5 billion annually and 50,000 jobs. Ten major commercial fisheries operate in the Reef, contributing around \$140 million to the economy each year. Recreational use of the Reef, including fishing, generates around \$150 million each year, with more than 14 million visits occurring in 2007.<sup>68</sup>

- 5.92 The Great Barrier Reef Marine Park Authority (GBRMPA) is the Commonwealth agency responsible for overall management of the Great Barrier Reef Marine Park and the World Heritage Area, and the Queensland Government, particularly the Queensland Parks and Wildlife Service, provides day-to-day management. Many other stakeholders – including research institutions, commercial and recreational fishing bodies, tourism associations and industry, Indigenous traditional owners, and community members – are also involved in different aspects of management.

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67 Reef and Rainforest Research Centre, *Submission 30*, p. 8.

68 *Maintaining a Healthy and Resilient Great Barrier Reef: The Commonwealth and Queensland Governments' Interim Response to the Great Barrier Reef Outlook Report 2009*, Australian Government and Queensland Government, 2009, p. 1.

**Figure 5.2 Summary of significant features of the Great Barrier Reef**

Six of the world's seven species of marine turtle

The largest green turtle breeding area in the world

One of the world's most important dugong populations

Over 43,000 km<sup>2</sup> (estimated) of seagrass meadows

A breeding area for humpback and other whale species

Over 2,900 coral reefs built from over 360 species of hard coral

More than 1,500 species of fish

1,500 species of sponges equalling 30% of Australia's diversity in sponges

2,200 species of native plants which is 25% of Queensland's total native plant species

800 species of echinoderms (e.g. sea stars) = 13% of the world's total species

Over 5,000 species of molluscs

Over one-third of all the world's soft coral and sea pen species (80 species)

Over 175 species of birds

Approximately 500 species of seaweeds

Over 2,000 km<sup>2</sup> of mangroves including 54% of the world's mangrove diversity

Spectacular seascapes and landscapes, e.g. Hinchinbrook Island, the Whitsundays

Extensive diversity of reef morphologies and geomorphic processes

Complex cross-shelf and longshore connectivity

*Source Australian National University, Implications of Climate Change for Australia's World Heritage Properties: A Preliminary Assessment, p. 55*

5.93 GBRMPA has completed a detailed climate change vulnerability assessment of the reef<sup>69</sup> and is now implementing the Great Barrier Reef Climate Change Action Plan, in partnership with the Department of Climate Change. The plan is organised around four objectives: targeted science, a resilient Great Barrier Reef ecosystem, adaptation of industries and regional communities, and reduced climate footprints.<sup>70</sup>

69 J Johnson and P Marshall (eds), *Climate Change and the Great Barrier Reef: A Vulnerability Assessment*, GBRMPA, 2007.

70 *Great Barrier Reef Climate Change Action Plan 2007-2011*, GBRMPA, 2007.

5.94 In its submission to the inquiry, GBRMPA raised a series of concerns with the Committee relating to improved management of the reef.<sup>71</sup>

5.95 A recent major study, *The Great Barrier Reef Outlook Report 2009*, identifies climate change, catchment runoff, loss of coastal habitats and fisheries management as key challenges facing the reef.<sup>72</sup> The report highlights that the Great Barrier Reef is 'one of the most diverse and remarkable ecosystems in the world and remains one of the most healthy coral reef ecosystems'. However, it notes that the reef is 'gradually declining, especially inshore as a result of poor water quality and the compounding effects of climate change':

Almost all the biodiversity of the Great Barrier Reef will be affected by climate change, with coral reef habitats the most vulnerable. Coral bleaching resulting from increasing sea temperature and lower rates of calcification in skeleton-building organisms, such as corals, because of ocean acidification are the effects of most concern and are already evident.

The Great Barrier Reef continues to be exposed to increased levels of sediments, nutrients and pesticides, which are having significant effects inshore close to developed coasts, such as causing die-backs of mangroves and increasing algae on coral reefs.<sup>73</sup>

5.96 The Australian Government and the Queensland Government released a joint response to the outlook report, outlining a 'cooperative and re-energised approach' to further protecting the reef.<sup>74</sup> The Committee notes that part of this response included a new Reef Water Quality Protection Plan, a joint plan of action to halt and reverse the decline in the quality of water flowing into the reef. Under the plan, the Australian Government and the Queensland Government have committed, by 2013, to halve runoff of harmful nutrients and pesticides and ensure at least 80 per cent of agricultural enterprises and 50 per cent of grazing enterprises adopt land management practices that will reduce runoff.<sup>75</sup>

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71 GBRMPA, *Submission 81*, pp. 1-16.

72 The outlook report is a new legislative requirement established by recent amendments to the *Great Barrier Reef Marine Park Act 1975*. Under the act, reports must be prepared by GBRMPA every five years, be independently peer reviewed and tabled in Parliament.

73 *Great Barrier Reef Outlook Report 2009*, GBRMPA, 2009, pp. i-ii.

74 *Maintaining a Healthy and Resilient Great Barrier Reef: The Commonwealth and Queensland Governments' Interim Response to the Great Barrier Reef Outlook Report 2009*, Australian Government and Queensland Government, 2009, p. 3.

75 See *Reef Water Quality Protection Plan 2009: For the Great Barrier Reef World Heritage Area and Adjacent Catchments*, Australian Government and Queensland Government, 2009.



- 5.97 *A Reef Plan Monitoring and Evaluation Strategy* has also been developed and a *Monitoring and Reporting Program* designed, ready for implementation in late 2009. This will enable the governments to measure the success of the plan's implementation and publicly report on progress towards the plan's goals and objectives.
- 5.98 The Committee is also aware that a focus of the Caring for our Country program is on further reducing sediment and nutrient discharge from agricultural lands into the Great Barrier Reef lagoon. The Australian Government's Reef Rescue commitment is part of the Caring for our Country initiative. Some \$200 million has been committed for over five years to reduce the decline in water quality by providing assistance to land managers in the reef catchments to accelerate the uptake of improved land management practices.<sup>76</sup> The Australian Government's Water for the Future initiative further provides assistance in this area. The *Great Barrier Reef Marine Park Act 1975* was also recently amended to strengthen legal, governance and policy frameworks relating to management and long-term protection of the reef.<sup>77</sup>
- 5.99 The Committee is pleased to note these recent efforts to step up action to further protect the reef. The Committee agrees that improving the quality of water flowing into the reef is one of the most important things we can do to help this region withstand the impacts of climate change.
- 5.100 The Committee further notes that a new Great Barrier Reef Intergovernmental Agreement between the Australian Government and Queensland Government was signed in June 2009.<sup>78</sup> Implementation of the agreement will be driven by the Great Barrier Reef Ministerial Council.

#### Great Barrier Reef as a best practice case study for integrated coastal zone management

- 5.101 As the recent *Great Barrier Reef Outlook Report* notes, the Great Barrier Reef Marine Park is 'considered by many to be a leading example of world's best practice management'. However, 'the effectiveness of management is challenged because complex factors that have their origin beyond the Great Barrier Reef Region, namely climate change, catchment runoff and

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76 *Caring for our Country Business Plan: 2009-10*, p. 63.

77 See background on *Great Barrier Reef Marine Park Amendment Act 2007* and *Great Barrier Reef Marine Park and Other Legislation Amendment Act 2008* at <<http://www.environment.gov.au/coasts/gbr/review/index.html>>

78 Great Barrier Reef Intergovernmental Agreement, an agreement between the Commonwealth of Australia and the State of Queensland, June 2009, DEWHA website accessed 3 September 2009 <<http://www.environment.gov.au/coasts/gbr/publications/pubs/gbr-agreement-2009.pdf>>

coastal development cause some of the highest risks to the ecosystem'.<sup>79</sup> This is the dilemma facing coastal zone management more broadly.

5.102 Of particular interest to the Committee is the Great Barrier Reef as a case study for integrated coastal zone management in Australia. The key challenges facing the reef – climate change impacts on biodiversity, continued declining water quality from catchment runoff, a loss of coastal habitat as a result of coastal development and population pressures – are also key challenges facing the coastal zone more generally. Further, the reef is an excellent example of integrated coastal zone management, with both the Australian and Queensland governments having direct legislative responsibilities for the reef, with joint management arrangements formalised under an intergovernmental agreement. Government bodies also work closely with industry, researchers and the broader community.

5.103 Further, the Great Barrier Reef provides a benchmark for consideration of potential climate change impacts on the coastal zone in Australia, as it has been the subject of a large number of detailed reports on such impacts, encompassing environmental and broader socioeconomic aspects. Strategies to minimise impacts, through improving and maintaining resilience, have also been developed.

5.104 Interestingly, the *Great Barrier Reef Outlook Report* identifies land use planning as one of the major barriers to successful management of the reef:

There are well developed planning systems in place for all issues except for coastal development where the fractured nature of the planning regime causes problems. Lack of consistency across jurisdictions is the weakest aspect of planning.<sup>80</sup>

5.105 As GBRMPA emphasised in its submission to the inquiry:

There are 21 local government councils in the Great Barrier Reef catchment, which can lead to inconsistency in addressing land use and coastal development issues affecting the Great Barrier Reef.<sup>81</sup>

5.106 The GBRMPA submission made several recommendations with a focus on improving coastal land use planning:

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79 'Great Barrier Reef Outlook Report 2009: Information Sheet – overview', GBRMPA website accessed 3 September 2009

<[http://www.gbrmpa.gov.au/\\_\\_data/assets/pdf\\_file/0020/40763/Overview.pdf](http://www.gbrmpa.gov.au/__data/assets/pdf_file/0020/40763/Overview.pdf)>

80 *Great Barrier Reef Outlook Report 2009: In Brief*, GBRMPA, 2009, p. 14.

81 GBRMPA, *Submission 81*, p. 5.

Special attention should be given to effective implementation and performance evaluation of statutory (coastal) planning processes that recognise and implement measures that preserve natural ecosystem functions, [and] manage the coastal development and catchment impacts likely to affect the Great Barrier Reef ...

Queensland and Commonwealth management outcomes should include limits on catchment development (based on resource condition targets and supported by end of catchment and inshore water quality monitoring), and limits or constraints on development in areas of critical connectivity, buffer or high ecological value to manage exponential development and population growth in coastal communities and catchments.

Current Queensland and Commonwealth policies should consider the implications of all coastal development proposals of their potential impacts with respect to the loss of coastal habitats, and economic and social impacts on coastal communities, and the long-term impacts on marine based industries.<sup>82</sup>

- 5.107 The Committee reinforces the need for continued management efforts to further improve the resilience of the Great Barrier Reef to the impacts of climate change, including addressing the problems of water quality from catchment runoff and loss of coastal habitat as a result of coastal development. The Committee also emphasises the need for improvements in state and local land use planning in terms of coastal development in the region, particularly given the lack of consistency across different local council jurisdictions, as identified by GBRMPA. This could be achieved through improved regional/strategic planning under the auspices of the Great Barrier Reef Intergovernmental Agreement between the Australian Government and Queensland Government.

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82 GBRMPA, *Submission 81*, p. 6, p. 7, p. 11.

## Recommendation 29

5.108 The Committee recommends that the Australian Government:

- **continue working with the Queensland Government and local councils under the existing Great Barrier Reef Intergovernmental Agreement to improve land use planning in the catchment**
- **commission analysis of the Great Barrier Reef as a case study for integrated coastal zone management (ICZM) in Australia. The study should draw out possible directions for ICZM in Australia with regard to:**
  - ⇒ **addressing challenges associated with climate change impacts on biodiversity**
  - ⇒ **declining water quality from catchment runoff and loss of coastal habitat from coastal development and population pressures**
  - ⇒ **building cooperative partnerships between Commonwealth, state and local government, and other stakeholders**
  - ⇒ **establishing governance and institutional frameworks**

### Kakadu National Park

5.109 Kakadu National Park is co-managed by the Commonwealth Director of National Parks and Indigenous traditional owners. The low-lying coastal plains in Kakadu are particularly vulnerable to saltwater intrusion, posing a significant threat to its freshwater wetland systems. As the Northern Territory Government submission noted:

the wetland system of Kakadu depends on a finely balanced interaction between freshwater and marine environments, in certain areas, the natural levees that act as a barrier between Kakadu's freshwater and saltwater systems are only 20cm high. Sea level rises of another 59cm by 2100 would adversely affect 90 percent of the Kakadu wetland system.<sup>83</sup>

5.110 The Committee is not aware of a detailed climate change vulnerability assessment having been undertaken for Kakadu National Park. As a recent report on the implications of climate change for Australia's World Heritage properties concluded, the 'vulnerability of freshwater wetlands

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83 Northern Territory Government, *Submission 106*, p. 14.

to further saline intrusion is unknown and additional research into this is urgently required'.<sup>84</sup> The Committee agrees that urgent research into this issue is required.

5.111 The Committee understands that Kakadu National Park has been identified as a case study under the 'first pass' National Coastal Vulnerability Assessment. This study should provide useful initial background for a more detailed assessment. The Committee also notes that the *Kakadu National Park Management Plan 2007-2014* identifies the following areas for action:

- obtain expert engineering and environmental advice on measures needed to protect significant freshwater habitats from salt water intrusion. Work with Bininj and stakeholders to make decisions about the need for intervention and the choice of available options ...
- Work with relevant experts and stakeholders to investigate climate change impacts and consider, and where possible implement, appropriate actions and responses.<sup>85</sup>

### Recommendation 30

5.112 **The Committee recommends that the Australian Government urgently commission a detailed climate change vulnerability assessment for Kakadu National Park, in consultation with the park's traditional owners and other stakeholders and drawing on the results of the 'first pass' National Coastal Vulnerability Assessment of the park. This assessment should specifically focus on the vulnerability of Kakadu's freshwater wetland systems to saltwater intrusion. A key outcome of the assessment should be the development of a Climate Change Action Plan for Kakadu National Park, with coordinated input from the Australian Government and Northern Territory Government, Indigenous land owners, researchers and other stakeholders.**

## Coastal Ramsar sites and other wetlands

5.113 Ramsar wetlands – that is, wetlands listed under the international Convention on Wetlands of International Importance (Ramsar

84 ANU, *Implications of Climate Change for Australia's World Heritage Properties: A Preliminary Assessment*, Commonwealth of Australia, 2009, p. 53.

85 *Kakadu National Park Management Plan 2007-2014*, Director of National Parks, 2007, p. 61, p. 62.

Convention, 1971) – are recognised as a matter of national environmental significance under the EPBC Act. Consequently, an action that has, will have or is likely to have, a significant impact on the ecological character of a Ramsar wetland must be referred to the Minister and undergo an environmental assessment and approval process.

5.114 Australia currently has 65 Ramsar wetlands and more than 900 wetlands listed as ‘nationally important’ in the Directory of Important Wetlands in Australia.<sup>86</sup> Marine and coastal zone wetlands are defined as:

- Marine waters – permanent shallow waters less than six metres deep at low tide; includes sea bays, straits.
- Subtidal aquatic beds; includes kelp beds, seagrasses, tropical marine meadows.
- Coral reefs.
- Rocky marine shores; includes rocky offshore islands, sea cliffs.
- Sand, shingle or pebble beaches; includes sand bars, spits, sandy islets.
- Estuarine waters; permanent waters of estuaries and estuarine systems of deltas.
- Intertidal mud, sand or salt flats.
- Intertidal marshes; includes salt-marshes, salt meadows, saltings, raised salt marshes, tidal brackish and freshwater marshes.
- Intertidal forested wetlands; includes mangrove swamps, nipa swamps, tidal freshwater swamp forests.
- Brackish to saline lagoons and marshes with one or more relatively narrow connections with the sea.
- Freshwater lagoons and marshes in the coastal zone.
- Non-tidal freshwater forested wetlands.<sup>87</sup>

5.115 Coastal wetlands play a vital role in coastal and marine biodiversity:

It is widely recognised that healthy aquatic systems are fundamental to the ability of both terrestrial and marine systems to continue to provide ecosystem goods and services to the community. Wetlands provide a buffer against coastal erosion and storm surges, mitigate flooding by slowing and absorbing floodwaters, and act as filters for many pollutants, nutrients and sediments. These roles will only increase in importance as human

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86 DEWHA website accessed 26 August 2009  
<<http://www.environment.gov.au/water/topics/wetlands/database/diwa.html>>

87 DEWHA website accessed 26 August 2009  
<<http://www.environment.gov.au/water/topics/wetlands/database/diwa.html>>

use of the coastal zone intensifies, and as climate change increases the risk of floods and storm surges.<sup>88</sup>

5.116 Inquiry participants raised a number of concerns about coastal Ramsar wetlands and other significant coastal wetlands, including:

- the various categorisations of coastal wetland across Australia (eg Ramsar listed wetlands, nationally important wetlands, state significant wetlands) and the varying levels of protection this afforded

In terms of the things we thought we could put forward to this committee regarding positive actions, we think there should be mandatory protection of wetlands – full stop.<sup>89</sup>

- why more coastal wetlands (eg nationally important wetlands) are not included as Ramsar sites and the complexity of the listing process

Coastal wetlands of National Importance as well as of International Importance should be protected under Commonwealth legislation ... While other wetlands are likely to meet Ramsar criteria they are not listed and not adequately protected. This is in part due to the need to obtain the support of private owners but also because the processes in place at both State and Commonwealth level for Ramsar listing seem unnecessarily complicated.<sup>90</sup>

- the proximity of housing and other developments to coastal Ramsar sites and other significant coastal wetlands – for example, the Committee noted development in the Port Geographe area (south-west WA) in close proximity to the Vasse-Wonnerup Ramsar site:

We face a massive development proposal at the moment. That is going to be built on a partial piece of wetland that is not Ramsar listed. We currently have a submission in to the federal minister to declare that little extra piece of wetland part of the Ramsar listing.<sup>91</sup>

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88 Reef and Rainforest Research Centre, *Submission 30*, p. 10.

89 Mr Anderson, Cairns Local Marine Advisory Committee, *Transcript of Evidence*, 29 April 2009, p. 27.

90 Lake Wollumboola Protection Association, *Submission 84*, p. 8, p. 17.

91 Mr Fuller, Global Warming Group Queenscliffe, *Transcript of Evidence*, 21 May 2009, p. 4.

Sensitive coastal wetlands require increased buffer zones to protect threatened and endangered ecological communities from urban encroachment.<sup>92</sup>

- adequate protection of coastal Ramsar sites and other wetlands

Provide statutory protection for Queensland's wetlands ... Queensland is the only Australian state in which wetlands do not have statutory protection. Although they are nominally protected by a range of treaties and legislation ... a number of weaknesses in the state's Wetlands Decision Support System continue to allow development to occur in and around wetland areas.<sup>93</sup>

- lack of clarity and public awareness about what actions impacting on a Ramsar wetland should be referred to the Minister for environmental assessment under the EPBC Act
- providing adequate volumes of water to coastal Ramsar sites
- lack of management plans for some Ramsar sites

5.117 In terms of housing developments encroaching on coastal Ramsar sites, the Committee was particularly concerned about a canal development in the Port Geographe area, in south-west Western Australia, located in close proximity to the Vasse-Wonnerup Ramsar site. As Professor Short commented:

Some of the big issues at Mandurah are those canal estates, and at Port Geographe, which are not only very low-lying but also cutting into acid sulphate soils and with all sorts of other issues. As you may be aware, they were banned in New South Wales back in 1970 but all other states are still going ahead and building canal estates. Those estates are very low-lying and not only are they alienating wetlands but some are exposing acid sulphate soils, so they are a major issue. Because they are low-lying, they will be very prone to sea level rise.<sup>94</sup>

5.118 The Committee was concerned about the continuing construction of canal estates more generally in some states, given the increased vulnerability of such developments to projected sea level rise and their environmental impact. As the Victorian Coastal Council noted in their submission to the inquiry:

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92 Coastwatchers Association, *Submission 33*, p. 5.

93 Reef and Rainforest Research Centre, *Submission 30*, p. 11.

94 Professor Short, *Transcript of Evidence*, 26 February 2009, p. 9.



Canal estates are ... discouraged in the [Victorian Coastal] Strategy as they often have major adverse impacts on the host estuary and cause the loss of estuarine habitat, wetlands or saltmarsh, and subsequent continuing pollution and disturbance of estuarine waters by urban runoff, boating activities, etc. Canal estates, like waterfront developments in general, also have adverse effects on wader populations (loss of habitat, disturbance of nesting birds).<sup>95</sup>



Canal development at Port Geographe, WA, as inspected by Committee members

5.119 In Broome, the Committee heard from representatives of Environs Kimberley and the Roebuck Bay Working Group, who drew attention to several issues facing fragile wetlands, mudflats and monsoon environments in Broome and the wider Kimberley region. The West Kimberley Nature Project, commencing in October 2009, will assess managing threats such as fire, feral animals and weeds in monsoonal vine thickets, and freshwater soaks and wetlands.<sup>96</sup> The Roebuck Bay Working Group, with 52 members, recognises that competing values exist in the

<sup>95</sup> Victorian Coastal Council, *Submission 83*, p. 10.

<sup>96</sup> Ms Williams, Environs Kimberley, *Transcript of Evidence*, 27 August 2009, p. 1.

Ramsar-listed site (for example, those of tourism, recreational boating and fishing, cultural site protection, shipping, increasing population) which are additional to the pressures resulting from climate change:

Roebuck Bay is already showing signs of stress: the lyngbya-blue green algae in the bay, the oil spill, the coastal erosion, the rubbish accumulation, increasing boat activity, shorebird disturbance, the threat of marine pests. It is one of the fastest growing towns in Australia. I honestly do not think the solution is that hard. We need to resolve the tenure issues and who is going to manage it.<sup>97</sup>

5.120 Some inquiry participants also pointed to major concerns about climate change impacts on coastal wetlands in terms of inundation and the need for buffers to allow for migration of habitat, particularly for birds.

5.121 The recent *Ramsar Snapshot Study* provided a preliminary review of the current status and management of all Australian Ramsar sites. The report concluded that

it is ... likely that there are many wetlands that would fulfil Ramsar listing criteria and could be included in Australia's Ramsar estate

...

to date there is no national scale assessment of the extent and distribution of wetlands ...

Currently there is no systematic way to characterise threats and impacts or to compare the magnitude of impacts of threats among sites. There is a clear need to develop a systematic method of describing, comparing and reporting impact magnitude among wetlands in future rolling reviews of Australia's Ramsar wetland estate.<sup>98</sup>

5.122 Similarly, the interim review report of the EPBC Act also highlighted concerns about Australia's wetlands:

submissions suggested that wetlands of national importance ... be listed as new matters of NES [national environmental significance]

...

The breadth of the definition and the scope of the Minister's power to declare wetlands as 'declared Ramsar wetlands' under the Act indicates that many more areas could be listed as Ramsar wetlands, including areas in northern Australia. However, it is

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97 Ms Curran, Roebuck Bay Working Group, *Transcript of Evidence*, 27 August 2009, p. 37.

98 *Ramsar Snapshot Study: Final Report*, BMT WBM Pty Ltd, prepared for the Commonwealth Department of the Environment and Water Resources, 2007, p. 5-1, 5-2.

important to note that this matter of NES only applies to wetlands of *international* importance. This potentially leaves a regulatory gap in the protection of Australian wetlands, as some will be nationally significant, but will fail to meet the criteria for international importance and will not be protected at a Commonwealth level.<sup>99</sup>

5.123 The report concluded that ‘it would seem that there are strong arguments in support of extending the protections afforded under the EPBC Act to wetlands and rivers that are declared to be of national importance’.<sup>100</sup>

5.124 The Committee notes that the Australian Government is currently going through a ‘rolling review’ of all the Ramsar sites to look at their management requirements:

We have a review underway at present and they are reporting by May next year on 20 of those sites, as a pilot for how we can move forward on the rest of the listed Ramsar sites.<sup>101</sup>

5.125 The Committee further notes that improved environmental management of Ramsar sites is a priority under the Australian Government’s Caring for our Country program, as discussed earlier.

5.126 The Committee is also aware that National Guidelines for Ramsar Wetlands are currently being developed by the Australian Government in consultation with the states and territories to improve management of Australia’s Ramsar sites, consistent with Australia’s commitments under the Ramsar Convention and responsibilities under the EPBC Act. The guidelines are being developed as a series of modules on relevant topics.<sup>102</sup>

5.127 The Coorong and Lakes Alexandrina and Albert Ramsar site is of particular concern to the Australian community. As the Conservation Council of SA emphasised, there needs to be ‘[i]mmediate implementation of real and defined strategies to ensure the recovery of the Coorong and Lower Lakes’.<sup>103</sup> The Committee acknowledges the significant work being undertaken by the Australian Government in this area through the

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99 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, p. 148, p. 155.

100 *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999: Interim Report*, p. 155.

101 Mr Forbes, DEWHA, *Transcript of Evidence*, 18 June 2009, p. 18.

102 DEWHA website accessed 26 August 2009  
<<http://www.environment.gov.au/water/topics/wetlands/ramsar-convention/australian-guidelines.html>>

103 Conservation Council of SA, *Submission 71*, p. 4.

\$12.9 billion Water for the Future program, National Water Initiative and the *Water Act 2007* (Cth).<sup>104</sup>

### **Recommendation 31**

5.128 **The Committee recommends that the Australian Government:**

- **require that all Ramsar listed wetlands have effective and operational management plans and that resources are allocated by governments to monitor the implementation of these plans**
- **increase the number of coastal wetlands classified as Ramsar sites, particularly those classified as Nationally Important wetlands**
- **work with state and territory governments through the Natural Resource Management Ministerial Council, and in consultation with other stakeholders, to improve the management and monitoring of coastal wetlands, particularly Ramsar sites located in close proximity to development**
- **improve public awareness about what actions impacting on a Ramsar wetland should be referred to the Minister under the *Environment Protection and Biodiversity Conservation Act 1999***
- **ensure that the National Guidelines for Ramsar Wetlands also include modules on the process for nominating Ramsar wetlands**
- **develop a climate change action plan for coastal Ramsar wetlands and Nationally Important wetlands**

### **Migratory and resident shorebirds**

5.129 Migratory species protected under international agreements are a matter of national environmental significance listed under the EPBC Act. Migratory species protected under the act include those listed in the China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA) and Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA). Of interest to the inquiry are Australia's migratory and resident shorebirds:

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104 DEWHA website accessed 26 August 2009 <<http://www.environment.gov.au/water/policy-programs/index.html>>

We have some species of shorebirds and coastal birds that travel to Australia from as far away as Siberia and Alaska and rely on the wellbeing of our coastal environments in the summer months before they return to breed in the Northern Hemisphere. We also have species of birds that are present year-round – 365 days of the year – that rely on the beaches and coastal areas of Australia to breed, feed and rest upon. With these species sharing common habitats, we have the mechanism by which we can provide them with protection – both resident and migratory species – by protecting their habitats.<sup>105</sup>

- 5.130 By way of background, some 17 shorebird species spend their entire lives within Australia and are known as ‘residents’, although they may make substantial movements within Australia and a further 36 species make regular international movements to Australia.<sup>106</sup> In terms of estimates of numbers of migratory shorebirds:

Typically, we have an annual estimate of somewhere between 3½ million and five million shorebirds that migrate into and out of Australia each year. These birds migrate between Australia and northern Siberia. Some of them weigh as little as 15 grams ... They will travel between southeast Australia and Siberia in six weeks, and they will do the round trip for 15 years. We are seeing incredible decreases in these species.<sup>107</sup>

- 5.131 Figure 5.3 provides a list of migratory and resident shorebirds of Australia.

- 5.132 Importantly, as Birds Australia emphasised, ‘clearly state, local and federal governments have a greater capacity to protect resident species because of the year-round presence of such species’.<sup>108</sup>

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105 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2009, p. 2.

106 J Oldland et al, *Shorebird Conservation in Australia*, Birds Australia Conservation Statement, No. 14, 2009, p. 2.

107 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2009, p. 6.

108 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2009, p. 2.

**Figure 5.3 Migratory and resident shorebirds of Australia**

<b>Residents</b>	<b>Regular Migrants</b>
Bush Stone-curlew	Pacific Golden Plover
Beach Stone-curlew	Grey Plover
Australian Pied Oystercatcher	Double-banded Plover
Sooty Oystercatcher	Lesser Sand Plover
Black-winged Stilt	Greater Sand Plover
Red-necked Avocet	Oriental Plover
Banded Stilt	Latham's Snipe
Red-capped Plover	Pin-tailed Snipe
Inland Dotterel	Swinhoe's Snipe
Black-fronted Dotterel	Black-tailed Godwit
Hooded Plover	Bar-tailed Godwit
Red-kneed Dotterel	Little Curlew
Banded Lapwing	Whimbrel
Masked Lapwing	Eastern Curlew
Plains-wanderer	Terek Sandpiper
Comb-crested Jacana	Common Sandpiper
Australian Painted Snipe	Grey-tailed Tattler
	Wandering Tattler
	Common Greenshank
	Marsh Sandpiper
	Common Redshank
	Wood Sandpiper
	Ruddy Turnstone
	Asian Dowitcher
	Great Knot
	Red Knot
	Sanderling
	Red-necked Stint
	Long-toed Stint
	Pectoral Sandpiper
	Sharp-tailed Sandpiper
	Curlew Sandpiper
	Broad-billed Sandpiper
	Ruff
	Red-necked Phalarope
	Oriental Pratincole
	Australian Pratincole

Source: J Oldland et al, *Shorebird Conservation in Australia, Birds Australia Conservation Statement, No. 14, 2009, p. 2*



Committee members with Ms Allison Russell-French, President of Birds Australia, Dr Graeme Hamilton, CEO of Birds Australia, and Dr Eric Woehler, Chair of Birds Tasmania, at Pitt Water-Orielton Lagoon coastal Ramsar site, near Hobart

5.133 Birds Australia made a detailed submission to the inquiry, raising serious concerns about the state of Australia’s migratory and resident shorebirds:

The existing framework of legislation, policies, management strategies and recovery plans at Local, State and Federal levels of Government in Australia is demonstrably failing to protect Australia’s coastal birds and their habitat ...

An increasing number of resident and migratory shorebird and seabird species are decreasing in their distribution and abundance, resulting in an ever-elevating conservation status. The Australian coastal margin, and the species that depend on intact, functioning coastal ecosystems are now in a worse condition than they were just a decade ago – there are fewer birds of fewer species, less suitable nesting, feeding and roosting habitats available, and a greater spectrum of threats of greater intensity and frequency

operating. There has been a rapid and accelerating fragmentation of coastal ecosystems around much of Australia.<sup>109</sup>

5.134 Key issues raised by Birds Australia included:

- loss of habitat and proximity of development and human population

The ever-increasing proportion of Australia's human population living in close proximity to the coastal margins is the major contemporary contributor to these long-term, widespread population decreases in Australia's coastal birds. The greater number of people, resulting in more vehicles, more predatory and disruptive domestic animals (eg dogs and cats), increased clearing of native vegetation for housing, associated infrastructure and aesthetics all result in a severely impacted coastal margin, with many areas beyond rehabilitation and restoration.<sup>110</sup>

- modification and degradation of habitat

You will not find a beach-nesting bird along the Gold Coast or Sunshine Coast at all.<sup>111</sup>

- disturbance of shorebirds affecting breeding, feeding and roosting

What we are seeing for many of our coastal breeding species are decreases in the order of 20 to 50 per cent or more in the last 20 years. Long-lived species that are decreasing generally show very low breeding success. The birds are present year after year, but they are not getting any chicks away because of four-wheel drives, dogs, people, human disturbance and loss of habitat ... The birds are there year after year. People see the birds year after year. There is not a problem. The birds were there last year, the birds are here this year and the birds will be here next year. However, in actual fact the birds are not capable of producing chicks to replace themselves when they die. We face the situation as was described in the US of what is called 'blink-out': the birds are there one day but they are gone the next. When the adult birds die, there are no young birds there to take their place.<sup>112</sup>

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109 Birds Australia, *Submission 61*, p. 2, p. 3.

110 Birds Australia, *Submission 61*, p. 3.

111 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2009, p. 13.

112 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2009, p. 4.



- climate change

Sea level rise in particular will destroy much of the existing remaining coastal habitats for beach-nesting birds. Many of these birds breed only a few centimetres above the high-water mark. Many of these birds nest in shallow cups in sandy beaches and, if you like, are obligate or dependent upon sandy beaches. They cannot just go somewhere else to breed. If the beach is not there to breed, they cannot breed ... the development and construction of coastal infrastructure such as roads and houses will stop that inward migration of the coastline. So, as the sea level rises, essentially what you are going to end up with is a seawall rather than the capacity for the coastline to find its new line inland of where it is now.<sup>113</sup>

5.135 As Dr Woehler, Chair of Birds Tasmania, commented, Australia's birds really are the 'canaries in the coal mine' with regard to climate change impacts on biodiversity:

canaries were taken into mines to provide early warning systems to the miners in terms of the dangers inherent in the build-up of dangerous gases. Today about 15 per cent of all bird species on the planet earth have a conservation status: vulnerable, endangered or critically endangered. Very clearly, birds are giving us a very good signal about the deteriorating state of health of our environment.<sup>114</sup>

5.136 The Committee also received evidence from representatives of Environs Kimberley, the Roebuck Bay Working Group and the Broome Bird Observatory as to the extent of migratory shorebirds in the Broome area and the potentially devastating impacts of climate change, sea level rise and development pressures on fly-ways and nesting habits of both resident and migratory birds.<sup>115</sup> Ms Spencer, from the Broome Bird Observatory, noted that 'there are approximately 700 bird species in Australia and more than 300 can be seen in Broome', and, 'of the about 24 species of shore birds in Australia, 20 species occur in internationally significant numbers in Roebuck Bay'.<sup>116</sup>

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113 Dr Woehler, *Birds Australia, Transcript of Evidence*, 18 August 2009, p. 4, p. 7.

114 Dr Woehler, *Birds Australia, Transcript of Evidence*, 18 August 2009, p. 3.

115 See especially Mr Pritchard, Ms Williams and Ms Lowe, *Environs Kimberley, Transcript of Evidence*, 27 August 2009, pp. 2-5.

116 Ms Spencer, *Broome Bird Observatory, Transcript of Evidence*, 27 August 2009, p. 37.

- 5.137 A recent study by the University of NSW has indicated that migratory shorebirds and Australia's one million resident shorebirds 'have suffered a massive collapse in numbers over the past 25 years':

A large-scale aerial survey study covering a third of the continent has identified that migratory shorebird populations plummeted by 73 per cent between 1983 and 2006, while Australia's 15 species of resident shorebirds (for example avocets and stilts) have declined by 81 per cent. This is the first long-term analysis of shorebird populations and health at an almost continental scale and reveals a disturbing trend of serious long-term decline.<sup>117</sup>

- 5.138 The Committee is aware that a Wildlife Conservation Plan for Migratory Shorebirds was prepared under the EPBC Act in 2006, setting out research and management actions in this area. The objectives of the plan are to:

Increase international cooperation for migratory shorebirds and ensure that countries of the East Asian-Australasian Flyway work together to conserve migratory shorebirds and their habitat.

Identify, protect and sustainably manage a network of important habitat for migratory shorebirds across Australia to ensure that healthy populations remain viable into the future.

Increase biological and ecological knowledge of migratory shorebirds, their populations, habitats and threats in Australia to better inform management and support the long term survival of these species.

Raise awareness of migratory shorebirds and the importance of conserving them, and increase engagement of decision makers and the community in Australia in activities to conserve and protect migratory shorebirds and their habitat.<sup>118</sup>

- 5.139 The Committee further notes the importance of the Australian Government's support for the East Asian-Australasian Flyway initiative, which was launched in November 2006. The Flyway Partnership represents the major international framework for the conservation of migratory waterbirds and their habitat in the flyway.<sup>119</sup>

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117 *Wetlands Australia: National Wetlands Update 2009*, Issue No. 17, DEWHA, 2009, p. 4. See also *The State of Australia's Birds 2008*, P Olsen, Birds Australia, 2008.

118 *Wildlife Conservation Plan for Migratory Shorebirds*, Department of the Environment and Heritage, February 2006.

119 See the Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian – Australasian Flyway, DEWHA website accessed 26 August

5.140 The Committee is also aware of the Australian Government's support for the Shorebird 2020 project, seeking to 'coordinate national shorebird monitoring in Australia in order to detect population trends nationally and at individual areas'.<sup>120</sup>

5.141 The Committee commends the work of community groups, such as Birds Australia, and volunteers in this area, particularly for the important role they play in promoting community education, participation and conservation awareness. The Committee also commends these groups' crucial monitoring and data collection role. As Birds Australia commented:

Fundamental to all management and conservation strategies and policies are scientifically robust long-term data sets that serve to guide the formulation and assessment of management and conservation priorities ...

Monitoring can be achieved by members of community groups with sufficient resources and capacity. However governments need to establish and support monitoring efforts including with community groups and individuals for collection of data sets on resident and migratory shorebird numbers in Australia. Promotion of community involvement could attain the collection of meaningful scientific data.<sup>121</sup>

5.142 The Committee agrees that shorebird monitoring is essential for identifying important wetlands and changes in shorebird populations and distributions. As discussed above, protecting wetland habitat for these birds is crucial. The Committee further notes Birds Australia's recommendation for formally listing the coastal shorebird and seabird community as a threatened ecological community under the EPBC Act, reflecting the wide spectrum of threats facing this avian community.<sup>122</sup>

5.143 The Committee also agrees with Birds Australia that there would be value in further understanding the scale of ecotourism in Australia, in this case with regard to bird watching:

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2009 <<http://www.environment.gov.au/biodiversity/migratory/waterbirds/flyway-partnership/index.html>>

120 Shorebirds 2020 website accessed 26 August 2009 <<http://www.shorebirds.org.au>> The project is supported by Birds Australia and the Australasian Wader Studies Group, through funding from the Australian Government's Caring for our Country and World Wildlife Fund Australia.

121 Birds Australia, *Submission 61*, p. 13.

122 Birds Australia, *Submission 61*, p. 12.

In the US, ecotourism and in particular just bird watching in itself are a multibillion-dollar-a-year industry in terms of the travel, the accommodation and the equipment ... Unfortunately, in Australia we do not undertake the collection of statistical data to give us a sense of the scale of ecotourism in Australia ... there would be a very good case for identifying the role of, the scale of and the dollar value associated with ecotourism as an argument for further funding for appropriate management.<sup>123</sup>

- 5.144 Birds Australia further recommended that 'coastal buffers and coastal setbacks to protect remaining coastal habitats and species' be established 'to allow greater flexibility by coastal species to deal with a changing environment driven by climate warming and sea level rise'.<sup>124</sup>

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### **Recommendation 32**

5.145 **The Committee recommends that the Australian Government:**

- **work through the Natural Resource Management Ministerial Council and in consultation with Birds Australia and other stakeholders to implement a National Shorebirds Protection Strategy. The strategy should focus on tightening restrictions on beach driving and access to bird breeding habitat, preserving habitat, identifying suitable buffer zones for migration of coastal bird habitat, managing pest animals and increased public education**
- **provide further funding to Birds Australia and other research groups to ensure continued monitoring and data collection with regard to migratory and resident shorebirds**
- **provide funding to strengthen partnerships between domestic and international shorebird conservation groups to increase awareness and conservation efforts in other countries**
- **commission a detailed climate change impact study on Australia's migratory and resident shorebirds**
- **in its consideration of amendments to the *Environment Protection and Biodiversity Conservation Act 1999* following the independent review, give consideration to the formal**

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123 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2008, p. 11.

124 Birds Australia, *Submission 61*, p. 13.

**listing of coastal shorebird and sea bird communities as threatened species/ecological communities under the act**

## **Environmental impacts on coastal and marine biodiversity**

5.146 A number of environmental groups gave evidence to the inquiry, often on behalf of a large number of member organisations. These groups included:

- Australian Conservation Foundation
- WWF-Australia
- Australian Network of Environmental Defender's Offices
- Coolum District Coast Care
- Nature Conservation Council of New South Wales
- Sunshine Coast Environment Council
- Coastwatchers Association
- Global Warming Group Queenscliffe
- Gwandalan/Summerland Point Action Group
- Catherine Hill Bay Progress Association and Dune Care
- Western Australia Conservation Council
- North East Bioregional Network
- Conservation Council of South Australia
- Lake Wollumboola Protection Association
- Environs Kimberley
- Mannering Park Progress Association
- Save the Kimberley

5.147 The Committee commends these groups for their contribution to the inquiry. The major environmental threats facing the coastal zone as identified by these groups and other inquiry participants are:

- loss of coastal habitat as a result of coastal development and population pressures

- land and marine based sources of pollution
  - climate change impacts on coastal and marine biodiversity
  - redistribution of water resources
  - introduced pest plants and animals
  - resource use
  - changed fire regimes<sup>125</sup>
- 5.148 Of particular interest here are the issues of loss of coastal habitat as a result of coastal development and population pressures, land and marine based sources of pollution, and climate change impacts on coastal and marine biodiversity. The other areas are being addressed under a range of existing programs, as discussed earlier.

## Coastal development and population impacts on coastal and marine biodiversity

- 5.149 Coastal development and rapid population growth within the highly sensitive environmental settings that characterise coastal areas are 'often associated with biodiversity loss, water degradation (coastal waters, wetlands, lakes and rivers), habitat fragmentation and loss, conversion of rural lands, and degraded scenic values'.<sup>126</sup>
- 5.150 The message that the Committee heard repeatedly was that coastal development and population pressures were having a dramatic impact on the coastal environment and that poor coastal land use planning practices were a significant factor in this regard:

Much of our submission focus is around coastal development and planning, including concerns with coastal population growth.<sup>127</sup>

population increase is one of the main drivers of environmental degradation in the coastal zone in Australia ... There is lack of long-term strategic planning in the coastal zone. At present the

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125 *The National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* identifies seven areas for national collaboration: integration across the catchment-coast-ocean continuum, land and marine based sources of pollution, climate change, introduced pest plants and animals, planning for population change, capacity building, and monitoring and evaluation. (Some of these matters represent environmental pressures and others relate more broadly to governance issues.)

126 N Gurrán et al, *Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities* (Report No. 2 for the NSCT), University of Sydney Planning Research Centre, 2006, p. 2 – *Exhibit 20*.

127 Ms Pettett, Conservation Council of SA, *Transcript of Evidence*, 8 October 2008, p. 30.

condition of our coastal environments is degrading at an alarming rate due to overdevelopment and population increase. Planning schemes need to be based on genuinely ecologically sustainable principles.<sup>128</sup>

There is substantial evidence of irreversible damage to the coastal environment from the impacts of development and population expansion.<sup>129</sup>

The Taskforce is concerned about the impact of urban growth and development on the environment in coastal areas. The level of development is placing many coastal environments at risk of serious degradation.<sup>130</sup>

...we are already seeing some pressure on the population gaining access to the foreshore, and that is an extremely important element of recreation in the town. That is where most of the local population take their recreation. They go down to the beach in the evening. It is getting congested, particularly during the peak tourism time. The increase in population is going to make that a lot worse. In the future we are going to have trouble providing sufficient access, because it will have to be handled and controlled in a fashion that means it does not start to harm the very thing we are trying to get near to.<sup>131</sup>

- 5.151 As the 2001 State of the Environment report concluded, '[d]evelopment of Australia's coastal strip is one of the major strategic issues confronting the conservation and management of the coastal zone'.<sup>132</sup> Similarly, as the 2006 State of the Environment Report warned:

if current population trends continue, 42.3 per cent of the Nowra to Noosa coastline will be urbanised by the year 2050, with the resulting loss of much of Australia's temperate and tropical coastal systems ... The rate and scale of this change will bring irreversible impacts to coastal zone environments and, ironically, threaten many of the natural values which draw people to live on the coast.<sup>133</sup>

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128 North East Bioregional Network, *Submission 70*, p. 1.

129 Lake Wollumboola Protection Association, *Submission 84*, p. 4.

130 NSCT, *Submission 79*, p. 17.

131 Mr Butcher, Shire of Broome, *Transcript of Evidence*, 26 August 2009, p. 32.

132 *State of the Environment 2001*, p 38.

133 DEWHA quoting 2006 State of the Environment report, *Submission 103*, p. 2.

- 5.152 By way of an example of projected population increase in the coastal zone, the NSW Government pointed to the projected increase in their coastal population over the next 10 years:

NSW Government projections suggest ... an increase of around 960,000 people living in coastal areas or coastal hinterland by 2021. Most of this increase will be in Sydney, Newcastle and Wollongong (735,000 people) in terms of absolute numbers, but the fastest rate of growth will occur on the Mid-North Coast, and in the Richmond-Tweed areas (... 152,000 additional people).<sup>134</sup>

- 5.153 In suggesting possible ways to address this problem, inquiry participants particularly emphasised sustainable development principles, limited urban footprints, and improved state and local government land use planning policies through strategic and regional planning.

The direction that the coastal strategy provides is where there is capacity for growth, where there are towns that only have a medium level capacity for growth, and where there are townships that have very limited capacity for growth. The Coastal Spaces policy is really that strategic framework for our 87 settlements across the coast to direct population to where it can be best accommodated ... we really believe that you cannot continue to funnel people into the coast and then manage the impacts afterwards. Population impacts on the coast are significant and we are really trying to manage them in a way they can best be addressed, where there is existing infrastructure and services, and where the impacts on the natural environment can be minimised.<sup>135</sup>

To minimise the impact of this growth it must be planned well in advance and carefully controlled, with a focus on expanding existing coastal centres, and minimising the spread of new development outside of these areas.<sup>136</sup>

Strategic planning at the local and regional level, consistent with a collective vision for the coast is part of the solution towards controlling the environmental impacts of population growth and helping steer coastal communities towards sustainability.<sup>137</sup>

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134 NSW Government, *Submission 55*, p. 3.

135 Ms Mears, Victorian Coastal Council, *Transcript of Evidence*, 20 May 2009, pp. 11-12.

136 Professor Short, *Submission 4*, p. 1.

137 Professor Tomlinson and Mr Lazarow, *Submission 58*, p. 5.



All coastal parks should now implement no vehicle access policies or severely limit vehicle access to beach and dune areas to minimise coastal degradation.<sup>138</sup>

The direct and indirect impacts of developments on coastal and marine habitats (e.g, seagrasses, mangroves, salt marshes) and their biodiversity are assessed and managed differently across jurisdictions and agencies. Identical habitats and communities can be subjected to rigorous development assessment and approvals processes in one jurisdiction without any effective management in another jurisdiction.<sup>139</sup>

- 5.154 The Committee notes the loss of coastal habitat as a result of development and population pressures and the major threat that future development and population growth pose for the coastal zone. This again raises the issue of coastal zone land use planning policies and the need for strategic/regional planning based on ESD principles and integrated coastal zone management. It also points to the need for sustainable coastal communities and the merits of policies that limit urban footprints. These matters are further discussed below and in Chapter 6.
- 5.155 The Committee also believes that, in a national cooperative approach to coastal zone management, federal, state and local government could consider limits on catchment development, based on resource condition targets and supported by water quality monitoring; and limits or constraints on development in areas of critical connectivity or high ecological value to manage development and population growth in coastal communities and catchments.

## Land and marine based sources of pollution

- 5.156 Declining water quality as a result of agricultural and stormwater runoff was raised as an area of major concern in evidence to the Committee:

Pollution control measures for whole of catchment need to be in place to overcome continued nutrient and sediment problems and address the legacy of history of fragmented decisions.<sup>140</sup>

- 5.157 This issue was of particular concern to GBRMPA, as discussed earlier, in its management of the Great Barrier Reef Marine Park, and also to South

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138 Conservation Council of SA, *Submission 71*, p. 6.

139 NT Government, *Submission 106*, p. 21.

140 Professor Thom, *Submission 6*, p. 21.

Australian representatives in seeking to reduce pollution from stormwater runoff and improve water security in the state through stormwater harvesting.

- 5.158 The Committee undertook a site inspection of the Salisbury Stormwater Project in South Australia, which seeks to 're-use up to 6.3 billion litres of stormwater each year that is currently discharged to Gulf St Vincent'.<sup>141</sup> The project provides for stormwater to be cleansed in local wetlands before being injected into the aquifers below the northern Adelaide plains, to replenish these aquifers. The wetlands therefore act as filters for urban and polluted stormwater that would otherwise run into Gulf St Vincent.
- 5.159 The Committee earlier recommended the implementation of a set of national coastal zone environmental accounts, with a particular emphasis on monitoring of estuarine and marine environments in Australia's waterways and catchments.

## Climate change impacts on coastal and marine biodiversity

- 5.160 Australia's unique biodiversity, already under threat from a wide range of stressors, 'now faces a further threat from a rapidly changing climate'.<sup>142</sup>
- 5.161 Inquiry participants raised a number of concerns about climate change impacts on coastal and marine biodiversity, including the need to:

- ensure appropriate coastal connectivity, habitat corridors and buffer zones to allow for the migration of coastal ecosystems

The presence of coastal infrastructure will exacerbate habitat loss by preventing the inland migration of habitat which would often occur naturally as a result of sea-level rise ... Consideration should be given to which forms of infrastructure may be more easily moved (for example, roads) to at least accommodate some habitat migration.<sup>143</sup>

- focus on the landscape scale and ecosystem based, bioregional planning  
we also support landscape-scale planning based on bioregions in Australia. The current planning systems in Australia are ad hoc

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141 Media release by Senator the Hon Penny Wong, Minister for Climate Change and Water, 'Salisbury Stormwater Project to reduce Murray River reliance', 8 October 2008.

142 *Australia's Biodiversity and Climate Change: Summary for Policy Makers 2009*, Summary of a report to the Natural Resource Management Ministerial Council, Department of Climate Change, Commonwealth of Australia, 2009, p. 1.

143 ACE CRC, *Submission 46*, p. 1, p. 4.

and based on political rather than environmental boundaries, so we would like to see that changed.<sup>144</sup>

- undertake further research on climate change impacts on biodiversity

Understanding of how climate change will impact on coastal ecosystems ... represents a significant gap in understanding. The response of these ecosystems to the changes, and what adaptation measures are available and are effective, is still largely unknown.<sup>145</sup>

- build resilience through maintaining well-functioning ecosystems

we should not forget a whole range of other issues that affect the coast today, including weeds ... pollution, biodiversity conservation, and catchment management. My view is that a well managed coast will be more resilient and more adaptable to climate change in the future.<sup>146</sup>

- adapt to changing geographic distributions of species and ecological communities
- develop new policy and management approaches to biodiversity conservation to respond to the challenges of climate change and the possible rapid rate of change within natural systems
- remove or minimise existing stressors, such as land clearing and invasive species

5.162 The key themes of a recent report on climate change and biodiversity are highly relevant to coastal and marine biodiversity:

Changing ecosystems, changing coastlines

- management objectives for the future aimed at maintaining all species in their present locations and ecosystems in their present composition will no longer be appropriate.

Resilience

- a central strategy is giving ecosystems the best possible chance to adapt by enhancing their resilience. Approaches to building resilience include managing appropriate connectivity of fragmented ecosystems, enhancing the National Reserve System, protecting key refugia, implementing more effective

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144 Mr Dudley, North East Bioregional Network, *Transcript of Evidence*, 28 January 2009, p. 29.

145 Queensland Government, *Submission 91*, p. 9.

146 Mr Clarke, Great Ocean Road Coast Committee, *Transcript of Evidence*, 20 May 2009, p. 72.

control of invasive species, and developing appropriate fire and other disturbance management regimes.

#### Risk assessments

- risk assessments are a key approach to identify especially vulnerable species and ecosystems. Risk spreading conservation strategies, coupled with active adaptive management approaches, are an effective way to deal with an uncertain climatic future.

#### Reorientation of policy

- reorientation of policy and legislative frameworks, and reform of institutional and governance architecture, are essential. These actions can support novel strategies for biodiversity conservation—such as integrated regional approaches tailored for regional differences in environments, climate change impacts and socio-economic trends.<sup>147</sup>

### 5.163 The report recommends the need to:

#### Reform our management of biodiversity

*We need to adapt the way we manage biodiversity to meet existing and new threats—some existing policy and management tools remain effective, others need a major rethink, and new approaches need to be developed in order to enhance the resilience of our ecosystems.*

#### Strengthen the national commitment to conserve Australia's biodiversity

*Climate change has radical implications for how we think about conservation. We need wide public discussion to agree on a new national vision for Australia's biodiversity, and on the resources and institutions needed to implement it.*

#### Invest in our life support system

*We are pushing the limits of our natural life support system. Our environment has suffered low levels of capital reinvestment for decades. We must renew public and private investment in this capital.*

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147 *Australia's Biodiversity and Climate Change: Summary for Policy Makers 2009*, pp. 1-2. See also *Australia's Biodiversity Conservation Strategy: 2010-2020 – Consultation Draft*, Natural Resource Management Ministerial Council (2009); *National Biodiversity and Climate Change Action Plan: 2004-2007*, Natural Resource Management Ministerial Council (2004); and AJ Hobday et al, *Impacts of Climate Change on Australian Marine Life*, Australian Greenhouse Office (2006).

Build innovative and flexible governance systems

*Our current governance arrangements for conserving biodiversity are not designed to deal with the challenges of climate change. We need to build agile and innovative structures and approaches.*<sup>148</sup>

- 5.164 As discussed in the previous chapter, 'biodiversity' is identified as a priority theme under the National Climate Change Adaptation Framework. In terms of biodiversity, the National Climate Change Adaptation Research Facility (NCCARF) has established adaptation research networks and host institutions for the following:
- terrestrial biodiversity, James Cook University
  - water resources and freshwater biodiversity, Griffith University
  - marine biodiversity and resources, University of Tasmania
- 5.165 These networks are currently finalising national adaptation research plans. The Committee further notes that one of the research themes of the CSIRO Adaptation Flagship is managing species and natural ecosystems, focusing on three areas:
- Predicting the responses of natural ecosystems to climate change, and developing adaptation options to improve their resilience.
  - Reducing the threats posed by invasive species, bushfires and habitat loss through development of well prioritised response strategies.
  - Incorporating climate change adaptation measures into conservation and natural resource management policies and strategies.<sup>149</sup>
- 5.166 The Committee is also aware that one of the components of the 'first pass' National Coastal Vulnerability Assessment is an assessment of the impacts of climate change on biodiversity in the coastal zone.

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148 *Australia's Biodiversity and Climate Change: Summary for Policy Makers 2009*, pp. 19-20.

149 CSIRO website <<http://www.csiro.au/resources/CAF-factsheet.html>>

### **Recommendation 33**

5.167 The Committee recommends that the Australian Government:

- **work with the Natural Resource Management Ministerial Council and other stakeholders to develop an action plan to:**
  - ⇒ **ensure that coastal buffers, coastal habitat corridors and high ecological value areas are identified and included in Commonwealth, state and local government management processes**
  - ⇒ **ensure appropriate infrastructure planning and that land is made available to allow for the migration of coastal ecosystems**
  - ⇒ **promote cooperative ecosystem-based planning and management approaches across jurisdictions**
  - ⇒ **implement a nationally consistent coastal and marine biodiversity monitoring and reporting framework**
  - ⇒ **develop a targeted strategy to address key gaps in knowledge of coastal and marine biodiversity and improve access and sharing of knowledge and data**
  - ⇒ **develop regional climate change adaptation policies and plans and integrate them into coastal and marine bioregional planning processes**
- **ensure that all future national coastal zone policy incorporates these priorities, as well as future revised national sustainability, biodiversity, climate change and environmental policy frameworks**

## **Natural Resource Management bodies**

5.168 There are 56 regional Natural Resource Management (NRM) bodies – also called Catchment Management Authorities (CMAs) – recognised by the Australian Government. Each state and territory has taken a different approach to the development of these bodies (for example, not all states have statutory NRM bodies). NRM bodies seek to:

- **scale up to catchment, landscape or regional scale;**
- **work across issues, land tenures and industries in an integrated way; and**

- bring diverse stakeholders together across both the government and community sectors to develop shared understandings and more collaborative approaches.<sup>150</sup>
- 5.169 The Australian Government has made a commitment to provide these organisations with secure base-level funding for the first five years of the Caring for our Country program, through to 2012-13. They will 'collectively be provided with up to \$138 million in 2009-10 to achieve Caring for our Country targets within their regions'. They will also 'be required to provide investment proposals that deliver on those targets'.<sup>151</sup>
- 5.170 The Committee was interested in the role of NRM bodies in coastal zone management, although limited evidence was received in this area. Further, somewhat disappointingly, only a few NRM bodies made a submission to the inquiry.
- 5.171 In terms of the evidence the Committee did receive, concerns were raised that some NRM regions reflected administrative rather than ecological regions:
- in Tasmania ... the NRM regions were actually based on the distribution of telephone books from the early days, even though there was in existence a contemporary and biologically valid bioregionalisation for Tasmania that would have provided a more biologically sound basis for land management practices and strategies for the state ... In other parts of Australia – for example, the Northern Territory – a single NRM covers everything from Kakadu to the middle of the desert.<sup>152</sup>
- 5.172 Another concern related to a lack of coordination between some NRM bodies and local councils and involvement in state regional planning:
- the whole issue of the relationship between regional bodies, CMAs and local government is quite varied across the whole country. Some of them do it very well – they have local government members actually on the CMA board and spend quite a lot of time trying to work closely with the local government partners to create integrated projects – but in a number of other cases there is a sense of some sort of competition between the different roles and

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150 A Campbell, *Managing Australian Landscapes in a Changing Climate: A Climate Change Primer for Regional Natural Resource Management Bodies*, Department of Climate Change, Commonwealth of Australia, 2008, p. 14.

151 *Caring for our Country Business Plan: 2009-10*, p. 20.

152 Dr Woehler, *Birds Australia, Transcript of Evidence*, 18 August 2009, p. 8.

responsibilities of the bodies. There is certainly room for improvement there.<sup>153</sup>

there is probably potential there for better integration between NRM and council in sharing resources and perhaps delineating responsibilities as a way to get better value out of the system. At the moment it is very rare to see a council officer who liaises regularly with their NRM counterpart.<sup>154</sup>

- 5.173 A lack of focus on coastal and marine issues by some NRM bodies was a further concern:

We have eight NRM boards in South Australia, of which seven have coast, and there is an exceptionally limited understanding. Some of the members on these boards did not even realise that they had any responsibility at all when it came to coastal areas, yet they do.<sup>155</sup>

Unfortunately generally across the board we have not really had that integration between catchment, coast and marine. Catchment management authorities in theory should be able to deal with that but generally they have not had the expertise to deal with coastal marine issues. Generally their policies and planning have been largely based around catchments.<sup>156</sup>

- 5.174 However, the Southern Rivers Catchment Management Authority noted that its catchment action plan for the region included 'targets for coastal and marine'. It also had a coastal and marine program in place to 'protect and improve the health of coastal, estuarine and marine environments on the NSW south coast', with this program having strong linkages to its other programs on biodiversity, water, soil and land, and community partnerships.<sup>157</sup> The Tasmanian Government also commented that the 'three NRM Regions in the State ... have invested in a number of initiatives that have provided better knowledge and understanding of processes influencing the coastal zone'.<sup>158</sup>

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153 Ms Rankin, DEWHA, *Transcript of Evidence*, 18 June 2009, p. 14.

154 Professor Tomlinson, *Transcript of Evidence*, 28 April 2009, p. 47.

155 Ms Pettett, Conservation Council SA, *Transcript of Evidence*, 8 October 2009, p. 44.

156 Mr Smyth, ACF, *Transcript of Evidence*, 25 March 2009, p. 48.

157 Southern Rivers Catchment Management Authority, *Submission 52*, p. 1.

158 Tasmanian Government, *Submission 93*, p. 1.



### **Recommendation 34**

- 5.175 **The Committee recommends that coastal based Natural Resource Management bodies seeking funding under the Caring for our Country program have coastal and marine priorities, as well as coastal zone management principles integrated in their management plans.**

### **Socioeconomic issues related to the coastal zone**

- 5.176 The growth in population along the Australian coastline and resulting intensification of land use is increasing pressure on both the natural and socioeconomic environment.<sup>159</sup>

- 5.177 Socioeconomic issues with regard to the coastal zone also take in cultural values and heritage concerns. The strong message in a number of submissions to the inquiry was a desire to retain the cultural values of coastal communities – to preserve local character and sense of place. This was often a major reason why people had settled there in the first place. Those giving evidence to the inquiry also emphasised the need to further investigate the impacts of climate change on cultural heritage. As the Tasmanian Government noted:

Rising sea levels as a result of climate change are likely to have significant impacts on Aboriginal heritage and sacred sites which are often located in coastal areas, Stone arrangements, pits, pathways, shell middens and walls are frequently found in coastal areas or beside estuaries, Rock shelters, caves and engravings may also be threatened by rising sea levels. Coastal erosion may reduce access to Aboriginal heritage sites.<sup>160</sup>

- 5.178 Similarly, the Gippsland Coastal Board commented:

our coastal region is not alone in containing a great number of indigenous and non-indigenous cultural assets that need to be protected from the combined threats of sea level rise, erosion and

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159 The concept of the 'environment' is commonly understood to refer to the natural environment but may also take in the social and economic environment.

160 Tasmanian Government, *Submission 93*, p. 3.

storms. Please consider how we are going to identify, protect, and, if necessary, relocate these valuable parts of Australia's heritage.<sup>161</sup>

- 5.179 Manly Council recommended that funding be made available to 'identify Aboriginal Heritage sites at risk of climate change on the coastal zone, and to identify conservation measures in response'.<sup>162</sup>

### Recommendation 35

- 5.180 **The Committee recommends that the Australian Government, in consultation with Indigenous Australians and other coastal stakeholders, commission work to provide a national repository identifying Indigenous and non-Indigenous cultural heritage sites in vulnerable coastal areas.**

### National Sea Change Taskforce

- 5.181 The National Sea Change Taskforce (NSCT) has a particular interest in socioeconomic issues relating to the coastal zone, as well as pressures on coastal ecosystems. This reflects the group's broader interest in ecological sustainable development and promoting sustainable coastal communities.
- 5.182 The NSCT was established in 2004 as a national body to represent the interests of coastal councils and communities experiencing the effects of rapid growth and development. The taskforce has 'more than 68 member councils from around Australia', which collectively 'represent more than four million residents'.<sup>163</sup> The NSCT has initiated several significant studies on Australian coastal communities of relevance to this inquiry:
- N Gurrán et al, *Planning for Climate Change: Leading Practice Principles and Models for Sea Change Communities in Coastal Australia* (2008)<sup>164</sup>
  - 'A policy framework for coastal Australia: discussion paper' (2007)<sup>165</sup>

161 Gippsland Coastal Council, *Submission 38a*, p. 2.

162 Manly Council, *Submission 72*, p. 9.

163 NSCT website accessed 26 August 2009  
<<http://www.seachangetaskforce.org.au/Home.html>>

164 N Gurrán et al, *Planning for Climate Change: Leading Practice Principles and Models for Sea Change Communities in Coastal Australia* (Report No. 3 for the NSCT), University of Sydney, 2008 – Exhibit 21.

165 NSCT, 'A policy framework for coastal Australia: discussion paper', 2007, NSCT website accessed 26 August 2009  
<<http://www.seachangetaskforce.org.au/Publications/Draft%20Policy%20Framework-May%202007.pdf>>

- *Coastal Management in Australia: Key Institutional and Governance Issues for Coastal Natural Resource Management and Planning* (2006)<sup>166</sup>
- *Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities* (2006)<sup>167</sup>
- *Meeting the Sea Change Challenge: Sea Change Communities in Coastal Australia* (2005)<sup>168</sup>
- *Managing Sea Change: The Challenge of Growth* (2004)<sup>169</sup>

5.183 The NSCT emphasised the need for a coordinated national approach to coastal zone management that encompasses not just environmental issues but also socioeconomic issues affecting coastal areas:

Commonwealth, State and local policy and planning instruments addressing the sea change phenomenon focus on biophysical aspects, particularly environmental protection and to a lesser degree, settlement structure and urban design. Social issues, such as building community cohesion, catering to the needs of aging populations, or housing affordability, are not well addressed within the scope of current policy or planning instruments.

Similarly, although some planning instruments aim to preserve agricultural land or to provide for tourism development, economic goals are not well-articulated or integrated within coastal policy and planning frameworks (though some of the local plans examined do contain economic objectives and strategies).

This failure to integrate social and economic objectives and strategies within coastal policies and the land use plans applying to coastal areas reflects broader difficulties associated with achieving the spectrum of sustainability goals. Given the evidence of social and economic disadvantage in sea change localities, and the likelihood that such disadvantage will continue without effective interventions, broadening coastal policy and planning

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166 *Coastal Management in Australia: Key Institutional and Governance Issues for Coastal Natural Resource Management and Planning*, N Lazarow et al, eds, CRC for Coastal Zone, Estuary and Waterway Management, supported by the ANU and the NSCT, 2006 – *Exhibit 10*.

167 N Gurrán et al, *Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities* (Report No. 2 for the NSCT), University of Sydney Planning Research Centre, 2006 – *Exhibit 20*.

168 N Gurrán et al, *Meeting the Sea Change Challenge: Sea Change Communities in Coastal Australia* (Report No. 1 for the NSCT), University of Sydney Planning Research Centre, 2005 – *Exhibit 19*.

169 NSCT, *Managing Sea Change: The Challenge of Growth*, 2004.

processes to properly include social and economic dimensions is a priority.<sup>170</sup>

5.184 The NSCT further pointed out that:

non-metropolitan coastal communities are often characterised by lower incomes, higher unemployment levels and a higher level of socio-economic disadvantage than the Australian population as a whole. Non metropolitan coastal areas also have a higher proportion of families receiving income support benefits. Coastal councils and their communities are at the forefront of Australia's ageing population and its impacts.<sup>171</sup>

5.185 This has serious implications for coastal councils in terms of their resources:

Local Government Authorities in coastal areas do not have the resources necessary to meet the increase in demand for community infrastructure and services required to meet the needs of an ageing population.<sup>172</sup>

5.186 Importantly, as the NSCT further noted, the social profile of non-metropolitan coastal communities also 'compounds their susceptibility to the environmental and economic consequences of climate change':

non-metropolitan coastal areas are exposed to the cumulative effects of physical exposure, higher levels of social disadvantage and reduced capacity to adapt to climate risk.<sup>173</sup>

5.187 This has consequences for those in temporary housing such as caravans and manufactured homes, which are at particular risk in the event of a major natural disaster. Such accommodation forms an 'important source of housing for low income Australians and retirees, particularly along the coast'.<sup>174</sup> Without proper insurance or ownership of land there is a high likelihood that tenants will face long term displacement in the event of a disaster.

5.188 The Department of Families, Housing, Community Services and Indigenous Affairs also noted that the impacts of climate change will 'negatively affect communities, households, and individuals, particularly

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170 NSCT, *Submission 79*, pp. 11-12.

171 NSCT, *Submission 79*, p. 4.

172 NSCT, *Submission 79*, p. 27.

173 NSCT, *Submission 79*, p. 4.

174 NSCT, *Submission 79*, p. 21.

those with low incomes' and that these issues are 'particularly acute for coastal communities'.<sup>175</sup>

- 5.189 In its submission, the NSCT recommended that 'further research on understanding and responding to social vulnerability to climate change impacts be undertaken, with priority assistance given to coastal areas where physical exposure, socio-economic disadvantage, and population instability coincide'.<sup>176</sup> The Committee agrees that such research is essential.

### Recommendation 36

- 5.190 **The Committee recommends that the Australian Government urgently commission further research on socioeconomic vulnerability to climate change impacts, particularly in coastal communities.**
- 5.191 The NSCT also noted that the current national coastal policy framework, as set out in the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, needed to take a much broader approach to 'social and economic issues related to the coastal zone'.<sup>177</sup>
- 5.192 The NSCT concluded that a broader approach to national coastal zone management needed to address five key challenges facing coastal councils and their communities: infrastructure, environment and heritage, community wellbeing, economy and tourism, and governance.<sup>178</sup> The Committee agrees that the principles of ESD and ICZM underpinning Australian coastal policy necessitate a broader approach to coastal zone management encompassing environmental, social and economic dimensions. This issue is further discussed in Chapter 6.

### National sustainability policies and programs relating to coastal communities

- 5.193 A number of major Australian Government initiatives are currently underway that seek to promote sustainable communities more broadly.

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175 Department of Families, Housing, Community Services and Indigenous Affairs, *Submission 99*, p. 3.

176 NSCT, *Submission 79*, p. 25.

177 NSCT, *Submission 79*, p. 4.

178 NSCT, *Submission 79*, pp. 10-11.

These initiatives cross several portfolios. For example, the Committee notes that the Department of Climate Change,<sup>179</sup> Department of the Environment, Water, Heritage and the Arts,<sup>180</sup> Department of Infrastructure, Transport, Regional Development and Local Government, Department of Innovation, Industry, Science and Research, and Department of Resources, Energy and Tourism administer a number of major programs that seek to encourage energy, water, building and transport efficiency and to promote sustainability in these sectors across all regions of Australia.

- 5.194 Other possible initiatives to encourage energy efficiency, particularly in the coastal zone, as suggested in evidence to the Committee included using wave and tidal power:

Waves are a powerful source of energy to power turbines, to produce clean renewable energy technology. Just two turbines, located well offshore on the ocean floor, could generate enough electricity to supply 10,000 coastal homes.<sup>181</sup>

- 5.195 While the Committee notes the significance of these initiatives in promoting sustainable coastal communities, a discussion of these broader initiatives is outside the inquiry terms of reference. Instead, the Committee's particular area of interest was in sustainability initiatives in the planning and settlement area, as this is a significant issue for the coastal zone. The Committee points to three key national initiatives in this area:

- the establishment of the Major Cities Unit in April 2008 within the Infrastructure, Transport, Regional Development and Local Government portfolio and development of a National Urban Policy:

The Major Cities Unit has been established to identify opportunities where federal leadership can make a difference to the prosperity of our cities and the wellbeing of their residents.

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179 See, for example, the Renewable Energy Target scheme, and National Greenhouse and Energy Reporting legislation <<http://www.climatechange.gov.au/renewabletarget/index.html>> and <<http://www.climatechange.gov.au/reporting/index.html>>

180 See, for example, the Water for the Future program and the LivingGreener website <<http://www.environment.gov.au/water/index.html>> and <<http://www.livinggreener.gov.au>> See also a list of programs administered by DEWHA aimed at making Australian homes and communities more sustainable, *Submission 103*, p. 9, and *Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability*, DEWHA, 2009.

181 Coastwatchers Association, *Submission 33*, p. 6.

The issues surrounding the infrastructure and governance of our major cities are complex and require the input of Local, State and Federal government, the integration of services and infrastructure bodies, and industry and community participation. The Unit will provide a more coordinated and integrated approach to the planning and infrastructure needs of major cities.

The unit aims to develop and implement specific, measurable outcomes to improve the environmental sustainability, liveability and productivity of the major cities of Australia.

The Major Cities Unit will work hand in hand with Infrastructure Australia, the new body charged with prioritising billions of dollars of investment in infrastructure around the nation. It will be central to the development of a strong relationship across the Commonwealth Government, all levels of government and the private sector.<sup>182</sup>

- the establishment of the Built Environment Industry and Innovation Council (BEIIC) in September 2008:

The BEIIC acts as an advisory body to the Minister for Innovation, Industry, Science and Research and as an innovation advocate for the industry. The Council considers industry innovation challenges like climate change, sustainability and industry competitiveness as well as issues such as regulatory reform, workforce capability, skills needs, access to new technologies and other priorities for the industry.<sup>183</sup>

- the establishment of 'sustainable cities and coasts' as a key research theme of the CSIRO Adaptation Flagship. The research focus in this area includes:
  - New building and infrastructure design, and adaptation of built infrastructure at building, development and urban system scales.
  - Developing exemplar sustainable urban development projects to promote the uptake of climate adaptation knowledge for integrated urban planning, design and development.

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182 Infrastructure Australia website accessed 25 August 2009  
<<http://www.infrastructureaustralia.gov.au/mcu.aspx>>

183 DITRD LG website accessed 25 August 2009  
<<http://www.innovation.gov.au/Section/Industry/Pages/BuiltEnvironmentIndustryInnovationCouncil.aspx>>

- Integration of social, economic and environmental analyses to assist communities, industry and governments to adapt to the impacts of climate change at regional scales.<sup>184</sup>

5.196 The Committee is aware that COAG, supported by the Local Government and Planning Ministers Council, is also undertaking important initiatives in this area, including the National Strategy for Energy Efficiency<sup>185</sup> and National Partnership Agreement on Energy Efficiency.<sup>186</sup> In April 2009, COAG further agreed to:

establish a Taskforce to examine existing strategic planning frameworks within jurisdictions to ensure they support the ongoing integration of state and national infrastructure in major metropolitan cities with land-use planning and urban development.<sup>187</sup>

5.197 Similarly, the newly formed Australian Council of Local Governments is focusing on 'sustainable development through effective town planning including improved building and urban design'.<sup>188</sup>

## Building sustainable coastal communities

5.198 In 2005, the former House of Representatives Standing Committee on Environment and Heritage conducted an inquiry into:

issues and policies related to the development of sustainable cities to the year 2025, particularly:

- The environmental and social impacts of sprawling urban development;
- The major determinants of urban settlement patterns and desirable patterns of development for the growth of Australian cities;

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184 CSIRO website accessed 25 August 2009 <<http://www.csiro.au/resources/CAF-factsheet.html>>

185 COAG meeting, Hobart, 30 April 2009, 'Communique', p. 7 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2009-04-30/docs/20090430\\_communique.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2009-04-30/docs/20090430_communique.pdf)>

186 COAG meeting, Darwin, 2 July 2009, 'Communique', p. 10 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2009-07-02/docs/20090702\\_communique.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2009-07-02/docs/20090702_communique.pdf)>

187 COAG meeting, Hobart, 30 April 2009, 'Communique', p. 10 <[http://www.coag.gov.au/coag\\_meeting\\_outcomes/2009-04-30/docs/20090430\\_communique.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2009-04-30/docs/20090430_communique.pdf)>

188 ACLG, 'Session outcomes', 18 November 2008, p. 2 <[http://www.aclg.gov.au/media\\_centre/session\\_outcomes.aspx](http://www.aclg.gov.au/media_centre/session_outcomes.aspx)>



- A blueprint for ecologically sustainable patterns of settlement, with particular reference to eco-efficiency and equity in the provision of services and infrastructure;
  - Measures to reduce the environmental, social and economic costs of continuing urban expansion; and
  - Mechanisms for the Commonwealth to bring about urban development reform and promote ecologically sustainable patterns of settlement.<sup>189</sup>
- 5.199 In its report of the inquiry, entitled *Sustainable Cities*, tabled in August 2005, the Committee recommended that the Australian Government:
- establish an Australian Sustainability Charter that sets key national targets across a number of areas, including water, transport, energy, building design and planning.
  - encourage a Council of Australian Governments agreement to the charter and its key targets.<sup>190</sup>
- 5.200 (The Committee's 2007 report, *Sustainability for Survival: Creating a Climate for Change – Inquiry into a Sustainability Charter*, provided further details on the implementation of such a charter.<sup>191</sup>)
- 5.201 At the time of report printing, the Committee had not received a response from the current government (nor the previous government) to either of these reports. However, the Committee notes that major Australian Government initiatives in this area to promote ecologically sustainable patterns of settlement, as discussed above, have been established since the tabling of these reports.
- 5.202 The Australia 2020 Summit also proposed the establishment of a Sustainability Commission and national sustainability reform agenda. The Australian Government's response to this proposal was that:
- The Government is currently considering options for a Sustainability Council/Commission for aspects of environmental sustainability that are influenced by Commonwealth legislation, policy or programs.<sup>192</sup>

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189 House of Representatives Standing Committee on Environment and Heritage, *Sustainable Cities*, Commonwealth of Australia, 2005.

190 House of Representatives Standing Committee on Environment and Heritage, *Sustainable Cities*, p. 31.

191 House of Representatives Standing Committee on Environment and Heritage, *Sustainability for Survival: Creating a Climate for Change – Inquiry into a Sustainability Charter*, Commonwealth of Australia, 2007.

192 *Responding to the Australia 2020 Summit*, Commonwealth of Australia, 2009, p. 77.

- 5.203 The Committee acknowledges that the issue of a national sustainability charter is much broader than the terms of reference for this inquiry, which concerns sustainable coastal communities. However, it still sees merit in an overall national sustainability framework and Australian Sustainability Charter, as recommended in earlier reports.
- 5.204 The Committee commends the Victorian Government's *Victorian Coastal Strategy 2008* as providing an excellent model for the characteristics of a 'sustainable coastal community':<sup>193</sup>

A sustainable coastal community is one which encourages:

Social and cultural wellbeing

- a sense of community and valued lifestyle even in communities where many residents are not permanent ...
- use and maintenance of heritage places and protection and celebration of significant cultural heritage sites
- high quality coastal public infrastructure which is well designed, maintained and used as a community asset throughout the year ...

Economic activity

- a healthy, diverse economy supporting the requirements of local, regional and visitor populations ...
- innovative tourism, business and rural activities that demonstrate sustainability practices and do not compromise the integrity and diversity of natural assets
- public or community transport designed to meet local and regional needs and to support links between coastal towns, regional centres and key tourism sites ...

Appropriate development

- consolidated urban development within settlements that have capacity for growth and the protection of non-urban landscapes between settlements
- building design and development that minimises the impact on natural ecosystems, landscapes and native flora and fauna
- building design and development that is sensitive and responsive to the coastal character of the settlement and significant landscapes, features and values
- development that is set back from the coast and low-lying areas to accommodate coastal features, vegetation and climate change risks and impacts

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193 Victorian Coastal Council, *Victorian Coastal Strategy 2008*, Victorian Government, 2008—*Exhibit 167*.

- environmentally sensitive design in residential development and subdivision that seeks to minimise the development impact and footprint ...

#### Environment protection and conservation

- the protection and conservation of significant natural and cultural features and values
- the maintenance and enhancement of biodiversity to deliver healthier waterways and coastal, estuarine and marine environments<sup>194</sup>

5.205 The *Victorian Coastal Strategy 2008* also sets out a policy framework and detailed actions for promoting sustainable coastal communities. The Committee believes that these action items provide an excellent reference point for other jurisdictions in seeking to build sustainable coastal communities – see Figure 5.4.

5.206 Of interest too is the National Sea Change Taskforce's 'Sea Change Sustainability Charter', which sets the following guiding principles and strategies:

#### Guiding Principles

- develop innovative and best practice strategic planning at regional and local levels
- preserve local character and sense of place
- provide for the timely provision of resources to meet the needs of high growth communities for infrastructure and services
- integrate coastal management and conservation objectives with economic development
- support community wellbeing
- ensure community ownership and participation in key planning decisions affecting the coast

#### Strategies

- commitment of all spheres of government
- focus on sustainability
- inclusive governance structures
- coordinated approach<sup>195</sup>

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194 Victorian Coastal Council, *Victorian Coastal Strategy 2008*, pp. 59-60 – *Exhibit 167*.

195 NSCT, 'A policy framework for coastal Australia: discussion paper', 2007, pp. 15-16, NSCT website accessed 26 August 2009  
<<http://www.seachangetaskforce.org.au/Publications/Draft%20Policy%20Framework-May%202007.pdf>>

**Figure 5.4 Actions to promote sustainable coastal communities**

- a Incorporate settlement boundaries into planning schemes by 2010.
- b Investigate options to reduce economic, environmental and social impacts of old and inappropriate subdivisions along the coast which are environmentally vulnerable and pose fire and health risks.
- c Identify mechanisms and strategies to strengthen community resilience and social cohesion and to preserve a sense of place, particularly within communities experiencing rapid change due to the sea change phenomenon.
- d Encourage economic development research targeted to the specific needs of small- to medium sized communities situated within highly sensitive environmental contexts.
- e Develop a planning research program to investigate and provide information to planners and managers on the following issues:
  - impacts and implications of population growth and seasonally fluctuating population levels on: short and longer term planning and management strategies and the carrying capacity of coastal Crown land and the broader coastal environmental
  - the impacts of sea change communities, ageing coastal populations and the implication for service delivery and infrastructure as part of a review and refinement of the coastal settlement framework
  - land tenure and changes in property ownership and development patterns to determine and better understand the trends in coastal settlement growth dynamics
  - residential land availability and demand, particularly in settlements with high spatial growth capacity within 1.5 hours of Melbourne
  - the predicted impacts of climate change on built coastal environments, including economic and social implications.
- f. Review the siting and design guidelines for structures on the Victorian coast (VCC, 1998) to provide a product that promotes environmentally sensitive design, sympathetic to coastal locations, which address the following:
  - incorporating energy and materials efficiency and water-sensitive urban design techniques, including solar access, natural light and ventilation, use of local materials and services, rainwater capture and water recycling
  - coastal character and the appropriateness of new built form for the existing sense of place • protecting significant views of waterways and from waterways
  - the coastal environment and coastal landscapes as a dominant setting
  - the spaces around buildings and maintaining the coastal landscape between towns along the coast, avoiding 'ribbon' development
  - continuity of the built and natural public realms
  - effects of extreme coastal weather on the built environment and outdoor spaces
  - effects of different use-patterns and seasonal occupation.

*Source Victorian Coastal Council, Victorian Coastal Strategy 2008, Victorian Government, 2008, p. 61—Exhibit 167*

### **Recommendation 37**

5.207 The Committee recommends that the Australian Government:

- consider the Victorian Government's model of a sustainable coastal community as part of the proposed Intergovernmental Agreement on the Coastal Zone to be concluded through the Council of Australian Governments
- ensure an early response to the recommendations provided in the *Sustainability for Survival: Creating a Climate for Change – Inquiry into a Sustainability Charter* report and the *Sustainable Cities* report



## Governance arrangements and the coastal zone

*we have reached a stage when Commonwealth leadership in CZM is vital. Coastal problems are national, not just state or local. They do have, of course, state, regional and local manifestations. However, the implications of climate change, population growth and demographic change, and infrastructure needs do require, in my view, national direction and technical and financial support. I will argue that sustainable solutions for many of these problems risk being limited in time and location unless the Commonwealth can offer leadership in the form of consistent guidance and support to achieve sustainable outcomes of benefit to local economies, environments and social interests.<sup>1</sup>*

### Introduction

- 6.1 Chapter 6 focuses on the Committee's terms of reference with regard to governance and institutional arrangements in the coastal zone.
- 6.2 Major issues covered in the chapter include existing governance arrangements in the coastal zone and perceived concerns with these arrangements, and the roles played by state, territory and local governments in coastal zone management. The chapter then looks at calls for national leadership to improve the cooperative approach to coastal zone management and suggested new models for coastal governance.
- 6.3 Ultimately, the Committee proposes an Intergovernmental Agreement on the Coastal Zone to be endorsed through the Council of Australian Governments (COAG), as well as:

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1 Professor Thom, *Submission 6*, pp. 1-2.

- a National Coastal Zone Policy
  - a National Catchment-Coast-Marine Management Program
  - a Coastal Sustainability Charter
  - a National Coastal Advisory Council
- 6.4 The Committee believes these recommendations will address current concerns in this area and provide the basis for a cooperative approach to coastal zone management. Such an approach is urgently required in the coastal zone due to the potentially severe impacts of climate change on the coast, the continuing environmental degradation of the coast, and the current complex and fragmented governance arrangements for the coastal zone.

## Existing coastal governance arrangements

- 6.5 Coastal zone planning and management is largely a state/territory responsibility, with day-to-day decision making the responsibility of local governments. However, the Australian Government has an important influence on coastal environmental policy and planning through the *Environment Protection and Biodiversity Conservation Act 1999*. It can also play an important role in national policy making by setting policies both directly and through national government councils, such as COAG, the Natural Resource Management Ministerial Council (NRMMC) and the Local Government and Planning Minister's Council (LGPMC).
- 6.6 The major coordinating processes for coastal zone management at a national level are:
- COAG, through the COAG Working Group on Climate Change and Water
  - the NRMMC and its Marine and Coastal Committee (MACC), which administers the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, and Intergovernmental Coastal Advisory Group (ICAG)
  - the NRMMC and its Natural Resources Policies and Programs Committee and Climate Change in Agriculture and Natural Resource Management Working Group, which covers coasts and some marine matters
  - the LGPMC and its Planning Officials Group



- 6.7 In their evidence to the Committee, representatives from the Department of Environment, Water, Heritage and the Arts (DEWHA) raised serious concerns about this structure:

To date, coordination between these processes has been ad hoc and there is a need to improve on communication and coordination of activities within and between governments, as well as with key stakeholders. Identifying the respective roles of each group will enable a clearer articulation of the roles of the NRMMC committees vis-a-vis the COAG process on climate change, and ensure that key NRM issues are adequately covered in coastal planning and adaptation.

As a first step, the NRMMC MACC agreed in July 2008 to a review of ICZM implementation, as well as reviewing the need and functioning of the Intergovernmental Coastal Advisory Group (ICAG), which manages the implementation of the ICZM for the MACC. This review should take into account where the ICZM fits in with the other processes currently underway and may provide an opportunity to better address some of the coordination issues above.<sup>2</sup>

- 6.8 The state and Northern Territory governments are primarily responsible for areas up to three nautical miles out from the territorial sea baseline. The Australian Government is responsible for all other waters within the outer limit of Australia's 200-nautical-mile exclusive economic zone (EEZ). In addition, agreements under the Offshore Constitutional Settlement delegate responsibility for some aquatic resource management between three nautical miles and the EEZ (generally) to either the state or joint authorities.

- 6.9 DEWHA explained that:

the Commonwealth's constitutional powers are constrained in terms of the reach of the Commonwealth's jurisdiction in the coastal zone. The offshore constitutional settlements that delineate the roles and responsibilities between the Commonwealth and the states and territories generally restrict what we can actually do. Generally, the states and the Northern Territory have primary responsibility over coastal waters – that is, from the territorial sea base line out to three nautical miles. This means that the states and territories have primary jurisdiction for what is often considered the coastal zone. And, of course, the states have primary

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2 DEWHA, *Submission 103*, p. 10.

responsibility for land planning and management, including how local government operates in each jurisdiction.<sup>3</sup>

- 6.10 The Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment, signed in 1997 by COAG and representatives of local governments, sets out Commonwealth and state responsibilities in the coastal zone as follows:

Commonwealth responsibility involves meeting obligations contained in international agreements and in Commonwealth legislation in relation to waters outside those waters under State control pursuant to the Offshore Constitutional Settlement, except where formal Commonwealth/State management arrangements are in place (e.g. specific fisheries) or where waters are under Commonwealth direct management (e.g. the Great Barrier Reef Marine Park). The Commonwealth has responsibility for control of sea dumping in Australian waters.

Commonwealth interest involves co-operation with the States to develop strategic approaches to ensure the management and protection of Australia's marine and coastal environment.<sup>4</sup>

- 6.11 As noted in Chapter 5, the existence of intergovernmental agreements on the environment and related issues such as water, as well as joint federal/state environment and natural resource management programs, suggests that, in recent times, many environmental policies and approaches have been developed nationally through cooperative federal-state processes.
- 6.12 Local government decision making on coastal planning and development is generally steered by policy and legislation at state/territory government level. However, in many instances local governments are at the forefront of coastal zone planning and management.
- 6.13 The role of local government in coastal zone management is therefore significant. As the Australian Local Government Association (ALGA) stated in its submission to the inquiry, local government is:
- the agency responsible for land use planning throughout much of the coastal zone
  - the agency commonly responsible for significant aspects of environmental management in the coastal zone, including the

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3 Mr Forbes, DEWHA, *Transcript of Evidence*, 27 November 2008, pp. 1-2.

4 Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment, COAG, November 1997, DEWHA website  
<<http://www.environment.gov.au/epbc/publications/coag-agreement/attachment-1.html>>

provision of waste removal and treatment services, and the provision of water, drainage and sewerage services

- the land manager for many coastal reserves and other coastal buffer areas
- the agency commonly responsible for provision and management of public infrastructure such as roads, recreational areas and parks, in the coastal zone.<sup>5</sup>

6.14 The Committee also recognises the role that Indigenous Australians play in the management of Australia's coastal resources. As the Northern Territory Government emphasised in their submission:

Indigenous stakeholders as significant land managers (particularly in northern Australia), need to be included in all aspects of national coordination, development and implementation of coastal climate change policies, strategies and plans.<sup>6</sup>

6.15 The NT Government noted that Indigenous Territorians:

hold title to approximately 84 per cent of the NT's coastline; have strong cultural ties to the sea, a well developed system of traditional custodianship and spiritual connections with numerous sites and species of marine fauna and flora.<sup>7</sup>

## Issues regarding coastal governance arrangements

6.16 The Committee heard from a full cross-section of stakeholders in coastal zone management, from state and local governments through to coastal experts and concerned community groups. Major challenges in current coastal zone governance arrangements identified by these groups included the need for:

- national leadership
- improved cooperation and coordination action across jurisdictions

The crucial challenge is how to improve coordination and consistency of implementation of the necessary mechanisms. While each local area will need tailored solutions, there is an urgent need for a federal framework, under which the implementation of the necessary mechanisms can be provided for

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5 ALGA, *Submission 14*, p. 1.

6 NT Government, *Submission 106*, p. 26.

7 NT Government, *Submission 106*, p. 3.

and resourced. Enhanced cooperation between all levels of government is essential if integrated natural resource management and adaptation planning is to be realised and comprehensively implemented.<sup>8</sup>

- a regional strategic approach

Different standards cause community and developer frustration and a lack of certainty for planning. [An] example is the differing requirements in planning legislation to the incorporation of sea level rises and the timeframes and data used in the calculations of storm surge and sea level rises.

Regional planning processes provide an excellent opportunity to integrate social, economic and environmental issues and plan for future growth in a co-ordinated way.<sup>9</sup>

- better integration in environmental management of socioeconomic elements

A major contributor to this is the apparent failure of assessment mechanisms to adequately consider and compare the social, economic and environmental impacts of population growth. Resolution of sustainability issues in the context of population growth will not be achieved by constraining the development of approaches to environmental impacts alone. An holistic response is needed that recognises limits to growth, and the sustainable use of coastal resources must adequately consider economic and social values.<sup>10</sup>

- new governmental arrangements to encompass climate change impacts

Climate change will have an impact on coastal communities around the nation and will necessitate federal leadership with strong coordination amongst Federal, State and Local Governments.<sup>11</sup>

- improved stakeholder involvement and community engagement, education and awareness

A Community education and engagement strategy for coastal communities should be a major priority of Coastal Policy. Such a

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8 Australian Network of Environmental Defender's Offices, *Submission 73*, p. 47.

9 Planning Institute of Australia, *Submission 51*, p. 5.

10 Western Coastal Board, *Submission 34*, p. 2.

11 Sydney Coastal Councils Group, *Submission 77*, p. 12.

strategy should aim to increase understanding of the impacts of population increase, development and climate change on the coastal environment and on coastal communities and to gain support for and engagement in Government action to address the emerging problems and assist in reducing community conflict surrounding environment protection.<sup>12</sup>

- improved coastal zone land use planning and population planning

There is pressing need to reconsider how we plan for coastal development, the criteria we apply to approve or reject development applications and the building regulations imposed for new structures to safeguard against risks of sea effects on coastal assets. These revisions will not be simple recasting of existing instruments but will need to be dynamic in nature to take into account the fact that the points of reference for planning (e.g., height above sea level, frequency of extreme sea levels) are now constantly changing and will continue to change for the foreseeable future. It is likely that appropriate guidelines, approval criteria and building regulations will necessarily be more complex than the existing, familiar, standards.<sup>13</sup>

- improved capacity building and resources

not all local governments have the capacity, expertise and resources to adequately address the impacts of climate change through the planning process, management activities and capital works. In particular, there are likely to be significant financial costs associated with the need to undertake 'coastal hardening' (build or upgrade shoreline protective structures to protect infrastructure and other development from increased erosion as a result of climate change). This is an issue not just for local government but for all jurisdictions as well as private landowners.<sup>14</sup>

- improved communication and information

State, regional NRM entities, and especially local councils, do not have the resources to provide continuity of policy thinking, of technical and information back-up, and of funding to meet the challenges of population growth, infrastructure needs and how

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12 Lake Wollumboola Protection Association, *Submission 84*, pp. 10-11.

13 Antarctic Climate and Ecosystems Cooperative Research Centre, *Submission 46*, p. 4.

14 Queensland Government, *Submission 91*, p. 9.

best their communities can adapt to climate change, especially the insidious effects of rising sea levels.<sup>15</sup>

- a reduction in institutional complexity across jurisdictions

For coastal management to be most effective it is increasingly necessary to ensure dialogue and cooperation between the technical, scientific and policy making bodies, as well as between governments at all levels and community groups that share responsibility for coastal management.<sup>16</sup>

- improved monitoring and reporting

Species and habitat mapping and coastal monitoring in Australia is currently undertaken by various Natural Resource Management ... government, and university groups. There are currently no nationally consistent reporting and monitoring standards or protocols and significantly, no national databases to assess the status and condition of coastal species or habitats in Australia.<sup>17</sup>

## **Current Australian Government role in coastal zone management**

### **National Cooperative Approach to Integrated Coastal Zone Management**

6.17 The Australian Government's current role in coastal zone management is primarily through the *National Cooperative Approach to Integrated Coastal Zone Management Framework and Implementation Plan*.

6.18 Dr Geoff Wescott, a coastal management expert at Deakin University, explained the principle behind the plan:

Integrated Coastal Zone Management (ICZM) has been the international conceptual basis for the coastal zone planning and management (CZM) for 15-25 years. The notion of 'vertical integration' of coastal zone planning and management highlights close cooperation and coordination of all three tiers of government: national, state and local.<sup>18</sup>

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15 Professor Thom, *Submission 6*, p. 2.

16 NT Government, *Submission 106*, p. 21.

17 NT Government, *Submission 106*, p. 20.

18 Dr Wescott, *Submission 60*, p. 2.

- 6.19 The plan acknowledges the differences in governance arrangements across the jurisdictions, and the consequent benefit of having a national framework to provide a coordinating function:
- [the] jurisdictions have different legislative and administrative frameworks for managing the coastal zone, [so] adopting a national cooperative approach seeks to address cross border and sectoral issues, harmonise joint action towards management of common issues, and encourage investments from all jurisdictions.<sup>19</sup>
- 6.20 The plan also highlights climate change as a concern within coastal zone management, stating that climate change is one of the four key economic, social and environmental drivers that affect the sustainable use of coastal resources.<sup>20</sup>
- 6.21 As discussed in the previous chapter, the National Sea Change Taskforce (NSCT) noted that the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* needed to take a much broader approach to ‘social and economic issues related to the coastal zone’.<sup>21</sup>
- 6.22 In the Committee’s view the framework and implementation plan, while commendable in content and principle, has failed to make inroads in improving Australia’s coastal management structures. The Committee heard unanimous evidence from stakeholders that problems in establishing responsibility for implementation of the plan, as well as a lack of funding, has meant that ICZM has never been fully implemented in Australia.
- 6.23 The *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* identifies seven areas for national collaboration: integration across the catchment-coast-ocean continuum, land and marine based sources of pollution, climate change, introduced pest plants and animals, planning for population change, capacity building, and monitoring and evaluation. The Committee notes that implementation of each of the plan’s priority areas has specific timeframes and that the plan required an annual report on progress on these areas to be provided to the NRMCC:
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19 DEWHA website accessed 22 August 2009

<<http://www.environment.gov.au/coasts/iczm/index.html>>

20 NRMCC, *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, 2006, p. 9. Other pressures listed are population growth and demographic shifts, industry trends and protection of the coastal resource base.

21 NSCT, *Submission 79*, p. 3.

Australian, state and Northern Territory governments agree to task the MACC [Marine and Coastal Committee] with preparing an annual report to the NRMMC on progress in implementing the national approach to integrated coastal zone management.<sup>22</sup>

6.24 The Committee believes it would have been helpful if these annual reports on the implementation of the plan, in terms of monitoring and evaluating progress towards improving sustainable coastal management, had been made publicly available.

6.25 The submission to the inquiry from Dr Wescott sums up the concerns that the Committee heard regarding the plan:

Whilst the framework established under the 'National Cooperative Approach to Integrated Coastal Zone Management' ... identified critical issues on the Australian coast it was very much a case of 'policy without implementation' – a good framework but no practical means of implementation was specified.<sup>23</sup>

6.26 Professor Bruce Thom, a leading coastal management expert, elaborated on this concern:

there were no incentives or direct leadership from the Commonwealth to support state and local councils in ICZM by making the Framework and Implementation Plan operational. ... Furthermore, there is evidence that State governments have simply ignored the agreement on the document that was endorsed by the NRM Ministerial Council.<sup>24</sup>

6.27 The Environment Institute of Australia and New Zealand (EIANZ) noted that the plan is 'limited in its scope and there is little awareness of its role and purpose, particularly in Local Government'.<sup>25</sup> As Dr Wescott explained, missing from the implementation of the plan is the vertical integration between levels of government called for by the principles of ICZM.<sup>26</sup> For the framework, and therefore ICZM, to be successful in Australia, cooperation between the Australian Government, the states and the NT was required. However, while support for cooperation is

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22 NRMMC, *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan*, 2006, p. 49.

23 Dr Wescott, *Submission 60*, p. 1.

24 Professor Thom, *Submission 6*, p. 10.

25 EIANZ, *Submission 95*, p. 3.

26 G Wescott, 'Stimulating vertical integration in coastal management in a federated nation: the case of Australian coastal policy reform', *Coastal Management*, 37: 6, 2009, pp. 501-513 – *Exhibit 163*.



expressed, no specific federal funding was attached to its implementation. As the Victorian Government submission stated:

The Victorian Government acknowledges the work to date so far by the Federal Government in developing the National Cooperative Approach to Integrated Coastal Zone Management and supports the continuation of efforts to implement it across the states/territories. This could be strengthened with a definitive structure in place at a national level to support its delivery.<sup>27</sup>

- 6.28 The federal department responsible for Australian Government interests in the coastal zone, DEWHA, noted that ‘an important shortcoming of the Framework is that it does not adequately address coastal development holistically’.<sup>28</sup>
- 6.29 The Committee concludes that the implementation of the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* had clear problems, including:
- the lack of a definitive structure at a national level to support its delivery
  - the lack of funding attached to the framework
  - the lack of clarity regarding where responsibility lay for its implementation and lack of accountability in reporting and timeframes
- 6.30 The Committee fully endorses the concept of ICZM as central to best practice coastal zone management, and notes that the *National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan* was agreed to by Natural Resource Ministers throughout Australia. The Committee recognises this as a sign of strong cooperation between governments in integrated coastal zone management. The Intergovernmental Agreement on the Coastal Zone, to be recommended by the Committee, could usefully draw on this document, and the existing cooperative links between state, territory and local governments it represents.

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27 Victorian Government, *Submission 90*, p. 9.

28 DEWHA, *Submission 103*, p. 8.

## State and territory role in coastal zone management

6.31 As noted earlier, state and territory governments are primarily responsible for planning and management of the coastal zone. The Committee acknowledges that coastal governance arrangements and coastal planning policies vary considerably in each state and the NT. Not all jurisdictions have a coastal act and dedicated coastal governance body and not all have comprehensively updated their coastal planning policies to address the projected impacts of climate change on the coastal zone. As the Australian Network of Environmental Defender's Offices (ANEDO) commented:

Common themes can be observed from the overview of state and territory approaches:

- not all states have a key coastal protection Act, and in many states planning and resource legislation regulate the most significant impacts on the coast
- detail is mostly delegated to policies, manuals and guidelines (subordinate to legislation);
- multiple layers of policies exist, and the status of some initiatives is unclear;
- while policies may be sound, implementation may be poor, or policy considerations can be easily discounted by other considerations (for example a decision maker may need only "have regard to" a policy rather than actually implement it). Aspirational principles in guidelines may be difficult to enforce;
- local implementation may be hindered by limited resources, and lack of appropriate data; and
- many different coastal management/advisory bodies exist with varied effectiveness.<sup>29</sup>

6.32 Over the course of the inquiry, many states were actively reviewing their coastal zone management policy frameworks to incorporate revised planning arrangements for coastal climate change impacts and adaptation.

6.33 While not having scope to comment on each state's coastal governance structure, the Committee conveys concerns about two aspects of state coastal policy that were drawn to its attention during the inquiry process. Firstly, there was concern about Queensland's injurious affection provision:

there is a peculiarity in Queensland planning legislation known as injurious affection, whereby in simple terms if a local government seeks to change the designation or the zoning, as it used to be

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referred to, in relation to a particular block of land then the owners of that block of land have an avenue to compensation.<sup>30</sup>

- 6.34 Secondly, there was also concern, particularly from environmental and community groups, about the NSW planning minister's call-in powers for major projects under part 3A of the *Environmental Planning and Assessment Act 1979* (NSW). As ANEDO commented:

A consequence of the listing of developments in the coastal zone as Part 3A projects ... is that developments that are likely to have the greatest impact on the coastal environment in NSW will be decided by the Planning Minister who determines the scope of any environmental assessment. This would be appropriate, provided that there is a clear process in place to ensure that environmental impacts are adequately considered, that the public is involved in the process and that concurrence is obtained from Minister for Climate Change, Environment and Water. This is not currently the case.<sup>31</sup>

- 6.35 This issue was of particular concern to the Catherine Hill Bay Progress Association and Gwandalan/Summerland Point Action Group.<sup>32</sup>
- 6.36 The Committee received comprehensive descriptions of coastal governance arrangements across jurisdictions from each of the states and the NT,<sup>33</sup> as well as a useful summary of these arrangements in the submission from ANEDO, and in Ms Barbara Norman's recent international coastal governance comparison study.<sup>34</sup> This information is set out in Appendix F of this report. The Committee noted the strengths of South Australia's coastal governance model.<sup>35</sup> Another example of best practice ICZM frequently drawn to the Committee's attention was the Victorian Coastal Strategy.

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30 Dr Skull, Sunshine Coast Regional Council, *Transcript of Evidence*, 28 April 2009, p. 51.

31 ANEDO, *Submission 73*, pp. 15-16.

32 See Catherine Hill Bay Association and Dune Care, *Submission 75* and Gwandalan/Summerland Point Action Group, *Submission 66*.

33 For more information see submissions from state and NT governments.

34 B Norman, *Planning for Coastal Climate Change: an Insight into International and National Approaches*, Victorian Department of Sustainability and Environment and Department of Planning and Community Development, 2009 – *Exhibit 176*.

35 SA Government, *Submissions 88 and 88a*.

## Victorian Coastal Strategy

- 6.37 Several stakeholders pointed to the model of coastal governance in Victoria under the Victorian Coastal Strategy 2008, as developed by the Victorian Department of Sustainability and Environment and the Victorian Coastal Council:

What works ... is that it is an integrated strategy. It looks at social impacts as well as environmental impacts. One of the overriding objectives of the coastal strategy in previous iterations has been restriction of further development to within existing settlement boundaries. I think that is a very good principle where possible. Establish boundaries where settlement can occur and maybe move towards an increased density or allow increased densities within those existing settlement boundaries, because this helps to protect the areas of natural coastline in between the settlements. I see this as being effective in the long term.<sup>36</sup>

- 6.38 The Committee commends the Victorian model and believes that the integrated nature of the strategy is of major importance in establishing best practice coastal management. The Committee further believes that this model could be effectively implemented across Australia's coastal zone. Figure 6.1 provides an outline of the key aspects of the Victorian Coastal Strategy 2008.
- 6.39 The Committee was also impressed by the coastal governance structures in Victoria. Under the *Victorian Coastal Management Act 1995*, the Victorian Coastal Council is appointed as the peak body for the strategic planning and management of the Victorian coast, and provides advice to the Victorian Minister for Environment and Climate Change. The council also has three regional boards: the Western Coastal Board, the Central Coastal Board and the Gippsland Coastal Board. These boards work to ensure coordination, planning and management of the coast and marine environment for long term sustainability along Victoria's coastal zone region. The boards are responsible for developing Coastal Action Plans that guide the implementation of the Victorian Coastal Strategy and approved coastal policy in the regions. The boards do not have core works budgets but seek funding for specific projects and research. The boards

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36 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 9.

also seek partnerships with organisations in order to maximise resources.<sup>37</sup>

**Figure 6.1 Victorian Coastal Strategy 2008**

The Victorian Coastal Strategy 2008 provides an integrated management framework for the coast of Victoria. It is established under the Coastal Management Act 1995. The Act directs the Victorian Coastal Strategy to provide for long-term planning of the Victorian coast for the next 100 years and beyond.

The purpose of the strategy is to provide:

1. a vision for the planning, management and use of coastal, estuarine and marine environments
2. the government's policy commitment for coastal, estuarine and marine environments
3. a framework for the development and implementation of other specific strategies and plans such as Coastal Action Plans, management plans and planning schemes
4. a guide for exercising discretion by decision-makers, where appropriate.

#### **Structure**

A hierarchy of principles sets the foundation of the strategy. The hierarchy of principles provides the basis for a series of policies and actions to guide planning, management and decision-making on coastal private and Crown land, as well as in coastal catchments, estuarine and marine waters.

Hierarchy of principles for coastal, estuarine and marine environment planning and management:

1. Provide for the protection of significant cultural and environmental values.
2. Undertake integrated planning and provide clear direction for the future.
3. Ensure the sustainable use of natural coastal resources.
4. Ensure suitable development on the coast.

#### **Scope**

This strategy applies to all Victorian coastal waters (i.e. the sea and seabed to the state limit—three nautical miles or 5.5 kilometres off shore) and all private and coastal Crown land directly influenced by the sea or directly influencing the coastline.

This strategy is a policy document intended for use by coastal, estuarine and marine planners, and managers. As the government's framework for the long-term stewardship of the Victorian coast, the application of this strategy relies on effective partnerships between stakeholders.

This strategy gives direction for planning and managing the impacts of activities on and in the:

- marine environment—includes the near shore marine environment, the seabed and waters out to the state limit or 5.5 kilometres.
- foreshore—or coastal Crown land 200 metres from the high water mark
- coastal hinterland—on private and Crown land directly influenced by the sea or directly influencing the coastline and land within critical views of the foreshore and near shore environment
- catchments—feeding rivers and drainage systems and including estuaries

The strategy addresses all activities or processes that may impact on coastal and marine areas.

#### **Ecologically sustainable development**

Also underpinning this strategy is the Victorian Coastal Council's commitment to ecologically sustainable development which is influenced through integrated coastal zone management, ecosystem-based management and adaptive management.

37 Victorian Coastal Council website accessed 15 September 2009 <<http://www.vcc.vic.gov.au/index.htm>> Central Coastal Board website accessed 15 September 2009 <<http://www.ccb.vic.gov.au/about.html>>

The key concepts are:

- Ecologically sustainable development (ESD) which incorporates caring for the environment, economic performance and social responsibility, often called the triple bottom line.
- Integrated coastal zone management (ICZM) which integrates coastal planning and management across the land and sea and the private and Crown land interfaces. It also integrates the activities of:
  - various government agencies, industry, non-government organisations and communities along the coastal zone (horizontal integration)
  - Commonwealth, state and local government and the community (vertical integration).

The Australian Government's framework for a national cooperative approach to integrated coastal zone management (2006) outlines national priorities and sets the scene for an agreed approach on ICZM in each state.

- Ecosystem-based management (EBM) which protects and manages the environment, recognising that humans and human needs are an integral part of the system.
- Adaptive management which learns from the current management activities to inform and improve the next phase of management. It is systematic and means continuously improving our planning and management approaches.

The Victorian Government is also undertaking a 'Future Coasts' project, working towards preparing Victorian coasts for the impacts of climate change. The 'Future Coasts' project involves significant vulnerability assessment of the coastline in that state and will provide information that will support the Victorian Coastal Strategy.

Source Victorian Coastal Council website <<http://www.vcc.vic.gov.au/2008vcs/purpose.htm>>

## Local government role in coastal zone management

6.40 Local government is often referred to as being the front line in coastal zone management. The Committee heard throughout the inquiry that capacity building, as well as increased resourcing, is urgently required to improve local government's ability to manage the coastal zone effectively. It was noted that 'many councils are struggling to attract and retain staff that have enough knowledge and experience to manage their coasts. Without technical support at the state level for these council officers many poor decisions can be made'.<sup>38</sup> As the Local Government Association of Tasmania (LGAT) stated in its submission to the inquiry:

Professional support and training for Local Government to build capacity to address as well as financial assistance is required. Such assistance across all of Local Government would enable a consistent approach to the delivery of Federal and State climate change agendas.<sup>39</sup>

6.41 Similarly, ALGA stated:

38 DHI, *Submission 101*, p. 1.

39 LGAT, *Submission 86*, p. 9.

The effective management of anticipated climate change impacts in the coastal zone will require significant additional capability and resources. Local government, as the key planning and management agency over much of the coastal zone, must be adequately equipped to ensure effective responses to these difficult challenges.<sup>40</sup>

6.42 The Queensland Government drew out the issues in its submission:

not all local governments have the capacity, expertise and resources to adequately address the impacts of climate change through the planning process, management activities and capital works. In particular, there are likely to be significant financial costs associated with the need to undertake 'coastal hardening' (build or upgrade shoreline protective structures to protect infrastructure and other development from increased erosion as a result of climate change).<sup>41</sup>

6.43 The pressures on coastal councils due to 'sea change' population growth were outlined to the Committee by the NSCT:

Coastal communities are attempting to deal with extraordinary growth pressures but research conducted for the Taskforce has shown that coastal councils do not have the resources necessary to keep pace with this demand.<sup>42</sup>

6.44 In particular, as the Committee heard from a number of local councils, the provision of infrastructure to meet demand associated with growth pressures is an issue facing coastal councils throughout Australia. ALGA noted that local government requires 'increased capability and resources for planning and design of new infrastructure, and hardening of existing infrastructure'.<sup>43</sup>

6.45 In its submission, the NSCT proposed a Community Infrastructure Fund be established to assist local government authorities in rapid growth coastal areas in meeting infrastructure demands:

The primary purpose of the new Fund would be to ensure that rapid-growth LGAs are able to meet increasing demand for community infrastructure generated by population and tourism growth. Projects undertaken with Community Infrastructure

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40 ALGA, *Submission 14*, pp. 5-6.

41 Queensland Government, *Submission 91*, p. 9.

42 NSCT, *Submission 79*, p. 8.

43 ALGA, *Submission 14*, p. 5.

Funding would publicly highlight the Australian Government's role in supporting rapidly-growing coastal communities.<sup>44</sup>

- 6.46 The Committee was pleased to note that, during the course of the inquiry, additional funding had been provided to local councils experiencing high population growth through a series of new funding programs.
- 6.47 The Regional and Local Community Infrastructure Program delivers major investments in regional and local community, recreational and environmental infrastructure initiatives.<sup>45</sup> In June 2008, the Australian Government also announced a \$220 million injection into the Regional and Local Community Infrastructure Program, with \$100 million being allocated to all 566 of Australia's councils on a formula basis and \$120 million for larger Strategic Projects being available on a competitive basis. Under this funding formula, all councils received a base grant of \$30,000, and the 105 councils classified as urban fringe or urban regional and that have at least 30,000 residents received an additional growth component of \$150,000.<sup>46</sup>
- 6.48 The Committee notes the recommendation from Professor Thom to:
- examine the diversity of funding mechanisms available to coastal local councils in the different Australian states to determine if there is need for a COAG agreement or some grant mechanism to ensure councils have a stronger and consistent capacity to manage the challenges of population growth and demographic change as well as other challenges.<sup>47</sup>
- 6.49 The issue of local government capacity building and resourcing is much broader than this inquiry's terms of reference. The Committee believes, however, that further capacity building in coastal local councils will be significant in achieving effective coastal zone management.
- 6.50 As discussed in Chapter 5, the Committee recommends better monitoring of coastal demographic and population growth and for this to be taken into account in local government funding arrangements and provision of services.
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44 NSCT, *Submission 79*, p. 27.

45 Media release, the Hon Anthony Albanese MP, Minister for Infrastructure, Transport, Regional Development and Local Government and The Hon Gary Gray AO MP, Parliamentary Secretary for Regional Development and Northern Australia, 13 May 2008, 'New direction for regional Australia'.

46 Media release, the Hon Anthony Albanese MP, Minister for Infrastructure, Transport, Regional Development and Local Government, 24 June 2008, 'Councils receive \$441 million from the Rudd Labor Government'.

47 Professor Thom, *Submission 6*, p. 16.



**Recommendation 38**

6.51 The Committee recommends that the Australian Government request that the Centre for Excellence for Local Government ensure a particular focus on capacity building for coastal local councils. Capacity building should focus on addressing issues relating to:

- population growth pressure
- planning and design of new infrastructure
- integrated coastal zone management
- climate change impacts and adaptation

**Recommendation 39**

6.52 The Committee recommends that the Australian Government give consideration to establishing a separate funding program for infrastructure enhancement in coastal areas vulnerable to climate change. Such funding should be provided according to a formula requiring contributions, either financial or in-kind, from state governments and relevant local government authorities.

**Call for national leadership in coastal zone management****State and territory perspectives**

6.53 A successful national approach to coastal zone management will require the agreement of the states and NT. The Committee noted a significant consensus among the states and the NT calling for a collaborative approach to coastal zone management. The Committee sees this as an important starting point for establishing more cooperative arrangements in coastal zone management.

6.54 The Northern Territory notes in its submission that:

National governance frameworks are essential to implementing a cross jurisdictional and national approach to coastal management and particularly, climate change. Across jurisdictional boundaries it is an ongoing challenge to ensure that conservation objectives

are complementary and that planning and management activities are coordinated. Inter governmental relationships need to be communicative and proactive in ensuring complementary 'on ground' actions. Government, industry and non government organisations (NGOs) need to be working together to make the most of common coastal climate change interests and requirements.<sup>48</sup>

6.55 The South Australian Government, in evidence to the Committee, suggested:

there is a role [for the federal government], in having that conversation with the community, in having levels of conversation through different governments, with industry, and with the broader general public. So, for example, when the findings of the sea level rise advisory committee are available in South Australia, in all likelihood there will be some public meetings around what has been found, how the government plans to use that information, and how it will come about that the South Australian public will benefit from it.<sup>49</sup>

6.56 The South Australian Government also pointed out, however, that while there may be some value from a 'toolbox' and some consistency of approach, regional variations in coastal and meteorological conditions would present challenges for implementation on a national basis.<sup>50</sup>

6.57 The submission from Western Australia recognised a cooperative and collaborative approach as being:

essential to achieve timely understanding of the high-magnitude impacts of climate change on the coastal zone and coastal communities. A cooperative approach will require leadership and an appropriate structural arrangement such as is provided through the Council of Australian Governments (COAG) with input through Ministerial Councils and subcommittees such as the long-standing Intergovernmental Coastal Advisory Group (ICAG). The National Cooperative Approach to Integrated Coastal Zone Management (2006), prepared by ICAG on behalf of the Natural Resource Management Ministerial Council, is a good example of

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48 NT Government, *Submission 106*, p. 26.

49 Ms Burch, SA Department of Environment and Heritage, *Transcript of Evidence*, 8 October 2008, p. 18.

50 Dr Townsend, SA Department of Environment and Heritage, *Transcript of Evidence*, 8 October 2008, p. 17.

what can be achieved in identifying priority actions across jurisdictions.

Such cooperation in identifying actions must be matched with an availability of funding and a transparent process by which all contributions are recognised and funds distributed. Tripartite agreements between the Commonwealth, the States and local governments are a strong means of achieving synergy in actions and an efficient use of resources. Only through a long-term inter-jurisdictional framework designed and implemented through cooperation, can effective actions, structural efficiency and accountability be achieved.<sup>51</sup>

6.58 Officials from the NSW Government expressed the view that:

There is an opportunity and a danger [in Commonwealth leadership]. The opportunity is some of those things I mentioned, the information base and how the Commonwealth can help to bring us to common understanding ... The Commonwealth could lead on developing the tools and approaches that we need. This is not a minor undertaking. The Commonwealth should not seek to impose a duplicate regulatory scheme on land use planning in the states. We already have an example under the EPBC Act of where we have got gross duplication of regulatory effort happening.<sup>52</sup>

6.59 Representatives from the Tasmanian Government outlined three areas in which all three levels of government should work collaboratively:

The first is clarifying who is responsible for what in this space. ... each level of government [currently] seems to have a slightly different interpretation of who is responsible for what in the climate change space.

The second area is collecting the information that we need to make decisions. That requires a substantial investment across the country, and I know that some work is happening under COAG on adaptation which is suggesting that you could quite easily spend, in a very short period of time, upwards of a quarter of a billion dollars on better information and data collection to inform decision making in this space. That is an area we are passionately interested in.

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51 WA Department of Planning and Infrastructure, *Submission 89*, pp. 20-21.

52 Mr Smith, NSW Department of Environment and Climate Change, *Transcript of Evidence*, 25 March 2009, p. 10.

The third area – which I believe in very strongly – is where the three levels of government have collectively failed to engage communities effectively. When we try to engage local communities on issues like adapting to the impact of climate change on coastlines, we tend to say, ‘Well, of course, you would be aware that model X from the IPCC projections say that, within this degree of likelihood, over this time period, there might be a rise by this many millimetres, plus or minus this percentage, and you must certainly be concerned about that.’ Of course, the response of coastal communities is: ‘We have no idea what that means for us. You have given us no information on which we can base decisions.’<sup>53</sup>

6.60 The Queensland Government stated that it:

recognises the risks faced by coastal communities as a result of continued population growth coupled with the impacts of climate change. The Queensland Government is therefore progressing its own responses to address these risks but strongly supports collaboration of further actions that are mutually beneficial to both the Queensland and Australian Government.<sup>54</sup>

6.61 The submission from the Queensland Government also suggested that nationally consistent coastal terminology would be of benefit to a more coordinated coastal management approach in Australia:

the Queensland Government supports a national approach towards creating an agreed set of definitions for the marine cadastre. A nationally consistent set of definitions for key coastal/marine terms will:

- reduce confusion across jurisdictions and policy/legislative instruments;
- facilitate a common/shared understanding;
- promote easier communication; and
- enable more effective and consistent legislation, particularly in relation to the definition and determination of legislative boundaries.<sup>55</sup>

6.62 The Committee received evidence from the Victorian Government and the Victorian Coastal Council (the peak independent advisory body on coastal

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53 Mr Johannes, Tasmanian Department of Premier and Cabinet, *Transcript of Evidence*, 28 January 2009, p. 38.

54 Queensland Government, *Submission 91*, p. 11.

55 Queensland Government, *Submission 91*, p. 9.

issues to the Victorian Government) and its three boards. The Victorian Coastal Council stated that:

Australians identify so clearly with the coast. I think because of that sense of connection to the coast there must be a sense of a tripartite approach. I do not think that the role of managing the coast sits clearly within any one level of government. There is a very clear need for a tripartite approach involving local, state and federal governments. The challenge is understanding and articulating what those roles are and which space we all work in.

I see this inquiry as an opportunity to progress an intergovernmental agreement, possibly through a COAG agreement, where we work to understand the responsibility of each jurisdiction and articulate within an agreement a commitment to working in each of those areas. By teasing through the roles and opportunities that each level of government has we then, by nature, start to strengthen the partnership between the three levels of government. ... When people talk about leadership from the federal government I really think it is about leadership in helping to drive a clear partnership approach between the three levels of government.<sup>56</sup>

6.63 The submission from the Victorian Government outlined its view of the federal role in coastal zone management:

The Federal Government has a key role in facilitating relationships across jurisdictions and with major industry. It also has a key role in funding, research, monitoring and in providing benchmarks and consistency nationally.

The basic principle in determining the division between Federal and State responsibilities should be 'subsidiarity', that is that a function should be performed by the lowest level of government that can do it well.<sup>57</sup>

6.64 The Committee notes the call for national leadership and a cooperative approach to coastal zone management arrangements from states and the NT. It was suggested that national leadership is required to build better relationships between the states and other non-government sectors, encourage community engagement, reduce complexity and fragmentation of governance arrangements around the country, and address the challenges of climate change in coastal communities. The Committee

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56 Ms Mears, Victorian Coastal Council, *Transcript of Evidence*, 20 May 2009, p. 3.

57 Victorian Government, *Submission 90*, p. 5.

recognises the concerns of states and the NT about the need for a cooperative national approach to reduce rather than increase the complexity of current coastal governance arrangements and for such an approach to take into account the diversity across Australia's vast coastal zone.



Committee members meet with Northern Territory coastal stakeholders, following a public hearing in Darwin in August 2008

6.65 For example, as inquiry participants pointed out to the Committee, there is 'a very big difference about how we should manage a coastal zone in our heavily populated urban areas in capital cities and the less populated sea change communities, the unpopulated areas and those of high conservation value'.<sup>58</sup> Similarly, the NT Government emphasised the unique challenges facing northern Australia and also the relatively undisturbed nature of the Territory's coastline – much of the coastline is 'largely unpopulated, and remains remote and often inaccessible during the wet season':

Ninety percent of coastal waterways in the Northern Territory ... were classified as near pristine during the National Land and

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58 Professor McDonald, *Transcript of Evidence*, 28 April 2009, p. 102.

Water Resources Audit ... This is a far higher percentage than any other state or territory, and much higher than the national percentage (of 50 percent).<sup>59</sup>

- 6.66 The Committee further notes that, while the states and the NT have called for national leadership, they have expressed the desire for the Australian Government to lead the process of collaboration between the jurisdictions and introduce new consistency into coastal zone management rather than calling for a prescriptive top-down arrangement that would hand coastal zone management responsibilities to the Australian Government.

## Local government perspectives

- 6.67 Views of local government largely echoed the states and NT in calling for national leadership and a cooperative and coordinated approach in coastal zone management. The submission from ALGA noted that:

climate change impacts will increase significantly over time, requiring altered governance and institutional arrangements. ALGA considers that immediate investigation of new nationally consistent governance and institutional options is required, in order to protect local governments, communities and developers. These options should include indemnification for planning decisions influenced by climate change considerations.<sup>60</sup>

- 6.68 The submission from the Local Government Association of Tasmania (LGAT) stated that:

LGAT recommends strong cooperative partnerships between Local Government and Federal and State Governments on the provision that financial support to councils is provided and no further cost shifting to local government occurs ...

Local Government as the closest sphere of government to the community works on the front line for delivery of local, state and federal climate change agendas. They have a major leadership role to play in the delivery of programs and as such need to work closely on cooperative and collaborative programs with the Federal and State Government.<sup>61</sup>

- 6.69 Pittwater Council recommended that:

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59 NT Government, *Submission 106*, p. 3, p. 11.

60 ALGA, *Submission 14*, p. 5.

61 LGAT, *Submission 86*, p. 8.

federal, state and local government tripartite agreements [be reintroduced] that include local government as an equal partner in the determination of planning, management and funding arrangements to sustainably manage coastal zone resources.<sup>62</sup>

- 6.70 Mr Beresford-Wylie, Chief Executive of ALGA, while expressing desire for greater collaboration, stressed that:

From our perspective, local councils are very well placed to deal with the issue. Elevating it to a national level when there is a national entity involved in determining coastal development and management is probably not the direction to go in. We would seek greater clarity and a greater degree of collaboration between the three tiers of government in terms of the planning processes and the interaction between the EPBC and state legislation. Putting in place a national institution to look at coastal management is not something we think is necessary.<sup>63</sup>

- 6.71 The Committee notes these comments from local government groups and acknowledges the importance of full involvement of local government on this issue, as the closest level of government to the community. The Committee considers that, without local government involvement, no cooperative coastal management strategy could succeed.

## **Stakeholder involvement and community skills, knowledge and engagement**

- 6.72 Australians have a strong connection with the coast, and the engagement of stakeholders and the wider community in coastal zone management is essential. The preservation of the coast is to a large extent reliant on the understanding and commitment of the Australian community in terms of protecting the fragile ecosystems of the coastal zone.
- 6.73 Key coastal stakeholders include Indigenous communities, research bodies, industry, volunteer groups and the wider community.
- 6.74 The Northern Territory Government pointed to initiatives in integrated coastal zone management being undertaken by Indigenous communities:

Indigenous communities such as Yolngu and Yanuywar have recently undertaken 'Sea Country' planning to identify

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62 Pittwater Council, *Submission 10*, p. 5.

63 Mr Beresford-Wylie, ALGA, *Transcript of Evidence*, 16 October 2008, p. 3.



management issues and strategies to support land and sea conservation and sustainable use, and to identify regional economic development and employment opportunities. These 'Sea Country' plans include coastal environments and estuaries. These plans, if adequately resourced, supported and integrated with government programmes, provide an avenue and exciting opportunity to implement integrated coastal management on indigenous land, and in the remote regions of the NT.<sup>64</sup>

- 6.75 The Northern Land Council's Caring for Sea Country Program also aims to 'increase the capacity of local Indigenous communities to be involved in coastal and marine natural resource management'. The program involves assisting communities with planning and managing their sea country through workshops, ranger programs and research projects:

Ranger programs with sea management capacity have been created around the coast (including in Tiwi Islands, Wadeye, Borroloola and Maningrida) and there is high demand amongst Indigenous people for more of these programs. There are also now over 30 Indigenous community based land and sea management agencies in the NT.<sup>65</sup>

- 6.76 Cooperation between all stakeholders in the coastal zone is required for effective management. The Northern Agricultural Catchments Council (NACC) noted that 'good inter-disciplinary coordination and diversification of economic activities (including better public consultation)' is required, and that 'partnerships with the private sector (coastal developers)' should be improved.<sup>66</sup>

- 6.77 Research bodies also play a significant role in ensuring best practice coastal zone management in Australia, through high level research to provide the best possible information to decision makers. For example, the Reef and Rainforest Research Centre (RRRC) commented that:

In order to maintain the economic, social, cultural and environmental values of this region despite the rapidly increasing twin pressures of population growth and climate change, sound science must underpin effective management that achieves sustainable used of natural resources.<sup>67</sup>

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64 NT Government, *Submission 106*, p. 9.

65 NT Government, *Submission 106*, p. 10.

66 NACC, *Submission 25*, p. 5.

67 RRRC, *Submission 30*, p. 4.

6.78 Volunteer groups are also vital to the successful management of the coastal zone. As Dr Woehler of Birds Australia commented, volunteers carry out vital work that would otherwise represent a cost to government:

The people who go out and count [shorebirds] are volunteers, as are the people who go out and train other counters, other community groups, to get involved. There is an incredible network of volunteers that state, local and federal governments rely on in a de facto sense to collect the information that is then used to feed back into management and conservation measures.<sup>68</sup>

6.79 The Committee commends the work undertaken by the Roebuck Bay Working Group, a locally-based organisation involved in the management of the bay on which Broome is located. The Committee was advised that the group, formed in 2004:

is made up of volunteers from the community, non-government organisations, government agencies, industry and business. The aims are to protect Roebuck Bay through a community based management planning process ...

... it does have penetration into the community. I have not had a member say that they want to leave. That was an indication of something quite fundamental about the group: they get the sense of managing a wetland, a sense of ownership and a sense of community. I think that is very unique to the Roebuck Bay Working Group.<sup>69</sup>

6.80 The Committee was advised that the group has recently published Interim Management Guidelines, which will 'form the basis for a community based management plan for Roebuck Bay'.<sup>70</sup> The Committee notes that, without the interest and commitment of dedicated volunteers, there would be a vacuum in terms of a management plan in Roebuck Bay, and recognises that this community-based approach is vital to ensuring ongoing involvement and awareness of the public.

6.81 The Committee commends the work of coastal community volunteer groups around Australia's coast and notes the significant role they play in the management of the coastal zone.

6.82 In its submission to the inquiry, the Gippsland Coastal Board stated that '[c]ommunity understanding can ... be a critical driver in planning and

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68 Dr Woehler, Birds Australia, *Transcript of Evidence*, 18 August 2008, p. 10.

69 Ms Curran, Roebuck Bay Working Group, *Transcript of Evidence*, 27 August 2009, p. 31, p. 32.

70 Roebuck Bay Working Group, *Interim Management Guidelines – Exhibit 178*.

management' in the coastal zone.<sup>71</sup> The Committee agrees, and believes that community participation in coastal planning, management and monitoring is of particular importance. In order to utilise community skills and knowledge, volunteer groups and community based initiatives must be supported.



Committee members, invited panel members and audience at a public hearing for the coastal zone inquiry, held as part of the Coast to Coast Conference 2008 in Darwin, NT

6.83 Building community understanding, awareness and appreciation of coastal values and issues is essential to encouraging wider community engagement in coastal zone management. This is particularly important given the projected impacts of climate change that are likely to pose significant new challenges to coastal communities.

6.84 As the Lake Wollumboola Protection Association recommended:

A community education and engagement strategy for coastal communities should be a major priority of Coastal Policy. Such a strategy should aim to increase understanding of the impacts of population increase, development and climate change on the coastal environment and on coastal communities and to gain

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71 Gippsland Coastal Board, *Submission 38*, p. 2.

support for and engagement in Government action to address the emerging problems and assist in reducing community conflict surrounding environment protection.<sup>72</sup>

6.85 This point was reiterated by a representative of the South Australian Department of Environment and Heritage:

if the community were engaged across the nation it would help there to be greater recognition of the issues that we face. Then there would be more acceptance of the changes that need to happen to the planning system and in other places.<sup>73</sup>

#### **Recommendation 40**

6.86 **The Committee recommends that the Australian Government undertake an awareness campaign to alert coastal communities to the key challenges facing the coastal zone and the value of community engagement in addressing these challenges. The campaign should aim to build understanding and awareness of coastal management issues to encourage the continued membership and support of volunteer networks in the coastal zone.**

#### **Recommendation 41**

6.87 **The Committee recommends that the Australian Government nominate 2012 as the Year of the Coast, to further build community awareness about the issues facing the coastal zone. The Australian Government should work with coastal stakeholders, volunteer groups and the general community in determining key activities as part of this initiative.**

### **Communication and information sharing**

6.88 Collecting information, undertaking research and monitoring results is essential to best practice coastal zone management. Information should be

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72 Lake Wollumboola Protection Association, *Submission 84*, pp. 10-11.

73 Mr Huppatz, SA Department of Environment and Heritage, *Transcript of Evidence*, 8 October 2008, p. 18.

collected across disciplines, across a wide range of areas, to enhance decision making and planning.

6.89 As the NT Government noted to the Committee:

effective management of the coastal zone requires that those developing or making policy decisions in coastal areas have access to diverse types of information including social, cultural, economic, ecological, biophysical and geophysical information and data.<sup>74</sup>

6.90 Professor Thom noted 'the urgency to establish a comprehensive coastal information centre which can offer both technical and funding support to local authorities and others managing the coast'.<sup>75</sup> Professor Thom further commented that:

State, regional NRM entities, and especially local councils, do not have the resources to provide continuity of policy thinking, of technical and information back-up, and of funding to meet the challenges of population growth, infrastructure needs and how best their communities can adapt to climate change, especially the insidious effects of rising sea levels. To this end, coordinated use of national R&D facilities such as CSIRO, AIMS, and Geoscience Australia, will be vital in providing information and decision-support tools for application at local and regional levels ...

Technical expertise must be available at a national centre to assist decision makers with modelling and collection of field data relevant to ICZM, including modelling probabilities of inundation and shoreline change for different sections of the Australian coast.<sup>76</sup>

6.91 Similarly, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) noted that:

A nationally consistent coastal information system is required to support planning and management decisions and policy development by providing scenarios which incorporate the potential impacts of different population growth projections, climate change and changes to economic conditions.<sup>77</sup>

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74 NT Government, *Submission 106*, p. 27.

75 Professor Thom, *Submission 6*, 18.

76 Professor Thom, *Submission 6*, p. 2, p. 18.

77 CSIRO, *Submission 49*, p. 34.

- 6.92 Information relevant to coastal zone governance spans environmental research, climate change science and adaptation, and management and planning information. Scientific and technical information can determine the potential environmental and economic impacts of proposed development within the coastal zone. However, broader information is required to determine its appropriateness. As such, social and cultural dimensions must also be considered.<sup>78</sup>
- 6.93 The Committee believes that all of this information should be publicly available to coastal stakeholders and the wider community through the proposed National Coastal Zone Database, as discussed in Chapter 3 of this report.

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#### **Recommendation 42**

- 6.94 **The Committee recommends that the National Coastal Zone Database be expanded over time to include information on environmental data and management and planning information relevant to the coastal zone.**
- 6.95 The Committee was also interested in the concept of an Australian Coastal Alliance, as proposed by the National Sea Change Taskforce (NSCT), to provide a national information and communication interface between coastal planners and managers and research organisations such as CSIRO and the universities:

The Taskforce ... proposes that an effective interface between key stakeholder groups with a role in coastal planning and management be created through the establishment of an [Australian] Coastal Alliance. This concept has been explored by a working group representing the National Sea Change Taskforce, NRM groups, CSIRO and the Centre for Resource and Environmental Studies at the Australian National University. Such a body would provide a much-needed interface between key stakeholder groups such as coastal councils, NRM groups, research organisations and others with a role in coastal planning and management. It could also provide informed input into Australian, State and Territory coastal policy development. It is proposed that the [Australian] Coastal Alliance be supported by the Australian Government.<sup>79</sup>

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78 Victorian Coastal Council, *Victorian Coastal Strategy 2008*, Victorian Government, 2008, p. 41.

79 NSCT, *Submission 79*, p. 6.

6.96 The Committee understands that the initial phase of the Australian Coastal Alliance was launched in March 2009, as part of the 2009 Australian Coastal Councils Conference. The draft vision and mission statement for the Australian Coastal Alliance are as follows:

The vision is –

To be the national information and communication interface between local government authorities, NRM groups and research organisations.

The draft mission statement indicates that –

The Australian Coastal Alliance will bring together stakeholders with a common interest in achieving sustainability of Australia's coastal zone through:

- acquisition of information and dissemination of knowledge required to achieve the sustainable use and management of coastal Australia;
- advising on the research needs of end-users, including communities, decision-makers and policy-makers responsible for coastal planning and management<sup>80</sup>

6.97 A steering committee for the alliance has also been established to further develop the alliance's role and mode of operation. The Australian Coastal Alliance seeks to 'focus future research efforts on the priority information needs of coastal councils and other government agencies involved in coastal planning and management' and 'reduce the amount of duplication in research effort and gain the most value from research expenditure'.<sup>81</sup>

6.98 The Committee supports the establishment of the Australian Coastal Alliance and commends the NSCT and other stakeholders for progressing this initiative. The Committee believes that such a body will play a valuable role in encouraging information exchange between the research community and coastal stakeholders and agrees that the Australian Coastal Alliance merits funding support from the Australian Government.

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80 NSCT website accessed 20 August 2009  
<<http://www.seachangetaskforce.org.au/Conference2009/ReportCoastalCouncilsConference%202009.pdf>>

81 NSCT website accessed 20 August 2009  
<<http://www.seachangetaskforce.org.au/Conference2009/ReportCoastalCouncilsConference%202009.pdf>>

**Recommendation 43**

- 6.99 **The Committee recommends that the Australian Government provide funding support for the ongoing activities of the Australian Coastal Alliance in providing a national information and communication interface between research organisations and local government authorities and other coastal stakeholders.**

**Other models for coastal zone management**

- 6.100 The Committee received evidence from a number of coastal management experts as well as other stakeholders suggesting alternative models for coastal zone governance arrangements in Australia.
- 6.101 There is a broad consensus amongst this group that many of the challenges of the coastal zone, not least the particular challenges posed by climate change, will only be met by national leadership in coastal zone management.

**Dr Wescott: national coastal policy**

- 6.102 In his submission to the inquiry, Dr Wescott put forward a proposal for a national coastal policy, incorporating four key elements:
- a National Ocean and Coasts Act;
  - a statutory Australian Coastal Strategy;
  - a statutory Australian Coastal Council;
  - a Coastal Resourcing Policy which provides at least matching national funds for infrastructure and community projects that is consistent with the Australian Coastal Strategy (which in turn would be based on ICZM and Ecologically Sustainable Development, ESD, principles).<sup>82</sup>
- 6.103 Dr Wescott went on to define the need for each of the proposed four elements of this national coastal policy:

This Act would clearly establish and codify the national governments role in CZM ...

national legislation [would] ... link coastal zone policy (a predominantly State level responsibility) with oceans planning

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82 Dr Wescott, *Submission 60*, p. 2.



and management policy ( a national level responsibility) - an element of 'horizontal integration' in the language of ICZM - through integrated oceans and coastal management ...

Australia needs a distinctive and separate piece of legislation if it is to achieve both the integration of coastal zone and oceans management and to adequately plan and manage the coast in a time of intensive pressure on the coastal environment through increased coastal development and potential impacts of human - induced climate change.<sup>83</sup>

- 6.104 Dr Wescott drew on a previous research paper to outline the need for a national coastal council:

The Council would recommend the appropriate (most effective and efficient) level of government to deal with these major issues and solutions and to propose mechanisms for the federal funding of these solutions. Hence a diverse, community-focussed, well respected group of individuals with well recognised long-term experience in coastal affairs would lead a discussion on the future of Australia's coast. The strong emphasis in these discussions would be on identifying solutions and how to implement and fund these solutions.<sup>84</sup>

- 6.105 Dr Wescott noted that there is little likelihood of established sector-based agencies implementing a national coastal strategy unless it is written with considerable direct public input. This input would give the community some 'ownership' and encourage a sense of stewardship of the coast by the community. The resultant strategy would establish the basis for uniform standards and delivery of coastal planning approaches nationally.<sup>85</sup>

- 6.106 His submission further suggested that:

the national government needs to provide funds (possibly matching funds) on a long term secure basis to ensure there is adequate resources and infrastructure to meet the two great coastal challenges of the next decade: coastal development and potential impacts of climate change (sea-level rise, increased storm surge and cyclone activity).<sup>86</sup>

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83 Dr Wescott, *Submission 60*, p. 3.

84 Dr Wescott, *Submission 60*, Appendix A, p. 8.

85 Dr Wescott, *Submission 60*, p. 3.

86 Dr Wescott, *Submission 60*, p. 4.

6.107 In evidence to the Committee, Dr Wescott explained that:

I think there is a very strong federal role to be played there. What might it entail? ... I think it is important that it is not perceived or seen in any way as some kind of federal takeover. As I said in my submission and in several of my papers we really want the decisions made at the lowest possible level of government which still protects the wider public interest. That is the interplay between the various issues that come up.<sup>87</sup>

### Professor Thom's five-step model

6.108 Professor Thom emphasised his view that national leadership is required in coastal zone management:

we have reached a stage when Commonwealth leadership in CZM is vital. Coastal problems are national, not just state or local. They do have, of course, state, regional and local manifestations. However, the implications of climate change, population growth and demographic change, and infrastructure needs do require, in my view, national direction and technical and financial support. I will argue that sustainable solutions for many of these problems risk being limited in time and location unless the Commonwealth can offer leadership in the form of consistent guidance and support to achieve sustainable outcomes of benefit to local economies, environments and social interests.<sup>88</sup>

6.109 His submission proposed for a five-step model for national leadership in coastal zone management, drawing particular attention to the need for national coastal zone management legislation and policy. The proposed five steps are:

- A Commonwealth National Coastal Policy, to be developed in consultation with the states and local government through COAG, that defines the national need for direction and sets out the principles, objectives and actions that a federal government must undertake to address the challenges of ICZM for Australia.
- ... enacting a CZM Act which establishes its interest in the coastal zone across all areas of national interest (not exclusively environmental) ... to include indemnification provisions for actions taken in good faith by public authorities that have followed agreed national guidelines and criteria similar to

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87 Dr Wescott, *Transcript of Evidence*, 20 May 2009, p. 62.

88 Professor Thom, *Submission 6*, pp. 1-2.

provisions in s 733 of the NSW Local Government Act 1993 ( as upheld by the High Court in 2005).

- Establish within an existing federal agency a Coastal Division ... responsible for coordination of federal interests including the monitoring of environmental conditions using a scheme of Environmental Accounts; recei[pt] and evaluat[ion of] requests for financial and other assistance to assist states, regional entities and local government in CZM following agreed national guidelines and criteria including those linked to potential impacts of climate change; and following consultation with other federal agencies as appropriate, recommend to a designated Minister grants for approval.
- ... enable a federal science agency to serve as the manager of a National Coastal Information System (NCIS) ... to fund new science on coastal physical, economic and social systems.
- Establish an external Coastal Advisory Council consisting of various stakeholder interests, to review and to offer technical advice on all activities under the Policy and the CZM Act, and the effectiveness of the NCIS and monitoring; ... report[ing] to COAG through a designated Federal Minister.<sup>89</sup>

6.110 Professor Thom noted that introduction of these five steps would enable a national approach to ICZM that goes beyond the framework document agreed by NRM Ministers in 2006. He also noted that if legislation were to be enacted, it should be *new* legislation, as the scope of the EPBC Act limits the ability of the Australian Government to directly support coastal programs across the range of coastal zone management interests.<sup>90</sup>

6.111 In evidence to the Committee, Professor Thom suggested that a COAG agreement on coastal zone management was required:

I think there needs to be a national approach. I think first of all you do need a COAG agreement and you need some form of agreement that brings together the issues that you are considering.<sup>91</sup>

6.112 The Committee also notes recommendations put forward at the 17th NSW Coastal Conference in 2008 and provided to the Committee by Professor Thom – see Figure 6.2.

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89 Professor Thom, *Submission 6*, pp. 19-20.

90 Professor Thom, *Submission 6*, pp. 19-20.

91 Professor Thom, *Transcript of Evidence*, 26 March 2009, p. 52.

**Figure 6.2 Recommendations 1-6 of the 17th NSW Coastal Conference 2008**

1. Federal and state governments work together to provide strong leadership on climate change in relation to coastal environments and communities with the intent to develop consistent intergovernmental coastal legislation on adapting to climate change.
2. Federal and state governments to develop together on-going support programs for observations, research and education at all scales (including local) to facilitate and assist communities to understand coastal decision making.
3. Federal government through its involvement with IPCC and other mechanisms benchmark what other countries are doing in relation to adapting to climate change in coastal areas and to communicate that information through COAG to ensure adoption of management and planning practices most appropriate to particular areas.
4. Short, medium and long-term coastal planning goals and management systems be determined through the COAG framework and backed by policy, legislation and investment involving all levels of government.
5. National leadership is required for consistent and relevant monitoring, evaluation, reporting and perpetual storage of data relevant to coastal planning and management and where possible incorporated into a centralised portal; this recommendation should be driven through COAG with agreements on resourcing between all levels of government and involving CMA's.
6. A national integrated coastal policy be developed by a National Coastal Commission (to include representatives of all levels of government and other independent experts) that would provide consistent planning standards to take account of climate change impacts on ecosystems of high conservation value and areas of vulnerability to erosion, inundation and other forms of damage to private and public assets.

*Source* Professor Thom, 'Responses from 2007 resolutions and recommendations from the 17th NSW Coastal Conference 2008', p. 2—Exhibit 76

## Australian Network of Environmental Defender's Offices

6.113 The submission from the Australian Network of Environmental Defender's Offices (ANEDO) recommended framework legislation for coastal zone management that could then be applied in the jurisdictions:

ANEDO recommends the development of a federal coastal framework, established by a COAG agreement and legislation.

Elements to be addressed in the framework include:

- improved cohesion and consistency of approach across jurisdictions, driven by an enhanced federal role;
- an integrated management approach taking into account all activities and impacts (and management) within the coastal zone;
- clarification of roles, responsibilities and resourcing of different agencies involved at different levels in coastal management;

- additional guidance and resources for local councils at the front line of implementing measures to address population increase and climate change;
- application of EIA [environmental impact assessment] and the principles of ESD;
- comprehensive vulnerability and risk assessment;
- Audit and proper valuation of environment and community assets in the coastal zone; and
- Collation of baseline data and modelling.<sup>92</sup>

6.114 In evidence to the Committee, Mr Smith of ANEDO further elaborated on the need for framework legislation:

[Framework legislation] ... would set out who was responsible for what and what the rules were at the strategic planning stage and also at the development control stage. The details would be embedded further down in regulations and perhaps even guidelines ... You could use those more flexible instruments such as guidelines to set your lines in the sand, so to speak, as appropriate. What is an appropriate line for Western Australia is not going to be the same for New South Wales. At least you have that overarching legislation that holds the whole scheme together in that you do know what the general rules are in each of those areas.<sup>93</sup>

## Regional planning

6.115 Some inquiry participants pointed to regional planning as a useful model to draw upon in achieving best practice coastal zone management. Regional planning aims to provide an overarching framework for management of development at a regional level, taking in the catchment-coast-marine continuum and addressing the full extent of management concerns in coastal regions. An integrated approach, incorporating socioeconomic, infrastructure, planning and environmental concerns, is seen as essential to addressing the many challenges of coastal zone management. The South East Queensland Regional Plan, released in 2005, was seen as representing a useful model in this regard:

What distinguishes the SE Queensland Regional Plan from most other regional planning schemes is an accompanying infrastructure plan, which allocated \$55 billion to meet the cost of

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92 ANEDO, *Submission 73*, p. 55.

93 Mr Smith, ANEDO, *Transcript of Evidence*, 26 March 2009, pp. 29-30.

infrastructure and services that would be required by the expanded population in the region. The plan included funding for infrastructure and services such as roads and public transport, social and community infrastructure, energy networks, water infrastructure and health facilities.<sup>94</sup>

6.116 The Planning Institute of Australia (PIA) also highlighted the inclusion of socioeconomic as well as environmental considerations in the SEQ Regional Plan, noting that the plan ‘guides long term development for the region, co-ordinates infrastructure and addresses environmental impacts of growth.’<sup>95</sup> Ms Norman, from RMIT University, recommended ‘that “sustainable regional plans” for managing urban growth and infrastructure be recognised as a key policy instrument in implementing integrated coastal management.’<sup>96</sup>

6.117 Professor Thom also recommended that the SEQ regional planning model be examined by the Committee:

with a view to determining the effectiveness at a national level of a regional model that integrates land use planning, natural resource and conservation planning and management, monitoring, and infrastructure planning.<sup>97</sup>

6.118 The Committee believes that a regional planning approach to coastal zone management will be of significant importance in dealing with the particular challenges of climate change. Many of the impacts of climate change will be specific to the geographic and economic conditions of a region. An approach that addresses these impacts holistically across a region will be more successful due to its level of integration

6.119 The submission from the NT Government outlined the work that coastal Indigenous communities are undertaking in producing coastal regional plans:

While there are no coastal management bodies or authorities in the NT, Indigenous communities such as Yolngu and Yanuywar have recently undertaken ‘Sea Country’ planning to identify management issues and strategies to support land and sea conservation and sustainable use, and to identify regional economic development and employment opportunities. These ‘Sea Country’ plans include coastal environments and estuaries. These

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94 NSCT, *Submission 79*, p. 9.

95 PIA, *Submission 51*, p. 5.

96 Ms Norman, *Submission 20a*, p. 2.

97 Professor Thom, *Submission 6*, p. 23.

plans, if adequately resourced, supported and integrated with government programmes, provide an avenue and exciting opportunity to implement integrated coastal management on indigenous land, and in the remote regions of the NT.<sup>98</sup>

6.120 The NT Government further noted that:

The Caring for Sea Country Program developed by the Northern Land Council aims to increase the capacity of local Indigenous communities to be involved in coastal and marine natural resource management ... The program involves assisting communities with planning and managing their sea country through workshops, ranger programs, research projects, and assisting with accessing funding. Ranger programs with sea management capacity have been created around the coast (including in Tiwi Islands, Wadeye, Borroloola and Maningrida) and there is high demand amongst Indigenous people for more of these programs. There are also now over 30 Indigenous community based land and sea management agencies in the NT.<sup>99</sup>

6.121 The NSCT identified five key challenges facing coastal communities in Australia, all of which they believe should be addressed in coastal regional planning to ensure ICZM – see Figure 6.3.

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98 NT Government, *Submission 106*, p. 9.

99 NT Government, *Submission 106*, p. 10.

**Figure 6.3 Key challenges facing coastal communities****Infrastructure**

All coastal councils report a shortfall in infrastructure and lack the capacity to finance these shortfalls through existing sources, such as grants, rates and developer contributions. There is a clear need to expand and upgrade services and infrastructure so that they are comparable to those in metropolitan areas. Gaps include insufficient physical infrastructure for existing and future population and visitor needs, including roads, sewer, water services and public transport.

**Environment and heritage**

Coastal environments are under significant pressure. Major environmental problems include habitat loss and fragmentation due to urban development and tourism, loss and degradation of coastal wetlands, change in hydrological systems and marine habitats, the introduction of exotic species, and erosion. Global climate change, particularly sea level rise, is likely to impact coastal environments in the near future.

**Community wellbeing**

Many non-metropolitan coastal communities are characterised by high levels of unemployment, lower than average household incomes, greater levels of socioeconomic disadvantage and higher numbers of seniors than other parts of Australia. Demand for new housing and holiday accommodation reduces affordable housing opportunities. There is a risk of social polarisation within many sea change communities.

**Economy/Tourism**

Increasing population growth and development activity in coastal areas is not translating to long term economic gains usually associated with population expansion. Many coastal communities are experiencing a decline in traditional resourced-based industries such as agriculture, fisheries and forestry. Coastal councils require assistance to manage this process of transition and its impact on environmental quality and character of their communities.

**Governance**

Sea change localities are subject to complicated, cross jurisdictional planning and management processes relating to coastal management and protection, natural resource management and heritage conservation, in addition to core land use planning and development responsibilities.

The research report reviewed Australian and State government policies, strategies and legislation relating to the planning and management of Australia's coastal areas and found that:

Commonwealth, State and local policy and planning instruments addressing the sea change phenomenon focus on biophysical aspects, particularly environmental protection and to a lesser degree, settlement structure and urban design. Social issues, such as building community cohesion, catering to the needs of aging populations, or housing affordability, are not well addressed within the scope of current policy or planning instruments.



Similarly, although some planning instruments aim to preserve agricultural land or to provide for tourism development, economic goals are not well-articulated or integrated within coastal policy and planning frameworks (though some of the local plans examined do contain economic objectives and strategies).

This failure to integrate social and economic objectives and strategies within coastal policies and the land use plans applying to coastal areas reflects broader difficulties associated with achieving the spectrum of sustainability goals. Given the evidence of social and economic disadvantage in sea change localities, and the likelihood that such disadvantage will continue without effective interventions, broadening coastal policy and planning processes to properly include social and economic dimensions is a priority.

Effective regional planning is widely regarded by representatives of sea change communities to be critical to the management of growth and change in these areas. Many sea change communities report that existing regional plans lack weight, are not consistently applied, or are out of date.

*Source* NSCT, *Submission 79*, pp.9-11

## **A new model for coastal zone management**

- 6.122 As discussed in the previous chapter, major reviews of Australia's national environmental policies and legislation were underway at the same time as this inquiry, including a review of the EPBC Act, the Australian Government's central piece of environmental legislation, and the National Strategy for the Conservation of Australia's Biological Diversity, Australia's premier biodiversity conservation policy statement. These policies and legislation form the national framework for environmental governance in Australia.
- 6.123 The Committee expects that the revised policy and legislative framework arising from these major reviews will result in new approaches to managing the environment and promoting the concept of ecologically sustainable development. This should then flow through to new approaches to integrated coastal zone management. However, possible future changes to Australia's sustainability and environmental policy frameworks do not mean that action on the coastal zone can wait. The Committee believes that the time to act is now.
- 6.124 Given the projected severe impacts on the coastal zone from climate change as described in this report, and the urgent need for adaptation strategies and resilience building, any hesitation in addressing the issues concerning governance arrangements for the coastal zone could have severe consequences. As discussed in Chapter 2 of this report, the coastal zone, with the majority of Australia's population and infrastructure, is

projected to face the most severe impacts from climate change. A robust and cooperative governance structure covering the coast is therefore required to help the coastal zone adequately withstand these impacts. The Committee considers that the consequences of inaction are likely to be grave.

- 6.125 With the cooperation of all levels of government and in consultation with other stakeholders and the general community, we can develop a national coastal policy that works for all Australians.

### Intergovernmental Agreement on the Coastal Zone

- 6.126 From the evidence it received throughout this inquiry, the Committee has identified 12 key challenges for improved coastal zone governance in Australia:
- involvement by the national government
  - definition of roles and responsibilities for each different level of government
  - improved cooperation and coordination action across jurisdictions
  - need for a regional strategic approach
  - better integration in environmental management of socioeconomic elements
  - new governmental arrangements to encompass climate change impacts
  - stakeholder involvement and community engagement, education and awareness
  - improved coastal zone land use planning and population planning
  - improved capacity building and resources
  - improved communication and information
  - a reduction in institutional complexity across jurisdictions
  - improved monitoring and reporting
- 6.127 The Committee notes the overwhelming call from state, territory and local governments and other coastal stakeholders for the Australian Government to have a more clearly defined role in coastal zone management and to provide national leadership in this area through a cooperative approach.

6.128 As discussed, many inquiry participants pointed to the fragmentation, overlaps, complexity and lack of coordination in existing coastal zone policy and management in Australia. As the National Sea Change Taskforce summed up this matter:

there needs to be a review of the current institutional arrangements as they affect the coast because all levels of government, at this stage, have a finger in the governance pie. The existing institutional arrangements are confusing. There is a lot of duplication. Sometimes it is unclear who is responsible for what in terms of the planning and management along the coast.<sup>100</sup>

6.129 The Queensland Government provided a useful outline of what the role of the Australian Government should be in providing national leadership in coastal zone management:

There is potentially a role for the Australian Government to:

- Lead the development of regional scale climate change projections in order to ensure consistency of approach and avoid duplication of effort;
- Lead the development of a set of nationally consistent default climate change scenarios for use in planning, particularly for sea-level rise;
- Coordinate and provide financial assistance for the development of a nationally consistent, high resolution merged topographic and bathymetric DEM for the coast and develop a set of nationally consistent definitions for coastal/marine terminology; and
- Lead the development of nationally consistent methodologies for assessing climate change risk and/or vulnerability;
- Collaborate and provide financial support for States and/or local government to undertake a suite of vulnerability assessments<sup>101</sup>

6.130 The Committee agrees that there is clearly a role for the Australian Government in providing national leadership in terms of coordinating accurate scientific information on climate change projections and impacts affecting the coastal zone and ensuring that everyone has access to the same information. The Australian Government also has a leadership role in establishing nationally consistent climate change benchmarks for coastal planning, particularly for sea level rise; coordinating national coastal vulnerability assessments to ensure consistency in coastal planning

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100 Mr Stokes, NSCT, *Transcript of Evidence*, 26 March 2009, p. 2.

101 Queensland Government, *Submission 91*, pp. 3-4.

responses; developing appropriate information toolkits to assist in coastal climate change adaptation and integrated coastal zone management; and encouraging community input into national coastal zone policy, planning and management.

6.131 The Committee draws attention to the suggested delineation of responsibilities for state and local government in this area, as submitted by the Victorian Government. They suggest that:

Key roles for states include:

- Preparing land use planning systems for change
- Protecting public assets
- Building knowledge of climate change science and impacts and sharing information between stakeholders
- Identifying and managing risk
- Reducing risk taking
- Facilitating change on a large scale
- Providing emergency response and recovery arrangements
- Increasing local capacity to adapt to climate change

Key roles for local governments include:

- Understanding local vulnerabilities to climate change
- Informing the local community of the impacts of climate change
- Supporting local community groups
- Implementing statutory planning decisions
- Ensuring planning schemes take account of vulnerabilities<sup>102</sup>

6.132 The Committee welcomes the cooperation of state and territory governments and support from local governments for a national cooperative approach to integrated coastal zone management, driven by national leadership. The Committee agrees that this is an issue of national importance and that the time to act is now.

6.133 The Committee has therefore concluded that an Intergovernmental Agreement on the Coastal Zone should be developed and agreed through COAG. This reflects the recommendation made by a number of inquiry participants, including the Victorian Coastal Council and Professor Thom, for a tripartite approach to the coastal zone, involving federal, state and local governments. As the Chair of the Victorian Coastal Council summed up:

I believe it is the essence of who we are. Australians identify so clearly with the coast. I think because of that sense of connection to

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102 Victorian Government, *Submission 90*, pp. 5-6.

the coast there must be a sense of a tripartite approach. I do not think that the role of managing the coast sits clearly within any one level of government. There is a very clear need for a tripartite approach involving local, state and federal governments. The challenge is understanding and articulating what those roles are and which space we all work in.

I see this inquiry as an opportunity to progress an intergovernmental agreement, possibly through a COAG agreement, where we work to understand the responsibility of each jurisdiction and articulate within an agreement a commitment to working in each of those areas. By teasing through the roles and opportunities that each level of government has we then, by nature, start to strengthen the partnership between the three levels of government. That piece of work and that opportunity is quite a significant one. When people talk about leadership from the federal government I really think it is about leadership in helping to drive a clear partnership approach between the three levels of government.<sup>103</sup>

- 6.134 The Committee further notes that the Intergovernmental Agreement on the Coastal Zone should address the key challenges for improved coastal governance in Australia outlined above and be supported by:
- a National Coastal Zone Policy and Strategy
  - a National Catchment-Coast-Marine Management Program
  - a Coastal Sustainability Charter
  - a National Coastal Advisory Council
- 6.135 The Committee notes the recommendations from a number of inquiry participants, as also reflected in past coastal inquiry reports, for a coastal act and statutory coastal council. The Committee believes that a National Oceans and Coast Act and a statutory coastal council should be the subject of ongoing consideration once the COAG Intergovernmental Coastal Zone Agreement is determined.

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103 Ms Mears, Victorian Coastal Council, *Transcript of Evidence*, 20 May 2009, p. 3.

**Recommendation 44**

6.136 The Committee recommends that the Australian Government, in cooperation with state, territory and local governments, and in consultation with coastal stakeholders, develop an Intergovernmental Agreement on the Coastal Zone to be endorsed by the Council of Australian Governments. The intergovernmental agreement should:

- define the roles and responsibilities of the three tiers of government – federal, state and local – involved in coastal zone management
- include a formal mechanism for community consultation
- incorporate principles based on strategic regional coastal planning and landscape scale/ecosystem based coastal zone management
- include an effective implementation plan with resources allocated to ensure that objectives are realised
- be overseen by a new Coastal Zone Ministerial Council
- be made public

**Recommendation 45**

6.137 The Committee recommends that the Australian Government:

- ensure that the Intergovernmental Agreement on the Coastal Zone forms the basis for a National Coastal Zone Policy and Strategy, which should set out the principles, objectives and actions that must be undertaken to address the challenges of integrated coastal zone management for Australia
- establish a broad based National Catchment-Coast-Marine Management program to provide funding for initiatives relating to:
  - ⇒ sustainable coastal communities
  - ⇒ climate change and biodiversity
  - ⇒ implementation of projects to progress integrated coastal zone management
- establish a National Coastal Zone Management Unit within the

**Department of Environment, Water, Heritage and the Arts to support the implementation of these national initiatives**

- **develop a Coastal Sustainability Charter based on the Victorian Government model**

#### **Recommendation 46**

**6.138 The Committee recommends that the Australian Government establish a National Coastal Advisory Council to:**

- **provide independent advice to government**
- **advise the new coastal unit within the Department of the Environment, Water, Heritage and the Arts**
- **ensure community input into national coastal zone policy, planning and management**

#### **Recommendation 47**

**6.139 The Committee recommends that proposals for a National Oceans and Coast Act and a statutory Coastal Council be the subject of ongoing consideration once the Intergovernmental Coastal Zone Agreement is determined.**







## Appendix A: Inquiry process

### **Adoption of the inquiry**

The inquiry was referred to the Committee by the Hon Peter Garrett AM MP, the Minister for the Environment, Heritage and the Arts, and Senator the Hon Penny Wong, the Minister for Climate Change and Water, on 20 March 2008.

### **Conduct of inquiry**

The inquiry was advertised in the national press<sup>1</sup> and on the Committee's website. Invitations to lodge submissions were sent to over 150 individuals and organisations with a possible interest in the matter, including State Premiers and Chief Ministers. The Committee received 107 submissions, 21 supplementary submissions and 180 exhibits.<sup>2</sup> Details are at Appendices B and D to this report.

The Committee held 28 public hearings, from July 2008 to August 2009, in Canberra, the Central Coast of New South Wales, Darwin, Adelaide, Hobart, Sydney, Perth, Brisbane, Melbourne and Broome. The dates and locations of these public hearings, including details of witnesses who appeared before the Committee, are at Appendix C.

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1 *The Australian* on 2 April 2008.

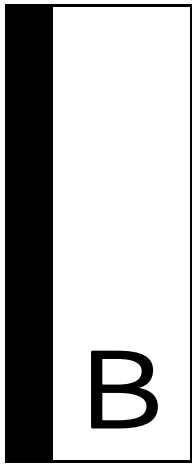
2 Due to variations in pagination style among submissions received, footnote references in this report generally refer to the electronic page number of the submission as published on the Committee's web site. Similarly, page references in transcripts are to the document as it appears electronically, not as it may appear in hard copy, because of variations in printer drivers.

The Committee also undertook nine site inspections to coastal areas vulnerable to climate change and environmental impacts, including the Great Barrier Reef, Queensland; the Central Coast, New South Wales; Kakadu National Park, Northern Territory; Port Adelaide and Salisbury, South Australia; Pitt Water-Orielton Lagoon Ramsar site, Hobart; Cottesloe, Mandurah and Busselton, Western Australia; the Gold Coast and Moreton Bay, Queensland; Port Phillip Bay, Melbourne; and James Price Point, Western Australia.<sup>3</sup> Case studies on some of these site inspections are included in the report.

Submissions to the inquiry, transcripts of evidence taken at public hearings and an electronic copy of the report are available from the Committee's website at <http://www.aph.gov.au/house/committee/ccwea/coastalzone/index.htm>.

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3 Thanks go to Ms Adrienne Batts, Committee Office, for some of the photos from the Committee's site inspections that have been reproduced in this report.



## Appendix B: List of submissions

- |     |  |
|-----|--|
| 1   | Miss Margaret Clinch                           |
| 1a  | Miss Margaret Clinch                           |
| 2   | Fisheries Research and Development Corporation |
| 3   | Coolum District Coast Care                     |
| 4   | Professor Andrew Short                         |
| 5   | Mr Craig Thomson MP                            |
| 5a  | Mr Craig Thomson MP                            |
| 6   | Emeritus Professor Bruce Thom                  |
| 7   | Torres Strait Regional Authority               |
| 7a  | Torres Strait Regional Authority               |
| 7b  | Torres Strait Regional Authority               |
| 8   | Town of Cottesloe, Western Australia           |
| 9   | Cleve Area School                              |
| 10  | Pittwater Council                              |
| 11  | Quicksilver Group of Companies                 |
| 12  | Insurance Council of Australia                 |
| 12a | Insurance Council of Australia                 |
| 12b | Insurance Council of Australia                 |
| 13  | Mr Edward Stuckey                              |

- 14 Australian Local Government Association
- 15 Bureau of Meteorology
- 16 Local Government Association of Queensland
- 17 Nature Conservation Council of NSW
- 18 Ports Australia
- 19 Insurance Australia Group
- 20 Ms Barbara Norman
- 20a Ms Barbara Norman
- 21 Australian Sustainable Built Environment Council
- 22 Australian Quaternary Association
- 23 Wet Tropics Management Authority
- 24 University of Wollongong
- 25 Northern Agricultural Catchments Council
- 26 Geoscience Australia
- 27 Sunshine Coast Environment Council
- 28 Australian Academy of Technological Science and Engineering
- 29 Engineers Australia
- 30 Reef and Rainforest Research Centre Ltd
- 31 Local Government Association of NSW and Shires Association of NSW
- 31a Local Government Association of NSW and Shires Association of NSW
- 32 Port of Melbourne Corporation
- 33 Coastwatchers' Association Inc
- 34 Western Coastal Board
- 35 Great Ocean Road Coast Committee
- 36 Mornington Peninsula Shire
- 37 Australian Fisheries Management Authority

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38	Gippsland Coastal Board
38a	Gippsland Coastal Board
39	Cairns Local Marine Advisory Committee
40	Attorney-General's Department
40a	Attorney-General's Department
41	Ocean Watch Australia Ltd
42	Global Warming Group Queenscliffe
43	Byron Shire Council
44	Lake Macquarie City Council
44a	Lake Macquarie City Council
45	Professor Will Steffen
46	Antarctic Climate and Ecosystems Cooperative Research Centre
47	National Marine Science Centre
48	Central Coastal Board
49	CSIRO
50	Eurobodalla Shire Council
51	Planning Institute of Australia
52	Southern Rivers Catchment Management Authority
53	Western Australian Local Government Association
54	Sunshine Coast Regional Council
55	NSW Department of Environment and Climate Change
56	Emergency Management Australia
57	Surf Life Saving Australia
58	Griffith Centre for Coastal Management
59	City of Port Adelaide Enfield
60	Dr Geoff Wescott
61	Birds Australia
62	Western Port Greenhouse Alliance

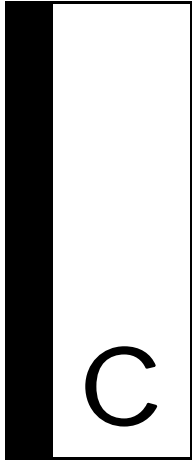
63	Mr Harry Johnson
64	Mr Ajay Hawkes
65	Ms Rebecca Wilson
66	Gwandalan/Summerland Point Action Group
67	Susan and Kelvin Wynne
68	Climate Action Newcastle
69	Stephen R Barrett & Associates
69a	Stephen R Barrett & Associates
70	North East Bioregional Network
71	Conservation Council of South Australia
72	Manly Council
73	Australian Network of Environmental Defender's Offices
74	Mr Barry Laing
75	Catherine Hill Bay Progress Association and Dune Care
76	Cr Natalie Stevens
77	Sydney Coastal Councils Group
78	Seaside Homes
79	National Sea Change Taskforce
80	Maritime Union of Australia
81	Great Barrier Reef Marine Park Authority
82	Australian Conservation Foundation
83	Victorian Coastal Council
84	Lake Wollumboola Protection Association
85	Department of Climate Change
86	Local Government Association Tasmania
87	Mannering Park Progress Association
88	South Australian Government
88a	South Australian Government

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89	Western Australian Department of Planning and Infrastructure
90	Victorian Government
90a	Victorian Government
90b	Victorian Government
91	Queensland Government
92	National Farmers' Federation
93	Tasmanian Government
94	Department of Infrastructure, Transport, Regional Development and Local Government
95	Environment Institute of Australia and New Zealand
96	Marine Coastal Community Network
97	Dr Bill Laing
97a	Dr Bill Laing
98	Wellington Shire Council
98a	Wellington Shire Council
99	Department of Families, Housing, Community Services and Indigenous Affairs
99a	Department of Families, Housing, Community Services and Indigenous Affairs
100	Department of Health and Ageing
101	DHI
101a	DHI
102	Commonwealth Scientific Industrial Research Organisation Tropical Ecosystems Research Centre
103	Department of the Environment, Water, Heritage and the Arts
103a	Department of the Environment, Water, Heritage and the Arts
104	University of Tasmania
105	SGS Economics and Planning Pty Ltd
105a	SGS Economics and Planning Pty Ltd

- 106 Northern Territory Government
- 107 Roebuck Bay Working Group





## Appendix C: List of witnesses

**Thursday, 10 July 2008 - Central Coast**

### **Individuals**

Mr Nigel Allan, Board Member, Community Environment Network

Miss Vanessa Hannan, Senior Officer - Aquatic Resource Management,  
Wyong Shire Council

Mr Peter Jones

Mrs Jocelyn Jones

Dr Salim Momtaz, Senior Lecturer, School of Environment and Life  
Science, University of Newcastle

Mrs Marlene Pennings, Coastcare - TEN

Mr Craig Thomson MP, Federal Member for Dobell

Mr John Wiggin, Vice President, Central Coast Branch, Australian  
Conservation Foundation

### **Catherine Hill Bay Progress Association and Dune Care**

Mrs Suzanne Whyte, President

Mr Barry Laing, Associate Member

### **Gwandalan/Summerland Point Action Group**

Mr Kevin Spencer, President

### **Lake Macquarie City Council**

Dr Kate Barton, Environmental Risk Officer

Mr Neale Farmer, Sustainability Actuary

**Monday, 18 August 2008 - Darwin****Individuals**

Dr Stuart Blanch, Northern Landscapes Manager, World Wild Fund for Nature Australia

Mr Luccio Cercarelli, Director of Technical Services, City of Palmerston

Professor Stephen Garnett

Mr Damian Hale MP, Federal Member for Solomon

Mr Stephen Popple, Member, Planning Institute of Australia (Northern Territory Division)

Ms Pam Robinson, Acting Environmental Manager, Darwin City Council

Mr Charles Roche, Coordinator, Environment Centre Northern Territory

Mr George Roussos, President, Northern Territory Chamber of Commerce

Mr Graeme Sawyer, Mayor, Darwin City Council

Dr Steve Skov, President, Northern Territory Regional Committee, Australasian Faculty of Public Health Medicine

**Birds Australia**

Dr Eric Woehler, Chair, Birds Tasmania

**Tuesday, 19 August 2008 - Darwin****Individuals**

Dr Clive Attwater, SGS Economics and Planning, Tasmania

Mr Matthew Boland, Victorian Coastal Council

Ms Paula Douglas, NSW Department of Planning

Mr Greg Fisk, BMT WBM

Mr Anthony Flaherty, Adelaide and Mt Lofty Ranges NRM Board

Dr Nicole Gurrán

Mr Simon Haber, Victorian Department of Planning and Community Development

Professor Nick Harvey

Ms Liz Johnstone, Central Coastal Board

Dr Robert Kay, Director and Principal Consultant, Coastal Zone Management

Dr Mick Lumb, Central Coastal Board

Mr Kim McClymont, Parks and Wildlife Group, NSW Department of Environment and Climate Change

Cr Libby Mears, Victorian Coastal Council

Mr Peter Merritt, Victorian Department of Sustainability and Environment

Mr Craig Morrison, Sydney Coastal Councils Group

Ms Barbara Norman

Mr Chris Rees, Tasmanian Department of Tourism, Arts and Environment

Ms Anne Shaw, Mornington Peninsula Shire

Professor Bruce Thom, Australian Coastal Society

Ms Patricia von Baumgarten, South Australian Department of Environment and Heritage

Dr Geoff Wescott

Mr Geoff Withycombe, Executive Officer, Sydney Coastal Councils Group

**CSIRO Tropical Ecosystems Research Centre**

Dr Garry Cook, Senior Principal Research Scientist

**Gippsland Coastal Board**

Mr Duncan Malcolm, Chair

Ms Natasha Vasey-Ellis, Executive Officer

**Surf Life Saving Australia**

Mr Peter Agnew, General Manager, Operations

Mr Norman Farmer, National Manager, Coastal Safety Services

**Wednesday, 20 August 2008 - Darwin**

**Individuals**

Miss Margaret Clinch

**Local Government Association of the Northern Territory**

Mr Peter McLinden, Manager, Transport and Infrastructure Services

Mr Jim Fraser, Waste and Environment Officer

**Torres Strait Regional Authority**

Mr Walter Mackie, Member for Iama Island and Portfolio Member for Health and Environment

Mr David Hanslow, Coastal Management Officer, Land and Sea Management Unit

**Thursday, 4 September 2008 - Canberra**

**Geoscience Australia**

Dr John Schneider, Group Leader, Risk and Impact Analysis Group

**Thursday, 18 September 2008 - Canberra**

**Attorney-General's Department**

Ms Karen Stewart, Acting Assistant Secretary, Territories East

Mr Julian Yates, Assistant Secretary, Territories West

Mr Paul Trushell, Acting Director, CIPMA, CIP Branch

**Emergency Management Australia**

Mr Anthony Pearce, Director General

**Thursday, 25 September 2008 - Canberra**

**Department of Climate Change**

Mr Ian Carruthers, First Assistant Secretary, Adaptation and land Management Division

Dr Greg Picker, Acting Assistant Secretary, Adaptation Partnership Branch

Mr Angas Hopkins, Director, Coasts and Tourism Adaptation, Adaptation Partnership Branch

**Wednesday, 8 October 2008 - Canberra**

**City of Port Adelaide Enfield**

Mr Wally Iasiello, Director, Technical Services

Ms Verity Sanders, Strategic Planner, Environment Policy

**Conservation Council of South Australia**

Mr Steve Vines, President

Ms Julie Pettett, Chief Executive Officer

Ms Alex Gaut, Marine Program Co-ordinator

**South Australian Department for Environment and Heritage**

Ms Leanne Burch, Director, Coast, Marine and Heritage

Dr Murray Townsend, Manager, Coastal Management Branch

Mr Anthony Huppertz, Senior Planner, Coastal Management Branch

**Thursday, 16 October 2008 - Canberra**

**Australian Local Government Association**

Mr Adrian Beresford-Wylie, Chief Executive

**Thursday, 23 October 2008 - Canberra**

**Australian National University**

Professor Will Steffen, Executive Director, Climate Change Institute

**Thursday, 13 November 2008 - Canberra**

**Planning Institute of Australia**

Ms Di Jay, Chief Executive Officer

Mr Neil Savery, National President

**Wednesday, 28 January 2009 - Hobart**

**University of Tasmania**

Mr Chris Sharples

**Antarctic Climate and Ecosystems Cooperative Research Centre**

Dr Anthony Press, Chief Executive Officer

Dr John Hunter, Sea Level Rise Oceanographer

**CSIRO**

Dr John Church, Program Leader, Sea Level Rise

**Local Government Association Tasmania**

Mr Allan Garcia, Chief Executive Officer

**North East Bioregional Network**

Mr Todd Dudley, President

**Tasmanian Department of Environment, Parks, Heritage and the Arts**

Mr Alasdair Wells, Section Head, Environmental Policy

**Tasmanian Department of Justice**

Mr Peter Fischer, State Planning Advisor, Land use Planning Branch,

**Tasmanian Department of Premier and Cabinet**

Mr Greg Johannes, Deputy Secretary

Mr Mathew Healey, Manager, Office of Security and Emergency  
Management

**Tasmanian Department of Primary Industries and Water**

Ms Deidre Wilson, Manager, Strategic Policy

**Thursday, 26 February 2009 - Canberra**

**Individuals**

Professor Andrew Short

**Thursday, 12 March 2009 - Canberra****Engineers Australia**

Mr Andre Kaspura, Policy Analyst, Public Policy

Dr Murray Townsend, Immediate Past Chair, NCCOE

**Thursday, 19 March 2009 - Canberra****Department of Families, Housing, Community Services and Indigenous Affairs**

Ms Alison Smith, Assistant Secretary, Intergovernmental and Policy Branch

Ms Sue Hunt, Section Manager, Disaster Preparedness and Recovery Branch

Ms Joanne Llewellyn, Section Manager, Disaster Preparedness and Recovery Branch

**Wednesday, 25 March 2009 - Sydney****Australian Conservation Foundation**

Mr Owen Pascoe, Climate Change Campaigner

Mr Christopher Smyth, Healthy Oceans Campaigner

**Byron Shire Council**

Mr Benjamin Fitzgibbon, Coastal and Estuary Officer

Ms Shannon McKelvey, Legal Services Coordinator

**Local Government of NSW and Shires Association of NSW**

Mr Robert Verhey, Strategy Manager, Environment

**NSW Department of Environment and Climate Change**

Mr Simon Smith, Deputy Director General, Climate Change, Policy and Programs

**NSW Department of Planning**

Mr Richard Pearson, Executive Director, Rural and Regional Planning

**Manly Council**

Mr Henry Wong, General Manager

**Maritime Union of Australia**

Mr Rod Pickette, Policy Executive Officer

**National Marine Science Centre**

Professor Alistair McIlgorm, Director

**Pittwater Council**

Mr Mark Ferguson, General Manager

Mr Chris Hunt, Director, Urban and Environmental Assets

Cr David James, Mayor

**Shires Association of NSW**

Cr Janet Hayes, Executive Member

**Southern Rivers Catchment Management Authority**

Ms Pamela Green, Chair

**Sydney Coastal Councils Group**

Ms Wendy McMurdo, Chair

Mr Craig Morrison, Senior Coastal Projects Officer

**The Nature Conservation Council of NSW**

Ms Cate Faehrmann, Executive Director

**Thursday, 26 March 2009 - Sydney****Individuals**

Mr Ross Keys

Emeritus Professor Bruce Thom

Professor Colin Woodroffe

**Australian Network of Environmental Defender's Offices**

Mr Jeff Smith, Director

Mr Robert Ghanem, Acting Policy Director

**Climate Action Newcastle**

Ms Victoria Brooke



**Lake Wollumboola Protection Association**

Ms Frances Bray, President

**National Sea Change Taskforce**

Mr Alan Stokes, Executive Director

**Ocean Watch Australia**

Ms Lowri Pryce, Executive Officer

Mr Simon Rowe, Program Manager, Aquatic Habitat Rehabilitation

**Tuesday, 7 April 2009 - Perth****Northern Agricultural Catchments Council**

Mr Alan Bradley, Chief Executive Officer

**Western Australian Department for Planning and Infrastructure**

Miss Vivienne Panizza, Team Leader Climate Change and Coastal Planning

Mr Charlie Bicknell, Senior Coastal Engineer

**Western Australian Local Government Association**

Ms Melanie Bainbridge, Climate Change Coordinator

**Tuesday, 28 April 2009 - Brisbane****Individuals**

Professor Jan McDonald

**Australasian Quaternary Association**

Dr Patrick Moss, President

Dr Craig Sloss, Secretary

**Coolum District Coast Care**

Ms Leigh Warneminde, President

Dr Christopher Crossland, Expert Advisor

**CSIRO**

Dr Andrew Ash, Director, Climate Adaptation Flagship

Dr William de la Mare, Theme Leader, Wealth from Oceans Flagship

**DHI Australia**

Mr Stefan Szylkarski, Managing Director

Dr Bruce Hooper, Principal

Mr Greg Stuart, Principal Engineer

**Griffith Centre for Coastal Management**

Mr Neil Lazarow, Senior Research Fellow

Professor Rodger Tomlinson, Director

**Local Government Association of Queensland**

Mr Gavin McCullagh, Planning and Development Policy Advisor

Mr Malcolm Petrie, NRM and Climate Change Policy Advisor

**Queensland Department of Environment and Resources Management**

Mr David Robinson, Director, Coastal Sciences, Environmental Sciences  
Division

**Queensland Department of Infrastructure and Planning**

Mr Gary White, Deputy Director-General, Planning Group

**Sunshine Coast Environment Council**

Miss Narelle McCarthy, Manager

Mr Ian Christesen, Renewable Energy Project Officer

**Sunshine Coast Regional Council**

Dr Stephen Skull, Manager, Environment Policy

**Wednesday, 29 April 2009 - Brisbane**

**Cairns Local Marine Advisory Committee**

Mr Timothy Anderson, Past Member

**Great Barrier Reef Marine Park Authority**

Dr Russell Reichelt, Chair

**Reef and Rainforest Research Centre**

Ms Sheriden Morris, Managing Director

**Thursday, 14 May 2009 - Canberra****Department of Health and Ageing**

Mr Richard Eccles, First Assistant Secretary, Portfolio Strategies Division

Ms Catherine Halbert, First Assistant Secretary, Office of Health Protection

Mr Damian Coburn, Assistant Secretary, Policy Strategies Branch

Ms Colleen Krestensen, Assistant Secretary, Mental Health and Suicide Prevention Programs Branch

**Wednesday, 20 May 2009 - Melbourne****Individuals**

Dr Geoff Wescott

Ms Barbara Norman

**Bureau of Meteorology**

Dr Michael Coughlan, Acting Chief Climatologist

Mr David Walland, Acting Superintendent, National Climate Centre

**Central Coastal Board**

Ms Elizabeth Johnstone, Chair

**Environment Institute of Australia and New Zealand**

Miss Elizabeth Hurst, President

Ms Jane Gibbs, Convenor, Climate Change Special Interest Section

**Gippsland Coastal Board**

Mr Duncan Malcolm, Chair

Ms Natasha Vasey-Ellis, Executive Officer

**Great Ocean Road Coast Committee**

Mr David Clarke, Chief Executive Officer

**SGS Economics and Planning Pty Ltd**

Mr Clive Attwater, Director

**Victorian Coastal Council**

Ms Elizabeth Mears, Chair

Mr David Harper, Executive Officer

**Victorian Department of Sustainability and Environment**

Ms Jennifer Pequignot, Director, Adaptation and Change Branch

**Victorian Department of Planning and Community Development**

Mr John Ginivan, Executive Director, Planning Policy

**Western Coastal Board**

Mr Steve Blackley, Executive Officer

Ms Susan Mudford, Board Member

**Thursday, 21 May 2009 - Melbourne**

**Academy of Technological Sciences and Engineering**

Professor Leonard Stevens

**Global Warming Group Queenscliffe**

Dr Robert Fuller

**Mornington Peninsula Shire**

Ms Sophia Schyschow, Manager, Renewable Resources

**Wellington Shire Council**

Mr Bruce Graham, Director, Strategic Development

Mr Lyndon Webb, Chief Executive Officer

**Western Port Greenhouse Alliance**

Mr Greg Hunt, Executive Officer

**Thursday, 4 June 2009 - Canberra**

**Insurance Council of Australia**

Mr Karl Sullivan, General Manager, Policy Risk and Disaster Planning  
Directorate

**Thursday, 18 June 2009 - Canberra****Department of Climate Change**

Mr Ian Carruthers, First Assistant Secretary, Adaptation and Land Management Division

Dr Anne-Marie Wilson, Director, Coastal Adaptation, Adaptation and Land Management Division

**Department of Environment, Water, Heritage and the Arts**

Mr Malcolm Forbes, Deputy Secretary

Mr Hilton Taylor, Assistant Secretary

Ms Alexandria Rankin, First Assistant Secretary, Land and Coasts Division

Ms Tania Rishniw, Acting First Assistant Secretary, Marine Division

Ms Vicki Middleton, Assistant Secretary, Environment Assessment Branch 1, Approvals and Wildlife Division

**Wednesday, 26 August 2009 - Broome****Broome Chamber of Commerce**

Mr Anthony Proctor, President

**Save the Kimberley**

Mr Hugh Brown

**Shire of Broome**

Mr Darryl Butcher, Director, Development Services

Cr Graeme Campbell, Shire President

**Thursday, 27 August 2009 - Broome****Individuals**

Mr Christopher Mitchell

**Broome Bird Observatory**

Mrs Andrea Spencer, Chairperson, BBO Management Committee

**Conservation Council of Western Australia**

Mr Piers Verstegen, Director

**Environs Kimberly Inc**

Ms Patricia Lowe, Board Member

Mr Martin Pritchard, Executive Director

Ms Louise Williams, West Kimberley Nature Project Co-ordinator

**Roebuck Bay Working Group**

Mrs Kandy Curran, Project Officer

**WWF - Australia**

Ms Tanya Vernes, Program Manager



## Appendix D: List of exhibits

- 1<sup>1</sup> SA Department for Environment and Heritage  
*Sea Level Rise and Climate Change: Implication for the Coorong and Lakes Alexandrina and Albert Ramsar Site*
- 2 Emeritus Professor Colin Field  
*'Threats to mangroves from climate change and adaptation option', Aquatic Botany, 2008*
- 3 National Native Title Tribunal  
*The Sinking of the Straits, O Cordes-Holland*
- 4 National Native Title Tribunal  
*Native Title Maps*
- 5 National Native Title Tribunal  
*Impacts and Opportunities of Climate Change: Indigenous Participation in Environmental Markets, April 2008*  
(Related to Submission No. 13)
- 6 CONFIDENTIAL
- 7 Local Government Association of Queensland  
*Adapting to Climate Change: A Queensland Local Government Guide, June 2007*  
(Related to Submission No. 16)

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1 The following information sets out the details of the individual or organisation that provided the exhibit and the title of the exhibit.

- 8 Professor Ralf Buckley, Griffith University  
*Climate response: Issues, costs and liabilities in adapting to climate change in Australia*
- 9 Planning Institute of Australia  
*Final Report: The delivery of training seminars to planning practitioners on the impacts of climate change, June 2007*  
(Related to Submission No. 51)
- 10 Mr Neil Lazarow  
*Coastal Management in Australia: Key Institutional and Governance Issues for Coastal Natural Resource Management and Planning, Oct 2006*  
(Related to Submission No. 58)
- 11 CONFIDENTIAL
- 12 Ms Barbara Norman  
*'Our Endangered Coast', Melbourne Age, 11 January 2008*  
(Related to Submission No. 59)
- 13 City of Port Adelaide Enfield  
*Port Adelaide Seawater and Stormwater Flooding Study: Stage 1, 2005*  
(Related to Submission No. 59)
- 14 Dr Geoff Wescott  
*Summary of Marine and Coastal Experience (Attachment C)*  
(Related to Submission No. 60)
- 15 Dr Geoff Wescott  
*'Waves: Marine and Coastal Community Networks, Autumn 2006 and Summer 2007'*  
(Related to Submission No. 60)
- 16 Dr Geoff Wescott  
*Implementing ICM in a Federated State: Australian Coastal Policy in the Twenty-First Century*  
(Related to Submission No. 60)



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- 17 Dr Geoff Wescott  
*National Coastal Council Discussion Paper*  
(Related to Submission No. 60)
- 18 Western Port Greenhouse Alliance  
*Local Government Responding to Climate Change in Western Port*  
(Related to Submission No. 62)
- 19 National Sea Change Taskforce  
*Meeting the Sea Change Challenge: Sea Change Communities in Coastal Australia, March 2005*  
(Related to Submission No. 79)
- 20 National Sea Change Taskforce  
*Meeting the Sea Change Challenge: Best Practice Models of Local and Regional Planning for Sea Change Communities, January 2006*  
(Related to Submission No. 79)
- 21 National Sea Change Taskforce  
*Planning for Climate Change: Leading Practice for Sea Change Communities in Coastal Australia, May 2008*  
(Related to Submission No. 79)
- 22 Professor Ralf Buckley, Griffith University  
*Byron Coastline Management Study: Review and Critique*
- 23 Professor Ralf Buckley, Griffith University  
*Submission to the Hon Robert Carr, MP, Premier*
- 24 WA Department of Planning and Infrastructure  
*Coast WA: Better Integration - Western Australian Government's Response to the Coastal Taskforce Report, April 2003*  
(Related to Submission No. 89)
- 25 WA Department of Planning and Infrastructure  
*Report of the Ministerial Taskforce: Review of the Structural Arrangements for Coastal Planning in Western Australia, June 2002*  
(Related to Submission No. 89)

- 26 WA Department of Planning and Infrastructure  
*Coastal Planning and Coordination Council: Terms of Reference*  
(Related to Submission No. 89)
- 27 Professor Jan McDonald  
*A Risky Climate for Decision-Making: The Liability of Development Authorities for Climate Change Impacts, 2007*
- 28 Professor Jan McDonald  
*The Adaptation Imperative: Managing the Legal Risks of Climate Change Impacts, 2008*
- 29 Mrs Jocelyn Jones  
*Climate Change Discovery Centre*
- 30 Australian Conservation Foundation - Central Coast  
*Central Coast Regional Strategy, 2006-31*  
(Related to Submission No. 44)
- 31 Lake Macquarie City Council  
*Mayoral Minute on Greenhouse Gas Emission Reduction Targets*  
(Related to Submission No. 44)
- 32 Lake Macquarie City Council  
*NSW Mayors' Agreement on Climate Change*  
(Related to Submission No. 44)
- 33 Lake Macquarie City Council  
*Sea Level Rise Report, May 2008*  
(Related to Submission No. 44)
- 34 Lake Macquarie City Council  
*Resolution on Sea Level Rise, May 2008*  
(Related to Submission No. 44)
- 35 Lake Macquarie City Council  
*Foundation Hunter Region: Environmental Attitudes Survey 2007*  
(Related to Submission No. 44)

- 
- 36 Lake Macquarie City Council  
*Information report on June 2007 storm/flood events*  
(Related to Submission No. 44)
- 37 NSW Department of Planning  
*High resolution Terrain Mapping of NSW Central and Hunter Coast for Assessments of Potential Climate Change Impacts, Final Project Report, May 2008*  
(Related to Submission No. 44)
- 38 Lake Macquarie City Council  
*Draft Lake Macquarie Community Plan 2008-2018*  
(Related to Submission No. 44)
- 39 Catherine Hill Bay Progress Association and Dune Care  
*Notification related to EPBC Act*  
(Related to Submission No. 75)
- 40 CONFIDENTIAL
- 41 Professor Stephen Garnett  
*Maps indicating potential sea level rise predictions for Darwin*
- 42 Darwin City Council  
*Coastal erosion issues in the East Point and Nightcliff areas of Darwin, April 2008*
- 43 Darwin City Council  
*Nightcliff Foreshore and East Point Erosion Study, Darwin City Council, May 2008*
- 44 Gippsland Coastal Board  
*Climate Change, Sea Level Rise and Coastal Subsidence along the Gippsland Coast: Final Report, July 2008*  
(Related to Submission No. 38)
- 45 Coastal Zone Management (Australia) Pty Ltd  
*'National coastal policy and how might this support NRM priorities?' 3rd National Coastal Estuarine and Marine NRM Workshop, Darwin, August 2008*

- 46 Barbara Norman, Global Cities Institute, RMIT University  
*Speech to National Coastal Conference, 20 August 2008*  
(Related to Submission No. 20)
- 47 CONFIDENTIAL
- 48 DHI  
*'A trial of the pressure equalisation module method of beach protection at Hervey Bay, Queensland', S Hunt and G Stuart*  
(Related to Submission No. 101)
- 49 DHI  
*'DHI water policy: governance for sustainable development'*  
(Related to Submission No. 101)
- 50 DHI  
*'Managing coastal disasters on Australia's Gold Coast', S Hunt and G Stuart et al*  
(Related to Submission No. 101)
- 51 DHI  
*'Improvements to integrated coastal zone management on Australia's Gold Coast: integrating coastal planning and engineering in local government', S Hunt and G Stuart et al*  
(Related to Submission No. 101)
- 52 DHI  
*'Queensland coastal forum: local governments looking after the coast', S Hunt and G Stuart et al*  
(Related to Submission No. 101)
- 53 DHI  
*'Overcoming barriers to coastal sustainability and facilitating improved delivery of regional management: case study of Sydney Coastal Council Group', C Morrison, S Hunt and G Stuart*  
(Related to Submission No. 101)

- 54 DHI  
*'Local government and integrated coastal management: the Queensland Coastal Councils Group'*, S Hunt and G Stuart  
(Related to Submission No. 101)
- 55 DHI  
*'Coastal Management in Australia: Key Institutional and Governance Issues for Coastal Natural Resource Management and Planning'*, N Lazarow et al, October 2006  
(Related to Submission No. 101)
- 56 Birds Australia  
*'Long-term trends of shorebird populations in eastern Australia and impacts of freshwater extraction'*, S Nebel et al, *Biological Conservation*, 2008  
(Related to Submission No. 61)
- 57 Birds Australia  
*'Status and trends of beach-nesting birds in Tasmania'*, E Woehler and P Park  
(Related to Submission No. 61)
- 58 Birds Australia  
*'Continuing decline of Eastern Curlew in Tasmania'*, T Reid and P Park, *Emu*, 2003  
(Related to Submission No. 61)
- 59 Birds Australia  
*'Beach-nesting birds get a helping hand'*, G Maguire, *Wingspan*, September 2008  
(Related to Submission No. 61)
- 60 Birds Australia  
*Assorted brochures on shorebirds*  
(Related to Submission No. 61)

- 61 SA Government  
*'Coastline: a strategy for implementing CPB policies on coastal acid sulphate soils in South Australia', South Australian Coast Protection Board, No. 33, January 2003*  
(Related to Submission No. 88)
- 62 SA Government  
*'Coastline: coastal erosion, flooding and sea level rise standards and protection policy', South Australian Coast Protection Board, No. 26, January 1992*  
(Related to Submission No. 88)
- 63 SA Government  
*'Policy on coast protection and new coastal development', South Australian Coast Protection Board, May 1991*  
(Related to Submission No. 88)
- 64 SA Government  
*Terms of reference and membership: Sea Level Rise Advisory Committee to the Coast Protection Board of SA, 2008*  
(Related to Submission No. 88)
- 65 SA Government  
*'Planning SA: BDP planning policy library', Version 3, Planning SA, November 2007*  
(Related to Submission No. 88)
- 66 City of Port Adelaide Enfield  
*Local Government Association of SA: Climate Change Strategy: 2008-2012, September 2008*  
(Related to Submission No. 59)
- 67 SGS Economics and Planning  
*'Three pass approach to coastal risk assessment', C Sharples and C Attwater et al*
- 68 SGS Economics and Planning  
*'Choosing from adaptation options – more than a short term cost benefit approach', C Attwater et al*

- 
- 69      SGS Economics and Planning  
*'Bearing the cost – setting price signals and cost sharing to ensure a soft landing', C Attwater et al*
- 70      SGS Economics and Planning Pty Ltd  
*'Establishing triggers for adaptive response to climate change', C Attwater et al*
- 71      SGS Economics and Planning Pty Ltd  
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## Appendix E: List of abbreviations

ACE CRC	Antarctic Climate and Ecosystems Cooperative Research Centre
ACLG	Australian Council of Local Governments
ALGA	Australian Local Government Association
ANEDO	Australian Network of Environmental Defender's Offices
ANU	Australian National University
ANZLIC	Australian and New Zealand Land Information Council/Spatial Information Council
AQA	Australian Quaternary Association
AR4	IPCC Fourth Assessment Report
ATSE	Australian Academy of Technological Sciences and Engineering
AEMC	Australian Emergency Management Committee
BCA	Building Code of Australia
CAMBA	China-Australia Migratory Bird Agreement
CMA	Catchment Management Authority
CMAR	CSIRO Marine and Atmospheric Research
CO <sub>2</sub>	carbon dioxide
COAG	Council of Australian Governments

CSIRO	Commonwealth Scientific and Industrial Research Organisation
CZM	Coastal Zone Management
DCC	Department of Climate Change
DEM	Digital Elevation Model
DEWHA	Department of Environment, Water, Heritage and the Arts
EBM	Ecosystem-based Management
EEZ	Exclusive Economic Zone
EIANZ	Environmental Institute of Australian and New Zealand
EMA	Emergency Management Australia
EPA	Environmental Protection Agency
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
EU	European Union
FaHCSIA	Department of Families, Housing, Community Services and Indigenous Affairs
GA	Geoscience Australia
GBRMPA	Great Barrier Reef Marine Park Authority
IAG	Insurance Australia Group
IBRA	Interim Biogeographic Regionalisation for Australia
ICA	Insurance Council of Australia
ICAG	Intergovernmental Coastal Advisory Group
ICZM	Integrated Coastal Zone Management
IGAE	Intergovernmental Agreement on the Environment
IPCC	Intergovernmental Panel on Climate Change
JAMBA	Japan-Australia Migratory Bird Agreement

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LAPP	Local Adaptation Pathways program
LGA	Local Government Area
LGAT	Local Government Association of Tasmania
LGPMC	Local Government and Planning Ministers Council
LIDAR	Light Detection and Radar
MACC	Marine and Coastal Council
MOU	Memorandum of Understanding
NAILSMA	North Australian Indigenous Land and Sea Management Alliance
NCCARF	National Climate Change Adaptation Research Facility
NCCOE	National Committee on Coastal and Ocean Engineering
NCVA	National Coastal Vulnerability Assessment
NDMP	Natural Disaster Mitigation Program
NEDF	National Elevation Data Framework
NES	National Environmental Significance
NEVSF	National Emergency Volunteer Support Fund
NGO	Non-government Organisation
NHT	National Heritage Trust
NRM	Natural Resource Management
NSCT	National Sea Change Taskforce
NRMMC	Natural Resource Management Ministerial Council
NRS	National Reserve System
PIA	Planning Institute of Australia
RAC	Resource Assessment Commission
RICAC	Remote and Indigenous Communities Advisory Committee

ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
RRRC	Reef and Rainforest Research Centre
SCCG	Sydney Coastal Councils Group
SEQ	South East Queensland
SLSA	Surf Life Saving Australia
TAR	IPCC Third Assessment Report
TSRA	Torres Strait Regional Authority
UNFCCC	United Nations Framework Convention on Climate Change
WWF Australia	World Wildlife Fund





## Appendix F: State and territory coastal governance arrangements

### Extract from Australian Network of Environmental Defender's Offices submission<sup>1</sup>

Tasmania
<p>Tasmania does not have specific coastal protection legislation, or a single coastal management authority. Responsibility for coastal management falls to a range of state and local government agencies under the general framework provided by the <i>State Coastal Policy 1996</i>. A State Coastal Advisory Committee was established in 1998 but has not met since 2001.</p> <p>The <i>State Coastal Policy 1996</i><sup>2</sup> was enacted to provide a consistent, state-wide approach to coastal management and applies to all State waters and land within one kilometre inland of high-water mark. The Policy comprises three overarching principles:</p> <ul style="list-style-type: none"><li>▪ The need to protect both natural and cultural values of the coast</li><li>▪ The need for sustainable use and development of the coast</li><li>▪ The need for shared responsibility in the management and protection of the coastal zone.</li></ul> <p>The Policy also sets out a range of outcomes for each of these principles. These outcomes state that the coastal zone will be managed to “<i>protect ecological, geomorphological and geological coastal features and aquatic environments of conservation value</i>” (clause 1.1.2).</p> <p>The Policy provides guidance for local governments regarding the coastal management issues that should</p>

1 ANEDO, *Submission 73*, pp. 8-17.

2 The State Coastal Policy 1996 is currently subject to review. A draft policy was released in 2006, but later withdrawn. A new draft policy is expected to be released by the end of 2008.

be taken into account in decision-making. Before endorsing any new or amended planning scheme, the Resource Planning and Development Commission must be satisfied that the scheme is in accordance with the State Coastal Policy. For older planning schemes, if there is an inconsistency between a provision of the State Coastal Policy and the planning scheme, the State Coastal Policy will prevail. The Policy provides for a precautionary approach to be taken when assessing applications for use and development in the coastal zone and for coastal developments to be directed to locations which will minimise their environmental impact. The Policy requires suitable urban and residential areas, areas of special value, important wetlands and coastal transport routes to be identified in planning schemes. The design and siting of development must also be subject to planning controls “to ensure compatibility with natural landscapes”.

The Policy also provides for areas subject to coastal hazards such as storm surge, erosion and sea-level rise to be identified and managed (clause 1.4.1) and for policies to be developed to respond to the potential effects of climate change on use and development in the coastal zone (clause 1.4.3).

It is an offence against the *State Policies and Projects Act 1993* to fail to comply with a provision of a State Policy, however the policy is a broad document primarily intended to provide a framework for coastal planning rather than to be an enforceable document. Implementation of the policy is generally achieved through individual planning schemes, enforced by local governments under the *Land Use Planning and Approvals Act 1993*. However, given the broad nature of the statements in the Policy, it has proven difficult to enforce in practice and has been subject to litigation on numerous occasions. In a recent decision, the Supreme Court held that local governments are bound to give effect to the policy and achieve its outcomes, but recognised that many of the statements in the policy are not prescriptive enough to be directly enforced.<sup>3</sup>

A review of the State Coastal Policy in 2004 also found that lack of technical resources and operational guidance results in many Councils not adequately implementing the Policy. To address this concern, the State government has produced a number of technical reports to assist with the identification of natural values and areas at risk from coastal hazards. In particular,

- The Coastal and Marine Branch of the Department of Environment, Parks, Heritage and the Arts has released GIS mapping tools for coastal vegetation, geomorphic values and fauna habitat. They have also released indicative mapping of coastal areas vulnerable to climate change and sea-level rise.<sup>4</sup>
- The three regional NRM bodies collaborated to produce a set of Estuarine, Coastal and Marine Indicators to assess natural resource conditions in the coastal zone.<sup>5</sup>
- The Local Government Association of Tasmania has released a Climate Change Toolkit comprising case studies to help local governments to address climate change issues.

In addition to this assistance, one of the key initiatives identified in Tasmania’s **draft *Climate Change***

3 *St Helens Landcare and Coastcare v Break O’Day Council* [2007] TASSC 15

4 Sharples, C., 2004. *Indicative mapping of Tasmanian coastal vulnerability to climate change and sea level rise: Explanatory Report*, Department of Primary Industries, Water and Environment.

5 *Trialing NRM Resource Condition Indicators in the Coastal Zone – Final Report, May 2006*

**Strategy** is to:

Incorporate climate change issues including coastal vulnerability, the impacts of sea level rise and storm surge risk, in planning schemes, and develop practical planning tools to assist local government in taking predicted climate change impacts into consideration.

It is clear that local governments will remain primarily responsible for assessing and managing coastal uses and development in the future.

### Victoria

The current agency that addresses coastal management in Victoria is the **Victorian Coastal Council**, which is appointed by the State Government in accordance with the ***Coastal Management Act 1995***. Under this Act, the VCC has an array of functions; one of which is the responsibility to undertake statewide strategic coastal planning and another being the responsibility to prepare and publish guidelines for the planning and management of the coast. In order to address these responsibilities, the VCC developed the *Victorian Coastal Strategy 1997*, which was subsequently superseded by the ***Victorian Coastal Strategy 2002*** (the Strategy). This Strategy aimed at implementing Integrated Coastal Zone Management, and providing guidance on catchment to coast integration.

With amendments currently being made to the **draft 2007 Victorian Coastal Strategy** Victorian coastal management is currently in a state of flux. In April 2007, an invitation for comments on the newly developed 2007 Draft Victorian Coastal Strategy was advertised, with the VCC receiving 174 submissions. These submissions are in the process of being analysed and incorporated into the development of the final Victorian Coastal Strategy. In a recent media release the Chair of the VCC, Ms Libby Mears, stated that the redrafted strategy hopes to present “a long-term vision to ensure appropriate planning decisions which protect the aesthetic, cultural and environmental values of the coast”, and seeks to achieve this by “addressing the major challenges posed by climate change and development pressures of the ‘seachange’ phenomenon.”<sup>6</sup> The EDO Victoria formulated a submission that outlined a number of key recommendations the 2007 Draft Strategy. Among these was a recommendation for an increased emphasis on integrated management of the coast on a state-wide scale. Additionally, EDO Victoria believed there was a need for a stronger and clearer focus on climate change impacts. Only once the amended strategy is released will it be apparent whether such recommendations will be put into practice.

The ***Planning and Environment Act 1987*** provides that each local government is to have a **municipal planning scheme**, which affects all landowners including the Crown. The development of such planning

6 Media Release From the Victorian Coastal Council, *Sea level rise key in new draft coastal strategy*, Friday 9 November 2007. Available at: <http://www.vcc.vic.gov.au/pdf/mediareleasedraftvcs.pdf>

schemes “provide a mechanism for integrating coastal development, management and outcomes by linking across public and private land”<sup>7</sup> Local governments may make additional coastal management policies under the powers conferred by the *Local Government Act 1989*, such as;

- Foreshore management plans
- Open Space and recreation plans
- Local Agenda 21 and local sustainability plans
- Greenhouse strategies
- Stormwater and domestic waste water management plans
- Asset and infrastructure management plans
- Waste and litter management plans.

These planning schemes were to be implemented to help manage the “change that will inevitably take place across the coast”<sup>8</sup> in relation to population growth and subsequent urbanisation of coastal areas. However, as illustrated by the *Coastal Spaces and Landscape Assessment Study: State Overview Report* there has been limited implementation of the schemes. On 27 September 2006, this study was released by the Minister for Planning and provided a comprehensive baseline assessment of visually significant landscapes along the Victorian coast. The study attempted to provide a guideline “on how management and protection of these important landscapes can be better achieved through planning schemes”<sup>9</sup>. The study discovered that of the 87 settlements within two-kilometres of Victoria’s coastline, only 18% have included strategic settlement plans into local planning schemes. The EDO Victoria, in its submission regarding the draft 2007 Draft Strategy, highlighted a need for time limits to be included regarding the compulsory implementation of coastal settlement frameworks into local government planning schemes to better assist in establishing some consistency throughout the coastal zone.

## Queensland

The *Coastal Protection and Management Act 1995* is the legislation which protects and manages the coastal zone in Queensland, primarily through Coastal Management Plans. The **State and Regional Coastal Management Plans** which sit under the Act and contain most of the detail have chapters on conserving nature, which include broad “coastal management outcomes” and principles and policies for protecting coastal resources, values and managing pressures on those resources. In practice these documents have been applied to regulating coastal development rather than coastal management or rehabilitation.

The **South East Queensland Regional Coastal Management Plan**, maps areas of coastal biodiversity significance and requires local town planning schemes to identify these areas as valuable features and include measures for their conservation and management. Criteria for development assessment are listed,

7 Australian Local Government Association website. Available at: <http://www.alga.asn.au/policy/environment/coasts/roles/>

8 Australian Local Government Association website. Available at: <http://www.alga.asn.au/policy/environment/coasts/roles/>

9 Department of Sustainability and Environment Victoria. Available at: <http://www.dse.vic.gov.au/DSE/nrenem.nsf/LinkView/F3C0CB8C21FD0964CA257157001B4D40C18B7E0199670F29CA256F5E0021B6C8>

and include directions such as that development does not occur where it will result in the loss, degradation or fragmentation of areas of coastal biodiversity.

The State and Regional Coastal Plans are treated as State Planning Policies for the purposes of the *Integrated Planning Act 1997* (IPA), meaning they must be taken into account by an assessment manager (usually the local Council) when assessing development applications. However, this means that Council must only “have regard to” the documents, and in practice they are frequently undermined. To be more effective, State and Regional Coastal Management Plans must be given an elevated status under IPA so that its provisions must be implemented. The State and Regional Plan are also considered a “State Interest” when developing local town planning schemes, meaning that the Planning Minister can require the State Coastal Plan to be reflected in local planning schemes and must also consider the State Plan prior to designating land for community infrastructure. However in practice, the details of the State or Regional Plans are not clearly and thoroughly implemented in local planning schemes as part of the process of doing the state interest check on draft local planning schemes.

Provisions of the **State Coastal Management Plan** address climate change issues. Section 2.2.4 of the State Plan deals with storm tides, cyclone effects and related inundation and recognises these as ‘coastal hazards’. The State Plan requires that the associated risks of coastal hazards are minimised, including by carefully considering development in coastal risk areas and wherever possible retaining those areas undeveloped. However, until Councils are obliged to comply with the State and Regional Plans (rather than simply “have regard to” them), these provisions will continue to be ineffective.

### Western Australia

WA does not have special purpose coastal protection legislation assigning responsibility to a particular agency or Minister. Instead, advice and strategic policy on the planning and management of the WA coast is provided by the Coastal Planning and Coordination Council, a Committee of the **Western Australian Planning Commission**.

The draft *Coastal Zone Management Policy for Western Australia (2001)* provides a ‘whole-of-government’ policy framework for coastal planning, management and protection. It sets out, in broad terms, coastal zone management objectives, including environmental, community, economic, infrastructure and regional development objectives. It also contains government policies for planning and management of the coastal zone.

The *Statement of Planning Policy No 2: Environment and Natural Resources Policy* sets out the broad environment and resource management policies for sustainability. It includes measures to “[s]afeguard and enhance areas of environmental significance on the coast ... [e]nsure use and development on or adjacent to the coast is compatible with its future sustainable use for conservation, recreation and tourism in appropriate areas [and to] [t]ake into

*account the potential for impacts from changes in climate and weather on human activities and cultural heritage including coastal and urban communities, natural systems and water resources.” (cl 5.1)*

The **Statement of Planning Policy No. 2.6: State Coastal Planning Policy** applies to the coast state-wide and is intended to complement SPP 2 and draft Coastal Zone Management Policy by addressing the more operational aspects of coastal planning. The policy provides high order guidance for decision-making on coastal planning matters and seeks to inform and guide the WAPC in undertaking its planning responsibilities. It also aims to guide local governments, and other agencies, about those aspects of State planning policy concerning the protection of the coast that should be taken into account in planning decision-making. SPP 2.6 is to be implemented through the preparation of regional and local strategies, plans and statutory planning schemes. It sets out requirements for local governments developing a coastal planning strategy by outlining what should be taken into account in the preparation of the strategy and the types of requirements and guidelines that must be included in the strategy itself. The policy encourages partnership with the broader community in this process. More specifically, SPP 2.6 provides guidance for determining a set-back, which is generally to be 100m from the horizontal setback datum (cl 2.3).

The **Coastal Planning and Management Manual (2003)** provides more detailed guidance on coastal planning and management for community groups and local government. It provides further detail on the types of coastal strategies and plans that can be developed and sets out coastal planning and management principles (e.g. sustainable management, identifying limits of acceptable change, maintenance of ecosystem integrity, consultation, minimal intervention etc).

In addition, WA has **Development Control Policies**. Outside the Perth Metropolitan Region, coastal planning in Western Australia has been largely guided by the WAPC’s **Development Control Policy 6.1 Country Coastal Planning Policy**. DCP 6.1 operates in a subordinate capacity to the SPPs. It provides general development principles, including requirements to the separation from the coast by a foreshore reserve, public access to the foreshore, and that development should not reduce the visual amenity of the foreshore (cl 3.1). It sets out principles adopted by the WAPC for the allocation of coastal land, for example, *“to give priority to coastal dependent developments over non-coastal dependent developments”* (cl 3.2.1). It also provides guidelines for set-backs (generally 100m) and the preservation of the ecology, visual amenity, and soil and water quality of the coastline. Other WAPC Development Control Policies relevant to the coast are:

- 1.8 Canal Estates and other Artificial Waterway Developments,
- 2.3 Public Open Space in Residential Areas and
- 4.2 Planning for Hazards and Safety.

In addition, many coastal management plans and strategies for specific areas and regions have been prepared by the WAPC, or by local governments, and a Regional strategy for the Perth metropolitan coastline is currently under preparation.

## Northern Territory

The overarching policy direction for coastal zone management in the NT is provided by the **Northern Territory Coastal Management Policy**. The policy is designed to guide management, planning and conservation in the NT coastal zone. Initially developed in 1985, this policy is currently under review.

The **Darwin Harbour Regional Plan of Management (DHRPM)** area covers Port Darwin, Shoal Bay and their catchments. The following five goals were identified by the DHRPM in order to achieve sound management of the Darwin Harbour region:

- To maintain a healthy environment;
- To support the sustainable recreational use and enjoyment of the environment;
- To encourage ecologically sustainable development;
- To protect cultural and heritage values; and
- To foster community ownership and participation in management.

A report about the status of the DHRPM was released in September 2007 by the Darling Harbour Advisory Committee. This report noted that “while the expectations remain high that the Plan will be implemented, the committee has been discouraged by a lack of funding and lack of commitment by the government to support the Plan as endorsed by Cabinet in early 2004”<sup>10</sup>. This indicates that the implementation of some of the objectives of the DHRPM in 2005-06 has been hampered by a number of factors. There were additional difficulties implementing the Plan as the “role and responsibility of DHAC as well as the status of the Plan continue to be unrecognized in legislation”<sup>11</sup>. A report by the committee is due to be released regarding the progress of the implementation of those objectives contained in the DHRPM.

The *Integrated Natural Resource Management Plan for the Northern Territory* was released in March 2005, and was based on the following three governing principles:

- “It should promote and support ecologically sustainable development;
- It should apply the precautionary principle in the absence of sound data on which to base planning decisions; and
- It should promote and support adaptive management.”<sup>12</sup>

10 2005-2006 Status Report on the implementation of The Darwin Harbour Regional Plan of Management. Available at: [www.nt.gov.au/nreta/water/dhac/pdf/dhac\\_status\\_report.pdf](http://www.nt.gov.au/nreta/water/dhac/pdf/dhac_status_report.pdf)

11 2005-2006 Status Report on the implementation of The Darwin Harbour Regional Plan of Management. Available at: [www.nt.gov.au/nreta/water/dhac/pdf/dhac\\_status\\_report.pdf](http://www.nt.gov.au/nreta/water/dhac/pdf/dhac_status_report.pdf)

12 Integrated Natural Resource Management Plan for the Northern Territory. Available at: <http://nrmbnt.org.au/files/inrmp/INRMPlanMarch2005.pdf>

The establishment of the three core governing principles demonstrates understanding of the importance of those factors integral to natural resource management. The Natural Resource Management Board (NT) Inc. is the regional body appointed the responsibility of developing and implementing the Plan. The Plan has been criticised as it “lacks detailed information about the role of stakeholders in the implementation and monitoring process.”<sup>13</sup>

The Northern Territory Marine Protected Areas Advisory Committee was established to provide stakeholder feedback to the Department of Natural Resources Environment & the Arts on the development of a **draft Northern Territory Marine Protected Areas Strategy**. This Strategy aims to “set out the legislative, scientific, planning and consultation framework” for how new Marine Protected areas will be identified. This strategy is an indication that management of the Northern Territory is beginning to incorporate an integrated approach into coastal zone management. This Strategy is currently being developed.

Other broad conservation plans such as the *Draft Northern Territory Parks and Conservation Masterplan*<sup>14</sup> may be relevant for the coast, but due to recent comments from government, there is some suggestion that this plan will not be implemented due to insufficient resources.

The *NT Environmental Impact Assessment Guide – Greenhouse Gas Emissions February 2007* aims to “assist proponents in providing the information needed by the Environmental Protection Agency Program to assess the impact of greenhouse gas emissions from proposed projects during assessment under the *Northern Territory Environmental Assessment Act 1994*. It identifies that proponents of projects should give particular consideration to the following five risks associated with the impacts of climate change;

- “increasing average temperature and evaporation rates;
- variation in rainfall and the incidence of floods;
- sea level rise;
- increased frequency and intensity of cyclones and storm surge levels; and
- altered distribution of pests and disease.”<sup>15</sup>

## South Australia

The *Coast Protection Act 1972* was created for the specific purpose of establishing a regulatory statutory body – the **Coast Protection Board** (CPB) – and outlining its powers, requirements and responsibilities. Under section 6 of the Act, the CPB is the statutory authority responsible for the management of the states

13 Hilton L. 2007, ‘Structuring South West’s Natural Management Plan’. Available at [http://www.southwestnrm.org.au/publications/downloads/ConsultancyReport\\_StructuringSWNRMPPlan\\_11-03-07.pdf](http://www.southwestnrm.org.au/publications/downloads/ConsultancyReport_StructuringSWNRMPPlan_11-03-07.pdf)

14 Northern Territory Parks and Conservation Masterplan, Summary Paper September 2005. Available at [www.nt.gov.au/nreta/parks/masterplan/pdf/summary\\_paper.pdf](http://www.nt.gov.au/nreta/parks/masterplan/pdf/summary_paper.pdf)

15 Available at: <http://www.nt.gov.au/nreta/environment/greenhouse/pdf/ghgemissions.pdf>



coastline and administration of the Act. The CPB is particularly interested in establishing whether land and any development on it is likely to affect, or be affected by coastal processes including storm surge flooding and short or long-term changes in the position of the coastline. The CPB assesses the impact of development and rezoning on coastal qualities such as conservation of vegetation/reserves/beaches. The CPB will assess the extent of impacts, particularly effects on natural coastal processes.

In 1992, the CPB established South Australia as the first State in Australia to adopt planning policies and standards to minimise the risk to coastal development by climate change-induced sea level rise. The ***Coastline: Coastal erosion, flooding and sea level rise standards and protection policy (1992)***, which has been included in the council-wide provisions of development plans, states that:

- Development should not be approved where building sites are lower than a height determined by adding 0.3 m (for 50 years of sea level rise) to the 1-in-100 year storm surge level and making an adjustment (where appropriate) for land level changes to 2050.
- For commercial or habitable buildings, floor levels should be no less than 0.25 m above this minimum site level.
- Development should not be approved unless it is capable, by reasonably practical means, of being protected or raised to withstand a further 0.7 m of sea level rise. (This condition allows for a further sea level rise of 0.7 m from 2050 to 2100 for a total sea level rise of 1 m to 2100).

This policy has been since incorporated into development plans and planning strategies by state and local government.

More recently, the ***Living Coast Strategy for South Australia (2004)*** was devised to formally set out the State Government's environmental policy directions for the sustainable management of these environments. This was in recognition of the significant pressure Australia's coastal, estuarine and marine environments are under following the 'Review of the Management of Adelaide Metropolitan Beaches' (Government of South Australia 1997), and the *Framework for a National Cooperative Approach to Integrated Coastal Zone Management* (2003) developed by the National Resource Management Ministerial Council. The SA Strategy follows from and builds on the State Government's previous policy document, *Our Seas and Coasts: A Marine and Estuarine Strategy for South Australia 1997*. The strategy encompasses a wide range of environmental initiatives and programs and sets out the policy directions that the State Government will be taking over the following five years to help protect and manage South Australia's coastal areas, estuaries and marine ecosystems. In addition, there is the proposal that there be, in conjunction with local government and the Commonwealth, the development of a clear policy for Government to manage sea-level change.

Due to concerns about sand erosion, tidal drift, seawalls and the need for beach nourishment, the Department for Environment and Heritage, on behalf of the Coast Protection Board initiated a review of the management of Adelaide's metropolitan beaches in 2000, and based on the recommendations of this report developed an innovative strategy for managing Adelaide's beaches called ***Adelaide's Living Beaches: A Strategy for 2005–2025***. The Government of South Australia endorsed the strategy in November 2005. Policy makers recognise that climate change is likely to gradually alter the forces that act

on the coastline, and so they must allow for additional supplies of sand to maintain beach width and provide for strengthened dune buffers. It is anticipated that the main effects of climate change along the coast of South Australia will be sea level rise and changes to weather and hence wave conditions. The vast majority of the explanation and policy on the effects of climate change on the coast of SA in this document is simply a re-iteration of the Coastal Protection Board's policy developed in 1992 (*Coastline: Coastal erosion, flooding and sea level rise standards and protection policy* 1992).

The ***Marine Planning Framework for South Australia (2006)*** incorporates elements of 'South Australia's Strategic Plan' (Government of SA 2004) regarding sustainable development, and *Living Coast Strategy for South Australia*. The framework will require a statutory basis from which to operate, which will be provided through a proposed revision of the ***Coast Protection Act 1972***, and will interact with the ***Development Act 1993*** and the ***Natural Resources Management Act 2004***. The Planning Framework does not contain any specific climate change provisions.

While many of the other policies in this area are purely directional and often aspirational, the Marine Planning Framework (2006) represents a practical embodiment of these and other policy directions that have been incorporated into development legislation. The overarching goals, objectives and strategies from the marine planning zones will, as appropriate, be incorporated into the *Planning Strategy for South Australia* under the *Development Act 1993*. In particular, the Better Development Plans project currently being undertaken by Planning SA will strengthen the linkages between the *Planning Strategy for South Australia*, Marine Plans and Development Plans. This will assist in ensuring that the strategies and objectives of Marine Plans are incorporated into the relevant Development Plans. The Government anticipate that existing responsibilities and jurisdictions of management agencies will remain, but the resource management policies, strategies, and plans will be progressively amended to manage development and use consistent with the objectives applied to relevant zones.

The ***Estuaries Policy and Action Plan (2005)*** provides a bridge between DEH coastal policy, and the realm of the Department of Water, Land and Biodiversity Conservation, which deal with the riparian part of the catchment-coast-ocean continuum. The broad vision of this policy document is that of the provision of '*healthy estuaries for the benefit of present and future generations*'. There are 5 key outcomes identified as requisite to achieving this vision:

- 1) Better management of estuaries for economic, social and environmental sustainability
- 2) Better development planning tools are established to aid decision making for social and environmental sustainability
- 3) The conservation values of estuaries are protected
- 4) Greater community understanding and involvement
- 5) Comprehensive research and monitoring of estuaries.

With respect to estuarine environments, DEH has (or is in the process of) developing 'Estuaries Information Packages' (EIP) for each of the 5 NRM regions of the state to support NRM bodies, State and local government and other agencies undertaking planning and management in estuarine areas. These EIP's provide an overview of the environmental, social and economic values of the estuaries in each

region.

More broadly, the *South Australia's Strategic Plan (2004)* as reviewed and updated in January 2007, the 'Strategic Plan' represents a dynamic framework for the forward development of the State of South Australia, and acts as an umbrella policy, informing and instructing the creation and development of policy in all areas of governance. The key targets broadly instructing the evolution of South Australian policy on coastal development, climate change and the environment are: Lose no Species, Marine Biodiversity, Ecological Footprint, River Murray – flows, and River Murray – salinity.

### New South Wales

A recent review conducted by the NSW Environmental Defender's Office (EDO) discovered that only 7 pieces of Commonwealth and NSW legislation mention climate change.<sup>16</sup> Key legislation of relevance to coastal management in NSW includes: the *Coastal Protection Act 1979*, as amended in 2002; the *Environmental Planning and Assessment Act 1979 (EP&A Act 1979)*; and the *Local Government Act 1993 (LG Act 1993)*.

The *Coastal Protection Act 1979* is the principal piece of legislation that applies to the NSW coastal zone. It aims to provide for the protection of the coastal environment of the State "for the benefit of both present and future generations".<sup>17</sup> This Act contains provisions relating to the use and supervision of the coastal zone, the carrying out of development within the coastal zone and the preparation of the Coastal Zone Management Plans.<sup>18</sup> The coastal zone was extended in 2005 and now also applies to the greater metropolitan regions of Sydney, Newcastle, the Illawarra and the Central Coast.

The Act prohibits a public authority from authorising or carrying out development in the coastal zone, without the consent of the Minister, if the Minister is of the opinion that the development:

- is inconsistent with principles of ecologically sustainable development
- adversely affects the behaviour of the sea or an arm of the sea or any bay, inlet, lagoon, lake, body of water, river, stream or watercourse; or
- adversely affects any beach or dune the bed, bank, shoreline, foreshore or flood plain of the sea or an arm of the sea or any bay, inlet, lagoon margin, lake, body of water, river, stream or watercourse.<sup>19</sup>

16 For further detail please see the report prepared by the NSW EDO for the Sydney Coastal Councils Group: *Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils*. February 2008 and is available at: <http://www.edo.org.au/edonsw/site/policy.php>.

17 Section 3, *Coastal Protection Act 1979*.

18 Coastal Zone Management Plans must address the following three things: the protection and preservation of the beach environment and beach amenity; emergency action to be taken during periods of beach erosion; and continuing and undiminished public access to beaches and waterways.

19 The coastal zone is defined in the *NSW Coastal Policy 1997* as 3 nautical miles seaward of the mainland and offshore islands; 1 km landward of the open coast high water mark; a distance of 1 km around all bays, estuaries, coastal lakes, lagoons and coastal rivers to the limit of mangroves or the tidal limit whichever is closer to the sea.

The preparation of a Coastal Zone Management Plan is currently discretionary, unless the Minister directs a council to prepare a plan. However, it is prudent for a council to prepare such a plan even in the absence of a ministerial direction as it enables a strategic approach to be taken in responding to climate change impacts within the coastal zone.

The *Environmental Planning and Assessment Act 1979* (*EP&A Act 1979*) has the potential to greatly influence the interaction between infrastructure and the environment when considering development in the coastal zone<sup>20</sup>. Section 117 of the *EP&A Act 1979*, provides that a Local Environmental Plan (LEP) be developed. An LEP is one environmental planning instrument (EPI) used to control the use of land adjoining the beach<sup>21</sup>. The development of such LEP's should include provisions that give effect to and are consistent with the NSW Coastal Policy 1997. This policy will be discussed in more detail below, however in reference to the development of EPI's, it provides the principles which should be addressed in new and existing LEP's (and Development Control Plans (DCP's)) to ensure:

- Only developments which do not compromise the natural and cultural values of the area will be permitted on beaches and frontal dunes; and
- In allowing works to protect, restore and rehabilitate beaches and frontal dunes, to preferably favour "soft" engineering<sup>22</sup> approaches as developed through a Coastline Management Plan.<sup>23</sup>

This Act appears to demonstrate that some efforts have been made to better manage the coastal zone, however in practice, many inappropriate developments are still approved in sensitive coastal zones. A consequence of the listing of developments in the coastal zone as Part 3A projects (under the *EP&A Act 1979*) is that developments that are likely to have the greatest impact on the coastal environment in NSW will be decided by the Planning Minister who determines the scope of any environmental assessment. This would be appropriate, provided that there is a clear process in place to ensure that environmental impacts are adequately considered, that the public is involved in the process and that concurrence is obtained from Minister for Climate Change, Environment and Water. This is not currently the case. Under section 75U of the *Environmental Planning and Assessment Act 1979*, the concurrence of the Minister for Climate Change, Environment and Water is not required for a Part 3A project (ie, the Minister charged with administering the *Coastal Protection Act 1979*).

On 1 November 2002 the Minister for Planning, pursuant to the *Environmental Planning and Assessment Act 1979* (*EP&A 1979*), implemented **State Environmental Planning Policy Number 71 – Coastal Protection (SEPP 71)**. This policy was introduced to regulate all development in NSW (other than the coastal land in the greater Sydney area) within the "coastal zone". The coastal zone is defined by reference

20 The coastal zone is defined in the *NSW Coastal Policy 1997* as 3 nautical miles seaward of the mainland and offshore islands; 1 km landward of the open coast high water mark; a distance of 1 km around all bays, estuaries, coastal lakes, lagoons and coastal rivers to the limit of mangroves or the tidal limit whichever is closer to the sea.

21 Thom, B. 2003, 'Beach Protection in NSW, New Measures to secure the environment and amenity of NSW beaches', *Environmental and Planning Law Journal*, vol. 20, no.5, pp 325-358.

22 Soft engineering approaches are discussed further below.

23 Thom, B. 2003, 'Beach Protection in NSW, New Measures to secure the environment and amenity of NSW beaches', *Environmental and Planning Law Journal*, vol. 20, no.5, pp 325-358.

to coastal zone maps, however it generally extends to:

- three nautical miles seaward of the mainland and offshore islands,
- one kilometre inland of the 'open coast' high water mark,
- one kilometre around all bays, estuaries, coastal lakes, lagoons and islands, and
- in relation to tidal rivers, one kilometre around the tidal waters of the river to the limit of mangroves, or the tidal limit (whichever is closer to the sea).

Under the policy, development applications that will diminish access to coastal foreshores, result in effluent that negatively affects water quality, or involve discharge of stormwater into the sea, a beach, coastal lake, creek or rock platform, must be rejected by the appropriate consent authority. SEPP 71 requires councils to address some of the environmental impacts associated with climate change, when deciding whether to grant consent to a development application. Councils are required to take into account “the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and hazards”<sup>24</sup>. This policy appears to demonstrate that there has been progress made in implementing considerations regarding climate change when considering the viability of development applications in coastal zones. However, the introduction of the *State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP), which incorporated several provisions from SEPP 71, has greatly undermined the environmental assessment process in coastal area. The *NSW Coastal Policy 1997* should be a mandatory consideration for the Planning Minister, and concurrence of the Environment Minister under the EP&A Act should also be required. Otherwise the overarching policy, which is meant to represent government policy relating to the management of NSW's coast, is meaningless, as it does not apply to activities that are likely to have the most significant impact on the coastal zone<sup>25</sup>.

In addition, the *Local Government Act 1993* provides that responsibility for the management of lands and waters in a given local government area, falls usually to local councils. Section 377 of the *LG Act 1993* provides for very broad powers to delegate such responsibility to committees, formed under the Act, in regard to “any matter related to development or use of all or part of their LGA”<sup>26</sup>. It is thought that such delegation has “established a process for evaluating hazards, amenities, resource use or conservation of areas periodically subjected to storm events” and has “established the lead role for councils in managing beaches which may or may not be formally in their care and control.”<sup>27</sup>

In addition to legislation, a number of policies have been developed for the NSW coast. The principal policy guiding local councils in the coastal zone is the *NSW Coastal Policy 1997*. One of the aims of the

24 *State Environmental Planning Policy No 71 – Coastal Protection*, Part 2 Sec 8(j).

25 Full submission by the NSW EDO on this topic available at: [http://www.edo.org.au/edonsw/site/policy/sepp\\_major\\_projects070525.php](http://www.edo.org.au/edonsw/site/policy/sepp_major_projects070525.php).

26 Thom, B. 2003, 'Beach Protection in NSW, New Measures to secure the environment and amenity of NSW beaches', *Environmental and Planning Law Journal*, vol. 20, no.5, pp 325-358.

27 Thom, B. 2003, 'Beach Protection in NSW, New Measures to secure the environment and amenity of NSW beaches', *Environmental and Planning Law Journal*, vol. 20, no.5, pp 325-358.

policy is to promote 'the ecologically sustainable development of the New South Wales coastline'. The Policy aims to facilitate the development of the coastal zone in a way which protects and conserves its values. This includes recognising and accommodating natural processes and protecting beach amenity and public access.

*"The 1997 Coastal Policy is essentially focused on recognising the need to reconcile the rapid population growth currently being experienced in coastal areas with the need to conserve what remains of valuable ecosystems."*<sup>28</sup>

The *NSW Coastal Policy 1997* contains provisions to implement appropriate planning mechanisms that incorporate sea level change scenarios set by the Inter-governmental Panel on Climate Change (IPCC), in order "to protect and conserve the coast for future generations"<sup>29</sup>. The Policy sets out various goals, actions and objectives. The key strategic action outlined in the policy is the development and implementation of Coastal and Estuary Management Plans in accordance with the existing Coastline and draft Estuary Management Manuals.

In June 1988 the NSW Government adopted the ***Coastline Hazard Policy***. The primary objective of the *Coastline Hazard Policy* was to reduce the impact of coastal hazards on individual owners and occupiers, and to reduce private and public losses resulting from natural coastal forces. The Policy sets out that certain actions should be taken to address coastal hazards. First, the impact of coastal forces on existing developed areas shall be reduced by works and measures and by the purchase of property on a voluntary basis, where appropriate. Second, the potential for coastal damage in respect of any proposed coastline development shall be addressed through the application of effective planning and development controls by local councils. Lastly, a merits approach to all development and building decisions should be adopted which takes account of social, economic and ecological as well as oceanic process considerations.

The ***NSW Coastline Management Manual 1990*** was prepared as part of the implementation of the *Coastline Hazard Policy*. The Manual was created to facilitate a sound understanding of coastal processes/hazards in NSW and their underlying causes. It assesses and identifies all available management options against environmental, social and economic criteria. It also provides detailed guidelines for councils to follow to address coastal erosion issues. The Manual also outlines a series of steps to prepare and then implement Coastline Management Plans, as well as other adaptive actions councils can take to address coastal hazards. As part of the **Coastal Protection Package** announced in 2001, Cabinet requested that a new Coastal Zone Management Manual be prepared to combine and revise the existing Coastline and Estuary Management Manuals. This new manual is not expected until 2008-2009. The 2005 **NSW Floodplain Development Manual** also addresses climate change management issues.

The NSW Government supports the coastal management planning process through the **Coastal Management Program**. It aims to enhance the amenity of the NSW coastline and to protect

28 *NSW Coastal Policy 1997*, Available at:  
<http://www.planning.nsw.gov.au/plansforaction/pdf/PPARTA.PDF>.

29 *NSW Coastal Policy 1997*, Available at:  
<http://www.planning.nsw.gov.au/plansforaction/pdf/PPARTA.PDF>.

infrastructure from coastal hazards in an ecologically sustainable manner. Under the Program, which is administered by the Department of Environment and Climate Change, the Government provides funding to local councils on a 50:50 basis for the preparation of Coastal Zone Management Plans. The Program also provides funds toward the implementation of management plans including mitigation works to address coastal hazard problems or coastal amenity enhancement. Furthermore, specialist technical advice is provided to local government addressing coastal processes/hazards and coastal management. This includes representation on Coastal Management Committees, and the provision of technical/specialist advice as required.

**Extract from *Planning for Coastal Climate Change: An Insight into International and National Approaches*, Barbara Norman<sup>30</sup>**

State	Policy/Strategies/Plan	Technical documents	Modelling/mapping	Future Work
<b>VICTORIA</b>	<p>The Victorian Coastal Strategy 2008 (VCS) sets the overall strategic direction for planning and management of the coast.</p> <p>Plan for sea level rise of not less than 0.8 metres by 2100, and allow for the combined effects of tides, storm surges, coastal processes and local conditions, such as topography and geology when assessing risks and impacts associated with climate change. As</p>	<ul style="list-style-type: none"> <li>▪ Currently developing interim guidelines about how to applying 0.8 metres sea level rise on coast</li> <li>▪ Ministerial Direction- non urban to urban new developments</li> <li>▪ General Practise Note - managing coastal hazards and the coastal impacts of climate change</li> <li>▪ Advisory Note - detail on planning for 0.8 metre sea-level rise</li> </ul> <p><a href="http://www.dse.vic.gov.au/DSE/nre npl.nsf/LinkView/9237AC17626E8D9">http://www.dse.vic.gov.au/DSE/nre npl.nsf/LinkView/9237AC17626E8D9</a></p>	<ul style="list-style-type: none"> <li>▪ DEM for whole of coast at 20 cm contour detail</li> <li>▪ Bathymetry for whole of coast</li> <li>▪ Modelling work to be undertaken to look at erosion, inundation along the coast - scale and detail of this modelling is yet to be determined.</li> </ul> <p><a href="http://www.climatechange.vic.gov.au/futurecoasts">http://www.climatechange.vic.gov.au/futurecoasts</a></p>	<ul style="list-style-type: none"> <li>▪ The Future Coasts Program undertaken by DSE will investigate adaptation options and an assessment framework</li> <li>▪ Planning Advisory Group set up by Department of Planning and Community Development (DPCD). Terms of Reference to be released shortly.</li> </ul>

30 B Norman, *Planning for Coastal Climate Change: an Insight into International and National Approaches*, Victorian Department of Sustainability and Environment and Department of Planning and Community Development, 2009 – Exhibit 176.



	<p>scientific data becomes available the policy of planning for sea level rise of not less than 0.8 metres by 2100 will be reviewed.</p> <p>State Planning Policy Framework, clause 15.08 is updated to reflect latest VCS.</p> <p><a href="http://www.vcc.vic.gov.au/2008vcs/part2.1climatechange.htm">http://www.vcc.vic.gov.au/2008vcs/part2.1climatechange.htm</a></p>	<p>ACA2572C6001E86EBEF546347BB845 D44CA2572DA007FE2BE</p>		
<b>NEW SOUTH WALES</b>	<ul style="list-style-type: none"> <li>▪ NSW Coastal Policy <a href="http://www.planning.nsw.gov.au/plansforaction/coastalprotection.asp">http://www.planning.nsw.gov.au/plansforaction/coastalprotection.asp</a></li> <li>▪ State Environmental Planning Policy (SEPP) No. 71 - Coastal Protection commenced on 1 November 2002. The Policy has been made under the <i>Environmental Planning and Assessment Act 1979</i></li> <li>▪ Regional Strategies for coastal areas</li> <li>▪ Draft policy plan for 0.9 m sea level rise to 2100</li> </ul>	<p>The definition of the coastal hazards takes into account the impact of sea level rise and future shoreline recession.</p> <p>Regional strategies require councils to consider increased coastal hazards when developing new LEPs.</p> <p><b>NSW Coastline Management Manual</b></p> <p>To guide for local councils, CMA and communities develop coastal zone management plans. Adopts a risk management approach</p> <p><a href="http://www.environment.gov.au/coa">http://www.environment.gov.au/coa</a></p>	<ul style="list-style-type: none"> <li>▪ Local govt doing LIDAR capture</li> <li>▪ State bathymetry - LAD's (needs to be ground truthed well)</li> <li>▪ Coastal vulnerability assessment – risk based approach – value asset (\$ values erosion etc)</li> <li>▪ 95 % complete not yet released <a href="http://www.planning.nsw.gov.au/plansforaction/climatechange_mapping.asp">http://www.planning.nsw.gov.au/plansforaction/climatechange_mapping.asp</a></li> </ul>	<ul style="list-style-type: none"> <li>▪ Govt doesn't have funding to buy back land</li> <li>▪ Department of Planning will develop guidelines for consistent assessment of future developments in vulnerable areas.</li> <li>▪ The Coastline Management Manual is being reviewed by DECC.</li> </ul>

		<p>sts/publications/nswmanual/index.html</p> <p><b>Local Environmental Plan template</b></p> <p>The LEP template includes provisions for consideration and accommodation of the impacts of climate change and sea level rise.</p> <p><b>Floodplain guidelines</b></p> <p>DECC's Floodplain Risk Management Guideline Practical Consideration of Climate Change</p> <p><b>SLR Technical Note</b></p> <p>The government has issued a technical note which explains how the sea level rise benchmarks were derived.</p>		
<b>TASMANIA</b>	<p><b>State Coastal Policy 2008</b> has been endorsed Government and is about to be referred to the RPDC for formal public consultation under the <i>State Policies and Projects Act 1993</i>. Implementation guidelines will also be referred.</p> <p>Standard planning scheme</p>	<p>DPIW managed Coastal Risk Assessment project The Project is developing tools and resources to assist with risk-based management and planning for various assets and values in the coastal zone.</p> <p><a href="http://www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7HNVLZ?open">http://www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7HNVLZ?open</a>.</p>	<p>Clarence City Council 'CC Impacts on Clarence Coastal Areas' project is a detailed integrated assessment of climate change risks</p> <p><a href="http://www.ccc.tas.gov.au/webdata/resources/files/CCICCA-Final-Report-A415375.pdf">http://www.ccc.tas.gov.au/webdata/resources/files/CCICCA-Final-Report-A415375.pdf</a></p>	<p>Work across government during 09/10 will focus on:</p> <p>Policy settings</p> <p>Planning provisions</p> <p>Implementation of Risk Assessment template with local Councils</p>

	<p>provisions will be developed as a recommendation of 'Better Planning Outcomes' project. New Coastal Policy and other policies will be implemented through these provisions.</p> <p><a href="http://www.justice.tas.gov.au/landuseplanning/better_planning_outcomes">http://www.justice.tas.gov.au/landuseplanning/better_planning_outcomes</a></p> <p><b>Existing State Coastal Policy 1996 -Outcome 1.4.3</b> is a driver for current policy and program responses to the potential effects of climate change (including sea level rise) on use and development in the coastal zone.</p> <p><b>Regional Planning</b></p> <p>Four regional planning strategies will include coastal planning issues and CC/SLR. They will contribute to implementation of new coastal policy. Current planning schemes will be replaced by a 'model' scheme that will</p>	<p>Technical documents include:</p> <ul style="list-style-type: none"> <li>▪ Template Coastal Risk Management Plan</li> <li>▪ General Information Paper on Coastal Hazards on Tasmania</li> <li>▪ Climate Change and Coastal Asset Vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise</li> <li>▪ Sea-Level Extremes in Tasmania: Summary and Practical Guide for Planners and Managers</li> <li>▪ Reference Manual: Historical and Projected Sea-Level Extremes for Hobart and Burnie, Tasmania</li> <li>▪ Background Report Coastal flooding: Review of the use of Exceedence Statistics in Tasmania</li> </ul>	<p>Current State initiative to draw together available data into 'toolbox' to support 'Clarence' type projects across Tasmania. Resources to be sought to address gaps. Data includes:</p> <ul style="list-style-type: none"> <li>▪ LIDAR 25 cm contours to 10m for more populated coastlines - free to all to use</li> <li>▪ Bathymetry a significant gap</li> <li>▪ Foreshores and immediate hinterland values mapping underway</li> <li>▪ Inshore marine habitat mapping to 40m (SeaMap Tasmania)</li> </ul>	<p>Identification of risk to natural systems</p> <p>Publishing coastal works and CC response manual</p> <p>Collaboration with local govt. under Statewide Partnership Agreement</p> <p><a href="http://www.climatechange.tas.gov.au/features/Partnership_Agreement_on_Climate_Change.pdf">http://www.climatechange.tas.gov.au/features/Partnership_Agreement_on_Climate_Change.pdf</a></p>
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	<p>implement the regional strategies.</p> <p><b>Sea level rise</b></p> <p>No statewide approach at this stage – individual planning schemes vary, but a number use 3 m AHD inserted in the late 1980s. Tasmania may not adopt a uniform SLR value at this stage, but is adopting a risk based approach taking location and planned life of development into account.</p>			
<b>SOUTH AUSTRALIA</b>	<p><b>Policy</b></p> <p>Coast Protection Board Policy Document, endorsed 30 August 2002.</p> <p>Coast Protection Board Policy translated into coastal Development Plans (the statutory development control documents – one Development Plan for each area) by way of a Ministerial amendment in 1994.</p> <p>The Board recommends sea level</p>	<p>Coast Protection Board Policy Document, endorsed 30 August 2002 – includes:</p> <p><i>Appendix 1- Standards applying to new development with regard to coastal flooding and erosion and associated protection works, includes 11 Standards including the following:</i></p> <p>S1 – Site and Building Levels</p> <p>S2 - Flood Protected site and building levels</p>	<p>Port Adelaide Seawater Stormwater Flooding Study Project led and partly funded by City of Port Adelaide Enfield with further funding from Commonwealth and State sources.</p> <p>The project is in two parts –</p> <p>Stage (1): A full assessment of the potential risks associated with the projected coastal impacts of climate change, combined with the existing flooding profile (completed);</p>	<p>April 10 2008 – State Government reaffirmed its support to review the Coast Protection Act.</p> <p>Continuing effort to improve Development Plans to ensure that sensitive coastal features (including areas subject to coastal hazards) are included in appropriate coastal zones</p>

	<p>rise of 0.3m by 2050 to be adopted for most coastal development (provided that development can be practicably protected against the further rise of 0.7 m to 2100).</p> <p>In regards to coastal erosion, development setbacks should generally take into account 100 years of erosion at a site (taking into account local coastal processes and assuming a sea level rise of 0.3m by the year 2050). For major developments, especially those establishing entire new communities, 200 years of recession should be considered, and also the effect of sea level rise on this over the longer period.</p> <p>Currently the Board policy is under review - on 27 March 2009 the Board endorsed the Final Report of its Sea Level Rise Advisory Committee and approved targeted stakeholder consultation</p>	<p>S3 - Sea Level Rise for Major Developments</p> <p>S4 - Setback for Erosion</p> <p>S5 - Impact of Protection Works</p> <p><i>Appendix 2 - Draft Development Guidelines and Risk Assessment Criteria for Coastal Acid Sulfate Soils in South Australia</i></p> <p>The 1994 Ministerial amendment to Development Plans provided a set of regional and council-wide objectives and principles. The provisions included matters of environment protection, the preservation of scenic, heritage and other values, maintenance of public access and hazard risk minimisation (coastal flooding and erosion):</p> <p>Those provisions included the following Principles:</p> <p><i>Maintenance of Public access</i></p> <p><i>15 Development adjacent to the coast</i></p>	<p>Stage (2): A strategic plan to address the issues identified in the above study, with associated investment programme (underway)</p> <p>Funding from the Natural Disaster Mitigation Program has been provided for sea flood risk mapping on low-lying coastal areas of Yorke Peninsula. The project incorporates the following key steps:</p> <ol style="list-style-type: none"> <li>1. Identification of Priority areas</li> <li>2. Aerial Photography</li> <li>3. Establishment of new survey benchmarks in coastal areas</li> <li>4. Building of a Digital Elevation Model for Flood Mapping</li> <li>5. Analysis of Flood Hazard under current and future sea level rise scenarios (four townships completed, two remaining).</li> </ol> <p>Funding has also been provided from</p>	<p>Coast Protection Board advice provided to Planning Authorities on development applications is not always accepted. Therefore the Government is examining extending powers of direction to the Coast Protection Board under Schedule 8 of the Development Regulations particularly in relation to coastal hazards.</p> <p>This is consistent with Strategy 4.3 of the Government's Living Coast Strategy</p>
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		<p><i>should not be undertaken unless it has or incorporates the provision of a public reserve, not including a road or erosion buffer provided in accordance with Principle 26, of at least 50 m width between such development and the toe of the primary dune or the top edge of the escarpment, unless the development relates to small scale infill development in a predominantly urban zone.</i></p> <p><i>21 For the purposes of assessing coastal developments the standard sea-flood risk level for a development site is defined as the 100 year average return interval extreme sea level (tide, stormwater and associated wave effects combined), plus an allowance for land subsidence for 50 years at that site.</i></p> <p><i>22 Land should not be divided for commercial, industrial or residential purposes unless a layout can be achieved whereby roads, parking areas and adequate development sites on each allotment are at least 0.3 m above the standard sea-flood risk level, unless the</i></p>	<p>the Natural Disaster Mitigation Program for a scoping study into South Australia's vulnerability to tsunamis, storm surge and sea level rise. The objective of the study is to identify knowledge gaps and prioritise future studies/works. The project is nearing completion with the final report to be delivered in June 2009.</p>	
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		<p>should have a floor level of at least 1.25m above the standard sea-flood risk level.</p> <p>25 Development which requires protection measures against coastal erosion, sea or stormwater flooding, sand drift or the management of other coastal processes at the time of development, or which may require protection or management measures in the future, should only be undertaken if:</p> <p>(a) the measures themselves will not have an adverse effect on coastal ecology, processes, conservation, public access and amenity;</p> <p>(b) the measures do not now, or in the future require community resources, including land,</p> <p>(c) the risk of failure of measures such as sand management, levee banks, flood gates, valves or stormwater pumping, is</p>		
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		<p>appropriate to the degree of the potential impact of a failure; and</p> <p>(d) adequate financial guarantees are in place to cover future construction, operation, maintenance and management of the protection measures.</p> <p><i>26 Development should be set-back a sufficient distance from the coast to provide an erosion buffer which will allow for at least 100 years of coastal retreat for single buildings or small scale developments. or 200 years of retreat for large scale developments such as new towns, unless:</i></p> <p><i>(a) the development incorporates private coastal works to protect the development and public reserve from the anticipated erosion, and the private coastal works comply with Principle 25; or</i></p> <p><i>(b) the council is committed to protecting the public reserve and</i></p>		
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		<p><i>development from the anticipated coastal erosion.</i></p> <p>27 <i>Where a coastal reserve exists, or is to be provided in accordance with Principle 15, it should be increased in width by the amount of buffer required.</i></p> <p>Note : SA Supreme Court Determination: Northcape Properties Pty Ltd V District Council Of Yorke Peninsula [2008] SASC 57 (4 March 2008).</p> <p><a href="http://www.austlii.edu.au/au/cases/sa/SASC/2008/57.html">http://www.austlii.edu.au/au/cases/sa/SASC/2008/57.html</a></p>		
<b>QUEENSLAND</b>	<p>The State Coastal Plan commenced in February 2002 and describes how the coastal zone is to be managed as required by the <i>Coastal Protection and Management Act 1995</i>.</p> <p><i>Supported by regional coastal plans (four completed)</i></p> <p><i>Coastal plans have status of State planning policy</i></p>	<ul style="list-style-type: none"> <li>▪ Technical guidelines about assessment of storm tide inundation risk – applies a nonstatutory SLR factor of 0.3 m/50yrs. This factor applied since 1993 (now under revision)</li> <li>▪ Guidelines published to show how coastal policies can be integrated into local planning schemes and applied in development assessment</li> </ul> <p><b>Erosion</b></p> <p>Information Fact Sheet - Assessment of erosion prone area width – Section 2.6</p>	<ul style="list-style-type: none"> <li>▪ Erosion prone area mapped (0 to 400 m on open coast depending on coast type; default 40m from MHWS tide in tidal waterways)</li> <li>▪ Aerial photograph program regularly flown (every 4 years along east coast – NSW to Cooktown).</li> <li>▪ Moved from film to digital images in 2008</li> <li>▪ DEM - State has recently adopted data standard and has</li> </ul>	<p><b>Revising Coastal Plan</b></p> <p>Section 42 of the Coastal Protection and Management Act 1995 requires that coastal plans be reviewed within seven years of commencement.</p> <p>The Minister for Sustainability, Climate Change and Innovation announced the</p>

	<p>The State Plan states that coastal management plans must address the impacts of climate change.</p> <p>Policy 2.2 – Physical Coastal Processes</p> <p>2A Principle – Trends in climate change including sea level rise, more extensive storm tide flooding and associated potential impacts are taken into consideration in planning processes.</p> <p>Policy 2.2.1 – Adaptation to Climate Change - Has a range of principles but not SRL number.</p> <p>Regional plans and planning schemes under Planning legislation provide means to give effect to coastal policies in development decisions</p> <p>Coastal Act provides that State can take land in erosion prone area (without compensation) where approval is given to subdivide –</p>	<p>– Brunn Rule used.</p> <p>Estimated SRL in based on the best current information available and the current value adopted for use in erosion prone area determination over a 50 year planning period is 0.3m.</p> <p><b>Shoreline erosion management plans</b></p> <p>– state funds 50% with councils – aimed at erosion response in advance of it becoming an emergency problem shows ‘ hot spots’ for councils eg: Cairns, sunshine</p>	<p>funded program (with Commonwealth) to acquire DEM between NSW &amp; Cooktown, plus hotspots (e.g. Torres Strait &amp; remote communities). Expect data capture to be complete by end 2010</p> <ul style="list-style-type: none"> <li>▪ Plot erosion, accretion at local scale (using aerial photo collection)</li> </ul>	<p>commencement of the review on 26 January 2008.</p> <p>New State coastal plan at an advanced stage – expected to release draft for public review in 3rd quarter 09. SLR factor being revised.</p>
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	provisions sit outside planning & development system			
<b>WESTERN AUSTRALIA</b>	<p>State Planning Policy 2.6 – State Coastal Planning Policy. This must be taken into account by decision makers in coastal planning.</p> <p>Currently have 100 m setback (from vegetation line) (with increase in 0.8 me sea level rise this would increase to 140m – this setback area is for both public access and physical erosion management)</p>	<p>SPP – Schedule 1 – Coastal Development Setback Guidelines for Physical Processes.</p> <p>There are three parts to the calculation:</p> <ol style="list-style-type: none"> <li>1. trend of erosion (S1)</li> <li>2. incidence of extreme storm events (S2)</li> <li>3. magnitude of sea level rise (S3)</li> </ol> <p>Guidelines based on 100 year planning time frame.</p> <p>Distance to allow for sea level rise has been derived from IPCC 2001 of 0.30m and applied to the Brunn rule with the multiplier of 100.</p>	<ul style="list-style-type: none"> <li>▪ DEM and bathymetry capture occurring at various locations</li> </ul> <p>Tsunami modelling, flood modelling and storm surge modelling</p>	<ul style="list-style-type: none"> <li>▪ Discussion paper about canal estates</li> <li>▪ Preparing a revision of the S3 component.</li> <li>▪ Reviewing policy guideline document to implement provisions in policy – may include sea level rise to 0.8m</li> </ul>