

REDESIGNING OUR COAST: USING LAW AND POLICY TO FACE THE CHALLENGES AHEAD

Introduction

The NSW coastline is under significant pressure. Population growth and climate change will exacerbate these pressures and pose significant challenges. The projected coastal impacts of climate change alone include sea level rise, increased coastal flooding and storm surges, increased coastline erosion, inundation of coastal wetlands and lowlands, and potential health impacts.

This paper will argue that we need to rethink, and redesign, our current legal and policy approaches and arrangements, to deal with these pressures.

Recent reforms by the NSW government will not adequately deal with these pressures. Rather, the reforms have, in key aspects, privileged the interests of private property over ecological integrity and the interests of the public. Furthermore, complex institutional arrangements will remain, resulting in the ad hoc and inconsistent treatment of our coast, with the Courts increasingly called upon to take the lead in this area.

New approaches need to be underpinned by a suite of legislative and policy prescriptions and controls, including institutional reform, no-go areas for development in the most sensitive coastal areas, comprehensive Environmental Impact Assessment mechanisms and community involvement in strategic regional planning and development approvals.

A hierarchy of adaptation options needs to be articulated and adopted to address the projected impacts of climate change. In this respect, the paper argues that planned retreat should be the primary adaptation action, due to its alignment with the principles of ESD. However, in those areas where planned retreat is not a viable or practicable option, the focus should be placed on the robust implementation of mandated planning controls, resilience building measures, early warning systems and emergency response plans.

State of the coastline

Currently, approximately 85% of the Australian population lives within fifty kilometres of Australia's 60 000 kilometre coastline.¹ 25% live within 3 kilometres of the coast.² Given that this is the case, it is clear that, as Thom states, "climate change offers a total societal challenge".³

Climate change, in particular sea level rise, will present many challenges for governments. The Australian Government has predicted a sea level rise of 1.1 metres by 2100 with profound consequences.⁴

In addition to the impacts of climate change, the coastline is under pressure from what has been called the 'sea change phenomenon', describing "the phenomenon of increasing settlement of the Australian coast, particularly those areas outside the primary urban metropolitan centres".⁵ Population growth and increases in density drive growth in development, which leads to a range of problems for the natural environment:

- Habitat loss and reduction in biodiversity levels;
- Issues with waste disposal;

- Pollution;
- Water scarcity, driven by increased demand, which may lead to the utilization of unsustainable water sources, as has been the case in Perth and Sydney with groundwater extraction;⁶
- Impacts on estuaries, which play an instrumental role in maintaining healthy marine and terrestrial ecosystems;⁷
- Impacts on coral reefs (resulting from the combined forces of development, tourism and rising water temperature);⁸
- Impacts on coastal sediment dynamics, caused by development, previous land clearing practices around coastal zones, and modifications to the shoreline (such as sea walls);⁹ and
- Impacts of recreational activities, such as four-wheel driving on beaches, disturbance of wildlife through increased noise, and the side effects of recreational fishing (not only through depleting fish stocks, but also the significant damage caused by discarded fishing equipment).¹⁰

The potential costs of these consequences are vast. Particularly, much development may be at risk from sea level rise and erosion. Homes, commercial infrastructure and public utilities will need to be “relocated, redesigned or protected by expensive engineering works”.¹¹ The CSIRO has predicted that a 1.1m sea level rise could jeopardise more than \$60 billion in homes by 2100.¹² The implications will also be vast for the many coastal communities that depend on tourism. Given the significant costs to both people and to the natural environment, the need for action is clear.

NSW regulatory regime: an Overview

In NSW, a wide variety of instruments are relevant to coastal management. Day-to-day administration and regulation of development in coastal areas generally rests with local government authorities, under the *Local Government Act 1993* while other decisions, policies and guidelines are set by State government agencies.

Coastal Protection Act 1979

The *Coastal Protection Act 1979* is the principal piece of legislation applying to the NSW coastal zone. It aims to provide an integrated approach to the many and varied coastal problems and issues, and to regulate the tension between development pressures and coastal protection. The Act plays three main roles: defining the boundaries of the coastal zone and providing for the preparation of Coastal Zone Management Plans by local councils; placing additional checks on local councils when determining development applications,¹³ and providing a means of restraining or remedying damage to the coast.¹⁴

Reforms to the *Coastal Protection Act 1979* were assented to in October 2010. Although they have not yet been proclaimed, these reforms are incorporated in this paper.

Coastal Zone Management Plans

Coastal Zone Management Plans (CZMPs) are prepared by councils in partnership with the Department of Environment, Climate Change and Water. Their purpose is to create a structured plan for protection of the beach and foreshore, setting out actions to avoid or mitigate the damage that can occur during storm events. They must address matters such as:

- protection of the beach environment and amenity;

- what emergency actions are permitted during periods of beach erosion such as violent storms;
- how the council will ensure continued public access to beaches, headlands and waterways;
- the impacts of climate change and coastal hazards;
- arrangements relating to long-term protection works in addition to protecting and preserving beach environments.¹⁵

CZMPs are legally binding, and are enforceable by the Minister or the relevant council in the Land and Environment Court.¹⁶

The Minister for Environment, Climate Change and Water will soon be able to issue directions to all councils within erosion 'hot spots' to review existing CZMPs within 12 months. CZMPs must now also address the impacts of climate change and coastal hazards, and make arrangements relating to long-term protection works in addition to protecting and preserving beach environments. Councils must now expressly consider CZMPs when assessing development applications.¹⁷

NSW Coastal Panel

NSW is soon to see the establishment of a new body called the NSW Coastal Panel.¹⁸ The Panel will be comprised of seven members with expertise in coastal planning, engineering, coastal geomorphology or coastal environmental management. It will be responsible for providing advice to the Minister on matters within the coastal zone and to local councils on coastal management issues, and also for approving long-term coastal protection works in some cases.

Emergency coastal protection works

Landowners within twelve coastal erosion hotspots¹⁹ around NSW, whose homes are at imminent risk from coastal erosion, will soon be able to place sandbags or sand on beaches to protect their homes, for up to twelve months. The works may only be placed once for each landowner, and they must obtain a certificate from the council before doing so. They must comply with Ministerial requirements, and be maintained in accordance with requirements in guidelines and Coastal Zone Management Plans. The Council may order removal of the works if they are increasing erosion, limiting public access to beaches, or constituting a threat to public safety.²⁰

Long-term coastal protection works

Landowners will also soon be allowed, after gaining development approval under planning laws, to build long-term coastal protection works (e.g. seawalls or groynes) to protect their properties, provided that the consent authority (either Council or the Coastal panel) is satisfied that the works will not unreasonably limit public access to or use of a beach or headland, or pose a threat to public safety. Consent may only be granted if the authority is satisfied that satisfactory arrangements have been made to maintain the works, as well as any ongoing works that may be necessary to maintain, and minimise the impacts of, the works. Councils may levy an annual charge on landowners for the works, in order to fund their maintenance and manage their off-site impacts. Future owners will also be liable for the charge.²¹

Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979 (EP&A Act)* governs the NSW planning regime, and creates various Environmental Planning Instruments to establish a strategic policy framework (e.g. State Environmental Planning Policies [SEPPs], Local Environmental Plans, etc).

Councils oversee most development proposals under Part 4 of the *EP&A Act*. For major projects under Part 3A developments are determined by the Planning Minister. Under s75U of the *EP&A Act*, the concurrence of the Minister for Climate Change, Environment and Water (the Minister in charge of administering the *Coastal Protection Act 1979*) is not required for Part 3A projects.

State Environmental Planning Policies (SEPPs)

SEPP Number 71 – Coastal Protection (SEPP 71) applies to land within the ‘coastal zone’, generally defined as one kilometre inland of the high water mark and around all bays, estuaries, coastal lakes, lagoons, islands and tidal waters, and three nautical miles seaward of the mainland and offshore islands. Where it applies, the decision-maker must consider certain matters set out in the SEPP when making a decision about a development application, including pedestrian access to the foreshore, conservation of threatened species and protection of wildlife corridors, any detrimental impact the development may have on the foreshore, and the likely impact of coastal processes and hazards on the development. Development approval must not be granted where the development will diminish access to coastal foreshores, result in effluent that negatively affects water quality, or involve discharge of stormwater into coastal areas.

SEPP (Major Projects) 2005 lists developments to which Part 3A of the *EP&A Act* applies, including areas within the coastal zone. The *NSW Coastal Policy 1997* is not a mandatory consideration for the Minister under *SEPP (Major Projects)*.²²

Other SEPPs that apply to coastal areas include:

- *SEPP (Infrastructure) 2007*;
- *SEPP 14 – Coastal Wetlands*;
- *SEPP 26 – Littoral Rainforests*;
- *SEPP 50 – Canal Estate Development*;
- *SEPP 62 – Sustainable Aquaculture*.

Standard Instrument – Principal Local Environmental Plan

The Standard Instrument was introduced in 2007 to standardise all Local Environmental Plans (LEPs) across the state. Whereas before the Standard Instrument, many LEPs contained designated coastal land use zonings with specific objectives responsive to the needs and hazards of the coast, this approach is not adopted in the Standard Instrument, with the result that councils must deal with coastal management issues through generic land zonings such as residential land use, environmental protection or public recreation zones.

Clause 5.5 deals with development within the coastal zone, including a comprehensive list of objectives related to protection and conservation of the coastal environment.²³ Clause 5.5(2) states that development consent must not be granted unless certain matters have been considered (including the suitability of the development to the surrounding area, and its potential impact on the amenity of the foreshore and on biodiversity and ecosystems), while Clause 5.5(3) states that development consent must not be granted unless the consent authority is satisfied that the development will not impede or diminish public access to the foreshore, cause

effluent discharge that will have a negative effect on water quality, or cause discharge of untreated stormwater into coastal waters.

While Clause 5.5 provides a detailed list of objectives and considerations, implementation of these may be difficult. The Standard Instrument does not require that development is consistent with, or promotes, the objectives in Clause 5.5(1). Similarly, Clause 5.5(2) only requires that consideration is given to the matters described; this can be contrasted with Clause 5.5(3), which prevents approval unless the consent authority is satisfied that certain conditions are met. Clause 5.5(3) is clearly a higher threshold, given that a consent authority may simply consider the matters in Clause 5.5(2) and still choose to grant approval to a development, even if not satisfied that it is consistent with these matters.

Proposed changes to the EP&A Regulations

Changes have been proposed in September 2010 to the issuing of planning certificates under s149 of the *EP&A Act*. Planning certificates provide information about planning matters that are relevant to the land. The proposed changes will require planning certificates to include information about coastal erosion hazard policies that restrict development on the land,²⁴ thus enabling potential purchasers to be informed about the risks that climate change poses to the land.

NSW Coastal Policy 1997

The *NSW Coastal Policy 1997* is the principal policy guiding local councils in the coastal zone. It aims to promote the “ecologically sustainable development of the NSW coastline”.²⁵ It provides guidance for state government agencies and local councils responsible for coastal protection and management. The Policy introduced initiatives such as the banning of new sand mining projects in coastal national parks, and new canal estate developments, and the prohibition of development on beach fore dunes. The Policy is a mandatory consideration under s79C of the *EP&A Act* for the purposes of assessing a development application, and by Ministerial Direction under s117(2) of the *EP&A Act*, all planning proposals must be consistent with the Policy unless departure can be justified.²⁶

NSW Coastline Management Manual 1990

The NSW Coastline Management Manual was created as a guideline for Councils to prepare Coastline Management Plans, aiming to encourage councils to allow development that is compatible with coastal hazards. The Manual describes methods of reducing the impact of hazards on existing development, and provides different options for dealing with coastal hazards.

NSW Sea Level Rise Policy Statement 2009

The Sea Level Rise Policy Statement outlines the NSW Government’s position on sea level rise. It states that over the period 1870-2001, global sea levels rose by 20cm, and predicts an average rise in sea levels along the NSW coastline of forty centimetres by 2050 and ninety centimetres by 2100. These are conservative estimates, and the Statement acknowledges the IPCC’s indications in 2007 that sea levels could rise even higher than this.²⁷

The aim of the Policy Statement is to adapt to sea level rise in a way that will minimise social disruption, economic costs and environmental impacts.²⁸ It aims to do this by:

1. Promoting an adaptive risk-based approach to managing the impacts of sea level rise;
2. Providing guidance to Councils to support their sea level rise adaptation planning;
3. Encouraging appropriate development on land projected to be at risk from sea level rise;
4. Continuing to provide emergency management support to coastal communities during times of floods and storms; and
5. Continuing to provide up-to-date information to the public about sea level rise and its impacts.²⁹

The Policy is not intended to prevent development in areas predicted to be affected by sea level rise; rather, it aims to ensure appropriate site planning and design, so that any development in these areas can recognise and appropriately accommodate the projected impacts of sea level rise over time.

NSW Coastal Planning Guideline: Adapting to Sea Level Rise

The NSW Coastal Planning Guideline was released in August 2010. It aims “to provide guidance on how sea level rise is to be considered in land use planning and development assessment in coastal NSW”, and to promote ESD, particularly a precautionary approach to land use planning and development assessment.³⁰

The Guideline adopts six principles to be applied in coastal planning decision-making:

1. Assess and evaluate coastal risks, taking into account the NSW sea level rise planning benchmarks.
2. Advise the public of coastal risks to ensure that informed land use planning and development decision-making can occur.
3. Avoid intensifying land use in coastal risk areas through appropriate strategic and land use planning.
4. Consider options to reduce land use intensity in coastal risk areas where feasible.
5. Minimise the exposure of development to coastal risks.
6. Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option.³¹

‘Coastal risks’ are defined in the guideline as coastal erosion, tidal inundation and coastal flooding. ‘Coastal risk areas’ refers to areas of land likely to be affected by rising sea levels.³² Councils are required to identify and make plans for these areas. They may become subject to restrictions on development and land use.

Issues with the NSW regulatory regime

This section of the paper outlines key aspects of the approach in NSW which have hindered the development of effective coastal management.

Inconsistency of approach

Part 3A

The reforms certainly signify efforts to better manage the coastal zone. However, by dint of Part 3A, many inappropriate developments can still be approved in sensitive coastal areas.³³ Thom argues that as a result of Part 3A, “it is perhaps easier now for major developers to access government and to seek Ministerial intervention over local council approval powers”.³⁴ He notes that while major project status may be necessary for some developments of state significance, the Part 3A regime has created a situation where developers actively pressure the Minister, in more and more cases, to bring a project under Part 3A, thus taking away councils’ approval powers, preventing genuine community involvement and undercutting the coastal protection regime.³⁵

Where this occurs, developments that are likely to have the greatest impact on the coastal environment are decided by the Planning Minister, without any clear processes in place to ensure the adequate consideration of environmental impacts or to involve the public. As noted, the concurrence of the Minister administering the *Coastal Protection Act 1979* is not required for Part 3A projects, nor is the *NSW Coastal Policy 1997* a mandatory consideration for the Planning Minister.

Aspirational standards

There are a litany of laws, policies and guidelines applying in NSW. Detail is mostly delegated to policies, manuals and guidelines, which is subordinate to legislation. For example, while the preparation of a Planning Guideline is an important tool to guide decision-makers, the Guideline does little to clarify legal requirements in relation to strategic planning and development assessment, and it simply adds another layer onto the current framework that relies heavily on subjective discretion and ad-hoc decision-making.³⁶

Lack of prescription

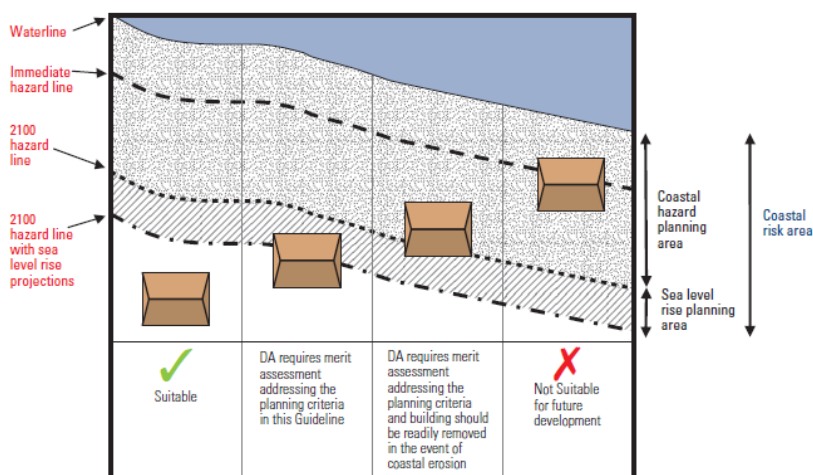
As stated in the Coastal Planning Guideline: Adapting to Sea Level Rise:

When assessing development applications in coastal areas, consent authorities must have regard to the coastal planning Principle 5 and Principle 6 of this Guideline.³⁷

In addition, consent authorities should take into consideration:

- location of the development site in relation to coastal risk areas (Figures 4 and 5) [emphasis added]

Figure 4 – Coastal erosion consideration in DA assessment



This provision exemplifies much of what is wrong in NSW planning on coastal issues. Even for unsuitable development proposals on the immediate hazard line, the guideline does not mandate that development cannot be approved.

Confusing miscellany of responsibilities

It is clear that there are many mechanisms in place in NSW to deal with the pressures on our coastline. However, the multiplicity of policies and bodies is often part of the problem. As Thom states, “coastal management now and into the future is confronted by a legacy of use and abuse that inhibits effective management of risk”.³⁸

At the local level, the State of the Environment Report 2006 states that while many initiatives are generally effective in focusing on specific threats and short-term impacts, most of these initiatives “lack a strategic approach to threat identification, analysis, mitigation or intervention”.³⁹ The main issue at the State level is that measures taken tend to be “short term and reactive”, creating a regime that tackles the symptoms without dealing with the causes.⁴⁰ At the Commonwealth level, “collective responses lack effective integration, both within the Commonwealth and with other levels of government”.⁴¹

In NSW, responsibility for coastal management is split between two State government departments and local councils, with a newly established Coastal Panel set to play an advisory role. Thom recently observed that “the disconnect between agencies is stronger now than any time since 1989”⁴² and warned that “to compartmentalise the adaptation agenda within and between institutions will simply maintain the sectoral approach to coastal management thus perpetuating the so-called ‘wicked problem’ of coastal management”.⁴³

The Coastal Panel will go some way to resolving a problem identified by Thom – that is, the lack of independent advisory committees who are able to provide “coordinated advice to government”.⁴⁴ The main attempt in NSW was the NSW Coastal Council, which was set up in 1979, removed in 1986, restored in 1989 and again removed in 2004.⁴⁵ The Council had a range of important roles, including reporting annually to the NSW Parliament, conducting inquiries, reviewing LEPs and Master Plans for the Minister, and acting for the Minister in the Land and Environment Court.⁴⁶ According to Thom it had a “strong public profile”, “technical skills and advocacy passion for improved coastal zone management” that replacement bodies have lacked.⁴⁷ The functions of the Coastal Panel appear more limited than its predecessor, and

it remains to be seen what role it can play in facilitating a considered and consistent approach to coastal management in NSW.⁴⁸

Poor implementation

One outgrowth of inconsistency of approach is poor implementation. This is exacerbated when the legal framework is left so open-ended that the Courts are relied on to develop a jurisprudence on coastal management. Development of the law by the judiciary can only be ad-hoc, depending as it does on appeals being brought to the court and thus - by definition – on the competing interests of the day that are before the Court.⁴⁹

A lack of resources – particularly at council level - has also hindered efforts to implement policies on coastal management, an issue that will be exacerbated as climate change impacts take hold.⁵⁰

Lack of climate-readiness

A further problem inherent in the NSW planning regime is a lack of direction on climate change. In a report prepared for the Sydney Coastal Councils Group by EDO NSW on the coastal zone and climate change in 2008 (hereafter ‘the SCCG report’), in which 137 legislative instruments were examined, it was found that only 16 made reference to ‘climate change’, ‘greenhouse’ or ‘sea level rise’.⁵¹ Significantly, in environmental planning instruments, these references were often contained in objects clauses, where climate change was listed as one of a number of objects – there was no case where it was expressed as the overriding objective.⁵² The main problem with climate change being referred to in the objects clause is that this does not place any substantive obligations on the consent authority – it simply assists the court in interpreting the obligations found in other provisions of the legislation.⁵³ The other references to climate change were as one of a number of ‘relevant considerations’ clauses, requiring the consent authority to have regard to climate change (among other considerations) as a pre-condition to the granting of consent.⁵⁴ Again, this is of limited assistance in that, where no weight is given to the various matters to be considered, courts will leave the ultimate ‘weighing up’ of the different factors to the consent authority,⁵⁵ meaning that in effect, “there is... no requirement to actually make decisions that are ‘climate-friendly’”.⁵⁶

There are a number of reasons why it is inappropriate to rely on judicial intervention to ensure that climate change is addressed in the law. Firstly, courts are limited by the relevant legislative regime within which they must operate.⁵⁷ Secondly, as noted above, Courts are bound by the matter before them. Thirdly, courts have only considered climate change impacts in the context of new developments, and have not yet looked at the issues surrounding climate change impacts on existing developments.⁵⁸ Thom argues this point as well, stating that “national coastal adaptation policy should not be left to the exigencies of the courts”.⁵⁹

These issues all point to a regime that lacks cohesion and coordination, and which inadequately addresses problems relating to climate change.

The Pathway to Reform: an integrated management framework

The risks that the coastline faces as a result of the twin pressures of climate change and population growth, combined with the problems detailed above with the current management mechanisms, point to “the need for a major paradigm shift in the way our coast is managed”.⁶⁰

Institutional reform

There is a need, long-recognised, to reform Australia's approach to coastal management so as to clearly define roles and responsibilities at each level of government.

Federal level

At the Federal level, an enhanced role would go a long way to ensuring consistency of approach. There are many possible ways of doing this. However, as planning and development matters have long been the purview of the States, political expediency might dictate that the Commonwealth role should be based around coordination, funding and review.⁶¹ Other key roles for the Commonwealth would include co-funding essential programs and obtaining the necessary baseline data to assist councils in planning, developing national guidelines for coastal management, undertaking overarching and specific vulnerability and risk assessments and implementing a national coastal advisory body made up of representatives from all levels of government.⁶²

An effective way to provide strong Federal guidance and facilitate integrated coastal management would be through the establishment of a National Coastal Council or Commission under legislative charter. Such a body was recommended in 1993 by the Resource Assessment Commission Coastal Zone Inquiry, who argued that it was necessary to bring expertise and an integrated, 'whole of government' approach to coastal zone management.⁶³ Thom argues that such a body should fulfil two roles: reviewing the effectiveness of coastal management mechanisms, and providing advice to all levels of government on how to respond to the challenges of coastal zone management.⁶⁴ These dual roles of overseeing and providing advice would assist in providing a unified, long-term approach to coastal risks and management.

State level

At the State level, what is required is "decisive whole-of-government commitment to short and long term strategies"⁶⁵ as well as increased communication between state departments and between state/federal government agencies. The largely advisory role of the Coastal Panel, coupled with the fact its functions are only triggered by the Minister, would seem to fall short in this endeavour. As Thom demonstrates, the Victorian Coastal Council (VCC), together with the Regional Coastal Boards, provide an example of how this approach can assist in implementing an integrated management approach.⁶⁶ Thom argues that such an agency must be independent, with "cross-sectoral representation which provides advice to all levels of government".⁶⁷ The role of this agency within the integrated management framework would be twofold; firstly, to "oversee and facilitate between state agencies and local authorities",⁶⁸ and secondly, to report to the federal agency to ensure national consistency. Other roles of the agency may include reporting to parliament, formulating coastal policies and guidelines, and overseeing development within the coastal zone.

Moreover, the State government needs to take a leadership role in setting the direction for coastal planning in NSW. In this respect, more prescriptive laws and standards should be the benchmark. As Ghanem, Ruddock and Walker state, "stronger laws and more clearly defined responsibilities will greatly assist decision-makers who are currently unsure how to proceed in tackling climate change. For example, state intervention will aid local councils in determining when and how to conduct adaptation activities in the coastal zone".⁶⁹

Finally, the development of a coherent and consistent approach to coastal management will always flounder while developers can approach the Minister to have their project declared under Part 3A of the *EP&A Act*.

Local level

Local government is often at the forefront of dealing with population increases and environmental impacts. However, the degree to which councils can adapt to the effects of climate change and increasing population varies, often hindered by factors such as a lack of available data, lack of guidance from state and federal government, lack of resources to implement initiatives, and a high level of uncertainty concerning the extent of their potential liability for activity or inactivity.⁷⁰ Burton and Dredge state that “given the vague directions contained within the state policy directions, councils are in the awkward position of having to find their own way across a minefield of addressing climate change related risks and local vulnerabilities”.⁷¹ Councils currently respond to sea level rise on a voluntary basis.⁷²

The SCCG report found a clear need for state or federal government guidance to assist councils in planning strategies to adapt to coastal hazards.⁷³ This would remove much of the uncertainty for councils, as well as ensuring that a consistent approach to sea level rise is taken throughout NSW. The CSIRO, in its Working Paper on Coastal Inundation under Climate Change, also recommends State government support of local governments’ “capacity to plan and implement effective land use and coastal inundation hazard management policies” through technical assistance, funding, and political and legislative backing.⁷⁴

Community level

Cutting across all the levels of government, the community needs to be integrated in decision-making frameworks at all levels. As well as ensuring that the views of all stakeholders are taken into account, public participation helps to ensure fairness, justice, accountability and legitimacy in decision-making.⁷⁵

Applying integrated coastal management principles

An integrated coastal management framework needs to be designed to reflect the Catchment - Coast – Ocean Continuum. In this regard, the principle of Ecologically sustainable development (ESD) is instructive. ESD is defined in the Federal Government’s *National Strategy for Ecologically Sustainable Development* as “using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased”.⁷⁶ There are four main components of ESD:

- The precautionary principle, defined in Principle 15 of the Rio Declaration as “where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.⁷⁷ This is relevant to implementing mechanisms to address the impacts of sea level rise;
- Intergenerational equity, recognising the duty to preserve and not damage resources for future generations, and taking their needs into account in decision-making;
- The polluter-pays principle; and
- Conservation of biodiversity.

The case of *Walker v Minister for Planning* highlights that there is a need for decision-makers to consider the impacts of climate change on coastal developments through considering the principles of ESD; however, as noted clear benchmarks would provide much more guidance.

Furthermore, comprehensive EIA is of fundamental importance for strategic planning and development assessment on the coast. Current application of EIA is flawed due to conflicting state and local planning controls, a lack of baseline data on environmental assets, and a lack of assessment of cumulative impacts, which will be increasingly important with increasing population growth and the pressures it creates. Clear legislative mandatory requirements for the consideration and application of ESD are needed to ensure comprehensive environmental impact assessment.

Addressing climate change

The challenges posed by climate change will require strong adaptive responses, entailing adjusting to respond to the threats of climate change, and managing the interaction between environmental processes and anthropogenic demands.

Planned retreat

Planned retreat can be defined as “the policy of managing coastal development and biodiversity close to shorelines (beaches and estuaries) likely to be inundated by storm surges and wave action exacerbated by sea level rise”.⁷⁸ Due to its alignment with the principles of ESD, planned retreat should be the primary option for adaptation. Planned retreat is not a ‘one size fits all’ approach mandating no new coastal development and gradual removal of existing structures; rather, it is a recognition that given the prospect of substantial sea level rise in the future, in some areas there is no sustainable long-term alternative. The NSW Coastline Management Manual states that planned retreat is “an effective and equitable way of maximising the use of a receding coastline”.⁷⁹

The Intergovernmental Panel on Climate Change (IPCC) suggests a number of mechanisms through which planned retreat may be implemented:

- Setbacks – requiring new development to be a minimum distance from the shore;
- Density restrictions – limiting development;
- Rolling easement policies – allowing development on the condition that it be removed to enable wetlands to migrate landward;
- Conditional phased-out development;
- Withdrawal of government subsidies;
- Denial of flood insurance.⁸⁰

The CSIRO, in its Working Paper ‘Coastal Inundation under Climate Change’, views planned retreat as a “key long-term action with low direct costs and great benefits”.⁸¹ It recommends implementation through an upgrade of planning codes to prevent or discourage new developments in areas which are likely to be flood prone in the next 100 years.⁸² This would involve a process of managed retreat, which includes refusal of planning permission to rebuild properties damaged during storms; landward realignment of flood defences and building setbacks on eroding coasts; and allowing land that is likely to be eroded or periodically inundated to be used for temporary purposes such as relocatable homes or caravan parks.⁸³

While a recognised policy tool, planned retreat is also a controversial planning strategy, particularly for those whose properties are at risk from coastal hazards, not least because of what the CSIRO terms the “opportunity costs” related to preventing development of land that, though flood prone, may have high real estate value in the short-term.⁸⁴ This controversy may

partly be caused by the competing pressures between the objectives of the planned retreat policy, and the rights and interests of property owners.

The recent case of *Byron Shire Council v Vaughan*⁸⁵ is a clear example of the controversy that may be created by implementing a planned retreat policy. Since 1988, Byron Shire Council has subscribed to a policy of planned retreat, meaning that properties affected by rising sea levels would be abandoned rather than protected using drastic measures. In May 2009 the front yard of a local resident, John Vaughan, was destroyed by heavy seas. He attempted to repair a seawall in front of his home but was prevented from doing so by the Council, in keeping with its planned retreat policy. The Council took legal action against Mr. Vaughan, and was successful in gaining an interlocutory injunction to restrain him from undertaking the works.⁸⁶ However, shortly before trial, the matter was settled, with the Council agreeing to “monitor, maintain and repair” the sandbag walls, and agreeing that residents were entitled to protect their properties from the sea.⁸⁷ The Council indicated its intention to incorporate the planned retreat policy into a coastal development policy, but doing so would require NSW Government approval, which the NSW Government has indicated it is unwilling to provide.⁸⁸

Development and planning controls

Development and planning controls should be implemented where full-scale planned retreat is not a viable option. Even where this is the case, some principles of retreat may be implemented, though tailored for the local area. The aim of these controls is to avoid compounding the problems already faced by coastal communities by further developing areas without considering biophysical realities.⁸⁹ Intergenerational equity is an important consideration in this regard. A number of mechanisms may be employed to promote sustainable use of resources and minimise environmental impacts.

Environmental Impact Assessment (EIA)

“The greater the density of people per hectare in settled areas, the greater the challenge of absorbing the impacts created by those people in situ”.⁹⁰ A critical step towards determining where a growing population can be housed in the coastal zone, and preventing development in areas where the effect on local ecosystems and biodiversity would be disastrous, is comprehensive EIA. This must both underpin strategic regional planning, and be applied to individual developments.

Other development and planning mechanisms

Other mechanisms that may be utilised in planning include:

- Public participation – ensuring that the views of all stakeholders are taken into account.
- Sustainable housing practices – incorporating basic requirements such as alternative energy sources, rainwater tanks and insulation into new housing assists in minimising environmental impacts and sustainable use of limited resources.
- Wildlife corridors – landscape connections between larger areas of habitat. Possibly coupled with no-go zones for development in the most sensitive areas, assist in migration, colonisation and interbreeding of plants and animals, and are essential to alleviate the impacts of increasing population and infrastructure on biodiversity.
- Mechanisms to protect water quality – essential for preventing contaminants such as sewage and fertiliser runoff from reaching aquatic systems, thus avoiding large environmental and economic costs.

Resilience building measures

Resilience building measures aim to protect and build the resilience of natural systems. Examples of such measures include dune revegetation, dune and coastal wetland buffer zones, and revegetated corridors. These 'soft', protective options are preferable to 'hard' engineering solutions such as sea walls, as the latter has the potential not only to be ecologically damaging and hence counterproductive, but also to damage the aesthetics of the area, an especially important consideration for areas that rely on tourism. Also, there is often great community opposition to implementing such measures.

In implementing resilience building measures, the nature of the coastal community will be highly relevant. For example, Noosa Beach has implemented a submarine sandshifter, which traps sand at one end of the beach to pump back to areas that are becoming eroded. Aside from the environmental side-effects that can arise if utilised without significant precautions, this option is extremely expensive. Hence it is unlikely to be viable for all locations, but may be appropriate for beaches such as in Sydney or Noosa, with high economic and tourist value.

Early warning systems and emergency response plans

While development controls and resilience building measures are useful in areas yet to be developed, in areas that are already developed such actions may be difficult to apply. For this reason, it is pertinent to install effective early warning systems and emergency response plans to deal with increasing risks and impacts in these areas.

Conclusion

It is clear that the twin pressures of population growth and climate change present enormous risks to Australia's coastline, both for people and for ecosystems. Unchecked, these problems will only exacerbate in the future, and the costs of remedying them will only increase. As the Inquiry into Climate Change and Environmental Impacts on Coastal Communities states, "the time to act is now".⁹¹

Given the poor history of coastal management, the best way to approach the problem is through an integrated approach, with a federal framework to guide responses to coastal hazards at the state and local level.

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1. Department of Environment and Heritage (2005) *Natural Trust: the Journal of the Natural Heritage Trust*, no 22 at 1. Available at: <http://www.nht.gov.au/publications/newsletters/pubs/nht22.pdf>
 2. Department of Environment and Heritage (2005) *Natural Trust: the Journal of the Natural Heritage Trust*, no 22 at 1. Available at: <http://www.nht.gov.au/publications/newsletters/pubs/nht22.pdf>
 3. Thom B (2010) 'Coastal Adaptation in Australia – Some Challenges', paper presented at the Coastal Forum, Adelaide, 18 February 2010, at 1. Available at: <http://www.wentworthgroup.org/uploads/COASTAL-ADAPTATION-IN-AUSTRALIA.pdf>
 4. The NSW Government's *Sea Level Rise Policy Statement* lists the most significant physical consequences of sea level rise as:
 - Increased or permanent tidal inundation of land by seawater;
 - Recession of beach and dune systems and to a lesser extent cliffs and bluffs;
 - Changes in the way that tides behave within estuaries;
 - Saltwater extending further upstream in estuaries;
 - Higher saline water tables in coastal areas; and
 - Increased coastal flood levels due to a reduced ability to effectively drain low-lying coastal areas.
- See Department of Environment, Climate Change and Water (2009) *NSW Sea Level Rise Policy Statement* at 1. Available at: <http://www.environment.nsw.gov.au/resources/climatechange/09708sealevrisepolicy.pdf>
5. Smith T and Doherty M (2006) 'The Suburbanisation of Coastal Australia', paper prepared for the 2006 Australia State of the Environment Committee, Department of Environment and Heritage, Canberra. Available at: <http://www.environment.gov.au/soe/2006/publications/integrative/coastal/index.html>
 6. FitzHugh TW & Richter BD (2004) 'Quenching urban thirst: growing cities and their impacts on freshwater ecosystems', *BioScience*. vol 54 no 8 at pp. 741–754.
 7. See Kennish MJ (2002) 'Environmental threats and environmental future of estuaries', *Environmental Conservation*, vol 29 no 1 at pp 78-107; New South Wales Government, 1992, 'Estuary Management Manual'; and Natural Resource Management Ministerial Council (2006) 'National Cooperative Approach to Integrated Coastal Zone Management. Framework and Implementation Plan'. Available at: www.deh.gov.au/coasts/iczm/index.html.
 8. The Australian Climate Group (2008) 'Climate Change Solutions for Australia 2008'. Published by World Wildlife Fund. Available at: <http://www.wwf.org.au/publications/wwf-climate-change-solutions/>.
 9. McKergow LA, Prosser, IP, Hughes AO & Brodiem J (2005) 'Sources of sediment to the Great Barrier Reef World Heritage Area', *Marine Pollution Bulletin*, vol 51 at pp. 200-211.
 10. ANEDO (2008) 'Submission on the Inquiry into climate change and environmental impacts on coastal communities', 7 June 2008. Available at: http://edo.org.au/policy/climatechange_coastal080610.pdf
 11. Thom B (2010) 'Coastal Adaptation in Australia – Some Challenges', paper presented at Coastal Forum, Adelaide, 18th February, 2010, at 2. Available at: <http://www.wentworthgroup.org/uploads/COASTAL-ADAPTATION-IN-AUSTRALIA.pdf>
 12. Stolz G (2010) 'Great walls to stem rising sea levels on southeast Queensland coast', *Courier Mail*, June 2010. Available at: <http://www.couriermail.com.au/news/great-walls-to-stem-rising-seas/story-e6freon6-1225885878659>
 13. See *Coastal Protection Act 1979*, Section 38.
 14. See *Coastal Protection Act 1979*, Part 4A, Division 2: Enforcement.
 15. *Coastal Protection Act 1979*, s55C. At the time of writing the latter two dot points were not yet law in NSW. The Coastal protection and Other Legislation Amendment Act 2010 has received assent but has not been proclaimed.
 16. *Coastal Protection Act 1979*, ss55K-55L.

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17. *Coastal Protection and Other Legislation Amendment Bill (No 2) 2010* Schedule 3, Part 3.2.
 18. *Coastal Protection and Other Legislation Amendment Bill (No 2) 2010* Schedule 1, Part 2A.
 19. Coastal Erosion Hotspots are listed in the Draft Minister's Requirements under the *Coastal Protection Act 1979* (NSW). Available at: www.environment.nsw.gov.au/resources/water/coasts/10706minrqrcostalprotact.pdf
 20. *Coastal Protection and Other Legislation Amendment Bill (No 2) 2010* Schedule 1, Part 4C.
 21. *Coastal Protection and Other Legislation Amendment Bill (No 2) 2010* Schedule 1, Part 4B.
 22. ANEDO Submission, at 18.
 23. *Standard Instrument – Principal Local Environmental Plan*, Clause 5.5(1).
 24. *Environmental Planning and Assessment Regulation 2010*, Public Consultation Draft, Schedule 5, Clause 6.
 25. Department of Planning, *NSW Coastal Policy 1997*, available at: <http://www.planning.nsw.gov.au/plansforaction/pdf/PPARTA.PDF>
 26. Ministerial Direction 2.2 – Coastal Protection, made pursuant to s117(2) of the *EP&A Act*.
 27. Department of the Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement*, October 2009, available at: <http://www.environment.nsw.gov.au/resources/climatechange/09708sealevrisepolicy.pdf>
 28. DECCW (2009) *NSW Sea Level Rise Policy Statement* at 3, available at: <http://www.planning.nsw.gov.au/LinkClick.aspx?fileticket=ukmXcVJesYA%3D&tabid=177>
 29. DECCW (2009) *NSW Sea Level Rise Policy Statement* at 3.
 30. Department of Planning (2010), *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* at 1, available at: <http://www.planning.nsw.gov.au/LinkClick.aspx?fileticket=VYjmQirQIAk%3d&tabid=177&language=en-US>
 31. Department of Planning (2010) *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* at 2.
 32. Department of Planning (2010) *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* at 2.
 33. ANEDO Submission, at 17.
 34. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007 at 5. Available at: [http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20\(Qld%20Conference%2009.07\).pdf](http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20(Qld%20Conference%2009.07).pdf)
 35. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007 at 5.
 36. EDO NSW (2009) 'Submission to the NSW Department of Planning on the Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise' (December 2009) at 2. Available at http://www.edo.org.au/edonsw/site/pdf/subs09/091130coastal_planning_guideline.pdf
 37. Principle 5 is Minimise exposure of development to coastal risks while Principle 6 is Implement appropriate management responses and adaptation strategies.
 38. Thom B (2010) 'Coastal Adaptation in Australia – Some Challenges', paper presented at the Coastal Forum, Adelaide, 18th February 2010, at 3. Available at: <http://www.wentworthgroup.org/uploads/COASTAL-ADAPTATION-IN-AUSTRALIA.pdf>
 39. State of the Environment 2006 Theme Commentary: Coasts and Oceans at 40.
 40. State of the Environment 2006, Theme Commentary: Coasts and Oceans', at 40.
 41. State of the Environment 2006, Theme Commentary: Coasts and Oceans', at 40.
 42. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 5. Available at: [http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20\(Qld%20Conference%2009.07\).pdf](http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20(Qld%20Conference%2009.07).pdf)

-
43. Thom B (2010) 'Coastal Adaptation in Australia – some challenges', paper presented at the Coastal Forum, Adelaide, 18th February 2010, at 3. Available at <http://www.wentworthgroup.org/uploads/COASTAL-ADAPTATION-IN-AUSTRALIA.pdf>
 44. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 5.
 45. Thom B (2006) 'The NSW Coast from an Australian Perspective', keynote address presented at the Coastal Conference NSW 2006, at 4. Available at: http://www.wentworthgroup.org/docs/NSWCoastalConference_2006_Thom1.pdf
 46. Thom B (2006) 'The NSW Coast from an Australian Perspective', keynote address presented at the Coastal Conference NSW 2006, at 4.
 47. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 5.
 48. *Coastal Protection and Other Legislation Amendment Bill (No 2) 2010* Schedule 1, Part 2A, s13.
 49. Ghanem R, Ruddock K and Walker (2008) J 'Are our laws responding to the challenges posed to our coasts by climate change?' 31(3) *UNSW Law Journal* 895 at 904.
 50. See, for example, House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts (2009) 'Managing our coastal zone in a changing climate: The time to act is now' at paras 1.7 and 3.44. Available at <http://www.aph.gov.au/house/committee/ccwea/coastalzone/report.htm>
 51. EDO NSW (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 1.
 52. EDO NSW (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 10.
 53. NSW EDO (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 11.
 54. NSW EDO (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 11.
 55. NSW EDO (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 11.
 56. NSW EDO (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils', at 12.
 57. Ghanem R, Ruddock K and Walker (2008) J 'Are our laws responding to the challenges posed to our coasts by climate change?' 31(3) *UNSW Law Journal* 895 at 904.
 58. Ghanem R, Ruddock K, and Walker (2008) J 'Are our laws responding to the challenges posed to our coasts by climate change?' 31(3) *UNSW Law Journal* 895 at 904.
 59. Thom B (2010) 'Coastal Adaptation in Australia – some challenges', paper presented at the Coastal Forum, Adelaide, 18th February 2010, at 4. Available at <http://www.wentworthgroup.org/uploads/COASTAL-ADAPTATION-IN-AUSTRALIA.pdf>
 60. Thom B 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 7. Available at: [http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20\(Qld%20Conference%2009.07\).pdf](http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20(Qld%20Conference%2009.07).pdf)
 61. ANEDO Submission, at 55.
 62. ANEDO Submission, at 56.
 63. Department of the Environment, Water, Heritage and the Arts (1993) 'Resource Assessment Commission Coastal Zone Inquiry – Final Report', November 1993. Available at <http://www.environment.gov.au/archive/coasts/publications/rac/chap8.html>

-
64. Thom B (2010) 'Coasts: how best can we adapt to the challenges of climate change?' Paper presented at the Sydney Theatre Company, April 2010, at 5. Available at <http://www.wentworthgroup.org/uploads/BruceThomSTCTalkApril2010.pdf>
65. Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 2. Available at: [http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20\(Qld%20Conference%209.07\).pdf](http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20(Qld%20Conference%209.07).pdf)
66. Thom B (2007) 'The New South Wales Experience', paper presented at the New Zealand *Resource Management Act* Conference, May 2007, at 8. Available at: http://www.wentworthgroup.org/docs/Thom_NZRMAConference_NSW.pdf
67. Thom B (2007) 'The New South Wales Experience', paper presented at the New Zealand *Resource Management Act* Conference, May 2007, at 8. Available at: http://www.wentworthgroup.org/docs/Thom_NZRMAConference_NSW.pdf
68. Department of the Environment, Water, Heritage and the Arts (1993) 'Resource Assessment Commission Coastal Zone Inquiry – Final Report', November 1993. Available at <http://www.environment.gov.au/archive/coasts/publications/rac/chap8.html>
69. Ghanem R, Ruddock K and Walker (2008) J 'Are our laws responding to the challenges posed to our coasts by climate change?' (2008) 31(3) *UNSW Law Journal* 895 at 904.
70. ANEDO Submission, at 56.
71. In Thom B (2007) 'Lessons from the NSW Coast', keynote address presented at the Inaugural Queensland Coastal Conference 2007, 19th September 2007, at 2. Available at: [http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20\(Qld%20Conference%209.07\).pdf](http://www.wentworthgroup.org/docs/Thom%20-%20LESSONS%20FROM%20THE%20NSW%20COAST%20(Qld%20Conference%209.07).pdf)
72. ANEDO Submission, at 56.
73. EDO NSW (2008) 'Coastal Councils and Planning for Climate Change: An assessment of Australian and NSW legislation and government policy provisions relating to climate change relevant to regional and metropolitan coastal councils'.
74. CSIRO Climate Adaptation Flagship, *Working Paper 6: Coastal inundation under climate change: a case study in South East Queensland* (August 2010) at 17. Available at <http://www.csiro.au/files/files/pxom.pdf>
75. ANEDO Submission, at 30.
76. Australian Government, Department of Sustainability, Environment, Water, Population and Communities (1992) *National Strategy for Ecologically Sustainable Development*. Available at <http://www.environment.gov.au/about/esd/publications/strategy/WIESD>
77. United Nations Environment Programme (1992) *Rio Declaration on Environment and Development*. Available at <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>
78. ANEDO Submission, at 63.
79. NSW Government (1990) "NSW Coastline Management Manual" Appendix D3(5).
80. Intergovernmental Panel on Climate Change (2001) *Climate Change 2001: Impacts, Adaptation and Vulnerability* 2001, at 368. Available at <http://www.ipcc.ch/ipccreports/tar/wg2/pdf/wg2TARchap6.pdf>
81. CSIRO Climate Adaptation Flagship (2010) *Working Paper 6: Coastal inundation under climate change: a case study in South East Queensland* (August 2010) at 17. Available at <http://www.csiro.au/files/files/pxom.pdf>
82. CSIRO Climate Adaptation Flagship (2010), *Working Paper 6: Coastal inundation under climate change: a case study in South East Queensland* (August 2010) at 17. Available at <http://www.csiro.au/files/files/pxom.pdf>
83. ANEDO Submission, at 45.
84. CSIRO Climate Adaptation Flagship (2010), *Working Paper 6: Coastal inundation under climate change: a case study in South East Queensland* (August 2010) at 17. Available at <http://www.csiro.au/files/files/pxom.pdf>
85. [2009] NSWLEC 88; [2009] NSWLEC 110
86. *Byron Shire Council v Vaughan* [2009] NSWLEC 88; [2009] NSWLEC 110

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87. Moore M 'Beachfront Landowners Win Sandbag Decision' *Sydney Morning Herald*, 3 February 10 (<http://www.smh.com.au/environment/beachfront-landowners-win-sandbag-decision-20100203-nbbv.html>)
 88. Fraser A 'Byron Bay Loses Fight over Seafront Homes' *The Australian*, 2 February 10 (<http://www.theaustralian.com.au/news/nation/byron-loses-fight-over-seafront-homes/story-e6frg6nf-1225825681635>)
 89. ANEDO Submission, at 27.
 90. Smith T and Doherty M 2006, 'The suburbanisation of coastal Australia', paper prepared for the 2006 Australia State of the Environment Committee, Department of Environment and Heritage, Canberra. Available at <http://www.deh.gov.au/soe/2006/integrative/coastal/index.html>
 91. House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts (2009) 'Managing our coastal zone in a changing climate: The time to act is now' at 3. Available at <http://www.aph.gov.au/house/committee/ccwea/coastalzone/report.htm>