

1 Introduction

1.1 Purpose of the Study

The goal of this study is to understand and facilitate the conservation, protection and management of the Coorong and Limestone Coast natural coastal resources and to establish conservation priorities for places and areas within the region. The report includes suggested actions to address threatening processes for specific locations within the defined coastal region, as well as actions to address broad threats across the coastal area. The study also establishes a coastal database in map and table form, both for the whole coastal region and sequentially for sections of the coast, or ‘cells’, as a tool for ongoing adaptive management.

1.2 Definition of the Limestone Coast and Coorong Region Coastal Project Area

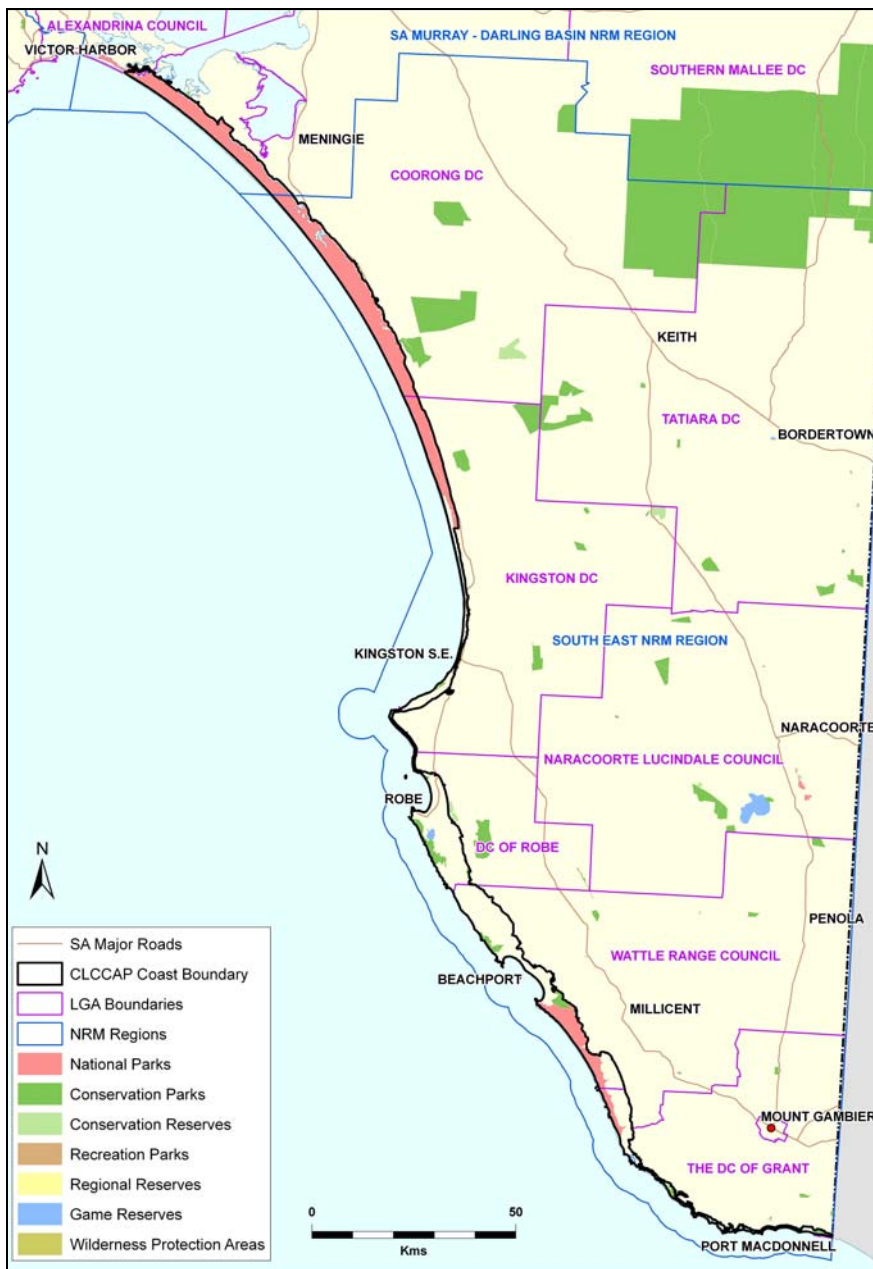


Figure 1.1. The extent of the Coorong and Limestone Coast study area.

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The coastline under study extends from the Murray Mouth to the Victorian state border. It is a coastline of approximately 427 kilometres, or 10% in length of the coastline of the state. The map above (Figure 1.1) shows that this region comprises the sea coast of 5 councils: DC Grant, Wattle Range Council, DC Robe, DC Kingston and DC Coorong.

The coast is defined for this study to include land above mean low water mark that, because of its vegetation, its landforms or because of its interaction with coastal processes can be described as coastal in nature. Elsewhere the boundary has been taken as 500 metres from low water. As a result, in the example at Figure 3 below, the coastal zone encloses coastal lakes, beach ridge systems, areas with distinctive coastal vegetation, and transgressive dune systems.

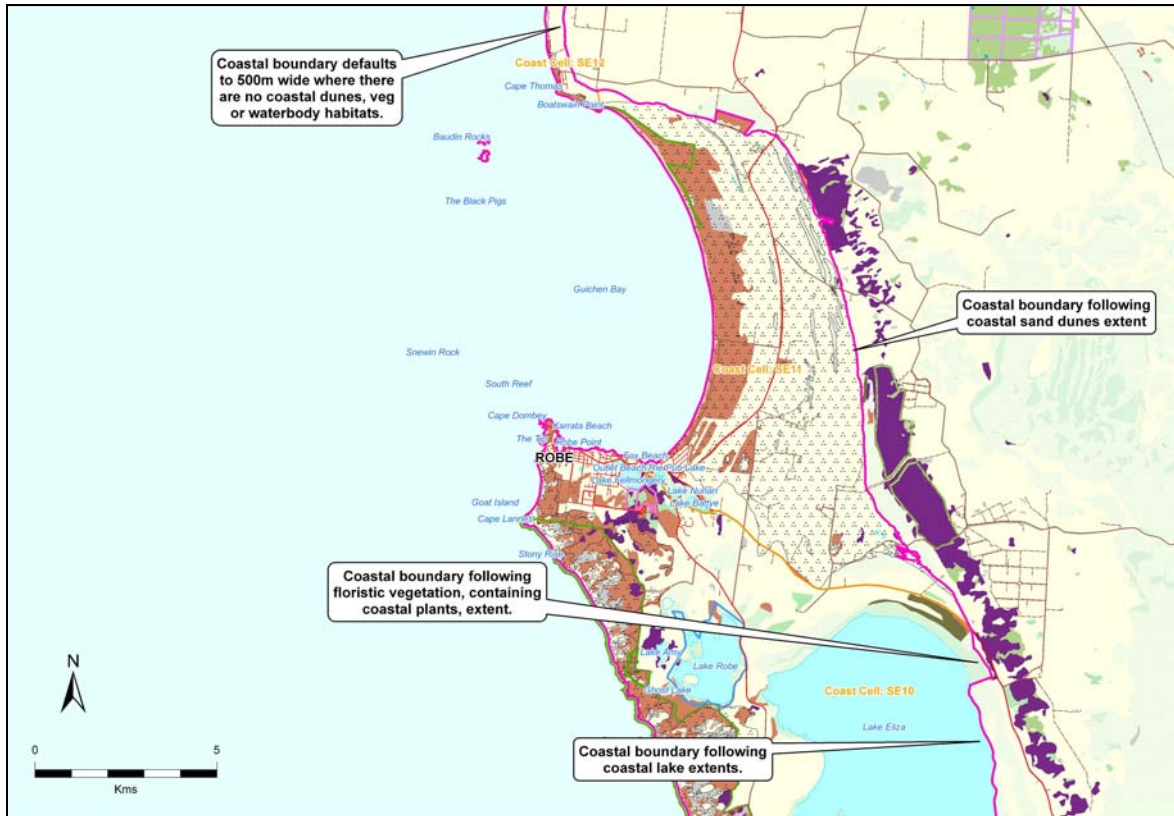


Figure 1.2. An example of the Definition of the Coastal Boundary in this Study.

The project area for the South East of the State comprises 124,568 hectares, of which 35% is native vegetation and 0.4% is urbanised. A considerable portion of the Limestone Coast and Coorong has reserve status: NPW Act reserve or heritage agreement 51%; Crown Land Act reserve 1.3%. Two Marine Parks have been proclaimed for the region: the boundary of these includes all estuaries and all tidal lands, and hence overlaps with the coastal boundary of this study. A significant part of the coastal region is unallotted Crown land – 19.9% of the total area.

The South East coastal region comprises a variety of coastal environments, including large coastal barrier dune systems, beach ridge plains, exposed calcarenite and limestone cliffs, low coastal plains, sheltered embayments and extensive coastal wetlands. There is a wide range of beach types and vegetation communities that support a diversity of plants and animals. A unique character of the South East region of the State are the extensive wetlands where the abundant shallow water and lake edge environments provide habitat and refuge for many bird species, including seasonal migrants, amphibians and small mammals. The dependence of the regions flora and fauna on the wetlands, lakes and ephemeral systems is discussed further in Chapter 3, Conservation Themes.

1.3 The Definition of Coastal Cells

Seventeen coastal cells have been defined for the region on the basis of physical parameters: landform, coastal wind and wave energy levels, shown in the Base Maps included in Appendix 1. The cells define relatively small sub-regional scale landform units along the coast: for example a bay between headlands, a sand dune mass, or an area of low cliffs of common orientation, may be coastal cells. In Figure 1.2 above the boundary of cell SE11 with SE10 and SE12 is shown.

The size of individual cells varies, but the average length of coastline of a cell is approximately 25 kilometres. The cells provide units of workable scale, in terms of bringing together a large amount of data for an area small enough to discuss local management issues.

These cells are used in the report for mapping and descriptive units, i.e. as the geographical units for which conservation priority, threats and actions are to be established. The cells are numbered SE1 Piccaninnie Ponds then sequentially north-west to SE17, Coorong - Murray Mouth.

1.4 Methods Used

The core of the methods used involves the assembly of data on conservation (32 sets) and threats (20 sets) within the defined coastal area. Within each set of data, values (from 0 to 9) are ascribed, with expert help, for presence or absence, frequency, or rareness. These values are placed on digital maps (or layers): each layer showing values from 0 to 9 for each pixel on the map; any one layer consisting of millions of such values set out on a fixed grid. Geographic Information Systems software was used to obtain statistics and summaries for the cell and the region; conservation or threat values can be summarised for each point on the map. For example, in Figure 1.3 below the conservation values are summarised for the Robe area. When this is compared with the threat values, spatial correlation is visually apparent.

These methods depend on spatial layout and their value is most visually apparent at the local (or cell) scale. However statistics for the whole region can be derived from the analysis and used to focus on features of the whole regional map.

The data is presented as a snapshot in time (although the most recent survey data is used, the dates vary); however, the most significant thing about many sets of data is change and the direction of change. Notably change in extent of habitat is critical for fauna. If there is repetition at a later date of this methodology for the region, then this will become apparent with each future iteration of the process. In this project, the local 'cell descriptions' are used to note local changes, where these can be identified and where they are a concern to the conservation of the natural assets of the region.

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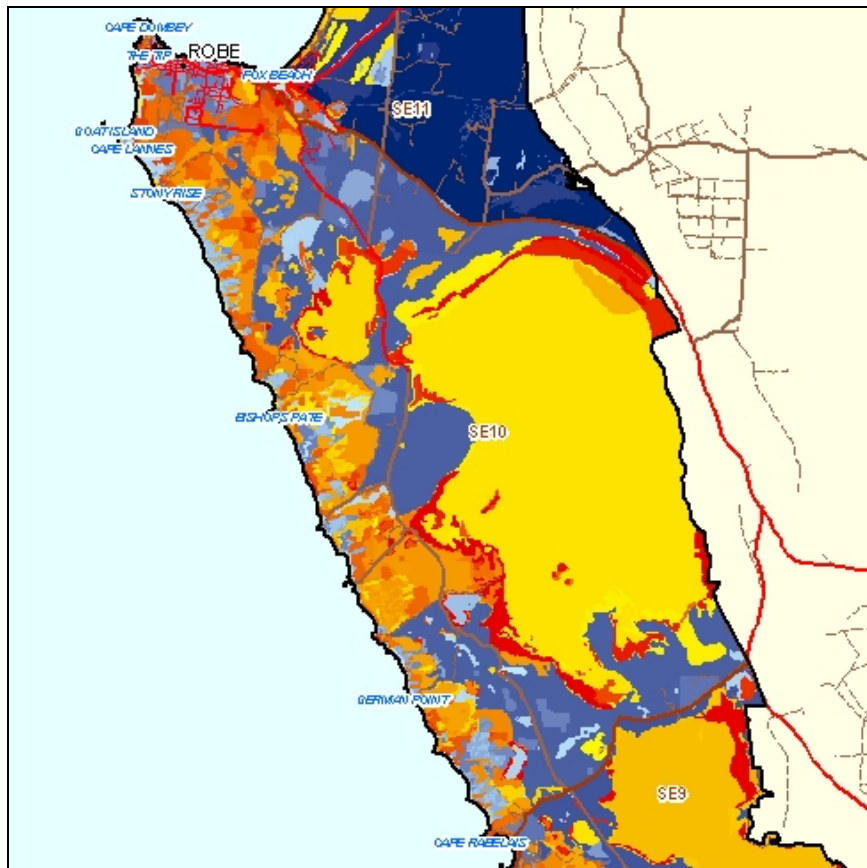


Figure 1.3. Summarised conservation values for Cell SE10. (red shows highest totals, blue lowest).

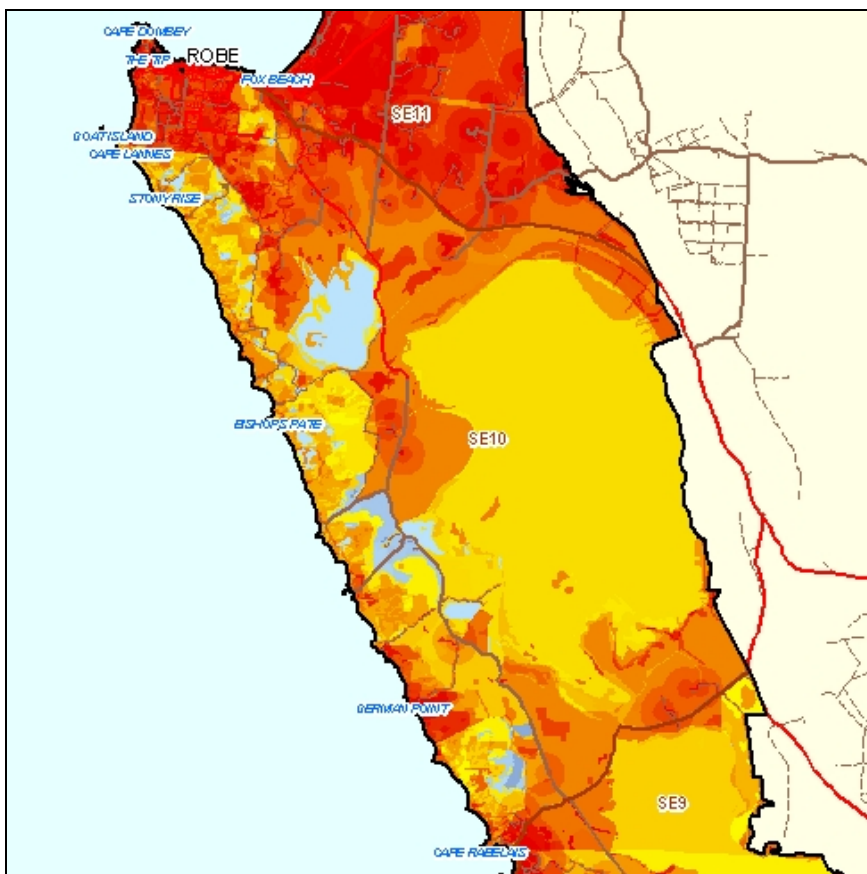
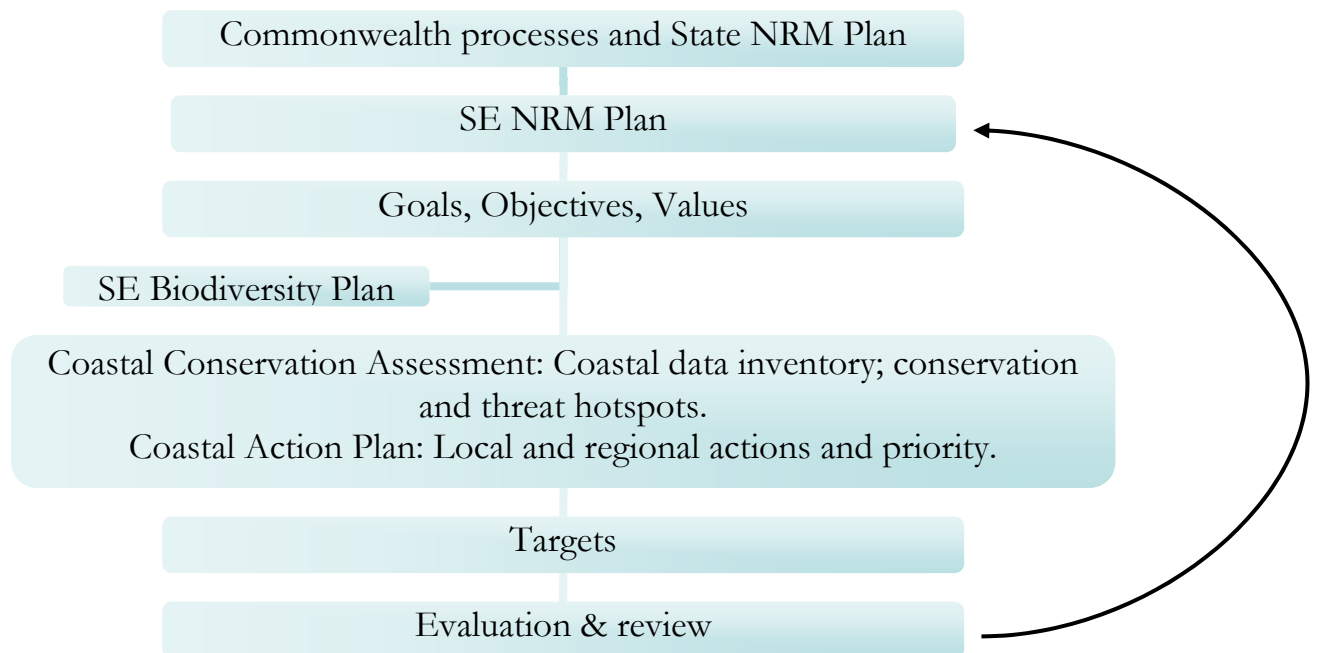


Figure 1.4. Total threat values for SE10 (again red shows the largest totals).

1.5 Management Context

This project sits within, or is related to, a number of on-going processes within the region; the diagram below attempts to indicate the principal elements of these processes.



The SE coastal project aims to establish conservation priority of areas and places to support and inform the work of the SE NRM Board. This has been undertaken in two steps in defining priority:

- the first step assembles data relating to biota, geology and heritage distributed throughout the region;
- the second step looks at threatening processes impacting these features.

The combination (see Chapter 5) gives a statement, in mapped form, which allows discussion of priority actions to achieve the goals of the NRM Board for its coastal regions: it is a decision support system.

The whole of the process outlined in the flow diagram above may be said to encompass the elements of an ecosystem based management system¹. This process has been described by Smyth et al 2003, and has been summarised below, with minor changes:

1. Holistic Integrated Science

Recognition that systems are open, complex and inter-active. Change in one system may impact others. Achieving management objectives involves considering cumulative impacts. The best available science must be used throughout the management process. Scientists must view impacts as cumulative and consider the ecosystem as a whole.

2. Adaptive Management

Sparse and incomplete knowledge requires management that can respond to change, in societal needs, and change in ecosystems some of which may have resulted from previous management actions. Management plans are a work in progress, and are able to respond to the results of monitoring key indicators. This is not a 'try it and see' approach, but a

¹ See Smyth, et al 2003; Grumbine 1994.

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management style that recognises constant change in the environment, and, in responding, acknowledges the precautionary principle.

3. Collaborative Decision Making

When management is based on ecosystem features rather than political boundaries a range of political, ecological, generational and cultural expertise - is necessary for decision-making.

4. Socially Defined Goals and Perspectives

“Management should become a reflection of societal values rather than narrow scientific concepts that focus on single issues. However, management goals and objectives must be tempered by an understanding that ecosystem processes must be protected above all other values” (Smyth et al, 2003, p.15.)

The Limestone Coast and Coorong Coastal Action Plan project is seen as contributing strongly to points 1 and 2 above. Particularly, the spatially based process for defining conservation priority for particular places and areas addresses the issue of cumulative impact.

The data used in this study is a summation of the best available expert work in biodiversity, assembled through a spatial information system (GIS). The work may be seen as establishing base line data from which monitored change may be put in perspective and serves as the foundation of an adaptive management approach.

The management actions proposed in this project have been based on the need to remediate identified threats, primarily from the GIS analysis. This has been supplemented by local knowledge, ongoing existing plans and consultation with NRM and Council officers. The priority of these actions depends mainly on the conservation priority, but also the pressure of the threat.

Many parts of the on-going work of the NRM Boards, including the NRM regional plans are essential components of elements 3 and 4 above.

1.6 Product

This project is a data assemblage and decision support system to assist in addressing the responsibilities of the NRM Regional Board. It is also useful for other managers, such as community groups, councils and state agencies. It provides a baseline statement against which future managers can evaluate management outcomes, as well as the impact of climate change. This document is produced on DVD and in hardcopy; the DVD allows detailed interrogation of the digital maps and data.