

# Technical information for the 2018 marine protected areas (marine parks network) trend and condition report card

DEW Technical note 2018/39



**Government of South Australia**

Department for Environment  
and Water

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Department for Environment and Water

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# Consultation and acknowledgements

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# Summary

This document describes the indicators, data sources, analysis methods and results used to develop this report and the associated report card. The reliability of data sources for their use in this context are also described.

# 1 Introduction

## 1.1 Marine parks – global perspective

The marine environment regulates our climate, supports regional tourism, commercial and recreational fishing, aquaculture and shipping, and has significant cultural value for Aboriginal people.

Globally, the marine environment faces a number of pressures including: population growth, coastal pollution and developments, fishing, habitat modification, mining exploration, pest species, climate change and human-animal interactions/disturbance. The consequence of these pressures include the destruction of marine habitats, excessive extraction of marine resources and a loss of marine biodiversity.

In 2016, it was reported that between, 2.18–3.27% of the earth's seas were protected by Marine Protected Areas (MPAs). However, less than half of this (about 1% global waters, about 16% of protected areas) is considered to be highly protected by "marine reserves" or "no take zones" (Boonzaier and Pauly 2016, O'Leary et al. 2016). In 2017, the United Nations reported that marine protected areas had increased to 5.3% of global waters but did not specify what percentage of this was "highly protected" or "no take" (United Nations 2017). Partially protected areas can lead to larger populations and biomass of target and non-target species when compared to unprotected areas. However, greater benefits are apparent in highly protected "no take" areas when compared to partially protected areas (Sciberras et al. 2013).

The United Nation's Convention on the Biological Diversity Coverage Target for MPAs is  $\geq 10\%$  by 2020. In 2014, the World Parks Congress recommended increasing this to  $\geq 30\%$ . A review of 144 articles indicated that an average of 37% of the sea is required to be protected in order to achieve or maximize the objectives expected of marine protected areas (Objectives: to protect biodiversity, ensure connectivity, avoid collapse, avoid adverse evolution and maintain fishery value and stakeholder satisfaction). More objectives are met when protection exceeds 50% (O'Leary et al. 2016).

## 1.2 South Australian marine parks

The Government of South Australia has implemented a network of 19 marine parks which cover around 26,670 square kilometres of the state's waters (44 per cent) and 267 square kilometres of coastal land and islands. The marine parks contain different zones which have differing levels of restrictions, ranging from General Managed Use Zones (GMUZ) – lowest level of restriction, through to Habitat Protection Zones (HPZ), Sanctuary Zones (SZ) and Restricted Access Zones (RAZ) – highest level of restriction. Sanctuary Zones and Restricted Access Zones comprise around 6 per cent of state waters. The management plans for South Australia's marine park network were authorised in November 2012 and provide for biodiversity conservation and public appreciation, and ecologically sustainable development and use of marine resources. Fishing restrictions in sanctuary zones were implemented on 1 October 2014.

Historical knowledge of the 19 South Australian marine parks is provided in the marine park baseline reports (e.g. Bryars et al. 2016, [Baseline reports](#)). These reports present predictions and indicators of change based upon the relationship between six inter-related components: (1) marine park management plans, (2) ecological values, (3) social and economic (socio-economic) values, (4) external physical drivers, (5) external socio-economic drivers, and (6) human-mediated pressures.

Ongoing monitoring measures the effectiveness of each management plan in achieving the objects of the *Marine Parks Act 2007*. The Monitoring, Evaluation and Reporting Program developed [six key evaluation questions](#) (KEQ) that are directly related to the objects of the Marine Parks Act. These KEQs provide clarity about the priorities for monitoring and guide how the marine parks program should be evaluated. Each KEQ addresses specific outcomes and strategies in the context of effectiveness, impact, appropriateness and efficiency of the marine parks program. To inform the KEQs, *specific evaluation questions* (SEQs) have been developed.

These questions: identify the monitoring indicators and methods used for information collection; assist in prioritisation of monitoring activities; and, support evaluation and reporting of monitoring information.

The specific evaluation questions that are used to assess environmental/ecological outcomes include:

1. What biodiversity and habitats are included within the marine parks network?
2. Have sanctuary zones maintained or enhanced biodiversity
3. Have habitat protection zones maintained biodiversity and habitats?
4. Have sanctuary zones maintained or enhanced ecological processes?
5. Have sanctuary zones enhanced ecosystems resilience?

Data to assess abundance, biomass, biodiversity and ecological processes is collected from priority sanctuary zones and marine parks. Currently, an assessment of ecological change from the monitoring program is not yet available as ecological change takes a number of years before it can be observed. In the interim, this report card reports on the status of protection as well as some of the management strategies in place to ensure our marine parks effectiveness. More detailed ecological assessments will be possible in future report cards.

### **1.3 Natural resources management trend and condition reporting**

The Minister for Environment and Water under the [Natural Resources Management Act 2004](#) is required 'to keep the state and condition of the natural resources of the State under review'. Natural resource management report cards are produced as a primary means for undertaking this review. Previous Natural Resources Management (NRM) trend and condition report card [releases](#) reported against the targets in the [South Australian Natural Resources Management Plan](#) (Government of South Australia 2012b) using the broad process outlined in the [NRM State and Condition Reporting Framework](#) (Government of South Australia 2012a).

As the state natural resources management plan is currently under [review](#), natural resource management report cards in early 2018 will instead inform the next [South Australian State of the Environment Report \(SOE\)](#) due out in 2018. Again, there is a legislative driver to guide the development of SOE reporting. The [Environment Protection Act 1993](#), which is the legislative driver to guide the development of SOE reporting, states that the SOE must:

- Include an assessment of the condition of the major environmental resources of South Australia 112(3(a))
- Include a specific assessment of the state of the River Murray, especially taking into account the Objectives for a Healthy River Murray under the [River Murray Act 2003](#) 112(3(ab))
- Identify significant trends in environmental quality based on an analysis of indicators of environmental quality 112(3(b)).

NRM Trend and Condition report cards will be used as the primary means to address these SOE requirements.

#### **1.3.1 NRM Trend and Condition Report Card Continual improvement**

Key documents guiding the content of South Australian NRM Trend and Condition report cards are:

- [Trend and Condition Report Cards Summary Paper](#) (DEWNR 2017)
- [NRM State and Condition Reporting Framework](#) (Government of South Australia 2012a).

Both of these documents reference a process of continual improvement in the way NRM Trend and Condition report cards are produced and communicated. A review based on key stakeholder feedback ([O'Connor NRM 2015](#)) indicated five key learnings ([DEWNR 2017](#)):

1. Trend and Condition Report Cards are acknowledged as a useful communication tool. There is support for them to continue to be produced to highlight data gaps and reliability issues to a broad audience including: policy makers and investors; environmental managers; and the community
2. There are issues with data availability, access, consistency and transparency, which will need to be addressed and improved over time in future Trend and Condition Report Cards
3. Indicators or measures reported on were based on those outlined in the State NRM Plan. Not all of these are considered to be the most appropriate or relevant for those assets. These will be reviewed as part of the current State NRM Plan review and a set of agreed measures will be determined for future Trend and Condition Report Cards
4. Greater alignment of reporting relevant to project, regional, state, program and State of the Environment is seen as imperative
5. Better clarity is needed around target evaluation reporting, which should measure the impact or outcome of an investment at a project, regional, state or program scale. However the trend and condition reporting reflects the status of an environmental resource and its change based on impacts that affect its condition. In some cases, the same reporting can be used for both (e.g. soil erosion), and in others it cannot (e.g. threatened species).

As the process by which the NRM Trend and Condition report cards are produced evolves, there is an increased emphasis, in keeping with the Premier's [digital by default declaration](#), on the use of open data and reproducibility. This is one key response to help address the second key learning outlined above. The report cards being produced to inform the 2018 State of the Environment Report are at varying stages along this route to open data and reproducibility.

# 2 Methods

## 2.1 Indicators

The indicators considered in the marine protected areas report card are: the area of state waters protected (trend), and the status of protection and monitoring (condition).

## 2.2 Data sources and collection

Information on the area of marine protection is obtained through the statewide baseline report (Bryars et al. 2017).

General marine park information, ecological monitoring and compliance data was obtained from the 'South Australia's 5-year status report' (DEWNR 2017a). The field surveys are conducted by DEWNR staff. Surveys are conducted using Baited Remote Underwater Video Systems and Underwater Diver Surveys. For further detail see (Brook et al. 2017, Miller et al. 2017, DEWNR 2018).

## 2.3 Analysis

### 2.3.1 Trend

There is no data for a trend analysis presented in this report card. For most species, ecological data collected by the marine parks program cannot yet be used to assess ecological changes in marine park sanctuary zones. This is due to the short timeframe (3 years) that has passed. Ecological change takes several years (>10 years) as biological systems take considerable time to recover. A thorough assessment of ecological data will be conducted in the 10 year review. Assessments of specific areas or species within the marine parks network may be available prior to the 10 year review.

### 2.3.2 Condition

Condition for this report card is based on the generalized notion that marine parks have been established, management plans implemented, and that ecological data is being collected to make future assessment on the condition of these marine areas.

### 2.3.3 Reliability

Information is scored for reliability based on the average of subjective scores (1 [worst] to 5 [best]) given for information currency, applicability, level of spatial representation and accuracy. Definitions guiding the application of these scores are provided in Table 2.1 for currency, Table 2.2 for applicability and Table 2.3 for spatial representation.

**Table 2.1. Guides for applying information currency**

<b>Currency score</b>	<b>Criteria</b>
1	Most recent information >10 years old
2	Most recent information up to 10 years old
3	Most recent information up to 7 years old
4	Most recent information up to 5 years old
5	Most recent information up to 3 years old

**Table 2.2. Guides for applying information applicability**

<b>Applicability score</b>	<b>Criteria</b>
1	Data are based on expert opinion of the measure
2	All data based on indirect indicators of the measure
3	Most data based on indirect indicators of the measure
4	Most data based on direct indicators of the measure
5	All data based on direct indicators of the measure

**Table 2.3. Guides for applying spatial representation of information (sampling design)**

<b>Spatial score</b>	<b>Criteria</b>
1	From an area that represents less than 5% the spatial distribution of the asset within the region/state or spatial representation unknown
2	From an area that represents less than 25% the spatial distribution of the asset within the region/state
3	From an area that represents less than half the spatial distribution of the asset within the region/state
4	From across the whole region/state (or whole distribution of asset within the region/state) using a sampling design that is not stratified
5	From across the whole region/state (or whole distribution of asset within the region/state) using a stratified sampling design

# 3 Results

## 3.1 Area of marine protected areas

Table 3.1 presents the area that marine parks protect. This area has not changed since marine parks were fully implemented in 2014.

**Table 3.1. Total area and percentage of marine park per protection zone type as of 2017**

<b>Zone type</b>	<b>Total area (km<sup>2</sup>)</b>	<b>Percentage of total marine park (%)</b>
General managed use zone	8184	30.7
Habitat protection zone	14862	55.7
Sanctuary zone	2938	11.0
Restricted access zone	689	2.6
<b>Total</b>	<b>26673</b>	<b>100</b>

## 3.2 Reliability

The overall reliability score for this report card is 5, based on Table 3.2

**Table 3.2. Information reliability scores for marine parks**

<b>Indicator</b>	<b>Applicability</b>	<b>Currency</b>	<b>Spatial</b>	<b>Accuracy</b>	<b>Reliability</b>
Status of marine parks	5	5	5	NA	5

### 3.2.1 Notes on reliability

The status of marine protection is measured directly by the area that is protected across the entire marine park network. Therefore, age applicability and spatial parameters are all given a score of 5.

# 4 Discussion

## 4.1 Trend

The trend for the status of marine protected areas is recorded as stable. The South Australian marine park network has been established since 2012 (although sanctuary zones weren't implemented until October 2014) and is halfway towards its legislated 10-year review. The 10 year review will assess the effectiveness of marine park management and zoning, and determine future management strategies. Since full implementation there has been no changes to zoning or protection status of zones.

There are no trends available on the specific evaluation questions related to ecological monitoring of marine parks (see questions listed in introduction). Ecological change usually requires a number of years before it becomes measurable. Sanctuary zones were only fully implemented in 2014 giving three years of data as of 2017. The rate at which ecological change will be detectable by marine parks monitoring will vary depending on the region and the species of fish and invertebrates most common within the sanctuary zones. There are some indications of change from specific studies that indicate that marine park sanctuary zones are effective. For example, the southern rock lobster in the Cape du Couedic Sanctuary Zone have responded with greater catch rates being observed in protected areas when compared to areas outside the sanctuary zone (McLeay et al. 2017). Trends in ecological change will form the basis of future report cards when an adequate amount of information is available.

## 4.2 Condition

There are five essential characteristics of effective marine protected areas. These areas should feature no take zones, be well enforced (compliance), be established for greater than 10 years, cover a large area of greater than 100 km<sup>2</sup>, and be isolated by geological features such as deep water or sand. Marine protected areas that meet four or five of these categories tend to contain greater fish biomass, more large fish greater than 250 mm, and greater biomass of apex predators like sharks. Marine protected areas with only one or two essential characteristics tend to be indistinguishable from unprotected and fished sites (Edgar et al. 2014).

The South Australian marine parks network has only been recently implemented, making it difficult to assess the effectiveness of the network. Until long term data on facets of ecological condition such as biodiversity, fish size, abundance and biomass are available, reporting on the condition of habitats and species within the marine parks will not be possible with any degree of certainty.

Therefore, the current "good" condition given for this report card is based on the status of marine parks protection, its management (i.e. compliance), and ecological monitoring programs. The '5-year status report' released in 2018 indicates that marine parks are protecting and conserving South Australia's marine life for future generations and are on track to meet the objectives and outcomes outlined in the objects of the *Marine Parks Act 2007*, the marine parks management plans, and the baseline reports (Bryars et al. 2017, DEWNR 2017).

## 5 References

- Boonzaier, L. and Pauly, D. 2016. Marine protection targets: an updated assessment of global progress. *Orynx* 50 (1), 27-35.
- Brook J, Miller D, Holland, S, Colella D and Brock D, 2017. Underwater visual census (UVC): Application and data management for the South Australian Marine Parks Program. DEWNR Technical note 2017/16, Government of South Australia, Department of Environment, Water and Natural Resources, Adelaide.
- Bryars, S, Brook, J, Meakin, C, McSkimming, C, Eglinton, Y, Morcom, R, Wright, A and Page, B 2017, Baseline and predicted changes for the South Australian Marine Parks Network, DEWNR Technical report 2017/06, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide.
- DEWNR, 2017a. South Australia's Marine Parks 5 Year Status Report. Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide.
- DEWNR (2017b). Trend and Condition Report Cards for South Australia's Environment and Natural Resources. Report. Department of Environment, Water and Natural Resources, Government of South Australia, Adelaide. Available at: [https://data.environment.sa.gov.au/NRM-Report-Cards/Documents/Trend\\_Condition\\_Report\\_Cards\\_2017.pdf](https://data.environment.sa.gov.au/NRM-Report-Cards/Documents/Trend_Condition_Report_Cards_2017.pdf)
- Edgar, GJ, Stuart-Smith, RD, Willis, TJ, Kininmonth, S, Baker, SC, Banks, S, Barrett, NS, Becerro, MA, Bernard, AT, Berkhout, J, Buxton, CD, Campbell, SJ, Cooper, AT, Davey, M, Edgar, SC, Försterra, G, Galván, DE, Irigoyen, AJ, Kushner, DJ, Moura, R, Parnell, PE, Shears, NT, Soler, G, Strain, EM, Thomson, RJ 2014, Global conservation outcomes depend on marine protected areas with five key features, *Nature*, vol. 506, pp. 216-220.
- Government of South Australia (2012a). Natural Resource Management State and Condition Reporting Framework SA. Report. Adelaide. Available at: <https://www.waterconnect.sa.gov.au/Content/Publications/DEWNR/91913%20NRM%20Reporting%20Framework%202012%20Final%20Draft%20v7.pdf>
- McLeay, L., McGarvey, R., Linnane, A., Feenstra, J. and Hawthorne, P. (2017). Rock Lobster Survey of the Western Kangaroo Island Marine Park – Cape Du Couedic (Sanctuary Zone 3). Report to the Department of Environment, Water and Natural Resources. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000282-1. SARDI Research Report Series No. 962. 38pp.
- Miller D, Colella D, Holland S and Brock D, 2017, Baited Remote Underwater Video Systems (BRUVS): Application and data management for the South Australian marine parks program, DEWNR Technical note 2017/20, Government of South Australia, Department of Environment, Water and Natural Resources, Adelaide
- O'Connor NRM (2015). Review of the project NRM Reporting Framework. Report. O'Connor NRM Pty Ltd, Stepney, South Australia. Available at: [https://data.environment.sa.gov.au/NRM-Report-Cards/Documents/Stakeholder\\_review\\_of\\_the\\_Trend\\_and\\_Condition\\_Reporting\\_Framework.pdf](https://data.environment.sa.gov.au/NRM-Report-Cards/Documents/Stakeholder_review_of_the_Trend_and_Condition_Reporting_Framework.pdf)
- O'Leary, B.C., Winther-Janson, M., Bainbridge, J.M., Aitken, J., Hawkins J.P. and Roberts, C.M. 2016. Effective Coverage Targets for Ocean Protection. *Conservation Letters* 9(6), 398–404.
- Sciberras, M., Jenkins, S.R., Kaiser, M.J., Hawkins, S.J. and Pullin, A.S. 2013. Evaluating the biological effectiveness of fully and partially protected marine areas. *Environmental Evidence*, Vol 2. 1-31.
- United Nations, 2017. Progress towards the Sustainable Development Goals. Report to the Secretary General, United Nations Economic and Social Council. Accessed online 30/01/18 [http://www.un.org/ga/search/view\\_doc.asp?symbol=E/2017/66&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=E/2017/66&Lang=E)

