Local Planning for Climate Adaptation in Coastal Queensland

Heather Zeppel
University of Southern Queensland, PO Box 4196, Springfield, Qld 4300, Australia
Email: heather.zeppel@usq.edu.au

Abstract
This paper reviews adaptation actions in climate change strategies by four urban Queensland coastal councils (e.g. Cairns, Gold Coast, Redland, and Sunshine Coast), and two community-based climate action plans for Bribie Island, and the Noosa Biosphere. The actions in these six plans are analysed for their adaptive response categories: *Emphasising Nature*, *Emphasising Development* and *Managed Nature* (Vasey-Ellis 2009), along with *Council Governance* of climate change, and *Emphasising Community*. Climate change planning and infrastructure responses by Queensland coastal councils mainly focus on protecting coastal development from erosion and other climate hazards, and building community resilience, supplemented by 'soft' environmental actions protecting nature. While some climate change plans for coastal areas included actions for shoreline erosion, coastal inundation, and storm surges, only two addressed sea level rise impacts. This review found an integrated mix of climate adaptation actions for nature, governance and community is required for enhanced adaptive capacity at the local level.

Introduction
Climate change adaptation is a key issue for local governments, especially coastal councils (Gurran *et al.* 2011; LGAQ 2007; Miles *et al.* 2008; NCCARF 2013; Walsh *et al.* 2004). In Queensland, coastal climate change impacts include the effects of tropical cyclones, storm surges, flooding, sea level rise (SLR), tidal inundation, and beach erosion. Key issues for councils include planning controls, building codes, insurance, risk reduction, and the cost of climate adaptation (Trueck *et al.* 2013). A projected SLR of 1.1m by 2100 will affect low-lying infrastructure and buildings in local government areas (LGAs) of coastal Queensland, mainly Brisbane, Gold Coast, Moreton Bay, Fraser Coast, Mackay, and Townsville (DCCEE 2011a). The growing impacts of coastal development, climate change and SLR are key issues in the heavily populated areas of Southeast Queensland (Abel *et al.* 2011; Dedekorkut *et al.* 2010; McDonald 2010; Noosa Biosphere 2010; Wang *et al.* 2010; Waterman, 2009; Waterman *et al.* 2009). Moreover, *ongoing coastal development and population growth in areas such as Cairns and South East Queensland...are projected to exacerbate risks from sea level rise and increases in the severity and frequency of storms and coastal flooding by 2050* (SCC 2010, p. 13). Queensland established a Coastal Councils Adaptation Taskforce (C-CAT) in 2011 to prepare, plan and adapt for the coastal impacts of climate change (Grenfell 2012).

In coastal Queensland, up to 4,700km of roads, 570km of railways and 1,400 commercial buildings are at risk from SLR of 1.1m by 2100 (DCCEE 2011a). With 0.8m SLR by 2100, the *Queensland Coastal Plan* states 94,000 buildings will be partially inundated (with 10,650 buildings in Brisbane); while 65,000 properties will be affected by storm surge inundation. In SEQ, almost 9,000 homes are within 110m of erodible shoreline; 32,500 homes are exposed to a 2.5m storm tide; with 61,500 homes at risk from storm tides by 2030 (DEHP 2012a). Queensland has the highest number of at risk residential buildings in Australia's coastal zone located within 55m (n=5,400) or 100m (n=15,200) of 'soft' coastlines. Between 48,300 and 67,700 houses, worth $15 to $20 billion, are at risk from SLR of 1.1m by 2100 (DCCEE 2011b). The cost and effect of storm surges, SLR and beach erosion on infrastructure, property, and the visual amenity of coastlines are recognised as a major risk and concern for coastal management and zoning in Queensland (Miles *et al.* 2008). Only 25% of councils have SLR/inundation data and 50% have flood data (Grenfell 2012). Despite this high level of exposure and vulnerability to climate change impacts in Queensland (Bajracharya *et al.* 2011), few coastal councils have completed a climate change risk assessment (i.e. Moreton Bay and Redland, SEQ), adaptation planning or controls for climate risk (Gurran *et al.* 2011).

In planning for climate change, councils thus need to promote adaptive capacity which is *the ability of built, natural, and human systems to accommodate changes in climate (including climate variability and climate extremes) with minimal potential damage or cost* (SCC 2010, p. 56). Council planning for Queensland coastal areas focuses on hazards and risk management, with planning guidelines to assess coastal hazards and risks to communities (DEHP 2013). The *Queensland Coastal Plan* initially required councils to prepare coastal hazard adaptation plans for those parts of their urban areas at risk, related to a projected SLR of 80cm by 2100, with a pilot coastal hazard adaptation strategy for Townsville (DEHP 2012a, b). State planning policies on flooding still don't consider SLR or storm surge impacts (PIA 2011). Climate adaptation strategies have been reviewed in the *SEQ Regional Plan* (Dedekorkut *et al.* 2010), but not in climate change plans by local councils (Zeppel 2012). Only five Queensland coastal councils have prepared climate change strategies or action plans, including Brisbane (BCC 2007); Cairns (CRC 2009, 2010); Gold Coast (GCCC 2009); Redland (RCC 2010), and Sunshine Coast (SCC 2010). The Gold Coast, Moreton Bay, and Sunshine Coast councils have also prepared shoreline erosion management plans, a coastal dune policy, and beach nourishment/replenishment programs for affected beaches. This paper reviews adaptive actions in climate change strategies by four coastal councils, and for Bribie Island and Noosa Biosphere. It identifies what adaptation actions for nature, governance and community are required for enhanced adaptive capacity at the local level.

Climate Change Adaptation Responses

This paper reviews adaptation actions in climate change strategies prepared by four urban Queensland coastal councils (e.g. Cairns, Gold Coast, Redland, and Sunshine Coast), and two community-based climate action plans for Bribie Island (Chapman 2010), and Noosa (Noosa Biosphere 2011). The council plans were prepared by council staff based on climate change information from scientists, climate risk assessment by consultants, and on the Sunshine Coast with input from interested stakeholders (SCC 2010). The climate action plans for Bribie Island and Noosa Biosphere were prepared by SEQ Catchments with input from university, conservation, emergency services, and residents groups. The actions in these six plans are analysed for their adaptive response categories: *Emphasising Nature*, *Emphasising Development* and *Managed Nature* (Vasey-Ellis 2009), along with *Council Governance* of climate change, and *Emphasising Community.* A number of adaptation options in coastal planning are listed for each of these key categories. The category, *Emphasising Nature,* focuses on protecting the environment (e.g. beaches, dunes, habitat, park land, plants, waterways, and wildlife) to buffer the effects of climate change on nature and also to protect developed areas from climate hazards. The adaptation options for this category include: relocate and prevent development, designate protected land, create setback buffers, prevent unsustainable land use, create wetlands and revegetate vulnerable areas. The category, *Emphasising Development*, focuses on protecting the built environment through insurance, building codes and engineering responses to limit damage to council, public and private property (i.e. assets, infrastructure, hazards, and risk). The adaptation options include: Private insurance for vulnerable properties, let developers accept full risk, elevate buildings and change building codes, and build hard structures. *Managed Nature* refers to 'natural' engineering options such as replacing beach sand by pumping or trucks. The adaptation options include: Beach nourishment, and build artificial reefs. Two additional adaptive response categories devised by the author were used in this analysis of climate actions: Emphasising Community and Council Governance. *Emphasising Community* refers to public access, community consultation and engagement, along with health risks and safety issues in climate impacts. *Council Governance* refers to internal council processes such as climate change policies, strategies and reports, and staff training on climate change actions. These two additional categories were used as climate change impacts affect both local communities and councils (i.e. infrastructure, services, and safety). The actions stated in the six plans were analysed according to which main adaptation response category they

best fit (i.e. *Emphasising Nature*, *Emphasising Development*, *Managed Nature*, *Emphasising Community*, and *Council Governance*), as defined by Vasey-Ellis (2009) and the author.

Adaptation Actions in Climate Change Strategies

The six climate change action plans included strategies for climate change mitigation and adaptation, environmental protection and building community resilience to climate change (Table 1). Specific actions for adaptation were included in the strategies for Sunshine Coast (n=25) and Cairns (n=9). The Sunshine Coast adaptation actions were further divided between *Objective 5: Identify and plan for climate change risks* (n=14), and *Objective 6: Adapt to the impacts of climate change* (n=11). The climate strategies for Bribie Island, Noosa, Gold Coast and Redland included a mix of both mitigation and adaptation actions in key areas, including the natural environment (i.e. biodiversity, shoreline, and water), planning and infrastructure (Bribie, Noosa, Gold Coast) or development and council assets/services, plus community safety and resilience (Redland). The Cairns strategy had a 'transition' section with nine actions about community resilience. Specific actions for council governance and leadership on climate change responses were included in strategies for Cairns, the Gold Coast, and Sunshine Coast. The Bribie Island and Noosa plans included specific adaptation actions for shoreline and emergency management.

Table 1 Adaptation actions in local climate change plans

Climate Actions	Bribie* Island	Noosa#	Cairns	Gold Coast	Redland	Sunshine Coast
Biodiversity	23	39	4	0	11	6
Planning and Infrastructure, Council Assets	22	26	7	14	25	10
Shoreline or Coastal	10	12	0	0	0	1
Water	10	0	0	0	0	3
Emergency/ Safety	6	11	0	0	13	2
Health and Lifestyle/ Resilience	0	37	6	0	16	2
Economy/ Development	0	35	0	0	19	1
Agriculture	0	21	1	0	0	0
Governance/ Leadership/ Services	0	0	18	21	14	27
TOTAL	**71**	**181**	**36**	**35**	**98**	**52**

Sources: Chapman (2010), Noosa Biosphere (2011), CRC (2010), GCCC (2009), RCC (2010), SCC (2010)
Notes: *Moreton Bay Council is responsible for implementing 85% of the 71 actions in the *Climate Proofing Bribie* plan
#Sunshine Coast Council is responsible for implementing 55% of the 99 actions in the *Noosa Climate Action Plan*

The Cairns, Sunshine Coast, and Gold Coast strategies focused on council governance to implement climate actions, along with actions emphasising nature to protect the environment, assets, and public areas. Emphasising nature was the main adaptation response in the community action plans for Bribie Island (n=52, 73%) and Noosa (n=88, 48%), and the council plan for Redland (n=48, 49%), by protecting the environment and facilities from adverse climate effects (Table 2). Emphasising community was the second adaptation response category in the strategies for Redland, Bribie Island, Noosa, and Cairns, with actions focused on community resilience and safety from climate hazards. There were only two actions for the response category, managed nature, with an artificial

reef (Bribie Island) and controlling vegetation for fire management (Redland). The beach nourishment and sand replenishment at beaches on the Gold Coast, Sunshine Coast and in Cairns were not mentioned as adaptation actions in climate plans but in separate coastal management plans. Climate actions in the four council plans focused on protecting council, public and private property in at-risk coastal areas, along with mitigation actions to reduce council and community emissions, and insurance for council assets. This is due to the high level of coastal development and population growth in both SEQ and in Cairns, and council liability to reduce risk from climate impacts through planning and adaptation (England 2006).

Overall, in these six climate plans, the total actions by adaptation response categories were: emphasising nature (46.7%), emphasising community (22.8%), council governance (21.5%), and emphasising development (8.4%). The four council plans had a key focus on governance actions to address climate change impacts (33% vs. 15% in Noosa plan and 0% in Bribie Island plan). However, the community-based plans relied on their respective local councils to implement 55% (Noosa) to 85% (Bribie Island) of their climate adaptation actions.

Table 2 Adaptive responses in local climate change plans

Adaptive Categories	Bribie Island	Noosa Biosphere	Cairns	Gold Coast	Sunshine Coast	Redland	Total Actions	Council Actions
Emphasising Development	4	16	4	4	6	6	40 (8.4%)	20 (9%)
Emphasising Nature	52	88	8	7	19	47	221 (46.7%)	81 (37%)
Emphasising Community	14	49	9	5	8	23	108 (22.8%)	45 (20.3%)
Council Governance	0	28	15	19	19	21	102 (21.5%)	74 (33.4%)
Managed Nature	1	0	0	0	0	1	2 (0.4%)	1 (0.4%)
Total Actions	71	181	36	35	52	98	473	221

Sources: Chapman (2010), Noosa Biosphere (2011), CRC (2010), GCCC (2009), SCC (2010), RCC (2010)

Coastal climate change adaptation actions were included in strategies for Bribie Island, Noosa, Redland and the Sunshine Coast. The climate plan for Redland City included adaptive actions for SLR impacts and coastal inundation of beaches and foreshores, under Development (Actions 7a, b, d), and Council Property, Assets and Infrastructure (Action 2a). Planning options, legislation, community engagement, and costs were all considered for sites vulnerable to inundation by storm tide, flooding or SLR. Some 22 actions (out of 98) addressed coastal climate impacts on Redland council assets and infrastructure including landfills; beaches/foreshores; and public open space. These coastal adaptation actions were for storm tides/surges/water (n=14), sea level rise (n=9), and coastal inundation (n=9). Coastal wetlands were listed as soft infrastructure in the Redland City climate action plan. The Noosa and Bribie Island plans included actions for shoreline management such as erosion control and dune protection. Coastal management actions in the Noosa plan addressed SLR (n=4), storm surge/coastal inundation (n=3), beach erosion (n=2), and saltwater intrusion on groundwater (n=1). Adaptive actions in the Noosa plan included sandbags, levee banks and planned retreat from vulnerable coastal areas.

Coastal adaptation actions in the Sunshine Coast strategy addressed longer-term changes from SLR and climatic extremes from storms, cyclones and floods. Responses included vulnerability and hazard mapping of major risk areas along with coastal erosion and inundation impacts in coastal management. There was only one coastal adaptation action (of 15) in this strategy: *Develop a coastal management strategy with shoreline erosion management plans where appropriate* (SCC 2010, p. 51). Storm surges are eroding popular Sunshine Coast beaches such as at Noosa. Coastal adaption actions in the Bribie Island plan also related to shoreline management (n=9) due to erosion of beaches on both sides of

the island. The actions in the Bribie plan address community involvement in preparing a shoreline erosion management plan, and other 'soft' options such as groundcover on dunes, protecting mangroves, education about dunes as a wave buffer, an artificial reef to protect beaches, and reducing impacts from boat wash and propellers. Environmental planning needs to protect coastal ecosystems as a vital climate buffer and defence.

Discussion

The climate change strategies for Cairns, Gold Coast, and the Sunshine Coast mainly focused on council governance of climate actions, while adaptive actions emphasising nature were the main focus of the Bribie, Noosa and Redland plans. It is to be expected that climate change plans by councils focus more on council governance and protecting property, while community-based climate plans have a stronger focus on environmental protection. However, the Redland City climate plan strongly emphasised nature in adaptation actions while the Sunshine Coast climate strategy gave equal priority to emphasising nature and council governance actions. Both these areas rely on nature-based tourism and have a residential population that supports environmental amenity and protection. Overall, the adaptive actions by the four urban coastal councils focused on emphasising nature (37%), council governance (33%), emphasising community (20%), and emphasising development (9%). Emphasising nature (64%) was also the main adaptive response of Victorian coastal councils (Vasey-Ellis 2009). This study found an integrated mix of adaptation actions for nature, governance and community is required for enhanced adaptive capacity at the local level. This recognises the varied capacity of built, natural and human systems to cope with the damage and cost of climate impacts. Climate proofing needs combined approaches to foster regional adaptation (Chapman & English 2011). Future research could identify which adaptation actions are most likely to be implemented by councils and local communities.

Councils have statutory obligations to protect the community and the environment from the impacts of climate change through adaptation. Queensland coastal councils adopted a mix of adaptive strategies similar to Victoria, but coastal climate hazards and actions were only considered in the Redland City (n=22), Noosa (n=12) and Bribie Island (n=10) plans. While some climate plans for coastal areas included actions for shoreline erosion, coastal inundation, and storm surges, only two addressed SLR impacts (i.e. Redland, and Noosa). State planning policies on flooding need to consider SLR and storm surge impacts (Norman 2013; PIA 2011). This analysis of adaptation actions in climate change plans found climate change planning and infrastructure responses by Queensland coastal councils mainly focus on protecting coastal development from erosion and other climate hazards, and building community resilience, supplemented by 'soft' environmental actions protecting nature as a buffer. In Queensland, there is less protection of coastal ecosystems and liability laws favour developers with a lower priority for nature-based adaptation options and growing pressure for built defences to protect valuable coastal assets (Abel *et al.* 2011). Queensland councils that seek to down-zone land in at risk areas are hampered by 'injurious affection' laws that compensate developers. State legislation is needed to provide councils 'with the mechanisms for land resumption or compensation in response to sea level rise predictions' (RCC 2010). Queensland's State Planning Policy 3/11: Coastal Protection was suspended from operation on 8 October 2012, and replaced by a State Planning Regulatory Provision that prioritised the approval of coastal-dependent land uses and property protection works to 'defend land uses and infrastructure from coastal processes.' Guidelines on coastal hazard risk assessment and SLR are no longer in operation. The draft *State Planning Policy* (DSDIP 2013) requires local councils to minimise or mitigate coastal hazards such as erosion and storm tide inundation for development assessment and community infrastructure. The State Policy for Coastal Management is still in effect for land activities (e.g. shoreline erosion).

Conclusions

This paper reviewed adaptation actions in climate change strategies by four Queensland coastal councils, and two community-based climate action plans. The climate actions in these plans were analysed according to the adaptive response categories of emphasising nature, emphasising development and managed nature (Vasey-Ellis 2009), along with emphasising community, and council governance. This extended the framework of adaptive responses and highlighted the varied responses to climate adaptation actions by councils and communities in coastal areas. These five adaptive response categories can be applied for a comprehensive analysis of adaptation actions in climate change plans prepared by councils and communities for other regions. It can evaluate the mix of 'soft' (environmental protection, community engagement) and 'hard' (engineering) responses to manage climate impacts. Further research needs to examine coastal adaptation actions in climate change plans prepared by local councils in other regions, in terms of protection versus planned retreat and their overall focus on nature, development, communities, and governance. The cost of coastal protection (e.g. sea walls, rock walls, geobags, geotextile mats, groynes) needs to be compared with expenditure on 'soft' environmental actions (i.e. dune protection, beach nourishment, and revegetation). Adaptive management of climate change impacts will be an ongoing cost and challenge for councils and communities along Australia's coastline.

Take Home Message

Climate change planning and infrastructure responses by Queensland coastal councils focus on protecting coastal development from erosion and other climate hazards, and building community resilience, supplemented by 'soft' environmental actions protecting nature. An integrated mix of climate adaptation actions for nature, governance and the community is required for enhanced adaptive capacity at the local level. State planning instruments need to provide consistent guidelines on planning for sea level rise impacts as a coastal hazard.

References

Abel, N., Gorddard, R., Harman, B., Leitch, A., Langridge, J., Ryan, A. and Heyenga, S. (2011). Sea level rise, coastal development and planned retreat: Analytical framework, governance principles and an Australian case study. *Environmental Science & Policy,* 14(3), pp. 279-288.

Bajracharya, B., Childs, I. and Hastings, P. (2011). Climate change adaptation through land use planning and disaster management: Local government perspectives from Queensland. 17th Pacific Rim Real Estate Society Conference, 16-19 January 2011, viewed August 2, 2013, <http://www.prres.net/papers/Bajracharya_Childs_Hastings_Climate_change_disaster_management_and_land_use_planning.pdf>.

Brisbane City Council (BCC) (2007). *Brisbane's Plan for Action on Climate Change and Energy 2007.* BCC.

Cairns Regional Council (CRC) (2009). *Climate Change Adaptation Action Plan.* Cairns Regional Council: Cairns.

Cairns Regional Council (CRC) (2010). *Climate Change Strategy 2010-2015.* Cairns Regional Council: Cairns.

Chapman, S. (2010) *Climate Proofing Bribie: A Climate Adaptation Action Plan.* SEQ Catchments.

Chapman, S. and English, K. (2011). Climate proofing Bribie Island and the Noosa Biosphere, South East Qld: Moving beyond the 'case study'. In J, Gunn, G. Stuart, N. Tindale & S. Sargent (Eds.) *Ancient Knowledge, Contemporary Innovation: Proceedings of the 2011 Queensland Coastal Conference*, *Cairns.* Bundaberg: Burnett Mary Regional Group for NRM.

Dedekorkut, A., Mustelin, J., Howes, M. and Byrne, J. (2010). Tempering growth: Planning for the challenges of climate change and growth management. *Australian Planner,* 47(3), pp.203-215.

Department of Climate Change and Energy Efficiency (DCCEE) (2011a). Analysis by local government area – Queensland. In *Climate Change Risks to Coastal Buildings and Infrastructure: A Supplement to the First Pass National Assessment* (p. 16). Canberra: DCCEE.

Department of Climate Change and Energy Efficiency (DCCEE) (2011b). *Climate change-potential impacts and costs: Queensland.* Fact Sheet, Canberra: DCCEE.

Department of Environment and Heritage Protection (DEHP) (2012a). *Queensland Coastal Plan,* viewed August 2, 2013, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web.pdf>.

Department of Environment and Heritage Protection (DEHP) (2012b). Queensland coastal plan. viewed August 2, 2013, < http://www.ehp.qld.gov.au/coastalplan/>.

Department of Environment and Heritage Protection (DEHP) (2013). *Guideline for Preparing a Coastal Hazard Adaptation Strategy,* April 2013, viewed August 2, 2013, <http://www.ehp.qld.gov.au/coastalplan/pdf/adaptation-strategy-guideline.pdf>.

Department of State Development, Infrastructure and Planning (DSDIP) (2013). *State Planning Policy Draft for Consultation April 2013*, viewed August 2, 2013, <http://www.dsdip.qld.gov.au/resources/policy/state-planning/draft-spp.pdf>.

England, P. (2006). *Climate Change: What are Local Governments Liable For?* Issues Paper 6, Urban Research Program, Griffith University: Brisbane.

Gold Coast City Council (GCCC) (2009). *Climate Change Strategy 2009-2014.* Gold Coast City Council.

Grenfell, M. (2012). Coastal Councils Adaptation Taskforce (C-CAT) Membership 2012/13, Ordinary Meeting 26 April 2012, Cairns Regional Council, viewed August 2, 2013, <http://www.cairns.qld.gov.au/__data/assets/pdf_file/0019/52237/26april12_ordinary_cl8.pdf>.

Gurran, N., Norman, B., Gilbert, C. and Hamin, E. (2011). *Planning for Climate Change Adaptation in Coastal Australia: State of Practice.* Report No. 4 for the National Sea Change Taskforce, Faculty of Architecture, Design and Planning, University of Sydney, Sydney, viewed August 2, 2013, <http://www.seachangetaskforce.org.au/Publications/Planning%20for%20climate%20change%20in%20coastal%20Australia%20%20State%20of%20Practice.pdf>.

Local Government Association of Queensland (LGAQ) (2007). *Adapting to Climate Change: A Queensland Local Government Guide.* LGAQ: Brisbane.

McDonald, J. (2010). *Climate Change Adaptation in South East Queensland Human Settlements: Issues and Context.* A report for the South East Queensland Climate Adaptation Research Initiative, Griffith University: Brisbane.

Miles, B., Marshall, C., Kinnear, S. and Greer, L. (2008). *Climate Change and the Implications for Local Government in Queensland: A Risk Assessment*. Institute for Sustainable Regional Development, Central Queensland University: Rockhampton.

NCCARF (2013) Building Resilient Coastal Communities and Ecosystems, Policy Guidance Brief 1, NCCARF, viewed August 2, 2013, <http://www.nccarf.edu.au/publications/policy-guidance-briefs>.

Noosa Biosphere (2011). *Noosa Climate Action Plan*. SEQ Catchments, University of the Sunshine Coast.

Norman, B. (2013) Smart planning for urban growth can minimise flood risks, 31 January, The Drum, ABC, viewed August 2, 2013, <http://www.abc.net.au/unleashed/4492512.html>.

Planning Institute Australia (PIA) (2011). Mitigating the adverse impacts of flood, bushfire and landslide. *Policy & Advocacy Bulletin,* June, pp. 9-10, viewed August 2, 2013, <http://www.planning.org.au/documents/item/2867>.

Redland City Council (RCC) (2010). *Confronting our Climate Future: Climate and Energy Action Plan 2010-2015.* Redland City Council: Cleveland.

Sunshine Coast Council (SCC) (2010). *Sunshine Coast Climate Change and Peak Oil Strategy 2010-2020*. Sunshine Coast Regional Council: Maroochydore.
Trueck, S., Mathew, S., Henderson-Sellers, A., Taplin, R., Keighley, T., and Chin, W. (2013) *Climate Adaptation Decision Support Tool for Local Governments: CATLog*: *Developing an Excel Spreadsheet Tool for Local Governments to Compare and Prioritise Investment in Climate Change Adaptation*, National Climate Change Adaptation Research Facility: Gold Coast.
Vasey-Ellis, N. (2009). Planning for climate change in coastal Victoria. *Urban Policy and Research,* 27(2), pp. 157-169.
Walsh, K.J.E., Betts, H., Church, J., Pittock, A.B., McInnes, K.L., Jackett, D.R. and McDougall, T.J. (2004). Using sea-level rise projections for urban planning in Australia. *Journal of Coastal Research,* 20, pp. 586-598.
Wang, X., Stafford Smith, M., McAllister, R.R.J., Leitch, A., McFallan, S. and Meharg, S. (2010). *Coastal Inundation under Climate Change: A Case Study in South East Queensland.* Report for South East Queensland Climate Adaptation Initiative, CSIRO.
Waterman, P. (2009). Demonstrating 'climate proofing' for coastal local government authorities and communities in the South East Queensland and Burnett-Mary regions. Proceedings of the Queensland Coastal Conference 2009, 12-15 May, Sea World Resort, Gold Coast.
Waterman, P., Chapman, S., Sargent, S., Laves, G., English, K. and Morvell, G. (2009). Climate proofing as a regional development strategy. SEGRA 2009 Conference, 27-29 October, Kalgoorlie-Boulder, WA, viewed August 2, 2013, <http://www.segra.com.au/segra/segra09CD/presentations/PeterWaterman.pdf>.
Zeppel, H. (2012). Local adaptation responses in climate change planning in coastal Queensland. *Australasian Journal of Regional Studies, 18*(3), 341-361.