

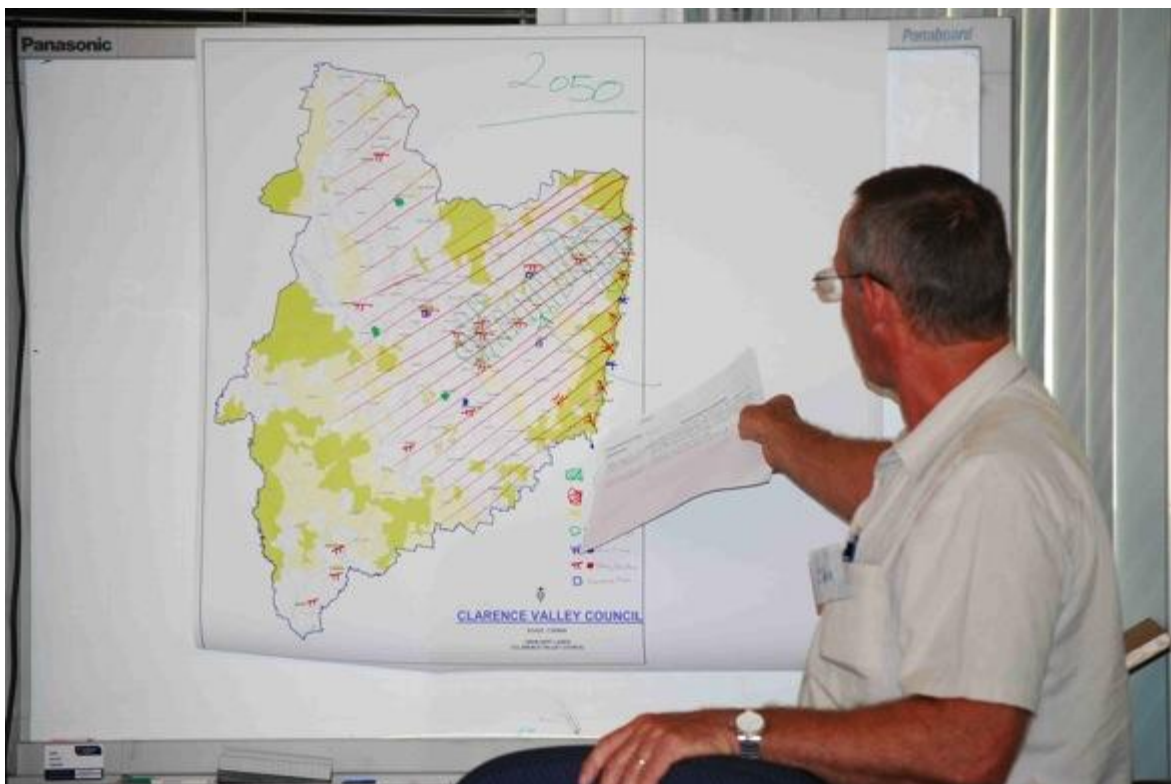
## **Australian Climate Change Adaptation Research Network for Settlements and Infrastructure (ACCARNSI)**

### **FINAL STAGE 1 REPORT**

### **CASE STUDIES OF CLIMATE CHANGE ADAPTATION TOOLS AND APPLICATION PROCESSES USED BY LOCAL GOVERNMENT PRACTITIONERS**

**Research and evaluation conducted in collaboration with the Australian Local Government Association and State and Territory counterparts**

**May 2012 – Philip Booth and Ron Cox**



**Assessing longer-term corporate risks with 2050 timeframe – Clarence Valley Council NSW**

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### Design of the Case Studies Reporting Template

The headings and semi-structured questions in the Case Studies Reporting Template (Appendix A) were devised in close cooperation with Amy Lovesey. A draft Template was 'test piloted' by Anne Weckert with a South Australian council then revised for the full roll out.

### Case studies contributed by councils and regional organisations

We thank all of the councils and regional organisations for responding to the call for case studies. Without these contributions, and the time and effort given to organise responses, this ACCARNSI local government research and evaluation initiative would have been fruitless.

### Images

Amy Lovesey kindly provided images from Clarence Valley and Lake Macquarie Councils. All other images were replicated from the case studies.

### Citing this report

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## EXECUTIVE SUMMARY

The Australian Climate Change Adaptation Research Network for Settlements and Infrastructure (ACCARNSI) is addressing three ‘demand-driven’ climate change adaptation research and evaluation priorities, identified by representatives from each of the State and Territory Local Government Associations at a Local Government Initiative workshop convened by ACCARNSI and the Australian Local Government Association (ALGA) in Adelaide in December 2010. These research priorities are reflected in ACCARNSI’s staged work plans for 2011 and 2012, below:

**1<sup>st</sup> research priority and reporting stage:** design a Reporting Template in collaboration with LGA representatives, to gather case studies and statewide synopses of how local government practitioners in States and Territories have used climate change adaptation tools and their application processes, and share experiences and helpful advice to professional peers on ways and means to select appropriate tools and use them effectively. Review reported purposes, key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps. Show whether and how these tools have enabled councils to mainstream adaptation, build capacities and avoid *maladaptations*. Develop a matrix to categorise adaptation tools and processes used by councils. Generate initial inputs to a Decision Support Guide. Produce a final draft Stage 1 Report and Portfolio of Case Studies and Synopses in March 2012 for public release on-line to inform decision-makers in local governments and other organisations.

**2<sup>nd</sup> research priority and reporting stage:** Utilise *provisional* findings from the Case Studies Report to design a national survey of councils and regional organisations of councils. Devise a series of closed questions that ask survey respondents to profile their organisations, identify the tools and process they have used, and rank their topmost key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps. Include follow-on open questions for local government practitioners to suggest other key drivers, challenges and barriers, critical success factors and so forth, and to gather further feedback on significant experiences using climate change adaptation tools and their application processes. Conduct the survey in August-September 2011. Analyse the survey responses to test (verify or disprove) and improve on the relevance of the provisional findings from Stage 1. Visually present ranked answers to closed questions in graphs and charts. Thematically analyse responses to open questions. Produce a final draft Stage 2 Report on the National Survey for public release on-line in April 2012.

**3<sup>rd</sup> research priority and reporting stage:** synthesise key learnings from the case studies and survey responses. Highlight the most effective climate change adaptation tools, processes and approaches that enable local government to achieve organisational change and, in tandem, achieve effective community and stakeholder engagement and manage their expectations. Produce a final draft Stage 3 Synthesis Report, to include a Decision Support Guide and publicly it release online in April 2012. Gather feedback in national roadshows conducted with Local Government Associations in each capital city during May 2012.

### Case Studies Reporting Template

A Case Studies Reporting Template was designed for councils to focus attention and report on *key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings, next steps*, and to gather feedback on ways to *improve* tools and application processes.

### Thematic analyses of case studies and statewide synopses

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18 case studies were gathered from councils and regional organisations across the States and Territories. In addition, statewide synopses of adaptation tools and processes commonly used in Victoria, Western Australia, South Australia and NSW were provided. This suite of case studies and synopses was thematically analysed to build a nationwide understanding of *corporate, business case, strategic response planning, technical, community and stakeholder*, and *context-specific* issues and concerns.

**Purposes and key drivers:** selection of tools/processes was often driven by the need to address key areas where councils have the most influence – their assets, services and areas of responsibility - and by an impetus to “get their own house in order” before approaching their communities.

**Outcomes and measures of success:**

- **Corporate** - risk assessments and other tools/processes provided decision support for corporate planning and identification of risk management responsibilities, skills acquisition and staff engagement across various business units, and enhanced staff ownership of adaptation processes
- **Response planning** - integrate adaptation strategies and measures into ‘next generation’ business, management and strategic plans
- **Community and stakeholder engagement** - in City of Clarence’s integrated coastal study, local attitudes and preferences were successfully gauged in Social and Economic Risk Assessments, which investigated social, cost-benefit and institutional factors. Other case studies reported on the benefits of tools and processes that: provided baseline data; identified responsibilities for taking action; built community understanding of impacts, risks and adaptation options; and enabled meaningful ongoing engagements with communities and key stakeholders

**Critical success factors:** the ability to update data in *living documents* as new information becomes available emerged as an important critical success factor in the Cairns Sustainability Scorecard project, the South Perth risk assessment and Moreton Bay’s flood mapping. Other reported organisational, response planning and community engagement factors included commitments by leaders to incorporate tool/process outputs in a longer-term Strategic Plan, and good use of scenarios and visual modelling tools at community and stakeholder meetings. Effective reporting on outputs is also essential, through visually engaging communiqués enabling mayors, councillors, community champions and residents to “get their heads around” key issues.

**Challenges and barriers:** two significant challenges to successful climate change adaptation have emerged, with implications for organisational change and good governance: firstly, reported low involvement of planners in cross-council risk assessment workshops; and secondly, failures to incorporate key outputs from those workshops in longer term strategic plans. Hence *maladaptations* may continue in short-term planning regimes. How to resolve internal organisational boundaries between planners and other divisions is a key concern requiring redress at senior decision-making levels. Another governance challenge facing councils involves external boundaries: how to engage communities and key stakeholders with local knowledge inputs to collaborate with experts in council-led hazards and vulnerability studies e.g. inundation mapping and risk assessment workshops? Engagement enables communities to own and support adaptation action plans. Councils will struggle to garner local understanding and support unless policy makers and management can attain community buy-in.

**Adaptive learnings, next steps and future directions:** these are clarified from corporate, external consultancy and community perspectives. In retrospect, the Local Adaptation Pathways Program (LAPP) funded risk assessments tended to be too broad - even larger councils were daunted by perceptions that undertaking comprehensive risk assessments are an “onerous” task. However, a

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positive learning for some communities was trusting that their council can provide high quality hazards maps, reports on local vulnerabilities, and Response Activity Plans. The case studies also provide timely advice to other organisations and practitioners on next steps or future directions that should or need to be taken.

### **Provisional recommendations to improve adaptation tools and processes**

Gaps in the availability of adaptation tools, and applications at local and regional scales are identified from the case studies. These need to be addressed. The recommendations below to improve existing tools and applications processes, and generate additional tools, are *provisional*. They will be reviewed in light of the follow-on national survey then reframed in the Stage 3 Synthesis Report:

- Need finer-scale tools that enable site-specific risk identification and prioritising
- Develop regional scale climate scenarios with 20-year time frames to underpin adaptation action plans, along with regional scale integrated decision tools that are practitioner-friendly and assist in getting key messages to communities
- Incorporate tool and process outputs in ‘next generation’ strategic plans
- Explore the advantages of good web-based adaptation tools from overseas for Australian applications
- Address the paucity of tools for longer-term financial analyses and financial planning that improve on traditional cost-benefit analyses
- Improve the strategic intent and continuity of follow-on funding to enable ‘next step’ adaptation projects e.g. to consolidate local and regional risk assessments and develop local/regional climate action plans. Offer at least part-funding to all complying councils rather than competitive funding to those with the resources or assistance to apply for grants
- Meet requests for tools that support *participatory scenario modelling* by enabling communities and key stakeholders to contribute their local knowledge of extreme weather events and impacts, and cooperate with experts to devise local or regional scenarios

### **Informing the design of the follow-on National Survey**

A national survey will be designed to incorporate and verify provisional shortlists of key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps, distilled from the case studies. In closed questions, respondents will be asked to *prioritise their ‘top three’* issues. Accompanying open questions will provide opportunities to describe **other** topmost issues relevant to their context and outline whether and how their challenges were resolved. Priorities will be tabulated, graphed and interpreted in conjunction with analyses of the qualitative feedback, to inform the Stage 3 Synthesis Report.

### **Towards the design of a Decision Support Guide**

Key outputs of Stage 1 will also inform development of a user-friendly Decision Support Guide to assist local government practitioners make better-informed decisions on which adaptation tools and processes best meet their purposes, assist them to identify strengths to capitalise on, and needs and gaps to address. The Guide will condense frequently reported experiences and practical knowledge and advice gleaned from the case studies, together with the priorities and feedback analysed from the survey into a question and answer format: *What are the Top Ten Enablers and Challenges to overcome that colleagues and I need to know in advance, to use climate change adaptation tools and processes effectively?* The Guide will contribute to developing an informed community of climate change adaptation practitioners.

## **PORTFOLIO OF CASE STUDIES AND STATEWIDE SYNOPSES**

### **New South Wales:**

- 1 - Synopsis of adaptation tools and processes
- 2 - Clarence Valley Council: corporate risk assessment – in-house workshop program facilitated by Echelon
- 3 - Gosford City Council: identifying options and developing a Business Case to manage adaptation
- 4 – Sutherland Shire Council: vulnerability assessment and systems approach to regional climate change adaptation

### **Queensland:**

- 1 - Moreton Bay Regional Council: regional floodplain database - boundary conditions, joint probability and climate change adaptation
- 2 - Cairns Regional Council: incorporating climate change adaptation in the Sustainability Assessment tool and report card
- 3 - Redland City Council: risk assessment and climate change adaptation Action Plan

### **South Australia:**

- 1 – Synopsis of adaptation tools and processes
- 2 - Sector-wide key learnings from facilitated risk assessments - foundations for Climate Adaptation Plans
- 3 – Campbelltown City Council: urban risk management through a Climate Adaptation Plan
- 4 – City of Port Adelaide Enfield: localised metropolitan flood risk assessment - spatial mapping and risk/adaptation costing
- 5 – Eyre Peninsula Natural Resources Management Board: climate change vulnerability assessment - region-wide pilot study
- 6 – Cities of Burnside, Marion and Onkaparinga: ‘first pass’ risk assessments - are risk identification and prioritisation processes the most important outcomes?

### **Tasmania:**

- 1 - Launceston City Council: LAPP funded risk assessment
- 2 – Devonport City Council and Cradle Coast Authority: coastal and regional risk assessments and adaptation action plans
- 3 – City of Clarence: comprehensive coastal vulnerability study of climate change impacts & adaptive responses - integrated spatial mapping, assessments of social & economic impacts, cost-benefit analyses and risk communication strategies

### **Victoria:**

Sector-wide review of LAPP funded risk assessment projects in Victorian councils: learning from applications

### **Western Australia:**

- 1 – Overview of case studies of adaptation tools and processes
- 2 – City of South Perth: ‘first pass’ risk assessment report - facilitated by Echelon with LAPP funding
- 3 – Eastern Metropolitan Regional Council: ‘future proofing’ risk assessment for a Regional Climate Change Adaptation Action Plan
- 4 – Mandurah City Council: coastal risk assessment and adaptation project



## 1. BACKGROUND TO THREE PRIORITY RESEARCH PROJECTS

This report on case studies of climate change adaptation tools and processes used by councils across Australia is the first of three ‘demand-driven’ research and evaluation priorities that the Australian Climate Change Adaptation Research Network for Settlements and Infrastructure (ACCARNSI) has undertaken since 2010. These three priorities were identified by representatives from each of the State and Territory Local Government Associations at a workshop co-convened by ACCARNSI and the Australian Local Government Association (ALGA) in Adelaide in December 2010, then reviewed by ACCARNSI’s Network Advisory Committee.

### 1.1 Intent of ACCARNSI’s local government research initiative

A clear rationale for gaining a better understanding of which adaptation tools, processes and approaches have been shown to assist local government people, their communities and key stakeholders emerged from the Adelaide workshop. The representatives posed this key question for ACCARNSI to research and evaluate: “What are local government practitioners saying about their experiences with climate change adaptation tools and processes? And what helpful advice and assistance can they offer to professional peers to select appropriate tools and use them effectively?” The workshop identified the following key information requirements and capacity building needs, which are reflected in the design of the Case Studies Reporting Template described in section 3.1:

- i. Which climate change adaptation tools and processes have been chosen by local governments and for what purposes? Drill down into why these were chosen?
- ii. Which tools/processes worked well in meeting needs, gaps and aims – or showed flaws?
- iii. Assess whether and how the tools addressed the needs, aims and tasks of decision-makers in councils and regional organisations of councils (ROCs) including CEOs, climate change/sustainability managers, corporate planners, asset managers, strategic planners, emergency services managers, and community development/ engagement managers
- iv. Provide measures of success to evaluate evidence of executive buy-in, utilisation by early birds, and mainstreaming risk management in corporate and strategic plans
- v. Explore gaps in the availability and adaptability of tools to deal with anticipated hazards and vulnerabilities? Which tools require external funding, to be affordable?
- vi. Develop a matrix of tools and adaptation processes used by councils, to add value to the research and evaluation outputs.

### 1.2 Research priorities and staged work plans

Rationales for ACCARNSI’s three prioritised research and evaluation initiatives in the local government space are reflected in the staged work plans for 2011 and 2012, below:

**1<sup>st</sup> research priority and reporting stage:** design a Reporting Template in collaboration with LGA representatives, to gather case studies and statewide synopses of how local government practitioners in States and Territories have used climate change adaptation tools and their application processes, and share experiences and helpful advice to professional peers on ways and means to select appropriate tools and use them effectively. Review reported purposes, key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps. Show whether and how these tools have enabled councils to mainstream adaptation, build capacities and avoid *maladaptations*. Develop a matrix to categorise adaptation tools and processes used by councils. Generate initial inputs to a Decision Support Guide. Produce a final draft Stage 1 Report and Portfolio of Case Studies and Synopses in March 2012 for public release on-line to inform decision-makers in local governments and other organisations.

**2<sup>nd</sup> research priority and reporting stage:** Utilise the *provisional* findings from the Case Studies Report to design a national survey of councils and regional organisations of councils, in collaboration with LGA representatives. Devise a series of closed questions that ask survey respondents to profile their organisations, identify the tools and process they have used, and rank their topmost key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps. Include follow-on open questions for local government practitioners to suggest other key drivers, challenges and barriers, critical success factors and so forth, and to gather further feedback on significant experiences using climate change adaptation tools and their application processes. Conduct the survey in August-September 2011. Analyse the survey responses to test (verify or disprove) and improve on the relevance of the provisional findings from Stage 1. Visually present ranked answers to closed questions in graphs and charts. Thematically analyse responses to open questions. Produce a final draft Stage 2 Report on the National Survey for public release in April 2012.

**3<sup>rd</sup> research priority and reporting stage:** synthesise key learnings from the case studies and survey responses. Highlight the most effective climate change adaptation tools, processes and approaches that enable local government to achieve organisational change and, in tandem, achieve effective community and stakeholder engagement and manage their expectations. Produce a final draft Stage 3 Synthesis Report, to include a Decision Support Guide and publicly it release online in April 2012. Gather feedback in national roadshows conducted with Local Government Associations in each capital city during May 2012.

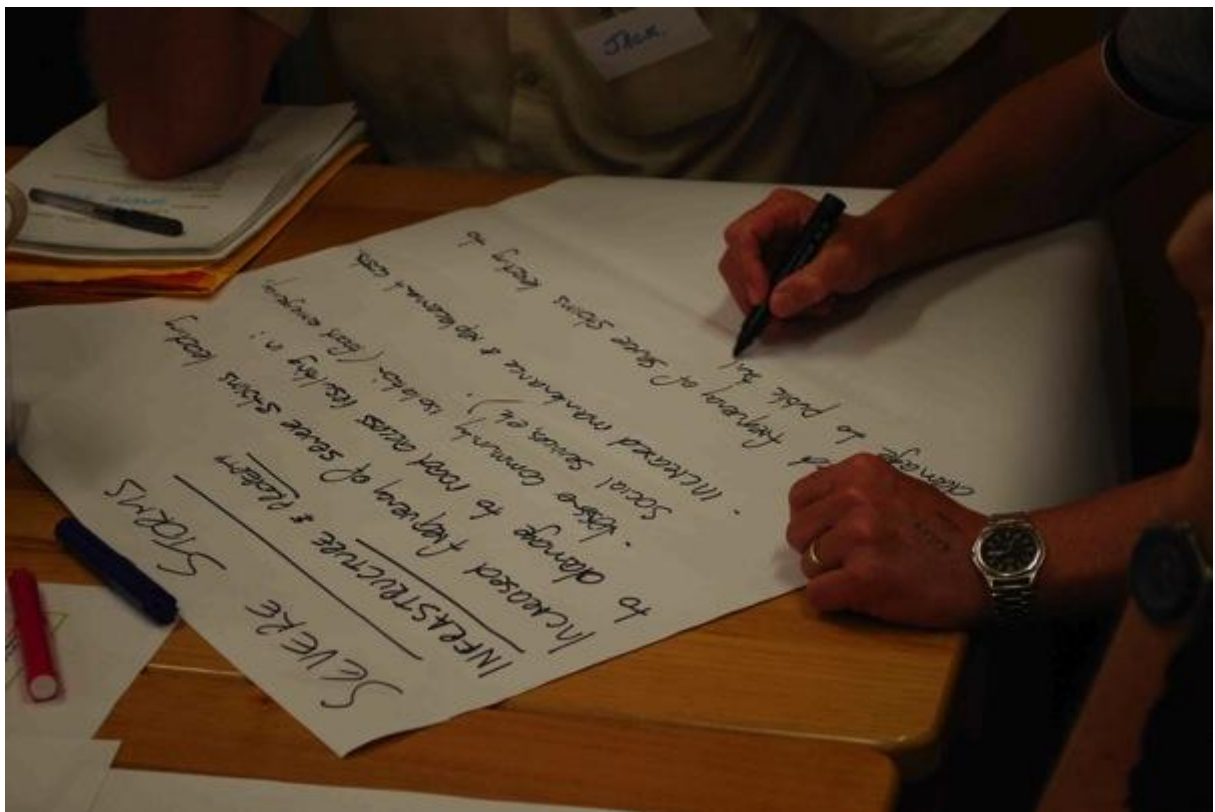
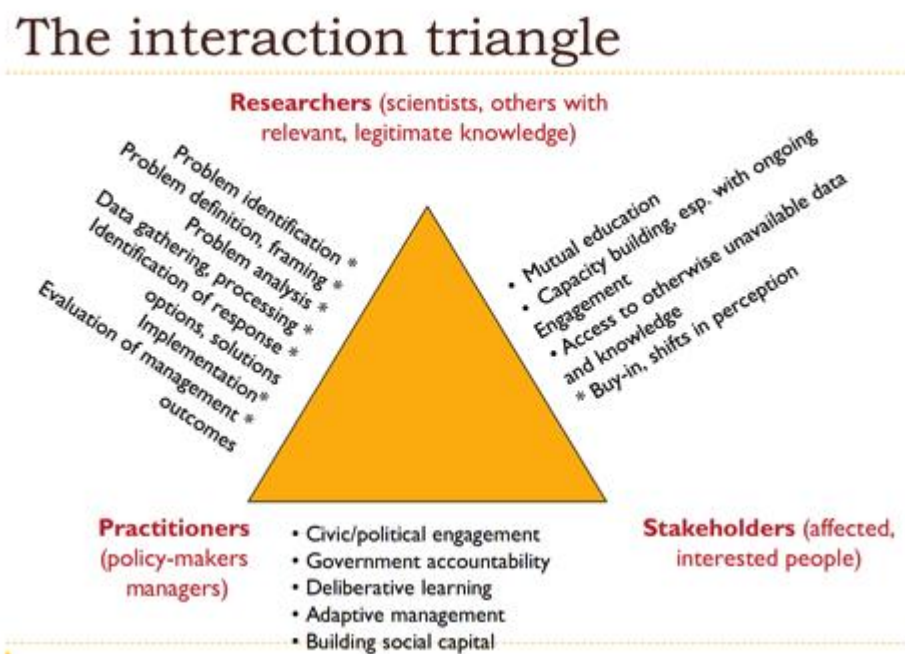


Image 1: assessing severe storm impacts on infrastructure – Clarence Valley Council NSW

### 1.3 ACCARNSI’s demand-driven research approach

ACCARNSI’s research and evaluation approach with the local government sector is “demand-driven’ and prioritises the needs and knowledge gaps of local government people, rather than a ‘supply-driven’ approach that serves academic agendas. The merits of the demand-driven approach in the local government space, which include collaboratively building communities of practice and knowledge, were aired at an Australian Centre of Excellence for Local Government (ACELG) roundtable at the University of Technology, Sydney, on 4 May 2011. This approach enables people who are primarily **researchers** and may also have consultancy experiences to join with local government people who are primarily **practitioners** and who may also have some research experiences such as an Honours or Masters research project.

The *interaction triangle*, below, was presented by Moser (2011) at the NCCARF Adaptation Masterclass to show relationships that can be developed between practitioners, researchers and stakeholders through engagement and effective communication:



### 1.4 Driving adaptation at local and regional scales

Responding to the risks of climate change impacts is a high order goal for the local government sector, which has carriage for much of the ‘on-the-ground’ management and implementation of climate change adaptation. Adaptation involves sustainability concepts and principles including the *precautionary principle* and the *subsidiarity principle* emanating from the Rio Earth Summit and Agenda 21 (McDonald, in Bonyhady et al 2010). The *subsidiarity principle* is a driver for locating power and responsibility for climate change adaptation strategies and actions at the lowest appropriate spatial scales of governance (Steele and Burton, 2010; Smith 2011). It asserts that the closer governance and decision-making are to grass roots community issues and local contexts, the better for relevance and buy-in through community engagement.

The significant roles that local governments and regional organisations play, around the world, in driving climate change adaptation at local and regional scales is acknowledged by organisations and researchers including Van Vuuren et al (Box 1) who contrast the global scale of mitigation:

**Box 1: Local scale costs and benefits of adaptation**

“While **mitigation** action is often taken at the national or local scale, the benefits are shared globally. As a result, a critical factor in the success and costs of climate policy is the degree of international cooperation... For **adaptation**, in contrast, both costs and benefits occur on multiple scales from local to national and even international. An enabling environment at a larger scale can still enhance adaptation at a smaller scale (e.g. local capacity-building in developing countries funded by international financing mechanisms). For these kinds of reasons, assessment of mitigation tends to concentrate on the global level, while by contrast, adaptation research is mostly focusing at the **local scale**.” (van Vuuren et al 2011: 576 – bold added)

Local and regional perspectives do matter and this research/evaluation is attentive to local and regional scales of application of tools and processes across Australia. Instances where suitability to local or regional contexts was reported to be a critical success factor for a tool/process are highlighted. Conversely, instances where the absence of contextualisation reportedly posed a challenge or limitation are also highlighted. In additions, adaptive learnings are noted from local, regional or state/territory perspectives. The task of linking global scale science with local scale knowledge, and the right tools and approaches to achieve these, were underscored by Tom Wilbanks (2011) and others at the NCCARF Adaptation Masterclass:

**Scale matters in:**

- Understanding processes and phenomena
- Considering how relevant knowledge and information are developed, assessed, and accessed
- Determining who matters and for what reasons

**Adaptation choices are almost invariably context-specific:**

- What makes sense here is not necessarily what makes sense there.
- Enormous variety of contexts – by location, threat, vulnerable systems, time frame, scale: global science tends to be large-scale and generic, when decision-making requires sensitivity particularly to the small scale
- Importance of local knowledge to inform possible actions: localities have essential data and knowledge not available to global scientists
- Evidence from sustainability science that innovation and problem-solving benefit profoundly from fusion of general scientific knowledge and local knowledge and perspectives

Wilbanks also highlighted another challenge to effective adaptation: *“The fact is that innovative problem-solving and capacity for adaptation is usually **bottom-up**, while resource availability is **top-down**”*.

**1.5 Challenges to enacting the subsidiarity principle**

Dovers (2005:167) points out that subsidiarity should not be confused with *devolution* of authority to lower levels of government seeking more powers from higher levels; or conversely when responsibility for “irksome” policy issues such as management of coastal erosion zones and funding to meet landowners’ compensation claims are foisted on to local governments. Enacting the subsidiarity principle can also be challenged either by the presence of overly prescriptive national priorities or by ad hoc decisions taken in the absence of coherent, guiding national frameworks. Ideally, national decision frameworks, strategies and incentives that underpin the level and timing of appropriate drivers at the local government level will tread the middle path

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between providing top-down guidance and consistency across local and state governments, and bottom-up approaches that devolve risks and responsibilities to regional and local authorities.

At issue is the appropriate spatial scale of governance for effective adaptation. This issue emerged at an NCCARF workshop on *Learning from Experience: Synthesis and Integrative Research*, held in Sydney on 27 June 2011. It was attended by a cross-section of people from industry, public utilities, all levels of government and research centres, who agreed that comprehensive vulnerability and risk assessments, and strategic adaptation response planning, need to move from local towards regional scales. A climate change manager from a peri-urban coastal council in NSW underscored the difficulties in managing contentious adaptation response planning issues in isolation:

*'The biggest challenge is that our risk assessments on coastal inundation and flooding are not correlated with risk assessments conducted by other organisations and public utilities – the RTA, Telstra, Sydney Water and so forth. So, how do we get beyond jumping in alone at the deep end? And how do we move ahead? For that to happen, we need regional strategic planning approaches, driven by the [NSW Government] Department of Planning.'*

A colleague from a neighbouring coastal council added that strong leadership is required at the state-level to halt maladaptive coastal development:

*'We are under constant pressure to approve development applications in the short-term, that we think are maladaptive in the longer-term. What we really need is leadership at the State level to be able to say to developers: 'No way are you building that kind of thing in this coastal hazard zone!' Constant pressure from developers also has huge implications in terms of shifting towards longer-term cost accounting.'*

## **1.6 Situating the case studies within wider challenges to adaptation**

Experiences with adaptation tools and approaches reported in the case studies are situated within contexts of organisations' and practitioners' key drivers, challenges and barriers encountered. Wider challenges were underscored by Jon Barnett (2010) and other national and international presenters at an NCCARF Adaptation Masterclass, held in Brisbane on 20 May 2011. Barnett raised the following questions, relevant at local and regional levels, and reflected in the demand driven issues clarified with Local Government Associations in section 1.2:

- What are the risks to be avoided?
- Who is at risk?
- Who decides, and on what basis?
- What information is needed?
- Who pays?
- Who implements?
- What policy instruments are to be used?
- Which groups win?
- Which groups lose?
- How much time is there to adapt?

## 2. PURPOSES OF THIS CASE STUDIES REPORT

The initial purpose of this 1<sup>st</sup> Stage of research and evaluation was to design a Reporting Template (see Appendix A) for councils to provide case studies of adaptation tools and processes used, and to share experiences with other practitioners regarding their *key drivers, outcomes and measures of success, critical success factors, challenges and barriers, adaptive learnings, next steps*, and to gather feedback on ways to *improve* tools and application processes.

18 case studies were gathered from councils across states and territories. In addition, synopses of adaptation tools and processes used in Victoria, Western Australia, South Australia and NSW were provided by the research coordinators. This suite of case studies and synopses was thematically analysed to build a nationwide understanding of *corporate, business case, strategic response planning, technical, community and stakeholder*, and *context-specific* issues and concerns. The research and evaluation was informed by other practitioner-led studies of climate change adaptation tools utilised by councils and regional organisations of councils, including a survey by the NSW Local Government and Shires Association (LGSA) and projects undertaken by Sydney Coastal Councils Group in collaboration with CSIRO, the University of the Sunshine Coast and other stakeholders.

### 2.1 Prevalent tools and application processes in the case studies

In the case studies and synopses, the climate change adaptation tools cited most frequently are:

- *Climate Change Impacts and Risk Management: A Guide for Business and Government* (AGO 2006) hereafter referred to as the 'AGO Guide'. It was recommended by the Commonwealth Government as part of applying for Local Adaptation Pathways Program (LAPP) funding
- *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines* (hereafter ISO 31000:2009), which supersedes the *Australian and New Zealand Standard for Risk Management* (AS/NZS 4360:2004)
- *Climate Change Adaptation Actions for Local Government* (Dept of Climate Change 2009)

These tools recommend commencing with a risk assessment process that comprises these steps: an initial risk *identification*; then *analysis* and *evaluation*; and *prioritising* risks that require further assessment (see the Glossary for further explanation). In the case studies these steps are frequently referred to as a 'first pass' or 'wide-scope' risk study. Higher priority risks require effective risk management plans and correlating adaptation action plans. In its Fourth Assessment Report in 2007, the Intergovernmental Panel on Climate Change (Box 2) emphasised that risk management is a key aspect of good governance:

#### **Box 2: Good governance and risk management**

"In many cases, governance is a key to climate change risk management strategies. For example, effective zoning can prevent encroachment of housing on slopes prone to erosion and landslides; and adequate investment in and maintenance of infrastructure will make the settlement less vulnerable to weather extremes." (IPCC 2007: 382)

## 2.2 Is the focus of analysis on tools *per se* or their application processes?

The short answer is on both! Local government practitioners reported that it was impossible to separate adaptation tools *per se* from processes of application and approaches taken - whether it be a corporate and community risk assessment, a detailed study of coastal hazards and vulnerabilities to inform options for adaptation responses, or development of a Regional Adaptation Action Plan. Evidently it is a *fusion*, hereafter often referred to as *tools/approaches* or *tools/processes*.

## 2.3 Difficult to confine case studies to only one tool

In several case studies a suite of tools was used and respondents reported that restricting their descriptions to only a 'primary' adaptation tool and process was like trying to grasp a slippery fish. For example, in Mandurah's coastal risks assessment several "off the shelf" tools/processes were applied. Other case studies refer to an *overall approach* that involved a range of tools and functions. The synopses of LAPP funded risk assessment projects in Victoria and Western Australia concluded that applications of the AGO Guide evolved into a range of targeted approaches based around one or a combination of several tools and methodologies including *Climate Change Adaptation Actions for Local Government* (Department of Climate Change, 2009) and detailed coastal zone hazards and flood studies provided by consultants. Selection and combination of tools and methodologies in Western Australia varied according to the:

- individual project objectives in the brief e.g. whether limited to a 'first pass' risk assessment or extending it to develop the next steps – a risk management plan and an adaptation action plan;
- expertise and methodology brought to the project by external consultants;
- extent of internal and external stakeholder involvement; and
- other context-specific local or regional issues



**Image 2: Wind and wave erosion, soft rock, Rokeby Beach – City of Clarence 2010**



**Image 3: Erosion on the end of a rock wall, Roches Beach - City of Clarence 2010**

## 2.4 Matrix of tools, approaches and case studies - at a glance

Table 1 below provides a matrix of adaptation tools and processes used, case study councils and regional organisations, funding sources, collaborations and facilitation i.e. externally funded by grants and facilitated by consultants, or funded and developed in-house. As discussed above, pigeon-holing some of the case studies to a particular tool and process is somewhat arbitrary e.g. the LAPP funded 'first pass' assessments of coastal hazards and risks undertaken by Devonport was intended as an initial step towards developing a regional risk assessment across the nine member councils in the Cradle Coast Authority.

Adaptation Tools & Processes	Case studies & synopses	Funding sources, collaborations, internal or external facilitation
<b>'First pass' risk assessments:</b> <ul style="list-style-type: none"> <li>○ AGO Guide to Risk Management 2006 (AGO 2006)</li> <li>○ ISO Risk Assessment Frameworks:                             <ul style="list-style-type: none"> <li>- AS/NZS 4360:2004</li> <li>- superseded by AS/NZS ISO 31000:2009</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Synopsis of 30<sup>+</sup> LAPP funded projects in WA councils</li> <li>○ Sector-wide study of LAPP funded projects in 19 Victorian councils</li> <li>○ Cities of Burnside, Marion &amp; Onkaparinga – Adelaide</li> <li>○ City of South Perth</li> <li>○ Redland City Council (Qld)</li> <li>○ Launceston City Council</li> </ul>	National: Local Adaptation Pathways Program (LAPP) - mandated external facilitation by approved consultants including JWT/Echelon Australia P/L & AECOM
<b>Climate Adaptation Plans (CAPs) – based on corporate &amp;/or community risk assessments:</b> <ul style="list-style-type: none"> <li>○ Climate Change Adaptation Actions for Local Government (DCC 2009)</li> <li>○ AS/NZS 4360:2004 &amp; AS/NZS ISO 31000:2009</li> </ul>	<ul style="list-style-type: none"> <li>○ City of Campbelltown Council (South Australia)</li> </ul>	South Australian Local Government Association Mutual Liability Scheme (LGAMLS)  Local Government Insurance Services (LGIS) in Western Australia
<b>Corporate risk assessment &amp; management - operations, services, assets &amp; personnel</b>	Clarence Valley Council (NSW)	NSW Statewide Mutual <i>Climate Change Risk Assessment Workshop Program</i>
<b>Coastal vulnerability &amp; risk assessments → adaptation options &amp; responses:</b> <ul style="list-style-type: none"> <li>○ AGO 2006</li> <li>○ DCC 2009</li> <li>○ additional methodologies provided by consultants</li> </ul>	<ul style="list-style-type: none"> <li>○ Mandurah City Council</li> <li>○ Devonport City Council &amp; Cradle Coast Authority</li> </ul>	Mandurah: LAPP funded consultancy provided by Coastal Zone Management P/L Devonport: LAPP funded consultancy provided by Climate Risk P/L
<b>Regional Adaptation Action Plans:</b> <ul style="list-style-type: none"> <li>○ AGO 2006</li> <li>○ AS/NZS 4360:2004 / AS/NZS ISO 31000:2009</li> </ul>	<ul style="list-style-type: none"> <li>○ Eastern Metropolitan Regional Council (ERMC): <i>Future Proofing Perth's Eastern Region</i></li> </ul>	LAPP funded consultancy provided by Coastal Zone Management P/L & Greensense P/L
<b>Vulnerability assessment – development of spreadsheet tool by external consultant</b>	<ul style="list-style-type: none"> <li>○ Eyre Peninsula Natural Resource Management Board</li> </ul>	Partnership with CSIRO, BoM, SARDI & ABARE
<b>High level vulnerability &amp; risk assessment</b>	<ul style="list-style-type: none"> <li>○ Sutherland Shire Council: Professional integration of spatial mapping &amp; other tools</li> </ul>	Collaborative project with SCCG, CSIRO & University of the Sunshine Coast (USC)
<b>Detailed flood risk &amp; climate adaptation studies → decision support tools:</b>	<ul style="list-style-type: none"> <li>○ Moreton Bay Regional Council</li> <li>○ City of Port Adelaide Enfield Council</li> </ul>	Professional integration of spatial mapping, rapid appraisal tools et cetera by engineering consultancies
<b>Integrated coastal impacts study: hazards &amp; vulnerabilities → Climate Adaptation Options and Responses</b>	<ul style="list-style-type: none"> <li>○ Clarence City Council (south Hobart)</li> </ul>	Professional integration of a range of tools by SGS Economics & Planning, Myriad Research & Water Research Laboratory UNSW
<b>Business Case for Adaptation</b>	<ul style="list-style-type: none"> <li>○ Gosford City Council</li> </ul>	Tool developed in-house
<b>Sustainability Scorecard</b>	<ul style="list-style-type: none"> <li>○ Cairns Regional Council</li> </ul>	Adaption of a sustainability tool initially developed by ARUP

**Table 1: Matrix of adaptation tools and processes used, case study councils, funding sources, collaborations and internal or external facilitation.**



### 3. RESEARCH APPROACH AND EVALUATION METHODOLOGY

The *pragmatic* research approach and evaluation methodology taken for gathering and investigating the Case Studies started out with *usefulness* in mind (Pawson and Tilley 1997; Weiss 2004:15; Patton 2008). The approach and methodology align with key purposes of this Stage 1 Report: generate salient findings and recommendations that are useful to local government decision makers. Build their knowledge, capacities and skills, inform their development of adaptation action plans, and encourage communities of adaptation practice.

#### 3.1 Design of Case Studies Reporting Template

The semi-structured questions in the Case Studies Reporting Template (Appendix A) were devised to focus respondents' attention on these six key areas of investigation:

- i. Clarify the *purposes and contexts* for selecting tools and processes
- ii. Identify key enablers - the *drivers, outcomes and measures of success*, and the *critical success factors* associated with each adaptation tool
- iii. Reveal the *challenges* experienced and perceived *limitations* in the design or application of the tools. Clarify whether councils were able to surmount these, and how
- iv. Draw out *adaptive learning experiences* i.e. going forward, what else is needed by councils to support effective adaptation?
- v. Consider intended *next steps*
- vi. Identify *future improvements* to make tools and application processes more effective

ACCARNSI provided resources to all of the Local Government Associations to engage research coordinators. They approached councils, gathered case studies and provided statewide synopses. Some research coordinators noted that challenges in developing the case studies or synopses included identifying the appropriate council officer(s) to engage and obtaining a sufficient amount of data that was consistent and in the required format. In some cases there were data ownership issues and the research coordinators were responsible for obtaining council approval for use of the information in the case studies and their publication. Research coordinators with experience working with local government were able to utilise their contacts in relevant councils and their knowledge of local government processes to readily overcome these challenges.

#### 3.2 Thematic analyses of salient issues and concerns

Thematic analyses were undertaken to clarify whether each adaptation tool does what it is supposed to, and identify what would improve its design and application. These thematic analyses have gone deeper than straightforward appraisals of the technical features of each tool (i.e. an *instrumentalist* approach). Key experiences of practitioners in applying the tools are qualitatively appraised, to identify their adaptive learnings.

Three *sense-making* qualitative methods - content analysis, word associations and pattern recognition - were used to thematically analyse, evaluate and codify responses to the semi-structured questions in the Case Studies Template, beginning with identifying frequently reported key drivers for selecting a tool/process, then outcomes and measures of success, and so forth. These qualitative methods generated the following research and evaluation outputs:

- *content analysis* to identify salient issues and concerns that local government practitioners around Australia raised about their experiences with adaptation tools and processes;
- *word associations* to classify domains of application i.e. corporate, technical, facilitation, response planning, community/stakeholder, and context-specific; and

- *pattern recognition* to develop shortlists of councils' purposes, key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learning, next steps, and future directions concerning selection of tools and processes

This approach aligned with methods used by other researchers and evaluators who work with spatially and temporally complex situations, evolving contexts and *wicked problems* (Blackmore 2007; Snowden 2002) that characterise the challenges of adapting to climate change faced by local government practitioners and decision makers in other organisations and levels of government (Gunderson and Holling 2002; Hulme and Adger 2007; Harding et al 2009; Preston, Jovicich and Yuen 2010; Patton 2010).

### 3.3 Criteria to enhance adaptation

Research and evaluation of the case studies draws on the following criteria adopted by Moser (2011) and similar criteria used by Ison (2010) and other researchers at the Victorian Centre for Climate Change Adaptation Research (VCCCAR):

#### ***Key attributes of 'useful' information***

##### **Saliency:**

- ✓ Local and regional specificity
- ✓ High resolution
- ✓ Linkages to key issues/concerns
- ✓ Communicated through visually engaging formats

##### **Credibility and Trust:**

- ✓ Expertise is relevant and acknowledged by stakeholders
- ✓ Good interactions among experts and stakeholders
- ✓ Transparency of information – scientific, engineering, social research etc – brought to assessment processes

##### **Legitimacy:**

- ✓ Taking account of local concerns, values, needs, interests
- ✓ Agree rules, procedures and protocols
- ✓ Involvement of practitioners in bringing information to decision support processes

##### **Efficacy:**

- ✓ High quality information makes the right decisions easier to reach.

#### ***Key attributes of good adaptation decisions***

##### **Framing:**

- ✓ is engaging and salient

##### **Problem definition:**

- ✓ facilitates consideration of alternative options
- ✓ delineates clear objectives
- ✓ identifies criteria
- ✓ helps confront trade-offs

##### **Process:**

- ✓ effectively and meaningfully involves key stakeholders

##### **Outcomes:**

- ✓ meet objective(s) - satisfy many/most stakeholders
- ✓ minimize negative side effects
- ✓ compensate for losses

### 3.4 Drawing on Realist and Developmental Evaluation approaches

Thematic analyses and sense-making evaluations of the case studies and statewide synopses also draw on a combination of the *Realist Evaluation* (Pawson and Tilley 1997; Pawson 2002) and *Developmental Evaluation* methodologies and approaches. The Realist Evaluation approach seeks answers to three pragmatic questions:

- i. **What adaptation tools and processes work for whom?**
- ii. **Why?**
- iii. **And under what circumstances or in which contexts?**

The *Developmental Evaluation* approach (Patton 2008, 2010; Rogers & Funnell 2011) is characterised as a collaborative decision-making enterprise designed to support continuous improvement, adaptation and intentional change. It is especially suited for evaluating sustainability and climate change pilot programs. The evaluator plays a key role in facilitating *evaluative thinking* skills that include sense-making and reality-testing, and providing evaluative feedback to decision makers in *real time* (see **Appendix C** for a fuller explanation of Developmental Evaluation and *real time* evaluation techniques).

The Developmental Evaluation methodology also applies complexity concepts that include *resilience thinking* (Gunderson and Holling 2002), *ecological systems dynamics* (Capra 2005), *recursive logic loops* rather than linear logic, and the *precautionary principle* (Harding et al 2009). These complexity concepts and methods also underpin *Social Learning for Sustainability* (Wals et al 2007) and other transdisciplinary approaches to integrated management of natural and social resources (Harding et al 2009).

#### 3.4.1 Encouraging adaptive learning

*Resilience thinking* and *agile problem-solving* are essential ingredients in evaluating complex climate change concepts, issues, tools and processes, where priorities may shift from outcomes-based reporting towards adaptive learning approaches where decisions by local government practitioners are viewed as experiments from which those involved in future projects can learn (Harding et al 2009). Research and evaluation of appropriate adaptation tools and approaches for the local government sector entails wide-ranging assessments of multiple factors including urban planning and environmental law, emergency management, urban and rural landscape management, insurance and financial planning (McDonald, in Bonyhady et al 2010: 2).

## 4. SYNTHESSES OF KEY FINDINGS FROM THE CASE STUDIES

Responses on purposes, key drivers, outcomes and benefits, critical success factors, challenges and limitations, and adaptive learning in relation to the adaptation tools and their application processes are meta-analysed in *corporate*, *strategic*, *community/stakeholder*, and *context-specific* categories. This synthesising process was undertaken to build an initial sector-wide understanding and produce provisional shortlists to incorporate in the design of a follow-on national survey.

### 4.1 Variances in applications and approaches to tools/processes

The case studies reveal notable differences in the scope and focus of approaches to utilising the same tool or a combination of tools, with different levels of complexity and completeness of application, ranging from studies of hazards, vulnerabilities and impacts to development of climate adaptation plans. The majority of councils conducted corporate and/or community risk assessments using the AGO Guide or AS/NZS 4360:2004 / AS/NZS ISO 31000:2009 as their start-up tool and methodology, in accord with stipulated conditions for funding from the national Local Adaptation Pathways Program (LAPP).

Synopses of how the AGO Guide was applied in Victoria, West Australia, South Australia and New South Wales highlight how some councils assessed the full range of impacts while others assessed a smaller range that council staff, workshops or consultants had considered particularly relevant to contexts. Applications also varied significantly depending on:

- available funding;
- levels of internal and external engagement;
- decisions made by consultant(s), who tailored the approach to suit their own methodology and/or the objectives of particular clients; and
- whether the stated purpose of the project was a “first pass” risk assessment or much broader or more strategic adaptive management processes undertaken by experienced consultants e.g. in coastal zone management for Mandurah and Eastern Metropolitan Regional Council (WA)

#### 4.1.1 Searches for suitable adaptation scenarios

The Victorian overview of LAPP funded risk assessment projects noted that most councils used the *Climate Change in Australia* data generated by CSIRO and the Bureau of Meteorology and DSE’s regional climate change information for their initial risk assessments, while one regional group used CSIRO’s *Sustainable Yields* project scenarios as these were deemed most relevant given the exposure of that region’s community and economy to reduced water for irrigation.

Clarence Valley Council in northern NSW, and councils in other states, faced the challenge of finding scenarios of predicted temperature and rainfall changes relevant to their local/regional climate, to provide a meaningful basis for their risk assessments. This challenge is elaborated in 4.5.2.

### 4.2 Purposes and key drivers for using the tools

The synopses from four States show a fairly consistent pattern of key drivers for selecting tools/processes such as in Victoria where the majority of risk assessments focused on council assets, services and areas of responsibility. However, the broader scope regional assessment conducted by City of Clarence (southern Hobart) included economic and social impacts on the community.

#### 4.2.1 Corporate drivers

Selection of tools/processes was driven by the need to address key areas where councils have the most influence and an impetus to “get their own house in order” (Victorian overview) before approaching their communities. Other corporate purposes and drivers include:

- i. Provide leadership at local and/or regional levels
- ii. Support development of relevant policies
- iii. Build internal organisational capacities
- iv. Initiate action plans (and overcome previous inaction)
- v. Identify future research needs and directions



**Image 4: Corporate risk assessment workshop – Clarence Valley Council NSW**

#### 4.2.2 Business case drivers

Gosford City Council’s Business Case for Managing Climate Change Adaptation was undertaken to provide a framework for policy development, concurrent risk assessments with different scopes and different partners (ICLEI - Local Governments for Sustainability, Statewide Mutual and Echelon, and Hunter Councils), and to provide a logic for investment in both adaptation and mitigation actions. The Business Case was designed for the Senior Managers Group and other staff across council responsible for landuse planning, floodplain management, social planning and corporate planning. It is a *living document* to which new information and research can be added.

Other councils highlighted these business case drivers:

- i. Save money in the future
- ii. Reduce risks to avoid litigation and liability issues

#### 4.2.3 Response planning drivers

- i. Identify and prioritise hazards, vulnerabilities and risks arising from climate change impacts
- ii. Collate baseline information to inform response planning strategies
- iii. Enhance resilience through the development and integration of adaptation strategies at a range of temporal and spatial scales, from local to regional

#### 4.2.4 Community/stakeholder engagement drivers:

- i. Identify and respond to community or stakeholder issues/concerns about impacts especially in vulnerable areas
- ii. Meet the expectations of community members who would like their council to prepare for climate change impacts
- iii. Provide a structured platform for ongoing engagement with stakeholders to enable further inputs on key climate change issues including local knowledge and histories of hazards caused by extreme cyclic weather events e.g. long droughts, big floods, cyclones, major bushfires

#### 4.2.5 Context-specific drivers and tools



**Image 5: mapping output from Moreton Bay Regional Council's Regional Floodplain Database**

Moreton Bay Regional Council's flood risk study was designed to produce a standardised approach to hydrological and hydraulic modeling of flood behaviour across the region and, in addition:

- i. facilitate targeted data capture and gain regional data consistency;
- ii. enhance understanding of changes in model behaviour due to changes in underlying parameters, allowing Council to develop a more robust and accurate set of parameters over time;

- iii. develop a stronger understanding of the modelling tools used by the consultants - difficult when a large number of different modelling packages are being used. This will enable a more thorough and critical in-house assessment of the methodologies being employed; and
- iv. achieve economies of scale

### 4.3 Outcomes achieved and beneficial results

Councils were asked to report on outcomes and benefits by referring to a list of key performance indicators to measure success in the Reporting Template. South Perth, Eastern Metropolitan Regional Council (EMRC), Mandurah, Campbelltown (SA) and Eyre Peninsula NRM Board responded directly to the *key measures of success* and their responses are aggregated in **Appendix B**. However, other case studies either reported outcomes generally or specified a main benefit or key outcome of whichever tools/processes they used. This presented some difficulties in teasing out and categorising responses. Nevertheless, the following beneficial outcomes and key *enablers* were synthesised.

#### 4.3.1 Corporate outcomes and benefits

The risk assessments and other tools/processes provided decision support, assisted with corporate planning of risk management responsibilities, facilitated skills acquisition and staff engagement across various business units, and enhanced staff ownership of the adaptation process. Adaptation plans were incorporated into some council's structural risk registers, and adaptation strategies and measures were integrated into some annual Corporate Plans.

Sutherland's vulnerability assessment proved to be a suitable initial tool for achieving goals of the project team: exploring context-specific climate change impacts; and responding to future risks in different ways depending on geographic location, demographics, and capacities. City of Port Adelaide Enfield's metro flood risk assessment moved people away from 'silo thinking' and promoted innovative problem-solving. The LAPP funded risk assessment at City of Marion fostered enhanced risk-based thinking and management across the organisation.

#### 4.3.1 Response planning outcomes and benefits

Integration of adaptation strategies and measures into 'next generation' management plans is a significant beneficial outcome. Steps taken towards longer term response planning include initiating formal monitoring and reviews of adaptation action plans every two to three years, and incorporating climate change adaptation in Water Management Plans, Wetland Management Plans, Building and Engineering Codes, and Emergency Management Plans.

#### 4.3.2 Community/stakeholder engagement outcomes and benefits

In City of Clarence's integrated coastal study, local attitudes and preferences were successfully gauged in Stage 1: the Social and Economic Risk Assessment, which investigated social, cost-benefit and institutional factors. It included an extensive literature review, stakeholder analysis and community consultation via focus groups and interviews, which then informed questions for a phone survey. Stakeholders included representatives from the real estate, urban planning, legal and insurance sectors. The Social and Economic Risk Assessment was used to design the Communications Strategy. Another key output was a table of preferred policy options for engaging communities (refer to Table 1 in the case study).

For City of Burnside the most important feature of its LAPP funded risk assessment process was the five community focus groups, which met the need/demand for key information to be readily

ACCARNSI – Final Stage 1 Report: Case Studies of Adaptation Tools & Processes used by Local Governments – May 2012 communicated. Redland’s community consultation process generated awareness raising, support and preparation for expected impacts on climate change in the Redland 2030 Community Plan, under *Green Living, Goal 3 – a community prepared for climate change*.

Other case studies reported on the benefits of tools and processes that provided baseline data, a clear structure for identifying responsibilities for action, a method to build community understanding of impacts, risks and adaptation options, and enabled meaningful ongoing engagements with communities and key stakeholders.

### 4.3.3 Context-specific outcomes and benefits

There were four good outcomes from the corporate risk assessment at Clarence Valley Council (NSW North Coast):

- ✓ risk assessment workshops prompted collective thinking and action;
- ✓ contributed to building knowledge of climate change risks among staff;
- ✓ resolved a need to strategically adapt to climate change; and
- ✓ encouraged collaboration across council

## 4.4 Critical Success Factors

The ability to update data in *living documents* emerged as an important critical success factor in Cairns’ Sustainability Scorecard project, South Perth’s risk assessment and Moreton Bay’s flood mapping.

### 4.4.1 Organisational success factors

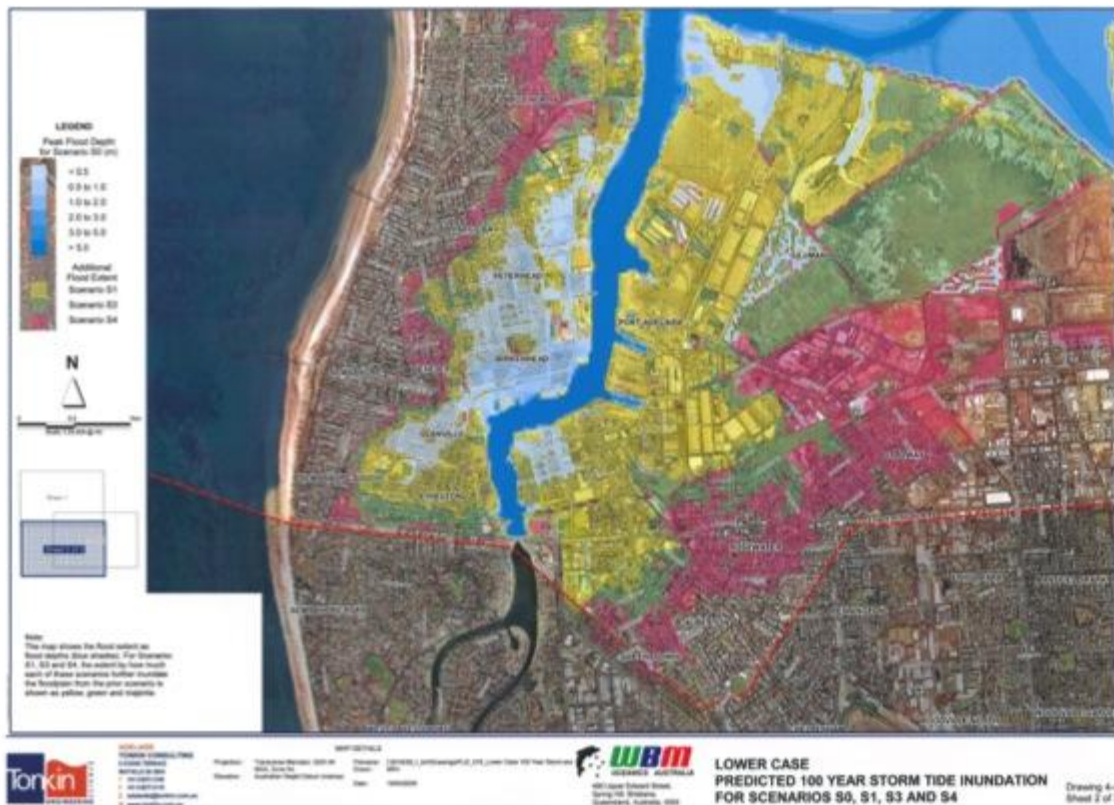
These actions and ownership across Victorian councils were critical to the success of the risk assessment process and integration of risks in management plans:

- ✓ *Executive support* - influenced the attendance of officers at workshops and the responsibility officers took on.
- ✓ *Understanding of relevance for non-environment officers* – if council staff understood key issues and relevance for their work area, then they were more likely to engage in the process and more likely to take on responsibility for incorporating adaptation actions into their business plans.
- ✓ *The presentation of climate change information* – local impact information helped staff ‘internalise’ the issues and make climate change ‘real for people’.
- ✓ *Strong evidence base for and well-known source of the impacts assessment* – gave the data greater gravitas in some projects and was useful in focusing people’s attention on issues and compelling action.

Other reported organisational, response planning and community engagement factors included:

- i. Reputable external consultants and facilitators brought expertise and rigour, and demonstrated skills in integrating multiple assessment factors (South Perth’s flood study)
- ii. One or more internal champions took responsibility to drive the process (Port Adelaide Enfield metro flood study, South Australian sector-wide review)
- iii. Sufficient resources were allocated to enable most departments to participate in tool/process workshops and follow through on actions (City of Campbelltown’s Community Adaptation Plan)
- iv. Outputs are valued e.g. spatial mapping outputs of the metro flood study have enabled City of Port Adelaide to identify specific areas of vulnerability and resulted in internal policy changes to incorporate impacts into the response planning process.





**Image 6: spatial mapping output of Port Adelaide metro flood study indicates flood extent in the event of a 100-year storm tide based on lower case scenario, where no-tidal wetland and ponding basins were empty**

#### 4.4.2 Response planning success factors

To develop its Climate Change Adaptation Action Plan, Redland City Council developed a range of criteria to assess existing controls and revise or develop new adaptation measures, including:

- effectiveness in treating the risk or groups of risks;
- adequacy of resourcing;
- clarity of roles and responsibilities;
- flexibility;
- cost to Council; and
- barriers to implementation

Other reported response planning success factors included commitments by leaders to incorporate tool/process outputs in a longer-term Strategic Plan; and the ability to add to and update baseline data, quantifiable outputs and initially incomplete evidence of risks generated by ‘first pass’ risk assessments.

#### 4.4.3 Community and stakeholder engagement success factors

Good use of scenarios and visual modelling tools at community and stakeholder meetings is essential. Effective reporting on outputs is also essential, through visually engaging communiqués so that councillors, community champions and residents can “get their heads around” key issues. City of Port Adelaide released its flood study maps to the community and the media as a Phase 1 project output and flagged that it would further investigate adaptation strategies in Phases 2 and

3. Spatial maps enabled Council and the community to visualise potential impacts on their local area. The community responded positively and no adverse effects on property values were reported.



Images 7 and 8: King tide flood events at Harbourside Quay (left) and Fletcher Road, Birkenhead (right), City of Port Adelaide, 25 May 2009

#### 4.5 Challenges, barriers and limitations encountered

Some councils highlighted how, firstly, they had to recover from lost momentum when preceding state/nationally funded adaptation programs were terminated, notably the ICLEI Cities for Climate Protection Program and the Green Loans Program. Another common challenge is a high rate of staff turnover and the consequent loss of corporate memory and acquired skills that this ‘churn’ entails.

“Franchise model” tools may not apply easily to differing contexts, without some “shoe horning” (WA overview of LAPP projects). Other salient challenges, barriers and limitations to the tools and processes listed in Table 1 are summarised below.

##### 4.5.1 Difficulties encountered in risk assessment workshops

- i. **Planners were missing from the workshops:** the WA Overview highlighted that Environmental Health officers attended the risk assessment workshops but planners really needed to be there too!
- ii. **Lack of in-house expertise vis-à-vis local knowledge:** Tasmanian and West Australian councils reported that council employees provided vital local context but this element also constitutes a potential weakness: local knowledge may not comprise the necessary expertise required to identify and assess risks. At Devonport and Launceston, the lack of in-house technical knowledge ‘up-front’ made it an onerous task for staff to source expert advice, conduct research, and apply high-level knowledge to the AGO Guide to generate risk ratings.
- iii. **Problems attaining sufficiently finer scale data sets and assessment tools:** Mandurah, Clarence Valley, Eastern Metropolitan Regional Council, Devonport and Launceston reported problems with overly generalised data sets and tools that are useful at identifying broader scale risks but are less successful in identifying localised and site-specific risks.

##### 4.5.2 Limitations to a corporate risk assessment

For Clarence Valley Council, three limitations emerged:

- i. Statewide Mutual’s corporate risks assessment workshops were based on CSIROs’ projected temperature increases for NSW by 2030. This broad scale scenario underestimates the North Coast context, where the number of hot days (>35<sup>0</sup> Celsius) per year already exceeds the NSW-wide projection for 2030. A finer resolution data set is required to enhance reliability.
- ii. Outdoor staff members were not involved in the workshops and so an opportunity to build their capacity was missed. Conversely the opportunity for indoor staff to learn from the practical knowledge and experiences of outdoor staff was missed.
- iii. Echelon provided Council with a list of common risks identified by other councils. This was more time efficient than brainstorming but it stymied lateral and contextual thinking about risks relevant to the Clarence Valley.

#### 4.5.3 Challenges to developing regional coastal adaptation plans

**Councils need to combine accurate, fine resolution data at the local scale with regional approaches to adaptation response planning:** For Mandurah’s coastal risks assessment, the consulting company had to modify its generic approach because Council was seeking a more specific, localised application of tools. The WA Overview concluded that coastal vulnerability assessment approaches facilitated examination at a regional scale but there were no approaches targeted at a local scale sufficient to identify hazards and risks to individual properties. City of Clarence’s integrated assessment of coastal impacts on local beaches and headlands in southern Hobart (refer to Table 2 in the Clarence case study) successfully provides information at a property scale.

“Any approach involving a variety of councils brings its own challenges” (WA Overview). Apart from the logistical difficulties of coordinating 9 member councils, the Cradle Coast Authority’s Adaptation Action Plan ran into resourcing difficulties with cancellation of the Green Loans program, which deprived it of funding for a climate change project officer to drive the member councils’ action plans. Meanwhile, Devonport Council has not implemented its Adaptation Action Plan because the relevant Council officers lacked confidence that the risks and vulnerabilities identified by the workshop participants were sufficiently robust and credible. The AGO Guide was considered a useful tool but the workshop participants lacked the necessary technical expertise to interpret the risk and adaptation data, and felt they were caught in an “information chasm”.

#### 4.5.4 Barriers in vulnerability assessments

Preston *et al* (2010) have observed that vulnerability mapping often generates more questions than answers, particularly as users are challenged to identify key factors that contribute to observed spatial patterns of vulnerability and formulate strategic design and delivery of adaptation responses. Furthermore, vulnerability assessments do not indicate the likely costs and benefits of potential adaptation actions to manage vulnerability. Sutherland Shire Council’s vulnerability assessment experienced similar challenges.

The Eyre Peninsula NRM case study provides a candid account of problems caused by an inadequate time frame for completion, an overly large project scope, and a methodology/approach that did not adequately identify and display the key elements and levels of vulnerabilities nor the adaptation actions to address them. Two further barriers to meeting the EPNRM Board’s expectations emerged: firstly, the EPNRMB was unable to apply the consultant’s vulnerability assessment equation and accompanying integrated systems assessment approach (which assessed vulnerability under five categorisations - Human; Social; Financial; Physical; and Natural) to other areas in the Eyre Peninsula. Additionally, the EPNRMB was not able to update the baseline data as and when new information became available.

## 4.6 Adaptive learnings, next steps and future directions

Did the tools and processes generate shared knowledge and initiate communities of adaptation practice skilled in risk management processes? Key adaptive learnings are summarised from corporate, external consultants' and communities' perspectives. The case studies also provide timely advice to other organisations and practitioners on next steps or future directions that should or need to be taken.

### 4.6.1 Key learnings from corporate perspectives

- i. In retrospect, LAPP funded risk assessment projects provided a good start by raising awareness among councils and opening up discussion but the AGO Guide did not serve as a tool to rigorously assess risks. Nevertheless, for South Perth and other councils, conducting a 'first pass' risk assessment was an important initial step on a learning journey towards developing action plans.
- ii. Although the AGO Guide advised that councils could conduct risk assessments with existing in-house expertise, even larger councils such as Redland were daunted by perceptions that a comprehensive assessment is an "onerous" task. Reputable external consultants and facilitators brought much needed expertise and rigour, which gave staff more confidence in learning how to integrate multiple assessment factors
- iii. Reports on adaptation tools and their initial applications need to include Executive Summaries written for busy leaders, to garner their buy-in and take-up, so that they champion and drive the action planning that follows on from assessment phases
- iv. Councils also need to clarify leadership roles and responsibilities e.g. who will take the lead in developing an action plan, encourage innovative thinking and build staff ownership of the adaptation processes, priorities, strategies and action plans (Campbelltown CAP).

#### ***City of Clarence (Tasmania) integrated coastal impacts study***

A key organisational learning for the City of Clarence is that routine ways of doing things may not be appropriate or effective. Allowing the flexibility to run an iterative learning process became a positive outcome from the project, which has now been mainstreamed throughout the organisation. Younger staff members have flourished in this adaptive organisational environment, whilst some older staff members have been less open to adapting their established processes.

#### ***City of Onkaparinga risk assessment:***

"City of Onkaparinga found both the process and outputs of the LAPP project equally important... [these outputs] engaged staff to think about climate change as a compounding impact on existing issues."

#### ***Eyre Peninsula vulnerability assessment:***

The EPNRMB has learnt from its experiences and has this advice for other organisations considering undertaking a vulnerability assessment:

- 'Know what you want to [make] happen.'
- 'Don't make your project too big'
- 'Make sure the outputs specify practical outcomes that help you to adapt.'
- 'It is easy to get lost in the science language. Ask for reports and community engagement information that is easy to understand.'
- 'Ask for the lifespan of decisions to be incorporated into assessments of vulnerability and adaptation options'.

#### ***Port Adelaide Enfield metropolitan flood risk study:***

Important learning-by-doing considerations for effective reporting include:

- Interim reports should be required at key milestones in the process, to ensure consistency and comprehension

- The reports should clearly document how and why decisions were made i.e. provide **transparent** decision pathways.
- Continuity of key staff resources throughout the project is important.

**Moreton Bay flood study:**

MBRC encourages other Councils undertaking flood risk assessments to ensure that strategic decision-making is targeted to those areas where climate change impacts on the floodplain are likely to be greatest. MBRC's flood modelling decision support tool/process is not web-based but can be shared with other Councils on demand. However, it should only be applied after site-specific consideration by a suitably experienced flood risk assessment specialist.

#### 4.6.2 Key learnings from external consultants' perspectives

Key learnings provided by the lead consultant on South Australian LAPP projects:

- most actions were too high level to be fully understood and costed - and some were *directions* rather than actions;
- councils need a financial decision support tool;
- no clarity on the timing or level of funding available for implementation; and
- scope of the LAPP projects may have been too broad.

#### 4.6.3 Key learnings from community perspectives

City of Clarence staff noted that the level of community confidence and positive public perceptions of Council increased as a result of its integrated coastal assessment project. The community learnt that they could trust Council to provide high quality products including hazards maps, reports on local vulnerabilities, and a Response Activity Plan.

Other case studies reported on the following observations and feedback from communities:

- Crucial to have an experienced, reputable external facilitator who is familiar with both community/stakeholder engagement and local governments
- Good local knowledge of hazards, risks and vulnerabilities including inter-decadal floods and bushfires is a crucial input
- Summarise key information in simplified, non-scientific language to improve communication and general comprehension
- Clarify how community leadership roles and responsibilities can best contribute to assessment processes and implementation plans

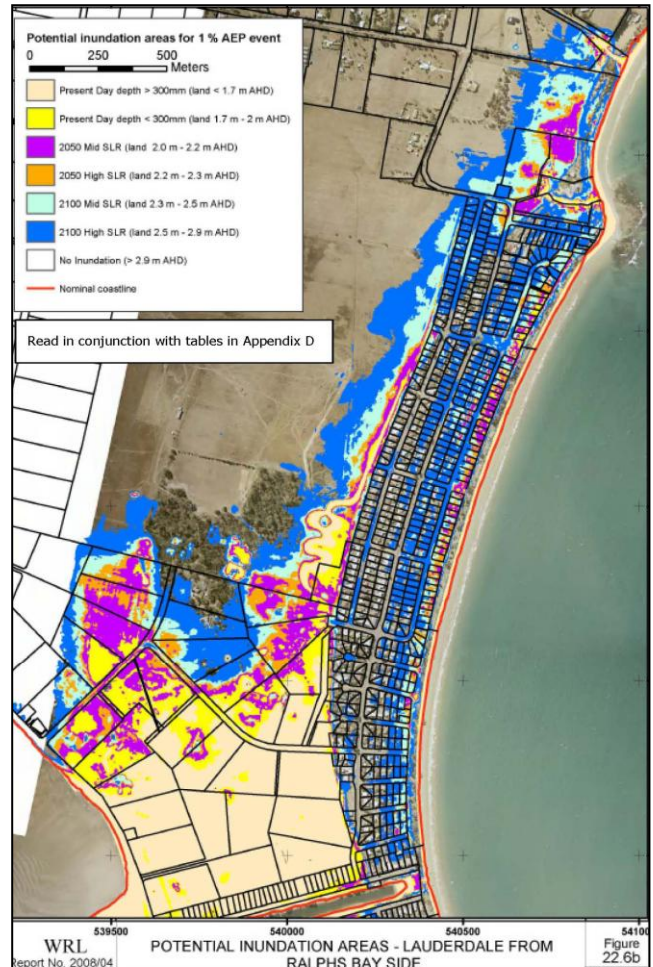


Image 9: Spatial mapping of erosion and recession hazard lines – City of Clarence, Tasmania

Image 10: Spatial mapping of potential inundation areas - City of Clarence, Tasmania



Image 11: Adaptation to increased flood risk – Lake Macquarie City Council, NSW

## 5. PROVISIONAL RECOMMENDATIONS TO IMPROVE TOOLS/PROCESSES

The case studies provided a platform to identify gaps in the availability of adaptation tools that need to be addressed and to improve their applications at local and regional scales.

The recommendations below to improve existing tools and applications processes, and generate additional tools, are *provisional*: they will be reviewed in light of responses to the follow-on national survey, then reframed in the *Stage 3 Synthesis Report on key learnings from the Case Studies and National Survey*.

### 5.1 Advice on improving application processes

Some case studies provided timely advice on how to proceed. Practitioners involved in risk assessments undertaken by the Cities of Burnside, Marion and Onkaparinga offered this concluding advice:

- *“Definitely involve your community as a way of getting an understanding of how they perceive the issue. This will give you information on how you can best communicate back to the various demographics. Demographic segments obtain information differently and you may have to use a variety of communication channels.”*
- *“Allow plenty of time to enable good engagement across the organisation”*
- *“Be clear in your initial brief, be clear in what you expect with regards to the project outputs, and do not accept the lowest common denominator from the consultancy. You will need to work with the consultancy to achieve the desired outputs.”*
- *“Start with some base level climate change and risk management education for all staff who will be involved in the project. This will enhance capacity and give you an understanding of the levels of knowledge and skill.”*
- *“Keep the description of risks simple.”*

### 5.2 Need tools that enable fine scale hazard and risk assessments

Challenges in identifying localised or site-specific risks - reported by Mandurah, Clarence Valley, Eastern Metropolitan Regional Council, Devonport and Launceston - underscore the need for councils to gain access to accurate, fine resolution data and tools including GIS at the local scale, then combine these with regional approaches to adaptation response planning.

The WA Overview poses two problematic issues with the AGO Guide’s risk framework that point towards the need for improvements. Firstly, it yielded results that were similar across councils around Australia. Was this because the risks are the same - or was the tool too broad scale (low resolution) to be useful at local or regional scales? Secondly, it is targeted at local government level operational risks but is actually a framework for strategic assessments and cannot deliver site-specific outputs.

Clearly there is an increasing need for a strategic framework that supports fine scale hazard and risk assessments, down to individual properties, to develop targeted adaptation action plans. An exemplar is the City of Clarence comprehensive coastal vulnerability study of climate change impacts and adaptive responses, which incorporated integrated spatial mapping, assessments of social & economic impacts, cost-benefit analyses and risk communication strategies.

### 5.3 Develop regional climate change scenarios for action plans

Related needs and gaps to address are, firstly, the development of regional scale climate scenarios with 20+ year time frames to underpin site-specific risk identification and prioritising – like the Integrated Assessment of Climate Change Impacts on Urban Settlements (IACCIUS) Project: Report on Local Climate Variability and Change in Bendigo, Canberra & Queanbeyan, Cooma and Darwin (2010) undertaken by the Fenner School at ANU. Secondly, good regional-scale **integrated decision tools** are required - they must be practitioner-friendly and assist in getting key messages to communities. These recommendations corroborate key concerns underscored at the NCCARF workshop on *Learning from Experience* (Sydney 27 June 2011): comprehensive vulnerability assessments and adaptation action plans are most effective at regional scales of application, where ‘major players’ including water utilities and government departments are required to share data and work collaboratively to design and implement strategies.

### 5.4 Incorporate outputs in next generation Strategic Plans

Informing *next generation* Strategic Plans emerges as a key outcome of the tools and processes. Although the response planning outputs of the risk assessment tools/processes may not be immediately striking, their longer-term benefits become more apparent in significant contributions to updating or developing new Strategic Plans. Nevertheless, leadership commitment is required to achieve incorporations of tool/process outputs in longer-term response plans with realistic vision, directions, intended outcomes and a timeframe for achieving objectives – ideally with correlating Financial Plans to ensure delivery.

### 5.5 Explore the advantages of web-based tools

The feasibility of modifying good web-based adaptation tools from overseas for Australian applications, and design of new web-based adaptation tools warrants further investigation. For example, the Cairns Sustainability Scorecard project prompts consideration of developing a correlating web-based version i.e. a *Climate Change Adaptation Scorecard* that sits alongside its Sustainability Scorecard. There are other pointers in the case studies to the value of web-based tools for visualising, communicating and monitoring impacts, and demonstrating adaptation effectiveness to communities and key stakeholders.

### 5.6 Address the gap in financial modelling tools

Another significant gap is the paucity of tools for longer-term financial analyses. In the Port Adelaide Enfield Metropolitan Flood Risk case study, Council felt that there was, and still is, very little available in the way of financial modelling tools for adaptation response planning and investment.

### 5.7 Meet requests to fund consolidation processes

Feedback to WALGA indicates that despite having undertaken LAPP funded risk assessment processes, Western Australian councils generally felt that **prioritising** risks does not necessarily make them strategically or operationally more capable of **dealing** with these. Furthermore, they felt that the process opened them to increased public perceptions of risks but they lack the capacity to deal with the additional burden that these risks may present. A rationale emerges for a follow-on round of funding to consolidate “first pass” risk assessment projects, focused sharply on incorporating outputs in strategic response planning and action plans.

### 5.8 Improve the scope and continuity of funding

Provide follow-on funding to enable ‘next step’ adaptation projects e.g. to develop local/regional climate action plans. Reflections on the West Australian experiences described above prompt calls for a more



strategic approach to funding, which would offer at least ‘part funding’ to all complying councils, rather than competitive funding to those who have the resources or assistance to apply for the grants.

### **5.9 Tools to support participatory scenario modelling processes**

Meet requests for tools that support *participatory scenario modelling*, by enabling communities and key stakeholders to contribute their local knowledge and memories of extreme weather events and impacts, and cooperate with experts to devise local or regional scenarios. However, bear in mind that “local knowledge will not always comprise the necessary expertise required to identify and assess risks” (Launceston City Council).

## 6. TOWARDS A NATIONAL SURVEY AND DECISION SUPPORT GUIDE

This Stage 1 Report and the Portfolio of the Case Studies provide the groundwork for the design of a follow-on national survey and a decision support guide. The Stage 1 Report and the Portfolio will be made available on-line to inform decision-makers in local governments and other organisations. Key findings, conclusions and recommendations will also be presented at conferences and workshops convened in 2012 and beyond, where further feedback will be gathered from participants.

### 6.1 Informing the design of a follow-on national survey

A follow-on national survey will be designed to incorporate and verify provisional shortlists of key drivers, key drivers, outcomes and measures of success, challenges and barriers, critical success factors, adaptive learnings and next steps, distilled from the case studies. In closed questions, respondents will be asked to *prioritise the 'top three'* enablers, challenges and barriers, and other topmost issues relevant to their context. Accompanying open questions will provide opportunities to describe **other** topmost issues and outline whether and how their challenges and barriers were resolved. Priorities will be tabulated, graphed and interpreted in conjunction with analyses of the qualitative feedback, to inform the Stage 3 Synthesis Report.

### 6.2 Commence generating a Decision Support Guide

The case studies and synopses have provided the impetus to commence generating a user-friendly Decision Support Guide to assist local government practitioners make better-informed decisions on which adaptation tools and processes best meet their purposes, assist them to identify strengths to capitalise on, and needs and gaps to address.

The Guide will condense frequently reported experiences and practical knowledge and advice gleaned from the case studies, together with the priorities and feedback analysed from the survey into a question and answer format: ***What are the Top Ten Enablers and Challenges to overcome that colleagues and I need to know in advance, to use climate change adaptation tools and processes effectively?***

These enablers will be communicated in a user-friendly web-based design, hot-linked to checklists of prioritised drivers, intended outcomes, critical success factors, barriers and challenges frequently encountered and possible ways to resolve the challenges, and appropriate next steps to consider. The Decision Guide will assist practitioners to make informed decisions and apply climate change adaptation tools, processes and approaches more effectively to achieve organisational change, and to engage communities and stakeholders and manage their expectations.

## 7. KEY REFERENCES

- Ausgeo news issue 101 March 2011, Geoscience Australia [www.ga.gov.au/ausnews](http://www.ga.gov.au/ausnews)
- ATSE- Australian Academy of Technological Sciences and Engineering, 2010, *Climate Change and the Urban Environment: Managing Our Urban Areas in a Changing Climate* – Workshop Report, Melbourne Business School 8-10 July 2009 [www.atse.org.au](http://www.atse.org.au). Accessed 25 February 2011.
- Australian Academy of Sciences, August 2010, *The Science of Climate Change: Questions and Answers*, Canberra
- Barnett J, 2011 “*Links to Adaptation and Maladaptation*”, presentation at NCCARF Adaptation Masterclass, Brisbane 20 May 2011) <http://www.nccarf.edu.au/masterclass>
- Blackmore C, 2007, “What kinds of knowledge, knowing and learning are required for addressing resource dilemmas? A theoretical overview”, in *Environmental Science and Policy* 10 (2007): 512-525.
- Bonyhady T, Macintosh A & McDonald J, 2010, *Adaptation to Climate Change: Law and Policy*, The Federation Press, Sydney.
- Brennan M & Westcott W, 2011, “Lessons learnt from the former Cities for Climate Change Program and implications for future planning and resourcing: Preliminary Report for Feedback”, ICLEI - Local Governments for Sustainability. Presentation at ACELG Roundtable, 4 May 2011, University of Technology Sydney.
- Capra F, 2003, *The Hidden Connections*, Flamingo, HarperCollins, UK.
- Neilson C, 2010, *Climate Adaptation Tools for Sustainable Settlements (CATTS) Report*, June 2010, Australian Institute of Landscape Architects and International Federation of Landscape Architects. Prepared by Catherine Neilson, AILA.
- Climate Commission *The Critical Decade: Climate science, risks and responses*, published by the Climate Commission Secretariat, Dept of Climate Change and Energy Efficiency, May 2011
- CSIRO & BoM State of the Climate Report 2010 <<http://www.bom.gov.au/climate>>
- Dovers S, 2005, *Environment and Sustainability Policy: Creation, Implementation and Evaluation*. The Federation Press, Sydney.
- Engineers Australia Infrastructure Report Card 2010 [www.engineersaustralia.org.au/irc](http://www.engineersaustralia.org.au/irc)
- Gunderson L & Holling C, (eds), 2002, *Panarchy: Understanding transformations in human and natural systems*, Island Press, Washington D.C.
- Gladwell M, 2000, *The Tipping Point: How Little Things Make a Big Difference*. Abacus, London.
- Harding R, Hendriks C & Faruqi M, 2009, *Environmental Decision Making: Exploring Complexity and Context*. The Federation Press, Sydney.
- Hulme M & Adger N, 2007, *Limits and barriers to adaptation: four propositions*, Tyndall Centre for Climate Change Research, London.
- Intergovernmental Panel on Climate Change (IPCC-4), 2007, *Climate Change 2007 Part 11: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the 4<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, UK.
- Moser S, 2011 “*Art and Science of Linking Science and Practise*”, presentation at NCCARF Adaptation Masterclass, Brisbane 20 May 2011 <http://www.nccarf.edu.au/masterclass>

- Patton M, 2008, *Utilization-Focused Evaluation*, 4th edn, Sage, Thousand Oaks, California.
- Patton M, 2010, *Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use*. Guilford Press, USA.
- Pawson R, 2002, “Nothing as Practical as a Good Theory” in *Evaluation* 9 (4): 471  
<http://evi.sagepub.com/content/9/4/471> Accessed 3 May 2009
- Pawson R & Tilley N, 1997, *Realistic Evaluation*. London: Sage.
- Preston B, 2011, “Through a Lens Darkly: Climate Adaptation in a Complex World”, presentation at Greenhouse 2011, 5 April 2011, Cairns.
- Preston B, Jovicich S & Yuen E, 2010, *Social Learning in Vulnerability Assessments: The role of double loop learning in helping communities adapt to climate change. Paper presented to the 8<sup>th</sup> World Congress of Participatory Action Research and Action Learning, 6<sup>th</sup>-9<sup>th</sup> September 2010, Melbourne.*
- Preston B & Stafford-Smith M, 2009, *Framing vulnerability and adaptive capacity assessment: Discussion paper*. CSIRO Climate Adaptation Flagship Working paper No. 2.  
<http://www.csiro.au/org/ClimateAdaptationFlagship.html>
- Pulwarty R, 2011, “Assessing adaptation practices”, presentation at the NCCARF Climate Adaptation Masterclass *From theory to implementation*, 20 May 2011, Brisbane
- Rogers P & Funnel S, 2011, *Purposeful Program Theory: Effective Use of Theories of Change and Logic Model*, John Wiley/Jossey-Bass
- Smith T, Brooke G, Preston B, Goddard R, Withycombe G, Beveridge B & Morrison C, 2008, *Case Studies of Adaptive Capacity: Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises*, CSIRO & Sydney Coastal Councils Group.
- Snowden D, 2002, “Complex acts of knowing—paradox and descriptive self-awareness”, in *Knowledge Management – special issue*, 6 (2): 100–111.
- Snowden D, 2008, posting on wicked problems <http://www.cognitive-edge.com/articlesbydavesnowden.php>
- Steele W & Burton P, 2010, “Adaptive governance and climate change: the challenge for cities”, presentation to the Climate Change Adaptation and Governance Workshop convened by the NCCARF Adaptation Research Network for Social, Economic and institutional Dimension, UNSW, Sydney, 16-18 November 2010.
- Steffen W, 2009, ‘Climate Change 2009: Faster Change and More Serious Risk’, available at:  
< <http://www.anu.edu.au/climatechange/wp-content/uploads/2009/07/climate-change-faster-change-and-more-serious-risks-final.pdf>> Accessed 24 February 2011.
- Van Vuuren D, Isaac M, Kundzewicz Z, Arnell N, Barker T, Criqui P, Berkhout F, Hilderink H, Hinkel J, Hof A, Alban-Kitous A, Kram T, Mechler M & Scricciu S, 2011, ‘The use of scenarios as the basis for combined assessment of climate change mitigation and adaptation’, *Global Environmental Change*, 21 (2011): 575-591 Accessed 13 May 2011
- Victorian Centre for Climate Change Adaptation Research, Critical Perspectives Working Papers:  
[Rickards, L. \(2010\) Governing the future under climate change: contested visions of climate change adaptation](#)  
[Jones, R. \(2010\) The use of scenarios in adaptation planning: managing risks in simple to complex settings](#)  
[Ison, R., Grant, A. and Bawden, R. \(2010\) Scenario praxis for systemic and adaptive governance: a critical review](#)
- Walker I, Leviston Z & Price, J, 2011, “Emotional responses to climate change: a missing link to behaviour?” CSIRO Climate Flagship presentation at Greenhouse 2011, 14 April 2011, Cairns
- Willbanks T, 2011, “Linking Global Science and Local Knowledge”, presentation at the NCCARF Adaptation Masterclass <http://www.nccarf.edu.au/masterclass>

## 8. GLOSSARY: RISK MANAGEMENT IN CLIMATE CHANGE ADAPTATION

ISO 31000: 2009 (p.1-2) defines *risk* as a positive or negative effect of *uncertainty* on objectives and “is often characterised by reference to potential **events** and **consequences**, or a combination of these... expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated **likelihood** of occurrence.” ISO 31000: 2009 (p.4) adds these notes on events:

1. An event can be one or more occurrences, and can have several causes [think of a cyclone and simultaneous flooding event as in Queensland in early 2011]
2. An event can consist of something not happening [e.g. failure to report a pollution spill, or failure to factor in the likelihood of a tsunami]
3. An event can sometimes be referred to as an “incident’ or “accident”.
4. An event without consequences can also be referred to as a “near miss”, “near hit” or “close call”.

In the context of Climate Change Adaptation, risk combines the **magnitude or consequence** of a potential event’ impact (usually adverse) with the **likelihood** or chance of its occurrence – and the combination of magnitude and likelihood is referred to as the **level of risk**. In IPCC, CSIRO and BoM parlances, “likely” equates with 2 chances in 3 (66%) of an event or factor occurring, while “very likely” equates to 4 chances in 5 (80%) of occurring. A key challenge for risk assessment and management is to capture the degree of **uncertainty** in anticipating and assessing the level of exposure to climate change events and their impacts, in order to calculate appropriate adaptation responses.

**Uncertainty** is defined as “the state, even partial, of deficiency of information related to understanding or knowledge of an event, its consequences or likelihood.” (ISO 31000: 2009 (p.2). An expanded definition of *likelihood* in risk management terminology is also provided: “...the chance of something happening, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically - such as probability or a frequency over a given time period.” (ISO 31000:2009 p.5)

Likelihood Categories and Risk Matrices are qualitative methods to determine and express the chances and the severity of a risk occurring:

**RISK MATRIX**

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	medium	high	high	extreme	extreme
Likely	medium	medium	high	high	extreme
Possible	low	medium	high	high	high
Unlikely	low	low	medium	medium	high
Rare	low	low	medium	medium	high

Swan River Trust. Climate Change Risk Assessment Project.. 2010

**Risk assessment** is a 3-step process of risk identification, risk analysis and risk evaluation. The next steps move into **risk management**, which involves coordinated activities to direct and control an organisation’s approach and responses to risk. Decisions on whether qualitative, semi-qualitative or quantitative methods are appropriate for each step can be guided by referencing the following key terms defined in ISO 31000: 2009 (p.2):

- Risk attitude:** an organisation’s approach to assess and eventually pursue, retain, take or turn away from risk
- Risk owner:** a person or entity with the accountability and authority to manage a risk
- Risk source:** an element which, alone or in combination, has the intrinsic potential to give rise to a risk e.g. an earthquake or global warming
- Risk criteria:** terms of reference against which the significance of a risk is evaluated
- Risk identification:** process of finding, recognising and describing risk sources and events, their causes and potential consequences by accessing historical data, theoretical analysis, informed and expert opinions, and stakeholders’ needs [i.e. the ‘What?’ stage in evaluations]
- Risk analysis:** process to comprehend the nature of risk and to determine the level of risk (*risk estimation*) to provide the basis for risk evaluation [i.e. the ‘So What?’ stage in evaluations]
- Risk evaluation:** process of comparing the **results** of risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable i.e. [the ‘Now What? stage in evaluations]

**Risk treatment:** process to modify risk by avoidance of activities that give rise to risks; removing the risk source; changing the likelihood; changing the consequences (e.g. cyclone-proof or earthquake-proof building codes); sharing the risk with other parties (e.g. cost responsibilities for sea level rise damage to coastal properties); or retaining the risk by informed decision (e.g. sea level rise is a national concern and will therefore be met at the national level)

**Hazard** refers to a source of potential harm (SA/SNZ 2004: 3) e.g. bushfire, flood, dam collapse, earthquake, tsunami, pollution spill or toxic discharge, or an epidemic - that could occur during the lifetime of a product, system or plant that has the potential for human injury, damage to property, damage to the environment or economic loss. (Paraphrased from Harding et al 2009: 231)

Jones (2010) makes these distinctions between **tame** and **complex** risks:

- *Tame* risks have agreed framings, bounded values, agreed processes for calculating risks, and processes to reconcile perceived and calculated risks. They can be 'fixed' or treated by timely actions;
- *Complex* risks have multiple frames, unbounded values, 'deep' uncertainties, and risks attached to both acting and not acting. They do not lend themselves to neat resolution through risk treatments.

### Managing positive and negative risks

In the Risk Management literature, there is still some debate over whether risk intrinsically refers to minimizing, eliminating, preventing or reducing the chances of **negative** internal and external events/impacts/cultural factors - or whether it also encompasses optimizing the chances of **positive** internal and external events and factors by taking an increased risk to pursue opportunities. ISO 31000: 2009 presents a rationale that is aimed at increasing the likelihood of achieving intended organizational objectives and outcomes, through proactive approaches and *risk attitudes*<sup>1</sup> that result in lessening the chance or likelihood of severe consequences and, at the same time, attend to key drivers that contribute to enhancing the likelihood of beneficial consequences of risk management including:

- ✓ improved strategic identification of opportunities - as well as threats;
- ✓ improved governance arrangements;
- ✓ improved stakeholder engagement, manifesting in confidence and trust;
- ✓ improved bases for reliability in decision-making processes;
- ✓ due compliance with legal obligations and regulatory requirements;
- ✓ improved financial planning and reporting;
- ✓ better OH&S compliance;
- ✓ enhanced organizational learning; and
- ✓ improved resilience to perturbations.

A risk-based approach that ignores the underpinning causes of *vulnerability* or that cannot be implemented because of limited capacity is bound to fail. Adaptation policies, strategies and action plans will need to demonstrate an understanding of major risks, and introduce some risk-specific measures to assess and manage them.

### Risk Management Principles



- a) Creates value for organisations
- b) Integral to organisational processes
- c) Part of decision making
- d) Systematic, structured & timely
- e) Based on best available information
- f) Tailored to context
- g) Takes human & cultural factors into account
- h) Transparent and inclusive
- i) Dynamic, iterative and responsive to change
- j) Facilitates continual improvement and enhancement of the organization (ISO 31000: 2009 p.vi)

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<sup>1</sup> "*Risk attitude*: an organisation's approach to assess and eventually pursue, retain, take or turn away from risk[s]" (ISO 31000:2009, p2)

## APPENDIX A: CASE STUDIES REPORTING TEMPLATE

### EXAMPLE

<b>Council:</b>	City of Port Adelaide Enfield	 
<b>Web Address:</b>	<a href="http://www.portenf.sa.gov.au">http://www.portenf.sa.gov.au</a>	
<b>Size:</b>	97 km <sup>2</sup>	
<b>Population:</b>	101,000	
<b>Classification:</b>	Coastal/Metro	
<b>Program:</b>	Port Adelaide Seawater Stormwater Flooding Study: Phase 1	
<b>Tools:</b>	Rapid Appraisal Method [RAM] for Floodplain Management (Victorian Department of Natural Resources and Environment 2000) ANUFLOOD (Australian National University Centre for Natural Hazards) TUFLOW (WBM Oceanics Australia and University of Queensland) 30m grid size model ILSAX (O'Loughlin, 1993) 2D/1D 30m grid size hydrological model	
<b>Function:</b>	Flooding Risk Assessment	
<b>Consultants:</b>	Tonkin Consulting, WBM Oceanics Australia & sub-consultants	
<b>Contact:</b>	Verity Sanders <a href="mailto:verity.sanders@portenf.sa.gov.au">verity.sanders@portenf.sa.gov.au</a> 08 8405 6765	

### 1. OVERVIEW OF PURPOSE

Summarise why the climate change adaptation tool was chosen, by whom, and for which operational task(s). Please limit to 125-150 words

### 2. ASSESSING THE TOOL

Please address the guiding questions and bullet points below.  
 Minimum 1000 words/2 pages - maximum 2000 words/4 pages

### 3. DRIVERS FOR USING THE TOOL

- 3.1 Background/context: drivers for council taking action; project aims and scope, time frame for applying the tool, etc.
- 3.2 Adaptation tool was taken up because?
  - offered free or at reduced cost through a grant
  - result of community demand
  - ROC was coordinating a program
  - Other reason...
- 3.3 Operational level task(s): decision support, corporate planning, strategic planning, compliance and risk, stakeholder engagement, community education, other sectoral responsibilities.
- 3.4 Which priority issues, key needs or gaps did/does the tool address?
- 3.5 User(s) within council (internal) and stakeholders/community (external)
- 3.6 Partners/stakeholders e.g. neighbouring councils, ROC, CSIRO, ICLEI, university, govt agency

- 3.7 Sources of baseline information e.g. CSIRO/BoM State of Climate 2010 projections or snapshots, Geoscience Australia
- 3.8 Additional reasons, specific to your context.

#### 4. IMPLEMENTATION METHODOLOGY

- 4.1 Can be used independently, without hand-holding? Requires expertise of service provider/consultant to obtain optimum effectiveness?
- 4.2 A stand-alone tool - or used in conjunction with other tools?
- 4.3 Staff resources required to successfully operate it – one person, or more? Who needs to be involved? Is training required before or during operation?
- 4.4 Additional software or other material resources required?
- 4.5 Adaptability of the tool to differing local contexts?

#### 5. EVALUATING OUTCOMES

- 5.1 Did the tool lead to intended outcomes and/or achieve beneficial results?

*Key performance criteria* to measure success – these may include:

- ✓ resolves a difficult problem/issue, need or gap;
- ✓ enables informed decision-making;
- ✓ enables improvements to strategic planning practices and/or action plans;
- ✓ promotes systems thinking in climate change adaptation and sustainability;
- ✓ drives innovative approaches to urban and regional planning;
- ✓ encourages collaboration within/across councils, and/or inputs from key stakeholders
- ✓ capacity for flexible applications in other contexts;
- ✓ capacity to be adapted or evolved over time to changing needs e.g. improved standards for risk assessments, improved valuation, improved processes for monitoring, evaluation and reporting on outcomes.

- 5.2 Critical success factors?
  - Which feature of this tool worked?
  - Particular features of the tool that suited the local context?
- 5.3 Challenges/barriers encountered in using the tool? How to overcome or get around these?
- 5.4 Adaptive learnings: what key lessons have been learnt?
  - Learnings across council/ROC?
  - Learnings within the local or regional community?
- 5.5 Can you suggest an improvement to the tool's design or application, to pass on to the designers or other users?

#### 6. FUTURE DIRECTIONS

- 6.1 Recommendations: What would you say about the tool to peers, neighbouring councils, professional associations, workshops and conferences etc?
- 6.2 Next steps?
  - What implementation actions will be initiated?
  - Will the Strategic Plan and/or Annual Plan be revised?
  - Will a regional approach be taken to adapt to major risks?



## APPENDIX B: RESPONSES TO MEASURES OF SUCCESS

### *i. Resolves a difficult problem/issue, need or gap?*

City of South Perth: Yes - risk assessment provided a shared understanding

Eastern Metropolitan Regional Council (EMRC – Perth): Yes

Mandurah City Council: Yes - met the need for a risk assessment for coastal impacts to respond to/mitigate impacts of climate change in the coastal zone

### *ii. Enables informed decision-making?*

South Perth: Yes - “On the road” – is now in annual Corporate Plan with budget allocated for next stage

EMRC: Yes

Mandurah: Yes - project objective to identify and prioritise risks for the Mandurah Coastal Zone has been met. Risk assessment was carried out initially at a strategic level. A number of climate change impacts were identified for consideration in the adaptation phase

### *iii. Enables improvements to strategic planning practices and/or action plans?*

South Perth: Yes

EMRC: Yes

Mandurah: Yes - currently a key risk is uncertainty in long-term land use planning and infrastructure design. The approach has helped to provide a basis for LG planning. Implementation of the Adaptation Plan requires mainstreaming across Council and integration of climate change issues in key documentation that the Council utilises to deliver its services to the community. These documents and processes may include: Council Planning Schemes; Water Management Plans; Wetland Management Plans; Building and Engineering Codes; Emergency Management Plans; and Council Approvals.

### *iv. Promotes systems thinking in climate change adaptation and sustainability?*

EMRC: Yes

Mandurah: Yes - includes functional areas including NRM.

South Perth: Not really - It is a good start in seeing interlinked issues. As the project progresses, systems thinking is essential.

### *v. Drives innovative approaches to urban and regional planning?*

Campbelltown City Council (South Australia): **No** - the scope of the CAP program was limited to risks that would influence the ability of Councils to continue their “*public administration and governance functions*” (LGAMLS & LGA 2010: 4). Thus this program does not **promote innovation**.

South Perth: Yes – but not at that stage yet. It may do in the next stage

EMRC: Yes

Mandurah: Yes - the approach (‘tool’) is one contributor to this.

### *vi. Encourages collaboration within/across councils or inputs from key stakeholders?*

South Perth: Yes - internal communication: it is rare to get everyone from across the organisation together on a task

EMRC: Yes

Mandurah: Yes - part of the City of Mandurah’s approach is to contribute to the Peron-Naturaliste Cooperative Group of nine LGAs from Rockingham to Busselton

*vii. Capacity for flexible applications in other contexts?*

South Perth: Yes - moves people away from silo thinking and builds capacity

EMRC: Yes

Mandurah: Yes – starting with coastal issues has encouraged Council to adapt the approach to examine climate change impacts across all areas

*viii. Capacity to be adapted or evolved over time to changing needs?*

South Perth: Yes - it is an iterative process

EMRC: Yes

Mandurah: Yes – recognise that science and risk assessment approaches will change. The Adaptation Action Plan should be regularly reviewed and updated re the risk assessment component, and to monitor effectiveness of adaptation actions in treating identified risks.

## APPENDIX C: DEVELOPMENTAL EVALUATION AND ADAPTATION

There are five applications of the Developmental Evaluation methodology in framing climate change adaptation policies, piloting innovative programs, and scaling-up for wider implementation or full roll out:

### Five applications of Development Evaluation approaches:

- i. **Ongoing development** to adapt a policy, strategy, program or another kind of innovation to new conditions or contexts in dynamic systems.
- ii. **Adapting effective principles to a local context**, as ideas and innovations are taken from elsewhere and developed into a new setting by a combination of bottom-up and top-down drivers.
- iii. **Pre-formative development of a potentially broad-impact, scalable innovation**, to a point where it is ready for traditional formative and summative evaluation methods.
- iv. **Major systems change and cross-scale developmental evaluation**, providing feedback on where, how and why an innovation needs adjusting to optimize impact.
- v. **Developing a rapid response in the face of major change or a crisis** such as a financial meltdown, epidemic or natural disasters – catastrophic bushfires, prolonged heat waves, earthquakes, tsunamis... (Adapted from Patton 2010: 194-5)

Provisional findings on policy/program implementation strategies are presented to decision-makers in *real-time* i.e. as they emerge and in context rather than waiting for conclusive findings on whether intended outcomes were delivered, from an end-of-program evaluation. Developmental evaluation also contributes to the *formative* stage of evaluating policy/program piloting and scaling up for full delivery. A mandated *summative* evaluation, set within a prescribed timeframe, brings rigour and accountability to the final stage of policy or program review.

### Real Time evaluation

“The purpose of real-time reporting is to position the evaluation to inform ongoing decisions and strategy. True real-time reporting requires more than providing feedback at regular intervals. It means giving feedback quickly after a significant event or action occurs... evaluators very literally expect the unexpected and reserve part of their evaluation design for “rapid response research.” These methodologies are not planned up front but are designed and implemented as needed to address emerging strategy-related questions.” (Heather Wiess, The Harvard Exchange, XIII (1) Spring 2007: pp. 1-3)

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