

Methods and key concepts applied



A robust description of ecological character is made by applying strong science based on sound data and information. Alongside WH VILHQMF GHVIXY YDODE@IRUDCKIMRUHV of the Ngarrindjeri Indigenous community and long-term stakeholders were considered as part of this comprehensive ecological character description.



Q 2.1 Overview

Wetlands are by their very nature both productive and dynamic systems, and these two attributes have implications for describing ecological character. Firstly, because of their productivity and the services they offer, wetlands have become focal points for human

A direct implication of the close human association with project within the local community and in South Australia, in particular. For this reason it was possible to gain some insights into the historic condition of the site from those longer-term stakeholders who have lived and worked around this wetland for generations. These insights, EDVHG RQ \WVKDQG REVHYDVRQV FDQ \IHG IQYDQDEGH RUDCKIVRULVIRUWKH VVMZ KIEK VFIHQMF GDVW FRODFVRQ may not be able to provide. Section 2.4 details how this information was collected and is used throughout the report.

6HFRQG EHFDXVHRI VHLG\QDP IF QDVUH GHACQJ the ecological character of wetland systems requires careful consideration to distinguish natural variability from human-induced impacts. Sometimes human-induced factors may have short-term, immediate impacts as well as longer-term, more subtle changes that incrementally increase over time. One of the aims of describing ecological character is to document the baseline FRQGMRQ \K VDWVWVEOKHVWKH UDQJ HRI QDVUDO variation in components, processes and services at each site within a given time frame, against which change FDQEH DWHWHG · 5DP \DU5HVRQVRQ,; SQCH S SDUDJ WSK \KDKQ H IQHFRQJ IEDCFKUDF VURFFXIV when these parameters fall outside their normal range.' (Res VI.1, Annex). This is considered further in Section 2.6.

Combined with the above two issues is the need to make the description of ecological character robust by applying strong science based on sound data and information. Where this is lacking, then a precautionary approach is required, so that the risk of ecological character changing is minimised.

Q 2.2 Boundaries of the Ramsar-listed area

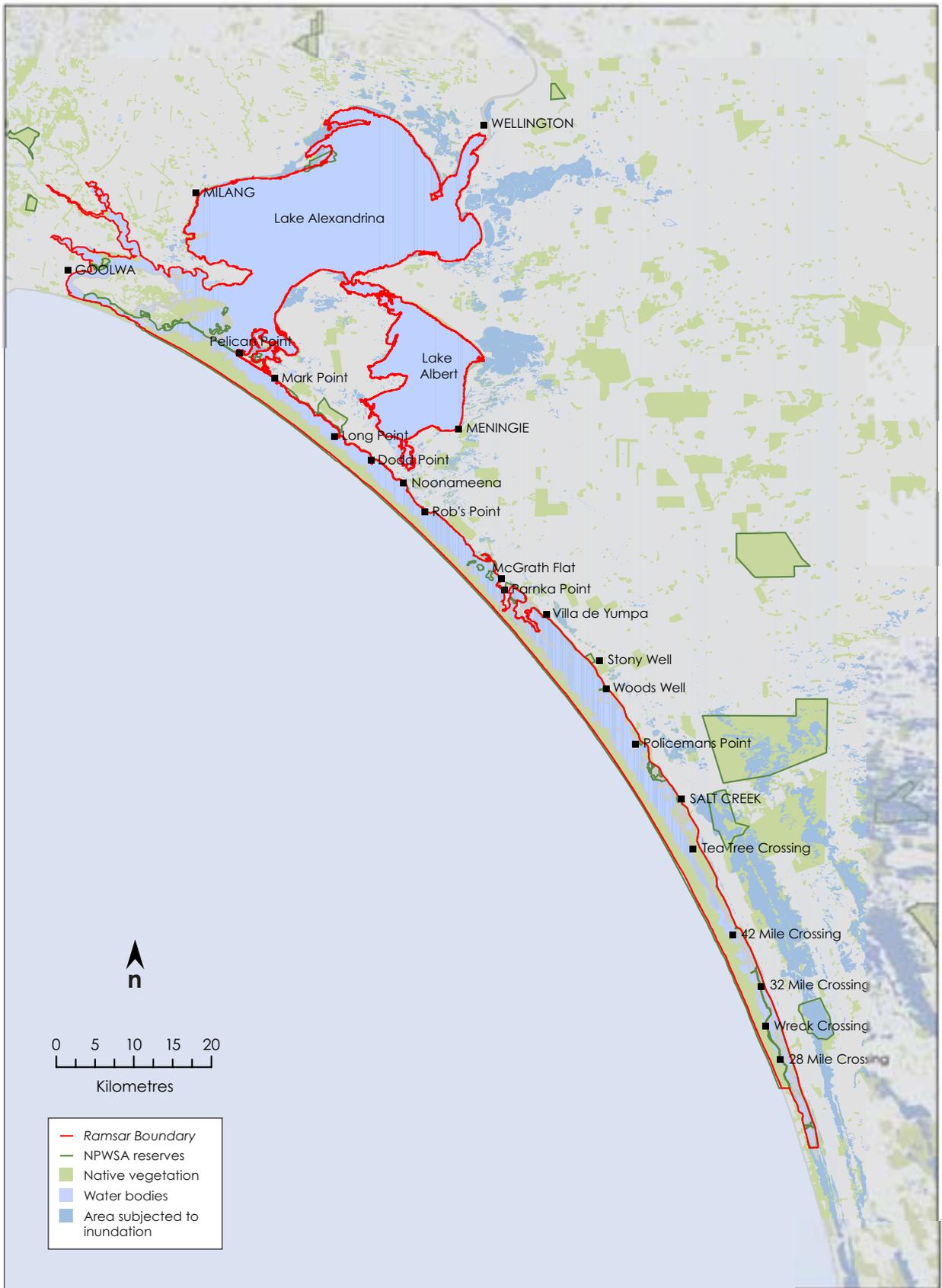
The area of the Ramsar-listed site is as shown in Figure 3. Summarised, the Coorong and Lakes Wetland of International Importance is approximately 140 500 hectares. Land and water included in the site is as follows:

Lake Alexandrina and Albert and the tributaries of the Finniss River and Currency Creek:

- all unallotted Crown Land and Crown Land occupied under licence that is connected to the lakes
- wetlands on freehold and perpetual lease land, where the wetland is seasonally connected to the lake
- all land and wetland on Hindmarsh, Mundoo, Mud, Reedy, Ewe and Long Islands and the many other small islands in the lakes
- Tolderol Game Reserve, Mud Islands Game Reserve and Currency Creek Game Reserve and Salt Lagoon Islands Conservation Park.

the Coorong:

- all land and water within the Coorong National Park, which includes the Younghusband Peninsula and the Ocean Beach to low water mark, but does not include Sir Richard Peninsula.



Disclaimer - Please refer to the beginning of the ecological report for a detailed disclaimer and map data.

Source - SA DEH, Russell Seaman 2006

Figure 3 - Map showing the boundaries of the Coorong and Lakes Alexandrina and Albert Ramsar site and other key landmarks

WDECI GWS ZIVHFIHQWF DSSURDFK used for this description of ecological character	
GWS ZIVHFIHQWF DSSURDFK XHG	Where found in this report
Step 1 Provide an overview of the site; its location, climate, hydrology etc. and identify the drivers, levers, components and processes that combine to form ecological character. Include in this a summary of the 5DP VDUBU QIAFDQWIRQJ IFDQ&RP SRQHQRRI the site; its plant and animal species and the ecological communities and assemblages ZKIEK SURYIGH WHEIRQJ IFDQVWF DMRQ for why the area is considered globally important.	Section 3
Step 2 Document the drivers, levers, components and processes within each of the six system units, noting that because of the size of this wetland system it was necessary to sub-divide it in order to gain XIAFILIQWRFVXRQ WIFH DMIE XIMVZ IXIQ logical management units. Provide, where possible, limits of acceptable change (see GHFVRQ DQG WADIAF QI KWDWHWP HQW (see Section 2.7). Cross-check these conclusions against Ngarrindjeri and long-term stakeholder views (see Sections 2.4 and 7).	Section 4
Step 3 RFXP HQWIKH 5DP VDUBU QIAFDQW Biological Components (RSBC) of the site placing them within the context of drivers, levers, components and processes. Provide, where possible, limits of acceptable change DQG WADIAF QI KWDWHWP HQW VHH GHFVRQV 2.6 an 2.7). Cross-check these conclusions against long-term stakeholder views (see Sections 2.4).	Section 5
Step 4 Based on the conclusions from Steps 2 and 3 establish those drivers, levers, components or processes that are the primary determinants of ecological character. Document, and where possible quantify these. Set limits of acceptable FKDQJ HDQG SURYIGH WADIAF QI KW assessments.	Section 6
Step 5 Using the outputs from Steps 2, 3 and 4, produce a whole of system description of ecological character.	Section 8
Step 6 Describe an ideal monitoring framework to give early warning of any potential change in ecological character, prioritising this to assist site managers with directing resource allocations.	Section 9
Step 7 Identify priority knowledge gaps for future attention. These will, in most part, be IGHQWIFG WURXJ K WHS UHFHGIQJ VMSV	Sections 3–6 and 8

Q 2.6 Limits of acceptable change

In Section 2.1 it was noted that the Ramsar Convention has previously observed that change in ecological character occurs when the key parameters of the wetland ecosystem fall outside their normal range (Ramsar CoP 6, Res VI.1, Annex). Steps 2, 3 and 4 in Table 1, indicate that the approach applied here GHACHV! EDVHQQHFRQGMRCVDQG QP IWRRI DFFHS WDECI change ...' and provides an overview of the system condition in relation to each particular parameter WURXJ K D WADIAF QI KWDWHWP %HFDXKH WIFH WUP VDUH used extensively throughout this report, some further consideration here is warranted.

As it is used in this report, limit of acceptable change (LAC) indicates the variation that is considered acceptable in a particular measure or feature of the ecological character of the wetland. This may include population measures, hectares covered by a particular wetland type, the range of a certain water quality parameter, etc. The inference is that if the particular P HDXKH RUS DDP HMUP RYHVRXWGH WIFH QP IWRRI acceptable change' this may indicate a change in ecological character that could lead to a reduction or loss of the values for which the sites was Ramsar-listed (see Figure 4). In most cases, change is considered in a negative context, leading to a reduction in the values for which a site was Ramsar-listed. For example ³ IL P RQWUQJ KRZ VWDWRUD FHUDDIQ VSHFIFVWKH population within the Ramsar site has fallen to below IVQZ HUQP IWRRI DFFHS WDECI FKDQJ H WIFH WIVZ RXG require careful examination to establish the cause, and to respond to it through intensive investigation and possibly adaptive management.

In order to set robust limits of acceptable change (LAC), there should be an understanding of the natural variability of the parameters or populations under consideration and the system drivers, levers, components DQG SURFHMHV VHH GHFVRQ IRUGHQMRQVRI WIFH terms). For parameters such as those relating to water quality it can be helpful to know the ideal range of these, either from research work, or other similar sites; this is especially the case if there is little historical data upon which to base LAC. For example, if a particular submerged aquatic plant species is known to be a vital part of the wetland ecosystem (i.e. a keystone species, see Section 6), then it is possible to set an LAC for water clarity that indicates a range of turbidities that will continue to permit light penetration to the depths normally occupied by that species and considered optimal for sustaining a healthy population.

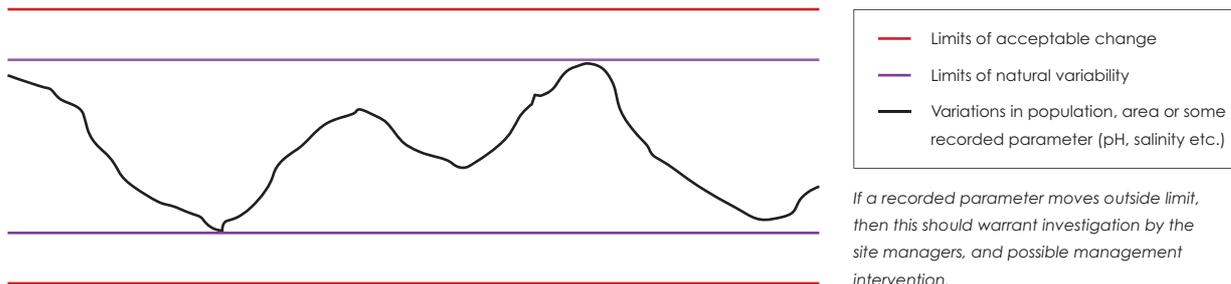


Figure 4 - The limits of acceptable change concept

The guidance given regarding limits of acceptable change for the Coorong and Lakes Ramsar site is provided whilst acknowledging that for some measures and parameters the long-term data sets are less than ideal. One of the follow up actions to this report will hopefully be to establish a comprehensive assessment program to avoid this problem in the future (see Section

: KHUH WHDXWRVEHGHYHG WHUH Z DVIOXIAFHQW data to support an LAC, then this is indicated. Where an LAC is based on data collected for this site, the RQO TXDQDFDVRQJ IYHQIVZ KHVKHUKH DUHFRQMGHUG HQMUP · RUQRW,QMUP /S & DUH Z KHUH WHDXWRVEHGHYH further data is needed and that until that time a more conservative, precautionary LAC should be used.

Q JUDIÄF Q KWDWHWP HQW

7KH JUDIÄF Q KWDWHWP HQWSURYIGHG IQWVUHSRUWUH designed to give a quick snapshot of the overall risk, WHUDVRUYXQHDEKWSURÄRI KH Z HVOQG DWMEXM under consideration as part of the ecological character description. Figure 5 provides an overview of how the categories are determined. The system has been introduced here as an aid for high-level decision makers, site managers and other stakeholders so they can, at a glance, gain a clear sense of system health. It is also envisaged that this approach may be useful to adopt as part of regular monitoring of the Ramsar wetland.

7KH JUDIÄF Q KWDWHWP HQW DUH XVHG W UHÄFVKH overall risk, threat or vulnerability of the various system DWMEXMV GUYHV ÖYHV FRP SRQHQRUSURFHWHV⁸ VHI the following section), as determined by the authors based on the collective information gathered together in this report, and particular with the individual sections Z KHUH JUDIÄF Q KWDWHWP HQW DUH SURYIGHG

- The threatening process or processes KDYH KDG D VI QÄFDQGHWP HQWDO impact warranting urgent management intervention.
- There are strong indications that a threatening process or processes are operating. Investigations should be given high priority and management intervention is likely.
- There are some concerns evident that warrant investigation and perhaps management intervention.
- All known risks or threats are being adequately addressed through management actions.

)J XUH 7KH JUDIÄF Q KWDWHWP HQW DWU RUHV

Q ' HÁQIQJ RVKHUMUP VXVHG

Terms and concepts used throughout this report are
 GHÁQHG IQ DEØI KRZ IQJ KRZ VHN DUHXVHG IQ VNH
 5DP VDUGHÁQMRQDQG DØR VURXJ KRXVVKIVUHS RUW

DEØI ' HÁQIQJ NHA WUP VXVHG IQ VIVUHS RUW		
Term	5DP VDUVIQNIS UHVMRQ	How used in this report
Components	The physical, chemical and biological components of the system, with the latter EHIQJ GHÁQHG DVKDEMDW VSHFIEV and genes.	SVGHÁQHG E\ VNH 5DP VDU&RQYHQMRO
Processes	Interactions between the components that IQ VUQ VSS Ø VHEHQHAW VHYIEHV	As used in this report, ecological processes are the dynamic biotic and abiotic interactions within an ecosystem such as primary production, decomposition, carbon and nutrient cycling, sedimentation and provision of habitats for other biota. These P D\ RUP D\ QRVB URYIGH GIJHFVEHQHAWRU services to humans.
%HQHAW VHYIEHV	ZKH IRRVQRM VV VNH 5DP VDUGHÁQMRQ of ecological character (see Section 1) IQGIEDMVKDW: HFRVWMP EHQHAWDUH GHÁQHG IQ DFFRIGDQFH Z IW VHO IQQIQP (FRVWMP SVWMP HQWGHÁQMRQRI HFRVWMP VHYIEHVDV VHEHQHAWKDW people receive from ecosystems'. Appendix B provides a summary of these for this site.	: KHUH XVHG IQ VIVUHS RUW VNH GHÁQMRQRI EHQHAWDQG VHYIEHVDØI QVZ IW VDVRI VNH Ramsar Convention.
Drivers and levers	The term drivers is used by the Ramsar Convention to refer to either indirect (economics, science, cultural, religious) or direct (landuses, invasive species, water abstraction) drivers of change within the wetland. This is derived from the Millennium Ecosystem Assessment and focuses on predominantly anthropogenic activities which lead to change in the wetland ecosystem. The Ramsar Convention does not use the term levers.	In this report, the term drivers is used in VNH Z D\ GHÁQHG E\ Ø IMFK DQG * RRVHØN (2000), and shown in Figure 7 (Section 3); namely, geomorphology, climate and natural hydrology. The difference being that the focus is on natural, not anthropogenic factors. The term lever is used here to refer to factors that are of anthropogenic origin that alter HFRVWMP FRP SRQHWDQG RUSURFHWIV. These may be the result of catchment-based activities (such as discharges to water from land-based activities) or direct manipulation at the site (such as barrage operations).



The Murray Mouth and the estuarine portion of the Coorong

2.9 Consultative approaches used in the development of this report

The development of this report was undertaken by the project team, in consultation with the expert panel (for membership, see inside cover). In addition, as the scope of the project and other factors of note become clearer, other experts in the field were consulted to review the draft or provide data and other inputs. These additional experts are indicated in the acknowledgments. Running in parallel with this process, consultations were underway with the Ngarrindjeri community and other long-term stakeholders (see Section 2.4).

The draft report was distributed to nearly 120 individuals and organisations which had knowledge or expertise in the ecology and management of the system.

In December 2005, two consultative workshops were held. The first workshop was provided to representatives of the Commonwealth Department for the Environment and Heritage in January 2006 in Canberra. Verbal comments noted at the workshop were incorporated into the report by the project team authors.

