Climate Change and the Coast: the Institutional Challenge

Climate Change Forum

Department of Primary Industries & Southern Rivers Catchment Management Authority

Bega & Nowra, 19-20 June, 2007

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A basic question confronting Australian society is how capable are we going to be at adapting to changes driven by global warming. As a coastal society this question is fundamental to the lifestyles and livelihoods of many coastal dwellers. However, it is also critical to the economy; many industries, including tourism, are dependent on coastal environmental conditions remaining similar to those of recent decades. Dramatically, or even insidiously, any change to those conditions and society will be forced to take steps to adapt in one way or another.

The coast is a domain full of competing interests and pressures. Along the eastern seaboard there has been a history of use and abuse as settlement spread from port cities and towns in the 19th century. Governments encouraged the spread of settlement with consequential land clearance and application of fertilizers, river-mouth dredging, drainage of wetlands, siltation of estuaries and lakes, and weed infestation. In the late half of the 20th century, the desire to own coastal land has grown apace leading to conversion of rural holdings to rural residential or urban blocks. Population growth, the Sea Change phenomenon, of the 21st century is expected to continue for at least two more decades. This will lead further to urban sprawl, and in places urban consolidation, with more removal of vegetation, pressure on waste removal, and increased demands for water and energy. As property values increase, the urgency to build larger homes or units will intensify as people seek to capitalise on investments and live close to waterways and the sea to best capture views and access the beach.

Often in conflict with many investing in coastal property, are those with interests driven by a passion to protect the ecological and scenic values of the coast. These passions are long standing. They manifested themselves in fights against sand mining, excessive forest destruction, and more recently, against urban sprawl along foredunes, on cliff tops, around the margins of coastal lakes, and onto low-lying lands of estuaries and deltas. Ironically, some who now pursue coastal protection have made personal gains before they realized how much would be lost if others seek to do the same.

Since the 1970s, successive state and local governments have instituted policies which address the tensions and interests of coastal communities. Against the need for investment and job creation have been policies to protect the coast, to prevent it from being turned into "concrete". Legislation, regulation, planning instruments and government investments have intervened with market forces. The result in NSW has been: (i) acquisition of coastal land for national parks or open space (35% of the coast); (ii) prescriptive state policies limiting uses on some parcels of private land (e.g. SEPPs 14, 26, 50); (iii) development of guiding policies on types of investment (e.g. limits on building heights); and (iv) various regulations and policies designed to protect public interests (e.g. SEPP 71, amendments to Coastal Protection

Act in 2002). Regional strategies, revision of LEPs, investments by CMAs, agencies and councils, together with commitments under the State Plan, are more recent actions by the NSW Government to ensure that coastal environments are not further degraded but "maintained and improved".

Whilst actions of governments, NGOs, some corporations and individuals have had beneficial environmental impacts on many parts of the NSW coast, there are still forces at work which left uncontrolled will severely damage natural assets. Catering for an expected ½ million or more people outside cities in NSW, and 1 million in SE Queensland over the next 25 years or so, will bring its own environmental challenges (e.g. removal of native vegetation, nutrient and topsoil runoff). But it is the hidden challenge of adapting to climate change that provides policy makers with many imponderables and difficulties in planning.

Early policy discussions on climate change included adaptation as an important option for developed and developing societies. In his Foreword to the first Prime Minister's Science Council in 1989, Bob Hawke noted:

> If global warming occurs, it is likely to affect many aspects of our lives in the years ahead and to require considerable changes in accepted patterns of behaviour.

However, as commented in the journal Nature (8/02/07), for much of the past two decades the mere idea of adapting to climate change became problematic for those advocating emissions reductions or mitigation. Even Al Gore in 1992 declared his opposition to adaptation as it represented a "kind of laziness, an arrogant faith in our ability to react in time to save our skins". But things change. Adaptation is now seen as an essential part of a nation's armoury in the development of policy to combat the negative impacts of global warming. The Stern Review in 2006 and IPCC Fourth Assessment Report (2007) have helped demonstrate why adaptation must be on the agenda and the "taboo" on adaptation must be lifted. Australia is one such nation; in the words of the Minister of the Environment, Malcolm Turnbull, on ABC Lateline (30/03/07):

> There is no government in the world, Tony, not one, that has done more to adapt to climate change than the Australian Government.

Even Stern acknowledges Australian efforts in his reference to the work of the Australian Greenhouse Office.

But just how prepared are we in coastal Australia to face the impacts of global warming where populations are growing and economic interests are expanding? To what extent do our policy makers understand potential changes, and are prepared to act to reduce vulnerabilities; to enhance societal resilience to different climatic and sea-level conditions; to ensure ecosystem health is maintained; and to introduce new methods of water and energy management to meet challenges of higher temperatures and less reliable rainfall? What are the short-term actions and costs that must be taken to reduce impacts? What long-term plans should be considered by communities and governments? Stern states actions now will reduce the severity of impacts later this century.

Projected changes to coastal processes and conditions driven by global warming are confronted by many uncertainties. Progressively the scientific community is refining those uncertainties and improving our capacity to understand the forces which will impact on the

coast. This leads coastal scientists and policy makers to address the question: adapt to what? IPCC reports assist here as does more recent (post 2005) science now appearing in peer-reviewed literature. More and more we need to apply the precautionary principle when evaluating global, regional and local information that flows from on-going research. We must be prepared to adjust plans and actions in the light of new science. For some in government and commerce, this is unsatisfactory as it may hinder investment and profits. But the risks and liabilities are too great unless we exercise caution in applying scientific results.

On the coast we can identify five potential changes from current climatological and oceanographic conditions:

1. Sea level may rise at an accelerating rate, even beyond the conservative projections of the IPCC Fourth Assessment Report;
2. Patterns of storminess may change leading to more intense, longer duration, less frequent East Coast lows with stronger easterly rather than south-easterly wind components separated by long drought periods;
3. Storm surges may coincide with east coast river floods leading to the extensive inundation of low-lying lands around lakes and estuaries;
4. The East Australian Current will continue to warm with effects on weather, migration of aquatic life and elevation of the sea;
5. Oscillations of sea-level induced by trapped continental shelf waves may grow in height due to intensification of pressure and temperature gradients in the Southern Ocean.

Knowledge of how these five process conditions will change requires on-going monitoring and research. For instance, the tide-gauge system along the east coast must be maintained. Beach and dune monitoring should be expanded (e.g. ARGUS at Gold Coast and Narrabeen). Climate models must be refined at regional scales by CSIRO and Bureau of Meteorology. And detailed local surveys using Airborne Laser Scanning (ALS) such as currently underway by Department of Planning on Central Coast, and local studies by DECC Coastal Unit at Batemans Bay and Wooli, must be completed and repeated elsewhere. Similar detailed work on changes to beaches, ocean currents, coastal ecosystems and species by DECC, DPI,CSIRO and university researchers must also continue.

How will the new science be brought together to provide policy makers with useful information? Such information is critical to assess probabilities of storm-induced erosion with rising sea levels along foreshores. Perhaps more significantly, in terms of total properties at risk, is the potential for areas to be inundated more frequently on high tides under rising sea levels (the so-called “Venice effect”). Increasing salinization of estuaries and coastal lakes is also an area requiring more local knowledge, projections and policy applications.

In reviewing the present capacity to adapt to climate change on the coast, it is apparent that inadequacies of the science is only one factor. Current institutional arrangements are too disconnected to allow for the coherent development and consistent application of adaptation strategies across the spectrum of decision makers. We may be ahead of other countries as the Federal Minister suggests, but along the east coast there are institutional arrangements which do not offer confidence in our ability to work collectively and harmoniously to meet the challenges of global warming.

There are four interdependent “players” in the use, planning and management of the coast: governments; commercial interests seeking to use and develop property; community and other

groups often with conflicting objectives; and the courts. Interestingly, the courts may be required to resolve future disputes which arise from actual or perceived impacts of climate change on property use. In the absence of "certainty" or specific legislation requiring consideration of climate change impacts, the courts may make judgements which have adverse environmental consequences (for instance, on the existence of beaches and public access as rising sea-levels and foreshore erosion undermine foreshore property).

A key area of concern is how the different layers of government will interact to make policy and take actions in adapting to climate change on the coast. Federal government interests are somewhat restricted by the Constitution (e.g. limited powers over land use planning). However, the various Commonwealth institutions are in a position to provide advice especially on land vulnerable to climate change (e.g. AGO, CSIRO). Coordination of that advice and information to state and local governments is possible using COAG, Natural Resources Ministerial Council, Intergovernmental Coastal Advisory Group or even the Planning Officials Group. But how effective are these arrangements? Natural Heritage Trust investments through regional bodies is another area the Commonwealth could influence if it adopted a specific adaptation strategy applicable to coastal regions. To date there is little evidence that this is occurring in any concerted or consistent way. Given the projections of coastal and climate change scientists, new coordinating arrangements could be seen as necessary.

State governments are well positioned in terms of statutory powers to plan and manage the coast. Use of these powers to address potential impacts of climate change is slow in coming, not so much in policy (see NSW Coastal Policy 1997, Goal 2), but more in implementation. Potential impacts have been noted as "matters for consideration", yet little has been done to ensure decisions are made with future consequences being "taken into effect". In fact there is more likelihood that other factors, such as need to provide for increased population and job creation, or allowing a landowner to exercise a property or existing use "right", are regarded as being more relevant. Under pressure from individual or corporate investors and the need to generate state or local revenues, it is little wonder that uncertainties of potential adverse impacts are not taken seriously. Queensland's land surrender policy can be seen as one positive step in securing buffers to property in areas of likely erosion. However, NSW has not been in a position to enact similar controls and relies more on plans of management to achieve adequate buffers and protect public assets such as beaches and foredunes. Are such plans really taken seriously? To date levels of investment by state agencies and councils have been limited in this regard despite provisions of the Local Government Act 1993 (see section 733), and decisions in the Land and Environment Court.

The issue is whether a state government such as NSW can put in place strong policies with appropriate financial backing, which minimize liabilities to property owners and the taxpayer under changing environmental conditions induced by global warming. Two new steps have been taken which may lead over the next 5 years to improved long-term adaptation. The first flows from planning reform. Regional strategies (e.g. South Coast) highlight the need for a new generation of local council LEPs to address potential climate change impacts (e.g. sea level rise). This puts the onus on councils to ascertain areas vulnerable to erosion and/or inundation and to then confront property owners with the consequences. How will councils manage such confrontation? What will be the outcome when taken to the Land and Environment Court? Such questions may receive different answers from different councils depending on local circumstances. But unless a council receives more State agency technical and financial support, guided by an over-arching policy framework (e.g. a revised Coastal

Policy and a new Coastal Zone Management Manual), then it will most likely shy away from hard decisions; i.e. it will be "business as usual', not effective adaptation planning.

The second step arises from state agency commitments to climate change research and policy development. NSW Greenhouse Office grants are of great value here supporting the ALS work by DoP and coastal vulnerability work by the former DNR (now DECC). Even the creation of a Department of Environment and Climate Change is taking public administration in a positive direction. However, such agencies (including DPI) must put resources into climate change science in order to provide the critical technical guidance required by CMAs, local councils, landowners, investors and operational managers within government itself (e.g. NPWS, Lands). This information must lead to periodic up-grading of planning instruments (e.g. LEPs) as knowledge develops on vulnerabilities and property risks. Section 149 certificates could be used in a more direct way to inform landowners/residents of risks in living and developing where hazard conditions are changing under global warming. It is somewhat disappointing that the State Plan 2006 was not a lot more explicit with respect to commitments to the development and application of adaptation strategies that binds and coordinates agencies, CMAs and councils. Perhaps this will be forthcoming as more in State Government appreciate the vital importance of such coordination and investment over the next 4 years.

This analysis of institutional arrangements highlights the need for more coordination in policy implementation. With the demise of the NSW Coastal Council in 2004, there is no independent advisory body that can provide governments with assistance in coastal planning and management on matters related to climate change or other environmental, social or economic issues. The Natural Resources Commission cannot do this at the moment given its restricted powers over local council or state agency plans and actions. Under the current terms of its legislation it is largely limited to reviewing CMAs. To date there has not been an emphasis in Catchment Action Plans on adaptation strategies to global warming. The Native Vegetation Act does not apply to lands zoned urban so developer-driven land clearing is left to the whim of local councils unless some threatened community or species is identified by DECC in time. The Coastal Protection Act gives the relevant Minister powers to demand management plans from councils, but who pays for implementation? CMAs are only now beginning to take a more direct role in public land management. But they are not party to decisions of the Department of Planning or its Minister.

Unlike the USA, which has a national Coastal Management Act that supports and guides state and local activities, the Federal Government is limited in what it can do to get coordinated action with state and local governments along the Australian coast. Despite many reviews going back to 1979, successive Federal governments have not been too enthusiastic about direct intervention in coastal planning and management. Will this ever change given the national threats posed by global warming to coastal conditions? Efforts in the Murray-Darling Basin and on the Great Barrier Reef involving cooperative actions may offer a way forward.

At the moment one cannot expect strong leadership from federal or state governments in assisting regional or local bodies better manage the Australian coast to meet the challenges of climate change which scientists will continue to work on. At best we will see piece-meal initiatives in the public interest which may be sustained for one or two electoral cycles. At worst we will see preference given to "business as usual" ignoring the potential difficulties that future generations will face. More people will be living "in harms way"; water and energy shortages will occur creating local crises and heavy cost burdens; and property owners

will seek to capitalize on their assets irrespective of impacts either individually or cumulatively, then sue or seek compensation when harmed.

A new institutional model should evolve to meet the challenges of global warming on the coast. The Federal Government is in a position to offer leadership and provide coordinated technical and financial support to states and local councils, and CMAs where appropriate. Environment and other federal agencies must combine with their state counterparts to ensure resources are delivered and used in the national interest. Monitoring must be improved involving consistent report cards on changes to conditions. Scientific work should be underpinned by modelling based on long-term measurements of key coastal variables. And financial institutions (banks and insurance) must be involved where developers are prepared to locate homes and commercial enterprises in hazardous areas. These institutions as well as governments should be evaluating the costs and benefits of adaptation now.

The new model must embrace the evolving projections of climate change science. To ignore the need to adapt under a “business as usual” approach is to put at peril the lifestyles and livelihoods of millions of Australians over the next 50 to 100 years. At some stage in the not too distant future, we will need to seriously start introducing the necessary engineering works (such as beach sand nourishment, barrage and dyke construction) to meet the challenges of global warming on the coast, along with plans for property buy back, sustainable urban design (including new building codes), innovative provision of energy and water supplies (e.g. wave power), and ecological restoration. Without firm national leadership, support and direction, most local authorities will find it too hard to go beyond “business as usual” until climate change “crises” hit their constituents and then the costs to society will be staggering.