# Resilient South

## Strengthening the Southern Region for changes in our climate

# Technical Report
# Climate Change Risks, Opportunities and Vulnerabilities in the Southern Region

02/04/2014

City of Holdfast Bay
City of Marion
City of Onkaparinga
City of Mitcham
Australian Government
Attorney-General's Department
Government of South Australia
South Australian Fire and Emergency Services Commission

**Cover photographs**
Cover photographs provided by the Cities of Onkaparinga, Holdfast Bay, Marion and Mitcham

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**Citation**

City of Onkaparinga (2014) *IVA Technical Report* prepared by URPS and Seed Consulting Services as part of the Resilient South consultancy led by URPS, for the Cities of Onkaparinga, Holdfast Bay, Marion and Mitcham in association with the Government of South Australia and the Australian Government.

## Contents

# 1 Background to this report

This Technical Report documents the Integrated Vulnerability Assessment (IVA) undertaken for the Resilient South project and provides a high level explanation of the IVA methodology. More detailed explanation of the methodology used to develop and implement the IVA and how the IVA results were analysed is provided in the *Climate Change Risks, Opportunities and Vulnerabilities in the Southern Region* report.

It is recommended that this report be read in conjunction with the *Climate Change Risks, Opportunities and Vulnerabilities in the Southern Region* report.

## 1.1 What is an IVA?

An IVA is a tool that helps to identify areas of vulnerability to the impacts of climate change. It is a tool that can assist with prioritising or identifying areas for focussing adaptation action.

The IVA is an evolution in purely risk based approaches to climate change adaptation because it considers both the potential impact of climate change (exposure and sensitivity) and adaptive capacity.

To complete the IVA, scores are assigned to how exposed something is to a climate variable (e.g. rainfall reduction in winter or an increase in bushfire frequency) and how sensitive something is to that exposure. The potential impact is determined by assessing exposure plus sensitivity.

Vulnerability is then identified by considering potential impact in relation to the adaptive capacity of an asset or service to cope or adjust.

Figure 1-1 shows how exposure, sensitivity, potential impact and adaptive capacity are all considered in the evaluation of vulnerability to a defined climate change variable.

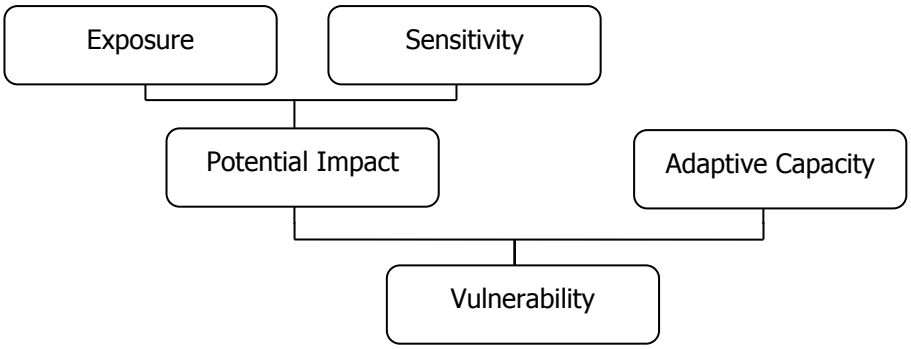


**Figure 1-1 Exposure, sensitivity, potential impact and adaptive capacity are all considered in the evaluation of vulnerability to a defined climate change variable[1]**

[1] Allen Consulting Group (2005). Climate Change Risk and Vulnerability. Canberra, Allen Consulting Group: 159

## 1.2 Undertaking the IVA

In total, 73 indicators were selected to be assessed by the IVA undertaken for Resilient South. Table 2.1 in the next section of this report comprises the full record of the IVA undertaken for the project.

The IVA is set up in Excel, and provides the framework for assessing the indicators.

Each indicator is assessed for exposure (score out of 5) and sensitivity (score out of 5).

Potential impact is calculated by adding exposure and sensitivity to give a score out of 10.

Adaptive capacity is then assessed (score out of 10).

Vulnerability is determined using the following formula to provide a score out of 19:

**Vulnerability = Potential impact – Adaptive Capacity +10 = /19**

Table 1-2 provides the definitions used for exposure, sensitivity and adaptive capacity and the scoring scales that were applied in undertaking the IVA for Resilient South.

**Table 1-2 Definitions of key terms and scoring**

| Key term | Scoring |
|---|---|
| ***Exposure*** *(to the climate variable)*<br>Exposure relates to the influences or stimuli that impact on a system.<br>For Resilient South, exposure relates to predicted changes in the climate at 2070 | 1-rare<br>2-unlikely<br>3-possible<br>4-likely<br>5-very likely |
| ***Sensitivity*** *(to the climate variable)*<br>Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change.<br><br>Note that where the sensitivity to the climate variable will deliver a positive effect, a score of 1 (very low) should be assigned. | 1-very low<br>2-low<br>3-medium<br>4-high<br>5-very high |
| ***Adaptive capacity*** *(to cope with 2070 conditions)*<br>Adaptive capacity is the ability of a system to adjust to climate change impacts (including climate variability and extremes) to moderate potential damages, take advantage of opportunities, or cope with consequences.<br><br>The key question to ask is to what extent the indicator being assessed in its current form, with current management practices, policies or legislative settings or funding, able to function, cope or adjust to the expected climate conditions at 2070. | (1-2)-very low<br>(3-4)-low<br>(5-6)-medium<br>(7-8)-high<br>(9-10)-very high |

### Climate variables

For the Resilient South project it was agreed by the Project Management Committee that the climate variables used by the IVA be based on the following:

- medium emissions scenario;
- median model output; and
- timeframe of 2070[2].

[2] If a shorter timeframe is chosen, such as 2030, it may be more meaningful or easier to relate to by stakeholders, but the impacts of climate change are harder to identify in an IVA. On the other hand, using longer term projections

Climate variables used in the IVA were described based on the projections outlined in the Climate Change Scenarios report[3] prepared as part of stage one of the Resilient South project.

Table 1-3 summarises the climate variables used by the IVA.

**Table 1-3 Climate variables used by the IVA**

| Climate variable | Description |
|---|---|
| Temperature increases - winter | Temperature is projected to increase by 1.75°C in winter by 2070 under a medium emissions outlook. Average maximum temperatures in winter will increase from 15-16°C to 17-18°C. |
| Temperature increases - spring | Temperature is projected to increase by 2.25°C in spring by 2070 under a medium emissions outlook (A1B1 scenario). Average maximum temperatures in spring will increase from 18-23 °C to 21-26 °C. |
| Temperature increases - summer | Temperature is projected to increase by 1.75°C in summer by 2070 under a medium emissions outlook. Average maximum temperatures in summer will increase from 26-28°C to 28-30°C. |
| Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | Under the 2070 medium emissions scenario, periods of up to five consecutive days ≥ 40 °C may occur, up from a three consecutive days in 1980-1999. |
| | Under baseline conditions temperatures exceed 40°C for more than 2 days at least once every 10 years. Under 2070 medium emissions this sequence will occur every 1-2 years. |
| | Sequences of 3 >= consecutive days with average temperatures of at least 32°C will remain uncommon, even under the 2070 high emissions scenario. However their average frequency is projected to increase from once every 5 years in 1980-1999 to once every 1.5 years under the 2070 high emissions scenario. |
| Rainfall reduction – winter and spring | Rainfall is projected to reduce by 15% in winter and spring by 2070 under a medium emissions outlook. |
| Rainfall reduction - summer | Rainfall is projected to reduce by 7.5% in summer by 2070 under a medium emissions outlook. |
| Intensity of rainfall | For Adelaide Airport, 100 year ARI daily rainfall is projected to increase from 76 mm to over 85 mm under the 2070 medium emissions scenario. This event is projected to increase from 102 mm to about 114 mm at Willunga. |
| Bushfire frequency | Under a medium emissions outlook the number of days with a very high Forest Fire Danger Index (FFDI)^ is projected to increase by 41% by 2070. Under a medium emissions outlook the number of days with an extreme FFDI is projected to increase three-fold by 2070, increasing from 2 to 6. |
| Increased risk of coastal inundation | Warming of the atmosphere and oceans could lead to global mean sea levels rising by up to 0.47 m by 2070 and 0.79 m by 2100. |
| Increased temperatures in the Gulf St Vincent | Sea surface temperatures are project to rise from 1 to 1.5°C rise in the oceans surrounding South Australia by 2070 under a medium emissions outlook. |
| Increased acidification of Gulf waters | The pH of surface oceans will drop by 0.1 to 0.3 units by 2100. |
| CO2 increases | Under the medium emissions outlook carbon dioxide concentrations in the atmosphere will increase to 700 ppm. |

such as 2100 may present strong changes in climate variables but be at a time scale that is not meaningful to stakeholders.

[3] Climate Change Scenarios Report (2014) prepared by SKM as part of the Resilient South consultancy led by URPS, for the Cities of Onkaparinga, Holdfast Bay, Marion and Mitcham in association with the Government of South Australia and the Australian Government

| Climate variable | Description |
|---|---|
| Incidence of frost | The incidence of frost conditions (daily minimum temperatures of 2°C or less) are projected to decline from 3.5 days/y in 1980-1999 to 1 day in 2.5 years by 2070. |
| Potential evaporation | Evaporation is projected to increase most (in percentage terms) in autumn and winter, particularly under the 2070 high emissions scenario. Annual average potential evaporation at Mt Bold Reservoir is projected to increase from 1617 mm in 1980-1999 to 1639 mm in 2070. With the projected increase in evaporation and decrease in rainfall, the winter excess of rainfall over evaporation (which drives catchment water flows and soil water accumulation) is projected to decline from 175 mm in 1980-1999 to 154 mm in 2070 (under the high emissions scenario). |

^ Forest Fire Danger Index (FFDI) is calculated from daily temperature, humidity and wind speed and (longer term) changes in soil and fuel dryness.

**Integrated Vulnerability Assessment**

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Economy and Infrastructure | Agriculture | GRP from local viticulture | Bushfire frequency | 5 | 4 | Exposure from direct impacts (fire damage) is likely to be low, however indirect (smoke taint) impact is high. | 5 | 5 | Entire harvest could be damaged by bushfire or smoke damage | 10 | 9 | 2 | 1 | No ability to adapt to smoke problems | 18 | 18 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Evaporation increasing | 5 | 4 | Grapevines will be exposed to increasing summer and spring temperatures and rising evaporation. If the season starts with less water, the demand for irrigation will start earlier and there will be an overall increase in water demand. | 5 | 5 | General growth of grapevine and yield will be adversely impacted by increased evaporation. This will place greater pressure on growers to apply additional irrigations. | 10 | 9 | 6 | 5 | Major adaptive response measure would be to apply additional irrigations. This will depend on water availability, access to that water and ability to pay. | 14 | 14 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | High exposure particularly hot temperatures earlier in growth season before canopy has established | 5 | 5 | Grape quality, yield and hence price is sensitive to very high temperatures. Direct impact of heat on fruit will reduce yield and change the chemical composition (therefore style) of the fruit. There will be different effects depending on the time of the heatwave during the season. | 10 | 10 | 5 | 3 | Limited ability to adapt to heatwaves because of the potential scalding impact on mature grapes close to harvest. There are some technologies available to reduce the impact of heatwave (e.g. sprays and shading) but these are not widespread. If water is available additional irrigation can cool the vine. Different varieties are available now. | 15 | 17 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Incidence of frost | 4 | 2 | Soil moisture is less and this increases frost damage although varilable suggests reduced frost overall. | 4 | 4 | Grape quality and water demand sensitive to frost. Winter frost is not relevant as there is no fruit on the vines. October frost is the greatest risk for viticulture. | 8 | 6 | 9 | 9 | Frost protection systems protect vineyards but require water. Also frost fans available now. | 9 | 7 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Intensity of rainfall | 3 | 3 | Increasing intensity of rainfall may impact grapevines but will generally be experienced during intense but patchy storm events. However, if this happens at the wrong time (as it did recently) exposure of the fruit is very high. | 4 | 3 | Increasing intensity of rainfall may impact grapevines but will generally be experienced during intense but patchy storm events. However, if this happens at the wrong time (as it did recently) exposure of the fruit is very high. | 7 | 6 | 5 | 7 | McLaren Vale already uses row cover crops to prevent erosion. Physical damage to bunches difficult to prevent. Rain covers (that act like an umbrella) are also available now at a cost. | 12 | 9 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Rainfall reduction – Winter and spring | 5 | 3 | Soil moisture content not as high prior to summer | 5 | 4 | Reductions in winter and spring rainfall will result in the soil profile not being | 10 | 7 | 5 | 5 | Groundwater extractions limited by WAP, recycled water is available at a cost, already irrigating | 15 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | recharged with water leaving less water available for plants to draw on during the growing season | | | | | as efficiently as possible. Water holding capacity of the soil may be improved but will require further research. Will growers be able to pay for recycled water which is also likely to have a higher cost if there is higher demand? | | |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Temperature increases - Spring | 5 | 4 | Grapevines will be exposed to increasing summer and spring temperatures and rising evaporation | 5 | 4 | Greater demand over shorter suitable harvest conditions may raise costs for picking. May reduce the maturing time for grapes. Changes in seasonality may alter quality and cost e.g. higher sugar content may require use of different yeast (higher costs). More fruit will need to be processed and stored within a shorter time period, this will increase costs. The flexibility of picking times will reduce (e.g. night harvest) and this will all increase costs. | 10 | 8 | 6 | 6 | Current management system could allow for earlier harvests to occur. May require changes to labour hire arrangements. Processing changes may also be required. | 14 | 12 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | Temperature increases - Summer | 5 | 4 | Grapevines will be exposed to increasing summer temperatures and rising evaporation. | 5 | 4 | Greater demand over shorter suitable harvest conditions may raise costs for picking and processing. May reduce the maturing time for grapes. Changes in seasonality may alter quality & quantity of grapes and associated cost. E.g. higher sugar content may require use of different yeast (higher costs).More fruit will need to be processed and stored within a shorter time period, this will increase costs. The flexibility of picking times will reduce (e.g. night harvest) and this will all increase costs. | 10 | 8 | 6 | 6 | Current vineyards can adapt to increasing average summer temperatures by applying more irrigation, provided they have sufficient allocation available. Future adaptations (not considered here) could include changes to varieties and styles. Canopy management techniques are available but dependent on cost. | 14 | 12 |
| Economy and Infrastructure | Agriculture | GRP from local viticulture | CO2 increases | 4 | | Research is currently being conducted into CO2 impact on | 4 | | Affects water relations in the vine and the compounds in the | 8 | | 1 | | No known adaptive capacity. | 17 | |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | viticulture | | | fruit. Results in more vine growth which increases management costs, however, this impact may self regulate if less water is available (see decreased rainfall). | | | | | | | |
| Economy and Infrastructure | Buildings | Area of appropriate land available for urban development | Bushfire frequency | 5 | 2 | Peri-urban areas will become increasingly exposed to bushfire risk. Areas close to Mitcham and in the hills would be more prone than other areas of the region. More heat drier fuels and more adverse bushfire, greater fuel loads. | 5 | 5 | Areas fringing current urban development will in many cases border farming country or native vegetation, both of which are exposed to increasing bushfire risk. Areas that used to be grazing was lower risk but now has been replanted and new assessment is medium. | 10 | 7 | 3 | 3 | Policy aims to manage development in high risk areas (flood, fire) but currently does not restrict area available for development. Different question is whether it should be allowed in areas of risk. If everyone adopted safe bushfire practices there would be good preparation for bushfires. Also requirement for new houses to have rainwater and bushfire tanks. | 17 | 14 |
| Economy and Infrastructure | Buildings | Area of appropriate land available for urban development | Increased risk of coastal inundation | 5 | 4 | Areas of land close to the coast will not be able to avoid exposure to sea level rise and coastal inundation. Also consider infiltration of sea water into groundwater results in increased salinity which impacts on footings of buildings over time. Lower lying of region more exposed and vulnerable and this will restrict development. Renewal SA has done a risk analysis of this and says it is possible. | 5 | 2 | All land close to the coast will come under increasing future pressure from rising sea levels. This includes areas of development close to beaches and cliffs. | 10 | 6 | 3 | 7 | There is currently little existing adaptive capacity that will enable urban development to respond to rising sea levels close to the coast. | 17 | 9 |
| Economy and Infrastructure | Buildings | Area of appropriate land available for urban development | Intensity of rainfall | 4 | 3 | Flood risk increasing to low lying areas. Also about vulnerability of buildings. Brownhill creek still vulnerable and further mapping required. Also Sturt Creek. Strong winds although no data can impact on loss of vegetation as seen last week cause | 3 | 3 | The area of land available for urban development will not be heavily impacted by increasing intensity rainfall because most of the areas in the region for which this is a risk are already developed. However, issue is redevelopment and intensification via | 7 | 6 | 7 | 3 | Policy aims to manage development in high risk areas (flood, fire) but currently does not restrict area available for development. If demolitions and rebuilds as well as infill will have medium adaptive capacity. Housing design for bushfire management exist and for flooding, but not if | 10 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | damage and reduces heat refuge areas and increases temp for buildings. | | | infill. Infill could happen anywhere, e.g. 70% urban infill policy. Greater runoff due to greater impervious surfaces even with res code. | | | | | relating to coastal inundation. Policy makes it harder to develop in flood prone areas but does not prevent. Another question however, is whether we should be allowing development given these impacts | | |
| Economy and Infrastructure | Buildings | Increased urban density impact on individual wellbeing | Bushfire frequency | 2 | 2 | Less urban areas within high bushfire hazard areas | 5 | 5 | People highly sensitive to bushfire where ever they are. Can result in trauma and increased demand for social and medical support | 7 | 7 | 5 | 3 | Urban areas are not likely to be designed to respond to increasing bushfire risk | 12 | 14 |
| Economy and Infrastructure | Buildings | Increased urban density impact on individual wellbeing | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | People living in high-density urban housing areas will be highly exposed to rising temperatures because of the urban heat island effect. | 5 | 5 | Rising temperatures will have a significant impact on individuals living in high density urban housing areas because of the exacerbating impacts of the urban heat island effect. | 10 | 10 | 5 | 3 | Building design and technologies not currently applied to maximum effect (e.g. no eaves, increased paved areas, no vegetation and micro climates). Lack of space to accommodate gardens/vegetation for cooling. Electricity demands/cost impact ability of people to cool homes. 30 year Plan and planning policy is facilitating increased urban infill, however, design responses to reduce UHI effect are managed by application of building code. Building design and technologies not currently applied to maximum effect. Electricity demands impact ability of people to cool homes. | 15 | 17 |
| Economy and Infrastructure | Buildings | Increased urban density impact on individual wellbeing | Increased risk of coastal inundation | 5 | 5 | Land close to the coast is likely to be redeveloped with increased density housing because of rising land costs and attractiveness to buyers. | 4 | 4 | People living in high density dwellings close to the coast will be impacted by more frequent flooding and in some areas permanent inundation of low lying. Resulting in trauma and demand for medical and social services | 9 | 9 | 3 | 2 | Current urban form not designed to deal with 2070 conditions | 16 | 17 |
| Economy and Infrastructure | Buildings | Increased urban density impact on individual wellbeing | Intensity of rainfall | 3 | 3 | Some urban areas will be exposed to intense rainfall events, but exposure will be patchy across the region during any one | 4 | 3 | Individuals less sensitive to short term impact of flooding. However, flooding events can result in sever damage and | 7 | 6 | 7 | 4 | Stormwater design often considers future conditions. Planning policy, stormwater management, flood mapping good tools for | 10 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | event. | | | trauma and demand on health system | | | | | managing currently, need consideration of future conditions | | |
| Economy and Infrastructure | Buildings | Increased urban density impact on individual wellbeing | Temperature increases - Summer | 4 | 4 | People living in high-density urban housing areas will be highly exposed to rising temperatures because of the urban heat island effect. | 4 | 4 | Rising temperatures will have a significant impact on individuals living in high density urban housing areas because of the exacerbating impacts of the urban heat island effect. | 8 | 8 | 5 | 3 | Building design and technologies not currently applied to maximum effect (e.g. no eaves, increased paved areas, no vegetation and micro climates). Lack of space to accommodate gardens/vegetation for cooling. Electricity demands/cost impact ability of people to cool homes. 30 year Plan and planning policy is facilitating increased urban infill, however, design responses to reduce UHI effect are managed by application of building code. Building design and technologies not currently applied to maximum effect. Electricity demands impact ability of people to cool homes. | 13 | 15 |
| Economy and Infrastructure | Communications networks | Percentage of down time for telecommunications infrastructure | Bushfire frequency | 5 | 5 | Numerous telecommunication assets located within high bushfire hazard areas | 5 | 5 | Direct fire impacts (flame) as well as smoke can interrupt with telecommunications efficiency or service. | 10 | 10 | 2 | 3 | Mobile coverage could be restricted if all towers and exchanges in area are burned. No alternative if infrastructure is burned | 18 | 17 |
| Economy and Infrastructure | Communications networks | Percentage of down time for telecommunications infrastructure | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Telecommunications assets are highly exposed to heatwave events. | 5 | 5 | Telecommunications infrastructure is very sensitive to increasing temperatures and require cooling to counter the affects of heatwaves. | 10 | 10 | 5 | 5 | Air-conditioning of exchanges can be undertaken but effectiveness could be impacted by disruptions to power. | 15 | 15 |
| Economy and Infrastructure | Communications networks | Percentage of down time for telecommunications infrastructure | Increased risk of coastal inundation | 4 | 4 | Some telecommunications assets will be in coastal areas and low lying areas close to the coast. | 2 | 2 | Inundation, whether from storm surge or rainfall intensity, is not likely to lead to down time. | 6 | 6 | 7 | 7 | Telecommunications infrastructure is likely to survive short term periods of inundation with current management responses. | 9 | 9 |
| Economy and Infrastructure | Communications networks | Percentage of down time for telecommunications infrastructure | Intensity of rainfall | 4 | 4 | Some telecommunications assets will be in coastal areas and low lying areas close to the coast. | 2 | 2 | Assets located to minimise impacts of flood | 6 | 6 | 7 | 7 | Telecommunications infrastructure is likely to survive short term periods of inundation with current management responses. | 9 | 9 |
| Economy and Infrastructure | Community planning and development | Frequency of public transport service interruptions | Bushfire frequency | 3 | 3 | Exposure to bushfires will be greatest in parts of the region closest to the Hills. | 4 | 4 | Increased bushfire risk may result in periodic loss of services either when a bushfire is occurring or on catastrophic fire | 7 | 7 | 3 | 3 | Principal adaptation option is to reschedule timetables. Rail lines may be cooled after bushfire. | 14 | 14 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | days. | | | | | | | |
| Economy and Infrastructure | Community planning and developmen t | Frequency of public transport service interruptions | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Rail and bus exposed to rising temperatures. | 5 | 5 | Rail lines can buckle during hot weather typical of heat waves. Road pavement will be damaged by average increase in temperatures although this is not likely to impact public transport service continuity. Overheating of buses | 10 | 10 | 4 | 4 | Principal adaptation option is to reschedule timetables as was done in the January 2014 heatwave across Adelaide. | 16 | 16 |
| Economy and Infrastructure | Community planning and developmen t | Frequency of public transport service interruptions | Increased risk of coastal inundation | 4 | 4 | Coastal inundation could periodically flood low lying roads e.g. near mouth of Onkaparinga Estuary and tram at Glenelg. Rail extension considered inundation during design. | 4 | 4 | Rail and tram lines sensitive to inundation and likely lead to loss of services. | 8 | 8 | 5 | 7 | Train timetables could be rescheduled. Buses can be re-routed. Low adaptive capacity if line washed out | 13 | 11 |
| Economy and Infrastructure | Community planning and developmen t | Frequency of public transport service interruptions | Intensity of rainfall | 3 | 3 | Patchy exposure across the region | 3 | 3 | Short term inundation of tracks and roads. | 6 | 6 | 5 | 7 | Alternate public transport options (tram, bus, train). Good adaptive capacity re short term impacts but less adaptive capacity re longer term impacts e.g. damage to infrastructure such as rails, roads | 11 | 9 |
| Economy and Infrastructure | Community planning and developmen t | Frequency of public transport service interruptions | Temperature increases - Summer | 3 | 3 | Rail and bus exposed to rising temperatures. | 3 | 3 | Increasing heat on average likely to have limited impact on service disruptions. | 6 | 6 | 7 | 6 | Replacement of trains and buses assumed to be planned for within DPTI and appropriate fleet made available. | 9 | 10 |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Bushfire frequency | 5 | 4 | Exposure to bushfire risk will mostly occur to trails in the hills (Mitcham and Onkaparinga). | 3 | 3 | Trails in bushfire prone areas are more typically dirt or gravel, also seating, signage, fencing. Some paved footpaths in suburban areas. Major impacts will be on surrounding vegetation which impacts amenity. | 8 | 7 | 7 | 3 | Vegetation adjoining trails in bushfire prone areas will regenerate through natural processes. Some materials likely to survive bushfire e.g. gravel paths but some financial commitment will be required to restore some built infrastructure | 11 | 14 |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Cycling and walking infrastructure will be exposed to rising temperatures across the region. | 4 | 3 | Concrete will have some degree of expansion, results in cracking and lifting, damage is not only be users on hot days, damage occurs as result of extreme and continues heat, vegetation impacted, die, loss of shade, | 9 | 7 | 4 | 6 | Limited inherent adaptive capacity for trails to adapt to rising temperature. Limited funding currently. Walking and cycling infrastructure undervalued as mode of travel. Have some adaptive capacity as existing tools/ | 15 | 11 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | limbs dropping, bitumen softens, ruts and damage, Melting bitumen could result but would be offset by lower use during extreme heat. Non-irrigated areas could be impacted by more frequent extreme heat. Different sensitivity across the region depending on location and age and materials e.g. coast park is quite resilient because of new infrastructure, paved, no trees which under stress would impact on the infrastructure | | | | | management processes e.g. asset management plans. Need to start planning now to adapt for 2070 as infrastructure has long decision timeframe. Don't have good data re how many walk/cycle where to attract funding | | |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Increased risk of coastal inundation | 5 | 4 | Exposure to coastal inundation will be less because lower percentage of trails is on the coast compared with remainder of region combined. However, some flooding will occur further inland | 5 | 5 | Pavements and trails sensitive along coast park. | 10 | 9 | 1 | 3 | Resources not sufficient to manage future impacts. Do have existing tools such as Land asset management plans. If permanent inundation e.g. SLR very limited adaptive capacity e.g. at Holdfast Bay, however, adaptive capacity higher relating to temporary inundation. | 19 | 16 |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Intensity of rainfall | 3 | 3 | Exposure to intense rainfall will be patchy across the region. | 3 | 3 | Increasing intensity of rain could erode and undermine trails/paths etc. Unsealed paths more sensitive e.g. scouring in sloped areas | 6 | 6 | 7 | 6 | Resources not sufficient to manage future impacts. There is existing planning by Councils via stormwater management plans and WSUD initiatives, detention basins to slow down flows onto infrastructure, planning policy re reducing/slowing flows from development however maintaining walking and cycling infrastructure not the focus of these. | 9 | 10 |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Rainfall reduction – Winter and spring | 4 | 4 | Rainfall reduction will occur equally across the catchment. | 4 | 4 | Reduced rainfall would mainly impact adjacent vegetation and soil heavage could crack the bitumen/pavement. | 8 | 8 | 6 | 5 | Could water more to maintain vegetation. Change vegetation types through street tree through street tree policies/ asset management planning. When a street tree dies currently, reassessment process re what planted next. Paving/surface less | 12 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | adaptive capacity less due to soil heavage. Need for increased maintenance requirements. Funding implications if need to replace more frequently. | | |
| Economy and Infrastructure | Community planning and developmen t | Quality of cycling and walking infrastructure (e.g. footpaths etc.) | Temperature increases - Summer | 3 | 3 | Cycling and walking infrastructure will be exposed to rising temperatures across the region. | 2 | 2 | Melting bitumen could result. Non-irrigated areas could be impacted by more frequent extreme heat. Vegetation impacted by heat, dropping limbs etc. Impacts are felt more when consecutive days of extreme heat rather than increased temperatures overall | 5 | 5 | 6 | 3 | Resources not sufficient to manage future impacts. Existing processes/tools enable identification of appropriate materials to use to accommodate heat | 9 | 12 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Bushfire frequency | 5 | 5 | Farmland will be highly exposed to increasing bushfire risk and is one of the most at risk areas of land in the region. | 3 | 3 | Short term loss of productivity, easier curing of grasses mean fires earlier could limit re-establishment for some months, longer fire danger season | 8 | 8 | 5 | 5 | Employ current management techniques such as firebreaks and reducing fuel loads. Re-seed pastures and irrigation could be applied. | 13 | 13 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | CO2 increases | 5 | 5 | All plant growth will be impacted by CO2 increases | 1 | 1 | Will benefit pasture growth | 6 | 6 | 8 | 9 | Pasture growth may be improved with increased C02. Could also change species and even increase tree planting | 8 | 7 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Evaporation increasing | 4 | 4 | All plants will be exposed to rising temperatures and evaporation and reducing average rainfall. | 4 | 4 | Productivity sensitive as increasing evapo-transpiration will reduce productivity. | 8 | 8 | 5 | 5 | Greater irrigation could occur where already in place, assuming water source is available, change in species planted, requires investment in irrigation and water storage, can irrigate where infrastructure already in place | 13 | 13 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 3 | 2 | Temperature peaks on top of already hotter temperatures could have impacts on pasture survival | 8 | 7 | 3 | 5 | Uncertainty in impact of extreme temperatures on viability of pasture areas. Land use change options | 15 | 12 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Incidence of frost | 3 | 3 | All plants will be exposed to reduced incidence of frost. | 1 | 1 | Likely to have a beneficial impact on pasture growth | 4 | 4 | 8 | 8 | Pasture growth may be improved with reducing frost | 6 | 6 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Rainfall reduction - Summer | 3 | 3 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 3 | 3 | Pasture growth is lower in summer already and so the system will be less sensitive to climate impacts at this time of year. | 6 | 6 | 5 | 4 | Greater irrigation could occur where infrastructure already in place, assuming water available | 11 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Rainfall reduction – Winter and spring | 5 | 5 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 5 | 5 | Pasture growth will be impaired by lack of soil moisture during the growing season. | 10 | 10 | 5 | 5 | Better land management and use of available resources | 15 | 15 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Temperature increases - Spring | 4 | 4 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 2 | 2 | May encourage more rapid growth at the end of the season provided soil moisture levels are sufficient. | 6 | 6 | 5 | 8 | Pasture growth may be improved with increasing temperatures, conditions also more suited to many weed species | 11 | 8 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Temperature increases - Summer | 4 | 4 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 2 | 2 | Pasture growth is lower in summer already and so the system will be less sensitive to climate impacts at this time of year. | 6 | 6 | 5 | 5 | Greater irrigation could occur where infrastructure already in place, assuming water available | 11 | 11 |
| Economy and Infrastructure | Land assets | Productivity of farmland (pasture) | Temperature increases - Winter | 4 | 4 | All plants will be exposed to rising temperatures and evaporation and reducing rainfall. | 1 | 1 | Positive impact on pasture growth from increasing winter temperature | 5 | 5 | 8 | 9 | No requirement to adapt | 7 | 6 |
| Economy and Infrastructure | Land condition | Area of land affected by soil erosion | Bushfire frequency | 4 | 3 | Secondary impacts from rainfall following bushfires | 3 | 3 | Bushfire can destroy soil cover and increase erosive forces when follow up rain occurs. | 7 | 6 | 2 | 3 | Current land management response may not be adequate to deal with 2070 conditions. Scale of adaptive response likely to be too large unless there are high impact areas such as on watercourses. More fires predicted and so increased pressure on already limited resources for land management. | 15 | 13 |
| Economy and Infrastructure | Land condition | Area of land affected by soil erosion | Intensity of rainfall | 3 | 4 | Patchy exposure across the region, coastal cliffs and dunes could also be exposed | 4 | 5 | Intense rainfall will have localised erosion impacts. This could be greatest near watercourses with limited riparian vegetation. Coastal cliffs also sensitive. Development on steep slopes in Mitcham and Onkaparinga where rainfall higher (compared to rest of region) coupled with low land cover can result in erosion issues | 7 | 9 | 2 | 3 | Adaptive capacity of coastal cliffs lower than hills on escarpment in City of Onkaparinga, current land management includes revegetation and land cover maintenance that may not be adequate to mitigate soil erosion under 2070 conditions where also additional development in steep areas (Mitcham and Onkaparinga). | 15 | 16 |
| Economy and Infrastructure | Land condition | Area of land affected by soil erosion | Rainfall reduction – Winter and spring | 4 | 4 | Likely exposure as land cover and soil moisture content reduced | 3 | 3 | Reduced land cover as growing season restricts, and sensitivity of current pasture species to reduced rainfall | 7 | 7 | 2 | 3 | Adaptive capacity of coastal cliffs lower than hills on escarpment in City of Onkaparinga, current land management includes revegetation and land cover maintenance that | 15 | 14 |

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| | | | | | | | | | | | | | | may not be adequate to mitigate soil erosion under 2070 conditions where also additional development in steep areas (Mitcham and Onkaparinga). | | |
| Economy and Infrastructure | Local government services | Property values | Bushfire frequency | 4 | 4 | Most exposed areas will be in hills (Mitcham and Onkaparinga) | 5 | 5 | Property values will be sensitive to bushfire risk, however, the cooler temperatures in the Adelaide Hills may attract people to these areas. | 9 | 9 | 6 | 2 | Existing planning rules could be used to limited house construction in peri-urban areas. | 13 | 17 |
| Economy and Infrastructure | Local government services | Property values | Increased risk of coastal inundation | 5 | 5 | Highly exposed in coastal areas. | 5 | 5 | Property values very sensitive to coastal amenity and protection | 10 | 10 | 3 | 2 | Coastal infrastructure could assist in protecting property values however not yet implemented | 17 | 18 |
| Economy and Infrastructure | Local government services | Property values | Intensity of rainfall | 3 | 3 | Low lying areas in suburbs have already been identified. These cover a small % of the total area of the region. | 3 | 3 | Property values may be impacted but people are likely to accept small increased risk as a result of climate change | 6 | 6 | 3 | 2 | There is limited capacity within existing stormwater systems. Some plans have actions identified but not all resourced yet. | 13 | 14 |
| Economy and Infrastructure | Quaternary sector | GRP from education and training | Bushfire frequency | 4 | 3 | Some education facilities, mostly in the hills (Mitcham and Onkaparinga) part of the region, could be exposed to greater bushfire risk | 2 | 2 | Attendance rates may be lower during extreme heat events during summer when bushfire risk is high | 6 | 5 | 8 | 7 | Greater array of remote access services are becoming available meaning that physically attending at an education facility is not always required | 8 | 8 |
| Economy and Infrastructure | Quaternary sector | GRP from education and training | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 2 | Education facilities will be exposed to extreme heat | 2 | 2 | Attendance rates may be lower during summer time, parituclalry during heat waves | 7 | 4 | 8 | 7 | Greater array of remote access services are becoming available meaning that physically attending at an education facility is not always required | 9 | 7 |
| Economy and Infrastructure | Quaternary sector | GRP from education and training | Increased risk of coastal inundation | 2 | 2 | Some education facilities will be exposed close to the coast | 2 | 2 | Reduced access to coastal education facilities may reduce attendance rates | 4 | 4 | 7 | 7 | Greater array of remote access services are becoming available meaning that physically attending at an education facility is not always required | 7 | 7 |
| Economy and Infrastructure | Quaternary sector | Impact on people choosing to live and work in the region | Bushfire frequency | 4 | 4 | Limited mostly to peri-urban and farming land in the hills part of the region. | 3 | 4 | Many people will be able to chose to live in areas not exposed to increasing bushfire risk | 7 | 8 | 7 | 7 | Future adaptive capacity could include Councils and Government purchasing high risk land or modifying development plans. Needs to be transparency about how decisions are made. There should be no disadvantage. Other legislation could also be reviewed. If people move out of bushfire prone areas they may remain living in the | 10 | 11 |

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| | | | | | | | | | | | | | | region. | | |
| Economy and Infrastructure | Quaternary sector | Impact on people choosing to live and work in the region | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | All people in the region will be exposed to rising temperatures. Heatwave likely to be of greatest concern. | 1 | 3 | Slightly cooler summer temperatures will encourage people to live in region (compared to northern Adelaide region) | 6 | 7 | 9 | 7 | High adaptive capacity because people will prefer to live in this area. People may choose to move to the region to take advantage of moderate temperatures, businesses also encouraged to move to region | 7 | 10 |
| Economy and Infrastructure | Quaternary sector | Impact on people choosing to live and work in the region | Increased risk of coastal inundation | 4 | 4 | Exposure restricted to the coastal zone | 3 | 3 | May restrict people choosing to live close to the coast | 7 | 7 | 7 | 4 | Future adaptive capacity could include Councils and Government purchasing high risk land or modifying development plans. Needs to be transparency about how decisions are made. There should be no disadvantage. Other legislation could also be reviewed. | 10 | 13 |
| Economy and Infrastructure | Quaternary sector | Impact on people choosing to live and work in the region | Temperature increases - Summer | 5 | 3 | All people in the region will be exposed to rising temperatures. Heatwave likely to be of greatest concern. | 1 | 2 | Slightly cooler summer temperatures will encourage people to live in region | 6 | 5 | 9 | 7 | People may choose to move to the region to take advantage of moderate temperatures, businesses also encouraged to move to region | 7 | 8 |
| Economy and Infrastructure | Quaternary sector | Impact on people choosing to live and work in the region | Temperature increases - Winter | 5 | 3 | All people in the region will be exposed to rising temperatures. Heatwave likely to be of greatest concern. | 1 | 2 | Warmer winter temperatures will encourage people to live in region | 6 | 5 | 9 | 7 | People may choose to move to the region to take advantage of moderate temperatures, businesses also encouraged to move to region | 7 | 8 |
| Economy and Infrastructure | Secondary industries | Costs of waste management | Bushfire frequency | 2 | 2 | There are limited number of waste disposal sites in bushfire prone areas | 4 | 4 | High hazard conditions mean more likely to have fires at landfills | 6 | 6 | 4 | 4 | Management not prepared to cope with more frequent fires | 12 | 12 |
| Economy and Infrastructure | Secondary industries | Costs of waste management | Intensity of rainfall | 2 | 2 | Limited number of landfill sites which will have patch exposure to increasing intensity of rainfall | 2 | 2 | Increased runoff from landfill sites may create water quality | 4 | 4 | 7 | 7 | Landfill designed to manage stormwater | 7 | 7 |
| Economy and Infrastructure | Secondary industries | GRP from manufacturing | Bushfire frequency | 3 | 4 | Wine industry is the only manufacturing that is occurring in bushfire prone zones. Wine industry only one small part of manufacturing for the entire region. | 3 | 3 | Bushfires could directly damage facilities and introduce a smoky taint to wine made from local grapes | 6 | 7 | 8 | 4 | Bottling facility (Torassan) could be shifted to elsewhere within the region although this is not currently occurring. Greater clearance of native vegetation could occur close to wineries and bottling facilities. Torassan covered on 3-sides by vines. | 8 | 13 |

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| Economy and Infrastructure | Secondary industries | GRP from manufacturing | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Manufacturing sites across the regions will be exposed to increases in annual average temperatures and heatwaves | 4 | 4 | Will impact productivity of workers and machinery. Workers will be impacted where workshops are not air-conditioned | 9 | 9 | 5 | 3 | Changes required to employment conditions (OHS), scheduling etc. | 14 | 16 |
| Economy and Infrastructure | Secondary industries | GRP from manufacturing | Rainfall reduction – Winter and spring | 3 | 2 | Rainfall reduction will occur equally across the catchment. | 3 | 3 | Soil heavage could impact integrity of manufacturing facilities | 6 | 5 | 9 | 7 | Increase application of water in areas surrounding buildings | 7 | 8 |
| Economy and Infrastructure | Secondary industries | GRP from manufacturing | Temperature increases - Summer | 2 | 4 | Manufacturing sites across the regions will be exposed to increases in annual average temperatures and heatwaves | 3 | 4 | Will impact productivity of workers and machinery. Workers will be impacted where workshops are not air-conditioned | 5 | 8 | 5 | 5 | Changes required to employment conditions (OHS), scheduling etc. | 10 | 13 |
| Economy and Infrastructure | Service networks | Condition of wastewater management assets | Increased risk of coastal inundation | 4 | 4 | Sea water intrusion to wastewater network | 4 | 4 | Sea water may damage condition and operation of wastewater management infrastructure. May also influence use of treated wastewater for irrigation if salinity levels rise. | 8 | 8 | 5 | 5 | SA Water have asset replacement programs and can adjust treatment systems | 13 | 13 |
| Economy and Infrastructure | Service networks | Condition of wastewater management assets | Intensity of rainfall | 4 | 4 | Stormwater inflows to sewage systems may occur | 3 | 3 | Impacts on treatment plants of increasing flows because of greater stormwater will have limited affect on stormwater infrastructure | 7 | 7 | 5 | 5 | SA Water have asset replacement programs and can adjust treatment systems | 12 | 12 |
| Economy and Infrastructure | Service networks | Condition of wastewater management assets | Rainfall reduction - Summer | 3 | 3 | Rainfall reduction will occur equally across the catchment. | 2 | 2 | Treatment systems less effective with less water | 5 | 5 | 5 | 5 | SA Water have asset replacement programs and can adjust treatment systems | 10 | 10 |
| Economy and Infrastructure | Service networks | Condition of wastewater management assets | Rainfall reduction – Winter and spring | 4 | 4 | Soil drying impacts and water reduction exposes pipes and other infrastructure | 3 | 3 | Treatment systems less effective with less water | 7 | 7 | 5 | 5 | SA Water have asset replacement programs and can adjust treatment systems | 12 | 12 |
| Economy and Infrastructure | Service networks | Condition of wastewater management assets | Temperature increases - Summer | 4 | 4 | Less water disposed to sewage so pipes and treatment systems exposed | 4 | 4 | Treatment systems less effective with less water which may occur if warmer summers mean that people reduce water usage on their properties | 8 | 8 | 5 | 5 | SA Water have asset replacement programs and can adjust treatment systems | 13 | 13 |
| Economy and Infrastructure | Service networks | Delivery of potable water (condition of pipes and water quality) | Bushfire frequency | 4 | 4 | Infrastructure may be exposed in some areas in the Hills. Happy Valley more of storage than catchment so lower impact. Pumping infrastructure exposed e.g. pump stations. Fires may affect | 3 | 4 | Water quality highly sensitive to bushfire impacts. Happy Valley not a catchment, however pump stations could be offline if bushfire and potential damage to pipes. Ash may still affect reservoir which | 7 | 8 | 5 | 7 | Adjust treatment of potable water as required. More work to be done on bushfire risk management to infrastructure. | 12 | 11 |

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| | | | | | | assets outside of region. Desalination can only supply half total demand. | | | supplies Happy Valley. | | | | | | | |
| Economy and Infrastructure | Service networks | Delivery of potable water (condition of pipes and water quality) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 4 | 4 | Infrastructure will be exposed to rising average temperatures and heatwaves. Algal blooms impact water quality potential increase in water treatment. Heat will crack soils and potential failure of water mains. | 4 | 3 | Soil drying impacts on distribution network. Still very old infrastructure and shift from wet to dry periods (over decades), likely to get interruption to supply at higher frequency over next few decades. | 8 | 7 | 4 | 5 | SA Water have asset replacement programs in place but have limited planning out to 2070. Vulnerability assessments commencing now. Funds in place for maintenance program over next 30 years will assist in adaptation. | 14 | 12 |
| Economy and Infrastructure | Service networks | Delivery of potable water (condition of pipes and water quality) | Intensity of rainfall | 3 | 3 | Pipes and water supplies could be exposed to increased intensity of rainfall in the Hills. Localised damaged. Some pump stations could be inundated. | 2 | 3 | High intensity rainfall events could cause water quality impacts. Normal water treatment would apply. Likely to be localised. | 5 | 6 | 8 | 5 | Adjust treatment of potable water as required | 7 | 11 |
| Economy and Infrastructure | Service networks | Delivery of potable water (condition of pipes and water quality) | Rainfall reduction - Summer | 2 | 3 | Rainfall reduction will expose all areas to reduced runoff. Supplies not reliant on summer runoff. Increased demand from households as rainfall reduces. | 2 | 3 | Some reduced runoff into storage reservoirs, but majority of potable water comes from outside the region | 4 | 6 | 9 | 8 | Source water from outside of the region. Desalination plant is a fall back. | 5 | 8 |
| Economy and Infrastructure | Service networks | Delivery of potable water (condition of pipes and water quality) | Rainfall reduction – Winter and spring | 4 | 4 | Rainfall reduction will expose all areas to reduced runoff. Rainfall reduction will impact on water storages. Autumn is important for catchment yields leading into water. Happy Valley is a storage and not a catchment reservoir it is supplied by Mt Bold which gets a lot of water from Murray River. | 4 | 3 | Some reduced runoff into storage reservoirs, but majority of potable water comes from outside the region | 8 | 7 | 8 | 8 | Capacity to source water from outside of the region is still vulnerable. Desalination plant is a fall back and potential for water restrictions as required. | 10 | 9 |
| Economy and Infrastructure | Service networks | Frequency of electricity supply disruption | Bushfire frequency | 5 | 5 | Exposure of distribution networks in peri-urban and farming areas | 5 | 5 | Network managers advise that there would be reduced servicing of lines during heatwaves | 10 | 10 | 4 | 5 | Greater native vegetation clearance near power lines | 16 | 15 |
| Economy and Infrastructure | Service networks | Frequency of electricity supply disruption | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | All networks in the region will be exposed to heatwave events | 5 | 4 | Rolling blackouts may occur as SA Power Networks manages the network to cope with increased demand due to greater use of air conditioners. | 10 | 8 | 4 | 3 | Actions generally aim to reduce damage to assets so involve switching off which does not contribute to reducing the interruptions. Does not address increased capacity needed in network overall to | 16 | 15 |

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| | | | | | | | | | | | | | | prevent/reduce disruption. | | |
| Economy and Infrastructure | Service networks | Frequency of electricity supply disruption | Intensity of rainfall | 3 | 3 | Extreme rainfall events may occur as part of storm with winds etc. | 4 | 2 | Intense rainfall events are most likely to result in short term flooding at the base of the poles. Increases storm activity cold bring down more power lines. | 7 | 5 | 3 | 7 | Existing network will have high adaptive capacity to periodic flooding in some low lying areas. However, storm conditions will result in trees coming down on power lines, power lines touching and therefore being switched off etc. | 14 | 8 |
| Economy and Infrastructure | Tertiary industries | GRP from health care and social assistance | Bushfire frequency | 4 | 4 | People living in bushfire zones will come under increasing threat | 4 | 4 | Demand for health care and social assistance is likely to increase in response to more frequent extreme weather events | 8 | 8 | 5 | 5 | Increasing service provision may be difficult given limited resources in Federal and State budgets for health care | 13 | 13 |
| Economy and Infrastructure | Tertiary industries | GRP from health care and social assistance | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Members of community will be equally exposed to potential threat of rising temperatures | 5 | 5 | Demand for health care and social assistance is likely to increase in response to more frequent extreme weather events | 10 | 10 | 5 | 5 | Increasing service provision may be difficult given limited resources in Federal and State budgets for health care | 15 | 15 |
| Economy and Infrastructure | Tertiary industries | GRP from health care and social assistance | Intensity of rainfall | 3 | 3 | Limited impact to people living in low lying areas | 3 | 3 | Demand for health care and social assistance is likely to increase in response to more frequent extreme weather events | 6 | 6 | 5 | 5 | Increasing service provision may be difficult given limited resources in Federal and State budgets for health care | 11 | 11 |
| Economy and Infrastructure | Tertiary industries | GRP from health care and social assistance | Temperature increases - Summer | 3 | 3 | Members of community will be equally exposed to potential threat of rising temperatures | 3 | 3 | Increases in average annual temperatures are likely to have less impact on demand for health services than heatwaves | 6 | 6 | 5 | 5 | Increasing service provision may be difficult given limited resources in Federal and State budgets for health care | 11 | 11 |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Bushfire frequency | 4 | 5 | Retail shops will be exposed in areas in the hills | 2 | 3 | Shops are likely to close on extreme bushfire days. There may be some direct damage to shops. Difference between discretionary spending vs essential spending i.e. people still need to purchase essentials like milk, toilet paper etc. Sensitivity is related to nature of the commerce of the centre and whether they are strip shops or in a centre. Sensitivity for the entire year is low compared to periodic, short term | 6 | 8 | 9 | 5 | Alter shop opening hours but this will possibly reduce trade | 7 | 13 |

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| | | | | | | | | | impacts. | | | | | | | |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | All retail shops will be exposed to increasing temperatures | 2 | 4 | People are less likely to spend time in small shops without air-conditioning. More people may go to large regional shopping centres (e.g. Westfield Marion). | 7 | 9 | 9 | 5 | Extended operating hours or install air-conditioning for smaller retail shops | 8 | 14 |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Increased risk of coastal inundation | 4 | 4 | Retain shops in near coastal zone will be exposed e.g. Jetty Road Brighton and Glenelg | 3 | 3 | Restricted access to shops in near coastal area may reduce trade. In the future, some shops close to the coast may need to relocate, depending on what adaptation actions are taken in response to rising sea levels | 7 | 7 | 9 | 3 | Short term sand bagging could reduce flooding impacts. Limited long term adaptation options. Will rely on whole of region response | 8 | 14 |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Intensity of rainfall | 3 | 3 | Exposure restricted to retail shops in low lying areas | 2 | 2 | Periodic restricted access to shops may have minor impact on trade | 5 | 5 | 9 | 8 | Short term sand bagging could reduce flooding impacts. | 6 | 7 |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Rainfall reduction – Winter and spring | 2 | 2 | All retail shops in the region will be exposed to reducing rainfall | 1 | 1 | Expectation that people will be more active during winter and trade could be greater than it currently is over this period | 3 | 3 | 10 | 8 | No adaptation options required | 3 | 5 |
| Economy and Infrastructure | Tertiary industries | GRP from retail trade | Temperature increases - Summer | 3 | 3 | All retail shops will be exposed to increasing temperatures | 2 | 2 | People are less likely to spend time in small shops without air-conditioning. More people may go to large regional shopping centres (e.g. Westfield Marion). | 5 | 5 | 9 | 6 | Extended operating hours or install air-conditioning for smaller retail shops | 6 | 9 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Bushfire frequency | 4 | 5 | Accommodation buildings and tourist attractions will be exposed to bushfire, especially in areas such as McLaren Vale | 3 | 5 | Fewer people may visit the region during bushfires or days of catastophic or extreme bushfire danger | 7 | 10 | 9 | 3 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. Potentially try to increase visitor numbers during winter and spring | 8 | 17 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Tourists and accommodation providers will be equally exposed to rising temperatures | 2 | 5 | Greater visitor numbers to beaches during heatwaves, assuming that beaches have remained intact. If heatwaves are too extreme general decline in visitor numbers could be expected. | 7 | 10 | 9 | 3 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. Potentially try to increase visitor numbers during winter and spring | 8 | 17 |

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| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Increased risk of coastal inundation | 4 | 4 | Near coastal tourist attractions and accommodation providers will be exposed. This includes impacts on beaches. | 5 | 5 | Loss of beaches could dramatically reduce visitor numbers to the region | 9 | 9 | 9 | 2 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. Limited adaptation options by tourism sector alone. Will require whole of region response. | 10 | 17 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Intensity of rainfall | 3 | 2 | Patchy exposure across the region | 1 | 2 | Limited, short term impacts | 4 | 4 | 9 | 8 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. | 5 | 6 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Rainfall reduction - Summer | 4 | 3 | Tourists and accommodation providers will be equally exposed to reduced rainfall | 1 | 2 | Reduced quality of some natural tourist attractions (e.g. conservation parks) if vegetation is degraded due to reduced rainfall | 5 | 5 | 9 | 5 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. | 6 | 10 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Rainfall reduction – Winter and spring | 4 | 4 | Tourists and accommodation providers will be equally exposed to reduced rainfall | 1 | 3 | Reduced quality of some natural tourist attractions (e.g. conservation parks) if vegetation is degraded due to reduced rainfall. Reduced rainfall could also increase the number of days people are willing to spend outdoors visiting the region. | 5 | 7 | 9 | 5 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. | 6 | 12 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Temperature increases - Summer | 4 | 4 | Tourists and accommodation providers will be equally exposed to rising temperatures | 1 | 3 | Greater visitor numbers to beaches during warmer summers, assuming that beaches have remained intact | 5 | 7 | 9 | 4 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. Potentially try to increase visitor numbers during winter and spring | 6 | 13 |
| Economy and Infrastructure | Tertiary industries | GRP from tourism (accommodation and food service) | Temperature increases - Winter | 4 | 4 | Tourists and accommodation providers will be equally exposed to rising temperatures | 1 | 3 | Assuming that beaches remain intact, increasing winter temperatures could extent the period of time over which people use the beach | 5 | 7 | 9 | 8 | Will be a positive for the region | 6 | 9 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Bushfire frequency | 4 | 5 | Accommodation buildings and tourist attractions will be exposed to bushfire, especially in areas such as McLaren Vale | 2 | 5 | Fewer people may visit the region during bushfires or days of catastophic or extreme bushfire danger | 6 | 10 | 9 | 3 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. Potentially try to increase visitor numbers | 7 | 17 |

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| | | | | | | | | | | | | | | during winter and spring | | |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Tourists and accommodation providers will be equally exposed to rising temperatures | 2 | 5 | People still likely to visit the region because the book in advance compared with Adelaide based people who can more easily cancel day trips | 7 | 10 | 9 | 3 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. Potentially try to increase visitor numbers during winter and spring | 8 | 17 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Increased risk of coastal inundation | 4 | 4 | Near coastal accommodation providers will be exposed to storm surge/periodic inundation, especially where they are located close to the beach | 3 | 5 | Loss of beaches could dramatically reduce visitor numbers to the region | 7 | 9 | 9 | 2 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. Limited adaptation options by tourism sector alone. Will require whole of region response. | 8 | 17 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Intensity of rainfall | 3 | 2 | Patchy exposure across the region | 2 | 2 | Limited, short term impacts | 5 | 4 | 9 | 8 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. | 6 | 6 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Rainfall reduction - Summer | 3 | 3 | Tourists and accommodation providers will be equally exposed to reduced rainfall | 1 | 2 | Reduced quality of some natural tourist attractions (e.g. conservation parks) if vegetation is degraded due to reduced rainfall, although overnight visitors are more likely to be coming to the region to visit Glenelg beaches and precinct and McLaren Vale | 4 | 5 | 9 | 5 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. | 5 | 10 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Rainfall reduction – Winter and spring | 4 | 4 | Tourists and accommodation providers will be equally exposed to reduced rainfall | 1 | 3 | Reduced quality of some natural tourist attractions (e.g. conservation parks) if vegetation is degraded due to reduced rainfall, although overnight visitors are more likely to be coming to the | 5 | 7 | 9 | 5 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. | 6 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | region to visit Glenelg beaches and precinct and McLaren Vale | | | | | | | |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Temperature increases - Summer | 4 | 4 | Tourists and accommodation providers will be equally exposed to rising temperatures | 1 | 3 | Greater visitor numbers to beaches during warmer summers, assuming that beaches have remained intact | 5 | 7 | 9 | 6 | Visitor numbers will adapt to the full range of climate variables because the impact is generally low. There may be some hotspots for inadequate adaptive capacity such as low lying areas near Glenelg. Potentially try to increase visitor numbers during winter and spring | 6 | 11 |
| Economy and Infrastructure | Tertiary industries | Tourist accommodation occupancy rates | Temperature increases - Winter | 4 | 4 | Tourists and accommodation providers will be equally exposed to rising temperatures | 1 | 3 | Assuming that beaches remain intact, increasing winter temperatures could extent the period of time over which people use the beach | 5 | 7 | 9 | 8 | Will be a positive for the region | 6 | 9 |
| Economy and Infrastructure | Transport networks | Condition of jetties and boat ramps | Increased acidification of Gulf waters | 5 | 5 | Greatest concern is for concrete infrastructure with footings in the water column | 3 | 3 | Concrete structures are understood to be sensitive to reducing pH. Extent of sensitivity not known | 8 | 8 | 3 | 5 | Options for use of alternate types of concrete are not known. Adaptive capacity of current infrastructure is expected to be low. | 15 | 13 |
| Economy and Infrastructure | Transport networks | Condition of jetties and boat ramps | Increased risk of coastal inundation | 5 | 5 | Highly exposed to rising sea levels and storm surge | 5 | 5 | Jetties in particular are known to be highly sensitive to large storm surge events. These structures are important for the local community and people visiting the region | 10 | 10 | 3 | 3 | Limited adaptive capacity within current design. Future adaptation options may be to relocate some boat ramps and raise deck heights of jetties. | 17 | 17 |
| Economy and Infrastructure | Transport networks | Condition of jetties and boat ramps | Increased temperatures in the Gulf of St Vincent | 5 | 5 | Concern re expsoure from new pest species that might occur | 3 | 3 | May see new species which could impact wooden infrastructure e.g. borers | 8 | 8 | 3 | 3 | Limited knowledge re what might occur. Might result in loss of species which adversely impact infrastructure. | 15 | 15 |
| Economy and Infrastructure | Transport networks | Condition of rail | Bushfire frequency | 4 | 4 | Lengths of rail line in Mitcham and Onkaparinga exposed to bushfire | 5 | 5 | Potential for line to buckle during fire | 9 | 9 | 4 | 4 | Existing clearance of vegetation adjoining lines | 15 | 15 |
| Economy and Infrastructure | Transport networks | Condition of rail | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Exposure will be even across entire region. Noarlunga rail line is a major public transport service and tram service in Marion and Holdfast Bay | 4 | 4 | Evidence suggests that rail lines can be highly sensitive to extreme heat. This results in disruptions to operations | 9 | 9 | 3 | 5 | Electrification may reduce adaptive capacity due to power outages, but trains have diesel back up, but boom gates, signalisation etc. don't . Reactive options are to cool down lines through application of water. Long term adaptation options not clear, although should be available given that | 16 | 14 |

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| | | | | | | | | | | | | | | rail lines operate in remote Australia where temperatures are already greater than will be experienced in Adelaide in the future. | | |
| Economy and Infrastructure | Transport networks | Condition of rail | Increased risk of coastal inundation | 2 | 2 | Exposure risk to Noarlunga line but most of the track will be too high. Some of tram line at end of line will be exposed | 4 | 4 | If inundation did occur on a frequent basis it would have major impact on condition of the line and its foundations. | 6 | 6 | 3 | 6 | Would require relocation or protection of lines which are not currently in place | 13 | 10 |
| Economy and Infrastructure | Transport networks | Condition of rail | Intensity of rainfall | 2 | 2 | Limited areas where rail line will be exposed to flooding from intense rainfall events, but nevertheless important areas such as Morphett Road crossing which have high traffic volumes | 2 | 2 | Limited impact of intense rainfall events | 4 | 4 | 5 | 7 | Short term periodic flooding will subside and result in minor changes to services. Put buses on to accommodate immediate service. Potential for damage to infrastructure which is longer term disruption. Have good flood mapping for Marion and Holdfast which inform planning, asset management etc. | 9 | 7 |
| Economy and Infrastructure | Transport networks | Condition of roads | Bushfire frequency | 3 | 4 | Exposure could be high in the hills (Mitcham and Onkaparinga). Road surfaces can be affected by fire depends on intensity of fire. Also consider bridges and risk to bushfires. | 2 | 4 | Bushfires could melt road surface in Hills region. For many fires it may not be a problem but for some fires it will depends on intensity. | 5 | 8 | 6 | 4 | Would require more frequent re-surfacing. May be restricted by resources allocated to road resurfacing. Existing technology to adapt, but what are funds to replace roads with this technology. Can also reduce fuel loads along roadsides. | 9 | 14 |
| Economy and Infrastructure | Transport networks | Condition of roads | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Exposure high across the entire region | 5 | 4 | Heatwaves could accelerate deterioration of the road surface across the region | 10 | 9 | 4 | 4 | Would require more frequent re-surfacing. May be restricted by resources allocated to road resurfacing. New technologies e.g. self repairing roads. But no funding at this stage. Could divert traffic from susceptible roads for heatwaves. Age of roads impacts on deterioration according to local government NCCARF report. | 16 | 15 |
| Economy and Infrastructure | Transport networks | Condition of roads | Increased risk of coastal inundation | 4 | 3 | Greatest exposure will be to roads running along the foreshore. | 4 | 4 | Foreshore roads are important transport corridors for local people and visitors to the region. Undermining of roads could occur through storm surge events | 8 | 7 | 4 | 4 | Existing roads would not be well adapted. Future adaptation options may require re-enforcing road base, improving drainage or relocating roads | 14 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Economy and Infrastructure | Transport networks | Condition of roads | Intensity of rainfall | 5 | 3 | Patchy exposure across the region . | 4 | 3 | Limited localised impacts. Can break transport routes. Note number of gravel roads in southern region. Washouts could impact on bridges e.g. Sturt River. Some smaller bridge collapse could result in flooding. Washout of dirt roads e.g. in Onkaparinga. Where no stormwater infrastructure exists can also cause problems with roads. | 9 | 6 | 6 | 8 | High adaptive capacity to localised high rainfall events. Why? We have stormwater and existing roads. Non sealed roads in regional area could have low adaptive capacity. Link to discussion on stormwater infrastructure. | 13 | 8 |
| Economy and Infrastructure | Transport networks | Condition of roads | Rainfall reduction – Winter and spring | 4 | 4 | Exposure would be similar across the entire region. | 1 | 1 | Reduced soil saturation could have a positive impact in terms of road stability. According to NCCARF report by Jacqueline Balston. Backstreet low volume roads is where positive benefits occur. | 5 | 5 | 10 | 10 | Don't need to do anything as reduced soil moisture is a positive. | 5 | 5 |
| Economy and Infrastructure | Transport networks | Condition of roads | Temperature increases - Summer | 4 | 3 | Exposure would be similar across the entire region. | 3 | 3 | Warmer summers could accelerate deterioration of road surfaces in general. Cause cracking of roads, surface gets soft and causes uneven surface of roads. | 7 | 6 | 5 | 5 | Would require more frequent re-surfacing. May be restricted by resources allocated to road resurfacing | 12 | 11 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Bushfire frequency | 3 | 4 | Above ground infrastructure (including treatment wetlands) in areas of Mitcham and Onkaparinga could be exposed | 3 | 3 | Stormwater infrastructure more sensitive where relies on natural treatment processes | 6 | 7 | 7 | 7 | SA Water maintenance schedule refers to fuel hazard as triggers, current technology and knowledge is available but resources (funding) may not be sufficient for more frequent maintenance. Need similar for stormwater management. | 9 | 10 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Evaporation increasing | 3 | 4 | Exposure relates more to natural assets rather than concrete assets | 3 | 3 | WSUD and other natural assets more sensitive | 6 | 7 | 2 | 5 | Different drivers (commercial v flood mitigation v environmental values) have different implications for maintenance, management and operation and the impact of rainfall on the volume of water and hence the availability of funding for maintenance . Commercial reality is | 14 | 12 |

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| | | | | | | | | | | | | | | that sale of recycled water is not financially viable on its own so needs to be within larger holistic management system | | |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 4 | 4 | Exposure to rising temperatures would occur across the region | 3 | 3 | Soil heavage could result in cracking of concrete drains | 7 | 7 | 3 | 5 | Limited inherent adaptive capacity within structures. Adaptation options would require design modifications. Different pipes and joints required to be more flexible under soil heavage conditions. Insufficient resources allocated currently, response to problems, need more preventative approach to be prepared for future conditions. | 14 | 12 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Increased risk of coastal inundation | 5 | 5 | Near coastal stormwater infrastructure, especially discharge points would be impacted | 4 | 4 | Direct damage caused from storm surge events either to the concrete structures or in causing erosion around the structures | 9 | 9 | 2 | 5 | Limited inherent adaptive capacity within structures. Adaptation options would require design modifications. Historic design and planning did not consider coastal inundation and hence construction is not sufficient to cope with future conditions. Some knowledge available but insufficient resources for upgrades. More dependent on engineered solutions (pumping etc.) than natural gravity so more likely failure. Current stormwater management plans do consider coastal inundation. | 17 | 14 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Intensity of rainfall | 5 | 4 | Exposure across the region because water is funnelled from all areas into stormwater system | 4 | 3 | May result in increased volumes of water carried by infrastructure. More chance of blockage from debris. Increased impervious area will increase runoff. | 9 | 7 | 2 | 5 | Limited inherent adaptive capacity within structures as insufficient maintenance. Open channels more maintenance. Adaptation options would require design modifications. Historic design and planning did not consider coastal inundation and hence construction is not sufficient to cope with future conditions. Some knowledge available but | 17 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | insufficient resources for upgrades. More dependent on engineered solutions (pumping etc.) than natural gravity so more likely failure. Current stormwater management plans do consider coastal inundation. | | |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Rainfall reduction - Summer | 4 | 3 | All stormwater management infrastructure would be exposed to reducing rainfall | 3 | 2 | Most stormwater infrastructure underground hence sensitive to changes in soil moisture. WSUD features particularly sensitive to reduced rainfall. | 7 | 5 | 2 | 5 | Possible need to irrigate wetland vegetation if less summer rainfall. | 15 | 10 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Rainfall reduction – Winter and spring | 4 | 3 | All stormwater management infrastructure would be exposed to reducing rainfall | 2 | 2 | Small reduction in winter rainfall could actually be beneficial to condition of traditional engineered infrastructure | 6 | 5 | 2 | 5 | Different drivers (commercial v flood mitigation v environmental values) have different implications for maintenance, management and operation and the impact of rainfall on the volume of water and hence the availability of funding for maintenance . Commercial reality is that sale of recycled water is not financially viable on its own so needs to be within larger holistic management system | 14 | 10 |
| Economy and Infrastructure | Water | Condition of stormwater management infrastructure | Temperature increases - Summer | 3 | 3 | Exposure to rising temperatures would occur across the region | 3 | 3 | Soil heavage could result in cracking of concrete drains | 6 | 6 | 2 | 5 | Lack of knowledge about condition of all stormwater infrastructure (as underground) means reactive rather than preventative | 14 | 11 |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Evaporation increasing | 5 | 5 | Equal exposure to increased evaporation across the region | 4 | 3 | Natural infrastructure sensitive - stormwater will evaporate from treatment wetlands etc. Wastewater treatment ponds also sensitive | 9 | 8 | 5 | 2 | SA Water and other treatment providers would be prepared to adapt wastewater treatment processes. | 14 | 16 |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 4 | 4 | Increased temperatures will impact on behaviour of people which will impact amount of water in wastewater system. Households equally exposed to | 3 | 3 | Heatwaves have short duration. Treatment of wastewater affected if high temperatures affect treatment processes, potential for algal blooms | 7 | 7 | 5 | 2 | There is limited to no adaptive capacity within the current system to increase the quantity of recycled water available. Future option to store winter flows for summer use. MAR projects for | 12 | 15 |

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| | | | | | | rising temperatures across the region | | | | | | | | stormwater and future wastewater? See 'quantity of stormwater generated' indicator comments. | | |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Intensity of rainfall | 4 | 3 | Increased peak loads of additional water entering the system | 3 | 3 | Harvest of stormwater limited following intense rain events, lack of storage within landscape for flood storages that enable harvest | 7 | 6 | 5 | 2 | Less of policy driver for use of recycled water with the availability of desalination water. | 12 | 14 |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Rainfall reduction - Summer | 4 | 4 | Equal exposure to reduced rainfall across the region | 4 | 4 | Falling rainfall will impact availability of recycled water because less water will enter the system as households become more conservative with water use, as experienced during the recent drought | 8 | 8 | 5 | 2 | Urban infill will increase volume of wastewater and stormwater generated. | 13 | 16 |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Rainfall reduction – Winter and spring | 4 | 4 | Equal exposure to reduced rainfall across the region | 4 | 4 | Falling rainfall will impact availability of recycled water because less water will enter the system as households become more conservative with water use, as experienced during the recent drought | 8 | 8 | 5 | 2 | There is limited to no adaptive capacity within the current system to increase the quantity of recycled water available | 13 | 16 |
| Economy and Infrastructure | Water | Quantity of recycled water (treated wastewater and stormwater) | Temperature increases - Summer | 4 | 4 | Increased temperatures will impact on behaviour of people which will impact amount of water in wastewater system. Households equally exposed to rising temperatures across the region | 4 | 4 | Warmer summers will motivate people to use more water on their properties e.g. water from showers and laundry as occurred during the drought | 8 | 8 | 5 | 2 | There is limited to no adaptive capacity within the current system to increase the quantity of recycled water available | 13 | 16 |
| Economy and Infrastructure | Water | Quantity of stormwater generated | Evaporation increasing | 5 | 5 | Equal exposure to increased evaporation across the region | 4 | 3 | Natural infrastructure sensitive - stormwater will evaporate from treatment wetlands etc. | 9 | 8 | 2 | 2 | Flow on effect from using stormwater commercially (see 'Quanitity of Recycled water' above) | 17 | 16 |
| Economy and Infrastructure | Water | Quantity of stormwater generated | Intensity of rainfall | 3 | 3 | Increased peak loads of additional water entering the system | 3 | 3 | High volumes of stormwater generated during high intensity events (but may not be able to be harvested) | 6 | 6 | 1 | 2 | Can not change intensity of rainfall (natural event) | 15 | 14 |
| Economy and Infrastructure | Water | Quantity of stormwater generated | Rainfall reduction - Summer | 4 | 4 | Equal exposure to reduced rainfall across the region | 4 | 4 | Falling rainfall will impact availability of stormwater because less water will enter the system because of lower runoff | 8 | 8 | 2 | 2 | Management objectives may change as the quantity of stormwater available reduces. Changes to impervious areas as increases in | 16 | 16 |

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| | | | | | | | | | | | | | | infill development occurring at the same time. Information is available but action not occurring sufficiently for 2070 rainfall conditions. | | |
| Economy and Infrastructure | Water | Quantity of stormwater generated | Rainfall reduction – Winter and spring | 4 | 4 | Equal exposure to reduced rainfall across the region | 4 | 4 | Falling rainfall will impact availability of stormwater because less water will enter the system because of lower runoff | 8 | 8 | 2 | 2 | Policy tensions between planning policy and stormwater management limiting adaptive capacity. | 16 | 16 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine fauna | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Marine environments exposed to heat particularly shallower waters near shore | 3 | 4 | Increasing temperatures will impact on all life stages of marine fauna | 8 | 9 | 5 | 2 | Limited ability to move to new habitats in the Gulf, some species will cope but others will not. Limited information to inform better management of non-commercial species and other less researched species. | | 17 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine fauna | Increased acidification of Gulf waters | 5 | 5 | Marine biodiversity very likely to be exposed to increased acidification | 4 | 5 | Increasing acidification will impact on all life stages of marine fauna | 9 | 10 | 5 | 2 | Limited ability to move to new habitats in the Gulf, some species will cope but others will not. Limited information to inform better management of non-commercial species and other less researched species. | 14 | 18 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine fauna | Increased risk of coastal inundation | 5 | 5 | Marine environments very likely to be exposed to increasing sea levels | 4 | 4 | 0.47 m rise in sea levels will impact on availability of habitat e.g. sea grass meadows, intertidal reefs, deeper water may impact light penetration for macro-algae | 9 | 9 | 5 | 4 | Limited ability to move to new habitats in the Gulf, some species will cope but others will not. Limited information to inform better management of non-commercial species and other less researched species. | 14 | 15 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine fauna | Increased temperature s in the Gulf of St Vincent | 5 | 5 | Marine biodiversity very likely to be exposed to increased temperature | 4 | 4 | Increasing temperatures will impact on all life stages of marine fauna | 9 | 9 | 5 | 2 | Limited ability to move to new habitats in the Gulf, some species will cope but others will not. Limited information to inform better management of non-commercial species and other less researched species. | 14 | 17 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine fauna | Intensity of rainfall | 5 | 3 | Increased intensity of rainfall will result in increased pollutant loads discharging into Gulf waters. Also cliff erosion sedimentation | 3 | 2 | Localised impact of pollutant discharges. Dilution will lesson the impact on the entire Gulf environment. | 8 | 5 | 5 | 6 | Limited ability to move to new habitats in the Gulf, some species will cope but others will not. Limited information to inform better management of non-commercial species and other less researched | 13 | 9 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | species. | | |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine flora | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Marine environments exposed to heat particularly shallower waters near shore | 3 | 3 | Possible sensitivity of fauna to heat impacts | 8 | 8 | 5 | 5 | There is limited to no adaptive capacity within existing marine flora systems or current management practices to adapt to changing ocean heights, rising temperatures and increasing acidity. Lack of knowledge contributes to this current management response. | 13 | 13 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine flora | Increased acidification of Gulf waters | 5 | 5 | Biodiversity is very likely to be exposed to increased acidification | 4 | 5 | Increasing acidity will impact on all life stages of marine flora | 9 | 10 | 5 | 1 | There is limited to no adaptive capacity within existing marine flora systems or current management practices to adapt to changing ocean heights, rising temperatures and increasing acidity. Lack of knowledge contributes to this current management response. | 14 | 19 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine flora | Increased risk of coastal inundation | 5 | 5 | Marine environments very likely to be exposed to increasing sea levels | 4 | 5 | Increasing depth will change the depth of the photic zone. There is limited ability of sea grass and reefs to migrate further inland. | 9 | 10 | 5 | 2 | There is limited to no adaptive capacity within existing marine flora systems or current management practices to adapt to changing ocean heights, rising temperatures and increasing acidity. Lack of knowledge contributes to this current management response. | 14 | 18 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine flora | Increased temperature s in the Gulf of St Vincent | 5 | 5 | Biodiversity that very likely are be exposed to increased temperatures | 4 | 4 | Increasing temperatures will impact on all life stages of marine flora | 9 | 9 | 5 | 1 | There is limited to no adaptive capacity within existing marine flora systems or current management practices to adapt to changing ocean heights, rising temperatures and increasing acidity. Lack of knowledge contributes to this current management response. | 14 | 18 |
| Environment and Natural Resources | Biodiversity | Adverse impact on distribution and populations of marine | Intensity of rainfall | 5 | 3 | Increased intensity of rainfall will result in increased pollutant loads discharging into Gulf waters. | 5 | 4 | Localised impacts of increasing discharge of stormwater could be significant. This has already been observed in the past | 10 | 7 | 5 | 6 | There is limited to no adaptive capacity within existing marine flora systems or current management practices to adapt to changing | 15 | 11 |

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| | | flora | | | | | | | with impact of stormwater on sea grass beds. Many communities already lost so may be more sensitive to any disturbance | | | | | ocean heights, rising temperatures and increasing acidity. Lack of knowledge contributes to this current management response. | | |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Bushfire frequency | 5 | 5 | Many terrestrial fauna species live in areas of native vegetation that are very likely exposed to bushfire | 5 | 5 | Injury and death from bushfire as well as habitat disturbance and damage | 10 | 10 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 18 | 17 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 5 | 3 | Some fauna highly sensitive due to impacts on plants (food and habitat) | 10 | 7 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. Inadequate funding and resources to manage currently let alone future. | 18 | 14 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Biodiversity very likely are be exposed to frequency of heat waves - no escape from Region wide heatwave | 5 | 5 | Heat stress to fauna with no escape within the Region | 10 | 10 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 18 | 17 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Increased risk of coastal inundation | 5 | 4 | Several species occur along estuary and southern coastal dunes near Aldinga very likely to be exposed | 4 | 4 | Mobility of fauna to avoid injury however damage to habitat possible. Breeding success impacted | 9 | 8 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 17 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Intensity of rainfall | 4 | 3 | Fauna species possibly exposed to increase rainfall intensity, consider fish and amphibians | 4 | 4 | Mobility of fauna to avoid injury however damage to habitat possible | 8 | 7 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 16 | 14 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Rainfall reduction - Summer | 5 | 3 | Already low rainfall in summer | 5 | 4 | Potential impacts on refuge pools, habitat and food sources. Greater impact in summer due to survival of juveniles | 10 | 7 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 18 | 14 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Rainfall reduction – Winter and spring | 5 | 4 | Biodiversity that very likely are be exposed to rainfall reduction | 4 | 4 | Potential impacts on hydrology, habitat and food sources | 9 | 8 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 17 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Temperature increases - Spring | 5 | 4 | Biodiversity that very likely are be exposed to temperature increases | 4 | 4 | Likely to have a greater impact on breeding cycles. Possible earlier start to breeding. | 9 | 8 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 17 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Temperature increases - Summer | 5 | 4 | Biodiversity that very likely are be exposed to temperature increases | 4 | 4 | Potential impacts on breeding, food availability | 9 | 8 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 17 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial fauna species that are threatened (regional, state) | Temperature increases - Winter | 5 | 4 | Biodiversity that very likely are be exposed to temperature increases | 4 | 3 | Potential impacts on breeding, food availability | 9 | 7 | 2 | 3 | There is limited adaptive capacity in regionally threatened species to adapt to future changes in climate. There are also physical barriers preventing migration of species. Fragmented habitat will impact on species movements. | 17 | 14 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Bushfire frequency | 5 | 5 | Increasing bushfire frequency will certainly impact flora | 5 | 5 | Damage and disturbance from fire unavoidable | 10 | 10 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also | 17 | 17 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | affect ability to regenerate. | | |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | CO2 increases | 5 | 5 | Flora will be exposed to increased CO2 | 1 | 1 | CO2 may increase productivity | 6 | 6 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 13 | 13 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Evaporation increasing | 5 | 4 | Flora likely to be exposed to increased evaporation | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 8 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 16 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Flora very likely to be exposed to frequency of heat waves - no escape from Region wide heatwave | 5 | 5 | Many species will be sensitive to extended periods of extreme heat | 10 | 10 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 17 | 17 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Incidence of frost | 3 | 3 | Possible exposure of flora in frost prone areas | 1 | 1 | Decrease incidence of frost | 4 | 4 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 11 | 11 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, | Increased risk of coastal inundation | 5 | 5 | Several species occur along Onkaparinga estuary and southern coastal dunes near Aldinga very likely to be exposed | 4 | 4 | Dune, estuarine and coastal species will be sensitive to more frequent and possibly permanent inundation. Saline | 9 | 9 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, | 16 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | state) | | | | | | | groundwater intrusion may also impact | | | | | combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | | |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Intensity of rainfall | 3 | 3 | Possible exposure of species in flood prone areas | 4 | 4 | Reduced ground cover (following dry periods) could increase sensitivity of flora to erosive rainfall events | 7 | 7 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 14 | 14 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Rainfall reduction - Summer | 5 | 4 | Flora very likely to be exposed to rainfall reduction | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 8 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 16 | 15 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Rainfall reduction – Winter and spring | 5 | 5 | Species will certainly be exposed to reduced rainfall | 4 | 4 | Potential impacts on hydrology, soil moisture and germination of seed | 9 | 9 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 16 | 16 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Temperature increases - Spring | 5 | 5 | Flora very likely to be exposed to temperature increases | 4 | 4 | Changes likely to flowering times, seed set and ability to regenerate | 9 | 9 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 16 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Temperature increases - Summer | 5 | 5 | Flora very likely to be exposed to temperature increases | 4 | 4 | Changes likely to flowering times, seed set and ability to regenerate | 9 | 9 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 16 | 16 |
| Environment and Natural Resources | Biodiversity | Proportion of terrestrial flora species that are threatened (regional, state) | Temperature increases - Winter | 5 | 5 | Species will certainly be exposed to increased temperatures | 3 | 3 | Changes likely to flowering times, seed set and ability to regenerate | 8 | 8 | 3 | 3 | Adaptation options described within existing plans (e.g. Regional Recovery Plans) are not adequate to cope with 2070 conditions, combined with limited natural migration ability and insufficient funding. Greater invasive species populations will also affect ability to regenerate. | 15 | 15 |
| Environment and Natural Resources | Land condition | Beach erosion | Increased risk of coastal inundation | 5 | 5 | All beaches in the region will be exposed to increased, coastal inundation as a consequence of rising sea levels and increased storm surge activity (OzCoasts data). | 5 | 5 | Increased coastal inundation will have major erosive impact on most beaches in the region. Beaches with dunes are most sensitive to erosion. Beaches with hard structural barriers (e.g. rock walls) will be likely to see increased erosion . Some sections of coast don't have a beach e.g. much of Marion's cliffs. | 10 | 10 | 1 | 1 | Adaptive capacity is low because in many areas there is nowhere for the beach to migrate inland because of lack of dunes and presence of coastal development (e.g. rock walls, roads, houses). This means that once the beach has eroded away, there will be no sandy beach remaining. | 19 | 19 |
| Environment and Natural Resources | Land condition | Beach erosion | Intensity of rainfall | 4 | 4 | Some discussion around whether intensity of rainfall was relevant. Some believed increased storm surge, and high seas were more likely to impact on beach erosion. However some comments that intensity of rainfall could result in turbidity and sedimentation impacts on seagrass, and that intense rainfall will impact on dunes where dunes lack vegetative cover. | 2 | 4 | Overall impact minimal, with exceptions, LGA projections suggest intensity increase will only 3 per cent and the group thought that this was not significant. One comment that rocky beaches would not be as affected. | 6 | 8 | 2 | 3 | Capacity of beaches to adapt intense rainfall is low. | 14 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Environment and Natural Resources | Land condition | Beach erosion | Rainfall reduction - Summer | 3 | 3 | Potential to kill off vegetation which hold sand dunes together and that this could lead to further beach erosion. | 3 | 3 | Most likely to impact in northern beaches of region, remnant dune vegetation will be more sensitive | 6 | 6 | 5 | 3 | Discussion around how planting supported by NRM planning and funding has been important to prevent beach erosion and that this planning/funding needs to continue | 11 | 13 |
| Environment and Natural Resources | Land condition | Beach erosion | Rainfall reduction – Winter and spring | 3 | 3 | Potential to kill off vegetation which hold sand dunes together and that this could lead to further beach erosion. | 3 | 3 | Most likely to impact in northern beaches of region, remnant dune vegetation will be more sensitive | 6 | 6 | 5 | 3 | Discussion around how planting supported by NRM planning and funding has been important to prevent beach erosion and that this planning/funding needs to continue | 11 | 13 |
| Environment and Natural Resources | Land condition | Beach erosion | Temperature increases - Summer | 3 | 3 | Increased temperatures have the potential to kill off vegetation which hold sand dunes together and that this could lead to further beach erosion. Comment also that increased visitation of beaches is likely to occur with increased temperatures and that this could increase beach erosion. | 3 | 3 | Most likely to impact in northern beaches of region, remnant dune vegetation will be more sensitive | 6 | 6 | 5 | 3 | Discussion around how planting supported by NRM planning and funding has been important to prevent beach erosion and that this planning/funding needs to continue | 11 | 13 |
| Environment and Natural Resources | Land condition | Cliff erosion | Increased risk of coastal inundation | 5 | 5 | Current natural protection (e.g. rocks and intertidal reef zones) at the base of cliffs is expected to be inundated with a 50 cm sea level rise by 2070, meaning that the base of cliffs are more directly exposed to impacts of erosion from sea level rise and storm surge. | 4 | 4 | The type of sediment that constitutes cliffs in the region is demonstrated to be highly sensitive to wind and water erosion . | 9 | 9 | 2 | 2 | Limited inherent adaptive capacity for the cliff system. | 17 | 17 |
| Environment and Natural Resources | Land condition | Cliff erosion | Intensity of rainfall | 4 | 4 | Increased intensity of rainfall will result in direct erosion of cliff surfaces and increased surface water run-off from roads will results in increased erosion at formal (e.g. stormwater drain) and informal discharge points (e.g. car parks). | 3 | 3 | Cliff surfaces are already eroding through natural processes but this will be enhanced with increased intensity of rainfall. | 7 | 7 | 4 | 4 | While it is not possible to reduce the direct impact of rainfall on the cliff surface measures are available to improve management of stormwater. | 13 | 13 |
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Bushfire frequency | 3 | 3 | Bushfires can directly impact the Estuary through local grass fires. Indirect impacts | 3 | 3 | Water quality impact of high ash loads in the River is considered to be | 6 | 6 | 6 | 6 | The system is expected to be able to tolerate some low water quality events. | 10 | 10 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | from fires in the upstream catchment which can impact quality and quantity of run off. Exposure score is rated as 3 because although this site is at the bottom of the catchment and it is likely that the regulating structures on the river will isolate the impacts of larger upstream fires on water quality. | | | medium. | | | | | | | |
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Evaporation increasing | 4 | 4 | Biodiversity and water quality and quantity likely to be exposed to increased evaporation | 4 | 4 | Water quality sensitive to evaporation that concentrates salts and other pollutants | 8 | 8 | 3 | 3 | Adaptive capacity is inherently low with reduced freshwater flows. This score assumes that the environmental flow release trial is not a permanent management arrangement. | 15 | 15 |
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Increased risk of coastal inundation | 5 | 5 | Sea level rise will permanently increased water levels in the Estuary and increased coastal inundation will result in erosion of the protective dune system at the mouth of the Onkaparinga River. | 5 | 5 | Estuary is permanently connected to the Gulf and therefore rising sea level will mean that tidal impacts push up through the Estuary at least to Main South Road. | 10 | 10 | 5 | 5 | Area of Estuary downstream of Commercial Road has low adaptive capacity. Area of Estuary upstream of Commercial Road but downstream of Main South Road has medium adaptive capacity because of large area of open space which may provide opportunities for expansion and migration of intertidal estuary habitat as sea level rises. | 15 | 15 |
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Intensity of rainfall | 4 | 4 | Increased intensity of rainfall will result in increased runoff into the Estuary. | 2 | 2 | Estuary would benefit from increased runoff but this may have some negative consequences if it results in erosion or introduction of low quality water. | 6 | 6 | 7 | 7 | There are existing open space buffers around the estuary to provide protection from high runoff. | 9 | 9 |
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Rainfall reduction - Summer | 4 | 4 | Rainfall in the catchment will reduce by 15% which will have a major impact on run off | 4 | 4 | Estuary will be sensitive to reduced freshwater flows. The environmental flows trial has provided evidence for this by showing the sensitivity of the estuary to increased freshwater discharge from Mt Bold. | 8 | 8 | 3 | 3 | Adaptive capacity is inherently low with reduced freshwater flows. This score assumes that the environmental flow release trial is not a permanent management arrangement. | 15 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Environment and Natural Resources | Land condition | Condition of the Onkaparinga Estuary | Rainfall reduction – Winter and spring | 5 | 5 | Rainfall in the catchment will reduce by 15% which will have a major impact on run off | 4 | 4 | Estuary will be sensitive to reduced freshwater flows. The environmental flows trial has provided evidence for this by showing the sensitivity of the estuary to increased freshwater discharge from Mt Bold. | 9 | 9 | 3 | 3 | Adaptive capacity is inherently low with reduced freshwater flows. This score assumes that the environmental flow release trial is not a permanent management arrangement. | 16 | 16 |
| Environment and Natural Resources | Land condition | Dune erosion | Increased risk of coastal inundation | 5 | 5 | Dunes are highly exposed to erosive forces from rising sea levels and storm surge (e.g. Minda Dunes, Southport, Sellicks Beach) | 5 | 5 | Dunes are susceptible to erosive forces from wind and water. | 10 | 10 | 2 | 2 | Hard structural barriers (e.g. roads, houses) will prevent inland migration of dune systems in the study region. | 18 | 18 |
| Environment and Natural Resources | Land condition | Dune erosion | Rainfall reduction - Summer | 3 | 3 | Reduced rainfall could impact growth of stabilising dune vegetation. Reduced rainfall would have an impact of water availability for plant growth and survival. | 2 | 2 | While Reduced rainfall could have an impact of water availability for plant growth and survival, most dune vegetation is tolerant of low water availability. | 5 | 5 | 7 | 7 | Adaptive capacity is high because while some existing vegetation may not persists it is expected that other plants (including weeds) could establish. | 8 | 8 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Bushfire frequency | 5 | 5 | Much of the native vegetation outside DEWNR reserves is in bushfire prone areas | 4 | 5 | Bushfire frequency and burn temperature increase above natural levels required for regeneration and seed germination | 9 | 10 | 3 | 3 | Already degraded ecosystems may mean more frequent fire tips system over edge to adapt within natural capacity. Changes in species composition likely. Smaller areas of vegetation more vulnerable to disturbance. Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Interaction with other climate variables also influential e.g. rainfall (intensity and drying) | 16 | 17 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | CO2 increases | 1 | 4 | Native vegetation likely to be exposed to CO2 | 2 | 1 | Positive impact on growth from increasing CO2, assumed to correlate to area of cover | 3 | 5 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control | 10 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | | |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 8 | 3 | 4 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 16 | 14 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Native vegetation very likely to be exposed to heat waves | 4 | 4 | Changes to ecosystem function. Most of native veg outside DEWNR reserve is Eucalypt forest and woodland that is sensitive to extreme heat with canopy damage occurring and have long regeneration time | 9 | 9 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 16 | 16 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Increased risk of coastal inundation | 5 | 2 | Dune vegetation in particular at risk, samphire | 5 | 4 | No area left for vegetation cover if dunes no longer present | 10 | 6 | 1 | 3 | Coastal vegetation has no ability to adapt if dune systems no longer present | 19 | 13 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Intensity of rainfall | 4 | 3 | Riparian vegetation in particular exposed to more intense rainfall, particularly in urban areas where runoff may increase. Aquatic vegetation also exposed. | 4 | 3 | Incised channels may have faster flows with riparian vegetation and aquatic vegetation at risk. Eucalypts can survive periods of inundation | 8 | 6 | 5 | 3 | Management of runoff in built-up areas already causing impacts on watercourses e.g. erosion, bank instability, nothing for native vegetation to regenerate on, weeds invade. Quite a bit of work currently in area of watercourse management, stormwater management plans that consider environmental values and future climate conditions. | 13 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Rainfall reduction - Summer | 5 | 4 | Native vegetation likely to be exposed to decrease in already low summer rainfall | 5 | 3 | Some summer rain may be required to sustain juvenile eucalypts that germinated following winter rains | 10 | 7 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 17 | 14 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Rainfall reduction – Winter and spring | 5 | 5 | Native vegetation likely to be exposed to reduced winter and spring rainfall as result of soil moisture content reduction | 5 | 5 | Natural regeneration and recruitment relies on sufficient rainfall and stores of soil moisture | 10 | 10 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 17 | 17 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Temperature increases - Spring | 5 | 5 | Increases in temperature may make conditions more suitable for weed species that following disturbance may colonise and prevent regeneration of native vegetation. Increased temperature may impact flowering, seed production and natural regeneration. | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 9 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 16 | 16 |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Temperature increases - Summer | 5 | 5 | Increases in temperature may make conditions more suitable for weed species that following disturbance may colonise and prevent regeneration of native vegetation. Increased temperature may | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 9 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a | 16 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | impact flowering, seed production and natural regeneration. | | | | | | | | different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | | |
| Environment and Natural Resources | Landscape fragmentation | Area of native vegetation cover outside of DEWNR reserves | Temperature increases - Winter | 5 | 5 | Increases in temperature may make conditions more suitable for weed species that following disturbance may colonise and prevent regeneration of native vegetation. Increased temperature may impact flowering, seed production and natural regeneration. | 4 | 4 | Potential impacts on hydrology, soil moisture and survival of seedlings over summer | 9 | 9 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. In the longer term native veg might establish a different system. Will need more weed control and revegetation to allow natural adaptation to occur. Improving connectivity and extent will also help | 16 | 16 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the marine environment | Increased acidification of Gulf waters | 5 | 5 | Pest threats very likely to be exposed to increased acidification | 3 | 3 | Pests possibly sensitive to acidification | 8 | 8 | 2 | 2 | Marine pest management requires response and coordination from outside the region | 16 | 16 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the marine environment | Increased risk of coastal inundation | 3 | 3 | Threats possibly exposed to coastal inundation | 2 | 2 | Changed habitat from reefs (intertidal and offshore) may reduce availability of habitat for pest spread | 5 | 5 | 2 | 2 | Marine pest management requires response and coordination from outside the region | 13 | 13 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the marine environment | Increased temperatures in the Gulf of St Vincent | 5 | 5 | Pest threats very likely to be exposed to increased temperatures | 4 | 4 | Pests likely to be sensitive to increased temperatures (may make conditions more conducive to increases in population) | 9 | 9 | 2 | 2 | Marine pest management requires response and coordination from outside the region | 17 | 17 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Bushfire frequency | 5 | 5 | Pest species very likely to be exposed to bushfire | 5 | 4 | Disturbance may result in conditions that allow pest plants to establish. Fire will favour some weeds and not favour others. Some weed species are stimulated by fire (recruitment) and regrow faster. | 10 | 9 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts. Depends on the species. Some animals will be reduced in abundance e.g. rabbits. | 19 | 15 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 3 | 3 | Some species may thrive in a drier climate although individual species may reduce (e.g. blackberry). Many weeds come from South Africa and will respond positively to a | 8 | 7 | 5 | 5 | Funding and resources not sufficient to address pest plant and animal impacts | 13 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | drier environment. | | | | | | | |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Pest threats very likely to be exposed to frequency of heatwave | 2 | 2 | Extreme temperatures may reduce populations of pest animals | 7 | 7 | 5 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 12 | 13 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Intensity of rainfall | 3 | 3 | Possibly exposure to periods of intense rain | 4 | 4 | Increased disturbance as result of erosive rainfall events may favour pest plant establishment | 7 | 7 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 16 | 13 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Rainfall reduction - Summer | 5 | 3 | Pest threats very likely to be exposed to rainfall reduction | 4 | 4 | Some species may thrive in a drier climate | 9 | 7 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 18 | 13 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Rainfall reduction – Winter and spring | 5 | 4 | Pest threats very likely to be exposed to rainfall reduction | 4 | 4 | Some species may thrive in a drier climate | 9 | 8 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 18 | 14 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Temperature increases - Spring | 5 | 4 | Pest threats very likely to be exposed to temperature increases | 4 | 4 | Weed germination and pest animal breeding may increase in warmer temperatures | 9 | 8 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 18 | 14 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Temperature increases - Summer | 5 | 3 | Pest species that have become well established are those adapted to hot dry climates | 3 | 3 | Some species may thrive in a warmer climate | 8 | 6 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 17 | 12 |
| Environment and Natural Resources | Pest plants and animals | Impact of pest plant and animal threats to the terrestrial environment | Temperature increases - Winter | 5 | 4 | Pest threats very likely to be exposed to temperature increases | 4 | 4 | Weed germination and pest animal breeding may increase in warmer temperatures | 9 | 8 | 1 | 4 | Funding and resources not sufficient to address pest plant and animal impacts | 18 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Bushfire frequency | 4 | 3 | Small area remains near Aldinga Scrub, possible exposure to bushfire. Prescribed burns already occur but concern is that they are too frequent and intense. There may be pressure to have more regular prescribed burns to reduce risk to surrounding houses. | 5 | 5 | Bushfire frequency increase above natural levels required for regeneration and seed germination. Many coastal habitats are not highly adapted to bushfire. Concern about too frequent and intense prescribed burns. Some species within the community will be favoured by fire. Risk needs to consider | 9 | 8 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Allocasuarina will be highly sensitive. Risk that weeds will be favoured by increased burning. Management options are currently prescribed burning. | 17 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | physiological tolerances to bushfire. Baseline condition is already quite poor. | | | | | | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | CO2 increases | 5 | 4 | Native vegetation likely to be exposed to CO2 | 1 | 1 | Positive impact on growth from increasing CO2 | 6 | 5 | 9 | 3 | High adaptive capacity to increasing CO2 levels. | 7 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 2 | 3 | Physiological structure of Allocasuarina may be less susceptible to increasing evaporation. While plants are sensitive to evaporation they could respond to increased evaporation. Available water is more important. | 7 | 7 | 5 | 4 | Medium because of plants ability to respond to increasing evaporation through physiological responses. | 12 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Native vegetation very likely to be exposed to heat waves | 3 | 3 | Physiological structure of Allocasuarina may be less susceptible to extreme heat and low rainfall. Low to moderate sensitivity to heat wave frequency. Younger plants are going to be more susceptible. If heat waves occur more frequently then there may be lower recruitment. If sequences of days over 40'C was to occur in spring this would have significant impact on seed production and seedling recruitment. | 8 | 8 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. | 15 | 15 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Increased risk of coastal inundation | 5 | 3 | Small area remains near Aldinga Scrub, possible exposure to coastal inundation. Saline groundwater intrusion could also result. | 4 | 3 | Allocasuarina can survive periods of inundation however may be more sensitive to sea water inundation. Area traditionally had freshwater inflow. Potentially less flushing of groundwater. | 9 | 6 | 2 | 3 | Natural adaptive capacity is low (2) but assisted human adaptation through restoration activities is moderate (5). Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. | 17 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Intensity of rainfall | 5 | 3 | Possible exposed to intense rainfall | 3 | 2 | Erosion risk from more intense rain events. Sandy soil cold be easily eroded during high intensity rainfall events. | 8 | 5 | 3 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 15 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Rainfall reduction - Summer and autumn | 5 | 3 | Native vegetation likely to be exposed to decrease in already low summer rainfall. Likely or very likely. | 3 | 3 | Physiological structure of Allocasuarina may be less susceptible to extreme heat and low rainfall | 8 | 6 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 16 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Allocasuarina forest and woodland) | Rainfall reduction – Winter and spring | 5 | 4 | Native vegetation likely to be exposed to reduced winter and spring rainfall as result of soil moisture content reduction | 4 | 3 | Physiological structure of Allocasuarina may be less susceptible to extreme heat and low rainfall. Plants are adapted to a winter rainfall. | 9 | 7 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 17 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Bushfire frequency | 3 | 4 | Less likely to be bushfire along coastal zone although Aldinga Scrub could be higher | 4 | 5 | This is a low fire frequency system. Need to check sensitivity to bushfire. | 7 | 9 | 2 | 3 | Coastal shrubland dunes and cliffs. Focus is on vegetation in dunes. Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 15 | 16 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | CO2 increases | 5 | 4 | Native vegetation likely to be exposed to CO2 | 1 | 1 | Positive impact on growth from increasing CO2 | 6 | 5 | 9 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 7 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 2 | 2 | Coastal vegetation likely to be quiet tolerant of some increase in evaporation due to location | 7 | 6 | 5 | 4 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 12 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Native vegetation very likely to be exposed to heat waves | 3 | 3 | More rapid regeneration time of species mean can recover more quickly from disturbance | 8 | 8 | 7 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. | 11 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | dunes. | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Increased risk of coastal inundation | 5 | 5 | Occurrence along coast means very likely to be exposed to increased coastal inundation | 4 | 3 | More rapid regeneration time of species mean can recover more quickly from disturbance however likely more sensitive to increasing frequency of inundation. Onkaparinga Estuary might be more susceptible to coastal inundation than the coastal dunes. | 9 | 8 | 2 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 17 | 15 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Intensity of rainfall | 3 | 3 | Possible expose to intense rainfall | 2 | 2 | Erosion risk from more intense rain events | 5 | 5 | 5 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 10 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Rainfall reduction - Summer | 5 | 3 | Native vegetation likely to be exposed to decrease in already low summer rainfall | 3 | 3 | Some summer rain may be required to sustain juvenile plants that germinated following winter rains | 8 | 6 | 5 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 13 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Coastal shrubland) | Rainfall reduction – Winter and spring | 5 | 4 | Native vegetation likely to be exposed to reduced winter and spring rainfall as result of soil moisture content reduction | 4 | 3 | Natural regeneration and recruitment relies on sufficient rainfall | 9 | 7 | 5 | 3 | Coastal shrubland species are already adapted to harsh conditions. Adaptive capacity is limited though in response to loss of habitat e.g. dunes. | 14 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Bushfire frequency | 5 | 5 | Much of the Eucalypt forest and woodland is located in bushfire prone areas. Bushfire intensity in the long term will need to be considered. | 3 | 5 | Bushfire frequency increase above natural levels that promotes regeneration and seed germination. Medium sensitivity - some species in this community will respond positively others negatively e.g. Banksia which take up to 7 years to produce seed. | 8 | 10 | 5 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 13 | 17 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type | CO2 increases | 5 | 4 | Native vegetation very likely to be exposed to CO2 | 1 | 1 | Positive impact on growth from increasing CO2 | 6 | 5 | 9 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for | 7 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | (Eucalypt Forests and Woodland) | | | | | | | | | | | | communities to adapt to 2070 conditions | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Evaporation increasing | 5 | 4 | Biodiversity very likely to be exposed to increased evaporation | 3 | 3 | Eucalypts can survive hot weather although may be sensitive to increased evaporation. Increased evaporation can also have an impact on dependant animals. | 8 | 7 | 7 | 4 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 11 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Native vegetation very likely to be exposed to heat waves | 4 | 4 | Eucalypt forest and woodland likely to be sensitive to extreme heat with canopy damage occurring and have long regeneration time so more frequent heatwaves damage or destroy regenerating plants. Slightly more susceptible to heatwave than fire. Some Eucalypts will be more sensitive than others e.g. Stringybark more than box. | 9 | 9 | 4 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 15 | 16 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Increased risk of coastal inundation | 2 | 3 | Majority of eucalypt is in hills away from coast | 4 | 4 | Eucalypts can survive periods of inundation however may be more sensitive to sea water inundation | 6 | 7 | 4 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 12 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Intensity of rainfall | 3 | 3 | Possible exposure to intense rainfall. Believe that in the longer term there is less rainfall overall. The duration of rainfall events also influences the amount of water absorbed by the soil. | 2 | 2 | Eucalypts can survive periods of inundation and regeneration can be triggered by flood events | 5 | 5 | 8 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 7 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Eucalypt Forests and Woodland) | Rainfall reduction - Summer and autumn | 5 | 4 | Native vegetation very likely to be exposed to decrease in already low summer rainfall | 4 | 3 | Some summer rain may be required to sustain juvenile eucalypts and other species in the community that germinated following winter rains | 9 | 7 | 6 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | 13 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native | Rainfall reduction – Winter and | 5 | 4 | Native vegetation very likely to be exposed to reduced winter and | 5 | 5 | Natural regeneration and recruitment relies on sufficient winter | 10 | 9 | 4 | 3 | Physiological adaptive capacity and current interventions | 16 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | vegetation by vegetation type (Eucalypt Forests and Woodland) | spring | | | spring rainfall as result of soil moisture content reduction | | | and spring rainfall | | | | | (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Bushfire frequency | 5 | 3 | Small area remains near Aldinga Scrub, possible exposure to bushfire | 5 | 5 | Community very sensitive to fire | 10 | 8 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | 18 | 15 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | CO2 increases | 1 | 1 | Native vegetation likely to be exposed to CO2 | 1 | 1 | Positive impact on growth from increasing CO2 | 2 | 2 | 9 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fernland than eucalypt woodland (e.g.) | 3 | 9 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 4 | 4 | Community sensitive to increased evaporation | 9 | 8 | 2 | 4 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | 17 | 14 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Native vegetation very likely to be exposed to heat waves | 5 | 4 | Community sensitive to heat and reduced rainfall. More sensitive than Eucalypt woodland | 10 | 8 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | 18 | 15 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/her | Increased risk of coastal inundation | 5 | 5 | Small area remains near Aldinga Scrub | 3 | 3 | Community sensitive to inundation of salt water | 8 | 8 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to | 16 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | bland) | | | | | | | | | | | | 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Intensity of rainfall | 3 | 3 | Possible expose to intense rainfall | 2 | 2 | Community tolerant of some level of freshwater inundation but not too frequently | 5 | 5 | 5 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fernland than eucalypt woodland (e.g.) | 10 | 12 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Rainfall reduction - Summer | 5 | 3 | Native vegetation likely to be exposed to decrease in already low summer rainfall | 4 | 3 | Community sensitive to heat and reduced rainfall | 9 | 6 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | 17 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Fernland/herbland) | Rainfall reduction – Winter and spring | 5 | 5 | Native vegetation likely to be exposed to reduced winter and spring rainfall as result of soil moisture content reduction | 5 | 4 | Community sensitive to heat and reduced rainfall | 10 | 9 | 2 | 3 | Physiological adaptive capacity and current interventions (revegetation and weed control) may not be sufficient for communities to adapt to 2070 conditions. Less ability for people to restore herbland/fern;land than eucalypt woodland (e.g.) | 18 | 16 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Bushfire frequency | 3 | 2 | Estuary location near water less exposed to bushfire | 2 | 2 | Samphire doesn't burn easily - low sensitivity to fire | 5 | 4 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 7 | 9 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | CO2 increases | 5 | 1 | Native vegetation likely to be exposed to CO2 | 1 | 1 | Positive impact on growth from increasing CO2 | 6 | 2 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 8 | 7 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by | Evaporation increasing | 5 | 4 | Biodiversity likely to be exposed to increased evaporation | 2 | 2 | High tolerance to low rainfall so likely to be tolerant of increased evaporation | 7 | 6 | 8 | 6 | Samphire communities along estuary can migrate quickly enough to cope with sea level | 9 | 10 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | vegetation type (Samphire shrubland) | | | | | | | | | | | | rise and have greater inherent capacity to changes in temperature and rainfall | | |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Native vegetation very likely to be exposed to heat waves | 3 | 3 | Location along estuary less sensitive to heat, more rapid regeneration time of species mean can recover more quickly from disturbance | 8 | 8 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 10 | 13 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Increased risk of coastal inundation | 5 | 5 | Location along Onkaparinga Estuary very likely to be exposed to rising sea level | 5 | 5 | Can't survive permanent inundation if sea level rises | 10 | 10 | 2 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall. There are varying levels of tolerance to inundation. This is shown through defend species being located at different elevations p the elevation gradient. | 18 | 15 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Intensity of rainfall | 3 | 3 | Possible expose to intense rainfall | 2 | 2 | Samphire requires moisture for growth and adapted to high water levels for short periods of time | 5 | 5 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 7 | 10 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Rainfall reduction - Summer | 5 | 3 | Native vegetation likely to be exposed to decrease in already low summer rainfall | 2 | 2 | High tolerance to low rainfall | 7 | 5 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 9 | 10 |
| Environment and Natural Resources | Vegetation communities | Condition and extent of native vegetation by vegetation type (Samphire shrubland) | Rainfall reduction – Winter and spring | 5 | 5 | Native vegetation likely to be exposed to reduced winter and spring rainfall as result of soil moisture content reduction | 2 | 2 | High tolerance to low rainfall | 7 | 7 | 8 | 5 | Samphire communities along estuary can migrate quickly enough to cope with sea level rise and have greater inherent capacity to changes in temperature and rainfall | 9 | 12 |
| Environment and Natural Resources | Water | Groundwater quantity and quality (salinity) - Central Adelaide Plains PWA | Rainfall reduction - Summer | 4 | 4 | Exposure to reduced rainfall and increased extraction, lower expose in CAP due to lower levels of extraction. exposure to reduced rainfall is a long term impact as it takes longer to recharge the aquifer. | 3 | 4 | Recharge into the PWA aquifers is likely to be sensitive to the projected reduction in rainfall | 7 | 8 | 7 | 5 | Low inherent adaptive capacity relating to reduced recharge and rainfall however management responses (WAP, alternate water supplies e.g. recycled water) provide some adaptive capacity. | 10 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | Champions were not sure about the comment re lower levels of extraction, depends on which aquifer you are talking T1 or T2? | | | | | | | | | | |
| Environment and Natural Resources | Water | Groundwater quantity and quality (salinity) - Central Adelaide Plains PWA | Rainfall reduction – Winter and spring | 5 | 3 | Exposure to reduced rainfall and increased extraction, lower expose in CAP due to lower levels of extraction. Winter rain is more important because more chance to saturate soil before recharge over long period of time. And higher reduction is projected. | 5 | 4 | Recharge into the PWA aquifers is likely to be sensitive to the projected reduction in rainfall | 10 | 7 | 6 | 5 | Low inherent adaptive capacity relating to reduced recharge and rainfall however management responses (WAP, alternate water supplies e.g. recycled water) provide some adaptive capacity | 14 | 12 |
| Environment and Natural Resources | Water | Groundwater quantity and quality (salinity) - McLaren Vale PWA | Rainfall reduction - Summer | 4 | 3 | Exposure to reduced rainfall and increased extraction, greater extraction in McLaren Vale than CAP. Plan manages situation comparison to CAP is irrelevant. | 3 | 4 | Recharge into the PWA aquifers is likely to be sensitive to the projected reduction in rainfall | 7 | 7 | 8 | 5 | Low inherent adaptive capacity relating to reduced recharge and rainfall however management responses (WAP, alternate water supplies e.g. recycled water) provide some adaptive capacity. Champions were confident in the WAP as an adaptive management mechanism. | 9 | 12 |
| Environment and Natural Resources | Water | Groundwater quantity and quality (salinity) - McLaren Vale PWA | Rainfall reduction – Winter and spring | 4 | 4 | Exposure to reduced rainfall and increased extraction, greater extraction in McLaren Vale than CAP | 4 | 4 | Recharge into the PWA aquifers is likely to be sensitive to the projected reduction in rainfall | 8 | 8 | 8 | 5 | Low inherent adaptive capacity relating to reduced recharge and rainfall however management responses (WAP, alternate water supplies e.g. recycled water) provide some adaptive capacity. Future review of plan will adjust sustainable yield and allocations to adapt. | 10 | 13 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Bushfire frequency | 5 | 5 | Watercourses, dams and wetlands certain to be exposed to more frequent bushfires | 5 | 5 | Watercourses highly sensitive to bushfire damage | 10 | 10 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 16 | 16 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Evaporation increasing | 5 | 5 | Watercourses, dams and wetlands certain to be exposed to increased evaporation | 5 | 5 | Surface water highly sensitive to evaporation, quality decreases as concentrations of | 10 | 10 | 3 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses | 17 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | pollutants and salinity increase | | | | | (WAP, riparian management and revegetation) provide some response | | |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Intensity of rainfall | 5 | 5 | Watercourses, dams and wetlands certain to be exposed to more intense rainfall events | 5 | 5 | Watercourse physical stability likely to be sensitive to increased erosion from more intense rainfall events | 10 | 10 | 3 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 17 | 16 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Rainfall reduction - Summer | 5 | 3 | Surface water very likely quantity be exposed to rainfall reduction | 5 | 3 | Surface water possibly sensitive to reduction in summer rain that provide freshes and dilute concentrations of pollutants and salinity increase | 10 | 6 | 2 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 18 | 12 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Rainfall reduction – Winter and spring | 5 | 4 | Champions requested using the correct name for this indication e.g. WMLR WAP. Surface water very likely to be exposed. | 5 | 5 | Quality and quantity highly sensitive to rainfall reduction | 10 | 9 | 5 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response. Adaptive cap lower because cannot adapt to less rainfall unlike groundwater. Less ability for intervention. | 15 | 15 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Hills | Temperature increases - Summer | 5 | 4 | Surface water resources across the Region are exposed | 5 | 4 | Quality impacts from algal blooms | 10 | 8 | 5 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 15 | 14 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Bushfire frequency | 4 | 4 | Watercourses, dams and wetlands certain to be exposed to more frequent bushfires particularly in Willunga Basin | 5 | 5 | Watercourses highly sensitive to bushfire damage | 9 | 9 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 15 | 15 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Evaporation increasing | 5 | 5 | Watercourses, dams and wetlands certain to be exposed to increased evaporation | 5 | 5 | Surface water highly sensitive to evaporation, quality decreases as concentrations of pollutants and salinity increase | 10 | 10 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and | 16 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | revegetation) provide some response | | |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Increased risk of coastal inundation | 3 | 3 | Exposure at estuary and coastal wetlands and watercourses | 4 | 4 | Surface water quality sensitive to saline water inflows | 7 | 7 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 13 | 13 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Intensity of rainfall | 5 | 5 | More impervious areas on Plains and more pollution sources | 5 | 5 | Watercourse physical stability likely to be sensitive to increased erosion from more intense rainfall events | 10 | 10 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 16 | 16 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Rainfall reduction - Summer | 3 | 3 | Surface water very likely quantity be exposed to rainfall reduction | 3 | 3 | Surface water possibly sensitive to reduction in summer rain that provide freshes and dilute concentrations of pollutants and salinity increase | 6 | 6 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 12 | 12 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Rainfall reduction – Winter and spring | 4 | 4 | Surface water very likely quantity be exposed to rainfall reduction | 5 | 5 | Quality impacts from algal blooms | 9 | 9 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 15 | 15 |
| Environment and Natural Resources | Water | Surface water quantity and quality - Plains | Temperature increases - Summer | 4 | 4 | Surface water very likely quantity be exposed to temperature increases | 4 | 4 | Quality impacts from algal blooms | 8 | 8 | 4 | 4 | Low inherent capacity to adapt to reduced rainfall and increasing temp and evaporation however management responses (WAP, riparian management and revegetation) provide some response | 14 | 14 |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage buildings, bridges, monuments, public art) | Bushfire frequency | 4 | 4 | Many built heritage items in bushfire prone areas | 5 | 4 | Old buildings are highly sensitive to bushfire, likely to have some wood in construction | 9 | 8 | 5 | 3 | If there is continued use of the site then it could be rebuilt if damaged in fire (but will require resources not currently allocated). Rebuild will depend on significance to the community and extent of damage. | 14 | 15 |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage | Evaporation increasing | 5 | | Buildings exposed to increased evaporation across the region | 4 | | Soil heavage risk to soil which can impact foundations | 9 | 0 | 8 | | Existing management arrangements could employ additional water to offset declining soil | 11 | 7 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | buildings, bridges, monuments, public art) | | | | | | | | | | | | moisture levels, provided water was available. | | |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage buildings, bridges, monuments, public art) | Increased risk of coastal inundation | 4 | 4 | Some buildings in coastal areas exposed | 3 | 3 | Medium impact on heritage structures. 0.5 m rise in Old Noarlunga, Port Willunga. Intrinsic vale of what is there. | 7 | 7 | 2 | 3 | There are few existing management arrangements that will provide adaptive capacity. Monuments could be moved but buildings are not. | 15 | 14 |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage buildings, bridges, monuments, public art) | Intensity of rainfall | 3 | 4 | Some buildings in low lying aras exposed | 2 | 3 | Direct impact of rainfall and flooding is short term although buildings with old or already sensitive roofs could be more sensitive | 5 | 7 | 8 | 3 | There are few existing management arrangements that will provide adaptive capacity. | 7 | 14 |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage buildings, bridges, monuments, public art) | Rainfall reduction - Summer | 5 | 2 | Buildings exposed to reduced rainfall across the region | 2 | 3 | Subject to variability given other factors such as maintenance, location etc. | 7 | 5 | 8 | 3 | Existing management arrangements could employ additional water to offset declining soil moisture levels, provided water was available. | 9 | 12 |
| Social and Community | Buildings | Condition of built cultural heritage (e.g. heritage buildings, bridges, monuments, public art) | Rainfall reduction – Winter and spring | 5 | 3 | Buildings exposed to reduced rainfall across the region | 3 | 3 | Subject to variability given other factors such as maintenance, location etc. | 8 | 6 | 8 | 3 | Existing management arrangements could employ additional water to offset declining soil moisture levels, provided water was available. | 10 | 13 |
| Social and Community | Buildings | Condition of public buildings (incl. Schools, libraries, hospitals) | Bushfire frequency | 5 | 5 | High number of public buildings in bushfire hazard zones | 4 | 4 | Buildings have been built to varying standards to cope with bushfire impacts | 9 | 9 | 3 | 3 | Current design has limited adaptive capacity for likely increased intensity and frequency of future fire events | 16 | 16 |
| Social and Community | Buildings | Condition of public buildings (incl. Schools, libraries, hospitals) | Increased risk of coastal inundation | 4 | 4 | Likely that some public buildings will be exposed in coastal areas (e.g. Glenelg) | 4 | 4 | Older buildings may be more sensitive to structural damage resulting from inundation | 8 | 8 | 4 | 4 | Some existing measures provide adaptive capacity but may have limited benefit under storm surge events | 14 | 14 |
| Social and Community | Buildings | Condition of public buildings (incl. Schools, libraries, hospitals) | Intensity of rainfall | 4 | 4 | Likely that some public buildings will be exposed in low lying areas | 3 | 3 | Buildings designed to cope with current understanding of flood impacts | 7 | 7 | 3 | 3 | Building design not likely to consider possible future rainfall intensities or flood levels | 14 | 14 |
| Social and Community | Buildings | Condition of public buildings (incl. | Rainfall reduction - Summer | 2 | 2 | Exposure unlikely as result of relatively small reduction in rainfall | 2 | 2 | Buildings designed to cope with soil heavage | 4 | 4 | 3 | 3 | Current buildings' design rarely considered future climate | 11 | 11 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | Schools, libraries, hospitals) | | | | | | | | | | | | | | |
| Social and Community | Buildings | Condition of public buildings (incl. Schools, libraries, hospitals) | Rainfall reduction – Winter and spring | 3 | 3 | Relatively small reduction in rainfall possible exposure to building condition as a result of impacts on soil moisture content | 2 | 2 | Buildings designed to cope with soil heavage | 5 | 5 | 3 | 3 | Current buildings' design rarely considered future climate | 12 | 12 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Bushfire frequency | 4 | 5 | 3 local government areas in the region have exposure to fire (not CHB). Fire exposure is only in part of these councils. Current estimate is that <25% of public realm is in areas exposed to bushfire risk. Could increase in the future with increasing frequency and intensity of bushfire. Potential impact area could increase in the future, so bushfire risk zone becomes larger. | 5 | 4 | Assets in the public realm are highly sensitive to bushfire | 9 | 9 | 4 | 3 | Rebuild is possible because of knowledge of what infrastructure is required. Budget is main limitation. Trees are a long term asset that take time to re-establish. Community needs may change through time as well. | 15 | 16 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Evaporation increasing | 4 | 4 | Condition of street trees likely to be exposed to increased evaporation | 3 | 3 | Trees sensitive to reduced rainfall | 7 | 7 | 8 | 8 | Adaptive capacity is high because management arrangements were developed during the drought. | 9 | 9 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Condition of street trees very likely to be exposed to heatwave conditions | 4 | 5 | Trees sensitive to extended periods of extreme heat. Trees can survive through physiological responses (e.g. close stomata, shed limbs). | 9 | 9 | 3 | 4 | Limited application of current options for adaptation e.g. WSUD although could provide additional water to landscaping and trees. Ability for maintenance staff to respond to impacts of heatwaves on street trees is less during a heatwave because of hot weather policy. | 16 | 15 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Increased risk of coastal inundation | 4 | 5 | Condition of assets that make up public realm very likely to be exposed to coastal inundation, e.g. coastline north of Seacliff. Some of most popular parks in HCB are on the coast. Exposure is high. | 4 | 5 | Refer to impacts of storm in 2009 (e.g. $60k damage to footpaths). Potential loss of trees and landscaped areas because of sea water inundation. | 8 | 10 | 1 | 3 | Low adaptive capacity e.g. limited budget to repair impacts | 17 | 17 |

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| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Intensity of rainfall | 3 | 5 | Possible exposure from localised flood damage | 2 | 4 | Public realm is less sensitive to heavy rainfall events that are short term | 5 | 9 | 7 | 5 | Existing maintenance arrangements will provide some level of adaptive capacity. Frequency may need to increase | 8 | 14 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Rainfall reduction - Summer | 5 | 3 | Exposure, particularly to trees and landscaping, possible as result of reduction in rainfall | 4 | 4 | Trees sensitive to reduced rainfall | 9 | 7 | 3 | 8 | Quality of streetscape has declined since the drought because less water being applied in general to gardens. What we have now is often low condition and sub-standard design. Species selection has changed to more tolerant species. Street scapes changing is an incremental change. People aren't looking after yards and road verges as much anymore. | 16 | 9 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Rainfall reduction – Winter and spring | 5 | 3 | Exposure, particularly to trees and landscaping, possible as result of reduction in rainfall | 4 | 3 | Water fountains may need to be turned off if water restrictions are in place. Street trees and other landscaping will be impacted. | 9 | 6 | 3 | 8 | Quality of streetscape has declined since the drought because less water being applied in general to gardens. What we have now is often low condition and sub-standard design. Species selection has changed to more tolerant species. Street scapes changing is an incremental change. People aren't looking after yards and road verges as much anymore. | 16 | 8 |
| Social and Community | Buildings | Condition of public realm (street scapes, street trees, paving, drinking fountains, public art) | Temperature increases - Summer | 5 | 4 | Landscaping and WSUD features likely to be exposed by increased temperatures | 4 | 4 | Trees and asset condition sensitive to increased temperatures due to nature of materials | 9 | 8 | 4 | 4 | Limited application of current options for adaptation e.g. WSUD. There are more species being selected that are resistant to increasing temperatures. | 15 | 14 |
| Social and Community | Buildings | Demand for emergency evacuation centres and facilities | Bushfire frequency | 4 | 5 | Very likely demand will increase from exposure to bushfires | 2 | 4 | For a bushfire it is likely that populations living areas both directly and not directly impacted by bushfire may require evacuation centres and facilities. Encourage people in | 6 | 9 | 9 | 3 | Very-high adaptive capacity because most people will stay with family and friends. If the are needed, they will be easy to locate. Capability already exists to rapidly establish evacuation centres if required. | 7 | 16 |

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| | | | | | | | | | advance to stay with friends in town. Leave early or stay and protect your property. Different Councils have different views on whether they will allow their buildings to be used as emergency evacuation centres. Ambiguity as to who picks up responsibility. If there are no friends and family people may book into a hotel. Experience interstate says that people self-evacuate to friends and relatives. Poor people and those without family connections are moved to evacuation centres. | | | | | | | |
| Social and Community | Buildings | Demand for emergency evacuation centres and facilities | Increased risk of coastal inundation | 4 | 5 | Very likely to have exposure however will be limited to those living, working or visiting low lying coastal areas | 2 | 3 | In Adelaide metro area people will more likely stay with family and friends. In smaller communities like Clarendon it could be harder for people to find unaffected people. | 6 | 8 | 9 | 7 | Very-high adaptive capacity because most people will stay with family and friends. If they are needed, they will be easy to locate. Capability already exists to rapidly establish evacuation centres if required. | 7 | 11 |
| Social and Community | Buildings | Demand for emergency evacuation centres and facilities | Intensity of rainfall | 3 | 4 | Localised flooding events that are short term present likely exposure | 2 | 3 | Localised flooding events that are short term. Some people may need to be evacuated if roof is removed. | 5 | 7 | 9 | 7 | Very-high adaptive capacity because most people will stay with family and friends. If the are needed, they will be easy to locate. Capability already exists to rapidly establish evacuation centres if required. | 6 | 10 |
| Social and Community | Buildings | Demand for heat refuges | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | During heatwaves people looking for refuge so very sensitive | 10 | 10 | 4 | 4 | Current adaptive capacity will not cope with expected increases in heatwaves | 16 | 16 |
| Social and Community | Buildings | Demand for heat refuges | Temperature increases - Summer | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 3 | 3 | Less sensitive because of physiological acclimatisation to warmer summers | 8 | 8 | 7 | 7 | Physiological adaptation is possible. Some capacity within system to adapt including using existing buildings (libraries and community centre) for general use. | 11 | 11 |
| Social and Community | Community planning and | Demand for social support services | Bushfire frequency | 5 | 5 | Very likely demand from exposure to extreme events with | 5 | 5 | Demand for services seen to increase following natural | 10 | 10 | 2 | 2 | Capacity to adapt to major bushfire is lower than flood response. | 18 | 18 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | development | | | | | life and property at risk | | | disasters and extreme weather events as people and property affected. Very likely to see increase following bushfire and extreme heat. | | | | | Massive cuts to support services already, future resources likely to be further challenged and needs additional resources to meet future demand, links to public health, mental health, need post-emergency assistance in community development . Emergency response centres for immediate response is ok but longer term less well developed or resourced. Not for profit organisations have coordinated responses in the past to emergency response. | | |
| Social and Community | Community planning and development | Demand for social support services | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | Vulnerable members of community accessing services are more sensitive to extreme heat | 10 | 10 | 6 | 2 | Red Cross telecross service. Providing this service likely to be stressed. Links to demand for emergency services. Increase in demand makes more difficult to reschedule services. Change nature of service - more telephone calls and possibly less visits | 14 | 18 |
| Social and Community | Community planning and development | Demand for social support services | Increased risk of coastal inundation | 2 | 3 | Coastal inundation possible to create demand as result of coastal flooding, northern beaches north of Marino most affected | 3 | 3 | Demand for services seen to increase following natural disasters and extreme weather events as people and property affected. | 5 | 6 | 6 | 3 | Knowledge and technology available but not organised, implemented or resourced effectively | 9 | 13 |
| Social and Community | Community planning and development | Demand for social support services | Intensity of rainfall | 3 | 3 | Flood and storm events present possible exposure | 4 | 3 | Demand for services seen to increase following natural disasters and extreme weather events as people and property affected. Demographic influence and migration policies influence. | 7 | 6 | 2 | 3 | If services are required there are no other adaptive options to alter demand. Current systems are not designed to respond to extended periods of increased demand and more frequent periods of demand. General public often not eligible for social support services, funding not from Council, elderly, disabled groups particularly vulnerable. Complexity of funding, policy, individual mentality means difficult to adapt. Support networks important | 15 | 13 |

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| Social and Community | Community planning and developmen t | Demand for social support services | Temperature increases - Summer | 4 | 4 | Increase in summer temperatures likely to increase demand from already vulnerable populations (elderly, disabled, pregnant) | 3 | 4 | Vulnerable members of community accessing services more sensitive to heat waves, night time temperatures | 7 | 8 | 6 | 6 | Physiological adaptation is possible within limits, building design could be improved | 11 | 12 |
| Social and Community | Education | Ability to access educational and lifelong learning facilities | Bushfire frequency | 4 | 4 | Numerous education facilities are located within bushfire prone areas (e.g. Flinders Uni, Urrbrae), varies for online learning (lower exposure), libraries and community centres higher exposure | 3 | 3 | Bushfire could damage facilities or force temporary closures or relocations | 7 | 7 | 7 | 5 | Ability to access learning materials online in the short term, relocation of facilities if damaged, libraries, communities centres may close on extreme or catastrophic fire danger days. Adults more adaptive, may have higher ability to access other transport or other facilities | 10 | 12 |
| Social and Community | Education | Ability to access educational and lifelong learning facilities | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | People wanting to access facilities are likely to be affected by heatwaves | 4 | 4 | Public transport less desirable option during extreme heat, waiting for transport and walk between facilities, infrequent services, more interruption to electricity supply | 9 | 8 | 6 | 4 | Possibilities to visit in cooler part of day, changing hours of operation to include weekends and night times, impacts on support networks, interactions between other climate variables and indicators e.g. school attendance impacts on parents | 13 | 14 |
| Social and Community | Education | Ability to access educational and lifelong learning facilities | Increased risk of coastal inundation | 3 | 3 | Not many facilities located close to coastal areas | 2 | 2 | Short visits that can be done later although course work may be missed | 5 | 5 | 8 | 7 | Possibility to visit later, coastal inundation more likely to be short term event, building design | 7 | 8 |
| Social and Community | Education | Ability to access educational and lifelong learning facilities | Intensity of rainfall | 3 | 3 | Not many facilities located in areas likely to flood | 3 | 2 | Short visits that can be done later although course work may be missed, more widespread impact on ability to access transport. | 6 | 5 | 8 | 7 | Possibility to visit later, intense rainfall more likely to be short term event | 8 | 8 |
| Social and Community | Education | Internet access | Bushfire frequency | 3 | 3 | Some infrastructure is underground and in protected facilities, above ground infrastructure exposed (eg mobile towers) | 4 | 4 | Physical damage to infrastructure | 9 | 7 | 5 | 5 | Limited adaptive capacity within existing system to extreme events | 14 | 12 |
| Social and Community | Education | Internet access | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 3 | 4 | Some infrastructure is underground and in protected facilities, above ground infrastructure exposed (eg mobile towers) | 4 | 4 | High temperatures my impact operation of infrastructure in same way as occurs for telecommunications infrastructure | 9 | 8 | 5 | 5 | Limited adaptive capacity within existing system to extreme events | 14 | 13 |
| Social and Community | Education | Internet access | Increased risk of coastal inundation | 4 | 4 | Some infrastructure is underground and in protected facilities, above ground infrastructure exposed | 3 | 3 | Physical damage to infrastructure | 9 | 7 | 5 | 5 | Limited adaptive capacity within existing system to extreme events | 14 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | (eg mobile towers) and may be located in exposed coastal zone | | | | | | | | | | |
| Social and Community | Education | Internet access | Intensity of rainfall | 3 | 3 | Some infrastructure is underground and in protected facilities, above ground infrastructure exposed (eg mobile towers) and may be located in exposed low lying areas | 3 | 3 | Physical damage to infrastructure | 9 | 6 | 5 | 5 | Limited adaptive capacity within existing system to extreme events | 14 | 11 |
| Social and Community | Education | Internet access | Temperature increases - Summer | 3 | 3 | Some infrastructure is underground and in protected facilities, above ground infrastructure exposed (eg mobile towers) | 2 | 3 | High temperatures my impact operation of infrastructure in same way as occurs for telecommunications infrastructure | 9 | 6 | 5 | 5 | Limited adaptive capacity to increasing average temperatures | 14 | 11 |
| Social and Community | Education | School attendance | Bushfire frequency | 5 | 5 | Several schools located in bushfire prone areas | 5 | 5 | No attendance when school is forced to close, possible damage or destruction of school could force additional short term closure | 10 | 10 | 3 | 2 | Capacity to move students around within schools using existing capacity, less of the Region likely to be affected by inundation than bushfire. High school students more affected by school closure when learning more important for exams etc. and impacts on future opportunities | 17 | 18 |
| Social and Community | Education | School attendance | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Everyone in the Region will be exposed to heatwaves | 4 | 4 | Walking to school undesirable in hot weather, school dynamics change when kids kept in all days, school building design impacts sensitivity | 9 | 9 | 5 | 5 | Air conditioning in schools, some schools need to have rolling use of air conditioners, community busses to take kids to school in hot weather, fridges for schools (occurs in QLD), changes to school terms, changes in lunch / food policies | 14 | 14 |
| Social and Community | Education | School attendance | Increased risk of coastal inundation | 2 | 3 | Several schools located in areas prone to coastal inundation. For those schools in lower lying coastal areas, exposure could be higher | 5 | 3 | School facilities sensitive and may force temporary closure if inundated | 7 | 6 | 3 | 7 | Some capacity to move students around within schools using existing capacity, less of the Region likely to be affected by inundation than bushfire. Difficult logistics, changes to schools where students moved to, High school students more affected by school closure when learning more important for exams etc. and impacts on future opportunities. More schools likely in the southern areas which is higher elevation. Difficult | 14 | 9 |

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| | | | | | | | | | | | | | | to find new locations for schools within Holdfast Bay and Marion | | |
| Social and Community | Education | School attendance | Intensity of rainfall | 3 | 3 | Several schools located in areas prone to inundation | 5 | 3 | School facilities sensitive and may force temporary closure if inundated | 8 | 6 | 3 | 7 | Adaptive capacity highly variable across the region. (this score reflects bigger problems in disadvantaged and less connected communities). Flood events can have longer term impacts when buildings damaged. Flood warning systems to let parents know about potential risks. Develop community networks to link parents together. Community not good understanding or preparation for flood events. | 15 | 9 |
| Social and Community | Emergency management | Demand for emergency services | Bushfire frequency | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | Emergency services very likely to be required for life and property protection | 10 | 10 | 1 | 2 | Current systems not currently adequate let along to cope with increased number of high intensity fire events where response limited by conditions. Ability to share resources between States may be limited by increases in bushfire frequency across southern Australia. Difficulty in maintaining volunteering numbers for CFS and SES, red tape and OHS conditions changes. Awareness of community to bushfire risk, ignition and hazard. Coordinated response to hazard management. We know what to do but we're not doing it adequately. Change in culture required. | 19 | 18 |
| Social and Community | Emergency management | Demand for emergency services | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | Emergency services (ambulance, hospitals) very likely to be required | 10 | 10 | 3 | 6 | During heat waves, additional ambulance staff put on to address increased callouts. Volunteers assist paid ambulance staff could affected. Demand for hospitals could be greater than capacity | 17 | 14 |
| Social and Community | Emergency management | Demand for emergency services | Increased risk of coastal inundation | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | Emergency services very likely to be required for life and property protection but some early | 10 | 10 | 5 | 4 | Some capacity within existing systems however increased resources required for flood planning and | 15 | 16 |

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| | | | | | | | | | warning would occur if people are aware and listening | | | | | infrastructure. Insufficient resources when resources diverted away from other areas. Some ability to prepare with warnings | | |
| Social and Community | Emergency manageme nt | Demand for emergency services | Intensity of rainfall | 5 | 5 | Very likely demand from exposure to extreme events with life and property at risk | 5 | 5 | Emergency services very likely to be required for life and property protection | 10 | 10 | 4 | 4 | Some capacity within existing systems however increased resources required for flood planning and infrastructure. Community resilience with people working together, well connected and banding together to make sure everyone is ok | 16 | 16 |
| Social and Community | Existing social capital | Level of support from family, friends and neighbours | Bushfire frequency | 5 | 5 | Bushfires very likely to expose people who provide support to others | 4 | 4 | Bushfire may have large geographic scale of impact, | 9 | 9 | 2 | 3 | A bushfire could affects a wider proportion of the community so could be larger demand for alternate support services. Preparation and preparedness to share support and help families and friends. Need local and wide spread networks. In event of a fire, unpredictability of a fire makes people less likely to offer assistance to others. Prevention and recovery might be easier to get help with. | 17 | 16 |
| Social and Community | Existing social capital | Level of support from family, friends and neighbours | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to impact across the region and all population will be exposed | 4 | 4 | Support networks may also be affected by heat wave | 9 | 9 | 6 | 5 | Affects a wider proportion of the community so could be larger demand for alternate support services. Services in place however already isolated people have less people to support them. Weather forecasts can help by identifying in advance when preparation is required. | 13 | 14 |
| Social and Community | Existing social capital | Level of support from family, friends and neighbours | Increased risk of coastal inundation | 3 | 3 | Possible exposure to coastal inundation to populations living in coastal low lying areas | 2 | 2 | Localised impacts may not affect all of network | 5 | 5 | 7 | 7 | Assumes availability of support outside the immediate impact area, so that not all of an individuals support network is affected by extreme event at any time | 8 | 8 |
| Social and Community | Existing social capital | Level of support from family, friends and | Intensity of rainfall | 4 | 3 | Likely exposure to flood and high intensity rainfall events to populations | 4 | 2 | Localised impacts may not affect all of network, roads flooded could impact | 8 | 5 | 5 | 7 | Assumes availability of support outside the immediate impact area, so that not all of an | 13 | 8 |

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| | | neighbours | | | | living in low lying areas | | | transport across the region | | | | | individuals support network is affected by extreme event at any time, disruption to essential services and transport could limit capacity | | |
| Social and Community | Existing social capital | Participation in organised sport, church or community group in local area | Bushfire frequency | 5 | 5 | Large part of the region is bushfire prone and increased bushfire frequency is very likely to expose those participating in activities or groups | 5 | 5 | Participation very sensitive to bushfire as ability to access group restricted and people may have been directly affected by fire | 10 | 10 | 3 | 4 | If fire has damaged or destroyed facility where activity occurs, will need to relocate or rebuilt. Share facilities and relocate. Some reticence to move clubs may result in reduced participation. Following bushfire, participating in group activities might not be a priority for individuals. | 17 | 16 |
| Social and Community | Existing social capital | Participation in organised sport, church or community group in local area | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | All people in the Region will be exposed to increased heatwaves | 5 | 5 | Sports participation restricted by extreme heat, older people highly sensitive | 10 | 10 | 5 | 4 | Cancellation of events likely to increase but not a regular option to maintain activity participation, changes in timing of events to assist, | 15 | 16 |
| Social and Community | Existing social capital | Participation in organised sport, church or community group in local area | Increased risk of coastal inundation | 3 | 3 | Fewer locations where sports facilities could be exposed to coastal inundation, groups such as SLSC, Coastcare, sailing and other aquatic activities and Waterwatch very likely to be exposed | 4 | 4 | SLSC, Coastcare and Waterwatch sensitive as without beaches or coastal areas their activities are restricted. | 7 | 7 | 4 | 3 | No alternative locations for coastal activities, coastal protection needed, more future planning and resources needed, non-coastal groups ok, SLS-SA looking at planning for the future and how might impact clubs and local communities. Events along east coast providing indications for future impacts. Knowledge is there but action is lagging | 13 | 14 |
| Social and Community | Existing social capital | Participation in organised sport, church or community group in local area | Intensity of rainfall | 3 | 3 | Shorter term impacts of flooding means less exposure | 3 | 3 | Participants may not wish to leave home during extreme rain or storms | 6 | 6 | 4 | 6 | Short term impacts unless major flood damage caused, ability to postpone activities, return to normal participation after event would be expected. More frequent flood events might put greater pressure on resources to respond to damage. Make public buildings (school halls / sports facilities) available out of hours, refer quality of open space and recreation areas. Water quality impacts from | 12 | 10 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | stormwater impact beach water quality and potentially participation | | |
| Social and Community | Existing social capital | Participation in organised sport, church or community group in local area | Temperature increases - Summer | 4 | 4 | All people in the Region will be exposed to increased summer temperatures | 3 | 3 | Participants possibly to be sensitive to increased temperature | 7 | 7 | 7 | 6 | Alternatives available with changing times of events, move to alternate facilities (indoor), seasonal changes to sports | 10 | 11 |
| Social and Community | Existing social capital | Rates of volunteerism | Bushfire frequency | 5 | 4 | Volunteers very likely to be exposed to bushfire | 5 | 5 | Individuals very sensitive to bushfires as could impact propensity to volunteer | 10 | 9 | 3 | 3 | CFS may require additional volunteers to cope with additional fires, adaptive capacity of current system considered low | 17 | 16 |
| Social and Community | Existing social capital | Rates of volunteerism | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 4 | 4 | All population will be exposed to heatwaves | 4 | 3 | Heatwaves makes conditions less suitable for volunteering over short term. Possible to be sensitive to overall rates of volunteering | 8 | 7 | 4 | 6 | Volunteering during heat waves likely to reduce however important for volunteer groups to prepare for increasing heat events and provide flexibility to volunteers. Opportunities for volunteering could also be reduced. | 14 | 11 |
| Social and Community | Existing social capital | Rates of volunteerism | Increased risk of coastal inundation | 3 | 5 | Volunteers associated with coastal activities very likely to be exposed (e.g. SLSC, Coast Care) | 5 | 5 | SLSC, Coastcare groups highly sensitive | 8 | 10 | 4 | 3 | Low given current general trends in volunteering, current increasing SLS numbers, demand for surf life saving may reduce if areas of beaches reduce as well | 14 | 17 |
| Social and Community | Existing social capital | Rates of volunteerism | Intensity of rainfall | 3 | 3 | Individual rain events may expose volunteers for short term localised impact but not as likely in the longer term | 3 | 3 | High variability depending on nature of volunteering (outdoor or indoor) | 6 | 6 | 5 | 4 | Volunteering during flood events likely to reduce however important for volunteer groups to prepare for increasing flood events and provide flexibility to volunteers. Need for more volunteers to address increase demand. Current adaptive capacity low based on current trends. | 11 | 12 |
| Social and Community | Existing social capital | Rates of volunteerism | Rainfall reduction – Winter and spring | 4 | 4 | Volunteers likely to be exposed to reduced rainfall (positive exposure) | 1 | 1 | Less rain may improve conditions for volunteering | 5 | 5 | 8 | 9 | Increased opportunities for volunteering | 7 | 6 |
| Social and Community | Existing social capital | Rates of volunteerism | Temperature increases - Spring | 4 | 4 | Volunteers likely to be exposed to increased temperatures | 2 | 3 | Increased length of fire season starting in Spring | 6 | 7 | 7 | 3 | CFS may require additional volunteers to cope with additional fires, adaptive capacity of current system considered low | 9 | 14 |
| Social and Community | Existing social capital | Rates of volunteerism | Temperature increases - Summer | 4 | 4 | Volunteers likely to be exposed to increased temperatures | 3 | 4 | Increased temp makes conditions less suitable for volunteering | 7 | 8 | 7 | 3 | CFS may require additional volunteers to cope with additional fires, adaptive capacity of current system | 10 | 15 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | considered low | | |
| Social and Community | Existing social capital | Rates of volunteerism | Temperature increases - Winter | 4 | 4 | Volunteers likely to be exposed to increased temperatures | 1 | 1 | Winter temp increases may make conditions more suitable for volunteering | 5 | 5 | 8 | 9 | Increased opportunities for volunteering | 7 | 6 |
| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Bushfire frequency | 4 | 5 | Some heritage sites are often located adjacent to areas of native vegetation with high exposure to bushfire hazard, increased bushfire frequency means very likely to be exposed in the future. Other heritage sites also exposed e.g. vineyards, orchards, rivers, watercourses | 4 | 5 | Natural cultural heritage sites are assumed to be sensitive to reducing rainfall where this impacts on the condition of plant and animal communities and water bodies at a cultural heritage site. Bushfires and coastal inundation can directly damage the structure of the surrounding natural environment e.g. cliffs and dunes. | 8 | 10 | 4 | 2 | Current maintenance is not designed or resourced to cope with future climate | 14 | 18 |
| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Evaporation increasing | 5 | 4 | Heritage sites along watercourses including Warriparinga (Sturt River) and where native vegetation important to condition are likely to be exposed | 4 | 4 | Cultural sites are assumed to be sensitive to reducing rainfall where this impacts on the condition of plant and animal communities and water bodies at a cultural heritage site. | 9 | 8 | 3 | 2 | Some irrigation could be applied, but not currently common. | 16 | 16 |
| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Increased risk of coastal inundation | 4 | 5 | Many heritage sites along coast including Tjilbruke coastal springs and Wangkondanangko (Aldinga Washpool) means very likely to be exposed to coastal inundation | 4 | 5 | Cultural sites are assumed to be sensitive to reducing rainfall where this impacts on the condition of plant and animal communities and water bodies at a cultural heritage site. Bushfires and coastal inundation can directly damage the structure of the surrounding natural environment e.g. cliffs and dunes. | 8 | 10 | 2 | 2 | Current maintenance is not designed or resourced to cope with future climate | 16 | 18 |
| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Intensity of rainfall | 3 | 4 | Heritage sites along watercourses including Warriparinga (Sturt River) are likely to be exposed | 4 | 4 | Some of the springs along the Tjilbruke dreaming track cold be impacted by increasing erosion. | 7 | 8 | 5 | 2 | Current maintenance is not designed or resourced to cope with future climate | 12 | 16 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Rainfall reduction - Summer | 5 | 3 | Watercourses, wetlands and springs have possible exposure to summer rainfall reduction. Heritage vineyards and orchards could also be exposed. | 4 | 3 | Rainfall reductions will impact mature trees less because they will have access to groundwater. | 9 | 6 | 3 | 2 | Some irrigation could be applied, but not currently common. | 16 | 14 |
| Social and Community | Land assets | Condition of natural cultural heritage (e.g. scar trees, heritage vineyard, springs, rivers, burial grounds) | Rainfall reduction – Winter and spring | 5 | 4 | Watercourses, wetlands and springs have possible exposure to summer rainfall reduction. Heritage vineyards and orchards could also be exposed. | 4 | 4 | Rainfall reductions will impact mature trees less because they will have access to groundwater. | 9 | 8 | 3 | 2 | Some irrigation could be applied, but not currently common. | 16 | 16 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Bushfire frequency | 4 | 5 | Many outdoor recreation and sports facilities in bushfire prone area | 3 | 5 | These are often places of refuge during bushfire so often well maintained and protected. | 7 | 10 | 6 | 3 | Under current state it has moderate adaptive capacity | 11 | 17 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Evaporation increasing | 4 | 4 | Quality of outdoor sites likely to be exposed to increased evaporation as increased irrigation demand | 4 | 4 | Quality of grassed areas will be reduced as evaporation increases | 8 | 8 | 5 | 7 | Irrigation management for turfed areas required. Question is whether there will be sufficient budget to purchase more water. | 13 | 11 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Quality of outdoor sites in particular turfed areas and landscaping likely to be exposed to damage during heat waves | 5 | 3 | Irrigated grass areas possibly sensitive to heat waves | 10 | 7 | 5 | 7 | Irrigation management for turfed areas required. Question is whether there will be sufficient budget to purchase more water. | 15 | 10 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Increased risk of coastal inundation | 4 | 5 | Quality of beaches very likely to be exposed to coastal inundation | 4 | 5 | High sensitivity | 8 | 10 | 2 | 2 | Low adaptive capacity in current system and beaches have low inherent capacity | 16 | 18 |
| Social and Community | Land assets | Quality of active recreation and sporting sites | Intensity of rainfall | 3 | 3 | Possible exposure from flood damage | 2 | 3 | Sensitive to impacts of flooding possible in short term | 5 | 6 | 8 | 6 | Expect these sites to be able to cope with heavier downpours as often have well designed drainage. | 7 | 10 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | (outdoor - ovals, courts, pools, lawn bowls) | | | | | | | | | | | | | | |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Rainfall reduction - Summer | 5 | 3 | Quality of outdoor sites likely to be exposed to increased evaporation as increased irrigation demand | 4 | 2 | Already low rainfall in summer and so future impact on quality not likely | 9 | 5 | 5 | 7 | Irrigation management for turfed areas required. Question is whether there will be sufficient budget to purchase more water. | 14 | 8 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Rainfall reduction – Winter and spring | 5 | 4 | Quality of outdoor sites likely to be exposed to increased evaporation as increased irrigation demand | 4 | 4 | Quality of grassed areas will be reduced as rainfall decreases, and use of facilities increases as weather more suitable for outdoor activities | 9 | 8 | 5 | 7 | Irrigation management for turfed areas required. Question is whether there will be sufficient budget to purchase more water. | 14 | 11 |
| Social and Community | Land assets | Quality of active recreation and sporting sites (outdoor - ovals, courts, pools, lawn bowls) | Temperature increases - Summer | 5 | 3 | Increased summer temperatures may increase demand for use of indoor facilities meaning lower exposure as use decreases | 4 | 3 | Possible sensitivity relates to decrease in use of outdoor facilities as temperatures increase | 9 | 6 | 5 | 7 | Irrigation management for turfed areas required. Question is whether there will be sufficient budget to purchase more water. | 14 | 9 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Bushfire frequency | 4 | 5 | Numerous outdoor open space areas in bushfire prone area | 5 | 5 | Quality of open space very likely to be damaged by a bushfire | 9 | 10 | 5 | 3 | Focus of bushfire suppression efforts will be life and property, open space less likely to be a priority. Current resource allocations not likely to be sufficient to address recovery in future. There are prevention actions that can be taken e.g. reduce human interaction. There is a greater understanding of what is causing fires. | 14 | 17 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Evaporation increasing | 4 | 3 | Quality of irrigated open space likely to be exposed to increased evaporation as result of irrigation demand | 4 | 4 | Quality of grassed areas will be reduced as evaporation increases | 8 | 7 | 4 | 7 | Areas that are actively managed will have high adaptive capacity because more water can be applied, however there are increasing areas that are not actively managed which will have greater adaptive capacity. May require a change in watering regimes. This could take away more resources from other activities within Council. | 14 | 10 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Social and Community | Land assets | Quality of open space (predominantly green space) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Quality of open space in particular turfed areas and landscaping likely to be exposed to damage during heat waves | 5 | 4 | Grass and landscaped areas possibly sensitive to heat waves. Currently watering parks less and so they are becoming more sensitive. Risk of trees falling on residents. Can't have brown open spaces close to the beach - it is essential that they stay green. | 10 | 8 | 3 | 7 | Areas that are actively managed will have high adaptive capacity because more water can be applied, however, there are increasing areas that are not actively managed which will have greater adaptive capacity. | 17 | 11 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Increased risk of coastal inundation | 4 | 5 | Quality of coastal open space very likely to be exposed to coastal inundation | 3 | 5 | Quality of open space very sensitive to damage by coastal inundation impacts on plants and landscaping. Higher risks in localised areas. | 7 | 10 | 2 | 2 | Open space in coastal areas will require increasing resources to maintain as repair costs increase. Current management not prepared to cope with 2070 inundation. | 15 | 18 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Intensity of rainfall | 3 | 3 | Possible exposure from flood damage | 2 | 4 | Open space sensitive to impacts of flood on assets and landscaping | 5 | 7 | 8 | 6 | Additional stormwater management may be required. Current management not prepared to cope with 2070 rainfall intensity | 7 | 11 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Rainfall reduction - Summer | 5 | 3 | Quality of open space likely to be exposed to increased evaporation as increased irrigation demand | 3 | 2 | Already low rainfall in summer and so future impact on quality not likely | 8 | 5 | 5 | 7 | Areas that are actively managed will have high adaptive capacity because more water can be applied, however, there are increasing areas that are not actively managed which will have greater adaptive capacity. | 13 | 8 |
| Social and Community | Land assets | Quality of open space (predominantly green space) | Rainfall reduction – Winter and spring | 5 | 3 | Quality of open space likely to be exposed to increased evaporation as increased irrigation demand | 4 | 4 | Quality of grassed areas will be reduced as rainfall decreases and use of open space may increase as weather more suitable for outdoor activities | 9 | 7 | 3 | 7 | There is no irrigation during winter at present so adaptive capacity is less than for declining summer rainfall. | 16 | 10 |
| Social and Community | Physical health | Demand for medical care and support services | Bushfire frequency | 5 | 5 | Very likely demand from exposure to extreme events with health and safety risks | 4 | 5 | Major issues impacting demand for medical services will be heatwaves and bushfires that have a high impact on vulnerable community members. Other climate related impacts (e.g. rainfall services) are less sensitive but may still result in demand for medical care and support services. Not just fire damage and | 9 | 10 | 3 | 2 | If medical care is required there are no other adaptive options to alter demand. Evacuation from an area of risk can reduce and demand for service. However, cannot avoid smoke. Emergency service staff are still exposed to fire and need medical attention. | 16 | 18 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | injury but mental health and related medical conditions including asthma | | | | | | | |
| Social and Community | Physical health | Demand for medical care and support services | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Very likely demand from exposure to extreme events with health and safety risks | 5 | 5 | Major issues impacting demand for medical services will be heatwaves and bushfires that have a high impact on vulnerable community members. Other climate related impacts (e.g. rainfall services) are less sensitive but may still result in demand for medical care and support services. | 10 | 10 | 4 | 2 | If medical care is required there are no other adaptive options to alter demand. Are existing behaviours to adapt to heatwaves, not for all population though e.g. low socio economic. Figures show demand for these services increase during current heatwaves. | 16 | 18 |
| Social and Community | Physical health | Demand for medical care and support services | Increased risk of coastal inundation | 3 | 3 | Coastal inundation possible to create demand | 3 | 2 | Major issues impacting demand for medical services will be heatwaves and bushfires that have a high impact on vulnerable community members. Other climate related impacts (e.g. rainfall services) are less sensitive but may still result in demand for medical care and support services. | 6 | 5 | 5 | 3 | If medical care is required there are no other adaptive options to alter demand. Depends if it is an event or gradual over time. | 11 | 12 |
| Social and Community | Physical health | Demand for medical care and support services | Intensity of rainfall | 4 | 3 | Flood and storm events possible to create demand | 3 | 2 | Major issues impacting demand for medical services will be heatwaves and bushfires that have a high impact on vulnerable community members. Other climate related impacts (e.g. rainfall services) are less sensitive but may still result in demand for medical care and support services. | 7 | 5 | 4 | 3 | If medical care is required there are no other adaptive options to alter demand. | 13 | 12 |
| Social and Community | Physical health | Demand for medical care and support services | Temperature increases - Summer | 4 | 4 | Increase in summer temperatures likely to increase demand from already vulnerable populations | 3 | 3 | Major issues impacting demand for medical services will be heatwaves and bushfires that have a high impact on vulnerable community members. Other climate related impacts (e.g. rainfall services) are less sensitive but may still | 7 | 7 | 5 | 3 | If medical care is required there are no other adaptive options to alter demand | 12 | 14 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | result in demand for medical care and support services. Sunburn, younger children and older people, impact on food supplies, diseases as per previous comments. | | | | | | | |
| Social and Community | Physical health | Self assessed health | Bushfire frequency | 5 | 4 | Bushfires expose large part of population to direct and indirect impacts (smoke) | 5 | 4 | Those with existing medical conditions likely to be very sensitive to bushfire impacts | 10 | 8 | 2 | 4 | Individual health affected by numerous factors including ability to access health and social services, exercise and food. Current adaptive capacity of general population to cope with 2070 conditions considered low however additional services to help particularly disadvantaged people improve their health could address this. | 18 | 14 |
| Social and Community | Physical health | Self assessed health | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 4 | Heatwaves very likely to impact across the region and all population will be exposed | 5 | 4 | Those with existing medical conditions likely to be very sensitive to heatwaves | 10 | 8 | 2 | 4 | Individual health affected by numerous factors including ability to access health and social services, exercise and food. Current adaptive capacity of general population to cope with 2070 conditions considered low however additional services to help particularly disadvantaged people improve their health could address this. | 18 | 14 |
| Social and Community | Physical health | Self assessed health | Intensity of rainfall | 3 | 5 | Exposure to flooding or rain damage may affect some parts of the population | 3 | 4 | Those with existing medical conditions, limited mobility or reliance on support from others likely to be sensitive to increased rain intensity | 6 | 9 | 4 | 4 | Individual health affected by numerous factors including ability to access health and social services, exercise and food. Current adaptive capacity of general population to cope with 2070 conditions considered low however additional services to help particularly disadvantaged people improve their health could address this. | 12 | 15 |
| Social and Community | Physical health | Self assessed health | Temperature increases - Summer | 4 | 3 | All population exposed to general increases in temperature | 4 | 3 | Many people likely to be sensitive to increasing temperatures | 8 | 6 | 3 | 4 | Individual health affected by numerous factors including ability to access health and | 15 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | social services, exercise and access to healthy food, availability of water, ability to be active and outdoors, gardening etc. Current adaptive capacity of general population to cope with 2070 conditions considered low however additional services to help particularly disadvantaged people improve their health could address this. but some people enjoy warmer weather and getting outdoors | | |
| Social and Community | Physical health | Impact on children < 12 years of age | Bushfire frequency | 5 | 5 | Bushfires very likely to expose children in the Region as large area bushfire prone | 5 | 5 | Children < 12 years are sensitive to extreme events however they are less likely to have existing medical concerns. Psychological impact very likely and has been seen following historic fire events across Australia. Also smoke likely tom impact on children more. | 10 | 10 | 2 | 3 | Adaptive capacity may be low. Parents and guardians will typically ensure that they are not exposed to extreme events. Counselling and trauma services required but demand may be greater than capacity of current system. Children not independently mobile, under extreme stress parents/carers do not necessarily respond appropriately, children not accounted for in evacuation etc. trauma after the event | 18 | 17 |
| Social and Community | Physical health | Impact on children < 12 years of age | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to expose all of the region and all population will be exposed. Children are susceptible to dehydration. | 4 | 4 | Children < 12 years are sensitive to extreme events however they are less likely to have existing medical concerns. Children sensitive to dehydration. | 9 | 9 | 5 | 6 | Physiological adaptive capacity may be low because parents and guardians will typically ensure that they are not exposed to extreme events. Existing education programs for children to cope with heat and with policies to protect children e.g. sport and schools. | 14 | 13 |
| Social and Community | Physical health | Impact on children < 12 years of age | Increased risk of coastal inundation | 3 | 3 | Possible exposure to coastal inundation in coastal low lying areas | 3 | 3 | Children < 12 years are sensitive to extreme events however they are less likely to have existing medical concerns. Psychological impact possible as inundation and flooding, noted following previous floods in Australia (e.g. Queensland | 6 | 6 | 5 | 5 | Adaptive capacity linked to adaptive capacity of coastal systems to protect property and beaches. Impact on children will be less if impact on coastal assets is less. Parents and carers responsible for responding to situation and typical take care of children. However, | 11 | 11 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | 2011) | | | | | socio-economic issues can impact ability to respond. | | |
| Social and Community | Physical health | Impact on children < 12 years of age | Temperature increases - Summer | 4 | 4 | General increases in temperature likely to expose children | 3 | 3 | Children < 12 years are sensitive to extreme events however they are less likely to have existing medical concerns. Increased temp could have impact on physical activity and affect health of children. | 7 | 7 | 7 | 6 | Physiological adaptive capacity may be low because parents and guardians will typically ensure that they are not exposed to extreme events. Existing education programs for children to cope with heat and with policies to protect children e.g. sport and schools. | 10 | 11 |
| Social and Community | Physical health | Impact on people aged over 65 years and at risk | Bushfire frequency | 5 | 5 | Bushfires very likely to expose people over 65 in the region as large area bushfire prone. Some areas of region are more exposed to fire than others. | 5 | 5 | People aged over 65 years are more sensitive because of mobility issues, pre-existing illness and poor health. Difference in this age group about frailty and still active. Older people also find it harder to maintain properties to reduce risk to bushfire. | 10 | 10 | 2 | 3 | Limited adaptive capacity due to lower mobility on average and heavier reliance on support networks that will be under stress during extreme events. Existing emergency response plans exist for aged care facilities, but independent living people may not have one and they rely on community bushfire response plan (is a legislative req.). | 18 | 17 |
| Social and Community | Physical health | Impact on people aged over 65 years and at risk | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to expose all of the region and all population will be exposed. | 5 | 5 | People aged over 65 years are more sensitive because of mobility issues, pre-existing illness and poor health. | 10 | 10 | 2 | 3 | Limited adaptive capacity due to lower mobility on average and heavier reliance on support networks that will be under stress during extreme events. Existing programs are in place for notifying or contacting older people to check on them during heatwaves. Also programs that encourage neighbours to check on elderly neighbours. Some services are not allowed to operate during extreme conditions. Power costs mean many people are reluctant to turn on cooling systems. | 18 | 17 |
| Social and Community | Physical health | Impact on people aged over 65 years and at risk | Increased risk of coastal inundation | 4 | 3 | Possible exposure to coastal inundation in coastal low lying areas. Population by 2050 will be older than it ever has, about 25% over 65 and older population | 4 | 3 | People aged over 65 years are more sensitive because of mobility issues, pre-existing illness and poor health. | 8 | 6 | 5 | 3 | Limited adaptive capacity due to lower mobility on average and heavier reliance on support networks that will be under stress during extreme events. Current planning policies | 13 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | will decline after that. | | | | | | | | about floor levels (flooding) etc. but what will happen if property values fall and people are unable to sell their home? | | |
| Social and Community | Physical health | Impact on people aged over 65 years and at risk | Intensity of rainfall | 4 | 3 | Exposure to rain and storm events possible across all populations. Power cuts as a result of high winds will impact older people. Also likely to be impacted by flooding. | 5 | 4 | People aged over 65 years are more sensitive because of mobility issues, pre-existing illness and poor health. Difference in this age group about frailty and still active. Older people also find it harder to maintain properties to reduce risk to bushfire. No phones, no internet, power cuts, emergency services stretched makes older people very sensitive. | 9 | 7 | 1 | 3 | Limited adaptive capacity due to lower mobility on average and heavier relance on support networks that will be under stress during extreme events. Existing stormwater management planning, there are also flood plain mapping. Unsure about adaptive capacity for people that require medical equip reliant on power e.g. batteries or power generators. Also some phones rely on electricity. | 18 | 14 |
| Social and Community | Physical health | Impact on people aged over 65 years and at risk | Temperature increases - Summer | 5 | 4 | General increases in temperature likely to expose older populations, higher likelihood of disease as a result of higher temperatures, older people more vulnerable. | 4 | 4 | People aged over 65 years are more sensitive because of mobility issues, pre-existing illness and poor health. | 9 | 8 | 6 | 3 | Limited adaptive capacity due to lower mobility on average and heavier relance on support networks that will be under stress during extreme events. Design of new buildings will be required to meet certain cooling requirements. Increased use of air conditioners will exacerbate climate change. heat refuges exist in community e.g. movie theatres and shopping centres and public buildings. Higher average temp will result in environments conducive to vectors of disease. Policies in place to further green the environment and create heat sinks. | 13 | 15 |
| Social and Community | Physical health | Impact on people who require assistance for core activities | Bushfire frequency | 5 | 5 | Bushfires very likely to expose people who require assistance that live in large area bushfire prone | 5 | 5 | Support services for core activities may not be available during extreme events for extended periods (>24 hours). | 10 | 10 | 2 | 2 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during extreme events. | 18 | 18 |
| Social and Community | Physical health | Impact on people who require assistance for core activities | Frequency of heatwaves (measured as the sequence of days ≥ 40 | 5 | 5 | Heatwaves very likely to expose all of the region and all population will be exposed | 5 | 5 | Support services for core activities may not be available during extreme events for extended periods (>24 hours). | 10 | 10 | 2 | 2 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during extreme events. | 18 | 18 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | °C) | | | | | | | | | | | | | |
| Social and Community | Physical health | Impact on people who require assistance for core activities | Increased risk of coastal inundation | 4 | 4 | Likely exposure to coastal inundation in coastal low lying areas. | 4 | 4 | Support services for core activities may not be available during extreme events for extended periods (>24 hours). Intense rainfall events will reduce access to core services but for shorter periods of time (< 24 hours). Higher sensitivity than other vulnerable groups as this indicator relates to those who may be physically unable to assist themselves. | 8 | 8 | 3 | 3 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during extreme events. | 15 | 15 |
| Social and Community | Physical health | Impact on people who require assistance for core activities | Intensity of rainfall | 3 | 3 | Exposure to rain and storm events possible across all region | 3 | 3 | Support services for core activities may not be available during extreme events for extended periods (>24 hours). Intense rainfall events will reduce access to core services but for shorter periods of time (< 24 hours). | 6 | 6 | 4 | 4 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during extreme events. | 12 | 12 |
| Social and Community | Public safety | Levels of anti-social behaviour | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to expose the entire region and all population will be exposed | 4 | 4 | Increased gatherings of people at the beach on warm days and nights is understood to lead to higher levels of anti-social behaviour. Heat is a stressor and is in the literature re change in behaviour (including domestic violence) as a result of heat stress. Being a recluse, mental disorder etc. also potentially exacerbated. Difficulty sleeping, lessens capacity to function well e.g. driving, working, operating machinery | 9 | 9 | 4 | 6 | Existing policing and security presence would enable management of most incidents of anti-social behaviour. Doesn't address coping with other issues e.g. domestic violence, sleep etc. | 15 | 13 |
| Social and Community | Public safety | Levels of anti-social behaviour | Temperature increases - Summer | 4 | 4 | General increases in temperature likely to impact all population | 3 | 4 | Increased gatherings of people at the beach on warm days and nights is understood to lead to higher levels of anti-social behaviour. As above | 7 | 8 | 4 | 6 | Existing policing and security presence would enable management of most incidents of anti-social behaviour | 13 | 12 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| Social and Community | Social inclusion/exclusion | Impact on people geographically isolated from transport services | Bushfire frequency | 5 | 5 | Bushfires very likely to expose people geographically isolated as large area bushfire prone | 5 | 5 | Limited access to transport services may influence ability to move to emergency evacuation centres | 10 | 10 | 2 | 2 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during bushfires | 18 | 18 |
| Social and Community | Social inclusion/exclusion | Impact on people geographically isolated from transport services | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to impact across the region and all population will be exposed | 4 | 4 | Limited access to transport services will limit access to heat refuges and ability to access primary care | 9 | 9 | 3 | 3 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during heatwaves | 16 | 16 |
| Social and Community | Social inclusion/exclusion | Impact on people geographically isolated from transport services | Intensity of rainfall | 3 | 3 | Exposure to rain and storm events possible across all populations | 3 | 4 | There will be short term impacts on accessing transport services | 6 | 7 | 2 | 2 | Inherent adaptive capacity would rely on support networks which may be under greater stress/demand during flood events | 14 | 15 |
| Social and Community | Social inclusion/exclusion | Impact on people under financial stress | Bushfire frequency | 5 | 5 | Bushfires very likely to expose people under financial stress as large part of Region bushfire prone | 5 | 4 | Those under financial stress very sensitive to damage or destruction of property as don't have resources to repair or replace | 10 | 9 | 3 | 3 | Those under financial stress have low adaptive capacity as have limited ability to repair or replace damaged property, may not be well insured and would rely more heavily on social services | 17 | 16 |
| Social and Community | Social inclusion/exclusion | Impact on people under financial stress | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 4 | 4 | Heatwaves very likely to impact across the region and all population will be exposed | 4 | 3 | Impact on those who may not have air-conditioning in their houses or concerned about cost of operating air-conditioners | 8 | 7 | 3 | 3 | Those under financial stress have low adaptive capacity as have limited financial ability to purchase air conditioners | 15 | 14 |
| Social and Community | Social inclusion/exclusion | Impact on people under financial stress | Intensity of rainfall | 3 | 3 | Exposure to rain and storm events possible across all populations | 4 | 5 | Those under financial stress very sensitive to damage or destruction or insurance of property as don't have resources to repair or replace | 7 | 8 | 3 | 3 | Those under financial stress have low adaptive capacity as have limited ability to repair or replace damaged property, may not be well insured and would rely more heavily on social services | 14 | 15 |
| Social and Community | Social inclusion/exclusion | Impact on people under financial stress | Rainfall reduction – Winter and spring | 3 | 3 | Exposure to primary producers | 4 | 5 | Primary producers sensitive to reduced rainfall impacts on their productivity, increased food costs and water costs | 7 | 8 | 3 | 3 | Primary producers already under financial stress may not have capacity to undertake land management activities to improve water efficiency or be able to purchase water from alternate sources | 14 | 15 |
| Social and Community | Social inclusion/exclusion | Impact on people under financial stress | Temperature increases - Summer | 3 | 3 | Exposure to primary producers | 3 | 4 | Primary producers sensitive to impact of increased water demand, food, cost of food, cost of utilities e.g. water, electricity | 6 | 7 | 4 | 4 | Primary producers already under financial stress may not have capacity to undertake land management activities to improve | 12 | 13 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | | | | | | | | | | | | water efficiency or be able to purchase water from alternate sources | | |
| Social and Community | Social inclusion/exclusion | Mental health | Bushfire frequency | 4 | 4 | Bushfires very likely to expose people with mental health issues that live in large area bushfire prone | 5 | | People with mental health issues may be more sensitive to impacts of property destruction as result of bushfire | 9 | | 2 | | Currently government mental health workers are overstretched and often diverted by crisis and therefore have a reduced capacity to deliver coordinated responses to these issues | 17 | |
| Social and Community | Social inclusion/exclusion | Mental health | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 5 | 5 | Heatwaves very likely to impact across the region and all population will be exposed | 5 | | Heat is a stressor and is in the literature re change in behaviour (including domestic violence) as a result of heat stress. Being a recluse, mental disorder etc. also potentially exacerbated. | 10 | | 3 | | Currently government mental health workers are overstretched and often diverted by crisis and therefore have a reduced capacity to deliver coordinated responses to these issues | 17 | |
| Social and Community | Social inclusion/exclusion | Mental health | Increased risk of coastal inundation | 4 | 3 | Likely exposure to coastal inundation in coastal low lying areas, higher than other vulnerable groups as this indicator relates to those who may be physically unable to assist themselves. | 4 | | People with mental health issues may be more sensitive to impacts of property destruction as result of coastal inundation | 8 | | 3 | | Currently government mental health workers are overstretched and often diverted by crisis and therefore have a reduced capacity to deliver coordinated responses to these issues | 15 | |
| Social and Community | Social inclusion/exclusion | Mental health | Intensity of rainfall | 3 | 3 | Exposure to rain and storm events possible across all populations, flood impacts localised | 3 | | People with mental health issues may be more sensitive to impacts of property destruction as result of flooding | 6 | | 3 | | Currently government mental health workers are overstretched and often diverted by crisis and therefore have a reduced capacity to deliver coordinated responses to these issues | 13 | |
| Social and Community | Social inclusion/exclusion | Mental health | Temperature increases - Winter | 4 | 4 | Increased winter temperatures very likely to impact across the region and all population will be exposed | 3 | | Positive outcome possible as those people with seasonal depression may experience less winter depression | 7 | | 5 | | Some positive response may be seen if increased winter temperatures reduce impacts of seasonal depression | 12 | |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Bushfire frequency | 5 | 5 | Events held during summer very likely to be exposed to increased frequency of bushfire | 5 | 4 | Events would have to be cancelled if bushfire occurs | 10 | 9 | 2 | 4 | Events may need to be postponed but may not always be capacity to reschedule. May mean event does not occur for that year and is rescheduled for the following year | 18 | 15 |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Frequency of heatwaves (measured as the sequence of days ≥ 40 | 5 | 4 | Events held during summer likely to be exposed to increased heat wave events | 5 | 1 | Events would have to be cancelled if heat wave makes conditions unsuitable | 10 | 5 | 2 | 8 | Events may need to be postponed but may not always be capacity to reschedule | 18 | 7 |

| Type | Primary Indicator | Secondary Indicator | Climate variable | Exposure Workshop Score | Exposure Project Team Score | Comment | Sensitivity Workshop Score | Sensitivity Project Team Score | Comment | Potential Impacts Workshop Score | Potential Impacts Project Team Score | Adaptive Capacity Workshop Score | Adaptive Capacity Project Team Score | Comment | Vulnerability Workshop Score | Vulnerability Project Team Score |
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| | | | °C) | | | | | | | | | | | | | |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Increased risk of coastal inundation | 5 | 5 | Events held along the coast very likely to be exposed | 4 | 3 | Some events along the coast may have to be cancelled | 9 | 8 | 4 | 6 | Could prepare by considering tide times for events but some rescheduling or relocation may be required. More scope to relocate than for other climate variables? | 15 | 12 |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Intensity of rainfall | 4 | 3 | Possible exposure to extreme rain events | 4 | 1 | Some events may have to be cancelled | 8 | 4 | 4 | 8 | Some rescheduling or relocation may be required | 14 | 6 |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Rainfall reduction – Winter and spring | 1 | 1 | Reduced rainfall could increase the number of events held during winter so exposure considered rare | 1 | 5 | Increased opportunity for events to be held during winter | 2 | 6 | 9 | 3 | Opportunity to hold more events during winter | 3 | 13 |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Temperature increases - Summer | 4 | 4 | Events held during summer likely to be exposed to increased temperatures | 3 | 2 | Daytime events most likely to be affected | 7 | 6 | 7 | 7 | Events could be held during evenings and cooler parts of day, ensure shade locations and provision of water, misting tents | 10 | 9 |
| Social and Community | Social inclusion/exclusion | Number of outdoor civic events held by Councils | Temperature increases - Winter | 2 | 2 | Warmer winter temperatures will encourage events to be held so exposure considered unlikely | 1 | 4 | Increased opportunity for events to be held during winter | 3 | 6 | 9 | 4 | Opportunity to hold more events during winter | 4 | 12 |
| Social and Community | Sporting facilities | Quality of active recreation and sporting sites (indoor) | Bushfire frequency | 3 | 3 | Few indoor facilities in bushfire prone areas in the Region | 5 | 5 | Buildings very likely to be sensitive to bushfire damage or destruction | 8 | 8 | 3 | 3 | Focus of bushfire suppression efforts will be life and property, recreation facilities less likely to be a priority. Facilities not likely to have bushfire recovery plans | 15 | 15 |
| Social and Community | Sporting facilities | Quality of active recreation and sporting sites (indoor) | Frequency of heatwaves (measured as the sequence of days ≥ 40 °C) | 2 | 2 | All population will be exposed but indoor facilities unlikely to be exposed | 2 | 2 | Quality of indoor facilities unlikely to be affected by heat as use likely to decrease during heat waves | 4 | 4 | 7 | 7 | Indoor facilities could close during extreme heat as active sports and recreation facilities are not essential services. | 7 | 7 |
| Social and Community | Sporting facilities | Quality of active recreation and sporting sites (indoor) | Increased risk of coastal inundation | 2 | 2 | Few indoor facilities in coastal areas so low exposure to coastal inundation | 4 | 4 | Inundation likely to cause damage to contents and possibly structure of facilities | 6 | 6 | 4 | 4 | Planned relocation of sports facilities before 2070 could be required. Current adaptation low. | 12 | 12 |
| Social and Community | Sporting facilities | Quality of active recreation and sporting sites (indoor) | Intensity of rainfall | 4 | 4 | Buildings likely to be exposed to increased rainfall intensity | 3 | 3 | Structures may be sensitive to damage from intense rain events | 7 | 7 | 6 | 6 | Maintenance of facilities required to adapt to storm and rainfall. May require additional resources to cope with 2070 conditions. | 11 | 11 |
| Social and Community | Sporting facilities | Quality of active recreation and sporting | Temperature increases - Summer | 4 | 4 | Increased summer temperatures may increase demand for use of indoor facilities | 4 | 4 | Quality of indoor facilities likely to be affected by heat as use likely to increase | 8 | 8 | 7 | 7 | Increased maintenance of facilities may be required to adapt to possible increases in | 11 | 11 |

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| | | sites (indoor) | | | | meaning likely exposure as quality may be reduced as use increases | | | as summers become warmer | | | | | use. May require additional resources to cope with 2070 conditions. | | |