Submission to the Productivity Commission- Response to *Natural Disaster Funding Arrangements Draft Report, September 2014*

Key Points

- Implementation of the draft recommendations of the Productivity Commission will increase the demand for a national, consistent, high-quality information base for robust and transparent decisions on mitigation and risk management. It is not realistic to assume that the current natural hazards information base will sustain such increased level of demands. There needs to be significant changes to the current funding arrangements to address these issues.
- Furthermore, GA notes there is considerable commitment needed to all issues related to natural hazard information governance. A nationally consistent, robust and accessible information base on which to make informed decisions on mitigation can only be achieved by a coordinated response in terms of developing appropriate governance to direct policy and funding.
- GA recommends that a governance framework should be developed to coordinate approaches around quality, standards, integrity, reliability, accessibility and infrastructure. This framework should aim to optimise the seamless delivery of quality information across a range of sources, both from all levels of Government and from the commercial sector.
- GA recommends that the development of a governance framework should build on and extend existing governance arrangements around technical expertise and information management. Governance arrangements should be endorsed by COAG, with leadership from national agencies, such as GA.

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Geoscience Australia (GA) acknowledges the vision of the Productivity Commission's (PC) comprehensive draft report on Natural Disaster Funding Arrangements. GA endorses the view to revise the national disaster funding arrangements to empower stakeholders to invest in mitigation. However, GA notes that the effectiveness of the recommendations may be limited by the reality of some of the broad assumptions underpinning it.

Based on GA's perspective as the Australian Government custodian of geoscience and geographical information and knowledge, this submission focuses on the current base of natural hazard information. The success of the recommendations relies heavily on a substantial, robust, accessible, interoperable and flexible information base. GA suggests that structural improvements to the governance of the information base should address various issues in terms of the adequacy and accessibility limiting its potential effectiveness, both currently and into the future.

This submission outlines this suggestion through GA's response to two Requests for Information in the PC Draft Report (pages 160 and 141, respectively), and a response to a particular comment around perceived duplication of effort (page 161). Appendix A gives further detail supporting this argument, as well as providing some comments on the findings of Chapter 4 in the PC report in general.

Information Request Chapter 4, page160

Summary

GA recommends that a comprehensive governance framework is developed for natural hazard information, to be endorsed by COAG. This would provide not only coordination, guidelines, but also address issues around licencing, quality management and interoperability. Such a framework should build on and extend current models for information governance, notably the Foundation Spatial Data Framework. Furthermore, any governance arrangements should seek to create and support the infrastructure to provide improved, seamless access to information.

Draft Report, page 160:

'If guidelines for the collection and dissemination of hazard mapping and modelling are developed:

1. *who would be best placed to develop these guidelines?*
2. *what hazards could be covered?*
3. *how could guidelines for hazard types be prioritised for development?'*

Guidelines and prioritisations should be part of a broader governance framework that covers all relevant hazard, vulnerability, exposure, impact and risk related data, mapping, modelling and derived information, as well as 'fundamental' data. In this submission, we refer to this broad spectrum of data and information as the 'natural hazard information base'. Information governance should address issues related to the effective management of such data and information, including quality, standards, integrity, reliability, accessibility and the roles and responsibilities of data custodians and users, both government and non-government. Across all these issues, the current status of the natural hazard information base shows the need for improved governance. Appendix A in this submission assesses the current status of the natural hazard information base, referencing relevant findings of the PC Draft Report.

GA contends improved information governance is an essential basis for transparent and efficient mitigation spending. Rather than 'just' covering hazard mapping and modelling, this should cover all components of information required to develop validated natural hazard, impact and risk modelling information. Prioritisation frameworks for this should be based on an analysis of information availability against local risk profiles across the country.

Governance and guidelines should be developed and endorsed through the mechanisms of COAG, and with full involvement of national agencies (i.e. GA, the Bureau of Meteorology and the Australian Bureau of Statistics) and the jurisdictions. There are examples of effective governance of technical guidelines in collaborations under COAG, such as the working group that developed the National Emergency Risk Assessment Guidelines, and the many guidelines developed by technical reference groups on flood and tsunami risk (the National Flood Risk Advisory Group and Australian Tsunami Advisory Group). Similarly, there are examples of effective information management, such as the development of the Foundation Spatial Data Framework[1] (FSDF) under the governance of ANZLIC – the Spatial Information Council[2].

These governance models of technical expertise and information management should be extended and integrated to develop a governance framework that covers all aspects of natural hazard risk information. This should recognise opportunities to leverage existing governance and infrastructure arrangements provided within the Whole of Government. It should allow jurisdictions to benefit from economies of scale and technical expertise represented in other parts of government.

The need for governance will become more important if the PC's recommendations on the opportunities for using private/public partnerships to acquire data and information are implemented (e.g. Recommendations 4.1, 4.2 and 4.3). Such recommendations require strong guiding principles to make them practicable. Appropriate governance should protect stakeholders against potential overreliance on industry bodies that have potentially conflicting commercial or lobbying interests, or who are not easily held to account for the quality of information or the level of transparency of their products. Furthermore, government leadership and coordination are needed to guarantee that the information base is sufficient where there might otherwise be gaps.

The Australian Government should ensure that all communities, all levels of government and businesses in Australia have appropriate information to make considered decisions on the appropriate actions for mitigation and risk management. There should be clear governance of data and information that covers all levels of jurisdictions, including the federal government. The governance model should be flexible enough to include private-public partnerships, ensuring coordination and guidelines are integrated in a best-practice and sustainable approach to information management. Furthermore, any governance arrangements should seek to create and support the infrastructure to provide improved, seamless access to information. Any governance arrangements need to be endorsed by COAG, and would benefit from involvement and leadership from national technical agencies, of which GA is one.

[1] http://www.anzlic.gov.au/foundation_spatial_data_framework. The FSDF provides a common reference for the assembly and maintenance of Australian and New Zealand foundation level spatial data in order to serve the widest possible variety of users. Its objective is to deliver a national coverage of the best available, most current, authoritative source of foundation spatial data which is standardised and quality controlled.

[2] http://www.anzlic.gov.au/

Information Request Chapter 3, page 141

Summary

Historical averages are an unreliable source for estimating disaster risk. Increasingly sophisticated disaster risk/catastrophe loss models are now available both in the commercial sector and in the community or 'Open Source' sector. These models, routinely used in the financial industry to price risk, should be used for risk management in a government context, for example to estimate future liabilities or 'savings' from mitigation measures.

Draft Report, page 141:

'The Commission seeks feedback on approaches for the Australian Government to provision for some base level of natural disaster risk in the budget each year.

1. *What would be the advantages and disadvantages of using historical averages?*
2. *Are there more sophisticated models available to estimate potential future liabilities?*
3. *How should 'imputed savings' from changes to the Natural Disaster Relief and Recovery Arrangements be estimated?'*

The limitation of historical averages as a basis for sound disaster risk management is continuously demonstrated by events that break all records in terms of impacts ('black swan events'). Often, these events would be considered probable from a physical perspective, but not from an actuarial perspective. The financial industry therefore uses alternative approaches for disaster risk management. In line with the OECD guidelines on disaster risk assessment and financing (OECD, 2012), methods to estimate disaster risk should consider the full range of potential disaster events. Catastrophe loss models go beyond the observed catalogue of historical events to combine probabilistic techniques with the understanding of the physics driving the events and their impact to estimate future liabilities.

Significant advances in the development of natural disaster cost modelling have been made over the past decades. Increasingly sophisticated disaster risk/catastrophe loss models are now available both commercially and in the 'Open Source' sector. Although not all hazards and vulnerabilities are covered and extensive validation remains a priority, there is no reason why the techniques routinely used in the financial industry to price risk could not be adopted for other applications, including governance of risk. By adapting the economic modelling component of existing stochastic disaster risk models to cover government liabilities, imputed 'savings' from changes in policy could be quantified.

GA has considerable expertise on the development and implementation of disaster risk models, both through in-house development of models, and as part of its ongoing membership of international and national research consortia. An independent review of open source risk models commissioned by the World Bank found that GA was a leader in developing risk models in the public sector (GFDRR, 2014). GA is the Australian representative on the board of the Global Earthquake Model (GEM), a leading open source earthquake risk model.

Suggested duplication of effort, page 161

Summary

The flood database component of the National Flood Risk Information Project (NFRIP) and the National Flood Information Database (NFID) should not be considered as equivalent. The flood information in the NFRIP is publicly available, while the NFID is developed for and by the insurance industry, and is not publicly accessible. This shows that there are real opportunities for both government and industry to streamline the quality of natural hazard information by developing derived products to leverage a consistent high-quality information base that government has invested in.

The PC report states that participants suggested that there is some duplication between the content of the National Flood Risk Information Project (NFRIP), led by the Australian Government, and the National Flood Information Database (NFID), led by the Insurance Council of Australia (page 161).

While both databases contain flood information, they should not be considered as equivalent from an information availability perspective. The Australian Flood Studies Database (AFSD) component of NFRIP aims to improve public and free availability of flood information to all stakeholders. In addition, the NFRIP project develops a range of products to improve the national quality and consistency of flood information, of which the AFSD is only one. The NFID, which is based on a GA database now redeveloped as part of NFRIP, is designed to meet the technical and business requirements of the insurance industry. The NFID is not publicly available (as indeed stated in the report on page 155).

GA views the perceived overlap between NFID and the NFRIP database as a good example of the need for better governance around information. It highlights the need to have leadership and a coordinated approach to information gathering across all levels of government and commercial stakeholders. In fact, NFID shows that there are real opportunities for both government and industry to streamline the quality of natural hazard information by developing derived products to leverage a consistent high-quality information base that government has invested in.

Conclusions

Implementation of the recommendations of the PC will increase the demand for a national, consistent, high-quality information base for robust and transparent decisions on mitigation and risk management. While the national information base has improved, it is not realistic to assume this will sustain such increased level of demands.

The recent improvement in availability of flood information, as noted by the PC, demonstrates the advances that can be achieved by targeted investment in conjunction with accelerated action across all levels of government and industry. Even so, there are still considerable gaps. Moreover, most of the recent effort has exclusively focused on the quality and availability gaps related to flood hazard information. The improved information availability does not extend to include a good understanding of building or infrastructure vulnerability to floods. An equivalent information base in relation to other hazard types, such as storm surge, bushfires, and severe wind is still non-existent. The ability to analyse total exposure of an area to all hazard types, and to prioritise between different hazard types, is still very immature at best.

GA therefore does not agree with the PC finding that 'the most significant information gaps in these areas will be addressed without the need for significant changes in the current funding arrangements' (page 158). GA notes there is considerable commitment needed to all issues related to natural hazard information governance. A nationally consistent, robust and accessible information base on which to make decisions on mitigation can only be achieved by a coordinated response in terms of developing appropriate governance to direct policy and funding. A governance framework should be developed to coordinate approaches around quality, standards, integrity, reliability, accessibility and infrastructure. This framework should integrate information across a range of sources, both from all levels of Government and from the commercial sector.

Appendix B outlines the potential value that GA can bring as a technical agency within a comprehensive governance framework of natural hazard risk.

References

Deloitte Access Economics, 2014. *Building an open platform for natural disaster resilience decisions*. Report commissioned by the Australian Business Roundtable for Disaster Resilience and Safer Communities.

GFDRR, 2014. *Understanding risk. Review of open source and open access software packages available to quantify risk from natural hazards*. Independent report commissioned by the Global Facility for Disaster Reduction and Recovery, the World Bank.

OECD, 2012. *Disaster Risk Asessment and Risk Financing. A G20/OECD methodological framework*. http://www.oecd.org/gov/risk/G20disasterriskmanagement.pdf.

Appendix A. Information provision and sharing

The Productivity Commission finds that (F 4.1) *'[T] he availability of information on natural hazards and exposure has improved significantly in recent years, especially in relation to floods. However, there is scope for greater coordination and prioritisation of natural hazard research activities across governments and research institutions'.*

GA agrees with the finding that the availability of natural hazard, particularly flood information has improved recently. This improvement has been possible through significant commitment from government and industry. Following the 2011 floods, all levels of government committed to improving accessibility of flood information to the public. The Australian Government invested $12M over four years to improve the quality, discoverability and accessibility of existing flood information[3], and the States and Territories agreed to expedite the provision of their information. The States and Territories have made significant investment (typically through state-based mitigation funding) over the years to develop the information that would be made available through a national approach. The insurance industry has developed information systems based on the flood studies commissioned by government to price insurance. Even so, considerable gaps and inconsistencies remain in the national information base on flood hazard. Moreover, an equivalent information base does not exist for other hazards. Without a coordinated commitment, this issue is unlikely to be addressed. While this is flagged by the PC, GA notes that there is no recommendation to endorse this.

GA questions whether the reality of the availability of data and information supports implementation of the PC's recommendations. This applies to the full range of natural hazards, including floods. The following briefly outlines the case for improved governance as a mechanism to improve issues around information availability, with reference to relevant sections in the Draft Report.

Information provision

A comprehensive information governance model would need to include strategies that address issues around i) adequacy of information, ii) standards, iii) quality, iv) integrity, v) gaps and vi) lack of prioritisation.

- **Data and Information**. GA notes that the terms 'natural hazard data' and 'information' have been used interchangeably throughout the draft report. However, there is a fundamental difference between 'data' and 'information'. Information implies that meaning has been assigned to data, for example by organising or processing. While a range of input data may be (more) available than previously, the software and capability to generate the information required for

[33] Through the National Flood Risk Project (NFRIP) the Commonwealth expenditure has covered the development of an online portal to allow existing flood information to be discovered and accessed, the development of a new nationally consistent dataset that describes how often water has been observed on the surface from satellites, and the completion of the revision of the Australian Rainfall and Runoff guidelines which is a key document for the development of flood information into the future. In addition, Engineers Australia has been revising the Australian Rainfall and Runoff Guidelines which will enable the development of quality flood information into the future. This revision has been possible through significant Commonwealth investment (from the Department of Environment and Department of Industry), but also significant contributions from the engineering community.

the analyses and decision making fundamental to the PC's recommendations is not. A significant amount of work is needed to address existing but disparate capabilities to realise substantial benefits for mitigation purposes. This includes collecting the data in a targeted, prioritised way, collating the data, making it interoperable, and creating and implementing the tools to generate the analysis. For example, Cost Benefit Analyses and Multi-Criteria Decision Analyses tools require pre- and post- treatment analyses to be run for very specific exposure/location combinations. Costs and required expertise to generate and utilise the information could be prohibitive for many LGAs or councils. GA believes there is a need for national leadership, at the very least to allow for economies of scale and quality guidance.

- **Standards**: GA notes a potential conflict between the need for guidelines on natural hazard information (page 160) and the statement that '*Mandating standards could have the unintended consequence of limiting the usefulness of information to [stakeholders].'*(page 159). It is important to recognise the need for information interoperability. Without a consistent approach to exchanging data in a meaningful way through (flexible) standards between stakeholders the ability to cost effectively use information to inform mitigation will be significantly limited. There are currently several national governance models that address information interoperability while recognising the issues around over-prescriptive standardisation.
- **Quality**: The quality of the existing information base remains inconsistent. Moreover, there is not always sufficient meta-information to assess information quality. Yet, this determines what level of decision making is appropriate. For example, the type of decisions that should be made on the basis of a flood or bushfire hazard map is determined by the resolution and vintage of the input data, as well as methodology and assumptions that were used to develop the map. This again suggests the scope for greater coordination and prioritisation within a governance framework, to ensure that future information development aligns priority and quality.
- **Integrity**: In many cases, the current information available is inconsistent and/or incomplete across the jurisdiction borders. Well-known examples are bushfire fuel maps and exposure (building asset and infrastructure) information. Yet, natural hazards don't recognise jurisdictions. Treatments of risks should be coordinated across borders, such as for example for bushfire or flood plain management. This is difficult with an inconsistent information base. An overarching governance framework should improve coordination of integrity and consistency.
- **Gaps**: There is still a lack of information in many areas, including engineering vulnerability (infrastructure), social vulnerability, assets, particular hazards, macro-economic impacts of disasters etc. For example, there is no single dataset that provides the location of every building across Australia. Significant time and effort has been put into GA's National Exposure Information System (NEXIS) to collate a range of publically available building datasets. However, these represent less than 5% of the national building stock. Statistical approaches have been developed in an attempt to fill these gaps, however, this can introduce greater uncertainties in the subsequent modelled results. Current research does not suggest these gaps will be filled in the near future, especially at a nationally consistent level. This also points to the need to coordinate priorities through an overarching governance framework (see 'Priority' bullet point).
- **Priority**: Any coordination and governance of natural hazard research and development activities needs to be addressed at the national level, in order to provide a fair and consistent approach to individual jurisdictions based on their priority in terms of their information needs and local risk profile.

GA notes that the PC restructure of the funding arrangements could be interpreted as dispensing with national research programs such as the NEMP and the NDRP. GA would argue against cutting these programs, as these are highly successful ways of coordinating and prioritising applied research across jurisdictions, as per Recommendation 4.1. Even so, they are not sufficient in their own right in addressing the need to prioritise and coordinate research activities.

Information accessibility

A comprehensive information governance model needs to address issues currently limiting information accessibility. Information access is determined by issues around: i) liability, ii) licencing restrictions, iii) costs, iv) infrastructure, and v) privacy constraints. These issues become more important when (but not only when) information is sourced from a range of private/public providers.

- **Liability:** GA supports the PC's position on the perceived constraints posed by liability on data access.
- **Licencing restrictions:** The PC recommends leveraging commercially developed information for decision making on mitigation (e.g. recommendations 4.1, 4.2 and 4.3). Against this background, judicious and appropriate information licencing as part of a governance framework is fundamental to ensuring public money is spent on best-value products.
  - Public-private partnerships can be powerful, but only strengthen the need for strong governance of licencing. Many commercially developed sources of information may be publicly available but not freely available, which limits accessibility. Other data sources are not made publicly available at all. To date, there has been little exploration of the legal and technical scope for this information to be made publicly available.
  - GA suggests the use of AusGOAL[4], as an existing Commonwealth initiative for making data accessible within an established licensing framework. AusGOAL is aligned with the government's open data policy but where necessary makes allowance for the incorporation of commercial data under a restrictive licence. AusGOAL is based upon the Creative Commons framework to maximise information accessibility while reducing risks associated with the public release of information.
  - GA has extensive experience with governance of public-private information, e.g the National Elevation Data Framework (NEDF) and the Optical, Geospatial, Radar, and Elevation Supplies and Services Panel (OGRE). NEDF provides access to elevation data across all levels of government, industry, academia and the community minimising duplication of efforts. OGRE is a cooperative procurement panel which allows the acquisition and use of commercial imagery supplies and associated services to all levels of Australian Government.
  - In general, the PC report has a lack of guidance on the criteria of disseminating information. Recommendation 4.2 only mentions existing data; nothing is said on future data. GA suggests the governments baseline position should be for full accessibility of existing and

[4] http://www.ausgoal.gov.au/overview - the Australian Governments Open Access and Licensing Framework, provides support and guidance to government and related sectors to facilitate open access to publicly funded information. AusGOAL makes it possible for organisations to manage their risks when publishing information and data in a way that drives innovation and entrepreneurial activities; providing enhanced economic and social benefits to the wider community. AusGOAL is aligned with numerous open government initiatives around the world and supports the Australian Information Commissioners Open Access Principles (HTML).

future data, unless particular conditions apply. These conditions should leverage existing frameworks, such as AusGOAL.

- **Costs:** The PC assumes that information that is provided by private/public partnerships can be made available in a cost-effective manner. GA believes this assumption needs to be explored and validated in more detail.
  - Much of the information used by the insurance industry for risk management is generated by international modelling consultancies companies who charge high fees and place heavy restrictions on their disclosure. Unless the feasibility of releasing this information has been explicitly explored, no assumptions should be made.
  - The PC recommends that '(..) governments should weigh up [the] costs [of using licensing arrangements with commercial providers that allow for public dissemination] against the public benefits of making the data freely accessible' (page 163). More guidance is needed on the criteria for government investment in freely accessible information, as the benefit of disseminating information is difficult to quantify.
- **Infrastructure:** The recent report commissioned by the Australian Business Roundtable for Disaster Resilience and Safer Communities (Deloitte Access Economics, 2014) recommends that a national platform is established for natural hazard data. GA agrees with the PC that a single data 'clearing house' is unlikely to be cost-effective. This is partly driven by specific information needs of stakeholders, and the costs in altering established patterns of custodianship of natural hazard information.
  - Nevertheless, there is a strong need for improved infrastructure to facilitate information access. The need for coordinated investment in infrastructure continues to increase with the demands of transparent and accessible information. Furthermore, the volume of information increases with improved resolution of data and models and high-performance computing.
  - Distributed infrastructure models are a flexible, sustainable and scaleable solution to information access. This approach should minimise the complexities and inefficiencies of information access multiple custodians. At the same time, it should maximise the efficiencies through the ability to reuse data for multiple purposes by a larger range of stakeholders while minimising the data management costs. The Foundational Spatial Data Framework (FSDF) under ANZLIC is an example of this approach[5]. Successful implementation enables the information to be visualised through tools such as the 'National Map', used in detailed modelling on high performance computing, or feed into commercial services or portals.
  - Extending and building distributed infrastructure will require targeted funding commitments, as well as coordination and governance across a broad range of stakeholders. GA believes there is a real opportunity to improve natural hazard information access through extending the FSDF. This would mean accelerating the (existing) roadmap of the FSDF.
- **Privacy:** Claims information (recommendation 4.2) used by the insurance modelling consultancies is usually subject to privacy considerations. It is extremely unlikely that this can be made publicly available in a meaningful manner (ie without degrading it so much as to render it useless for meaningful interpretation).

[5] Other examples are the National Environmental Information Infrastructure (NEII), http://www.bom.gov.au/environment/activities/infrastructure.shtml, and the Terrestrial Ecosystem Research Network (TERN), http://www.tern.org.au/.

Appendix B. GA's potential within a comprehensive governance of natural hazard information

As a prescribed Government agency recognised as an independent authority on matters of geoscience, GA could play a key role in supporting the Australian Government's ability to manage the nation's natural hazard information base by:

- Providing leadership in implementing and extending a COAG-endorsed governance framework of information across the entire natural hazard information spectrum. This should cover the range from so-called fundamental data such as elevation, land cover, satellite observations and geographic data, to derived hazard, vulnerability and exposure information and tools. GA's leadership draws on its role as a government agency with a mature capability both in information management, and natural hazard risk modelling. GA currently is a member of various relevant COAG bodies, including the committee developing the National Emergency Risk Assessment Guidelines, the Australian Tsunami Advisory Group and the National Flood Risk Advisory Group and is a member of the Risk Assessment, Measurement and Mitigation Sub-committee (RAMMS);
- Playing a key role in the prioritisation and coordination of natural hazard information and research, relevant to Finding 4.1 and the Information Request on page 160. In this, GA looks to continue collaborating with other agencies such as the Bureau of Meteorology, CSIRO and the Australian Bureau of Statistics. Furthermore, GA has been closely involved in the establishment of the Bushfire & Natural Hazard CRC research program, and has continued involvement in the NEMP program through its involvement with RAMMS;
- Acting as a trusted, independent custodian and provider of high-quality hazard, vulnerability, exposure information, and advice around the interpretation and use of such information. As a technical government agency, GA provides data, services and advice to stakeholders without any potential conflicts of interest. As such, the agency's role is recognised in the Government's response to the Land Use Planning and Building Codes Taskforce. GA already is the provider of the national hazard map as input into the Australian Standard on earthquake loading. This would also build on GA's track record as a trusted agency in other sectors where government and industry collaborate closely, such as mining and exploration;
- Continuing to contribute leadership and technical expertise to the development and application of high-quality Australia-appropriate open-source models and data. While there is a place for commercial models, transparent and robust decision making processes around disaster risk require open source, peer reviewed models (GFDRR, 2014).
- Providing its data and expertise to support the development of various government products and services in the recovery and response spectrum, such as the National Impact Assessment Model (NIAM).
- Providing advice around the use of models and modelling to inform government decisions and policy around future liability (Information Request page 141).