ACS
Australian Coastal Society Ltd
PO Box 65, Flinders University, Bedford Park SA 5042

Natural Disaster Funding
Productivity Commission
LB2 Collins Street East
Melbourne Vic. 8003

Dear Sir,

Please find enclosed a submission to the Natural Disaster Funding Inquiry from the Australian Coastal Society Ltd.

We are very grateful for the opportunity to present this submission on behalf of our members. We look forward to the outcome of your inquiry and wish you all the best in your endeavours.

Yours sincerely

Emeritus Professor Bruce THOM AM, FTSE, FIAG
Vice President, ACS

6 June,2014

PRODUCTIVITY COMMISSION INQUIRY

NATURAL DISASTER FUNDING ARRANGEMENTS

SUBMISSION FROM THE AUSTRALIAN COASTAL SOCIETY

Key issues raised in this submission:

- **That future assessment of risk and funding arrangements involving coastal settlements and infrastructure arising from natural disasters must factor in projections to increased impacts resulting from climate change.**
- **That for coastal areas defined as vulnerable to natural disasters, future investment should be based on the principle of disposable infrastructure and relocatable buildings to minimise the financial burden and maladaptation effects that may arise from construction of permanent protective works.**
- **That the Australian Government would improve the effectiveness of disaster mitigation if it followed the model of other countries and established a permanent group in an agency with the responsibility of assisting states and territories with coastal hazard mapping and risk assessment at scales appropriate for regional land use planning and development assessment.**
- **That the Australian Government adopt guidelines/standards that form the basis of partnership payments to states similar to that used in the USA under their national Coastal Management Act, and that there be a mechanism for the Australian Government to reduce grants if land use plans allowed inappropriate development or redevelopment in known vulnerable areas.**
- **That consideration is given to working with states and local governments in raising a levy on land tax or rates that would constitute a national fund to support general disaster preparation and resilience.**

1. The Australian Coastal Society (ACS) was established in 2008. A key objective is to serve as a forum for the exchange of ideas and knowledge among people involved in the management, planning and development of the Australian coast. In this context it seeks to foster rational, open decision-making in order to achieve sustainable use of coastal resources and responsible stewardship of coastal assets (see web site www.australiancoastalsociety.org for details). It has linked with other organisations involved in coastal management and planning such as the national Sea Change Taskforce and Engineers Australia.
2. ACS welcomes this opportunity to provide a submission to this inquiry given the long-standing interest of many of its members to issues of coastal hazards, vulnerability assessments, disaster impacts, and local, state and federal coastal management and policy frameworks. For instance, one of the authors of this submission (BT) was a convenor of the first Natural Hazards Symposium sponsored by the Academy of Science in 1976 (see Heathcote and Thom, 1979, noting Appendix 24.3 for policy suggestions on natural disasters). He

also served as Chair of the National Coasts and Climate Change Council, 2011. Another author (AG) has written extensively on engineering aspects of coastal management and amongst other appointments has served as a General Manager of a local council (Pittwater) in NSW (see Attachment A to this submission) and contributed to the guidelines of Engineers Australia 2012 referred below. Both BT and AG are members of the statutory Coastal Panel of NSW. The President of ACS, Professor Nick Harvey, and Vice President, Associate Professor Geoff Wescott, have contributed to state policy (South Australia and Victoria respectively) and to the scientific literature on coastal issues.

3. ACS recognises that considerable efforts have been made by local, state and federal governments in identifying **climate change risks** to the Australian coast (see DCC, 2009; DCCEE, 2011, as examples of "first pass" assessments which have attempted to quantify values of built assets at risk to sea level rise and storm surges). **Engineers Australia** (2012) has developed guidelines for responding to the effects of climate change on coastal management and planning and issues related to adaptation and maladaptation to natural hazards. These reports consider implications of continued population, property and infrastructure growth in vulnerable coastal areas, and barriers as well as best practice tools to adaptation. In this context the ACS is aware of the Productivity Commission's report on "Barriers to Effective Climate Change Adaptation" (2012) and the Australian Government's response to that report (2013). This ACS submission will not detail climate change risks except where coastal planning and management in relation to known history of past and current disasters also impinges on managing the uncertainties of projected climate change conditions (for instance, accelerated sea level rise, changes in magnitude/frequency of regional storm conditions on wave energy and on runoff/flooding of low lying coastal lands). ACS is well aware of the outputs of the IPCC and national work, for instance in the USA (e.g. various publications of the National Research Council on impacts of natural disasters, and AECOM, 2013 on behalf of the National Flood Insurance Program).
4. ACS asserts with a very high level of confidence to the point of **inevitability** that many coastal areas in Australia will experience natural disasters in the "near future". By "near future" we mean over the next 10-20 years which would embrace atmospheric cycles such as ENSO that drive episodic coastal storms of high magnitude, especially tropical cyclones and east coast lows. We are familiar with the geomorphological literature on cyclonic storm frequency and impacts, and the history of flood and storm wave/surge impacts in SE Australia (Thom, 1974; Foster et al. 1975; Gordon, 1987, see also Gordon, 2013, Attachment A). The clusters of storms that hit S.Qld and NSW in the 1970s have been particularly well documented, but storms of similar or even greater magnitude have also occurred, for instance in 1967, 1912, 1889 when the coast was less settled and infrastructure was less exposed. Contemporary erosion of shorelines occurs around much of the Australian coast as does flooding of flood plains and margins of estuaries especially during La Nina years. We must expect events such as Cyclone Yasi or Tracy to occur again and again with insurance and disaster relief costs to grow and grow as population crowds into areas that are known to be vulnerable based on past events. One perspective on the future comes from recent modelling in the US. In their assessment of the impact of climate change and population growth

on the US National Flood Insurance Program, the consultants (AECOM, 2013) concluded that a scenario involving receding shorelines that the total number of NFIP insurance policies was projected to increase by 80% by 2100 and premiums by as much as 40% in today's US dollars.

5. **Mitigation actions** in coastal regions over the past 200 years have a mixed record. On the open coast, they range from massive ongoing investments in sea wall and beach nourishment on the Gold Coast, involving sand by passing from NSW to Qld that will continue for decades, to ad hoc piecemeal efforts to throw rocks and car bodies onto an eroding scarp (Gordon et al. 1978). Such efforts have consequences both for the public good (safety, loss of beach amenity) and liability of councils/state governments. Only rarely have settlements been abandoned with compensation (Sheltering Palms in N.NSW). Many so-called protective works and other coastal structures such as breakwaters and storm water drains are under designed for the scale of likely extreme events and will require retrofitting to higher standards in future. There is also the issue that building sea walls may have on beach amenity and loss of adjoining lands, what could be seen as maladaptation to a natural hazard unless carefully designed in relation to long term impacts. Building levees have been necessary for many coastal towns as well as compulsory acquisition of houses in flood prone areas (Maitland after the 1955 floods but not after the Brisbane floods of 1974). State governments, with some help from federal grants, have invested in drainage works to help mitigate flood impacts and it has been accepted that this was state responsibility, However, on one occasion the Commonwealth passed specific, one off, legislation to permit investment in drainage on the tidal reaches of Tweed, Clarence, Richmond, Macleay and Shoalhaven rivers (NSW Grant (Flood Mitigation) Act 1964, see details in Tulau, 2011). As with sea walls there are some unforeseen consequences of digging these flood drains such as activation of acid sulphate soils during subsequent dry periods. Recent examples of federal "investment" in disaster management as noted by the PC in their issues paper has been focussed more on recovery (see also DAE, 2013, and Thom, 2014). The recent Federal budget only provides funding for $39.2m on national disaster resilience in 2014-15, dropping to $26.1m in the following years. This is far less than the $250m per year estimated by Deloittes (DAE) that could potentially halve the costs of disasters by 2050.
6. **Natural disasters associated with extreme events** in coastal areas subject shorelines and adjoining tidal lands to both immediate and longer term adverse impacts. Coastal lands are transient in time and space and coastal lands will be lost in future and suffer more devastation especially as sea level continues to rise. Hunter (2012) in his modelling of sea levels in the future applies evidence that a rise in mean sea level is generally the dominant cause of the observed increase in the frequency of the impacts of extreme events even if there is no change in the variability of the extremes. Experience in Europe and the USA informs us that we must expect to change our approaches to capital expenditure on infrastructure and its maintenance, on building design and location, and on the sanctity of private property protection, if we are not going to incur increasing public burden of relief and recovery. We are personally familiar with cases in these overseas countries. As noted above, DAE 2013 makes the point that resilience and preparation requires more investment. However, it does not specifically identify some of the additional cost burdens

facing Australian society of how planning systems have allowed coastal settlements to be placed in "harms way": houses on edge of eroding foredunes and cliffs, hospitals in surge zones, electric substations in flooding areas, drains that back up with salt water on king tides, etc. ACS **recommends** that for areas that can be identified as vulnerable to coastal natural hazards, future investment/reinvestment should be based on the **principle** of disposable infrastructure that will provide the desired services and relocatable buildings that will not require a financial burden in being protected from property damage (see Attachment A for details on this recommendation).

7. In its response to the PC report on effective climate change adaptation, the Australian Government noted that "the coordination and dissemination of natural hazard information, including flood risk, coastal inundation, bushfires and extreme weather elements, **will continue to be a core role for the Australian Government**" (2013, p.8). The emphasis in this statement is on coordination and dissemination of information, not on use of Commonwealth financial powers, for instance under s96 of the Constitution, to construct or maintain mitigation works. This is in contrast to the USA where NOAA, FEMA and Corps of Engineers are directly involved in aspects of coastal planning and management (a similar role exists for the Environment Agency in the UK). An example in the USA is how FEMA is engaged in the designation and on-going review of so-called V and A zones related to breaking waves and water depths. In comparison, the Australian Government has never accepted as part of its "core role" a federal disaster insurance program like FEMA, or having an agency with technical skills and mandated responsibilities to perform similar functions to those undertaken at a national level in these and other countries. Thom (2014, p.33, Attachment B) outlined a potential role for **Geoscience Australia** in this space following work it undertook under contract as part of the work of the Queensland Reconstruction Authority (QRA). Disaster mitigation involves mapping and assessing risk to public and private assets according to agreed national standards removed from local self interest that may affect outcomes. Engineers Australia guidelines (2012) highlight what could be achieved nationally in coastal areas. Future work must include more detail assessment of "coincident events" impacting on coastal settlements involving river floods, high tides and storm surge such as occurred in 1974 in Brisbane. ACS **recommends** that the effectiveness of disaster mitigation would be improved if the Australian Government permanently funded an entity, following agreement and cooperation with the states and territories that would provide nationally consistent coastal risk mapping at scales appropriate for regional land use planning and development assessment. Such consistent mapping would be of benefit to finance, insurance and development industry.
8. ACS accepts that some natural disasters are of a scale that is beyond the **mitigation resources** of state and local governments. This was the reason for the Commonwealth's specific coastal flood legislation in 1964 and the one off tax levy in 2012. ACS **recommends** consideration of options that the Australian Government could employ to assist states and local governments including: (1) using a mechanism similar to that under the US Coastal Management Act (administered by NOAA) to offer partnership payments on the basis of agreed actions following standards and guidelines that are nationally consistent but require detailed evaluation for local implementation;

and (2) using a mechanism that would reduce Commonwealth grants to state and local governments if it can be demonstrated that local land use plans allowed development or redevelopment in known vulnerable areas.

9. ACS accepts the case put by DAE 2013 that there needs to be a better cost effective mechanism to meet the **budgetary challenges** of natural disasters. Under current arrangements, coastal erosion, storm surges, wind destruction and inundation of low lying lands resulting (in some cases from combined catchment flooding and high storm tides) will continue to cause economic and social turmoil. While never removing adverse impacts entirely as the Dutch attempt, more investment is required to reduce the budget burden of general disaster relief as occurred over the past 5 years. On the coast sufficient scientific knowledge exists to plan for future disaster mitigation provided certain conditions are met. Implementation to satisfactory national standards using a coastal management approach similar to that used since 1993 in the UK based on coastal cells is now being discussed federally (Thom, 2014a, Attachment C). This would lead to improved regional land use and asset management planning as recommended in the submission to this Inquiry by the Wentworth Group. However, in performing these assessments we note that key data are often missing at vulnerable locations to model potential impacts and inform best practice mitigation decisions (retreat, accommodate, protect; see Engineers Australia guidelines).
10. Governments could give more priority under present financial arrangements knowing over time they can reap the budget benefits of fewer big single year "hits" when the inevitable bites. This would involve using criteria for the allocation of tied grants as noted above. An alternative would involve using a "future fund" approach relying on state and local governments to collect an additional amount from **council rates or land tax** which can be later allocated under agreed criteria by the Commonwealth for specific mitigation purposes (e.g. raising road levels and drainage in areas subject to periodic storm tide inundation). We also see the need on some occasions for the Australian government to borrow for major infrastructure improvements that would have a disaster mitigation purpose. ACS **recommends** that the Commission further examines such options with specific reference to how the UK, USA and Netherlands fund coastal disaster mitigation.

Submitted on behalf of ACS by:

Professor Bruce Thom AM, Vice President ACS
Angus Gordon, Chair Coastal Panel of NSW
Professor Nick Harvey, President ACS
Associate Professor Geoff Wescott, Vice President ACS

REFERENCES

AECOM, 2013. Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100. Executive Summary. Report prepared on the recommendation of the US Government Accountability Office.

Deloitte Access Economics, 2013. Building our nation's resilience to natural disasters report for the Australian Business Roundtable for Disaster Resilience and Safer Communities.

DCC, 2009. Climate Change Risks to Australia's Coast. A first pass national assessment. Australian Government, Canberra.

DCCEE, 2011. Climate Change Risks to Coastal Settlements and Industry. A supplement to the first pass national assessment. Australian Government, Canberra.

Engineers Australia, 2012. Guidelines for Responding to the Effects of Climate Change in Coastal and Ocean Engineering, 3rd edition. Canberra.

Foster, D. et al. 1975. Storms of May-June 1974, Sydney, NSW. In the proceedings of the 2nd Australian Conference on Coastal and Ocean Engineering, Gold Coast, Institution of Engineers Publication 75/2, 1-11.

Gordon, A. et al. 1978. Byron Bay-Hastings Point Erosion Study. Public Works Department NSW, PWD 78026.

Gordon, A. 1987. Beach fluctuations and shoreline change, NSW. 8th Australian Conference on Coastal and Ocean Engineering, Launceston, Institution of Engineers Publication, 87/17.

Gordon, A. 2013. Disposable infrastructure including relocatable buildings: adapting to climate change. Australian Journal of Water Resources, Water and Climate: Policy implementation challenges, 17, 152-160. **ATTACHMENT A.**

Heathcote, L. and Thom, B. 1979. Natural Hazards in Australia. Australian Academy of Science, Canberra.

Hunter, J. 2012. A simple technique for objectively estimating an allowance for uncertain sea-level rise. Climatic Change, 113, 239-252.

Thom, B. 1974. Coastal erosion in eastern Australia. Search, 5, 198-209.

Thom, B. 2014. Time to get serious about national disaster mitigation. Focus, Australian Academy of Technological Sciences and Engineering (ATSE), February, 2014, 31-33. **ATTACHMENT B.**

Thom, B. 2014a. Coastal Compartments Project. Summary for Policy Makers. Department of Environment, June 2014, Canberra. **ATTACHMENT C.**

Tulau, M. 2011. "Lands of the richest character", Agricultural drainage of backswamp wetlands on the north coast of NSW. PhD Thesis, Southern Cross University.