



SECTION 3.

RISK & VULNERABILITY ASSESSMENT

3 WHAT IMPACT WILL CLIMATE CHANGE HAVE ON MY ORGANISATION? (RISK AND VULNERABILITY ASSESSMENT)

Many organisations will conduct climate change assessments primarily to better understand the potential impacts of a changing climate on infrastructure, services and the broader community. They also assist in identify adaptation actions that address areas of greatest climate risk to an organisation.

The impact of climate change is often considered through the lens of risk or vulnerability. “Risk” ratings are based on an assessment of the consequence of a threat on an asset, service or feature of interest and the likelihood that the threat will occur. “Vulnerability”, on the other hand, considers the potential impact of climate change and adaptive capacity, the latter being the ability to withstand the impact. The potential impact considers both exposure to climate change and sensitivity to climate change.

Risk and vulnerability assessments have become an integral part of adaptation planning and implementation frameworks, because of the power of communicating risk as a motivator of change for stakeholders and decision makers. However, it is important that the risk or vulnerability assessment does not become an end in itself. Anecdotally, there are many examples of where very thorough climate risk or vulnerability assessments have been undertaken but resulted in little on-ground action. As such, it is important to remember that risk or vulnerability assessments primarily provide a tool for determining the focus for option appraisal.

While not designed to help understand opportunities, risk and vulnerability assessments can provide some insight into opportunities as well. For example, a community may have low vulnerability because extreme heat impacts are limited due to its location. Rather than ignore this in future strategy development, this can be seen as a strength or an opportunity on which the region can build (e.g. our region will have a better climate to live and work in).

While risk assessments are common for many organisations, climate risk assessments differ because of the need to estimate or model impacts in relation to longer term changes in climate which will be beyond the experience of most staff within an organisation.

Climate risk and vulnerability assessments provide an opportunity to identify issues for risk mitigation independent of other council drivers. However, climate related risks can also be integrated into more routine council risk management processes. For example, the LGA Mutual Liability Scheme (LGAMLS) maintains a risk profile to assess Local Government’s continuing and evolving risk profile. As part of this, annual risk reviews are completed by a nominated council risk officer and an LGAMLS representative. The annual risk review, which is designed to monitor Council’s operational risk profile and measure

ongoing business improvement, provides an opportunity to connect the outcomes of climate risk and vulnerability assessments with broader council risk management processes.

Note that in addition to the steps outlined in this document, other function specific guidance exists that can also be considered when seeking to understand the impact of climate change and identify adaptation options (**Box 3**).

Has your organisation already undertaken a risk or vulnerability assessment? Be sure to check the integrated vulnerability assessment for your region, National Emergency Risk Assessment Guidelines (NERAG) assessment, review industry adaptation plans and see if your organisation already has already considered climate risk in its own adaptation plan.

See Step 4 of the LGA SA's Climate Adaptation Planning Guidelines for further general information on Integrated Vulnerability Assessments.

3.1 Scan

At the *Scan* level, risk and vulnerability assessments should be used to improve stakeholders' general understanding of which aspects of climate change are likely to impact on an asset, service or feature of interest to their organisation.

This high-level assessment can use a simple screening approach, presenting assets, services or features in a matrix along with key climate variables (identified in the previous step – see Section 2), to determine which aspects of climate change are most likely to have an impact. For example, a high-level assessment could be used to confirm that sea level rise will be relevant to protecting built and natural assets in the coastal zone, that extreme heat could impact on the delivery of community services, or that increasing rainfall intensity is relevant to maintaining stormwater management infrastructure or preventing flood impacts.

High level risk and vulnerability assessments can be delivered through workshop processes. Provided appropriate stakeholders and experts are present, the perspectives are balanced and the participants are well informed, they can draw on local knowledge about past exposure to climate-related hazards without requiring extensive literature reviews or additional research.

Box 3. Function specific guidelines

Function specific guidelines can be used in conjunction with this Guide and the Adaptation Planning Guidelines. They can assist with detailed risk assessment and option identification. Examples of guidelines relevant to Councils include:

Emergency management

The National Emergency Risk Assessment Guidelines (NERAG) can be used in conjunction with climate change planning guidelines and provide an emergency-related risk assessment method consistent with the Australian Standard AS/NZS ISO 31000:2009 Risk management – principles and guidelines.

<https://www.aidr.org.au/media/1489/handbook-10-national-emergency-risk-assessment-guidelines.pdf>

Coastal management

One of the most pressing and complex adaptation challenges is responding to sea level rise risks in the coastal zone. Several guidelines and tools are worthy of consideration, such as:

- Coast Adapt, an information delivery and decision support framework <http://coastadapt.com.au>
- Guidelines for Responding to the Effects of Climate Change in Coastal and Ocean Engineering <http://www.engineersaustralia.org.au/coastal-ocean-engineering/publications>
- Climate Change Adaptation Guidelines in Coastal Management and Planning <http://www.engineersaustralia.org.au/coastal-ocean-engineering/publications>

Asset management

Asset management represents many council's most significant financial liability and commitment. Climate change guidelines that can assist with building climate resilience assessment, include:

- South Australian Department of Planning, Transport and Infrastructure Climate Change Adaptation Guideline for Asset Management https://www.dpti.sa.gov.au/_data/assets/pdf_file/0010/165943/DOCS_AND_FILES-9473145-v5-Environment_-_DPTI_Climate_Change_Adaptation_Guideline_2015_pdf.pdf
- Australian Green Infrastructure Council Guideline for Climate Change Adaptation <https://isca.org.au/downloads/20-climate-change-adaptation-guideline/file>

Water infrastructure management

Building resilience into water resource management infrastructure requires more specialist understanding than for general infrastructure and can be aided by guidelines that relate to the infrastructure itself or understanding changing rainfall projections:

- Water Services Association of Australia Climate Change Adaptation Guidelines https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdgx/~e disp/dd_081098.pdf
- Interim Guideline on Climate Change for Australian Rainfall and Runoff http://arr.ga.gov.au/_data/assets/pdf_file/0011/40412/Draft_ARR_interim_guidance_Format.pdf

3.2 Plan

At the *Plan* level, a more detailed risk and vulnerability assessment will be undertaken than at the *Scan* level. Examples of this level of vulnerability assessment are contained in each of the regional adaptation plans developed for South Australia under the State's Adaptation Framework.

This type of risk or vulnerability assessment will generally require:

- Identification of assets, services and features of interest to your organisation, which can be informed by values mapping in the scoping stage;
- Identification of relevant climate variables, including a specific projection combining a choice of emissions scenario, global *climate model* and year (e.g. your vulnerability assessment could use climate variable information based on an intermediate emission scenario, using the median model output to 2070); and
- Delivery of an assessment process, using either a risk or vulnerability assessment framework, that draws on information from relevant literature, experts or local knowledge about past exposure and sensitivity to climate-related hazards.

The output of such an assessment will most likely be semi-quantitative scores that are useful for determining relative priorities of risk or vulnerability.

The extent of investment to obtain additional information to undertake a risk or vulnerability assessment is worthy of consideration. Experience in South Australia during the development of regional adaptation plans suggests that there is often little published information about the potential impacts of climate change on assets, services and features of interest. Undertaking research to develop this knowledge base is likely to take time and may not greatly improve on the relative rankings that can be obtained from use of expert and local knowledge.

While both risk and vulnerability assessments can be used to inform priorities for adaptation action, vulnerability assessments have the advantage of considering adaptive capacity, which provides an indication of the preparedness of an organisation, system or service to respond to potential climate impacts.

Further information on how to conduct an integrated vulnerability assessment can be found in the Local Government Association of South Australia's Climate Adaptation Planning Guidelines.

3.3 Delve Deeper

By the time your organisation is at the *Delve Deeper* level it is possible that sufficient risk and vulnerability assessment has already been undertaken and that the emphasis is more so on options appraisal.

If it is decided that further risk and vulnerability assessment is required to support decision making, the emphasis may shift toward more quantitative analysis backed by information contained in the research literature. Where this is not present, your organisation may need to fund further research to obtain the information required to complete a quantitative assessment.

If your organisation has moved straight to this step in the *Delve Deeper* level of adaptation assessment, you may wish to understand whether the project you are working on has a low, moderate or high level of climate risk or vulnerability associated with it. This can be assessed by undertaking an initial risk screening at the project concept phase. Using a checklist based approach, you can identify projects with low or no climate risk compared with those that have a medium or high potential risk. For those projects with a medium or high potential risk, an evaluation and selection of climate resilience measures can be included in project design, taking note of decision lifetimes and the extent of climate change that can be reasonably expected.