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**Submission to the Senate Standing Committees on Environment and
Communications
Inquiry into Recent trends in and preparedness for extreme weather events**

We welcome the opportunity to provide a submission to the Senate Inquiry into recent trends in and preparedness for extreme weather events. The authors of this submission are part of the Australian Sea Level Rise Partnership ('ASLRP') within the Global Change Institute at The University of Queensland. The ASLRP project aims to explore and develop the ecological, economic, industry, planning and legislative responses required to advance preparation for the challenge of rapid sea level rise.

Please find attached our submissions on selected terms of reference relevant to our expertise. Given our research focus, our submission specifically addresses the impacts of flood and storm surge events.

Sincerely,

Ove Hoegh-Guldberg
Director

**Attachment: Submission to the Senate Standing Committees on
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(b) Based on global warming scenarios outlined by the Intergovernmental Panel on Climate Change and the Commonwealth Scientific and Industrial Research Organisation of 1 to 5 degrees by 2070:

...

(ii) The costs of extreme weather events and impacts on natural ecosystems, social and economic infrastructure and human health

Natural ecosystems

There is no longer any credible doubt that anthropogenic climate change is occurring and that the effects of change are already being felt.¹ It would be negligent to hold an alternative viewpoint given the overwhelming certainty of the scientific evidence as well as the conclusions reached by the Australian Academy of Sciences, CSIRO, Bureau of Meteorology and well over 99% of Australia's best and brightest scientific experts. Climate change is increasing sea-level due to the expansion of warmer oceans and the melting land-based ice (glaciers, icesheets). Changing sea temperatures are also influencing extreme weather events by changing the exchange of water vapour and energy between the ocean and atmosphere. The 2007 IPCC assessment report predicted sea-level rise of 18 cm to 59 cm by 2100 but these projections explicitly leave out the contribution from the melting of land-based ice due to uncertainties at the time of the fourth assessment report. The next IPCC assessment report is due in 2014 and is likely to include a more complete assessment of how sea level will change by the end of the century. It is notable

¹ Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, 2007) 104.

that the scientific peer-reviewed literature indicates the growing evidence that many expert groups that sea level may increase up to 2 m by the end of the century.²

This range in possible outcomes is due to uncertainty inherent in modeling the rate of warming of the oceans and rate of melting of the icesheets, but there is no reasonable doubt that sea levels are rising. The ice sheets are melting³ and thus many consider the upper estimates to be most likely.⁴ Predicting the frequency and intensity of extreme weather events has a high level of uncertainty but consensus of climate models and analysis of the instrumental record both indicate increases in the intensity of extreme weather events with warming of the planet.⁵ These events will have an impact on several important natural ecosystems, including coastal vegetation and coral reefs.

Coastal vegetation

Coastal mangrove forests that border the ocean (called fringing mangroves) are vulnerable to sea level rise and there is growing evidence that they will degrade and be subject to loss as sea levels rise. The degradation and loss of mangroves is likely to have needed consequences for coastal systems. Coastal vegetation such as seagrass, mangroves, and saltmarsh plays a critical role in coastal protection.⁶ The existence of mangroves can reduce the impacts of storms, floods and storm surges through binding sediments and wave attenuation.⁷ Mangroves also reduce shoreline erosion by dissipating tidal and wave energy to a lower level, which allows for salt marshes and reeds to grow,

² S Rahmstorf, 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise' (2007) 315 *Science* 368.

³ Eg, H Pritchard et al, 'Corrected ICESat altimetry data, surface mass balance, and firn elevation change on Antarctic ice shelves' (2012) *Nature* (submitted).

⁴ S Rahmstorf, 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise' (2007) 315 *Science* 368.

⁵ Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, 2007) 104; Knutsen et al, 'Tropical cyclones and climate change' (2010) 3 *Nature Geoscience* 157.

⁶ EB Barbier et al, 'The value of estuarine and coastal ecosystem services' (2011) 81 *Ecological Monographs* 169.

⁷ SC Mangi et al, 'Valuing the regulatory services provided by marine ecosystems' (2011) 22 *Environmetrics* 686; A Mclvor et al, *Storm surge reduction by mangroves. Natural Coastal Protection Series: Report 2.* (2012) <<http://conserveonline.org/workspaces/naturalcoastalprotection/documents/storm-surge-reduction-by-mangroves>>.

which in turn reduces erosion.⁸ They also play an important role in the maintaining coastal water quality and as habitat for important fisheries species.

The role of mangroves in reducing the impacts of extreme weather events has been heavily debated since the Indian Ocean Tsunami on 26 December 2004. In regions less severely affected by the tsunami, areas with coastal vegetation along the shoreline were significantly less damaged than areas without coastal vegetation.⁹ A study of the district of Cuddalore in India found that villages situated on exposed coasts were completely destroyed, whereas villages protected by mangrove forests suffered no destruction, even though there was damage to areas unshielded by vegetation both north and south of these villages. This led the researchers to conclude that the vegetation may shield coastlines from damage by reducing wave energy.¹⁰ Several other studies supported this conclusion.¹¹ However, these studies have attracted criticism,¹² with doubt expressed that mangrove forests can provide protection from large tsunamis. Whilst the usefulness of mangrove forests in protecting against devastating tsunamis is debatable, the protection mangroves provide from smaller storms, and the accretion services provided, such as trapping sediments which increase elevation of the coastal margin,¹³ make these ecosystems highly valuable.¹⁴ Indeed, in Queensland, Australia, the state government has recognised the importance of mangroves in reducing the impacts of cyclones, noting that the damage bill from Cyclone Larry in 2006 would have been much higher if not for the existence of intact mangrove

⁸ R Davidson-Arnott, *Introduction to Coastal Processes and Geomorphology* (Cambridge, 2010).

⁹ F Danielsen et al, 'The Asian Tsunami: A Protective Role for Coastal Vegetation' (2005) 310 *Science* 643.

¹⁰ F Danielsen et al, 'The Asian Tsunami: A Protective Role for Coastal Vegetation' (2005) 310 *Science* 643.

¹¹ K. Kathiresan and N. Rajendran, 'Coastal mangrove forests mitigated tsunami' (2005) 65 *Estuarine, Coastal and Shelf Science* 601; LR Iverson and AM Prasad, 'Using landscape analysis to assess and model tsunami damage in Aceh province, Sumatra' (2007) 22 *Landscape Ecology* 323.

¹² AM Kerr, AH Baird and SJ Campbell, 'Comments on "Coastal mangrove forests mitigated tsunami"' by K. Kathiresan and N. Rajendran [*Estuar. Coast. Shelf Sci.* 65 (2005) 601-606]' (2006) 67 *Estuarine, Coastal and Shelf Science* 539; AH Baird and AM Kerr, 'Landscape analysis and tsunami damage in Aceh: comment on Iverson and Prasad (2007)' (2008) 23 *Landscape Ecology* 3.

¹³ See for example U Thampanya et al, 'Coastal erosion and mangrove progradation of Southern Thailand' (2006) 68 *Estuarine and Coastal Shelf Science* 75.

¹⁴ EF Granek and BI Ruttenberg, 'Protective capacity of mangroves during tropical storms: a case study from 'Wilma' and 'Gamma' in Belize' (2007) 343 *Marine Ecology Progress Series* 101; EB Barbier et al, 'Coastal Ecosystem-Based Management with Nonlinear Ecological Functions and Values' (2008) 319 *Science* 321.

forests.¹⁵ Mangroves are also recognised as a safe anchorage point during cyclones.¹⁶ Where it exists, coastal vegetation should be retained as a defence against storm inundation, as defending against inundation by the sea using engineering techniques is costly and fraught with challenges.

There are existing threats to coastal vegetation in Australia. Precipitous losses of coastal vegetation have occurred both locally within Australia and on a global scale over recent decades due to anthropogenic activities.¹⁷ Sea-level rise, in combination with coastal development, is going to result in “coastal squeeze”, whereby coastal vegetation is gradually physically squeezed out of the landscape.¹⁸ Protection of existing, and rehabilitation of degraded coastal vegetation is essential to maintain biodiversity, ecological processes and will thus help to buffer impacts of extreme events in coastal areas.

Coral reefs

Coral reefs are also an important coastal defence system. Coral reefs provide a physical barrier to large waves and thus protect shorelines from erosion, wave run-up, and other physical impacts of wave energy. In the case of Queensland, the protection provided by the Great Barrier Reef is critical importance to coastal ecosystems and human infrastructure and livelihoods. The amount of wave energy that passes over a coral reef is directly related to the depth of water over the reef.¹⁹ Deepening water results in larger waves traversing over the reef and consequently impacting lagoonal and shoreline areas.²⁰

¹⁵ Department of Environment and Resource Management, 'Mangroves' (28 June 2011) <<http://www.epa.qld.gov.au/wetlandinfo/site/factsfigures/FloraAndFauna/Flora/mangroves.html>>.

¹⁶ MJ Williams, R Coles and JH Primavera, 'A lesson from cyclone Larry: An untold story of the success of good coastal planning' (2007) 71 *Estuarine, Coastal and Shelf Science* 364, 366.

¹⁷ DM Alongi DM, 'Present state and future of the world's mangrove forests' (2002) 29 *Environmental Conservation* 331; M Waycott et al, 'Accelerating loss of seagrasses across the globe threatens coastal ecosystems' (2009) 106 *Proceedings of the National Academy of Science* 12377.

¹⁸ RJ Nicholls, FM Hoozemans and Marchand, 'Increasing flood risk and wetland losses due to global sea-level rise: regional and global analyses' (1999) 9 *Global Environmental Change* S67.

¹⁹ C Sheppard et al, 'Coral mortality increases wave energy reaching shores protected by reef flats: Examples from the Seychelles' (2005) 64 *Estuarine Coastal and Shelf Science* 223; CD Storlazzi et al, 'Numerical modeling of the impact of sea-level rise on fringing coral reef hydrodynamics and sediment transport' (2011) 30 *Coral Reefs* 83.

²⁰ C Sheppard et al, 'Coral mortality increases wave energy reaching shores protected by reef flats: Examples from the Seychelles' (2005) 64 *Estuarine Coastal and Shelf Science* 223; CD Storlazzi et al, 'Numerical modeling of the impact of sea-level rise on fringing coral reef hydrodynamics and sediment transport' (2011) 30 *Coral Reefs* 83.

There are two primary factors can cause deepening of the coral reef. Firstly, erosion due to degradation of the living coral reef (for example, caused by overfishing or coral bleaching due to elevated sea temperatures), or due to ocean acidification resulting in the lowering of reef carbonate production rates, potentially impairing reef growth, compromising ecosystem functionality and ultimately leading to net reef erosion.²¹ Secondly, sea-level rise occurring at a rate that is faster than the reef can accrete vertically.²²

Increasing wave energy over reefs also is linked to increasing water turbidity as a result of the resuspension of carbonate and terrigenous sediment. Modelling results from a fringing reef in Hawaii suggested that under a moderate 20 cm increase in sea-level in the next 50 years, suspended sediment concentrations could increase from a daily maximum of 11 mg/l to 20 mg/l, with turbidity events adverse for coral recruitment and growth (>10 mg/l) increasing in duration from 9% of a typical month to 37%. Additionally, wave energy reaching the shoreline could increase by 80% from present levels, having considerable implications on coastal hazard issues such as beach erosion.²³

Although sea-level rise is a global phenomenon that cannot be solved on a regional scale, regions can certainly take actions to adapt. Coral reef condition can be influenced at local and regional scales. Using best available management solutions to maintain (and improve) condition of corals reefs will enhance the ability of coral reefs to act as coastal defence structures.

Social and economic infrastructure

Our research relates to the impacts of sea-level rise, including the impact of sea-level rise on extreme weather. Our research has also focused on Queensland, particularly South-East Queensland. Therefore this part of the submission will focus on economic impacts for South-East Queensland.

²¹ O Hoegh-Guldberg et al, 'Coral Reefs Under Rapid Climate Change and Ocean Acidification' (2007) 318 *Science* 1737; CT Perry et al, 'Caribbean-wide decline in carbonate production threatens coral reef growth' (2013) 4 *Nat Commun* 1402.

²² C Sheppard et al, 'Coral mortality increases wave energy reaching shores protected by reef flats: Examples from the Seychelles' (2005) 64 *Estuarine Coastal and Shelf Science* 223.

²³ AS Ogston and ME Field, 'Predictions of Turbidity Due to Enhanced Sediment Resuspension Resulting from Sea-Level Rise on a Fringing Coral Reef: Evidence from Molokai, Hawaii' (2010) 26 *Journal of Coastal Research* 1027.

Currently, the ‘success’ of the South-East Queensland region is based on the premise that our population must continue to grow in order to thrive economically. This has led to increased urbanisation, which has affected South East Queensland’s natural systems.²⁴ Increased population growth coupled with climate change will have negative impacts on both human populations and natural systems. The key biophysical impacts of sea-level rise will be increasing flood frequency, inundation, rising water tables, saltwater intrusion and erosion. Moreover, sewerage and waste-water facilities will also be affected. In addition to this, coastal wetlands such as mangrove and salt marshes will decline without sufficient sediment supply.²⁵

Coastal communities will be exposed to higher costs and many challenges in order to protect their lives and assets as a result of likely SLR and extreme weather events.²⁶ For instance, built coastal developments and transport infrastructure on the Gold Coast is owned by a diverse range of stakeholders. They include Federal, State and local government, private owners, community groups and commercial enterprises. The Gold Coast’s coastal assets include residential and commercial buildings, surf lifesaving clubs (SLC), public amenities (e.g. beach showers), parks, the harbour, bridges and service infrastructure (wastewater and stormwater).

Preventing new development in at-risk areas has clear social and economic benefits. Modelling undertaken by CSIRO in 2010 for South-East Queensland examines three possible scenarios for 2030, estimating an increase in population and construction to 4.4 million people and 2.4 million buildings. The modelling anticipated that the following numbers of people and property will be at risk of a 1 in 100 year inundation event depending on the planning regulations implemented now:

²⁴ S Baltais, ‘Environment and economy: can they co-exist in the “smart state”?’ (2010) 91 *Issues* 21-24.

²⁵ RJ Nicholls and A Cazenave, ‘Sea-Level Rise and Its Impact on Coastal Zones’ (2010) 328 *Science* 1517.

²⁶ P Reichenmiller et al, *Weathering climate change: insurance solutions for more resilient communities* (Swiss Re, 2010).

- The same planning and building regulations as today - \$2 billion worth of property and 399,422 people at risk;
- Planning regulations tightened up now to allow no further risky development, and no action to protect existing housing - \$1.3 billion property and 245,000 people at risk; and
- Planning regulations tightened up now to allow no further risky development, and maintain risk on existing houses - \$1.1 billion property and 227,000 at risk.²⁷

Therefore prohibiting new development in at-risk areas may result in a potential saving of more than \$700 million. It is important to note that these projections are only until 2030, and only estimate damage from a single flood event. The impact of sea-level rise will be amplified because of extreme events, including cyclones and storm surges.²⁸ The intensity and frequency of storms and cyclones is likely to increase in the future as a result of climate change impacts,²⁹ increasing the incidence of so-called '1-in-100-year' flood events.³⁰ If sea levels continue to rise, these impacts could be greater and more frequent beyond 2030, and the financial savings from preventing development in at-risk areas may be far greater. In the case of existing developments, hazard mitigation may also be economically efficient. A study conducted by the Federal Emergency Management Agency in the United States found that for every \$1 spent on hazard mitigation, there is an approximately \$4 saving in recovery and repair costs.³¹

The Queensland government have recently acted to weaken restrictions and controls on coastal development in Queensland, and the authors of this submission have urged the Queensland government to re-introduce strong planning laws prohibiting new development in at-risk areas, and promoting

²⁷ National Research Flagships: Climate Adaptation, *Coastal inundation under climate change: a case study in South East Queensland: CSIRO Working paper 6* (2010) pp 12-13.

²⁸ JA Church et al, 'Understanding and projecting sea level change' (2011) 24 *Oceanography* 130.

²⁹ JA Church et al, 'Understanding and projecting sea level change' (2011) 24 *Oceanography* 130.

³⁰ P Bromirski et al, 'Storminess Variability along the California Coast: 1858–2000' (2003) 16 *Journal of Climate* 982.

³¹ Multihazard Mitigation Council, *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities* (2005) <http://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/hms_vol1.pdf>.

hazard mitigation in developed areas.³² Importantly, insurance will not be an appropriate tool to protect against the impacts of sea-level rise and flooding. Of the approximately 40 home and contents insurance policies available in Australia, only two policies cover loss or damage caused by actions of the sea.³³ It is likely that the majority of loss or damage caused by gradual sea-level rise and storm surge events will be borne by homeowners themselves. Where homeowners are unable to finance this, it becomes a major issue for government. For example, following the flood disaster in Queensland in 2010-2011, it became apparent that many homeowners were under- or un-insured. In such situations, government are subject to intense pressure from the public and the media, and in this instance, many of these repairs were ultimately funded by government schemes, using funds raised through taxation and public donations. Increasing the number of persons and households at risk to inundation is in fact increasing the government's exposure to financial assistance.

In addition to disaster assistance, government may be subject to legal action for failure to prevent development in hazardous areas. It is unclear where the legal liability for future damages to coastal property rests. There is a potentially strong legal argument by coastal landholders impacted by future flooding that government were negligent in approving development in at risk-areas.³⁴ This is especially so for decisions made now and into the future, as governments have access to information on the projected impacts of climate change. Approving development in areas clearly known to be located in a hazard area may expose the government to financial exposure through legal action.

The social impacts of extreme weather events also lead to a further strain, including on the economy. Flow-on effects from extreme weather events include

³² Australian Sea-Level Rise Partnership, Submission to Queensland Government Draft Coastal Protection State Planning Regulatory Provision Planning Group, 19 November 2012.

³³ For a summary of insurance coverage, see Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

³⁴ See for example P England, Heating up: climate change law and the evolving responsibilities of local government (2008) 13 *Local Government Law Journal* 209; J McDonald, 'A risky climate for decision-making: the liability of development authorities for climate change impacts' (2007) 24 *Environmental and Planning Law Journal* 405.

depression, anxiety and stress,³⁵ which will be exacerbated by allowing population growth in hazard areas. As an example, after the Queensland floods, there was a marked increase observed in persons seeking medical treatment for depression,³⁶ and numerous government-funded initiatives were developed to address this.

In summary, there are enormous social and financial costs associated with sea-level rise and extreme weather events. Future costs can be diminished by prohibiting development in at-risk areas.

(iii) the availability and affordability of private insurance, impacts on availability and affordability under different global warming scenarios, and regional social and economic impacts

The problem

Extreme weather events have historically been a major source of business for the Australian insurance industry.³⁷ As a recent example, the Queensland floods in 2010-2011 alone generated over 58,000 insurance claims, totalling over \$2.38 billion,³⁸ closely following by floods in 2013, which have so far generated over 53,000 claims, totalling over \$553 million.³⁹ These impacts have global ramifications, with major reinsurer Swiss Re ranking Australian extreme weather events as the fifth, eighth and ninth costliest catastrophes worldwide in 2010.⁴⁰

³⁵ See for example Australian Centre for Posttraumatic Mental Health, *Surviving the trauma of the Queensland floods: the mental health consequences* (2011) <http://www.acpmh.unimelb.edu.au/resources/media.html#media_releases>.

³⁶ See for example Georgia Waters, 'Despair Lingers long past the deluge (Brisbane Times, 4.5.11) <<http://www.brisbanetimes.com.au/queensland/despair-lingers-long-past-the-deluge-20110504-1e7hs.html>>.

³⁷ For example, the Insurance Council of Australia have stated that 19 of the 20 largest property losses in the past 40 years have been caused by weather-related events: Insurance Council of Australia, *Improving Community Resilience to Extreme Weather Events* (April 2008) 2 <<http://www.insurancecouncil.com.au/Portals/24/Issues/Community%20Resilience%20Policy%20150408.pdf>><http://www.insurancecouncil.com.au/Portals/24/Issues/Community%20Resilience%20Policy%20150408.pdf>>.

³⁸ Insurance Council of Australia, 'Flood report: ICA welcomes focus on improved flood protection and mitigation' (Media Release, 16 March 2012) 2.

³⁹ Insurance Council of Australia, 'Catastrophe update: claims for 2013 pass \$670 million' (Media Release, 8 February 2013) 2.

⁴⁰ Lucia Bevere, Brian Rogers, Balz Grollmund, *Natural catastrophes and man-made disasters in 2010: a year of devastating and costly events* (March 2011) Swiss Re, 15 <http://media.swissre.com/documents/sigma1_2011_en.pdf>.

As the frequency and intensity of extreme weather events increases, there is also a risk that insurance coverage for such events will become difficult to obtain or prohibitively expensive. Presently in Australia, there is some degree of coverage available for all extreme weather events, and there are no 'red-flagged' areas in which no insurance is available.⁴¹ A review conducted in early 2011 of 40 current Australian home insurance policies revealed that all policies cover storm damage, whilst only approximately half of the policies surveyed cover damage by river flood, and only two products cover damage caused by actions of the sea.⁴² Since then, additional insurers have entered the market to offer full flood insurance,⁴³ with most recent estimates suggesting that 83% of home insurance products cover flood damage.⁴⁴ However, there have also been recent moves by insurers to remove coverage in areas prone to extreme weather events. For example, Suncorp Insurance, a major Queensland insurer, has refused to write new policies for home and contents insurance in the towns of Roma and Emerald, unless flood mitigation works are put in place.⁴⁵

Insurance availability is overshadowed by the larger problem of insurance affordability. Even where insurance is available, the cost may deter homeowners from obtaining it. The Insurance Council of Australia has estimated that annual flood insurance premiums in low-risk areas are approximately \$77 per annum, with this figure increasing to \$952-\$2,117 per annum in high-risk areas, and \$2,439-\$6,777 per annum in extreme-risk areas.⁴⁶ More recent anecdotal evidence provided by Allianz Insurance suggests flood insurance premiums could be as high as \$19,000 per annum in Queensland, and \$24,000 per annum in New South Wales for the highest risk

⁴¹ House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009) 116.

⁴² Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

⁴³ The Insurance Council of Australia has recently stated that there are five new products offering full flood insurance: Insurance Council of Australia, 'Flood report: ICA welcomes focus on improved flood protection and mitigation' (Media Release, 16 March 2012) 2.

⁴⁴ Rob Whelan, 'Investment in flood levees could cut insurance premiums', *The Queensland Times* (Online), 4 February 2013 <<http://www.qt.com.au/news/investment-flood-levees-could-cut-insurance-premiu/1741418/>>.

⁴⁵ See for example Bridie Jabour, 'Suncorp refuses to insure Queensland towns', *The Brisbane Times* (Brisbane, Australia), 7 May 2012.

⁴⁶ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) 27, Natural Disaster Insurance Review <http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf>.

properties,⁴⁷ and other homeowners have reported premium increases of 2000%.⁴⁸

Historically, high flood premiums have led to a high incidence of under-insurance and un-insurance in high and extreme risk areas, which may be exacerbated as premiums rise even further.⁴⁹ The problem of un-insurance and underinsurance can also lead to ‘natural disaster syndrome’⁵⁰ or the ‘Samaritan’s dilemma’,⁵¹ whereby governments feel compelled to provide disaster assistance, resulting in the costs of repairs and rebuilding of damaged property being absorbed by the wider community.⁵² These disaster payments distort incentives to purchase insurance, because individuals do not bear the full cost of actions,⁵³ and also raise costs for taxpayers.⁵⁴ Additionally, government assistance as an alternative to actuarially sound flood insurance has major drawbacks, as it often takes longer to be received than insurance funds, it is often less than the amount required to compensate for total losses, and its provision is subject to political influences, including, for example, the proximity of a flood or other natural disaster to government elections.⁵⁵ It also means that those most at risk of loss bear a disproportionate amount of the loss.⁵⁶

⁴⁷ Peter Hannam, ‘Walls keep water out and flood bills down’, *The Age* (Melbourne), 2 February 2013, 6; ABC Radio National, ‘Disaster insurance premiums becoming unaffordable as flood and bushfires increase’, *Breakfast*, 11 February 2013 <<http://www.abc.net.au/radionational/programs/breakfast/more-natural-disasters-as-insurance-premiums-rise/4511192>>.

⁴⁸ Andrew Carswell, ‘Big insurers leave towns high and dry’, *The Sunday Telegraph* (online), 3 February 2013 <<http://www.theaustralian.com.au/news/big-insurers-leave-towns-high-and-dry/story-e6frg6n6-1226567331469>>.

⁴⁹ House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009) 115.

⁵⁰ Howard Kunreuther, ‘Reducing Losses from Catastrophic Risks through Long-Term Insurance and Mitigation’ (2008) 75(3) *Social Research* 905, 912.

⁵¹ Howard Kunreuther and Mark Pauly, ‘Rules rather than discretion: Lessons from Hurricane Katrina’ (2006) 33 *Journal of Risk and Uncertainty* 101, 106.

⁵² See for example Scott E Harrington, ‘Rethinking disaster policy’ (2000) 23 *Regulation* 44. This situation has occurred in Queensland following the 2010-2011 flood disaster, whereby persons who suffered property damage in the Queensland floods and are un-insured or underinsured are eligible for a range of government grants and payments – see Queensland Reconstruction Authority, *Build back: the rebuilding navigator* (2011) <<http://www.qldreconstruction.org.au/grants/>>.

⁵³ Louis Kaplow, ‘Incentives and Government Relief for Risk’ (1991) 4 *Journal of Risk and Uncertainty* 167, 172-173.

⁵⁴ Scott E Harrington, ‘Rethinking disaster policy’ (2000) 23 *Regulation* 40, 40.

⁵⁵ Howard Kunreuther and Mark Pauly, ‘Rules rather than discretion: Lessons from Hurricane Katrina’ (2006) 33 *Journal of Risk and Uncertainty* 101, 106.

⁵⁶ Robert E Litan, *Sharing and Reducing the Financial Risks of Future “Mega-catastrophes* (2006) The Brookings Institution, 3 <http://www.brookings.edu/~media/research/files/papers/2006/3/business%20litan02/200603_iiep_litan>.

Proposed Federal Government Response

The final report of the Natural Disaster Insurance Review (“NDIR”) recommended that the Federal government impose a requirement that all insurers include flood insurance as standard in policies for buildings, contents and units, and also in policies for small businesses, with no provision for policyholders to opt-out of flood cover.⁵⁷ It also recommended that all insurers include cover for storm surge flooding in policies.⁵⁸ The Review acknowledged that their recommendations would increase the cost of insurance for properties in high-risk areas, and suggested that the government introduce a premium discount scheme, whereby government would initially absorb the cost of premium increases. These discounts would ideally be phased out over time to allow homeowners to adjust to increased premiums.⁵⁹

The discounts would be delivered through a partial reinsurance pool operated and funded by government. Private insurers would retain a portion of the risk and set the price for this portion, and the remainder of the risk would be covered by the reinsurance pool.⁶⁰ The insurer would receive a discounted reinsurance premium for the portion of the risk covered by the pool.⁶¹ The system would be designed to subsidise claims rather than premiums,⁶² and discounts would only be available to owners of existing properties.⁶³

⁵⁷ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁵⁸ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 82 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁵⁹ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 36-38 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶⁰ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 55 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶¹ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 56 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶² Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 55 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶³ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 55 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

The system would operate on a cap of approximately \$200 per annum for flood insurance. For low-risk properties, an insurer may be able to underwrite the entire risk for \$200. In higher-risk properties, the insurer may only be able to underwrite 20%, 10%, 5% or even 3% of the risk for \$200. In these cases, the insurer will cover that percentage at market value. If loss occurs exceeding that percentage, the remainder of the risk will be covered by the government reinsurance pool.⁶⁴ Evidence obtained by the NDIR suggests that many flood damage claims are fairly small, and insurers will likely be able to pay many claims without resort to the reinsurance pool.⁶⁵ However, for the properties at the highest risk of flood damage, even covering 3% of risk may cost thousands of dollars, in which case premiums may be capped and subsidised by government.⁶⁶

The moral hazard issues associated with subsidised insurance were acknowledged in report, as a high flood premium provides an important signal to purchasers.⁶⁷ To this end, the report noted the importance of flood premiums, to some extent, continuing to reflect flood risk exposure.⁶⁸ The report also mentioned the possibility of implementing mitigation strategies in at-risk properties to reduce their vulnerability to flood damage. It suggested that homes identified as high-risk should be assessed to determine what mitigation action could be taken. In the case of extreme-risk properties, risk mitigation measures may be preferable to premium discounts, as the cost of implementation may be outweighed by the savings in insurance premium subsidies. The report urged that these properties be assessed as soon as possible to determine what could

⁶⁴ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 60 < http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶⁵ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 61 < http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶⁶ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 60 < http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶⁷ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 38 < http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁶⁸ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 38-39 < http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

be implemented, to avoid unnecessary reliance on the reinsurance facility.⁶⁹

The Federal government has released a partial response to the final report of the Natural Disaster Insurance Review. This response recommends that all insurers be required to offer flood cover, but with an option for consumers to 'opt out' of cover.⁷⁰ Where property is subject to flood risk, the consumer will be made aware of this, and flood cover will be included in initial premium estimates. Consumers may then choose to opt-out, but with the knowledge that they are exposed to a flood risk, which will not be covered by their policy.⁷¹ The government has not yet responded to the NDIR recommendations for a reinsurance pool and discount scheme,⁷² and the initial response does not address mitigation measures beyond a passing reference.

Critique of the NDIR scheme

The NDIR scheme has the potential to deliver some benefits. The 2010-2011 flood disaster exposed a widespread practice of private insurers covering damage caused by rainwater flood, but not river flood.⁷³ To determine the cause of damage following an event, these insurers have to engage hydrologists to identify the cause of flood damage. One of the benefits of requiring insurers to cover all types of flood damage would be that expensive hydrology reports are no longer needed,⁷⁴ resulting in cost savings for the insurer. The recommendation that all insurers cover storm surge flooding is also welcome, as coverage differs considerably amongst current policies.⁷⁵

⁶⁹ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Final Report* (September 2011) Natural Disaster Insurance Review, 38 <
http://www.ndir.gov.au/content/report/downloads/NDIR_final.pdf >.

⁷⁰ Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 3 <
http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

⁷¹ Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 6 <
http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

⁷² Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 4 <
http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

⁷³ See for example Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

⁷⁴ Howard Kunreuther and Mark Pauly, 'Rules rather than discretion: Lessons from Hurricane Katrina' (2006) 33 *Journal of Risk and Uncertainty* 101, 110.

⁷⁵ See for example Justine Bell, 'Insurance for extreme weather events in Australia – current policy trends, and future directions' (2011) 8 *Macquarie Journal of Business Law* 339.

However, the introduction of mandatory and subsidised flood insurance, with or without provision for opt-out, also has several flaws, many of which were raised by representatives of the insurance industry in submissions to the reviews.⁷⁶ One of the main problems with mandatory insurance, irrespective of whether consumers can opt-out, is that insurance companies not currently offering flood insurance will need to invest significant resources into developing this product. To ensure that flood insurance is appropriately priced based on the degree of risk posed to a property, insurers will have to obtain flood risk data for all properties, potentially outweighing the cost savings of unnecessary hydrology reports. The Insurance Council of Australia maintains a National Flood Information Database, but this is not comprehensive.⁷⁷ Insurers that offer flood insurance, such as Suncorp, use their own independent data and methods for calculating flood risk.⁷⁸ Insurance companies that have not previously offered flood insurance will be at a disadvantage, as they will need to invest significant capital into obtaining data and assessing flood risk to individual properties. This could potentially lead to an increase in premiums across all properties, including those not currently subject to flood risk. Alternatively, insurers may base insurance pricing on incomplete data or estimates, which could lead to premiums being higher than necessary, or lower than necessary, which could result in loss to the insurer when a flood occurs. The Federal government has acknowledged this problem, but has not yet addressed it.⁷⁹

Second, the proposal does not make insurance coverage mandatory for homeowners and occupiers; it only requires insurers offering residential insurance to cover flood risk. There may still be instances where homeowners

⁷⁶ See for example Suncorp Group, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, July 2011, 5; Insurance Australia Group, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, 14 July 2011, 3; Insurance Council of Australia, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, July 2011, 2; Allianz Australia Limited, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, 21 July 2011, 2.

⁷⁷ Commonwealth of Australia, *Inquiry into flood insurance and related matters: Issues Paper* (June 2011) Natural Disaster Insurance Review, 38 Submission to the NDIR <<http://www.ndir.gov.au/content/issuespapers/NDIRIssuesPaper.pdf>>.

⁷⁸ Suncorp Insurance, *Flood facts: calculating risk* (2011) <<http://www.floodfacts.suncorp.com.au/#/Floodfacts/flood-calculating-risk>>.

⁷⁹ Commonwealth of Australia, *Reforming flood insurance: a proposal to improve availability and transparency* (November 2011) Treasury Department, 11 <http://www.treasury.gov.au/documents/2221/PDF/transparency_november2011.pdf>.

or occupiers do not purchase residential insurance at all. This may lead to continued reliance on free disaster assistance, which can reduce demand for private insurance.⁸⁰ There is also a risk that homeowners may decline to purchase insurance due to a perception that disaster assistance will always be available following a natural disaster.

Another possible flaw in the NDIR proposal is the recommendation that the government subsidise premiums. It is widely acknowledged that insurance premiums should reflect risk,⁸¹ and globally, insurance and reinsurance companies have highlighted the dangers of failing to accurately price risk. Lloyd's have strongly advised against government subsidisation, particularly where it is introduced as a hasty solution to mounting political pressure following a disaster.⁸² It is also unsustainable to offer 'affordable' insurance where it is not based on actuarially sound data, as the premium does not reflect the risk, and the burden is ultimately borne by taxpayers.⁸³ Domestically, the Insurance Council of Australia have postulated that the 'one-dimensional' approach of subsidising premiums 'will only shift costs and defer action on solutions to solve the true problem'.⁸⁴

Additionally, subsidising insurance premiums does not encourage policyholders to decrease their vulnerability to extreme weather impacts. Accurate pricing of risks is imperative, as it promotes the right incentives to move societies towards resilience.⁸⁵ If insurance is subsidised and does not reflect risk, there is little

⁸⁰ Scott E Harrington, 'Rethinking disaster policy' (2000) 23 *Regulation* 40, 44.

⁸¹ See for example Celine Herweijer, Nicola Ranger, and Robert ET Ward, 'Adaptation to Climate Change: Threats and Opportunities for the Insurance Industry' (2009) 34 *The Geneva Papers* 360, 367; Howard Kunreuther, 'Reducing Losses from Catastrophic Risks through Long-Term Insurance and Mitigation' (2008) 75(3) *Social Research* 905, 915; Trevor Maynard and Nicola Ranger, 'What Role for "Long-term Insurance" in Adaptation? An Analysis of the Prospects for and Pricing of Multi-year Insurance Contracts' (2012) 37 *The Geneva Papers* 318, 333.

⁸² Alice LeBlanc, 'Managing the escalating risks of natural catastrophes in the United States' (2011) Lloyds of London, 8 <<http://www.lloyds.com/~media/Lloyds/Reports/Emerging%20Risk%20Reports/7549%20Lloyds%20Natural%20Catastrophes%20in%20the%20US%20V5a.pdf>>.

⁸³ Alice LeBlanc, 'Managing the escalating risks of natural catastrophes in the United States' (2011) Lloyds of London <<http://www.lloyds.com/~media/Lloyds/Reports/Emerging%20Risk%20Reports/7549%20Lloyds%20Natural%20Catastrophes%20in%20the%20US%20V5a.pdf>>.

⁸⁴ Insurance Council of Australia, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, July 2011, 5.

⁸⁵ See for example Patrick Reichenmiller, Andreas Spiegel, David Bresch and Reto Schnarwiller, *Weathering climate change: insurance solutions for more resilient communities* (2010) Swiss Re, p

reason for insurers to encourage mitigation measures through premium discounts.⁸⁶ Furthermore, ensuring that insurance premiums are proportional to the chance and magnitude of a potential loss can provide an incentive for change.⁸⁷

Although the insurance industry generally advocates for the practice of accurately pricing risks without resorting to government intervention, this may prevent owners of at-risk property from being able to afford insurance. In the aftermath of the 2010-2011 Australian floods, global reinsurers upgraded their risk ratings for Australia, resulting in higher reinsurance costs. Combined with the uncertainty of future losses and the need to set aside extra capital, insurance premiums increased significantly.⁸⁸ There is a clear need to find a solution to the insurance availability and affordability problem, but it is unclear whether mandatory insurance and government subsidies will be the solution to the problem.

An alternative course of action, with strong support from the insurance industry, is to address the root cause of flood damage, which is exposure of properties to flood risk.⁸⁹ The NDIR did mention the need to implement mitigation measures in at-risk properties, but did not consider in any detail the mechanics of doing so. Flood mitigation can occur at a property scale, through measures such as raising houses and building or retrofitting with flood resistant materials, or at a larger scale, through construction of defence measures such as levees,⁹⁰ combined with compulsory resumptions where flood immunity cannot be

3; Celine Herweijer, Nicola Ranger, and Robert ET Ward, 'Adaptation to Climate Change: Threats and Opportunities for the Insurance Industry' (2009) 34 *The Geneva Papers* 360, 367; Trevor Maynard and Nicola Ranger, 'What Role for "Long-term Insurance" in Adaptation? An Analysis of the Prospects for and Pricing of Multi-year Insurance Contracts' (2012) 37 *The Geneva Papers* 318, 333.

⁸⁶ Howard Kunreuther and Mark Pauly, 'Rules rather than discretion: Lessons from Hurricane Katrina' (2006) 33 *Journal of Risk and Uncertainty* 101, 111.

⁸⁷ Productivity Commission, *Draft Report: Barriers to Effective Climate Change Adaptation* (April 2012) p 226.

⁸⁸ Productivity Commission, *Draft Report: Barriers to Effective Climate Change Adaptation* (April 2012) p 228.

⁸⁹ See for example Patrick Reichenmiller, Andreas Spiegel, David Bresch and Reto Schnarwiller, *Weathering climate change: insurance solutions for more resilient communities* (2010) Swiss Re; Lloyds of London, '360 risk project: adapt or bust' (2006) <<http://www.lloyds.com/~media/3be75eab0df24a5184d0814c32161c2d.ashx>>.

⁹⁰ See for example Insurance Council of Australia, Submission to the Natural Disaster Insurance Review, *Inquiry into Flood Insurance and Related Matters*, July 2011, 7.

achieved this way.⁹¹ In order for these measures to be implemented, there must be an impetus for change. This impetus may come from law reform, either of planning or insurance law, or it may come from the insurance industry itself. Alternatively, measures may be implemented by homeowners themselves, with or without direct assistance through government funding.

A more effective solution and recommendation

An ideal approach would involve co-operation amongst all levels of government, and the insurance and finance sectors. The involvement of state and local governments is essential, through the prohibition or restriction of new development in flood-prone areas. At the federal level, amendments to insurance law could require premium discounts where mitigation measures are introduced at the household level. In the absence of a legislative requirement, insurance companies may be too fearful of the impact on business to do so. This could be supplemented by a federally-funded grant or loan scheme to facilitate these mitigation measures, with the object of eventually delegating this to private banks. Retrofitting homes prior to a flood may be preferable to homeowners enduring a flood, but as a last resort, insurance law should also require rebuilds to comply with new planning laws and construction standards. In terms of repairs, it will be necessary to explore whether there should be a threshold that, when reached, requires compliance with higher standards.

Although the approach outlined requires further refinement, and potentially a significant departure from current practices, there are significant advantages to partnering actuarially sound insurance with risk mitigation measures.

(e) The current roles and effectiveness of the division of responsibilities between different levels of government (federal, state and local) to manage extreme weather events

Laws and policies regulating development in flood-prone areas and coastal development in Australia have traditionally been developed and administered by

⁹¹ For example, in the United States, the government insurer has determined that properties with large, repetitive losses should not receive subsidised insurance, and should instead be resumed: Scott E Harrington, 'Rethinking disaster policy' (2000) 23 *Regulation* 40, 44.

state governments.⁹² Despite recent calls for a more integrated, Australian-wide approach to coastal planning,⁹³ each state still has in place an independent legal framework regulating coastal development. Therefore this submission will focus on the effectiveness on the division of responsibilities between state and local government, with the Queensland experience used as a case example.

Coastal planning in Queensland

Coastal planning in Queensland has undergone several major changes over the past five years. The Queensland Coastal Plan (QCP) came into force on 3 February 2012, following five years of development and consultation (Queensland Government, 2012a). Since the change of government in Queensland focus has shifted, and on 8 October 2012 the QCP was suspended, with a new draft Coastal Protection State Planning Regulatory Provision introduced. The QCP is currently under review, with government expected to release a final document in 2013.

The QCP was a significant step forward in coastal planning policy. The QCP incorporated a planning policy, which local governments were required to take into account at the strategic planning and decision-making stages. The QCP aimed to ensure that development in the coastal zone is planned, located, designed, constructed and operated to:

- Avoid the social, financial and environmental costs arising from the impacts of coastal hazards, taking into account the projected effects of climate change;
- Manage the coast to protect, conserve and rehabilitate coastal resources and biological diversity; and
- Preferentially allocate land on the coast for coastal-dependent development.

⁹² House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009), 1.

⁹³ House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, *Managing our coastal zone in a changing climate: the time to act is now* (2009), xix-xx; Nicole Gurrán, Barbara Norman, Catherine Gilbert and Elisabeth Hamin, *Planning for climate change adaptation in Coastal Australia: State of Practice* (November 2011) Sea Change Task Force: Report No. 4, 49 <<http://www.seachangetaskforce.org.au/Publications/Planning%20for%20climate%20change%20in%20coastal%20Australia%20%20State%20of%20Practice.pdf>>.

To achieve these outcomes, the QCP contained policies governing land-use planning, and development in 'coastal hazard areas'. These areas were identified using high-precision LiDAR-derived elevation data of the State's coastline, and have been represented on a coastal hazard map. The QCP required climate change to be factored into this mapping, accounting for a sea-level rise factor of 0.8 m and 10% increase in cyclone intensity by 2100. Areas prone to erosion were assessed based on a combination of risks from projected sea-level rise, short-term storm-induced erosion and long-term beach-specific erosion trends.

The QCP also contained a development assessment code, which regulated development in erosion prone areas, and high and medium coastal hazard areas. The code placed different levels of restriction on development based on the degree of hazard, and whether the area is classified as urban or non-urban.

Following the change of State government in March 2012, on 8 October 2012 the QCP was suspended, and the new 'Draft Coastal Protection State Planning Regulatory Provision' ('regulatory provision') was introduced. It is clear from the outset that the focus of the regulatory provision is economic development, with the QCP attracting criticism for not being 'sufficiently supportive of the Government's commitment to grow the four pillars of Queensland's economy'.⁹⁴

The regulatory provision reiterates the QCP's preference for avoiding further development in non-urban, hazard areas, but in a less forceful tone. The regulatory provision requires conservation of the coastal zone in non-urban areas, but only 'to the extent practicable'.⁹⁵ In terms of existing urban areas, the regulatory provision removes the requirement for preparation of adaptation strategies, and instead notes that 'new development within existing urban areas

⁹⁴ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 5 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

⁹⁵ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 7 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

(for example, infill and redevelopment) is preferred and new development should be undertaken so as to avoid or minimise adverse impacts on coastal resources and their values'.⁹⁶

The reference to 'coastal hazard areas' is retained, as is the use of coastal hazard maps. The regulatory provision removes the reference to 0.8m sea-level rise, although the definition of 'coastal hazard area' notes that the maps presently used are based on a projected 0.8m sea-level rise. Consequently, the 0.8m benchmark is retained, but not giving the prominence held under the QCP.

The regulatory provision requires that decisions regarding selection of new areas for urban development include an evaluation of 'the level of potential risk to life and property from coastal hazards'. This is to be based on mapped coastal hazard areas, subject to inaccuracies, as well as the impact of physical coastal processes, including sea-level rise.⁹⁷ At the strategic level, the regulatory provision does not place any prohibitions or restrictions on development, but suggests a hierarchy of approaches being avoidance, planned retreat, accommodation and protection.⁹⁸ At the development approval level, restrictions on development in coastal hazard areas have been weakened considerably, with the regulatory provision specifying that 'development in areas on the coastal zone identified as having a high risk of being affected by coastal hazards needs to be carefully considered and *wherever possible* (emphasis added), be retained undeveloped'.⁹⁹

The regulatory provision creates issues for local government. One of the most

⁹⁶ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 7 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

⁹⁷ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 7 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

⁹⁸ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 7-8 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

⁹⁹ Queensland Government Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision: Protecting the Coastal Environment* (October 2012) 9 < <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>>.

valuable features of the QCP was its highly prescriptive development assessment code. For example, QCP performance outcome 13 in relation to development in hazard areas stated that 'Development within an urban locality that is not specified development is located outside a high coastal hazard area unless:

- a) it is consistent with a relevant adaptation strategy.'

This was accompanied by a limited list of exceptions. This approach to planning provides very clear guidance to local government implementing policy, thereby avoiding completely inconsistent approaches across the state. Although some variation in policy may be needed to suit local conditions, it is desirable that all local governments are implementing similar policies to avoid confusion.

Additionally, providing local governments with a highly prescriptive policy to implement lowers the potential for compensation claims. Under the *Sustainable Planning Act 2009* (Qld), local governments may be liable to pay compensation where a change to a planning scheme reduces the value of an interest in land.¹⁰⁰ This does not apply in several circumstances, including where the change has the same effect as another statutory instrument, in relation to which compensation is not payable.¹⁰¹

The QCP states that 'when making or amending a local planning instrument, the SPP overall policy outcome will be achieved when:

- coastal hazard areas, erosion prone areas, areas of high ecological significance, and areas of general ecological significance are reflected in a local planning instrument;
- adaptation strategies for relevant coastal hazard areas are appropriately reflected in a local planning instrument;
- development to which the SPP applies is made assessable or self-assessable;
- the allocation of uses and any assessment codes are consistent with the specific policy outcomes and policies of the SPP. The code at Annex 2

¹⁰⁰ *Sustainable Planning Act 2009* (Qld) s 704.

¹⁰¹ *Sustainable Planning Act 2009* (Qld) s 706.

may be used in a planning scheme to establish appropriate development requirements; and

- the planning instrument may state the matters that will be the subject of an information request if they are not included with the development application for development to which the SPP applies, for example, information regarding the determination of coastal hazard risks.¹⁰²

This provision very explicitly requires local government to take action, and therefore likely protects local governments from liability. The very clear statement of expectations on the part of local governments leads to a very strong argument that a local planning scheme would have ‘the same effect as another statutory instrument’.

The draft regulatory provision departs from this heavily prescriptive form of language. In the absence of highly prescriptive state government policy, it is possible that local governments will be reluctant to impose restrictions on development for fear of liability to pay compensation.

The authors of this submission have recommended that any new coastal planning document re-instates prescriptive directions for local government.¹⁰³ It should be noted that there is currently a proposal to amend these compensation provisions,¹⁰⁴ although this will not address the issues of consistency.

Conclusion

There is no doubt that climate change is occurring, and the projected increase in the frequency and intensity of extreme weather events may be severe. To adequately address this, a holistic approach is needed, involving protection of

¹⁰² Queensland Government, *Queensland Coastal Plan* (2012) <www.derm.qld.gov.au/coastalplan/pdf/qcp-web.pdf>.

¹⁰³ Australian Sea-Level Rise Partnership, Submission to Queensland Government Draft Coastal Protection State Planning Regulatory Provision Planning Group, 19 November 2012.

¹⁰⁴ Queensland Department of State Development, Infrastructure and Planning, *Proposed amendments to Sustainable Planning Act 2009 compensation and statutory exemption provisions in relation to natural hazard management* (2013) <<http://www.propertyoz.com.au/library/Proposed%20amendments%20to%20Sustainable%20Planning%20Act%202009.pdf>>.

essential natural ecosystem, strong restrictions on development, and amendments to insurance law to support hazard mitigation.