

Tracking changes in South Australia's environment

Summary of our approach to trend and condition
report cards



South Australia's economy, and the wellbeing of all South Australians, is dependent on how well we manage our environment. By gaining insight into how our environment is changing over time we can ensure our future prosperity.

South Australia's environment is fundamental to our economic prosperity and quality of life. Each day it provides us with a range of goods and benefits including clean air, fresh water and a variety of foods and fibres for our consumption.

The condition of our environment changes over time in response to pressures – changing climate, invasive species, land clearance, and use of natural resources – as well as the decisions and actions we take to manage our landscapes.

To ensure the environment's contribution to our economic prosperity and quality of life, we need to understand our environment and the natural capital it provides.

South Australia has released a suite of open access trend and condition report cards since 2013. The purpose of these report cards is to communicate the current condition of our environment, and how it is changing (trending) over time.

These report cards span a breadth of topics at a state scale. They encompass key environmental assets, such as water resources, native vegetation and soil, as well key pressures that impact on our landscapes.

These report cards give the most complete picture we have on South Australia's long-term environmental trends. This comprehensive view provides insight into the effectiveness of past actions and opportunities for future action.

By understanding our natural capital we will ensure a sustainably productive landscape that meets the economic needs of the present without compromising the future.

The importance of measuring change

A country could exhaust its mineral resources, cut down its forests, erode its soil, pollute its aquifers, and hunt its wildlife to extinction, but measured income would not be affected as these assets disappeared.

Robert Repetto (1989), former World Resources Institute economist



Our approach to trend and condition report cards

Our report cards assess and summarise the current condition of the environment, the trend or change in condition over time, as well as the reliability of the information.

Each 1-page report card is summarised in a 'snapshot', and also links to a technical document that describes the underpinning data and analyses.

The information used to develop our report cards is compiled from South Australia's environmental data sets. These data sets gather data from across government agencies, NGOs, universities, field naturalists, and industry.

Condition	is the state of the environment at a single point in time
Trend	is the trajectory of change in condition over multiple points in time.

Although both trend and condition are important, the report cards give particular emphasis to trend. Trend shows us how the environment has responded to past drivers, decisions and actions, and is what we seek to influence through future decisions and actions.

Benefits of trend and condition report cards

- Provide insight into our environment by tracking its change over time
- Interpret complex information in simple and accessible format
- Provide a transparent and open evidence base for decision making
- Highlight those knowledge gaps that will impede South Australia's ability to make decisions
- Drive alignment of environmental reporting, ensuring we 'do once, use many times'
- Identify opportunities for further investment and on-ground action

Report cards provide evidence for decision making

South Australia's approach to environmental reporting gives focus to the assets and pressures we care about.

Our comprehensive suite of report cards enable us to see patterns in trend and condition across South Australia. For example, the condition our native flora and fauna varies between good and fair, however the trend is declining across the state (see full snapshot summaries, pages 14-16).

Our report cards also give insight to a particular asset over time, for example the protection of agricultural land from soil erosion (see Agricultural land case study, page 5).

They also help to understand the impact of pressures on our assets. For example the impact that observed change in rainfall has had on our water resources and how projected changes will continue to impact (see Climate case study, page 9).

They also highlight where gaps in our knowledge prevent us from assessing the trend or condition of our assets (see current 'Unknown' assessments in our full spread of snapshot summaries, page 13-16). We can determine which knowledge gaps impede our ability to make decisions, and then decide the imperative of filling the gap.

The importance of measuring change

The importance of trend is reflected in the design of our report cards.

Our report cards show trend, condition, and information reliability in a succinct visual summary. The banner colour behind the dashboard reflects the trend of the report card.

These report cards can be used on their own, or grouped to tell a more complete story.

Your guide to statewide report cards

1. The focus of the report card, which could be an environmental asset, a pressure, or a management activity.

2. The 'indicator' is what we measured to assess trend and condition.

3. The banner colour indicates the statewide trend of this report card (see Icon index, below).

4. The 'trend' is the statewide change over time.

5. The 'condition' is the current state of the indicator (see 2).

6. Rating out of five for the reliability of the information based on; collection methods, age of the information, and how applicable the information is.

7. A map, which is on most report cards, shows regional trends.

8. The key message that sums up the report card.

9. Background information.

10. A hyperlink to access more technical information or to search Enviro Data SA.



Icon index

Statewide trend

- Getting better
- Stable
- Getting worse
- Unknown

Condition

- Very good
- Good
- Fair
- Poor
- Not applicable
- Unknown

Information reliability

- Excellent
- Very good
- Good
- Fair
- Poor



Where to next

South Australia's report cards give a picture of the long-term trends of our natural capital.

The rigour and suitability of the information that underpins South Australia's report cards has improved since we first published them in 2013, and we will continue to improve them.

We will review the focus of our report cards, the frequency at which we report, and the applicability of report cards to better inform decisions and actions that shape our landscapes.

Revision of our report cards will be guided by future state priorities as well as best practice approaches to environmental reporting.

A common national approach

Commonwealth, state and territory governments have agreed to collaborate on a strategy and action plan for environmental-economic accounting - *Environmental Economic Accounting: A Common National Approach Strategy and Action Plan*.²

It is anticipated that integrating environmental and socio-economic information will enable a better understanding of how our natural systems contribute to economic and human wellbeing.

South Australia's trend and condition report cards will be an important contribution to the national approach.

Through our reporting we want to highlight the environment's contribution to a prosperous and healthy society, and ensure the environment is accounted for in decision making.

² *Environmental Economic Accounting: A Common National Approach Strategy and Action Plan* - Department of the Environment and Energy, 2018.

environment.gov.au/science/environmental-economic-accounting/publications/environmental-economic-accounting-strategy

Agricultural land case study

Report card(s):

Agricultural land: days protected from soil erosion

Why this example?

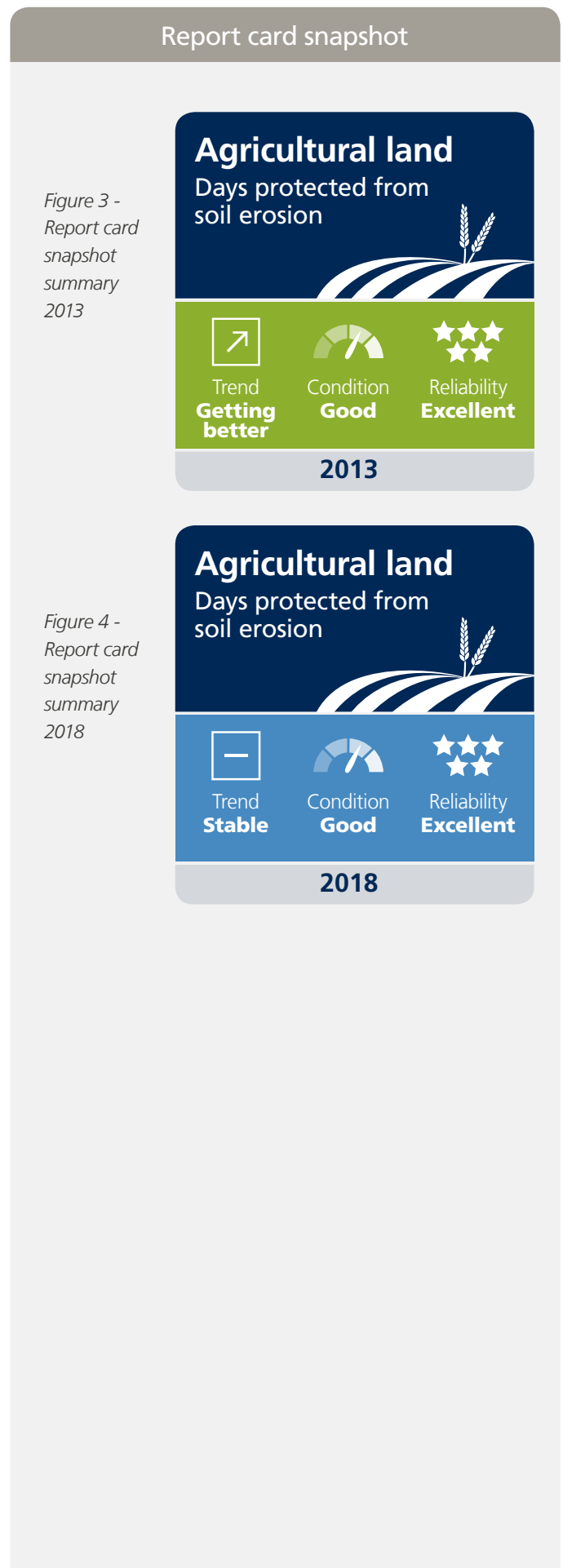
This example illustrates the value of focusing on trend, and demonstrates the advantage of tracking changes through successive report cards.

What is this report card telling us?

This case study references two points in time, the 2013 report cards, and the 2018. In 2013 the trend of this asset was assessed as 'getting better' because specific management actions - in this case a change to broad scale no till farming practices - had led to an improvement in condition

Five years on, our 2018 assessment shows management action has maintained this improved condition, thereby stabilising the trend.

We will continue to track the trend and condition to build our understanding of this asset.



Agricultural land



Days protected from soil erosion

South Australia's

Environmental trend and condition report card 2018

STATEWIDE



Trend
Stable



Condition
Good



Reliability
Excellent

Trend

The protection of agricultural land from soil erosion has stabilised at around 342 days each year.

The number of days that agricultural land was protected from soil erosion improved between 2002 and 2013 in all four natural resources management (NRM) regions that are monitored (South East [SE], South Australian Murray–Darling Basin [SAMDB], Northern and Yorke [N&Y] and Eyre Peninsula [EP]) (bottom figure).

Since 2013, the improving trend has stabilised (top figure).

Improvements over time relate to the adoption of 'no-till' cropping methods, where surveys indicate that the proportion of crop area sown using no-till increased from 16% in 1999 to 83% in 2016.

Protection from erosion has been consistently high in the South East NRM region (bottom figure) because the main land use there is grazed pastures rather than annual cropping. Adelaide and Mount Lofty Ranges and Kangaroo Island NRM regions are not monitored because they are not part of the main broadacre cropping areas.

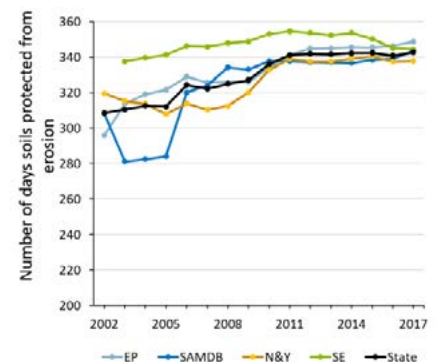
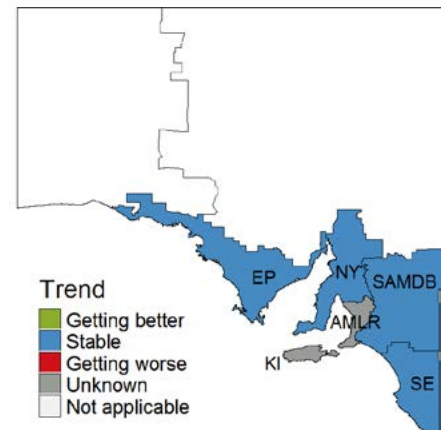
Condition

The level of protection of agricultural land from soil erosion is good.

The level of erosion protection averages around 340–345 days each year across the agricultural regions. Localised erosion is still occasionally triggered by very strong winds or intense rainfall and run-off.

Ongoing erosion protection requires continuous implementation of sustainable land management practices.

South Australian agricultural soils are protected from erosion on around 342 days each year



Why is agricultural land important?

Agricultural land that is protected from erosion supports food and fibre production through crops and livestock, with South Australian agriculture valued at \$4.5 billion annually. Protected agricultural land also minimises dust storms and the amount of sediments and nutrients that reach our waterways.

What are the pressures?

About 60% of South Australia's agricultural soils are susceptible to wind erosion and 32% are susceptible to water erosion.

Soils can be exposed to erosion in very dry seasons when there is not enough plant growth to cover the soil. Tilling, bushfires and managed burns (for pest and weed management) also remove plant cover, increasing the risk of erosion.

Future climate predictions forecast warmer temperatures and reduced rainfall across most agricultural areas in South Australia.

What is being done?

Field surveys of agricultural soils are regularly conducted to estimate the number of days each year that they are protected from erosion.

The state government also works with agribusiness, advisers, industry and farmer groups to improve soil management and help farmers to adopt practices that protect the soil from erosion.

For further information see: [technical information](#)



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Land native fauna case study

Card(s):

Land native fauna: Population trends and per cent threatened

Why this example?

This example illustrates an environmental asset that we value that is in decline.

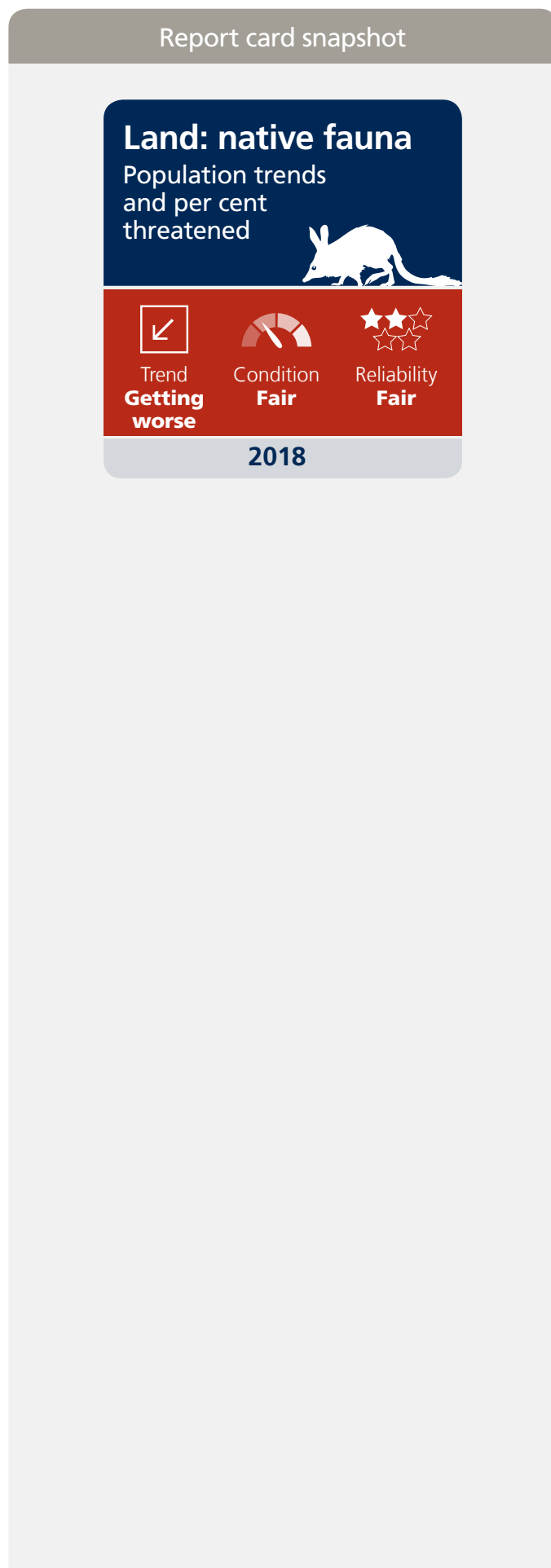
What is this report card telling us?

This report card shows that the trend is 'getting worse', particularly so in five of the eight regions across the state.

These five regions have the greatest urban population pressures and intensive agriculture.

This report cards highlights the scale of the issue.

Given the relatively low reliability of information rating of this report card, there is also opportunity to improve our underlying data on this asset.



Land: native fauna



Population trends and percentage threatened

South Australia's

Environmental trend and condition report card 2018

STATEWIDE



Trend
Getting worse



Condition
Fair



Reliability
Fair

Trend

The statewide trend in populations of land native fauna is getting worse.

This report card is based on expert assessments of the abundance and distribution for 779 taxa, across four groups, that are considered to be land native fauna. Notable taxa include waru (black-footed rock-wallaby), malleefowl, pygmy copperhead, burrowing frog and glossy black cockatoo.

Across the natural resources management regions, population trends are stable in three regions (Alinytjara Wilurara [AW], Kangaroo Island [KI] and South Australian Arid Lands [SAAL]) and getting worse in five regions (Adelaide and Mt Lofty Ranges [AMLR], Eyre Peninsula [EP], Northern and Yorke [NY], South Australian Murray-Darling Basin [SAMDB] and South East SE) (top figure).

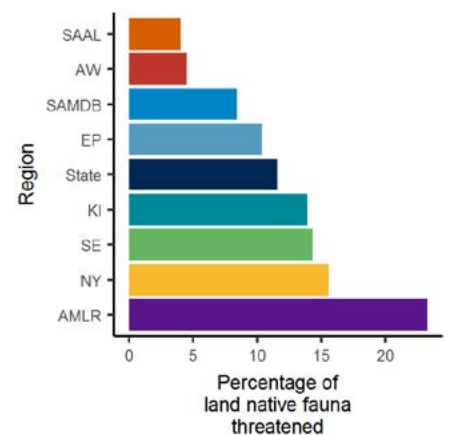
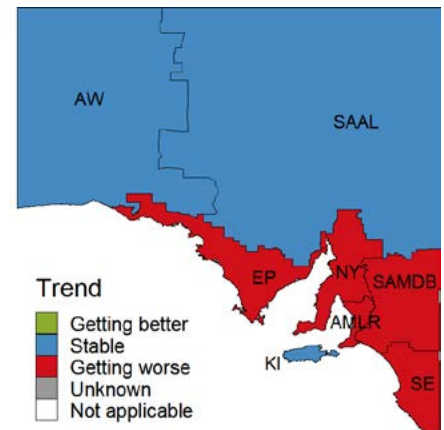
The fair reliability score for this assessment is due to the data being relatively aged, limited in scope and availability, and largely based on expert opinion.

Condition

The percentage of land native fauna considered to be threatened statewide is fair when compared with a worldwide benchmark.

Species with a conservation rating of regionally extinct, critically endangered, endangered or vulnerable are considered threatened. An estimated 12% of land native fauna is threatened in South Australia. At the regional level, estimates are 23% in AMLR (fair), 4% in AW (good), 10% in EP (fair), 14% in KI (fair), 16% in NY (fair), 4% in SAAL (good), 8% in SAMDB (fair) and 14% in SE (fair) (bottom figure).

The statewide trend in populations of land native fauna is getting worse due to a range of ongoing pressures



Why is land native fauna important?

Land native fauna is an important part of South Australia's natural heritage. Species such as Australian magpie, red kangaroo and sleepy lizard are iconic, while many species are found nowhere else on Earth. The state's land native fauna improves ecosystem and agricultural health through pollination, predation, herbivory and soil turnover. Native fauna is an integral element of how people connect with nature. Landscapes with high species diversity also provide mental and physical health benefits.

What are the pressures?

Land native fauna is threatened by land clearance that leads to habitat loss, degradation and fragmentation. Land clearance is usually accompanied by a suite of other pressures such as changing grazing and fire regimes; changing communities of insects, diseases, pest plants and pest animals; and increasing salinity. Climate change adds a further pressure to native species, particularly native fauna that cannot disperse or adapt.

What is being done?

Land native fauna in South Australia is protected by national and state legislation. Approval to clear the habitat of land native fauna can be coupled with conditions to provide an environmental gain over and above the clearing activity. Land native fauna is also cared for by activities such as reintroduction, revegetation, fencing, managing grazing and fire regimes, and controlling pest plants and animals.

For further information see: [technical information](#)



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Climate case study

Report cards:

Rainfall, Projected Rainfall, Surface water

Why this example?

This report card set illustrates how report cards can be used together to show how particular issues or pressures impact on our environmental assets.

What are these report cards telling us?

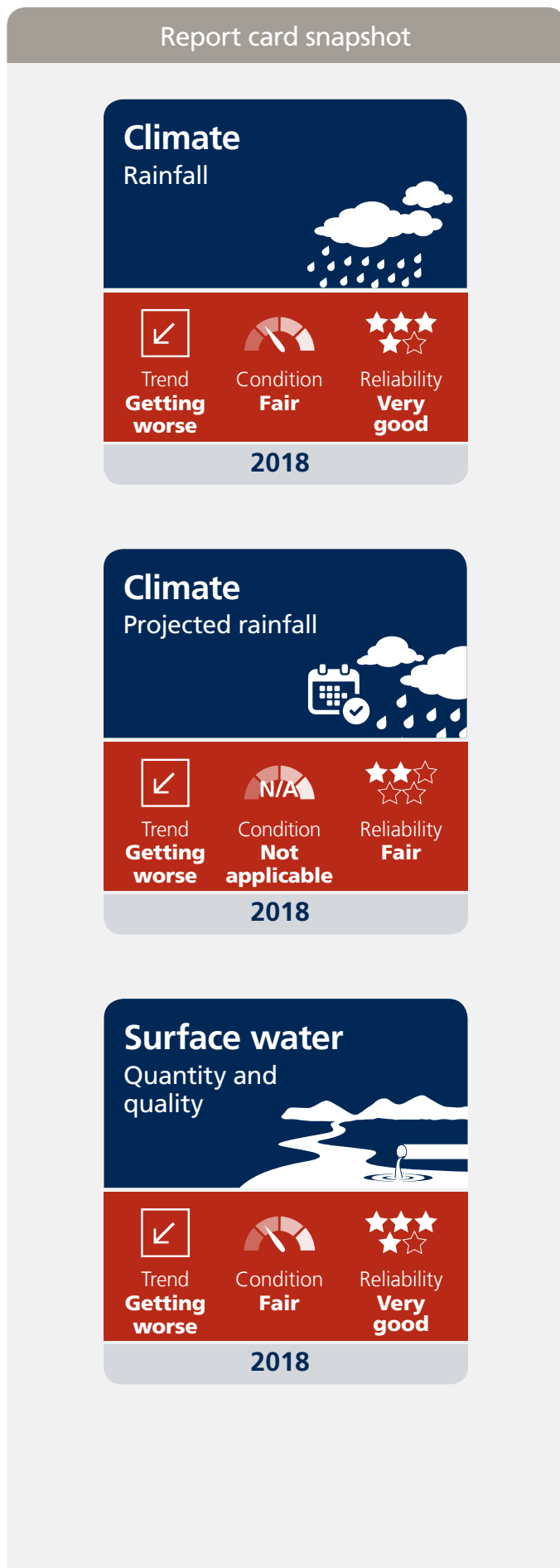
The Rain report card shows rainfall has been declining over the past 30 years.

The Surface water report card shows a decline in water quality and quantity over the past 30 years.

This illustrates how a decline in rainfall leads to a corresponding decline in the quantity and quality of our surface water resources.

The Projected Rainfall report card shows that this decline is expected to continue over the next 30 years. It is therefore expected that our surface water resources will be under increasing pressure as the water flowing in our rivers and streams reduces.

This set of report cards draws attention to South Australia's future challenge in securing water for consumptive uses and for our environment.



Climate



Rainfall

South Australia's
Environmental trend and condition report card 2018

STATEWIDE



Trend
Getting worse



Condition
Fair



Reliability
Very good

Trend

Significant regional variation in seasonal rainfall trends have been observed across South Australia since 1990. Winter rainfall has decreased in the state's south, while summer rainfall has increased in the north.

This assessment uses the latest Bureau of Meteorology (BoM) observed rainfall data in the Australian climate change and variability tracker.

Significant drying trends were evident across much of the southern agricultural areas from April to October (top figure). The observed decrease in rainfall during these months of 10–40 mm per decade are significant since the typical average rainfall ranges from 300 to 500 mm across the region. Such winter drying is consistent with climate change predictions and has occurred in other mid-latitude areas of Australia, such as south-west Western Australia and Victoria.

Pastoral areas in northern South Australia had increased tropically influenced summer rainfall of up to 40–60 mm per decade (bottom figure), with some increase in extreme rainfall events.

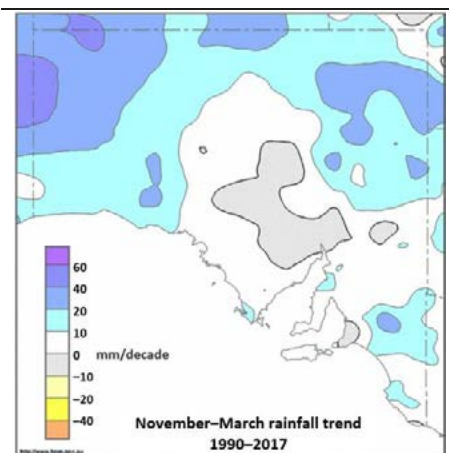
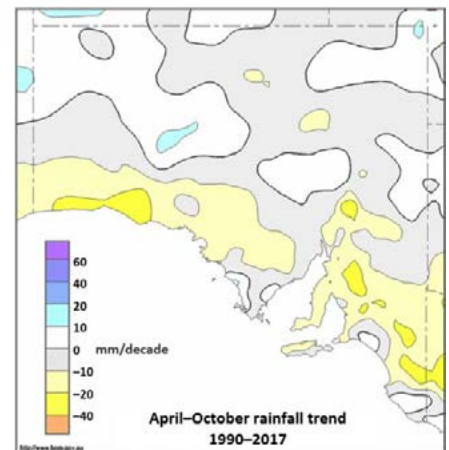
Condition

The condition is rated as fair because rainfall changes across South Australia have been manageable.

Persistent drying trends in the southern agricultural areas may reduce water security and agricultural yields, impact ecosystems and increase fire risk in the future.

In wetlands and water-dependent ecosystems, particularly in the south-east of the state, the duration of surface water inundation has fallen during the drier months of the year, leading to encroachment of dryland terrestrial vegetation.

Since 1990, April to October rainfall in the south has decreased and November to March rainfall in the north has increased



Why is climate important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, they must either adapt, migrate, transform or decline.

What are the pressures?

According to the Australian Academy of Science, 'Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems.'

What is being done?

BoM and other science agencies use a range of atmospheric, terrestrial and marine sensors to track climatic trends across Australia. Trends in rainfall are assessed using a high-resolution gridded dataset developed for CSIRO's Australian Water Availability Project (AWAP). The BoM's biennial State of the Climate report draws on the latest monitoring, science and projection information to describe variability and changes in Australia's climate (including rainfall), and how it is likely to change in the future.

For further information see: [technical information](#)



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Climate

Projected rainfall

South Australia's
Environmental trend and condition report card 2018



STATEWIDE



Trend
Getting worse



Condition
Not applicable



Reliability
Fair

Trend

Average annual rainfall across South Australia is projected to decrease by between 5% and 15% by 2050 under plausible emissions scenarios.

Under intermediate emissions, average annual rainfall is projected to decrease by between 3% and 9% by 2030 and by between 5% and 11% by 2050. Changes are greater under high emissions, particularly later in the century, with projected decreases in rainfall of between 4% and 8% by 2030 and between 7% and 15% by 2050 (top figure).

In all regions across the state, the projected decrease in spring rainfall is greater than the projected decrease in the annual average. Under intermediate emissions, average spring rainfall is projected to decrease by between 13% and 19% by 2030 and by between 14% and 21% by 2050. Changes are greater under high emissions, particularly later in the century, with projected decreases of between 8% and 17% by 2030 and between 18% and 28% by 2050 (bottom figure).

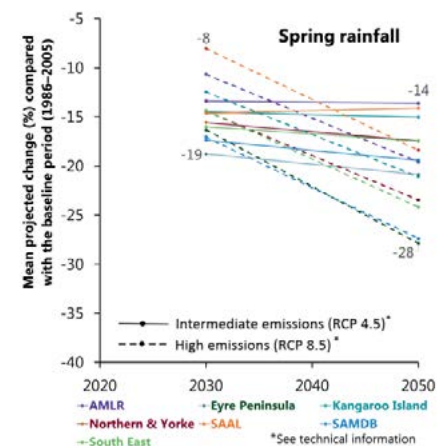
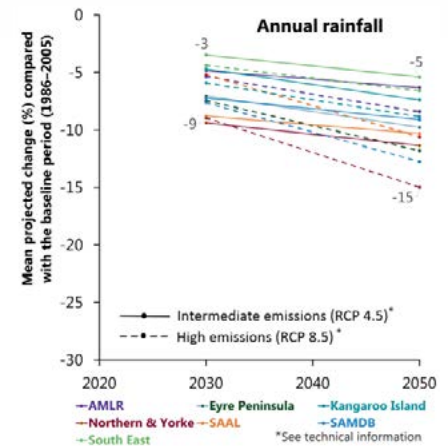
Condition

A condition rating is not applicable because this assessment is of projected rainfall under likely climate scenarios.

This assessment draws from the SA Climate Ready rainfall projections for the state. The projected changes are relative to the baseline period 1986–2005.

The projections are from a range of global climate models under two scenarios of global atmospheric greenhouse gas concentrations (representing intermediate and high emissions scenarios). Note that each model projects some variability around the averages shown.

Annual and spring rainfall across South Australia are projected to decrease significantly by 2050



Why is climate important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, they must either adapt, migrate, transform or decline.

What are the pressures?

According to the Australian Academy of Science, 'Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems.'

What is being done?

The Bureau of Meteorology and other science agencies use a range of atmospheric, terrestrial and marine sensors to track climatic trends across Australia. Trends in rainfall are assessed using a high-resolution gridded dataset developed for CSIRO's Australian Water Availability Project (AWAP). Climate change projections, including rainfall projections, are periodically improved and updated in line with advancements in climate modelling.

For further information see: [technical information](#)



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Surface water

Quantity and quality

South Australia's

Environmental trend and condition report card 2018



STATEWIDE



Trend
Getting worse



Condition
Fair



Reliability
Very good

Trend

Annual streamflows (quantity) in the state's prescribed surface water resource areas over the past 30 years indicate a declining trend. Water salinity (quality) varies with streamflow, but trends are considered to be within natural ranges.

This assessment is of the quality and quantity of surface water in actively managed surface water areas (top figure). The River Murray is excluded and reported on in a separate assessment.

Over the past 30 years, declining trends in streamflow have been observed throughout the prescribed surface water areas of South Australia. In 12 of the past 15 years, streamflows across the state were less than the 30-year average (bottom figure).

Salinity typically varies annually with streamflow, and is influenced by rainfall and evaporation. The salinity trends across the prescribed areas are considered to be within the natural range.

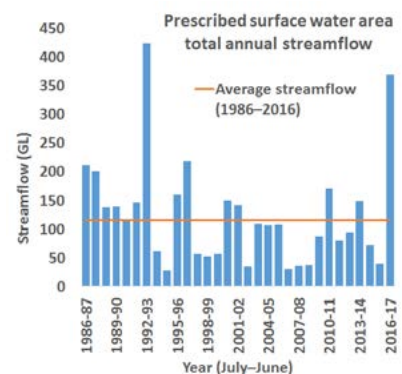
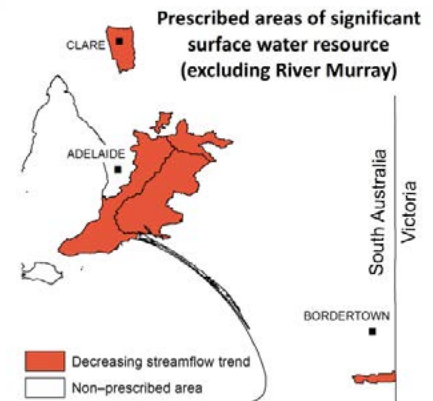
Condition

The condition of surface water quality and quantity is considered to be fair.

While the long-term streamflow trend is declining, the overall condition of surface water resources is fair. Management by water allocation plans (WAPs) seeks to ensure that the condition of our surface water resources is sustainable.

Because of variable rainfall, surface water does not always meet the full consumptive demand and may be supplemented by other water sources, such as groundwater, in dry periods.

Although streamflows are declining across most of South Australia, water quality is generally stable



Why is surface water important?

Surface water resources are fundamental for our industries, environment, health, and way of life. The main uses of surface water across the state are for domestic consumption, agriculture and industries.

Surface water is a limited resource in South Australia. Sustainable water management and planning, in terms of both quality and quantity, is vital to our long-term water security, the environment and the economy of the state.

What are the pressures?

Surface water quantity is affected by climate as well as water-use demands from industry, irrigated agriculture, stock and communities.

Climate impacts rainfall patterns and can lead to a reduction in surface water run-off to rivers and streams. Reduced availability of surface water can also have adverse impacts on water quality.

Surface water quality is affected by use, stock access, sediment and run-off.

What is being done?

Key surface water resources in South Australia are managed through WAPs under natural resources management legislation.

The quality and quantity of water resources across the state are regularly monitored and annually assessed. Science supporting WAPs is reviewed and updated as required.

Regional programs aim to reduce the impacts of land management activities on surface water quality while supporting economic productivity.

For further information see: [technical information](#)



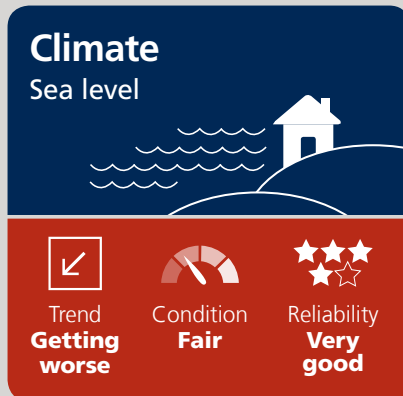
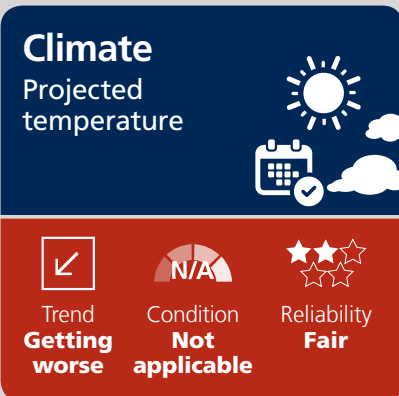
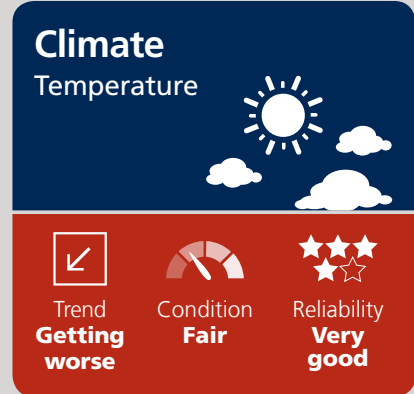
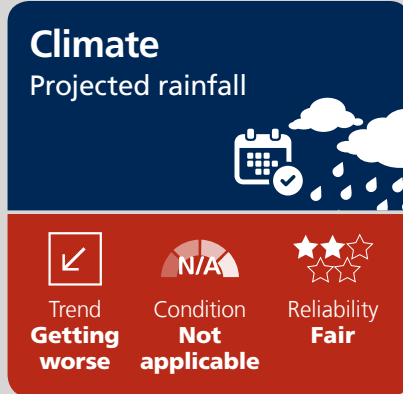
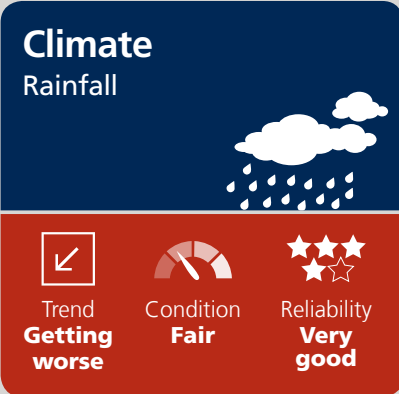
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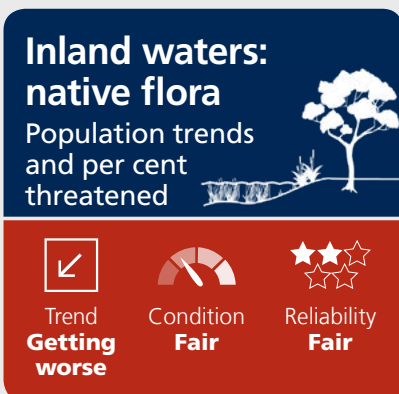
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Trend and condition report card snapshot summaries 2018

Climate



Inland waters



Air quality

Air quality
Particles (PM₁₀)



Trend **Getting better**

Condition **Good**

Reliability **Very good**

Air quality
Lead (Pb)




Trend **Stable**

Condition **Very good**

Reliability **Very good**

Air quality
Sulfur dioxide (SO₂)



Trend **Stable**

Condition **Very good**

Reliability **Very good**

Air quality
Nitrogen dioxide (NO₂)



Trend **Stable**

Condition **Very good**

Reliability **Very good**

Surface water
Quantity and quality



Trend **Getting worse**

Condition **Fair**

Reliability **Very good**

Groundwater
Water level and salinity



Trend **Stable**

Condition **Good**

Reliability **Very good**

Inland waters: native fauna
Population trends and per cent threatened

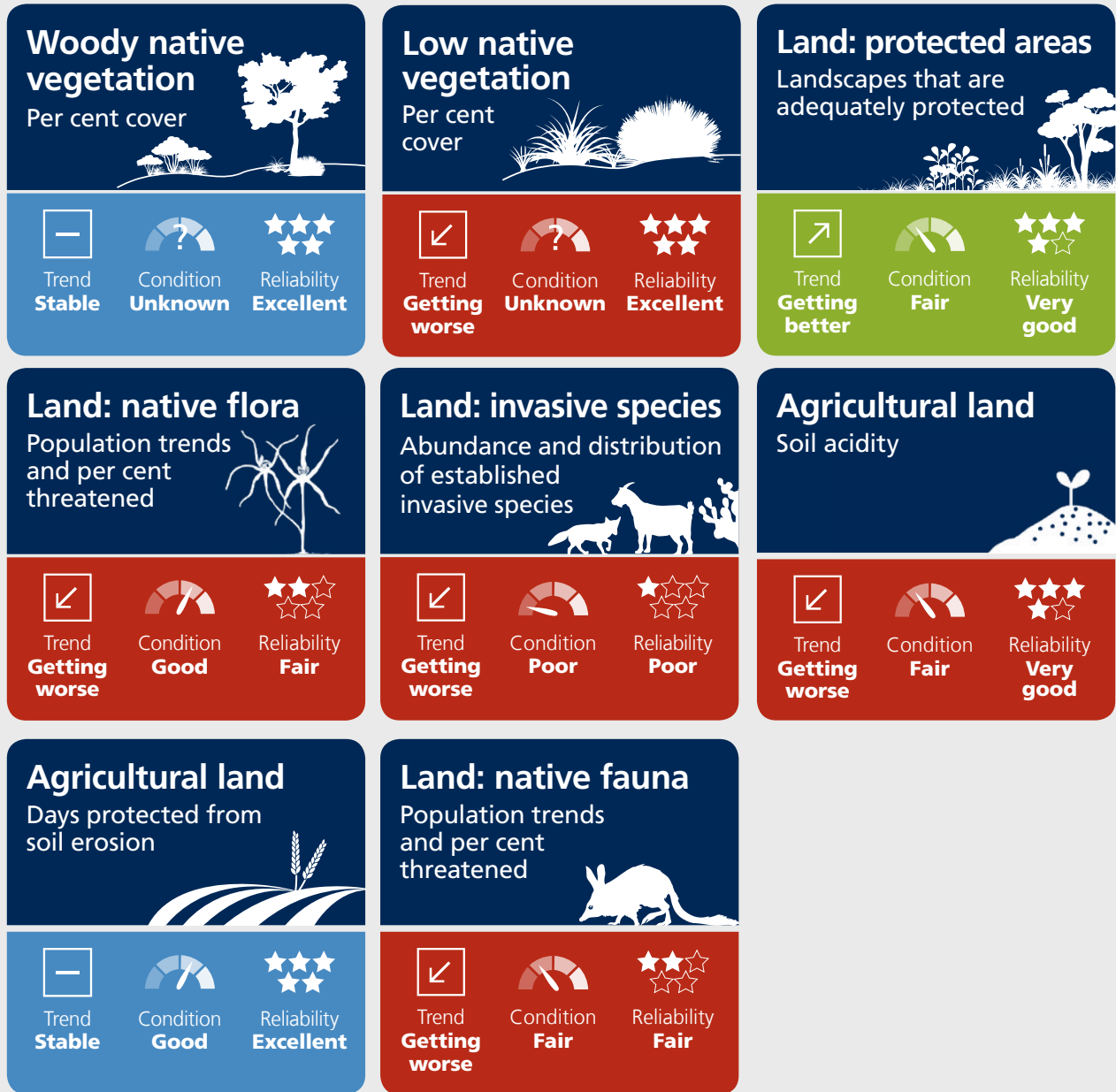


Trend **Getting worse**

Condition **Fair**

Reliability **Fair**

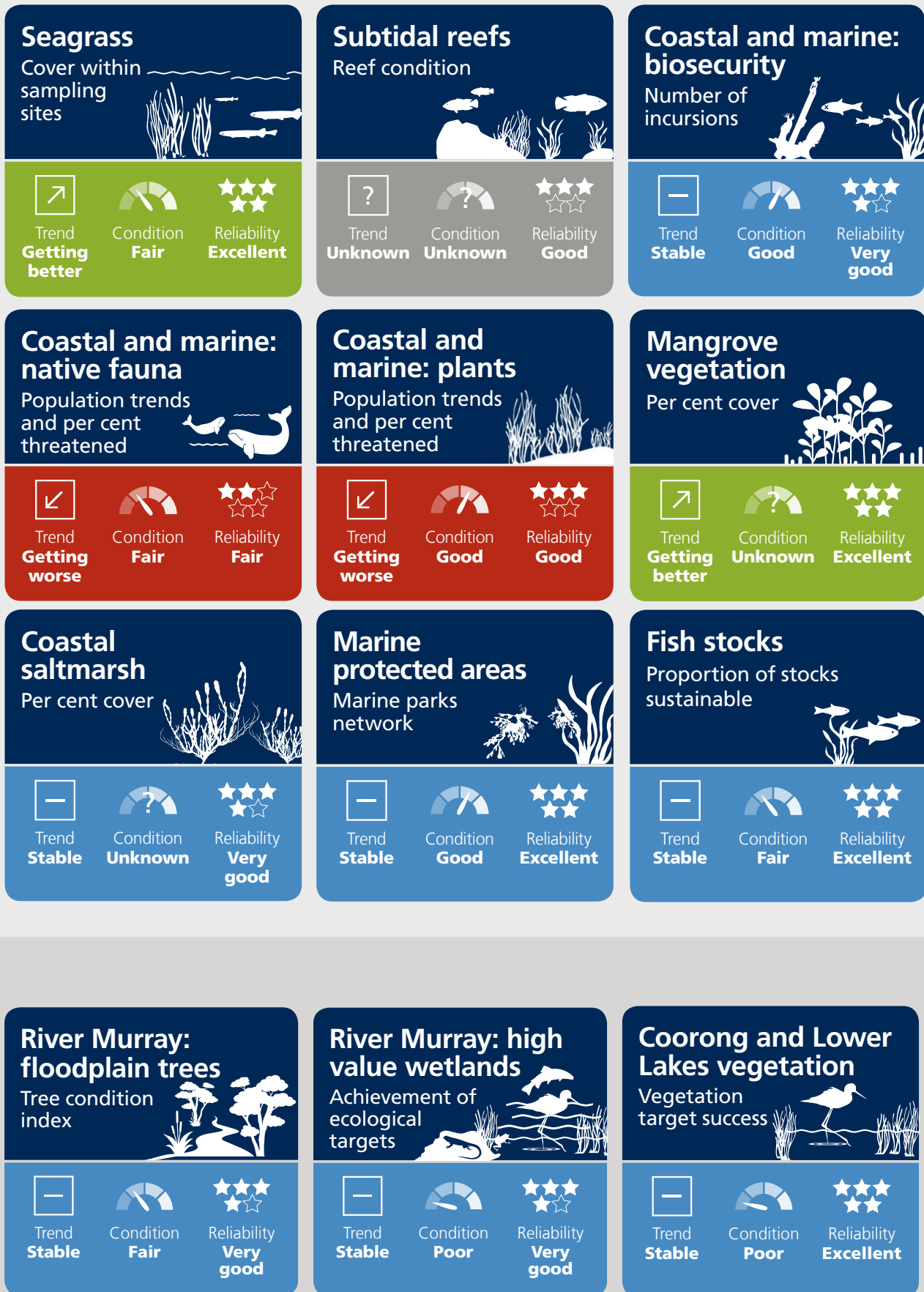
Land



River Murray



Coast and marine









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