A Climate Risk Report

BUYER-BEWARE

Home Insurance, Extreme Weather and Climate Change.

A report to The Climate Institute of Australia

In partnership with CHOICE

choice

Climate Risk Pty Ltd provides specialist professional services to business and government on risk, opportunity and adaptation to climate change.

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Released 5th of June, 2014

Climate Risk Proprietary Limited (Australia)
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Acknowledgements

We would like to acknowledge the advice and insight from Greg Wakeham, *Risk Works,* Corey Watts, *The Climate Institute,* and Kevin Roche, *Risk Frontiers.*

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1. Executive Summary

1.1 Extremes, Climate & Insurance Risk

This study finds that, when it comes to weather related risk, homes in Australia are not equal in the eyes of insurers. Australia may have a history of being the land of floods and fires, but this has not prevented all tiers of government from allowing the development of many vulnerable homes in locations known to be at risk from floods, bushfires, cyclones and severe storms, erosion, drought, and seawater inundation. Insurance companies have no choice but to charge higher premiums to cover high probabilities of loss. This is a market failure in the property sector, not insurance, which leaves unwary homebuyers at risk of discovering, too late, high and possibly unaffordable insurance premiums.

This study also finds that climate change can be expected to worsen the situation for homebuyers through increases in the frequency and/or intensity of many hazards. According to the latest report from the Intergovernmental Panel on Climate, these escalating hazards are projected to, 'increase losses and loss variability in various regions and challenge insurance systems to offer affordable coverage'. This study finds that this is not a distant threat, but one that could push up some insurance premiums by more than 90 per cent over the period of a 30 year mortgage.

1.2 Uncovering Insurance-Related Risks

Many insurance companies are amongst society's most sophisticated and experienced risk analysts, and some are well aware of the dangers posed by extreme weather events and climate change. However, because this expertise is an aspect of their commercial advantage, insurers' insights are generally not made available to the public.

This study sought to determine whether information from the insurance market can reveal which types of property locations are subject to high levels of weather-related risks, the extent of this threat to homebuyers, and the possible impact of climate change on insurance affordability. To achieve this, a set of Insurability Risk Indicators have been developed, which wary homebuyers may use to test insurability via insurance company on-line quoting systems accessible to the general public:

1. Underinsurance: Is the cost of replacing the house more than the sum insured?
2. Heightened Premiums: Are premiums much higher than usual?
3. Absentee Insurers: Are one or more insurers not offering online policies?
4. Price Sheer: Is there an unusual divergence in the premiums offered?
5. Non-covered Exposure: Are the local hazards covered by a standard policy?

1.3 Mapping the Insurability Indicators

Using these indicators, the authors carefully selected a sample of 42 representative Australian locations from both 'neutral' locations and those exposed to a range of weather hazards. Using publicly available online insurance quoting systems, over 250 sample quotations were acquired and analysed with the five Insurability Risk Indicators. The results have been mapped onto indicative regions or location types of 'insurability risk' in Australia. A map has also been created to project changes to premiums based upon Australia's best climate science.

1.4 The Bad News: Buyers Face Many Insurance Risks Today

Analysis of the five indicators reveal significant insurability risks for homebuyers. Key findings include:

- Due to underinsurance, in some cases, homeowners could receive insurance payouts amounting to as little as half the sum required to replace their home.
- In some high-risk locations, the cost of premiums is ten times that of a typical policy at locations at low risk to weather hazards.
- In half of the tested locations that are at high risk from weather events, one or more insurers declined to make online quotes available. In some locations, the companies refusing to do so include four of Australia's six major insurers. By contrast, in a control sample containing only low-risk homes, refusal of online quotes was never observed.
- In some instances, a premium for the same policy, on the same house, in the same location varied by up to ten-fold across different insurance providers. Large discrepancies like these portend possible future insurance changes at the location; for example, more insurers may raise their prices, and some companies may even exit the local market.
- Standard cover under normal insurance polices does not always cover hazards to which many properties are exposed now and may become increasingly exposed in future: storm surge, erosion, foundation damage from soil contraction, and landslip. Homebuyers need to be aware of these critical gaps in hazard coverage.

1.5 The Good News: Buyers Can Use Insurability to Uncover Risk

This analysis shows that insurability is an effective way for homebuyers to

gauge extreme weather-related risks, and gain early insights into whether climate change may escalate risks.

Property buyers can use the five Insurability Risk Indicators defined by this study to assess a property. Depending on the signals from these indicators, buyers may wish to adjust the location, design and materials of a property they wish to purchase – or the price they are willing to pay. In this way, buyers could also help foster climate resilience in the housing market, since this type of well-informed decision-making would compel the market to place a higher value on well-adapted buildings.

1.6 Insurability Risk & Climate Change

Climate projections for hazards vary widely depending on location, emissions pathways, models used, and assumptions. Nevertheless, the first-pass attempt to estimate climate impacts on premium pricing suggests that, at the lower end, the price impact of these changes to hazards may be negligible; however, at the high end, projections for some hazards indicate they could lead to premium increases of up to 92 per cent.

To what extent individual insurers are already factoring climate change into their premiums is unknown. Customers cannot know whether their insurer is taking a risk-averse approach by assuming the worst about weather-related hazards. Nevertheless, properties with already-high premiums are often in the same locations where the largest increases in risk due to climate change are likely to be felt. It is possible that future climate change will make insurance unaffordable for some customers in such locations.

Due to the combined effect of extreme weather and price increase to premiums because of projected climate change, property value could decline by an estimated 20 per cent or more over the term of a 30-year mortgage, relative to the market.

1.7 Market Failure & its Consequences

Unaffordable insurance is the symptom not the cause of failures in the property market. Transparent risk disclosure to homebuyers is a vital precursor to risk mitigation, management and adaptation.

Currently, this market failure means that many homes are being built in the wrong locations, specified for the wrong level of hazards, using the wrong materials and the wrong designs. The first unwitting victims of this market failure are homebuyers. The second unwitting victims are taxpayers; it is they who must foot the bill for emergency relief and pay special levies for the avoidable consequences of extreme events.

1.8 A Buyer-Beware Market

The findings of this study indicate that homebuyers should adopt a buyer-beware attitude to the housing market. Unfortunately, it appears unlikely that Australian homebuyers can rely on local governments, planning laws or building codes for protection or advice. In the absence of consumer protections like these, homeowners can expect poor resilience or imprudent placement to be reflected in higher insurance costs and lower insurance availability. Homebuyers must apply their own due diligence to avoid become the unwitting recipients of high-risk properties, which are costly, difficult or even impossible to insure and which may decline in value as the property market recognises weather and climate hazards.

1.9 Recommendations

Governments

1. Mandate disclosure of all available hazard mapping including in digital formats e.g. Global Information System.
2. Require all dwellings and associated infrastructure be built or renovated as fit-for-purpose for the maximum projected impacts over their design life.
3. Disclose extreme weather and climate change risks associated with a property at the point of sale and legislate the *Key Fact Sheet.*
4. Disclose current and projected insurance premiums for a property at the point of sale, based on independent metrics (such as presented in this report).
5. Disclose any settlements where climate change risks make future habitation untenable this century.

Homebuyers

1. Ask the local council whether the dwelling is in a location where historical climatic data indicates a risk from extreme weather impacts.
2. Check whether the dwelling will be exposed to rising extreme weather risk because of climate change.
3. Test the house against the five Insurability Risk Indicators.
4. Factor into the purchase price of the home the costs of adaptation and/or possible insurance prices.
5. Avoid properties where insurability is uncertain, may become unaffordable/unavailable, or will lead to deterioration in property value.

Insurers

1. Establish mechanisms for premiums to reflect property resilience.
2. Explain the reason for a high or unavailable quotation if extreme weather or climate change are factors.
3. Add policy options to include climate exacerbated risks including soil movement & actions of the sea.

2. Introduction

This section explains the rationale for this study. It briefly touches on the history of Australian property development in the context of risks from key climate and weather-related hazards, and outlines how climate change will increasingly affect these risks. It explains why consumers cannot rely on government to cover off insurability risk, and describes how this study aims to fill information gaps important for homebuyers.

2.1 High-Risk Locations

Homeownership has traditionally been part and parcel of the Australian way of life. Unsurprisingly, given their love of nature, Australians generally favour locations with high natural amenity, and tend to pay a premium for properties near the coast, along rivers or escarpments, and at the edges of, or within, bushland. However, these same environments carry inherently higher risk of certain natural disasters, such as fires, floods, and storms.

Australia is also a heavily urbanised country, with two-thirds of the population living in cities. Because population growth creates an unrelenting appetite for new land, locations that may have previously been dismissed as inappropriate – for example in flood-prone areas – are being developed for housing.

Although local governments usually provide risk information to assist residents in decision-making, there are numerous examples of important information being withheld or not being factored into planning. These issues are discussed further in light of this study's findings in Section 7.1.

2.2 Add Climate Change

Greenhouse gas emissions accumulating in the atmosphere in ever-larger quantities since about 1850 are the main cause of global warming over this period. In Australia, average temperatures have risen by almost 1°C since 1910.[1] Since the 1970s, every decade has been hotter, on average, than the one prior. January 2013 was Australia's hottest recorded month, in the hottest summer, in the hottest year. The duration, frequency and/or intensity of heat waves have increased in many locales, and numerous records for heat extremes are broken every year around the country.

Rainfall in southern Australia is declining sharply, even as the risk of inland floods increases in both northern and southern regions. When the rains do come, they are apt to be heavier and more concentrated, elevating the risk of inland flooding.

The risk of bushfire weather has been increasing in many parts of the country as drier, hotter days and nights become more frequent and more intense.[2] The length of the fire season is also growing, reducing the already small number of days authorities can safely perform controlled burns to reduce fire risk.[3]

Rising sea levels are increasing the risk of coastal inundation and storm damage. The risk of storm surge also increases with sea-level rise. These trends are expected to continue with further warming.

2.3 Insurance Affordability and Availability are Additional Risks

That insurance is always available and affordable, and will continue to be so, is a common misunderstanding.

1 CSIRO and Bureau of Meteorology, State of the Climate 2014, Australian Government, 2014.
2 Ibid
3 Ibid

Insurance works well where risks are low. Typically a homeowner can expect to pay as little as 0.1 per cent of their property value in annual building insurance. But, where risks are higher, premiums must also rise to cover losses and avoid low-risk properties subsidising high-risk ones.

Homebuyers cannot simply assume that affordable insurance will be available today or in the future. Sharp changes in premiums have been occurring in some parts of Australia to bring insurance premiums in line with new assessments of the hazards.[4] The insurance industry is also well aware of climate change.[5] As such, this is clearly a buyer-beware market.

2.4 The Dangers of Insurance Market Distortion by Governments

High premiums for high risk properties are the necessary result of a properly functioning insurance market. Yet, governments persistently target this symptom, not the underlying cause.

Evidence shows that high-risk locations combined with poorly adapted buildings can lead to soaring insurance premiums or even complete withdrawal of insurance. Governments' attempts to intervene in this critical balance between risk and premium generally backfire. In Florida, insurance premiums are regulated, but attempts to cap prices at levels less than companies consider to be commercially viable led to the cancellation of 500,000 polices[6] in the 2 years following Hurricane Katrina; in the UK, creation of a government-run 'flood-pool' has undermined the market pressure to avoid high-risk areas, and this paved the way for 21 per cent of new London homes being built flood-risk locations. [7]

2.5 The Goal of this Report: Provide Missing Market Signals

This study has sought to identify the extent to which consumers need to be aware of insurability risks, the geographical and financial extent of these risks, and the means by which homebuyers can protect themselves from unwittingly buying into high-risk properties.

As one first step toward addressing this information gap, this study compiles and analyses publicly available home insurance market information for a carefully selected sample of locations. This is done to draw a clearer picture, from a consumer perspective, of the Australian insurance landscape in high-risk locations.

Specifically, this study describes five Insurability Risk Indicators, and uses them to analyse insurance market information. It also provides an indication of how important hazards are impacting the cost of insurance premiums today, and provides first-pass estimates of how these costs might be projected to increase due to climate change over the course of a mortgage period.

> "The Australian Building Code only seeks to protect the safety of occupants, and does not require the building to be resilient to damage. New cyclone-rated buildings are designed to be structurally sound and protect the inhabitants during cyclones by not collapsing. However, they do not prevent damage to the building and its surrounds."
>
> Insurance Council of Australia

4 ICA 2012 submission to the House of Representatives Standing Committee on Social Policy and Legal Affairs, on residential strata insurance matters http://www.insurance-council.com.au/issues-submissions/issues/residential-strata-insurance.

5 L. Phelan, 2011, Managing climate risk: extreme weather events and the future of insurance in a climate-changed world. Australian Journal of Environmental Management, 18, 223–232

6 Mills 2007 From Risk to Opportunity: Insurer Responses to Climate Change, A report to CERES.

7 http://www.economist.com/news/finance-and-economics/21598664-new-proposals-reform-subsidised-flood-insurance-do-too-little-reduce

3. The Importance of Insurability

This section discusses the role of insurance. It also explains why, in this era of climate change, insurance is more important than ever to homebuyers, who should assess their insurability risk when purchasing a property.

3.1 The Role of Insurance

As the world's largest industry, insurers are paid about 8 per cent of global GDP to act as the primary shock absorber of risk.[8] Private insurance allows individuals to manage risk without collectively imposing unnecessary social cost. Insurance companies are amongst society's most sophisticated and best-informed of risk analysts.

3.2 Insurance in the Climate Change Context

Climate change will increasingly change the way insurers deal with weather-related risk and alter the risk profiles that they apply to what they insure. In the past, certain risks may have been deemed acceptable based on historical data. However, because of climate change, driven by still rising emissions of greenhouse gases, it is no longer possible to assume the future weather patterns will look like those of the past.

Australia has the unfortunate distinction of being a world leader in insured losses from extreme weather events. Although it makes up only 2 per cent of the global reinsurance market, Australia accounted for 6 per cent of global losses in the 5 years to 2013. [9]

Given that Australia is likely to be a country significantly affected by climate change, Insurance Australia Group (IAG) notes, 'it is a sobering thought when one considers about 95 per cent of the most costly natural disasters in Australia, in terms of property insurance losses, are weather related'.[10]

3.3 Why Insurability is More Critical Today Than Ever

In an era of climate change, insurance is particularly critical for several reasons:

1. Insurance protects people from the loss of what is often their largest single financial asset: their home.

2. Insurance is critical to the healthy operation of the housing market. Most homebuyers use mortgage facilities provided by banks and other lenders, which have rights to the property during this period. Like homeowners, banks rely on property insurance to protect their assets, and typically assume these assets will be retained for up to 30 years. Should insurance become unaffordable or unavailable during this period, at the time of sale such properties would be unsuitable for any buyers who require a mortgage.

"Should insurance become unaffordable or unavailable during this period, at the time of sale such properties would be unsuitable for any buyers who require a mortgage."

8 Mallon, K, Wormworth, J, Burton, D, Best, P, and Kidney, S. 2008. From Risk to Advantage: General Insurers as Key Agents for Climate Change Adaptation. Published by Zurich Financial Services Australia, ISBN 978-0-9804343-5-4

9 ICA, http://www.climateinstitute.org.au/verve/_resources/TCI_MediaBrief_IPCC_March2014.pdf

10 Wilkins, M.J., 2011 IAG Submission to the Productivity Commission Barriers to Effective Adaptation Review, 2011 http://www.pc.gov.au/__data/assets/pdf_file/0004/114529/sub039.pdf

3. Insurance costs can serve as a signal to potential homebuyers, flagging the risks to which a property may be exposed – risks that might otherwise be very hard for buyers to discover. Similarly, consumers should also reasonably expect to be able to use insurance as a tool to manage their own risk, including climate exacerbated weather risks.

4. Private-sector insurance is crucial for society as a whole because it reduces the risk that, when disasters occur, homeowners will need to be bailed out using the public purse. The Queensland floods and Victorian bushfires are examples of insurance/planning/development market failures that compelled taxpayers to contribute when communities needed to be buffered in the aftermath of weather-related disasters.

5. In this era of climate change, insurance policies can also deliver a social benefit by putting a price on climate-related risk. In this way, insurance costs can serve as a significant driver of climate-change adaptation. Insurance price signals could, for example, encourage would-be homebuyers to avoid high-risk neighbourhoods, factor resilience-building renovations into their purchase offer, or, at the very least, consider the cost of projected insurance premiums alongside their mortgage repayment in their budgets.

3.4 The Need to Assess Insurability Risk

As the above points suggest, several aspects of insurance are relevant for homebuyers who seek to factor climate change and extreme weather into their purchasing decisions. Cost, availability, coverage, and exclusions are dimensions of insurance that capture insurers' views of a property today. Studying how these aspects of premiums differ between insurers, and whether and how the premiums themselves are evolving over time, can yield some important insights into the causes and extent of change.

Homebuyers can use the five Indicators (Section 5) developed by this study as one way to assess insurability risk. This study's findings (Section 7) indicate that this type of diligence is important. When insurance policy information on selected homes from around Australia is applied to these indicators, the results constitute a blunt warning to homebuyers that insurance is a service that cannot be taken for granted.

“When insurance policy information on selected homes from around Australia is applied to these indicators, the results constitute a blunt warning to homebuyers that insurance is a service that cannot be taken for granted.”

4. Method

This section describes the methods used to obtain the data for insurability, mapping and climate change projections used in this study.

4.1 Dwelling Specifications

Using readily available online quoting systems, this study obtained multiple quotes from a range of insurers for a standardised dwelling at selected locations across Australia.

The hypothetical policyholder of these quotes was deemed to be 40 years of age, an owner-occupier, and was assumed to conduct no business activity at the premises.

A generalised home profile was used to standardise these quoting outcomes. This profile stipulated a standard, single storey, two-bedroom, one-bathroom brick home with a sheet metal roof, built in 1970. It further stipulated that this home is built on a flat slope with a concrete slab foundation, has a floor area of approximately 100m^2, and a single garage, but no veranda, shed or balcony.

Quoted packages provided by each insurer were also standardised to permit this study to compare like with like. Each quote stipulated the highest level of available insurance, including flood cover,[11] fusion cover (heat damage), and accidental damage. The coverage of home contents was not included. All quotes included a standard excess of $500, and a standard replacement value of $200,000 if insurers did not calculate their own replacement cost for the hypothetical building.

4.2 Data

A total of 250 sample insurance premiums were obtained for the study. These were based on 42 locations selected for their known or likely exposure to particular weather and climate hazards, or lack thereof.

At least six online insurance premiums were obtained from large and reputable providers for each these 42 locations. The data for five of these locations were considered to be of insufficient quality and were subsequently discarded, leaving a net sample of 37 sites.

4.3 Indicator Calculations

The data were collected and used to calculate five Insurability Risk Indicators (Section 5): Underinsurance, Heightened Premiums, Absentee Insurers, Price Sheer, and Non-covered Exposure. The methods used to calculate these indicators are discussed below, and additional details are provided in the Appendices.

4.4 Estimating Climate Change Impacts on Premiums

Ideally, projections of climate change impacts on property insurance should consider location-specific hazard data that is downscaled from climate change impact projections for relevant parameters. Vulnerability and uncertainty are also relevant to these calculations. However, this level of detailed analysis was beyond the scope of this high-level study.

It is possible, however, to use other methods to obtain an indicative understanding of potential climate change impacts on insurance premiums. To make first-pass projections this study undertook a three-step process outlined in Section 6.1.

11 QBE Insurance (Australia) Limited, Home Cover Insurance Product Disclosure Statement and Policy Wording,2014;
The covering of normally dry land by water that has escaped or been released from the normal confines of any of the following: (a) a lake (whether or not it has been altered or modified); (b) a river (whether or not it has been altered or modified); (c) a creek (whether or not it has been altered or modified); (d) another natural watercourse (whether or not it has been altered or modified); (e) a reservoir; (f) a canal; (g) a dam.

5. The Insurability Risk Indicators

This study developed five Insurability Risk Indicators as a way to capture insurers' market position on properties, in light of weather hazards. Detailed in this section in order of increasing importance, these indicators should be considered by homebuyers when purchasing a new property. As described in the Methods section, data on home insurance premiums from around Australia were used in conjunction with these indicators to provide a snapshot of insurability risk in Australia (Sections 5, 6 and 7).

5.1 Level 1 Risk: Underinsurance

Definition: The insurance premium is inadequate to cover the cost of replacing the house to an equivalent level of amenity.

Climate change is expected to increase levels of underinsurance in two ways. First, it will tend to increase the frequency and severity of extreme weather events, such as bushfires, storms and floods. Unlike a house fire or burglary, an extreme event like this tends to impact many properties in the same suburb or region simultaneously. As a consequence, localised demand for materials and services for rebuilding increases. This serves to significantly raise the price of rebuilding.

Thus, although the premium payout for rebuilding a property might have been adequate under normal circumstances, if building costs escalate after an extreme weather event, a homeowner's insurance payout may fall short of what is required.

The second major cause of underinsurance is change in building standards – especially in high-risk areas. The Productivity Commission notes, "A formalised program to incorporate climate change impacts into the National Construction Code over time is required".[12] Building standards will continue to evolve as they factor in increasing climate change impacts and resilience. In many cases this will require more costly design specifications, materials and building techniques.

As a result, homeowners unaware of these evolving standards may mistakenly insure their dwellings for the cost of rebuilding to the home's existing specifications, rather than those stipulated under updated building standards. As climate change continues, the risk of underinsurance is likely to increase.

Homebuyers can use the Underinsurance indicator to check whether their insurance premiums adequately cover the costs of replacing their home under current or anticipated building codes; they should also factor in a margin for rebuilding cost spikes.

12 Productivity Commission, 2013. Barriers to Effective Adaptation. p. 191 http://www.pc.gov.au/__data/assets/pdf_file/0004/119713/13-climate-change-adaptation-chapter10.pdf

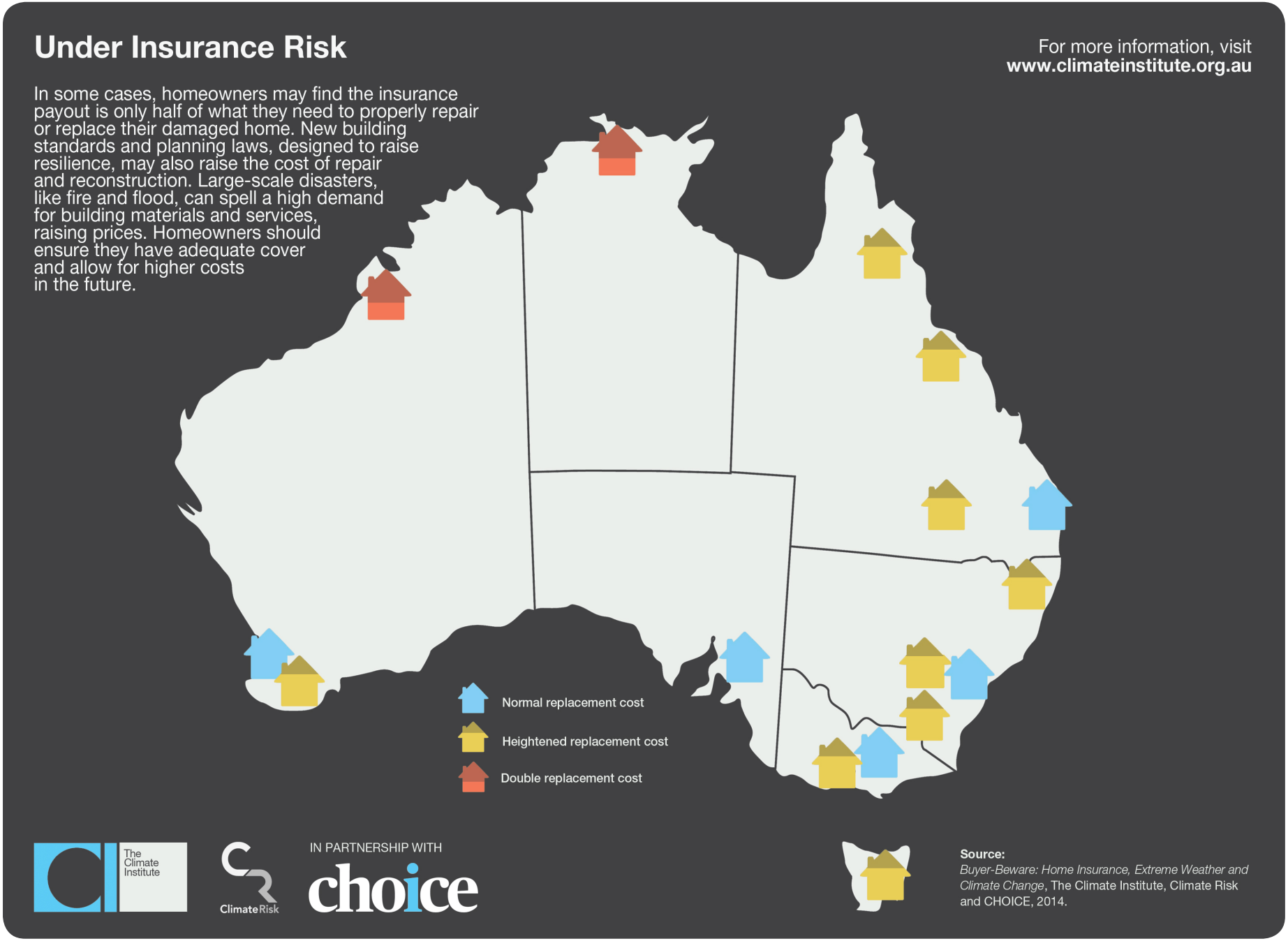


Figure 5.1
Replacement Building Costs Australian National Map.

5.2 Level 2 Risk: Heightened Premiums

Definition: The insurance premium of a property is significantly higher than for equivalent properties in other locations.

Insurance costs in different locations may be expected to reflect differences in the general level of risk from extreme events. These differences between locations will tend to be further accentuated by climate change. These differences in risks range from geographically generalised ones (for example, risks stemming from the heightened danger of severe storms and cyclones along the north coast), to highly localised risks from flooding (that may cause premium costs to differ even between two sides of the same street).

Relatively high premiums could thus reflect an insurers' response to a property's exposure to relatively high (or increasing) weather events. Insurers may also demand higher premiums to minimise underinsurance. Extremely high premiums may be used to actively deter new business in a high-risk area.

Buyers should check the affordability of insurance premiums before purchasing a house. They should also factor in some increase in premium costs due to climate change, where relevant. Buyers should consider including insurance costs in their mortgage servicing costs and, if necessary, adjust their offer price accordingly.

5.3 Level 3 Risk: Absentee Insurers

Definition: One or more insurers refuse to provide standard online quotes for the property, location or region.

An insurer's refusal to provide an online quote could be an important signal of risk for home owners for several reasons. First, it indicates that an insurer has some rationale, related to the location, to turn away business. This may be because it deems the risk levels too high to be acceptable. Second, absent insurers make for a smaller-than-normal market of providers offering policies, potentially leading to higher prices. Third, climate change may tend to further increase insurers' risks to the point where more companies exit the market or raise their premium prices.

Buyers can test for Absentee Insurers by obtaining a large set of online quotes, to discover whether any insurers are refusing to provide a standard, online policy. Buyers may want to contact the insurer in question to find out the reasons for their unwillingness. Climate change can be expected to worsen the risk of Absentee Insurers.

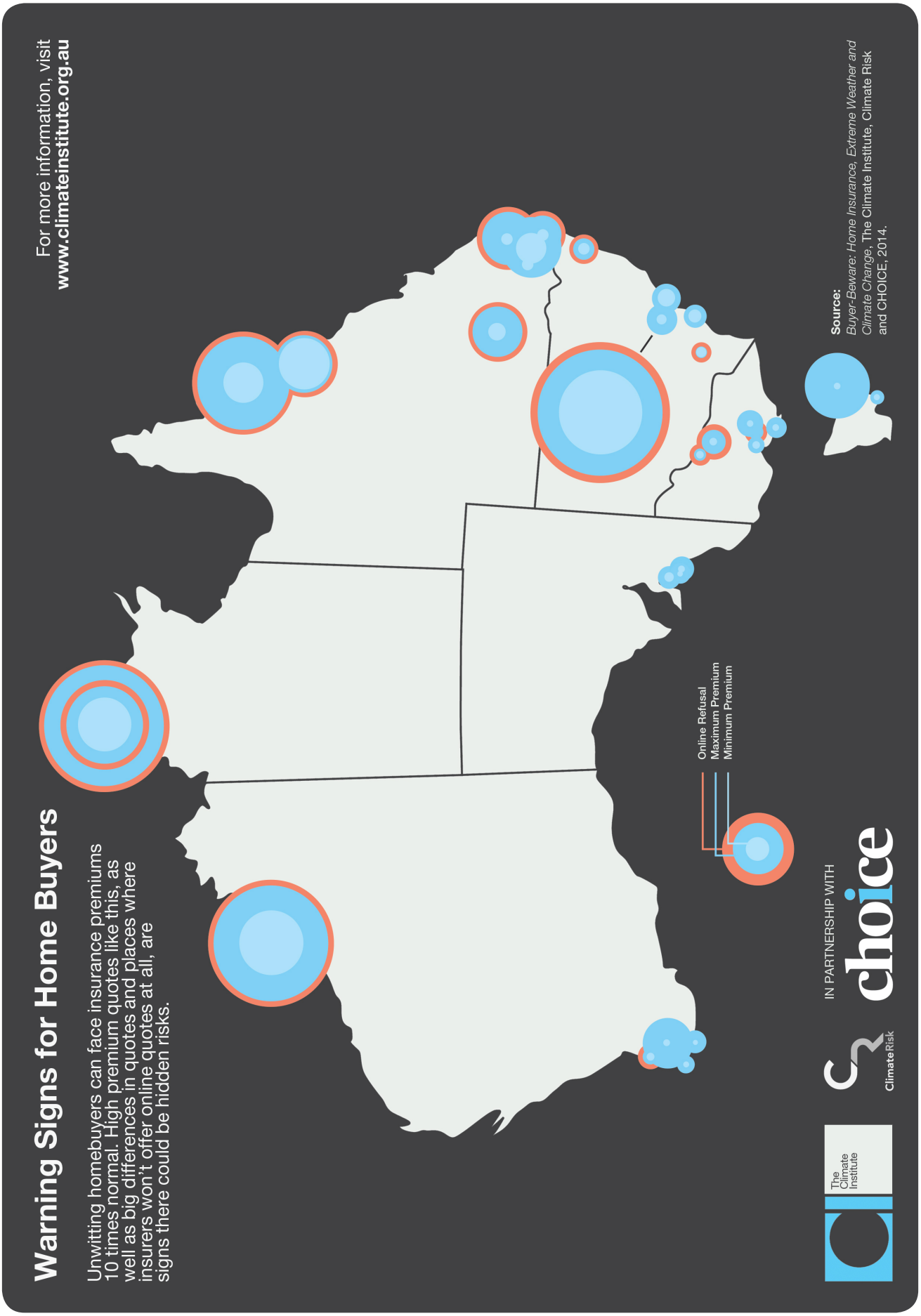


Figure 5.2
Affordability, Price Sheer and Affordability for Australian Insurance Premiums.

5.4 Level 4 Risk: Price Sheer

Definition: Price Sheer is the ratio of the highest quote to the lowest quote; a high ratio indicates an abnormal variation in premiums between insurers for the same level of cover.

A small amount of variation among insurance premiums is to be expected even when they are applied to similar homes, in the same location, and with the same level of cover and inclusions. This analysis finds that a typical homeowner should expect to pay about 0.1 per cent of their property value (house and land) per year for good quality insurance (excluding insurance for contents). Some price variation in policies is normal since insurance providers seek to market their products in different ways, price being one point of differentiation.

However, in some cases there are very large price variations between premiums, and these should act as a warning to homebuyers. Such differences could indicate that a property is in a high-risk location. Some insurers' higher prices might reflect their greater knowledge about these risks compared to competitors. Alternatively, an insurer could actually possess less information than its competitors, but choose to assume the worst about potential risks and price accordingly.

Price Sheer is the ratio of the highest quote compared to the lowest.

In this analysis, a Price Sheer of two, indicating a highest quote double the price of the lowest quote, was not unusual.

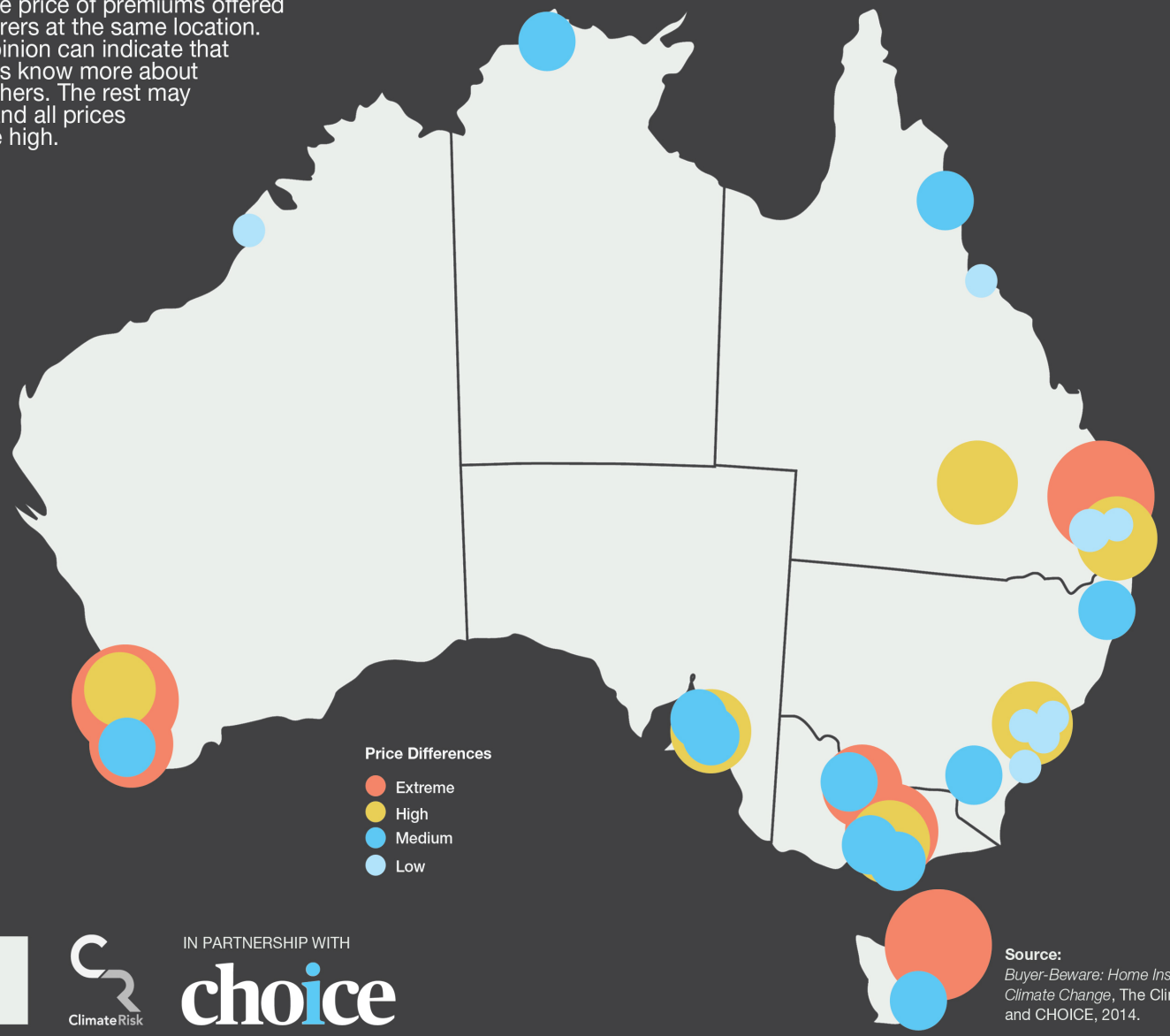
However, values for Price Shear above two, could be an important signal in terms of insurability risk; they could indicate that insurance costs will increase to the higher level if data-poor insurers move to set their premiums more accurately and bring their prices in line with those of better informed, higher-cost providers.

Homebuyers can calculate Price Sheer by acquiring quotes for several insurance premiums and assessing the amount of variation. A price sheer value above two could indicate that prices are likely to change, and should prompt buyers to seek a causal explanation for large price variations.

Differences of Opinion

Homebuyers must beware when there are big differences in the price of premiums offered by different insurers at the same location. Wide gaps in opinion can indicate that some companies know more about the risks than others. The rest may catch up soon and all prices could end up be high.

For more information, visit
www.climateinstitute.org.au



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IN PARTNERSHIP WITH choice

Source:
Buyer-Beware: Home Insurance, Extreme Weather and Climate Change, The Climate Institute, Climate Risk and CHOICE, 2014.

Figure 5.3
Price Sheer National Map of Australia.

5.5 Level 5 Risk: Non-covered Exposure

Definition: A property that is exposed to hazards that are not covered by the insurance policies offered.

Several climate-related hazards are not covered by standard home insurance policies. If a homeowner is impacted by one of these hazards, they will be exposed to the full extent of the associated losses, which may be equal to the total house value. The relevant hazards include:

1. Coastal inundation/storm surge in which sea water reaches and damages the property.

2. Coastal erosion from high-sea events or riverine flooding that undermines the integrity of the soil upon which the property foundations depend.

3. Landslip in which soils give way and which, in turn, may cause: the property to slip downhill by a small amount; wall or foundation cracking; or catastrophic property collapse.

4. Soil contraction caused by prolonged drought leading to a loss of soil moisture and contraction of vulnerable soils (for example, those with high clay content). Such soil contraction can lead to concrete cracking and foundation damage.

The climate science suggests that it is entirely reasonable to expect almost all of these risks to be exacerbated by climate change.

Homebuyers can check for Uninsured Hazards by seeking information from local councils for properties on:

(a) low-lying land close to coastal or closed coastal waters;

(b) soft erodible soils close to the coast;

(c) properties on steep slopes with foundations that are not located on rock; and

(d) clay soils in locations prone to drought.

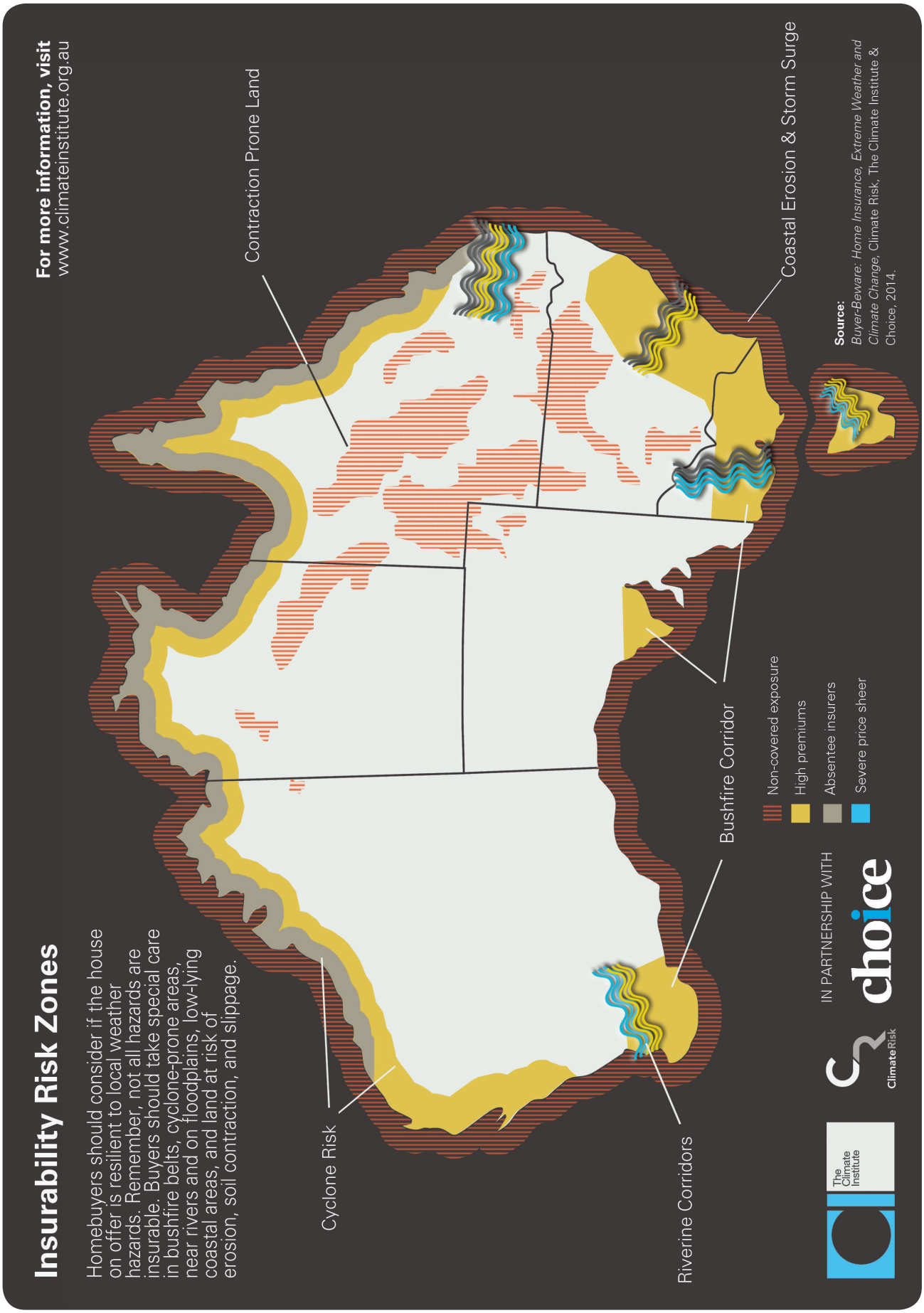

Figure 5.4

Insurance Risk Index National Map of Australia.

6. Climate Change Impacts on Insurance Pricing

It is not yet possible for homebuyers to discern the extent to which insurers may or may not be factoring climate change into premiums. But homebuyers need to expect that this is happening or will happen. Therefore, this study includes a first-pass projection of the effects of climate change on insurance premiums over the term of a mortgage.

6.1 Applying Climate Changes to Existing Extreme Weather Premiums

Ideally, projections of climate change impacts on property insurance should consider location-specific historical hazard data and downscaled climate change impact projections for relevant parameters.[13] Vulnerability and uncertainty are also relevant to these calculations. However, this level of detailed analysis was beyond the scope of this preliminary study.

Nevertheless it is possible to use other methods to obtain an indicative understanding of the potential range of climate change impacts on insurance premiums.

For this assessment, firstly the component of a premium that could likely be assigned to a single, particular hazard was isolated for each of the 250 insurance quotation samples. This extreme weather risk component was separated out by comparing a low-risk/nominal premium with a premium obtained for a location with a known exposure to a known, single climate hazard.

Second, the projected increase in frequency or intensity of the hazard due to climate change was calculated. Climate change projections were obtained from reputable and widely cited sources including CSIRO, the Bureau of Meteorology and the IPCC. The selected period of interest for projections was 2050 (since this period roughly approximates the 2045 endpoint of a 30-year mortgage taken out today). The Appendices provide more detailed information about the projections and sources for each of the extreme events.

Thirdly, these projected increases in the frequency or intensity of hazards due to climate change were applied to the weather component of the insurance premiums. This component was then re-combined with the non-weather related component of the premium, yielding the projected total premium.

6.2 Cover and Uncovered

Climate change is likely to have impacts on all of the hazards noted in this study, but as stated earlier, insurance cover is not available for all these hazards. A change in premium cost can be estimated for hazards for which insurance is available. For uninsured hazards, it is not possible to estimate a change in premium cost. Nevertheless, even for the uninsured hazards, risks may escalate for homeowners, so these homeowners do need to consider if they are prepared to manage these increased risks. For this reason the climate impact on uninsurable hazards was also presented.

“It is not yet possible for homebuyers to discern the extent to which insurers may or may not be factoring climate change into premiums. But homebuyers need to expect that this is happening or will happen.”

13 Climate Risk 2012, AdaptWater: incorporating climate change adaptation into utility asset management decision-making.

6.3 Premium Changes in Riverine Zones

Even where average rainfall levels remain unchanged or are even set to decrease, the risk of extreme rainfall events that result in flooding may increase. The amount of moisture a body of air can hold increases by about 7 per cent for every 1 per cent increase in temperature.[14]

Table 6.1 Changes in return rate for 3-day intense precipitation (mm) (A1FI and Ensemble of 5 GCMs). Interestingly climate change may shift the 3-day-intense rainfall return rate. The red arrow shows that historical events become more frequent.

return period(year)	mm	A1FI_2030	A1FI_2050	A1FI_2070
5	252	262	273	286
10	305	320	336	355
20	359	379	400	427
50	433	462	493	530
100	492	530	569	617

Risk studies in the mid-north coast of New South Wales indicate that extreme precipitation events currently with a return frequency of 1-in-100 years would, by 2050, have a much shorter return interval of 50 years, approximately doubling the probability of such a flooding event.[15] Modelling by Abbs and colleagues indicates a 48 per cent increase in 2-hour events by 2070 in some locations.[16] Rafter and Abbs also showed how the change in events will vary depending on location around the Australian continent, with 20-year return interval precipitation events for 2055 decreasing by up to 40 per cent or increasing by 100 per cent.[17]

For this high level study, the aim has been to assign non-specific 'hazard areas' with the range of possible climate impacts. On this basis the riverine risk locations have been assigned a climate change impact modification from zero to a doubling of the premium component due to flooding over the period of the mortgage. No geographical variation has been applied.

6.4 Premium Changes to Bushfire Zones

The risk of bushfires is affected by many climate and weather variables such as seasonal rainfall, drying of vegetation, days of extreme heat, and wind speeds. One composite parameter (which integrates aspects of various contributing hazards) is called the Forest Fire Danger Index (FFDI).

The CSIRO has undertaken work to examine how the FFDI is affected by climate change (Table 6.2)[18] Following the high emissions pathway that is most consistent with current international trends, and assuming that premiums may follow the high FFDI indicator, over the period to 2050 the projected impact on the bushfire component of premiums is assumed to increase between 20 to 100 per cent.

Table 6.2 Forecast changes in the number of days with very high and extreme fire-weather – 2020 and 2050 relative to 1990.

Table E1: Percent changes in the number of days with very high and extreme fire-weather - 2020 and 2050, relative to 1990

	2020		2050	
	Low global warming (0.4°C)	High global warming (1°C)	Low global warming (0.7°C)	High global warming (2.9°C)
Very high	+2-13%	+10-30%	+5-23%	+20-100%
Extreme	+5-25%	+15-65%	+10-50%	+100-300%

14 Allen, M.R. and Ingram, W.J. (2002). Constraints on future changes in climate and the hydrologic cycle. Nature, 419, 224- 232

15 Climate Risk, 2010. Climate Change Risk Assessment: Kempsey Shire Council. Table 5 http://www.kempsey.nsw.gov.au/environment/climate-change/pubs/climate-change-risk-assessment.pdf

16 Abbs, D.J., McInnes, K.L. and Rafter, T. (2007). The impact of climate change on extreme rainfall and coastal sea levels over South East Queensland, Part 2. Report prepared for the Gold Coast City Council, CSIRO Marine and Atmospheric Research.

17 Rafter, T. and Abbs, D. (2009). An analysis of future changes in extreme rainfall over Australian regions based on GCM simulations and Extreme Value Analysis. In: CAWCR Research Letters, Issue 3, December 2009. The Centre for Australian Weather and Climate Research

18 C Lucas, K. Hennessy, G. Mills and J. Bathols (2007) Bushfire Weather in Southeast Australia: Recent Trends and Projected Climate Change Impacts. A report for the Climate Institute of Australia

6.5 Premium Changes due to Cyclone Risk

According to the consensus statements of the 6th International Workshop on Tropical Cyclones,

> *It is likely that some increase in tropical cyclone peak wind-speed and rainfall will occur if the climate continues to warm. Model studies and theory project a 3-5 per cent increase in wind-speed per degree Celsius increase of tropical sea surface temperatures.*[19]

Destructive energy increases with the cube of the wind speed, thus even relatively small changes in peak wind speed can lead to notable increases in the level of destruction.

Based on high resolution modelling, there are three important trends projected for cyclones in Australia[20] (and global hurricanes more generally): (a) the overall frequency of tropical cyclones is modelled to decrease, (b) there is likely to be an increase in the frequency of more intense tropical cyclones (c) tropical cyclones will tend to reach further poleward (south in Australia).

The critical issue with regard to insurance for potential damage to a building is whether a gust of wind exceeds the design thresholds for the building. In this light, the reduced frequency of smaller cyclone events is much less important than changes to the severity of major events.

Considering intensity specifically, at the low end of projections this study has assumed a increase in 22 per cent increase based on Leslie and colleagues[21] and an interpolated doubling in intensity over the mortgage period based on Abs and colleagues.[22] The increase in the extreme weather component of the insurance premium in tropical-cyclone-exposed locations is assumed to increase in direct proportion to the change in intensity of the most extreme storms.

6.6 Financial Loss Changes for Exposed and Low Lying Coastal Properties

Even small amounts of sea level rise can significantly impact the probability of an event with damaging seas.

McInnes and colleagues projected the increased frequency of an equivalent high-sea event in Far North Queensland based on both storm surge and mean sea level rise. They found that a 1:100 year event would become a 1:40 year event.[23]

The ACE CRC has calculated the increase in the frequency of high-sea events around the country[24] as ranging from between 200 and 600 per cent for a 0.1 metre sea level rise, and 2 to 4 order of magnitude increases for a 0.5 metre increase in mean sea level.

The challenge of estimating future increases in losses from high-sea events is that they depend on the location of the buildings, soils and elevations and the probability of events that would exceed the exposure thresholds of the building.

In this study it is assumed that coastal areas exposed to high sea events – including erosion and saltwater inundation – might expect to face an increase in the probability of annual losses, from a doubling to a ten fold increase over the period to 2050.

Note that in most locations these potential annual losses are starting from a small risk base, but importantly these are not insurable risks under normal household policies (and are therefore not included in the insurability mapping).

19 WMO 2006, Sixth WMO International Workshop on Tropical Cyclones (IWTC-VI) WWRP 2007-1. WMO/TD No.1383

20 CSIRO/BOM 2007 Climate Change in Australia – Technical Report 2007. Chapter 5.

21 Leslie, L.M., D.J. Karoly, M. Leplastrier, and B.W. Buckley, 2007: Variability of Tropical Cyclones over the Southwest Pacific Ocean using a High Resolution Climate Model. Meteorology and Atmospheric Physics (Special Issue on Tropical Cyclones).

22 Abbs, D.J., S. Aryal, E. Campbell, J. McGregor, K. Nguyen, M. Palmer, T. Rafter, I. Watterson, and B. Bates, 2006: Projections of Extreme Rainfall and Cyclones. A report to the Australian Greenhouse Office, Canberra, Australia, 97 pp

23 CSIRO/BOM 2007 Climate Change in Australia – Technical Report 2007. Figure 5.46

24 Department of Climate Change and Energy Efficiency. 2009. Climate Change Risks to Australia's Coast: a first pass national assessment. Department of Climate Change. 172 pp.

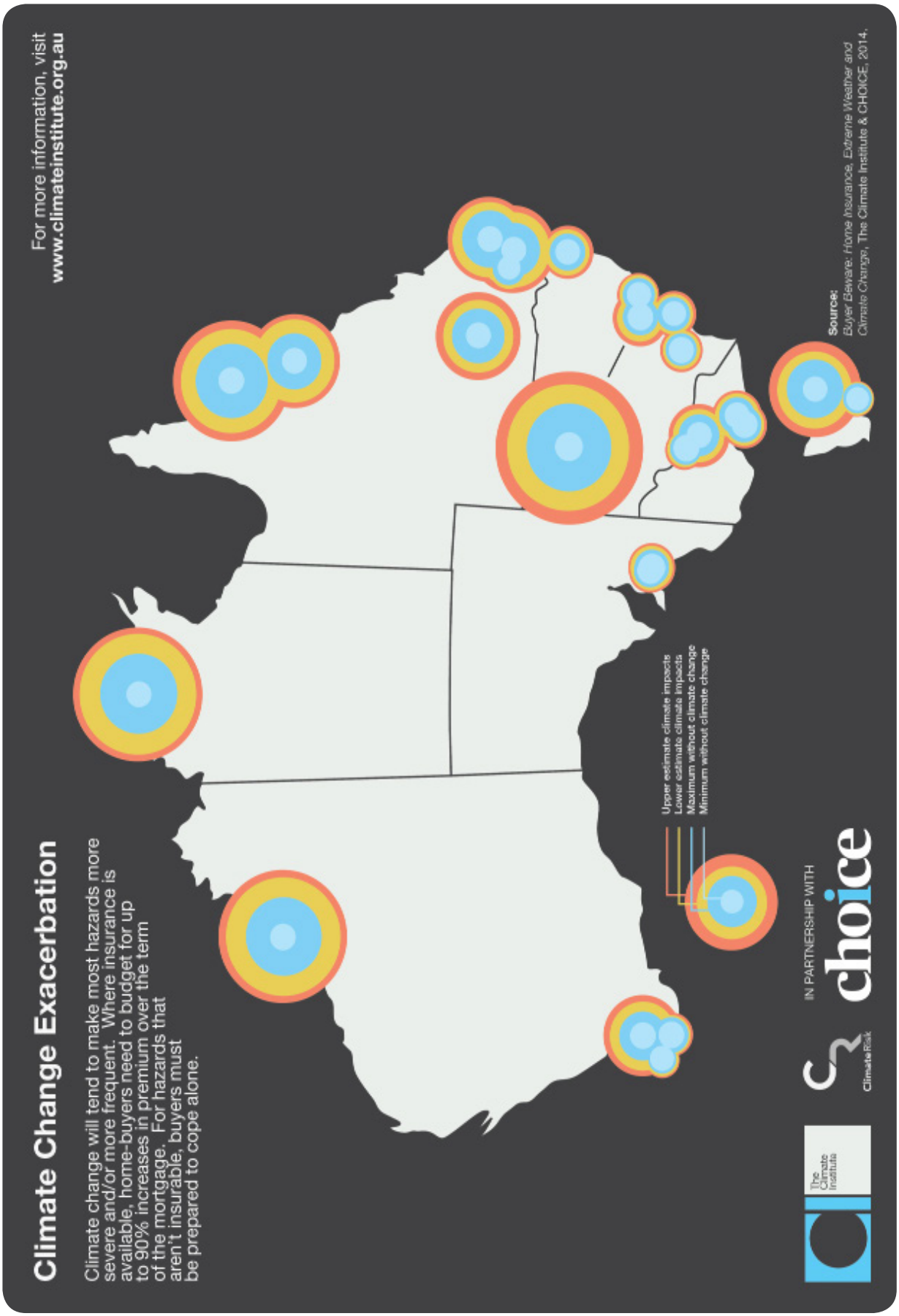

Figure 6.3

Projected Impact of Climate Change on Insurance Premiums.

Buyer-Beware: Home Insurance, Extreme Weather and Climate Change.

6.7 Losses from Landslip and Soil Contraction

Landslip and soil contraction risks are highly dependent upon the actual composition of soils and their stability as well as the design specification and materials used in the house foundations. They are also dependent upon the severity and duration of drought events.

Simulations show up to 20 per cent more drought-months over most of Australia by 2030. This rises to 40 per cent more droughts by 2070 in eastern Australia, and up to 80 per cent in south-western Australia.

Therefore, where there are vertosol soils and foundations vulnerable to soil contraction, homebuyers ought to be prepared for an increase in the risk of foundation damage of 30 to 50 per cent over the course of a mortgage.

6.8 Premium Increases and Value Reductions

The results of the analysis suggests that 92 per cent increases in premiums due to climate change are possible by 2050 (this time point being roughly equivalent to the end of a 30-year mortgage taken out today).

The effect of climate change on increasing insurance premiums and thereby impacting gross home ownership costs would effectively lead to property value reductions of 20 per cent or more, relative to the general market.

The implication for homebuyers is that they may need to factor 'climate impact inflation' into insurance premiums over the period of their property ownership, and consider the effect of these costs on re-sale value.

7. Findings: Why Homebuyers Must Beware

This section presents the findings of the analysis conducted for this study. It provides a general discussion of how different types of extreme weather are already affecting homeowners, how the market is failing to address property exposure to high climate risk and insurability risks, and how future climate change might exacerbate these risks. It also flags major insurance-related issues that homeowners should be aware of, such as an inability to access important information about climate and weather hazards, and the pitfalls of insufficient or unavailable insurance.

7.1 Homes are Being Built, Bought and Sold in High Risk Locations

Australia has only collected data on many risks for about a century. As noted in Section 2, this relative lack of knowledge on historical risks perhaps led some settlements to be placed where hazards were poorly understood and buildings poorly adapted to climate variability.

One of Australia's most severe lessons came on Christmas Day in 1974, when Cyclone Tracy forced the evacuation of Darwin. Northern Territorians awoke to find their capital destroyed. Since then, the Australian approach to extreme weather has been much more cautious and the appropriateness of homes and their locations more considered. Today it's generally known which locations to avoid and/or how to engineer buildings and settlements for the local weather extremes.

Despite these lessons, this study has found that buildings continue to be traded in the high-risk locations canvassed by the analysis. In sample locations likely to be exposed to bushfire, riverine flooding and extreme winds, the Insurability Risk Indicators demonstrated that one or more insurers are factoring these risks into their premiums or availability. Also of concern, many properties canvassed were also found to be exposed to hazards that were uninsurable. This would appear to confirm the view of the Insurance Council of Australia (ICA):

> *The Australian Building Code only seeks to protect the safety of occupants, and does not require the building to be resilient to damage.*[25]

In some cases homes are being built or renovated with even less resilience today than 50 years ago. For example, riverside homes in known flood-risk locations in South-East Queensland were originally built with living spaces elevated well above ground level and were therefore able to cope with several metres of flooding without consequence. Today, however, these lower-level spaces are being walled in to create extra rooms and granny flats now highly vulnerable to flood waters. Other buildings have been replaced with slab-on-ground construction, again leaving main living areas highly vulnerable to flood.[26]

It would appear that decades of planning laws have left councils weak or powerless to prevent developers from building and

25Productivity Commission, 2013. Barriers to Effective Adaptation. p. 191 http://www.pc.gov.au/__data/assets/pdf_file/0004/119713/13-climate-change-adaptation-chapter10.pdf

26 No individual addresses are released in this report

selling high-risk properties. In the same year as Cyclone Tracy, the Brisbane River demonstrated to Queenslanders the extent to which it could inundate the city by flooding 8,000 households.[27] Yet in 2011, for a flood level that was one metre lower, 25,600 homes were completely or partially flooded.[28] Thus the scale of risk actually increased. This failure is hard to fathom, given that the 1974 event clearly demonstrated the geographical extent of the exposure, and 37 years had elapsed to build protective structures, adapt existing buildings and avoid new, exposed development.

The problem is not confined to Brisbane, according to Risk Frontiers:

> *Very roughly we estimate the national numbers of homes at high risk – say exposed to over ground flooding in a 1-in-100 year event – to be around 150,000 addresses. Many of the land-use planning decisions that allowed these homes to be built were made before the availability of modern flood mapping and for reasons that at the time made perfect sense. However, there can be little excuse now for the continued development of the floodplain in ways that do not consider the latent risk.*[29]

For homebuyers in at-risk areas, this strongly implies the need for a cautious approach; they cannot assume properties offered for sale are at low risk from extreme events, even properties built very recently.

7.2 Governments are Not Requiring Risk Disclosure to Buyers

Recent legal changes in some states actually make it hard for local government to either protect buyers or inform them of emerging risks revealed by hazard modelling. A recent paper by legal firm DLA-Piper even suggests that the situation is going backward.[30] Under a proposal in New South Wales, for example, councils without a policy on future hazards may not be permitted to include risk warnings in mandatory disclosure on 149(2) certificates, used during house conveyancing.[31] Instead these warnings would be provided in advisory notices available upon request in 149(5) certificates. This type of change may help protect present property owners from having projected risks revealed at the point of sale, but it does so at the expense of new buyers.

In many local government areas, available hazard mapping in published reports is not suitable for proper risk analysis. Requests for digital flood maps of the type used in proper analysis often meet with refusal,[32] or cost up to hundreds of thousands of dollars (despite this information having been paid for by tax- and rate-payers). Appeals against such obstructive practices have been unsuccessful under state legislation. This obstruction makes it hard or even impossible for independent analysts to

27 BOM 2013 Known Floods in the Brisbane and Bremer River Basin http://www.bom.gov.au/qld/flood/fld_history/brisbane_history.shtml

28 http://www.bom.gov.au/qld/flood/fld_history/brisbane_history.shtml

29 Risk Frontiers 2011, Response to the Natural Disaster Insurance Review http://www.ndir.gov.au/content/submissions/issues_paper_submissions/Risk_Frontiers.pdf

30 Bell, J and Baker-Jones, M (2014) Retreat from retreat – the backward evolution of sea-level rise policy in Australia, and the implications for local government. Local Government Law Journal (2014) 19 LGLJ 23. http://www.dlapiper.com/~/media/Files/Other/2014/Retreat_from_retreat.pdf

31 Wollongong Council 2014 submission on coastal hazard notations on section 149 planning certificates ref: cm43/14 file: esp-080.03.003, http://www.wollongong.nsw.gov.au/council/meetings/BusinessPapers/Submission%20on%20Coastal%20Hazard%20Notations%20on%20Section%20149%20Planning%20Certificates.pdf

32 Pers. Comm. J L Bohm (4/12/12).

provide homebuyers with services to analyse and advise of the risks.

The implication for homebuyers is that they cannot assume, even if hazards are known to Council and mapped, that: councils will automatically disclosed risk; risks will be discovered in the conveyance process; or that risks will be accessible to an independent risk analyst.

7.3 Insufficient Insurance to Rebuild

Underinsurance refers to levels of coverage that are inadequate to restore a house to the same level of amenity.

In the locations canvassed for this analysis, the replacement value of a building ranged up to 95 per cent higher than its current value. This means that unwitting homebuyers, who are underinsured but find they must rebuild, could face the scenario of an insurance payout that is only about half the amount required to replace their house.

The implication for homebuyers is that they need to factor a margin for increasing re-building costs into the replacement payout provided in the policy. In some locations, the replacement costs could be double the current value of the building, and this higher cost will have to be reflected in the insurance premium.

7.4 Unaffordable Premiums

This study finds that premiums can be up to 10 times higher than normal in locations exposed to significant hazards.

This study also dispenses with the myth that these risks are usually restricted to the coast. Relatively high premiums were found not only in coastal locations but also in inland suburbs of Australia's largest cities.

House insurance premiums for sample locations in this study ranged from a normal level of about 0.1 per cent of the property value (land and building) up to a full 1 per cent of the property value per year, a significant cost burden. (For comparison purposes, annual mortgage repayments may be on the order of 5 per cent of a property's value.)

The implication for homeowners is that they cannot assume insurance fees will be a relatively minor cost of homeownership. In some locations insurance will increase the cost of home ownership by up to 20 per cent. Homebuyers will need to budget for this cost, and for some it may be sufficiently high to cause them to avoid purchasing a given property. Buyers could also shop around for better insurance offers. However, large discrepancies in the premium prices may not be a positive sign (see below).

7.5 Differences of Opinion

This study identified large differences in pricing (Price Shear) for the same insurance product at the same location. In principle, this discrepancy provides homeowners with the opportunity to shop around to find better deals. But insurance customers should not overlook the potential warning signs inherent in large price differences.

Based on this analysis, premium variations of 20 to 100 per cent appear quite normal. However, if one insurer is charging 11 times more than another, as revealed in several locations, this

“This study finds that premiums can be up to 10 times higher than normal in locations exposed to significant hazards.”

“Homebuyers, who are underinsured but find they must rebuild, could face the scenario of an insurance payout that is only about half the amount required to replace their house.”

discrepancy may signal a significant risk that one insurer knows something the other does not. An insurer might decrease their premiums once they have more information. Equally, however, all parties could shift to the higher price point: this presents a risk to the homebuyer. One insurer, for example, may charge more because they are factoring rising climate change-related hazards into their equations.

Though the premiums are substantially higher in the northern regions of Australia, Price Shear is much worse in southern Australia, as shown in section 5.4. It may therefore be riskier for some homebuyers in the southern regions because there is a significant possibility of sudden price changes.

The implication for homebuyers is that, although relatively cheap policies may be available, the presence of high-cost polices in the market could signal the shape of things to come. Homeowners should therefore consider the full range of premiums, and view large differences in price as both a cause for concern and a reason for further investigation.

7.6 Refusal to Offer a Policy

In each of the 42 selected locations canvassed in this study, at least one insurer was available to provide an online quote. However, in many of the locations surveyed, one or more of Australia's largest insurance companies were unwilling to provide an online quote for the property. (The applicant is referred to make direct contact with the company).

In the 28 locations canvassed that are known, or assumed, to have high levels of weather-related risk, the refusal rate was higher; for 50 per cent of these locations, one or more insurer declined to provide an online quote. In fact, in some locations, 4 out of the 6 major insurers refused to provide an online quote. By contrast, in the control sample, which was restricted to properties at low-risk locations, no insurers refused to provide online quotes.

The implications for homebuyers of one or more insurers refusing to provide an online quote are quite important, since they suggest that the insurer would rather walk away. The homebuyers must ask themselves if there is a compelling reason why they should not take the same view. As with cost of premiums, the buyer may well be able to shop around and find another provider, but this overlooks the issue that one insurer may know what another does not.

7.7 Uninsurable Hazards

This study identified a number of uninsurable hazards. Some of these may already pose potential risks to properties today. Climate change, however, may exacerbate some of these hazards, or cause them to emerge as new risks for some homes.

Coastal Inundation and Storm Surge. In Australia, 8 out of 10 people live within 50 kilometres of the coast. Since 1880, the average sea level has risen by more 20 centimetres, due to thermal expansion of the oceans and glacier melt. Although the rate of sea-level rise varies around Australia, in low-lying coastal areas flooding is a real risk, one that is increasing in a non-linear fashion. Cyclones and east-coast lows create storm surges that can cause sea levels

"Though the premiums are substantially higher in the northern regions of Australia, Price Shear is much worse in southern Australia. It may therefore be riskier for some homebuyers in the southern regions because there is a significant possibility of sudden price changes."

to rise temporarily by several metres. With a future sea-level rise of only 10 centimetres, for example, today's 1–in-100-year storm-surge event would likely occur several times per year, on average. A sea level rise of 50 centimetres would see the average frequency of such an extreme event rise up to 10,000 per year, depending on the location. [33]

Erosion. Within a few hundred metres of the coast, erosion is a risk to dwellings built on soft sandy soils. Coastal erosion can be caused by severe sea conditions, but also by general changes in prevailing wave direction.

Landslip. Residents at locations relatively distant from coasts and rivers may be unaware that they too may be vulnerable to soil movement on steep slopes, from flash-flooding or extreme precipitation causing localised soil saturation, instability and landslip.

Soil Contraction. Large parts of Australia are built on vertosols, a type of clay soil that readily contracts and expands as its moisture content changes. Foundations built on this soil can be prone to cracking when the soils dry out, as occurs during prolonged drought. Climate change looks set to exacerbate drought risk. In Australia's southwest since the 1970s, and the southeast since the 1990s, cool-season rainfall has been declining (by 17 and 15 per cent, respectively).[34] Rainfall in southern Australia is expected to continue to decrease, and the frequency, intensity, and spatial extent of droughts to rise. [35]

Many homeowners do not realise that coastal inundation, erosion, landslip, and soil contraction are not covered by any normal insurance policy in Australia. This leaves homebuyers highly vulnerable to a non-recoverable loss. Lack of coverage for these hazards could also, in principal, make buildings unavailable for mortgages in future. Homebuyers should seek to identify whether a property is subject to uninsurable risks in potentially exposed locations.

7.8 Climate Change Exacerbation

It is not yet possible for homebuyers to discern the extent to which insurers may or may not be factoring climate change into premiums. Homebuyers should, however, expect that this is happening or will happen. First-estimate analysis for this study, which estimated future premium price variations, suggests that 92 per cent increases are possible, based on scientific projections out to 2050 (this time point being roughly equivalent to the end of a 30-year mortgage taken out today.)

Based on the reduction in affordability, the combination of climate change and insurability could lead to property value reductions of 20 per cent or more for exposed properties relative to the general market value.

The implication for homebuyers is that they may need to factor climate-change-related inflation of insurance premiums over the period of their property ownership, and consider the impact of these costs on re-sale value.

> Insurers must respond to escalating exposure and poor resilience by raising premiums or even withdrawing cover.

33 Geoscience Australia 2012, OzCoasts: Frequently Asked Questions http://www.ozcoasts.gov.au/climate/sd_fqa.jsp#impact

34 CSIRO, BoM, 2014 State of the Climate

35 K. Hennessey, et al. 2008 An assessment of the impact of climate change on the nature and frequency of exceptional climatic events. CSIRO and Bureau of Meteorology.

8. Conclusions and Recommendations

The results of this study suggest that some homeowners are caught in a property market failure between governments, builders and insurers. The evidence suggests that federal, state and local governments are failing to discourage settlement in high-risk locations. In many cases governments are failing to make risk information freely available. Property developers are not under a consistently applied obligation to ensure buildings are resilient to future local climate and weather hazards. So insurers must respond to escalating exposure and poor resilience by raising premiums or even withdrawing cover.

Many Australians are unwittingly buying the wrong house in the wrong location. Many are also paying high premiums and, in some cases, one or more insurers refuses to quote at all. Premiums 10 times higher than normal and costing many thousands of dollars per year present real risks, as much for homebuyers in Australia's largest cities as in rural or coastal locations.

Climate change will make a bad situation worse. Climate projections clearly indicate that some risk factors will evolve substantially over the typical 30-year term of a mortgage. It is reasonable to assume that some of these changes will be reflected in even higher insurance premiums for properties already exposed to extreme weather risks. Climate change may push insurance for some properties beyond normal affordability. This will have consequences for property values.

The study estimates that climate change and changes to insurability could lead to property value reductions of 20 per cent or more.

8.1 A Buyer-Beware Market

The study characterises today's market as 'buyer-beware'. It lacks the market signals and consumer protections that buyers might reasonably assume would help inform their property decisions and, in their absence, protect them from market failure. Under these market conditions, property buyers must act with caution. Although not all properties are exposed to all hazards, there are general geographic belts or types of risk that homebuyers should consider, as follows:

1. Houses on soft or erodible soils (for example, sandy soils) close to coastal waters.

2. Houses within a few metres' elevation of the current high tide level.

3. Houses on steep slopes where ground is of 'uncertain stability'.

4. Houses in soils prone to contraction in drought-risk areas.

5. Houses close to rivers or in locations that may be within a floodplain.

6. Houses within or close to forests or grassland in the bushfire belts.

7. Houses exposed to extreme wind and cyclones.

8. Houses constructed prior to hazard-dependent building standards.

9. Houses that may have highly exposed infrastructure for power, water and roads.

10. Houses in locations with inadequate protective infrastructure.

Just because a home is highly exposed to a hazard is not necessarily a reason to walk away. However, potential homebuyers should examine a property's resilience to local hazards, to ensure that the design and materials can reduce the risk of damage and loss, and that insurance will be affordable.

To help homebuyers identify properties with high insurability risk, this study sets out five Insurability Risk Indicators. These indicators signal when homebuyers should tread carefully. Homebuyers are strongly recommended to obtain a series of online quotes for their target property and to apply each of the five indicators. A poor result does not necessarily mean a problem, but it does imply that more research is warranted, such as seeking information from the local council.

Climate change has been factored into this study from the perspective of homebuyers assessing properties (but not from the point of view that climate change is already affecting premiums). Although climate change will have little or no direct impact on most homes, which are not in high-risk locations, in some instances homeowners should prepare for premiums that could roughly double over the course of a 30-year mortgage.

Where insurance becomes unaffordable, unavailable or simply doesn't cover the relevant hazards, effective adaptation to climate change may require transformative changes to settlement patterns. This has consequences for individual homeowners, but also for the insurance industry and society as a whole. This is because government - and hence the taxpayer – is still often seen as insurer-of-last-resort. Large public bailouts of companies and communities affected by climate-related catastrophes cannot be sustained if these impacts become the norm rather than the exception.

The property market failure demonstrated by this study indicates a heightened role for government under climate change. Government must act to shepherd – and in some cases regulate – development and settlement patterns to ensure they are appropriate and resilient. It must act to make hazard information readily available, mandate its disclosure, and require forward-looking resilience. In some cases it will need to manage the long-term withdrawal of settlements from untenable locations.

Recommendations to Governments.

To address this property market failure, federal, state and local governments must:

1. Mandate disclosure of all available hazard mapping including in digital formats, e.g. Global Information System.
2. Require that all dwellings and associated infrastructure be built or renovated as fit-for-purpose for the maximum projected impacts over their design life.
3. Disclose extreme weather and climate change risks associated with a property at the point of sale and legislate the *Key Fact Sheet*[36].
4. Disclose current and projected insurance premiums for a property at the point of sale, based on independent metrics (such as those presented in this report).
5. Disclose any settlements where climate change risks make future habitation untenable this century.

36 Key Fact Sheet for home building and home contents insurance policies. This reform was completed and is in place, but the relevant regulations haven't commenced yet. They will begin in Nov this year. See Insurance Contracts Amendment Regulation 2012 (No 2): http://www.comlaw.gov.au/Details/F2012L02163/Explanatory%20Statement/Text

Recommendations to Homebuyers.

Based on the results of this analysis, potential homebuyers are advised to:

1. Ask the local council whether the dwelling is in a location where historical climatic data puts it at risk from extreme weather impacts.
2. Check whether the dwelling will be exposed to rising extreme weather risk because of climate change.
3. Test the house against the five Insurability Risk Indicators.
4. Factor into the purchase price of the home the costs of adaptation and/or current and future insurance prices.
5. Avoid properties where insurability is uncertain, may become unaffordable/ unavailable, or will lead to deterioration in property value.

Recommendations to Insurers.

To assist the property market in general and homebuyers in particular, it is recommended that insurers;

1. Establish mechanisms that allow premiums to reflect the resilience of residential properties.
2. Disclose to consumers the reason why a particular quotation is unavailable or significantly more costly than market norms if extreme weather and climate change are factors.
3. Add policy options to include climate exacerbated risks including erosion, soil contraction and actions of the sea.

Beyond the mortgage term.

This study has focused on climate change impacts over the term of a 30 year mortgage. These impacts are largely unavoidable due to the greenhouse gases already in the atmosphere. Beyond this period the severity of impacts will be affected by current and future emissions.

Rising emissions and worsening climate change will inevitably lead to more properties and settlements becoming exposed to extreme weather, resulting in higher premiums and more properties becoming uninsurable.

Willing or not, property owners and insurers have a significant stake in the success of government initiatives to regulate emissions.

9. Appendix A: Insurability Indicators Method

9.1 Underinsurance

The underinsurance comparison was conducted using the highest property replacement cost returned for each location. This may not correspond to the same insurer quoting the highest premium. Sometimes the packages derived from each insurer were not completely aligned, for example, some insurers used a customer-provided replacement cost while others automatically calculated their own replacement cost. Only insurer-provided costs were used to compare replacement costs in order to identify possible Underinsurance Risk.

9.2 Heightened Premiums and Price Sheer

For the premium comparison the highest collected prices and the lowest prices from each location were used to capture the range of costs. The difference between the maximum and the minimum premium as a proportion of the nominal (no-hazard) premium was used to calculate Price Sheer.

9.3 Absentee Insurers

For each location analysed, it was noted when one or more insurers would not provide a quote online for the location stipulated. Insurers would often recommend that users personally contact their company. Climate Risk did not pursue these quotes further, but has deemed this to indicate possible uninsurability.

9.4 Non-covered Exposures

Each insurer has a Product Disclosure Statement/Agreement (PDS/PDA) for events not covered by the contract. Standard online polices excluded the following events, which were hazards that some properties in the sample were considered to be exposed, the following comes from Suncorp Insurance *Home and Content Insurance, Product Disclosure statement*:

- *Loss or damage caused by actions or movements of the sea or storm surge;*
- *Loss or damage caused by erosion, vibration, subsidence, landslip, landslide, mudslide, collapse, shrinkage or any other earth movement;*
- *Heat, ash, soot and smoke when home or contents has not caught on fire unless it is caused by a burning building within 10 metres of the insured address.*[37]

37 Suncorp Metway Insurance Ltd, 2012, Home and Content Insurance Product Disclosure Statement.

10. Appendix B: Sourced data and profile

Home Profile

- Year built: 1970
- Number of storeys: 1
- Number of bedrooms: 2
- Number of bathrooms: 1
- Number of garages: 1
- No balconies/decks/verandahs
- House description: house on slab
- Construction material: Brick Veneer
- Roof material: Colorbond/metal
- Total Cost to rebuild: $200,000 (if needed)
- Age of Policyholder: 40 (1974)
- Size of building = 100m^2
- House occupied: Owner occupied – no business activity
- No pool
- No Strata
- Occupied during the day
- Flood cover included
- Not built on a steep slope
- Accidental damage cover included
- Standard $500 excess

Table 10.1: Replacement Value research data

Area	Replacement Value
Maroochydore, QLD, 4558	$179,000.00
Echuca, VIC, 3564	$184,000.00
Thompson Beach, SA, 5501	$184,000.00
Narrabeen, NSW, 2101	$185,000.00
Wyong, NSW, 2256	$187,000.00
Wannanup, WA, 6210	$187,000.00
Collie, WA, 6225	$191,000.00
Dunalley, 7177, TAS	$192,000.00
Koondrook, VIC, 3580	$198,000.00
Duffy, 2611	$198,000.00
Blackheath, NSW, 2785	$200,000.00
Grafton, NSW, 2460	$201,000.00
Rosslea, Queensland, 4812	$202,000.00
Roma, QLD, 4455	$202,000.00
Edge Hill, QLD, 4870	$208,000.00
Mount Dandenong, VIC, 3767	$216,485.00
Cable Beach, WA, 6726	$288,000.00
Coconut Grove, NT, 0810	$347,000.00
Wagait Beach, NT, 0822	$347,000.00

Note: The information in the tables relates to the hypothetical home profile, which is an example only. It should not, and is not intended to, be used for assessing replacement value or insurance premiums for an actual home in the relevant area and cannot be relied upon. Readers should make their own inquiries with respect to actual properties.

Table 10.2: Maximum and Minimum Premium research data

Area	Maximum Premium	Minimum Premium
Blackheath, NSW, 2785	$1,491.00	$475.00
Worrigee, NSW, 2540	$1,111.00	$664.00
Wyong, NSW, 2256	$1,052.00	$647.00
Grafton, NSW, 2460	$1,418.00	$538.00
Mona Vale, NSW, 2103	$880.00	$449.00
Narrabeen, NSW, 2101	$1,424.00	$880.00
Collaroy, NSW, 2097	$880.00	$449.00
Edge Hill, QLD, 4870	$5,204.00	$1,936.00
Rosslea, QLD, 4812	$3,319.00	$2,630.00
Bundall, QLD, 4217	$2,345.00	$605.00
Mount Lofty, QLD, 4350	$1,021.00	$552.00
Woodend, QLD, 4305	$3,005.00	$1,558.00
Maroochydore, QLD, 4558	$3,132.00	$574.00
Roma, QLD, 4455	$2,941.00	$844.00
Inverloch, VIC, 3996	$1,008.00	$349.00
Venus Bay, VIC, 3956	$1,133.00	$349.00
Altona, VIC, 2018	$830.00	$375.00
Marysville, VIC, 3779	$1,298.00	$302.00
Mount Dandenong, VIC, 3767	$1,162.00	$348.00
Echuca, VIC, 3564	$1,748.00	$372.00
Koondrook, VIC, 3580	$1,051.00	$386.00
Semaphore, SA, 5019	$667.00	$282.00
Thompson Beach, SA, 5501	$1,088.00	$468.00
Glenelg North, SA, 5045	$729.00	$309.00
Upper Sturt, SA, 5156	$1,189.00	$318.00
Brooklyn Park, SA, 5032	$972.00	$315.00
Duffy, 2611, ACT	$1,043.00	$468.00
Cable Beach, WA, 6726	$6,321.00	$3,273.00
Wannanup, WA, 6210	$1,240.00	$328.00
Pemberton, WA, 6260	$1,039.00	$231.00
Margaret River, 6285, WA	$781.00	$292.00
Collie, WA, 6225	$2,523.00	$320.00
Coconut Grove, NT, 0810	$6,424.00	$2,668.26
Wagait Beach, NT, 0822	$4,439.00	$2,021.75
Dunalley, 7177, TAS	$639.00	$271.00
St Helens, 7216, TAS	$3,317.00	$295.00

Table 10.3: Premium increase due to low climate change and high climate change

Area	2014 Estimated Extreme Weather Component of Premium*	Additional to premium in Low Climate Change	Additional to premium in High Climate Change
Windsor, NSW, 2756	$6,663.00	$333.15	$6,663.00
Grafton, NSW, 2460	$818.00	$40.90	$818.00
Woodend, QLD, 4305	$2,405.00	$120.25	$2,405.00
Maroochydore, QLD, 4558	$2,532.00	$126.60	$2,532.00
Roma, QLD, 4455	$2,341.00	$117.05	$2,341.00
Echuca, VIC, 3564	$1,148.00	$57.40	$1,148.00
Koondrook, VIC, 3580	$451.00	$22.55	$451.00
Brooklyn Park, SA, 5032	$372.00	$18.60	$372.00
Collie, WA, 6225	$1,923.00	$96.15	$1,923.00
St Helens, 7216, TAS	$2,717.00	$135.85	$2,717.00
Blackheath, NSW, 2785	$891.00	$178.20	$891.00
Worrigee, NSW, 2540	$511.00	$102.20	$511.00
Wyong, NSW, 2256	$452.00	$90.40	$452.00
Mount Lofty, QLD, 4350	$421.00	$84.20	$421.00
Marysville, VIC, 3779	$698.00	$139.60	$698.00
Mount Dandenong, VIC, 3767	$562.00	$112.40	$562.00
Upper Sturt, SA, 5156	$589.00	$117.80	$589.00
Duffy, 2611, ACT	$443.00	$88.60	$443.00
Pemberton, WA, 6260	$439.00	$87.80	$439.00
Margaret River, 6285, WA	$181.00	$36.20	$181.00
Dunalley, 7177, TAS	$39.00	$7.80	$39.00
Rosslea, Queensland, 4812	$2,719.00	$598.18	$2,719.00
Wagait Beach, NT, 0822	$3,839.00	$844.58	$3,839.00
Edge Hill, QLD, 4870	$4,604.00	$1,012.88	$4,604.00
Coconut Grove, NT, 0810	$5,824.00	$1,281.28	$5,824.00
Cable Beach, WA, 6726	$5,721.00	$1,258.62	$5,721.00

*Maximum Premium - Nominal

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