

SOUTH AUSTRALIA IN A CHANGING CLIMATE:  
A BLUEPRINT FOR A SUSTAINABLE FUTURE



# COAST & MARINE IN A CHANGING CLIMATE

## CCSA'S COAST AND MARINE VISION:

CCSA envisages a future where our coast and marine areas are valued and protected for their true worth; where the marine environment is not used as an endless dumping ground, and where marine resources are not overexploited. We envisage coastal and marine environments that are resilient to climate change, and coasts that are protected from vehicle damage and inappropriate development.

Coast: land next to the sea; the seashore.

Marine: 1. of or relating to the sea.

2. native to, inhabiting, or formed by the sea.

### **Current coast and marine trends**

South Australia's coastline extends 4250 kilometres, ranging from cliffs, rocky shores and sandy beaches in the South East and West Coast to mud flats, seagrass, samphire and mangrove habitats in the upper St Vincent and Spencer Gulf regions<sup>15</sup>.

Our marine environment is an extremely valuable resource, supporting large commercial and recreational fisheries, as well as aquaculture worth approximately \$500 million a year to South Australia's economy<sup>16</sup>. Many South Australian fisheries are at their upper sustainable limit, and alarmingly some are currently over fished. The number of fisheries that are fully fished is increasing, with Snapper in Gulf St Vincent and Northern Zone Rock Lobster already identified as overfished<sup>17</sup>.

As a community living primarily along the coast, our development of coastal regions has resulted in the alteration of an additional 70 km of South Australia's coastline over the period from 1980 to 2004<sup>18</sup>. Sea change trends to growth of housing and population in coastal towns and along our metropolitan coasts is increasing as the baby boomer generation retires. Seagrass populations along the metropolitan coast are declining as a result, and nitrogen concentration along the metropolitan coastal waters is increasing. Degradation of coastal reefs is increasing and dieback of at least 250 hectares (ha) of mangroves has occurred around the Bolivar Wastewater Treatment Plant since the 1950s<sup>19</sup>.

Furthermore, recent growth in mining operations and South Australia's global trade of minerals has seen an increase in shipping traffic, in turn increasing the risk of marine pest transfers through ballast water.



### Coast and marine in a changing climate

A global increase in population has created a range of new and increasing pressures on the coastal zone, including coastal development, pollution, and habitat modification. Climate change exacerbates these as changes in temperature, stratification, sea level, wind, currents and climate patterns all have the potential to have major impacts on coast and marine environments<sup>20</sup>.

Changes in ocean characteristics are likely to include changes to winds which drive upwelling, ocean circulation, sea level rise, mixing and surface warming. These changes will lead to increased stratification, which means reduced mixing of nutrients from the deep sea. In addition, changes to ecology as a result of climate change may include:

- changes in species abundance (at a location some species will disappear, and some will be more/less abundant)
- changes in species distribution (range changes, migration paths)
- changes in phenology (e.g. timing of spawning, breeding) and physiology (e.g. coral bleaching, growth rates)
- changes in community structure (new species arriving, some going locally extinct).



New research is showing that the world's oceans are acidifying faster than marine scientists had predicted. This increase is directly related to climate change as the oceans are absorbing approximately one third of the excess carbon dioxide that human industrial activity and deforestation are releasing directly into the atmosphere. Scientists can now measure human-generated carbon down to 3km in the North Atlantic. Marine scientists warn that the world's coral reefs may be extinct by the end of this century unless the amount of carbon dioxide in the atmosphere is cut down. Furthermore, researchers are concerned about the impacts of ocean acidification on the entire ocean food web because it undermines the ability of marine creatures to build hard shells and skeletons. The most important shell-forming creatures are the plankton, which are the basis of the entire ocean food web, without which many marine species will not survive.

Climate change presents many new environmental challenges, and consequently the way we manage coast and marine environments will need to change. Governments, on-ground managers and policy makers must begin working towards the reality of climate change, making decisions about adaptation choices. Quick adaptation is needed, and even if full mitigation began today, because of inertia/time lags in the climate system, warming is inevitable.



While coastal issues such as sea level rise are high on the policy agenda, there is a general lack of recognition of importance of marine systems in South Australia's climate change policy. We need to recognise the value of marine systems in planning and management; that seagrass is vital for sequestering carbon and that plankton can influence climate. We need more marine science and research reflected in government mitigation and adaptation policy and targets.

### What are the key coast and marine issues in South Australia?

South Australia's waters are amongst the most biologically diverse in the world. They provide habitat for a massive variety of plants and animals, including internationally and nationally important species such as Southern Right Whales, Australian Sea Lions, dolphins and the Leafy Seadragon. Our waters support more than 6000 invertebrates, 1200 algae, 350 fish species, 16 breeding seabird species, 33 mammal species and 12 seagrass species. In the Southern Ocean, 75% of the red algae, 85% of the fish species and 95% of seagrasses are found nowhere else in the world, giving them local, national and international significance. In comparison, the Great Barrier Reef shares more than 80% of its fish, coral reefs and other marine organisms with other countries in the tropics<sup>21</sup>.

Australia's stunning beaches, and their importance as our places of fun and recreation, are an integral part of Australian culture. Because of this value, humans continue to place unrelenting pressure on coast and marine environments. With more than 90% of South Australians living on or near the coast and so many people working on the coast or visiting it, we are in danger of 'loving it to death'<sup>22</sup>. Notable pressures on our coast and marine environments arise from such activities as:

- pollution from stormwater, industrial effluent and waste water has decreased South Australia's coastal water quality, simultaneously destroying more than 10 000 ha of seagrass meadows in Gulf St Vincent
- coastal development disrupting the natural movement of sand and destroying fragile habitat, and impacting on adjacent marine areas
- accidental introduction of pest species that disrupt the natural balance of ecosystems
- dredging of ports and harbours increasing sediment in waters and destroying fragile habitat
- exploitation of natural resources by commercial and recreational fishing, and the aquaculture industry. If not managed appropriately these activities can exert pressures on marine health and biodiversity disrupting the balance of marine ecosystems
- reckless engineering of landscapes adjacent to the coast, resulting in large flows of sediment-laden stormwater onto beaches and into the sea
- lack of leadership by the government, as evidenced by the failure to acknowledge for the last 18 months the recommendations of the Adelaide Coastal Waters Study<sup>23</sup>.



Currently there is little information on the distribution and density of marine pests, and consequently there is a need to increase resources for monitoring, awareness, education and eradication of such pests. Biosecurity of our marine resources is vital if we are to continue to reap the benefits in terms of ecological services and resource use. Education on the risks marine pests pose is vital, and a commitment by all stakeholders to adopt the principles and best practice guidelines of legislation and policies is essential for execution to be successful.

**Changing the future - new ways forward**

The state government's has identified the need for strategic planning and integrated management in long-term conservation, development and productivity of coast and marine environments<sup>24</sup>. A coordinated approach to management is required together with an increased awareness of the coast and marine roles and responsibilities of NRM boards. There should also be an increase in support to develop best practice management activities which will serve to protect the natural resource value of coast and marine environments.

To protect our threatened coast and marine species there must be a review of current legislation and an extension of the protection afforded to marine species which are identified as 'threatened' under the legislation. For informed decisions to be made in making legislative amendments to protect marine biodiversity, there must be increased funding for marine research programs to expand our knowledge of coastal, estuarine and marine habitats and species, ecosystems and the bio- and geo-physical systems and processes that exist in South Australia.

Marine-based industries play a key role in the future of our coast and marine environments and must be well managed. South Australia's aquaculture industry is growing, and if appropriate management plans are not in place aquaculture operations can have a significant impact on the environment. Poorly planned or overstocked developments and high levels of feed and excreta may elevate nutrient levels and reduce water quality surrounding the farm<sup>25</sup>.

Management plans must be updated and further scientific research conducted into fish species and the ecosystem impacts of commercial fisheries. This includes a change to ecosystem level management of fisheries, and an update of annual reports to include actions to reduce in-take of those fisheries which are considered 'over fished' or 'fully fished'. For management of fisheries to be sustainable, plans must also be developed and implemented with support and input from the conservation sector, industry, and the South Australian community. Furthermore, management and regulation of recreational fishing is essential to minimise the potentially significant impact of overfishing species on marine biodiversity. Any strategies developed will require greater support for implementation and review through partnerships between Primary Industries and Resources South Australia (PIRSA) and the community, and PIRSA and the conservation sector.



A significant development for the future of South Australia's marine environment is the commitment by the state government to establishing 19 marine parks by 2010 under Target 3.4 of the State Strategic Plan<sup>26</sup>. The government is working in close consultation with industry and local communities to establish parks with zones for recreational and commercial fishing, aquaculture, tourism, water sports, ocean-going transport and infrastructure developments, and conservation of marine biological diversity. To safeguard those biodiversity objectives against the interests of industry or recreation, at least 30% of each habitat should consist of no-take protection, and additional resources to be allocated to monitoring and research within marine protected areas. Furthermore, firm guidelines need to be developed and enforced, without the loopholes created by the existence of special permissions to mine or conduct other degrading activities.



In a further effort to protect our coast and marine environments we must review and amend current legislation that allows for vehicle access to public beaches. With the exception of those owned by the Department of Environment and Heritage as part of a national park or conservation park, South Australia's beaches are 'owned' by the Department of Transport, Energy and Infrastructure under the *Marine and Harbours Navigation Act 1993*. This means beaches are, by default, roads on which road rules apply, although access can be restricted when local councils use their bylaws to allow or restrict vehicle access to beaches. In Victoria beach driving is classified as off road driving and has been prohibited throughout the state for nearly 40 years under the *Land Conservation (Vehicle Control) Act 1972 (Vic)*. To bring South Australia up to date with other states and protect our coastal environments, the Coast Protection Board should restrict vehicle access to all beaches under the *Coast Protection Act 1972*.

To adapt to the future and protect our coast and marine environments, 'no regrets' responses to the threats we face must occur now, while decisions which have greater impacts should be prioritised as the targets of more detailed and dedicated research.

# RECOMMENDATIONS

## Marine parks

14. The *Marine Parks Act 2007* requires reform, because:

- it currently tends towards a piecemeal development ('stamp collecting') of marine parks, with isolation of habitat, rather than protection on a broad basis
- South Australia's network of marine parks must contain sanctuary zones large enough to ensure the ongoing ecological viability of all represented species, habitats and ecosystems. This means implementing sanctuary zones which fully protect at least 30% of each habitat type within each of South Australia's 8 bioregions.

14.1. Mining and petroleum exploration and extraction in the Great Australian Bight Marine Park's Benthic Protection Zone should be permanently prohibited, not carried on subject to approval from the Governor-General, as is currently the case.

15. Adequate resources must be allocated for:

- ongoing, long-term scientific monitoring, research and assessment both inside and outside of marine parks
- education, compliance and enforcement
- community-based management programs.

15.1. There is a need to build the capacity of the conservation sector to ensure it is fully engaged with marine parks. Resources must also be allocated to foster the broader community's capacity to participate in consultation processes, so that the public is well-informed on coast and marine issues.

15.2. The state government must ensure that alongside the declaration of Marine Parks and Wilderness Protection Areas, resources are allocated without delay for the collection of baseline data, scientific monitoring and research in these areas. Community members should be involved in data collection and monitoring, thereby facilitating their ownership of the process.

## Natural resource management

16. Resources must be made available to support Natural Resource Management Boards, and local and state government agencies to reach agreement regarding the roles and responsibilities of each agency relating to coast and marine environmental management, and to implement actions to meet those responsibilities, especially where they overlap.



## Coastal water quality and estuaries

17. There should be timely implementation and adequate resourcing of the Adelaide Coastal Waters Quality Improvement Plan. The Estuaries Policy and Action Plan must also be finalised and implemented as a matter of priority.

17.1. The state government should maximise its capacity to reduce the amount of treated effluent being discharged into the marine environment. CCSA supports Professor Anthony Cheshire's call for a target of zero discharge of waste to the marine environment by 2015<sup>27</sup>.

17.2. The licensing, monitoring and control of brine discharges from desalination plants needs to be rigorously implemented by the Environmental Protection Agency (EPA), with adequate resources and full public transparency. Mandatory requirements should include the immediate cessation of operations when triggers are exceeded, and discontinuance of operations if stated dilution targets are consistently not being met.

## Biodiversity and threatened species

18. The amount of resources available for marine species research and taxonomy must be significantly increased, especially for non-commercial species.

19. The administrative arrangements for managing the *National Parks and Wildlife Act 1972*, under which animals can be listed on schedules 7, 8 and 9 as 'rare', 'vulnerable' or 'endangered' and the *Fisheries Management Act 2007*, must be amended to allow marine species to be listed under the schedules in the first instance or both Acts where there are fishery interactions.

### Introduced and abundant pests

20. The State Draft Biosecurity Strategy needs to be fully supported by legislation and the state government must increase resources for coast and marine pest monitoring, research, awareness, education and eradication.

- 20.1. Comprehensive risk assessment identifying and prioritising risks posed by the introduction of marine pest species is vital.
- 20.2. A strict monitoring regime and quality research programs should be implemented in all ports and harbours to continuously monitor for introduced marine pests in order to inform better management, in conjunction with the species outlined in the Monitoring section of the National System for the Prevention and Management of Marine Pest Incursions.
- 20.3. Development of DNA probes and improved arrangements for the *United Nations Convention on the Law of the Sea* would be beneficial.

### Labelling

21. The state government should call for the Australian Standard for fish names to be backed by legislation and follow the lead of the United Kingdom with mandatory labelling for seafood retailers.

- 21.1. As with the UK system, labelling information in South Australia should include:
  - the production method (either wild catch or aquaculture)
  - the scientific (Latin) name of the species. In the UK this is required during the distribution chain and is optional for sale to the final consumer.

### Aquaculture

22. The aquaculture industry needs to operate under stricter legislation, together with increased measures and resourcing for compliance.

- 22.1. Aquaculture legislation needs reform to address:
  - the ability to challenge the licensing process under the *Aquaculture Act 2001*
  - the lack of a right of appeal by third parties against granting of licences
  - the establishment of aquaculture zones proceeding ahead of marine parks planning
  - the repeal of Regulations under the *Development Act 1993* that effectively exclude most aquaculture from the operation of the *Aquaculture Act 2001*
  - the removal or watering-down of the public participation rights over aquaculture that existed under the *Development Act 1993* prior to the proclamation of the *Aquaculture Act 2001*.
- 22.2. Reporting processes for marine mammals and threatened species need to be strengthened via:
  - wider education on the PIRSA definition of 'interactions'
  - government commitment to ensuring that compliance with protocols is undertaken
  - making feedback about reports available to the public, updated regularly and in an easily accessible format.
- 22.3. All aquaculture equipment must be clearly identified to the owner to overcome problems associated with stranded nets and equipment.
- 22.4. All aquaculture operations should require an EPA licence (under Schedule 1 of the *Environment Protection Act 1993*) in addition to a licence under the *Aquaculture Act 2001*.



### Commercial Fishing

23. The biennial public reports on the status of commercial fisheries produced by the Department of Primary Industries and Resources SA (PIRSA) Fisheries should:

- be done annually
- include actions planned to reduce intake of those fisheries that are rated as 'over fished'
- identify those 'fully fished' fisheries that are in danger of becoming over fished - particularly in the light of expected climate change impacts.

24. PIRSA (and the commercial fishing industry) should fund a Fisheries and Aquaculture Liaison Officer within the non-government sector to promote greater conservation sector and community engagement in fisheries management, particularly in light of emerging co-management trends.

### Recreational Fishing

25. Recreational fishing should be licensed, with the license fees being directed towards increased research of non-commercial species, education of recreational fishers and increased policing of illegal activities on public jetties (e.g. practices such as 'chumming').

### Ports and Harbours

26. Dredging activities must be kept to a minimum, or completely prevented if possible.

**Best practice methods must be used at all times, including:**

- a comprehensive and independent monitoring program of physical and ecological values directly linked to the project's operation to ensure rapid responses to undesirable impacts
- environmental limits for impacts on natural assets including contingency plans if unacceptable damage does occur
- environmental limits for natural asset threats with mandatory reporting to all agencies, the Independent Monitor and the community when such limits are breached
- baseline data to ensure causes and effects can be clearly interpreted for quick response
- ongoing public release of all monitoring data.

## Coastal Protection

### 27. The *Coast Protection Act 1972* requires amendment, as promised in the Living Coast Strategy because:

- there is a noticeable lack of implementation of the coast protection district provisions, which means that the strict management plan provisions can also be avoided
- it is not based on exhaustive and proactive planning documentation for coast areas
- no sufficiently strong central body exists
- there should be greater Commonwealth and interstate cooperation, as envisaged at one time in the late 1990s.

27.1. There needs to be greater coordination and integration between bodies involved in coastal planning.

27.2. The management of beaches needs to be undertaken with priority to sustainable uses, so that retrograde practices are subject to a critical evaluation of impacts. Vehicle access to all beaches should be restricted by the Coast Protection Board under the *Coast Protection Act 1972*.

27.3. Regional NRM Boards need to be aware of the issue and work with and support councils in the better management and monitoring of beach access/traffic.

27.4. Where there is clear evidence of vehicle damage to beaches, for example Adelaide's southern beaches, prompt repair work should be undertaken, in consultation with the affected communities.

<sup>15</sup> Environment Protection Agency (2003) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>16</sup> Environment Protection Agency (2003) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>17</sup> Environment Protection Agency (2008) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>18</sup> Environment Protection Agency (2008) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>19</sup> Environment Protection Agency (2003) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>20</sup> Department for Environment and Heritage (2004) *Living Coast Strategy for South Australia*, Government of South Australia, Adelaide

<sup>21</sup> Department for Environment and Heritage (2004) *Living Coast Strategy for South Australia*, Government of South Australia, Adelaide

<sup>22</sup> Department for Environment and Heritage (2004) *Living Coast Strategy for South Australia*, Government of South Australia, Adelaide

<sup>23</sup> CSIRO (2007) *The Adelaide Coastal Waters Study*, Accessed online <<http://www.clw.csiro.au/acws/documents/ACWSFinalReportVol1.pdf>>

<sup>24</sup> Department for Environment and Heritage (2004) *Living Coast Strategy for South Australia*, Government of South Australia, Adelaide

<sup>25</sup> Environment Protection Agency (2003) *State of the Environment Report*, Government of South Australia, Adelaide

<sup>26</sup> Government of South Australia (2007) *South Australia's Strategic Plan 2007*, Accessed online <[http://saplan.org.au/images/pdf/South\\_Australia\\_Strategic\\_Plan\\_2007.pdf](http://saplan.org.au/images/pdf/South_Australia_Strategic_Plan_2007.pdf)>

<sup>27</sup> Cheshire, A. (2006) *A Vision for Adelaide's Coastal Waters and Environments in 2020*, Accessed online <[http://www.amlnrm.sa.gov.au/Portals/1/Programs\\_Projects/christie-tf/cheshire\\_pres.pdf](http://www.amlnrm.sa.gov.au/Portals/1/Programs_Projects/christie-tf/cheshire_pres.pdf)>