National Coastal Reform-- 2010 and beyond

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Introduction

I wish to dedicate this talk to the late Steven Schneider.

Why Steven? Like many climate scientists in the 1970s, he was captured by the snowblitz hypothesis of global cooling. But as evidence unfolded, he became one of the great international advocates for policies to recognise and start taking action to mitigate and adapt to global warming. His own research, together with the growing body of observations and the increased sophistication of coupled atmosphere and ocean models, provided Steven and others with the scientific confidence to engage policy makers.

Right up to his death in July he toured the world a very sick man using superb oratory powers to explain the way in which human activities are changing the planet's climate and how can our policy choices can reduce the threat those changes pose to natural and social systems. To see him politely but firmly confront the sceptics and deniers on Insight SBS two weeks ago was a revelation in courage and intellectual brilliance.

What resonates with me about the ideas of Steven Schneider is the way he explains concepts of uncertainty and risk. To him uncertainty will not be eliminated from many aspects of climate change science any time soon. The best way to help policy-makers is to try to forge a consensus about the degree of confidence that can be assessed for each important conclusion, such as the effects of sea level rise. Even as models become more sophisticated and get better at simulating global and regional conditions in the future, Schneider argues that what constitutes "enough" credibility to act is not science per se, but a subjective value judgment on how to gauge risks and measure costs.

Let me offer you some quotes from Steven which relate to my talk today:

"Human activities are changing the climate. But how large and how fast will these changes be? What systems will only be partly disturbed and what other systems seriously disrupted? And how can our policy choices reduce the threat they pose to natural and social systems?"

"The policy problem is hard [Garnaut said diabolical] because the global scale of climate change and its subtly intensifying impacts contrast uneasily with the short-term, local-to-national scales of most management systems. Furthermore, significant uncertainties plague projections of climate change and its consequences".

“Such projections stretch the traditional scientific method of directly testing hypotheses because there can be no data for the future before the fact.…But we can go along way toward bracketing probable outcomes and even defining possible outliers” [surprises].

“We also have a responsibility to communicate all of this as well as we can. Communicating this complex systems science to policy-makers and the public is difficult”

And finally “Despite the large uncertainties in many parts of the climate science and policy assessments to date, uncertainty is no longer a responsible justification for delay” (Schneider, 2010).

That is the context for this presentation.

1. We must understand what the science is telling us noting the significant uncertainties that plague projections of climate change and its consequences as they relate to coastal Australia and why we must heed that advice.
2. We must find more convincing ways to communicate that understanding of the implications of the science to policy makers, commercial interests and communities who traditionally work with decision systems that are short term, local in scope, and driven more by private rather than long term public and intergenerational interests.
3. We must devise and use new systems of governance, finance, law, land use planning and management of both natural and built coastal assets to help reduce adverse impacts arising from the twin challenges facing our coast of climate change and population growth.

The Science

Science of climate change comes in three forms: **one**, building models to simulate change, calibrated against past and present conditions, and thereby developing projections/scenarios for the future; **two**, devising experiments to test impacts of changes in atmospheric composition on natural systems; and **three**, observing present-day changes in the condition of those natural systems.

Schneider has made the point that observations from different natural systems provide the “finger prints” or evidence that together takes us beyond the domain of natural climatic variability into what some call the anthropogenic disturbed “new climate era”. Some of the observations that impress me include:

- The Keeling CO2 curve which I first saw in embryonic form on top of Mauna Loa, Hawaii, in 1967
- Greenhouse gas concentrations in Antarctic ice cores going back 600000 years showing a consistent glacial /interglacial “balance” of 180 to 280 ppm CO2—now 380ppm and rising (i.e. 27% above interglacial maximum for CO2 and 230% above maximum for the even more powerful greenhouse gas, methane)
- Ocean waters are becoming more acidic as the waters take up more CO2, while at the same time there is a steady increase in ocean temperature and elevation; sea level is rising at an apparently accelerating rate from both satellite and tide gauge measurements [remember that oceans contain 50 times more CO2 than the atmosphere and is absorbing at the moment 90% of greenhouse induced heat, and that this added heat in the ocean accounts for 60% of ocean expansion according to IPCC 2007].

- Increasing signs of ice sheet destabilisation, especially in Greenland where melt on the flanks is proceeding four times faster than accumulation at altitudes, as well as decay of mountain glaciers, for instance in the Andes
- And various terrestrial and marine biological indicators that taken together highlight disturbances to our natural ecosystems, including southward movements of kelp species and associated organisms along the southeast coast of Australia, as well as more frequent "king" high tide inundations of low-lying properties and infrastructure.

To Schneider, such observations when taken together, offer "finger prints" of global warming which is "highly likely" to be the result of human atmospheric pollution.

Evidence for global warming can be masked by short term natural climate variability and what could be interpreted as impacts of forces other than greenhouse gas effects. No doubt for some systems it is very difficult to disentangle natural from human induced changes. Open ocean beaches may be one example. Twenty centimetres of sea level rise in 100 years appears to have had no impact on the open coast east Australian beaches. They oscillate for the most part around a morphodynamically determined equilibrium condition. But go to some of the more fetch-limited beaches and observations to date suggest persistent recession. Is this the impact of contemporary sea level rise?
And then there are the models! They can only improve as extra data become available to improve calibration and hence raise confidence in their projections. However, it is ocean temperatures, methane increase, or sea level rise, the data are pointing to higher levels of the 2007 IPCC projections. When combined with uncertainties of ice sheet behaviour we are left to conclude that the science is telling us that while we may **hope for the best, we must plan for the worst**.

Communicating the consequences

Although the science has been reasonably well established for 20 years or more, and the evidence of global warming is now more apparent, we remain confronted by deniers, sceptics, and even for the more informed, serious problems of how to manage natural resources and the built environment in the new climate era. The cost of action now overwhelms many who accept what the science is telling decision-makers, and recommend deferring implementation of policy initiatives that will benefit future generations and the long term health of ecosystems. When is the time to act? "Now" recommended the Standing Committee of the House of Representatives in October 2009.

I am reminded of recent remarks by my coastal engineer friend, Angus Gordon, who in commenting on an article in NATURE, "Science scorned", (9-9-2010), said:

"Welcome to the new dark ages. I have for some time been expressing my belief that easy access to apparent facts through the WWW has produced a community of cut lunch scientists who have been fed a healthy diet of pulp fiction."

"We live in a culture that encourages everyone to have their say but does not require them to take responsibility for what they say."

"My stint outside science, as a CEO of Pittwater Council, really opened my eyes to the culture of articulate, selfish, ill-informed participatory democracy which we have encouraged in Australia. Future generations will pay the price."

These salutary words come at a time when science is informing us that along our coast we are moving beyond the "comfort zone" of a fixed sea level to which our settlements were built. It is a new world where we must plan for tipping points, or surprises. It will ultimately involve decisions to relocate towns, to retrofit infrastructure, and to construct massive protective works. And, like it or not, it is a world where decision makers will have to rely more and more on modelled projections, with their probabilities and uncertainties that many in society find hard to comprehend let alone accept.

It is not as if we have not been trying. There have been enormous efforts in Australia such as Greenhouse and other conferences since 1987; presentations to Science Councils (including the first Prime Minister's Science Council in 1989); academy reports; work by Engineers Australia; research papers in the hundreds if not thousands, participation in IPCC; the efforts of think tanks; and the actions of government agency "greenhouse offices". **Champions** of communicating the implications of climate change science in Australia, going back to the first Greenhouse Conference in 1987, such as Graeme Pearman, David Karoly, Tony McMichael and Will Steffen, have strived to make an impact on national public policy. And others like Angus Gordon have tried to engender new thinking into local government and the engineering profession. The position taken by insurers, banks such as Deutsch Bank, and miners like BHP, in response to their understanding of "mainstream" science, is also heartening.

Many have expressed a concern for the impacts or potential impacts on coastal systems. Back in 1992, the Institute of Engineers released their first report on this topic. They continue to be active. So have numerous geomorphologists and ecologists, and more recently that always powerful group, the economists, led in Australia by Ross Garnaut in his 2008 report.

In 1997, we convinced the NSW Government to include consideration of sea level rise and climate change in the Coastal Policy; South Australia did this even earlier. And to our great satisfaction, there have been more recent successes at federal and state levels including:

- State sea level benchmarks to 2100 that are even being applied in the courts and tribunals
- Revision of state planning and management legislation, guidelines and policies, even applying some interesting concepts such as time-limited consents to developments in areas at risk to sea level rise
- A House of Representatives Inquiry "The time to act is now", October, 2009, but note we still have to receive a response to the 47 recommendations from Government who realise there are budgetary implications to many of them
- The appointment of an interim Coasts and Climate Change Council reporting to the Minister for Climate Change and Energy Efficiency
- A section in the DCCEE devoted to coastal adaptation which has sponsored research and forums on coastal climate change issues, releasing in November 2009 the "first pass risks report", and is continuing to foster the development of new tools for assessing risk to sea level rise and storm surge; we should not underestimate the importance of the efforts of DCCEE in providing national estimates of risk to properties and infrastructure in the evolution of coastal adaptation reform in this country, something I hope will excite the interest of the new Minister

- Establishment of adaptation research programs related to coasts within NCCARF and CSIRO as well as coastal programs in Geoscience Australia
- And the emergence of lobby groups like the National Sea Change Task Force and the Australian Coastal Society with active web sites seeking to promote local to national reform and investment in adaptation and infrastructure for both urban and regional coastal areas.

These are all fine initiatives but will they be sustained, are they going to have successful outcomes, when will we know, and who is listening? Who is resisting and opposing investment in climate change mitigation and adaptation? And will implementation of good policies be helped by frequent changes to the structure of government agencies and to staff?

A Victorian Civil & Administrative Tribunal (VCAT) decision in July this year gives one clue as to why we have a problem in coastal adaptation planning. The Tribunal found, and I quote, that:
"It is evident that since the East Gippsland Shire Council set in train processes to manage ongoing development and intensification of land use within the commercial centre of Lakes Entrance, it has failed to respond to changes in state coastal planning policy. These changes arise from a growing recognition of the level of impact from climate change and the corresponding impacts to the Gippsland Lakes and Lakes Entrance… of not only sea level rise but other effects of climate change such as an increased frequency of storm surges and other wind driven flood events" (Para 11, Potts, 2010).

This VCAT decision flies in the face of this council's desire for intensification of settlement, for short- term gains for developers, and for consequential higher rate income. VCAT found that such thinking would be "pre-emptive of appropriate strategies to address climate change risks". If it had been permitted it "would not lead to an orderly planning outcome as it would fail to satisfy the purposes of planning in Victoria for intergenerational equity, sustainable, fair and socially responsible development" (Para 13, Potts, 2010).

It is so important in the context of continued development and population growth pressure on valued coastal lands to have a judicial entity recognise the interests of future generations that is those who will bare the costs of climate change impacts. But a polarized society on climate change presents more problems than an enlightened VCAT can resolve. And we cannot be sure the next Tribunal or Court will make a similar judgement.

Schneider describes climate science as a "combat sport". This has been evident for some time, but never more so since the apparent failure of Copenhagen Climate Conference last year. The media went into frenzy. The antics of some well known commentators did a lot to reduce the credibility of climate science. Scientists in Australia and overseas were attacked even in those elements of the media which sought to offer "balance" of what they perceived as conflicting views. We appear to have lost the trust of many in the community.

I was shocked but not surprised by the negativity and how it played out in federal politics. Two leaders received knock out blows in the contact sport of climate change. And this game is not even quarter-time! What next?

But during all this I was impressed and personally quite satisfied that senior elements of federal and state bureaucracies maintained their faith in the science and have been seeking to

develop sound policies and strategies to meet the coastal challenges of population growth and climate change.

An additional challenge arises from limited national collaboration and cooperation to achieve consistencies, efficiencies and agreements on issues such as variation in planning laws, capacities of local councils, monitoring coastal habitat change, and legal liabilities as noted in the 2009 House of Representatives Inquiry—the so-called George report. We can only hope and continue to put pressure on the new Government, and state counterparts, to achieve better outcomes reflecting the widespread consultation that went into this report.

However, despite all the good intentions, our society contains powerful vested interests that resist both the science and its implications. The "need to act is now", even in a precautionary and intergenerational sense, makes not the slightest sense to these interests!

Participation in TV programs this year, like SBS Insight in February, has revealed strident opposition not only to the science, but also to using the science to adapt to potential impacts of sea level rise. Lobbying is fierce by developers and councillors with short term vision, supported by those with valid but short sighted needs for placing affordable housing and aged care facilities on low-lying land. Our media thrives on such conflict and is readily attracted to the polarised extremes chasing public attention.

However, I also fear some who reside in central government agencies like Treasury or Cabinet offices; here they can pull the levers of power if they see adverse political implications and costs of thinking and planning too long term. It is easy to be a sceptic in such places!

And then there are the lawyers who can be used to argue both sides. Under our adversarial legal system it does not take much for a lawyer to demonstrate how aspects of statute and common law will adversely impact on property rights. Finding holes in legislation is what many pay lawyers to do. It will be very difficult to adapt to the consequences of climate change in settled coastal areas of Australia when we are constantly going into battle with property owners fearful of losing property rights and values, demanding the state protect their homes with taxpayers' funds. In the words of one solicitor, writing in the Australian Law Journal 2010, "Governments and legislatures cannot ignore the fundamental right of property owners to protect their land from the sea" (Coleman, p.422). But they also cannot ignore the public interest in maintaining our beaches!

Meeting the adaptation imperative in coastal Australia

I submit that beyond the actions currently underway at federal and state levels, and by some enlightened local governments, there needs to be further institutional changes to make us as a nation more resilient to threats to our coastal lifestyles and livelihoods, to our treasured natural and our valued built assets, from the twin pressures of population growth and climate change.

I am going to propose six steps consisting of a set of 3 climate change driven adaptation initiatives that will better secure our nation for the tough times ahead; and a further 3 initiatives that specifically relate to coastal adaptation. None are all that original. They build

on ideas floated by the House of Representatives Committee and through discussions with members of the Wentworth Group, ACS and the Sea Change Task Force.

- Three national adaptation initiatives –future fund, environmental accounts, legal system change
- Three steps to address coastal needs—national policy , information system and a National Coastal Commission

First: eventually our Treasuries and political masters will see the necessity of building up a **futures fund** to cope with the extreme impacts, and tipping points, arising from climate change. They may be massive protective works including barrages to protect our cities when relocation options are not practical---this could be seen as the Dutch approach.
Adaptation investments will not be confined to coasts and may be required to ensure human and ecosystem survival in other areas under threat for instance by catastrophic bushfires of higher frequency than today. But work of the insurance industry and the DCCEE "first pass" report indicate the scale of properties, infrastructure, natural resources and amenities at risk from sea level rise and storm surge. And at some stage action must be taken involving public works and even compensation to affected landowners thus placing huge imposts on the public purse. So let us start creating those reserves as soon as budget surpluses permit.

Second: the Wentworth Group of Concerned Scientists has been advocating the need and power of a national system of regionally based **environmental accounts** to reinforce the current monetary system and offer a better basis for decision making in future. Steps are already underway on this front---good news. Without such a system we have no consistent way of measuring the direction and rate of change in the condition of natural assets as the new climate era starts to bite. The Healthy Waterways Partnership in SE Queensland is showing the way.

Third, there is the vexed question of **legal reform.** The House of Representatives Inquiry touched on this but more thought is required. Coastal land must be seen as transient—we cannot protect everything. Our settlements were designed for a constant sea level and land position and a certain magnitude and frequency of storm events. The new climate era takes us out of this comfort zone and geomorphic processes will become a lot more active. Land will be lost to the sea and large tracts of low-lying land will be more and more inundated by tidal waters with floods reaching higher levels.
Other societies are recognising that the dynamics of landscape change necessitates an approach to land tenure, property law and common law rights which must be a lot more flexible than at present. For instance, freeholding of land on which shacks were located in two states has not helped, nor does the principle of injurious affection in another state. Our planning systems and perceived common law rights are not aligned to the scale of coastal change that science is projecting.
Courts are already setting state by state precedents and show that some local councils, like East Gippsland, are not prudently considering existing guidelines and strategies; it is still legally messy and it is not appropriate for the courts to be the continual consent authority. More explicit and nationally consistent obligations in statute law, backed by resources to implement the law, are required when consideration is given to location and type of development. The use of rolling easements and time-permitted consents should be given more thought along with the application of planned retreat and other options, such as more explicit application of the public trust doctrine.

Four: **coastal reforms** were canvassed by the House of Representatives Committee 2009. One that impressed me is the urgent need for an **intergovernmental agreement** on coastal management and planning. Previous committees and the RAC in 1993 said similar things—the time to act is now! Yes it is complex, multifaceted, and multi-agency with no clear lead agency or political champion—that is the "wicked" nature of CZM. It will be hard to get agreement, but without one the states, local councils and the federal authorities will continue to do there own disintegrated, business as usual thing. Then crises of the type we see on a local scale now, such as in Torres Strait, will hit the nation's coasts and our state and local governments will cry poor and lack capacity to cope.
Hope for the best and plan for the worst should be the foundation of a **national coastal policy** under an intergovernmental agreement. Until we do this we will not as a nation be able to stand up for the rights of future generations and environmental values, otherwise we will remain swamped by the on-going wave of self interests pushed along by the tide of population growth and needs to intensify settlement in hazardous areas.

Five: there is the need for a **National Coastal Information System**. Advocates for such have been active for the past 5 years. NOAA in the USA is a model. It is exciting to see different groups in CSIRO, BoM, Geoscience Australia and the universities all active in the development of systems and sensors that measure coastal change. There is now an impetus to integrate these techniques in ways that will underpin a sustained coastal observing system perhaps linked to an oceans system like IMOS. We must ensure that a coordinated information management service will emerge that will offer enhanced capacity to our local governments and other coastal managers.

And sixth, there is the need for a **National Coastal Commission**. I cannot stress too strongly how vital such a Commission will be in years to come. We have a National Water Commission based on a National Water Initiative. Sooner or later we will realise as a nation we need a NCC based on a National Coastal Act. The scale of threats, the needs of communities, the economic importance of coastal infrastructure, and the need for protection of built and natural assets, will cumulatively build the case for a Commission.

An NCC should have the capacity to offer advice and technically support governments in a consistent and coordinated way. Tough decisions will have to be made and we need to set in place processes to achieve long term outcomes while raising the level of national awareness to ensure minimum disruption and community conflict. Our society must become better informed on the evolving science, probabilities, risk, uncertainties and options. Research must be sustained as we will need to learn more about impacts of climate change on your place, your community and your environment.

Conclusion
It is a privilege to have worked with so many dedicated coastal scientists, engineers, planners, environmental managers, policy makers and community folk, as well as some committed politicians, over many years. Through ACS and other ways I hope I can still help make our coast resilient and sustainable in the new climate era and as coastal populations continue to grow. There is so much to do. My 6 steps are offered as a contribution to the national debate on reforms to coastal management and planning.
To conclude with another quote from Schneider:
"Had we begun mitigation and adaptation investments decades ago…the job of remaining safely below dangerous thresholds would be cheaper and easier…Strong action is long

overdue…for me a high-stakes gamble [is] not remotely worth taking with our planetary life support system".

Our task is made easier when we follow the lead given by Steven and take an active part in pursuing strategies that demonstrate how the science can be best used in coastal policy delivery. Thank you