# The effects of climate change induced coastal inundation.

## By Chris Forbes[1]

The 2007 IPCC Report indicates that by the end of the 21st century, sea levels will rise by 0.8 meters. This is a significant concern for Australia and its coastline. This report outlines a select number of issues coastal communities and governments will face as sea levels rise. Particularly, the report will identify and analyze liability issues facing coastal councils as property owners face decreasing land values, erosion and inundation of their properties. There is a need for councils to closely monitor their development approval process and ensure a 'best practice' approach is adopted to minimize the risk of adverse effects to coastal properties. The second main issue this report will investigate is the insurance industry's capabilities to assess risk and vulnerability and develop adaptive strategies in response to coastal inundation. Its role will be investigated as a key player to work alongside governments to develop and reform policy and legislation to mitigate the effects of climate change induced coastal inundation.

### 1. Introduction

The Fourth Assessment Report released by the Intergovernmental Panel on Climate Change (IPCC Report) projected a sea level rise of between 0.18-0.59 metres by 2090-2099.[2] Throughout the 21st century, the IPCC predicts that coasts are expected to be exposed to increased risks, including coastal erosion due to climate change and sea level rise.

The IPCC Report claims that there is a very high confidence that the effect will be exacerbated by an increase in human induced pressures on coastal areas and that by the 2080's, many millions more people than today will experience floods every year due to sea level rise.[3] There is very high confidence that the largest population numbers affected will be in densely populated and low lying mega deltas of Asia and Africa while small islands will be especially vulnerable.[4]

Looking at the IPCC Report's predictions on various regions, by 2050 Australia and New Zealand's population growth is expected to exacerbate the risk from sea level rise and increases in the severity of coastal flooding.[5] The effect of climate change in Europe is expected to magnify regional differences for natural resources and assets and include more frequent coastal flooding and increased erosion.[6] North American coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution[7] and sea level rises, storm surges and erosion are expected to exacerbate inundation of small island communities and affect local resources.[8]

According to a report on the insurance industry's response to climate change, the worldwide economic loss from weather related disasters in 2008 was around $130 trillion.[9]

The legal recognition of climate change is gaining momentum in accordance with an increased awareness and acceptance of scientific evidence in relation to the anthropogenic effects on the climate system. In response, there has been an increase in case law, legislative development and international regulation building upon the legal principles and rules identified as 'climate change law'.[10]

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2 Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, Report No 4, Geneva, 2007 at 45
3 Note 1 at 48
4 Note 2
5 Note 1 at 50
6 Note 4
7 Note 1 at 52
8 Note 1 at 52
9 Geneva, Geneva Association, A Global Review of Insurance Industry Response to Climate Change, International Association for the Study of Insurance Economics, 2009
10 J Peel, 'Climate Change Law: The Emergence of a New Legal Discipline' (2008) 32(3) *Melbourne University Law Review* at 923

Climate change law can be seen from both a global (ocean warming) and local (extinction of species particular to certain areas) perspective and encompass governance from an international level to a local level. There is an increase in anxiety and concerns spanning all levels of government and property owners as coastal properties are becoming more susceptible to the effects of coastal inundation. There are issues of diverging expectations as to how much responsibility should fall upon councils to protect property owners from coastal inundation. Conversely, there are diverging expectations as to how responsible property owners should be for the decrease in value, and in the most severe cases, the loss of their properties to coastal inundation.

There are examples of coastal properties, both in Australia and overseas, being ineligible for adequate insurance cover because of an increased risk in loss of value, damage or loss of property due to coastal inundation. What level of protection should property owners receive, if they should receive any protection at all, from the various levels of government?

This research report aims to identify, analyse and critique the legal and regulatory framework in relation to climate change induced coastal inundation and the effectiveness in regards to the competing interests of coastal property owners and local councils. The argument put forward is that in order to achieve an effective approach to mitigation and adaptation of coastal inundation, there needs to be a focus on strategic integration of all levels of regulation with an emphasis on adaptation at the local levels. This, along with direct involvement from the insurance industry is essential in achieving a viable, commercial and sensible approach to adapt to the effects of climate change induced coastal inundation.

## 2. Issues surrounding areas susceptible to coastal inundation

### 2.1 Background

Australia's coastal zone is under increasing pressure with approximately 80% of Australians living within 50 kilometres of the coast.[11] The potential impacts for these communities include sea level rise, increased coastal flooding and storm surges, increased coastal erosion and the destruction of property.[12]This section of the report will briefly summarise the decreasing coastal property values as a consequence of inundation, unsustainable property development and the potential liability of inappropriate council development processes and coastal management systems. The issues facing the insurance industry's heightened risk assessment leading to the unavailability of insurance for certain coastal properties will also be introduced as this links in with the potential liability of councils if development is approved in areas deemed too risky to receive insurance coverage.

### 2.2 Decrease in property values

Many developed areas the subject of coastal inundation are considered to have a high real estate value. However there are growing numbers of property owners worried about the loss of this value. There are instances of a 50% reduction in the value of some properties due to coastal erosion and there are suggestions of a duty of care owed by councils to prevent loss of value due to inundation and erosion where residents have been paying council rates for 30 or 40 years.[13]

The loss of value of coastal land is an increasing risk as the threat of climate change threatens to increase the frequency and severity of inundation. There is evidence suggesting that municipalities right across Australia have not got a handle on the value of assets that are under risk and the adaptive strategies that should be taken in response.[14]

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11 Australia, Department of Climate Change, *Climate Change Adaptation in Australia's Coasts* http://www.climatechange.gov.au/impacts/coasts.html, at 23 September 2009

12 K Ruddock, *Factoring climate change and sea level rise into planning and infrastructure decisions?* (2008) Environmental Defender's Office New South Waleshttp://www.edo.org.au/edonsw/site/pdf/papers/090525cc_planning.pdf at 15 August 2009

13 K Maguire and G Oakeshott, 'Crumbling Coast', *About the House,* September 2009 http://www.aph.gov.au/house/news/magazine/ath38_coast.pdf at 23 September 2009

14 Note 11 at 21

The decrease in land values is a result of certain types of council policies responding to an increase in the effects coastal inundation. There is an increasing level of urgency in which coastal councils must consider the effects of climate change and property owners will cause a significant portion of the effects of coastal inundation. The question of who should be liable for this loss of asset value is contentious. Should those who purchase properties in high risk coastal areas, assuming they are fully informed of the potential effects, assume the risk of a decrease in value? How do we respond to those who have owned coastal property for several decades, before the cause and effects of climate change induced coastal inundation became known, to deal with the incremental and certain loss of property value over time? Where does the responsibility lie for this loss in value, and should compensation be provided to assist those property owners from financial loss?

### 2.3 Unsustainable property development

An obvious issue in relation to climate changed induced coastal inundation is unsuitable property development. Properties constructed on beach front land, man-made canals and low lying coastal areas which are prone to tidal flooding cause significant issues in mitigating the effects of inundation.

The loss of property by coastal inundation can raise the question of liability. Liability will be difficult to determine unless there are clear guidelines in place for when decisions are being made by those looking to purchase coastal properties and for councils when local laws and policies are being formulated.

An example of this issue is outlined in the case of *Vaughan v Byron Shire Council.*[15]The owners of a beachfront property on Belongil Spit at Byron Bay attempted to rebuild an interim sandbag wall constructed by the local Council which had been destroyed by rising ocean water levels. The Council sought an interlocutory injunction against the Vaughans to restrain the rebuilding of the wall.[16] The Council argued that the structures will cause damage to other properties by exacerbating existing down drift erosion impact, and that the structure would impede access to the beach.[17]The court ruled in favour of the Council, and an injunction against the rebuilding of the interim wall was enforced.[18]The legal framework behind this aspect of the Byron Council's coastal management scheme is discussed more fully in 4.2 below.

Another example is shown through the purchase of two adjoining properties in 2001 at Old Bar New South Wales. In 2008, the highest tide in 22 years washed away six metres of Mr Key's land in four hours. After the loss of this land, Mr Keys complied with a local council order to demolish both houses on the properties. Previously he had been made aware of this policy and was told he would be allowed to rebuild if required. However after demolishment, the council revealed it had reviewed its previous policy and prevented Mr Keys from rebuilding his homes.[19]

As a consequence of a lack of clear policy and legislative guidance and communication, the above two scenarios played out causing significant uncertainty for property owners in terms of the extent in which they are able to protect their properties, and for the councils in terms of their increase in exposure for potential liability.

Coastal erosion also presents a significant issue surrounding the development of areas susceptible to inundation. As the loss of land along the shoreline due to the natural removal of beach and dune material occurs, buildings in these low-lying coastal areas can be inundated due to storm surge conditions[20]and this also decreases property values or more significantly lead to a loss of property all together.

### 2.4 Insurance industry

The justification for the insurance industry's involvement in climate change is based upon the fact that weather and climate are core business for the insurance industry. The insurance industry provides a financial recovery mechanism from weather related catastrophes by evaluating, pricing and spreading the risk of such events, then paying claims

15 [2009]NSWLEC 88
16 Note 11 at [1]
17 Note 11 at [6]
18 Note 11 at [18]
19 Note 12
20 State Emergency Service New South Wales, *Coastal Erosion and Inundation, http://text.www.ses.nsw.gov.au/topics/5844.html* 23 September 2009

when they arise. In this way, the insurance industry can be seen as being at the 'coalface' of climate change effects due to their heightened awareness of climate change. The insurance industry is a basis in which market based strategies for the adaptation to coastal inundation can be developed. From this, climate change law is very relevant to insurers considering the scope of risks to include in insurance contracts.

The role of insurance underwriting weather-related risk is an important component of the national economy. Any reduction in the industry's ability to underwrite weather-related risk will have serious ramifications for the economies of those vulnerable regions where climate and weather risk is great.[21] An increase in the risk of property damage due to coastal inundation presents significant issues for insurance consumers. There are a number of real and potential problems consumers may face. These include:

- a significant increase in real premium charges;
- the limited pool insurance funds come from;
- the withdrawal of coverage for certain types of events in certain areas such as flooding of low lying areas;
- an increase in under-insurance due to the lack of real appreciation consumers have for the risk of property damage;
- an increase in levels of non-insurance leading to an increase in property loss; and
- an increase in the number of conditions insurers insist upon before adequate coverage is provided.[22]

## 3. International and national perspectives on coastal management

### 3.1 Background

It is necessary to investigate a select number of other jurisdictions and summarise their handling of the threat of coastal inundation, and what their coastal strategy programmes involve to determine an appropriate Australian local council response to coastal inundation.

### 3.2 Venice

The Consortium for Coordination of Research Activities Concerning the Venice Lagoon System is an association set up between several Italian universities and Italy's National Research Council. Their website states 'Venice and its lagoon constitute a complex system of major historical, artistic and environmental interests that is currently passing through a delicate phase – in the quest for equilibrium between man's needs and the conservation and restoration of the environmental system'.[23]Because of the long history of coastal inundation, Venice provides an excellent example of a region facing the immediate effects of storm surge, subsidence and sea level rise from climate change.[24]

Rebuilding at higher levels and modifying structures has been their adaptive response.[25]Since 2000, Venice has developed two major strategies to adapt to rising sea levels. These are the:

(a) implementation of the 'Moses' project which consists of the construction of a mobile barrier system together with public works designed to protect Venice from inundation; and
(b) 'Rialto' project which is a system designed to 'lift' nominated buildings by one metre in response to the sea level rise. [26]

Given the IPCC's prediction of a 0.8 metre sea level rise by the end of this century, Venice's 'Rialto' project appears to be a suitably adapted response. Although the Venice response may be appropriate to the particular region, the application of a system similar to the 'Moses' or 'Rialto' projects is impractical for Australia's response, given the significant difference in land types.

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21 T Coleman, Insurance Australia Group, *The Impact of Climate Change on Insurance against Catastrophes,* < http://stephenschneider.stanford.edu/Publications/PDF_Papers/IAG-Climate_Change_Paper.pdf> 23 September 2009

22 Australia, Parliamentary Library, *Climate change –background note,* (2009) < http://www.aph.gov.au/library/Pubs/ClimateChange/effects/economic/onInsurance.htm> at 23 September 2009

23 CORILA, *Consortium for Coordination of Research Activities Concerning the Venice Lagoon System* < http://www.corila.it/ENCorila.asp> at 1 October 2009.

24 B Norman, *Planning for Coastal Climate Change – An Insight into International and National Perspectives* (2009) Victorian Government < http://www.climatechange.vic.gov.au/CA256F310024B628/0/8A5ACCF88D5F6257CA257626001574ED/$File/Planning+for+coastal+climate+change+v1.pdf> at 1 October 2009.

25 Note 23 at 23.

26 Note 23 at 23.

### 3.3 Nethelands

The Netherlands provides a useful case study as it has been dealing with coastal inundation for a long period of time. Over 60% of the country is below sea level however much of that land still remains economically productive.[27]Previously, the country sought to adapt to coastal inundation by building high defences. However this is no longer viewed as a 'long term' answer. In their 2008 report *Working with Water*, the Delta Commission accepts a sea level rise of between 0.35m and 0.8. by 2100.[28]

The approach by the government is based on a 'living with water' strategy. This means it will allow flooding in certain circumstances for certain land regions within an acceptable range of possible responses from 'do nothing', 'adapt', 'retreat' and 'defence'.[29]

These broad principles can have direct application to an effective coastal strategy for Australia. There will be instances where coastal land is too susceptible to the effects of inundation, as highlighted by the problems of erosion encountered by property owners in the Byron Bay Shire. Further, the 'adapt' and 'retreat' principle are already being utilised in terms of the controversial 'planned retreat' policy in regards to Belongil property owners.

### 3.4 London

The *London Climate Change Adaptation Strategy* is methodical and detailed and takes a wide view of inundation by looking at it from an economic, social and environmental perspective.[30]It provides for flood risk management and emphasises the responsibility of all sectors of society and has a strong emphasis on building resilience similar to the Bay of San Francisco approach discussed below in 3.5.

For example, the Strategy states that the City of London should encourage businesses to consider relocating flood sensitive IT equipment and archives out of London areas susceptible to flooding, out to less prone areas. Further, it provides that developers should be encouraged to install sustainable drainage systems in targeted flash flood 'hotspots' for new development, redevelopment or major refurbishment.[31]A particularly excellent recommendation the Report makes is that developers be required to contribute to emergency flood plans in flood risk areas. This can be linked into a policy of 'user pays' in that those who choose to purchase or develop property in flood risk areas should be required to pay to minimise the costs to the community. A link to an Australian coastal approach can be made with this in mind. There is argument that those wishing to purchase property in areas deemed high risk should bear all costs associated with coastal effects as long as they are made aware of the risks upon purchase. This idea is discussed in more detail below in the context of reform to property law and the requirement of mandatory insurance coverage.

### 3.5 Canada

The Canadian government report titled *From Impacts to Adaptation: Canada in a Changing Climate* outlines the Canadian approach to adapting to climate change effects.[32]Specifically, the report outlines the response of the New Brunswick region of Canada in combating the effects of climate change induced coastal inundation. The specific sea level rise report called the *Impacts of Seal Level Rise on the Coastal Zone of South Eastern New Brunswick 2006* has made two conclusions for the adaptation of coastal areas. These are that:

(a) appropriate adaptation strategies may take many forms and may include components at different s c a l e s . Communication and co-ordination of efforts between various levels of government, community leadership, local organizations and citizens are essential ingredients for success. Further there needs to be a balance in adaptation strategy design between addressing isolated issues and developing a comprehensive plan that

27 Note 23 at 22.
28 Delta Commission, *Working together with Water 2008* http://www.deltacommissie.com/doc/deltareport_full.pdf 23 at 1 October 2009.
29 Note 23 at 22.
30 City of London, *Rising to the Challenge – the City of London Corporation's Climate Change Adaptation Strategy 2007*, http://217.154.230.218/NR/rdonlyres/7347D392-3CF3-4344-8B2D-9AF9315E8801/0/SUS_climateadapt.pdf at 1 October 2009.
31 Note 29 at ii.
32 Natural Resources Canada, *From Impacts to Adaptation: Canada in a Changing Climate 2007,* http://adaptation.nrcan.gc.ca/assess/2007/toc_e.php at 1 October 2009.

addresses every dimension of the problem[33]; and

(b) environmental impact assessment processes should ensure that climate change considerations are included prior to any new development projects being started.[34]

The current coastal protection method used in New Brunswick is by a zoning approach. The coast is divided into three zones based upon the risk of coastal inundation. Zone A covers the area at most risk with land being of limited use. Zone B is classified as 30 metres landward of the limited use of Zone A and Zone C is classified as a 'transitional' zone which is generally an area of least risk, with development able to occur.[35]This is similar in substance to the Netherlands approach in terms of their 'do nothing', 'adapt' and 'retreat' policy and appears logical to effectively manage Australia's coastline. The 'zoning system' should be considered as a possible adaptive strategy to be implemented by local councils in Australia in places where a similar approach has not already been adapted.

### 3.6 California

The *2009 Californian Climate Adaptation Strategy Discussion Draft*[36]summarizes the best known science on climate change impacts in seven specific sectors and provides recommendations on how to manage against those threats. The regional focus the draft takes is appropriate in ensuring that the context specific effects of climate change are met. Looking at a particular Californian region, the Bay of San Francisco has been the subject of active planning in preparation for and consequences of sea level rise. The Bay Conservation and Development Commission is responsible for this planning and identifies the following adaptation strategies:

(a) an identification of the most significant structural, environmental, aesthetic, social, cultural and historic resources that require protection;
(b) areas inappropriate for protection; and
(c) strategies and techniques that will make future conservation and development projects more resilient to climate change effects.[37]

These three points should be considered for application on an Australian local council level. It is inevitable that certain coastal areas are inappropriate for protection, whether that be due to constant erosion or past inappropriate development. Further, it is vitally important that future development utilise strategies and techniques to ensure, as far as possible, resilience to climate change and its effects. It is important for risk appropriate strategies to be implemented from building standard and legislation formulation right through to construction and development to ensure the best possible chance of obtaining adequate insurance cover.

### 3.7 Local Australian Council perspectives

The Byron Shire Council provides an excellent example of progressive coastal management with its policy of 'planned retreat'. This policy means that 'certain limited and temporary residential development has been permissible on lands subjected to coastal hazards strictly on the basis that once those hazards are realised, that residential development must be relocated to a safe distance from the erosion risk zone.[38]

A study undertaken by the Sydney Coastal Councils Group Inc (**SCCG**) aims to promote 'a co-ordination between member councils in environmental and natural resource management issues relating to the substantial management of the urban coastal environment'.[39] This collaborative approach needs to be adopted nationwide to ensure consistency and consensus is reached among coastal councils in formulating a consistent and appropriate response to coastal inundation. Such a collaborative approach, ideally in conjunction with relevant industry can assist in

33 Minister for the Environment, *Impacts of Seal Level Rise on the Coastal Zone of South Eastern New Brunswick 2006* < http://www.adaptation.nrcan.gc.ca/projdb/pdf/20061005_exec_sum_e.pdf> at 1 October 2009.
34 Note 23 at 25.
35 Note 23 at 26.
36 California Government, *2009 Californian Climate Adaptation Strategy Discussion Draft* http://www.climatechange.ca.gov/adaptation/ at 1 October 2009.
37 San Francisco Bay Conservation and Development Commission, *A Sea Level Rise Strategy for the San Francisco Bay Region,* http://www.bcdc.ca.gov/planning/climate_change/SLR_strategy.pdf page 6 at 1 October 2009
38 Note 23 at 38.
39 Sydney, Sydney Coastal Councils Group Inc., A Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises 2009 < http://www.sydneycoastalcouncils.com.au/> at 9 October 2009.

setting standards and common benchmarks for such things as building codes, emergency procedures and coastal zoning measurements.

Within the Gippsland Coastal Board, the Shire of Wellington is working with the local community to find long term solutions to 'old and inappropriate subdivisions' in areas at high risk of coastal inundation.[40]

Finally, the Clarence City Council in Tasmania produced a report outlining adaptive measures which included planning controls for new developments dealing with building setbacks, minimum floor levels, appropriate engineering assessments and appropriate construction techniques. It also recommended a development freeze in locations with high erosion.[41]

There are various strategies currently being adopted by the various international and national jurisdictions. These are used as examples for those councils that currently do not adopt appropriate mitigation and adaptation strategies so they can best plan their coastal strategy. The involvement of the insurance industry will also be discussed and a need for a collaborative approach between industry and government to ensure the most appropriate reforms is developed.

## 4. Local governments and coastal councils v property owners – legal issues

### 4.1 Introduction

In this section of the report an investigation into the liability those councils potentially face who fail to take into consideration the effects of climate change will be discussed. The consequences of climate change range from global effects to local effects. Due to local authorities facing climactic consequences from a localized perspective, these local governments and councils are often at the forefront of potential litigation from property owners due to the localisation of their planning and environment laws.

The various consequences of climate change are resulting in a new environment for councils and development planners. There is an increasing level of urgency in which councils must consider the effects of climate change. There are many ways local governments and councils respond to the challenge of climate change induced coastal inundation. Examples of these include the implementation of coastal strategies,[42] planning guidelines[43] and legislation[44] and ruling out development on certain areas with a high risk of coastal inundation. However there are more controversial methods of adapting to coastal inundation which can open the door for potential litigation by property owners and local governments.

### 4.2 Best practice approach

An example of this is the Byron Shire Council's policy of 'planned retreat' which has been in effect since 1988 and has withstood numerous legal challenges.[45]Based in the local *Development Control Plan*[46] this is a hazard management option in which coastal land which has been determined as having a limited life due to the effects of erosion and inundation is allowed to be occupied until coastal hazards threaten or damage property.[47]At the time development is approved, a specified period can be identified until consent to occupy ceases. After this time, the structure must be moved back, relocated or demolished.[48]

40 Note 23 at 39.
41 Tasmania, Clarence City Council, *Climate Change Impacts on Clarence Coastal Areas December 2008* < http://www.ccc.tas.gov.au/webdata/resources/files/00-cover-contents-exec_summary.pdf> page v at 9 October 2009.
42 Victoria, Victorian Coastal Council, *Victorian Coastal Strategy 2008* http://www.vcc.vic.gov.au/2008vcs/home.htm at 28 October 2009.
43 New South Wales, New South Wales Government Department of Planning, *North Coast Urban Design Guidelines* http://www.planning.nsw.gov.au/plansforaction/pdf/north_coast_design_guide_complete.pdf at 28 October 2009.
44 *Environmental Planning and Assessment Act 1979* (NSW)
45 Environmental Defender's Office of New South Wales (Ltd), *EDO Northern Rivers,* (2009) http://www.edo.org.au/edonsw/edonr/northern_rivers_edo.php#expertseminarbb at 25 September 2009
46 2002 – see Part J2.1 for required development standards for the zone between escarpment to the immediate impact line http://www.byron.nsw.gov.au/development/control-plans/ at 28 October 2009.
47 Department of the Environment, Water, Heritage and the Arts, *Hazard Management Options,* Canberra, 2007 http://www.environment.gov.au/coasts/publications/nswmanual/section5.html#anchor683029 at 25 September 2009
48 *Vaughan v Byron Shire Council* [2009]NSWLEC 88

In terms of beach front land:

(a) new development must be at least 20 metres from the erosion escarpment; and
(b) dwellings must be demountable structures capable of being moved within 12 hours by a single four wheel drive vehicle.[49]

In terms of existing structures, the Byron Shire Council repeatedly rejects development applications for protective works such as private rock walls and the intensification of existing development.[50]This response by the Byron Council is emerging as a 'best practice approach' with an endorsement by the Land and Environment Court.[51]

As discussed in 3.6, there are numerous other strategies that local councils have already proposed as an appropriate method to mitigate and adapt to the risk of coastal inundation. It is recommended that a collaborative approach similar to the SCCG be taken to devise context specific mitigation and adaptive measure. Moreover, the Gippsland Coastal Board's plan to find new alternatives to 'old and inappropriate subdivisions' is a necessary way forward for other councils to learn how best to mitigate effects and help reduce property damage.

From an international perspective, London's strategy that those who develop or purchase land in what can be considered 'high risk' areas should pay a premium by contributing towards emergency plan costs is another point councils should consider adopting. This will help shift the financial burden from public authorities who are usually restricted.

The Californian requirement to ensure development projects are more resilient to climate change effects is also a logical reform. Finally and perhaps most importantly, an approach similar to New Brunswick in Canada whereby coastal areas are divided up into three different zones depending on the risk level is a core element of the framework from which the various other ancillary reforms can be implemented. However going back to the example of the Byron Shire Council, a similar system has already been implemented by splitting the coast up into three 'precincts'. Their element objective and prescriptive measures are summarised as follows:

- Precinct one (from the beach escarpment to the immediate impact line) - ensure the impact of coastal processes on potential development is minimised by limiting development and ensuring any development is only temporary.
- Precinct two (between the immediate impact line and the 50 year erosion line) - ensure the impact of coastal processes on potential development is readily relocated as the erosion escarpment nears development. Development must be designed to be relocated or demolished, or to cease operation, should the erosion escarpment come within 50 metres.
- Precinct three (between the 50 year and 100 year erosion line) - to ensure the impact of coastal processes on potential development is minimised by ensuring any development ceases as the erosion escarpment nears the development. Development will be considered on the understanding that any consent granted will be subject to the proviso that should erosion escarpment come within 50 metres of any building the development consent will cease in which case, the owner of the land will be responsible for the removal of all buildings.[52]

From London and California's broad policy approach, to New Brunswick's and Byron's progressive and thoughtful approach, there is ample opportunity to 'cherry pick' the elements best placed to adapt to the effects of coastal inundation.

### 4.3 Court intervention

Most climate change litigation up until now has focused on issues from a climate change mitigation perspective. That is, litigation on the potential impact of a project or development on climate change. However there are now

49 Part J2.1 of Byron Shire Council *Development Control Plan* <http://www.byron.nsw.gov.au/development/control-plans/ at 28 October 2009.
50 Maddocks Lawyers, *Implications of Climate Change for Planning: Helping councils and planners navigate the new environment,* < http://www.maddocks.com.au/download/sustain-may3-2009.pdf> at 3 October 2009.
51 *Parkes v Byron Shire Council* [2003] NSWLEC 104 (Parkes No. 1)
52 Part J2.1 of Byron Shire Council *Development Control Plan* <http://www.byron.nsw.gov.au/development/control-plans/ at 28 October 2009. For a more detailed analysis of the prescriptive measures, see parts J2.1, J2.1 and J2.3.

instances of litigation from an adaptation perspective, that is, the impact of climate change on developments.[53]When councils receive development applications, adopting a 'best practice' approach would best assist councils in limiting their potential liability.

Where councils provide advice, there is a potential for liability for loss associated with that advice if:

- such losses were reasonably foreseeable to the council at the time of the provision of the advice; and
- it was reasonable for the plaintiff to act in reliance of that advice.[54]

In *Walker v Minister for Planning & Ors*[55]a judicial review held that the Minister, in approving a concept plan for a residential subdivision and a retirement development, failed to consider ecologically sustainable development (climate change flood risk) when assessing the concept plan.

In certain circumstances there are instances of courts finding an existence of a 'reasonable foreseeable' risk of inundation. In *Gippsland Coastal Board v South Gippsland SC & Ors*[56](**Gippsland case**) the Victorian Civil and Administration Tribunal overruled a local Council decision to approve a coastal development in Gippsland, due to the unacceptable risk posed to the property from rising sea levels as a result of climate change. The decision is particularly significant because the VCAT relied upon the *Planning and Environment Act 1987* (Vic) in reaching a determination which does not explicitly require planning authorities to consider the effects of climate change in approving coastal development. Specifically, s 60(1)(e) requires an authority to consider significant effects the development may have on the environment as well as the significant effects the environment may have on the development. The Tribunal held the section was broad enough to include a consideration of climate change and coastal processes on development.

In the Gippsland case, the South Gippsland Shire Council was fortunate in that development approval was overturned by the VCAT before there was a resulting loss from its initial approval. However there are many examples of Councils approving development applications, that have been actioned and which have the potential to give rise to costly litigation to determine who is liable for property damage. To minimise their liability, coastal councils must educate themselves on what the 'best practice' is based on cases such as these, and incorporate them into their local planning laws.

### 4.4 Queensland statutory intervention

The *Civil Liability Act 2003* (Qld) (**CLA**) s 35 provides a set of principles concerning the resources and responsibilities of public authorities and factors to be considered in determining whether a public authority has breached their duty of care. These factors are:

- the functions required to be exercised by the authority are limited by the financial and other resources that are reasonably available to the authority for the purpose of exercising the functions;
- the general allocation of financial or other resources by the authority is not open to challenge;
- the functions required to be exercised by the authority are to be decided by reference to the broad range of its activities (and not merely by reference to the matter to which the proceeding relates); and
- the authority may rely on evidence of its compliance with its general procedures and any applicable standards for the exercise of its functions as evidence of the proper exercise of its functions in the matter to which the proceeding relates.

Further, the CLA s36 provides that an act or omission of the authority does not constitute a wrongful act or omission unless it was so unreasonable that no public authority could properly consider it to be a reasonable exercise of its functions. As is a fundamental principle in tort law, courts will apply a test of 'reasonableness' in determining whether a council has acted appropriately and will consider whether such a reasonable council in the same position would take the same course of action.

53 J Lynn & P McCormack, *Blake Dawson - Climate Change –a major challenge for local environment planning laws,* (2008) < http://www.blakedawson.com/Templates/Publications/x_article_content_page.aspx?id=53029> at 3 October 2009
54 *Shaddock v Parramatta City Council* (1981) 150 CLR 225 at 231
55 [2007] NSWLEC 741
56 [2008] VCAT 1545

### 4.5 Recommendation

Councils are going to be at an increasing risk of climate change litigation. Councils must take into account the risk of climate change induced coastal inundation in assessing new development applications. Councils will need to carefully consider information relating to the effects of climate change induced coastal inundation, and how this information can best be used to provide an appropriate development assessment.

The following are recommendations based on a comparative investigation of coastal strategies and current council policies in place to help limit the potential liability of coastal councils:

a) Australian coastal councils should adopt a zoning system similar to the Canadian, Dutch and the Byron approach. A consistent framework should be adopted to ensure minimum standards and guidelines are developed. One possible mechanism for this is through a COAG Agreement to ensure consistency and standardisation. However given the mediocre success of some past COAG Agreements, there is a chance that a it may not be as effective as is required to bring about urgent reform;
b) an adoption of a 'user pays' approach for developers and purchasers of coastal properties. Similar to the recommendation put forward by *London Climate Change Adaptation Strategy*, this policy should require financial and non-financial (such as the sharing of information and policy planning input) contributions to emergency flood plans in risk areas; and
c) developing coastal plans with a context specific and regional focus in mind, similar to the Californian approach.

## 5. The insurance industry and climate change induced coastal inundation

### 5.1 Background

The occurrence of more extreme weather events as an impact of climate change are likely to cause significant damage to economic and social infrastructure.[57]It has been suggested that the insurance sector is at the front line of climate change. This makes sense. Through the development of product pricing, terms and conditions and assistance the insurance industry provides to society in diversifying the cost of losses[58]the industry could be thought of as a messenger of climate risks.

Where governments and councils fail to provide adequate protection for property owners from coastal inundation effects (bearing in mind that financial capacity of councils is a factor to be taken into account in determining liability under the CLA), there is a market opportunity for insurers to increase their effort to safeguard customers instead of limiting coverage or exiting markets. In a market economy, protecting the climate through the implantation of adequate mitigating and adaptive strategies makes perfect sense. Peter Hoeppe, of the Munich Reinsurance company, states that 'climate change is a fact. Countering it is a must. We are convinced that climate protection makes economic sense, as it would be more expensive in the long term to pay for the damage it causes. It offers companies and national economies that react quickly great opportunities.'[59]

The availability of insurance products is fundamental to ensure the financial security of infrastructure owners now and in the future. However with the growing risk of climate change, there will be more uncertainty about the availability and price of these insurance products.[60]

Evidence showing that US insurers who take a financial approach to limit their exposure to losses by restricting insurance availability, tightening terms and increasing prices highlight the gap left for the inadequately resourced public sector. An example of this is the public flood insurance scheme in the US. The National Flood Insurance

57 Garnaut Climate Change Review, *Financial Services for Managing Risk: Climate Change and Carbon Trading Issues Paper 2* < http://www.garnautreview.org.au/CA25734E0016A131/WebObj/IssuesPaper2-FinancialServicesforManagingRiskClimateChangeandCarbonTrading/$File/Issues%20Paper%202%20-%20Financial%20Services%20for%20Managing%20Risk%20Climate%20Change%20and%20Carbon%20Trading.pdf> page 2 at 1 October 2009.
58 Note 8
59 Note 8
60 Note 40 at 2

Programme has a combined deficit of $30 billion due to the damage caused by Hurricanes Katrina and Ike.[61]

Presently, insurance companies in Australia do not cover for damage caused by coastal inundation. After reviewing several insurance policies, climate change induced coastal inundation is a non-insurable event. Industry justification is a heightened risk and an increase of the frequency of inundation and erosion occurring. It is easy to find examples of this exclusion in insurance policies[62]and several have been identified for purposes of this report. There is a clear need for an alternative to the insurance industry's policy of non-insurance for coastal inundation.

Further, there is evidence of Australian councils not having a handle of what their risk and vulnerability are.[63] In this section of the report, mandatory insurance will be suggested as one possible reform to enhance the industry's involvement in developing a climate change response. However for this to be commercially viable, incentives need to be offered to encourage industry participation.

### 5.2 Current approach by the insurance industry to coastal inundation

As discussed, the justification for coastal inundation (and the effects of coastal inundation such as erosion) being a non-insurable event is that it is considered something that happens naturally and with more frequency.[64]This lack of insurance opportunities, in addition to the high level concentration of coastal property addresses and population and the fact that claims will coincide making it harder to pool risks across populations means that the financial impacts of rising sea level and coastal erosion could be significant.[65] This obviously presents serious concerns for coastal property owners and has significant economic and social consequences. However there are macro level effects to this as well. As described above, the role of insurance underwriting weather-related risk is an important component of the national economy. Any reduction in the industry's ability to underwrite weather-related risk will have serious ramifications for the economies of those vulnerable regions where climate and weather risk is great.

In Cape Cod Massachusetts, the affordability-availability issue reached a critical point which resulted in 40% of homeowners receiving their insurance from the FAIR (Fair Access to Insurance Requirements) Plan. This comes as private insurance companies seek to limit their exposure in coastal areas.[66]

### 5.3 Opportunity for reform

In a submission to the Australian Federal Government (Qld Submission) standing committee on climate change, the Queensland Government called for a national compensation scheme for properties affected by inundation.[67] Whether it be that coastal property owners are provided some kind of protection by local councils and governments or that the insurance industry somehow provides cover to coastal properties, the need for cover is obvious.

Insurers, along with trade allies and other community members increasingly see industry, and not just the public sector, as a part of the solution in leading the way in policy and environmental law reform. By creating innovative products and services to promote emerging technologies and practices, opportunities emerge for leaders in the insurance industry who respond quickest to climate change.[68]

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61 Note 8

62 An example of this type of exclusions can be found in CGU's '*Listed Events Home Insurance Product Disclosure Statement and Policy'* at page 40 which provides that 'we will not cover for any loss or damage, or liability as a result of, or arising from erosion, the action of the sea, tidal wave or high water unless the loss or damage is the result of a tsunami' http://www.cgu.com.au/cgu/pub/cgu/website/DocumentLibrary/Personal/Home/C0012.pdf on 29 September 2009

63 Note 12

64 This was confirmed with Suncorp GIO Insurance on 29 September 2009 who say that there is no erosion cover available because it is naturally occurring and the purchaser assumes the risk. Further ACE-IRM Insurance Broking Group Pty Ltd confirm that there is no insurance company they deal with which covers coastal inundation as it is happening more frequently and the risk is too high.

65 Note 40 at 2

66 S Shemkus, 'FAIR alternative for homeowners', *Cape Cod Times,* 7 February 200 http://www.capecodonline.com/apps/pbcs.dll/article?AID=/20090207/BIZ/902070314/-1/SPECIAL09 at 7 October 2009.

67 D Houghton, 'Insurance industry considers boycott on coastal properties', *The Courier Mail* 11 April 2009 < http://www.news.com.au/couriermail/story/0,23739,25318586-5012449,00.html> at 15 August 2009

68 Note 8

### 5.4 How the insurance industry can help mitigate the effects of coastal inundation

In a report on community adaptation to extreme weather events released by the Insurance Council of Australia (ICA Report), it clearly stated that the risk appropriate use of land is a critical issue in Australia.[69] The insurance industry is one sector of society best equipped to assist in reform.

Before the industry can be expected to come to the table in providing policy and legislative reform assistance, guidance should to be taken from industry recommendations. The predicted impacts of future extreme weather events underscore the need for a renewed focus and emphasis on risk appropriate selection of land for development.[70]The ICA Report provides that the following development guidance is considered critical:

a) no residential or commercial development should be authorised on land that is presently subject to a 1:50 all insurance risk (ARI) storm surge event or a predicted 1:50 ARI storm surge event within the next 100 years, without storm surge mitigation works incorporated into the development that reduce the risk to a minimum of 1:100 ARI risk;
b) zoning for existing land where the storm surge risks greater than 1:50 ARI presently exist and where storm surge mitigation works are not being implemented should be altered to stipulate non residential and non commercial uses only;
c) zoning for existing land where storm surge risks are predicted to deteriorate to 1:50 ARI and where storm surge works are not being implemented should be altered to stipulate non residential and non commercial uses only from the time that the storm surge risk is predicted to become a potential.[71]

The ICA Report emphasises the need for a zoning approach to coastal land at risk of inundation, consistent with the approach already adopted by the Byron Council and New Brunswick and provides a further dimension to a possible recommendation in coastal management in ensuring that the industry cooperates.

The Qld Submission is seeking the development of a set of nationally consistent default change scenarios for use in planning for sea level rise.[72]This is vitally important to best set the platform for the insurance industry's involvement. Specifically, it should be a requirement that the State and Federal Government collaborate with the Australian Building Codes Board, the Queensland Master Builders and the Housing Industry Association to establish minimum building standards for new development to withstand flooding.

### 5.5 Combined approach of public sector and insurance industry

Should insurance companies that initiate innovation and respond to the threat of climate change induced coastal inundation with viable solutions by assisting in the development of mitigation policies and legislative frameworks be rewarded through preferential treatment? The insurance industry has a history of helping society understand and adapt to emerging risks.[73]

Should there be mandatory insurance for those wishing to purchase properties in areas susceptible to coastal inundation? If so, how do we get insurance companies to 'come to the table' so that if they are obliged to provide insurance over coastal properties, then it is done so in order to remain a commercially viable part of their business?

In dealing with equity and affordability issues, it is suggested that any special treatment given to residents in areas prone to coastal inundation (such as low income earners) should come from general public funding as opposed to insurance premium subsidizes.[74] The reason that it should come from the public sector ties in with the principle that the insurance premium reflects the risk. This makes sense as it involves collaboration between the private and public sector in mitigating the effects of coastal inundation.

69 Note 79 at 8
70 Note 79 at 9
71 Note 49 at 9
72 Note 49
73 Note 8
74 H Kunreuther, 'Long Term Insurance and Climate Change' (Paper presented at the International Seminar at the University of Innsbruck *Adaptation to Climate Change: The role of insurance,* Pennsylvania, 6-7 March 2009) < http://opim.wharton.upenn.edu/risk/library/WP2009-03-13_HK_LTI.pdf> at 4

### 5.6 Mandatory insurance for property

Mandatory insurance is one way that the effects of climate change can be mitigated. To combat the decreasing value of coastal properties and to protect owners from property damage, adequate insurance coverage needs to be put in place. A possible way for insurance to be mandated would be through the reform of property law. There needs to be a point in which coverage exists for high risk coastal property if not already in place. If current property owners wish to sell, then the purchaser should be mandated to obtain appropriate insurance as a requirement of the purchase contract, similar to the requirement for smoke alarms in Queensland conveyance law. With this in mind, consideration should be given to providing exclusive rights over a certain section of the coast to one or two insurance providers. This is discussed in more detail below, but is justified as a way to provide an incentive for the industry's involvement in providing cover.

There is also a suggestion that long term insurance be provided as a way of providing stability to homeowners and encouraging adoption of cost effective mitigation measures.[75]This can tie in with point above in legislating for mandatory insurance when coastal property is bought and sold. Perhaps thought should be given to a permanent attachment to certain coastal properties whereby insurance passes with title and is unable to be cancelled, such as an encumbrance or covenant on the property title. Mandatory insurance also takes away the risk of property owners refraining from obtaining insurance due to the assumption that the government will hand out assistance in times of natural disasters.

### 5.7 Ways to incentivise industry involvement

After appropriately classifying coastal areas according to the risk of coastal inundation, the next step in reform can be taken to mitigate the effects of coastal inundation. This is to give one or two private insurance providers the opportunity to have a monopoly over one area of coastal land by being the sole provider(s) of insurance for that coastal region. This is a key feature of incentivising industry involvement in setting up a mandatory insurance scheme for coastal areas deemed suitable. However it is important to realise that this will only be effective if recommendations, such as those developed by the ICA Report, are implemented otherwise it will not be commercially viable. In doing this, an emphasis needs to be placed on as accurate classification as possible of various coastal areas to ensure that an appropriate level of risk is allocated. A scheme of classification similar to the Canadian approach would be ideal so that a different level of risk is attributed to each different classification. Risk levels still need to be considered commercially viable from an industry point of view.

## 6. Conclusion and recommendations

Climate change litigation is a fairly new phenomenon.[76]The first significant Australian court decision relating to climate change dates from 1994.[77]Since then the number of cases being litigated relating to climate change has increased.[78]

At this point, a logical observation should be made in that courts have no function directly requiring that society adapt to climate change or mitigation of its impacts. The role courts play is to declare and interpret the law and any role directly related to climate change will be generated as a consequence of their vested functions to adjudicate disputes brought before them.[79]Therefore it is up to policy makers, legislators and industry to implement ways to mitigate and adapt to climate change induced coastal inundation.

75 Note 62 at 6

76 Hon J B Preston, *Climate Change Litigation in the Land and Environment Court of New South Wales and other Courts* (2009) Australasian Conference of Planning and Environment Courts and Tribunals http://www.lawlink.nsw.gov.au/lawlink/lec/ll_lec.nsf/vwFiles/Paper_20Aug09_PrestonCJ_NZ.pdf/$file/Paper_20Aug09_PrestonCJ_NZ.pdf at 23 September 2009.

77 *Greenpeace Australia v Redbank Power Company* (1994) 86 LGERA 143

78 Note 27

79 Note 27

As can be seen, there is evidence at local levels of frustration by the lack of state or nationwide policy on climate change. For example the Pittwater Council has stated that it would like to see a cooperative coastal zone agreement between the three spheres of government as it claims that presently, council responses to climate change have been thwarted by government restructuring and overlap.[80]

In terms of managing risk and ensuring the continual coverage of properties by insurance companies, the Insurance Council of Australia states that the risk appropriate use of land is a critical use in Australia.[81]Further, the predicted impacts of future extreme weather events underscore the need for a renewed focus and emphasis on risk appropriate selection of land for development.[82]

In Australia, a collaborative approach between coastal councils and State governments should be taken to ensure standards and benchmarks are formulated for policies and legislation relating to coastal development. A standardised approach based on the input of industries such as the Australian Building Codes Board, the Queensland Master Builders, the Housing Industry Association and utility providers will offer the best possible chance at not only limiting coastal council liability, but also provide the best chance at coastal property owners being able to obtain insurance coverage in areas where coverage is not available, or restricted.

It has been argued that governments are unable to address the issues facing property loss on their own. There needs to be a combined effort with the private industry with a view to reform property laws to address the issue of decreasing property values when buying and selling. It has been suggested that mandatory insurance be attached to the title deed of land, similar to a covenant or encumbrance. However consideration must be given as to who will start paying for this; should the long term property owner who has never had to worry about loss of value be liable, or should an incoming owner be expected to pay an inflated purchase price?

As discussed, such an option should coincide with a mandatory insurance scheme, with the possibility of a monopoly over certain sections of the coastline for those insurance companies that provide input and assistance in legislative and policy reform to help limit coastal council liability. And this can only be based on the assumption that a coastal zoning policy will be implemented using a risk based approach to determine the suitability of land for possible development.

Despite what type of mitigation and adaptation strategies governments and industry choose to adopt in the face of growing evidence of climate change induced coastal inundation, the need for reform and action is urgent and will only become more so as time passes. A 'do nothing' approach is clearly not an option, both from a legal and a moral perspective, and as the effects of climate change become more indisputable, then so will the need for certain and real reform of policies and legislation to minimise the liability of councils and governments and to protect residents of coastal areas most affected by coastal inundation.

The reference list is available with the editor if it is required.

80 Note 11 at 21

81 Insurance Council of Australia, *Improving Community Resilience to Extreme Weather Events*, 2008 Paper < http://www.insurancecouncil.com.au/Portals/24/Issues/Community%20Resilience%20Policy%20150408.pdf> at 23 September 2009

82 Note 36