29 February 2016

WRL Ref: WRL2013101 LR20160229

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UNSW AUSTRALIA

Water Research Laboratory

Submission on NSW Coastal Management Manual, Part C: Coastal Management Toolkit:

***Using Cost-Benefit Analysis to Assess Coastal Management Options: Guidance for Councils, Consultation Draft,* (November 2015);**

Funding mechanisms to implement coastal management actions: Guidance for local councils, Consultation Draft, (December 2015)

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1. Introduction

This submission is from the Water Research Laboratory of the School of Civil and Environmental Engineering at UNSW Australia, regarding consultation drafts of the following documents:

- *"NSW Coastal Management Manual, Part C: Coastal Management Toolkit":*
    - *"Using Cost-Benefit Analysis to assess coastal management options: Guidance for Councils", Consultation Draft, ISBN 978-1-76039-184-3, OEH 2015/0805, November 2015* - hereafter referred to as "CBA Guidance (November 2015)"*;*
    - *"Funding mechanisms to implement coastal management actions: Guidance for local councils", Consultation Draft,* ISBN 978-1-76039-219-2, OEH 2015/0873, December 2015 - hereafter referred to as "Funding Mechanisms Guidance (December 2015)"*.*

WRL strongly supports the development of these documents, as they will substantially support the development of sound coastal management within NSW.

A summary of WRL's submission is provided in Section 2, with detailed comments provided in Appendix A for CBA Guidance (November 2015) and Appendix B for Funding Mechanisms Guidance (December 2015). Grammatical, typographical and spelling errors have not been included in the review.

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2. Summary

2.1 CBA Guidance (November 2015)

Overall, the CBA Guidance (November 2015) provides councils with a process for assessing the economic comparability of coastal management options, with the commonly-used method of cost-benefit analysis. WRL strongly supports the development of these documents, as they will substantially support the development of sound coastal management within NSW.

The Funding Mechanism Guidance (December 2015) presents potential means to meet the financial requirements of favoured options. Most comments in this submission are focussed on the CBA Guidance (November 2015) as it deals with the majority of issues that relate specifically to financial decision making and options assessment in coastal management.

The scope of a cost-benefit analysis (CBA) in the draft guidance is proposed to be limited to the local government area (LGA), with the exclusion of losses borne by non-resident landowners from the CBA. This is likely to be contested by affected stakeholders such as investors or holiday home owners and remains politically untested. The actuality of owner occupation (or otherwise) over the long term may also be difficult to establish, with the main method suggested being a single night ABS census undertaken on a week night in winter time. Federal and/or state land tax records would provide greater insight into owner-occupation status, but are unlikely to be available for this purpose.

The CBA Guidance (November 2015) proposes that any costs or benefits that accrue to non-resident landowners, or other entities outside the LGA, are deemed irrelevant in the analysis. However, these landowners may still be expected to contribute financially to management solutions.

The description of scope states "second-round/flow-on effects" should be excluded, however, CBA Guidance (November 2015) does not adequately define these. This may result in some costs/benefits being incorrectly treated as irrelevant, which could potentially skew the results. WRL recommends that a better definition of these effects is included and guidance provided as to how to distinguish a second-round effect from an externality.

The CBA Guidance (November 2015) lacks a detailed explanation and collation of limitations of CBAs, such as those discussed in Chapter 9 of the Department of Finance (2006) *Handbook of cost benefit analysis*.

The methods of accounting for property losses through erosion/recession under a policy of retreat are supported by WRL. The estimation of property losses through inundation needs to be carefully reconsidered. Inundation may only be a rare and episodic event (e.g. 1 hour in 100 years), or could be near permanent at mid or high tides. Provided the building structure has been suitably engineered, episodic inundation may have only minor impacts on a site (e.g. damage to some vegetation). Some of the highest value apartments in Sydney are located on wharves over permanently inundated "land".

CBA Guidance (November 2015) collates several Australian studies of the valuation of nonmarket goods, such as beach amenity or environmental goods, and implies that international studies on the same topic may be irrelevant to the NSW coast. While location will affect the values of these goods, a lack of extensive research within Australia means that international sources may provide insight into estimating these values. A compilation of relevant international studies would enhance the users' ability to monetise non-market values.

2.2 Funding Mechanisms Guidance (December 2015)

The Funding Mechanisms Guidance (December 2015) considers a range of funding mechanisms, however, there are likely to be additional mechanisms than those listed. There appears to be some inconsistency with the CBA Guidance (November 2015), particularly with regard to the exclusion of landowners, individuals and groups living outside the local government area who may still be required to fund the coastal management option desired.

3. Conclusion

WRL strongly supports the development of these documents, as they will substantially support the development of sound coastal management within NSW. Thank you for the opportunity for WRL to provide this submission on them. Detailed specific comments are attached as Appendix A and B.

Yours sincerely,

G P Smith
Manager

A. Appendix A – Detailed Section-By-Section Review of CBA Guidance (November 2015)

A.1 CBA Guidance Section 2 – What is a cost-benefit analysis?

The scope of the CBA is discussed and said to not consider "second-round flow on effects" including the indirect stimulation of economic activity in other sectors of the community. This is not well defined and runs the risk of certain items being left out or included in the analysis despite not meeting the required degree of separation. WRL recommends including a number of examples to assess whether businesses are first or second round flow on effects.

The discount rates are set at the prescribed NSW Treasury rate of 7% with sensitivity tests for 4% and 10%. However, coastal management is often concerned with works with significant design lives (up to 50 or 100 years) and there are many global examples that use significantly lower discount rates for long term infrastructure valuation. European countries, for example, are advised to use social discount rates between 3 and 5% (European Commission 2008), and there have been other reports that favour even lower rates. As such, WRL recommends that (notwithstanding NSW Treasury guidelines) more rigorous discount rate sensitivity testing be prescribed in the guidance, including discount rates between 0 and 10%.

The perspective of the CBA is stated to be inclusive of only those landowners that reside within the local government area (LGA). This potentially excludes a number of relevant parties, such as holiday home owners and investors, who may have significant financial interest in the coastal management option pursued. These individuals may potentially contribute to paying, through rates, special rates or privately negotiated funding.

It should be recognised that coastal processes are not contained within council boundaries and due diligence is required to prevent losses to any individuals or other council areas that will be affected by coastal management. For example, the training walls on the Tweed River that interacted with the natural northward movement of sand into Queensland, and the resulting sand bypassing scheme that was consequently required (Ware et al, 2015).

A.2 CBA Guidance Section 3 – What does a CBA look like?

The Department of Finance (2006) Handbook of cost benefit analysis highlights that "*No analysis is better than the assumptions on which it is based and, in the interest of 'quality control', assumptions should always be made explicit".* Assumptions and simplifications will always be a part of complex analyses such as CBA, and as there is the potential to influence decision making based on the assumptions made, any assumption required should be at the forefront of the analysis and be adequately justified.

A.3 CBA Guidance Section 4 – Step 1: Defining the problem and the need for action

4.1 Socio-Economic profile

The socio-economic profiling highlights that coastal hazards often occur in localised areas and indicates that the local community affected needs to be predominately considered. This conceivably includes members outside the LGA who may be called on to assist with funding, such as holiday home owners. If the perspective was to be broadened, the socio-economic profile would be useful within the distribution analysis for identifying whether the majority of benefits go to those outside the LGA.

Socioeconomic assessment will feed directly into the distributional analysis and equity issues should be highlighted as more central to this assessment.

A.4 CBA Guidance Section 5 – Step 2:Developing a detailed base case

While the document refers to "Council" within the definition of the base case, much of the historic management of many erosion-prone areas has been undertaken directly by landowners, independently from Councils.

A.5 CBA Guidance Section 7 – Step 4: Identify costs and benefits of coastal management options

7.1.5 Business impact

The documents Section 7 – Step 4 refers back to Section 2 for the definition of business indirectly affected, highlighting the need to better define the scope and second-round flow on effects.

There is an example of a business that is able to relocate to another location where beach goers have shifted to and it states "no net change to the welfare/well-being of the community", however, this does not include the relocation costs associated with moving the business which may be substantial.

A.6 CBA Guidance Section 8 – Step 5: Estimating net present value and benefit cost ratio

The last sentence "A project is potentially worthwhile if the BCR is greater than one…" outlines only the decision criteria for the Benefit Cost Ratio, and not for Net Present Value. Both should be mentioned.

A.7 CBA Guidance Section 9 – Step 6: Interpretation of net present value and benefit cost ratio results

The document should indicate that CBA is a simplistic model and should be used only to identify significant differences in NPV and BCR. Small differences are unlikely to be significant for decision making capacities.

A.8 CBA Guidance Section 10 – Step 7: Sensitivity Testing

Sensitivity testing should include conceptual testing of those factors that were unable to be quantified and directly included in the CBA. This will be able to explicitly highlight any biases that occur due to those factors that are not monetised.

A.9 CBA Guidance Section 11 – Step 8: Distributional analysis

As highlighted in the report, CBAs lack the ability to identify the net effect on the community of transfer payments or "those that do not necessarily result in net welfare change". Because of this, CBAs are an inherently simplistic decision making tool that should not be used without reference to other factors. As stated previously, it is suggested that a section of the guidance be dedicated to highlighting limitations of CBAs and the potential issues and biases associated with them.

Table 3: Identification of parties relevant to decision-making includes investors and holiday home owners outside the LGA, who are otherwise excluded from the CBA.

Methods for determining whether properties are owned by residents of the LGA should be discussed, and over what term this may apply. Commonwealth and state taxation details may provide the best data, but are unlikely to be available for analysis. The ABS census data may provide some insight, but it is noted that the most recent census was conducted on a winter weeknight. Properties owned by a corporation may provide additional insight, but the ownership structure and residential status of the corporate entity may be too convoluted for a ready determination to be made within a CBA.

A.10 CBA Guidance Appendix 2 – Monte Carlo modelling

It should be noted that *risk* is *likelihood* (or probability or chance) times *consequence*. The example given of the present value of a 50% chance of loss in 20 years' time is incorrect, as it completely ignores the impact of the chance of loss in other years. The amount shown may be an accurate reflection of the risk contribution from year 20 (for a single discount rate), but the risk contributions from all other years of the life cycle have been ignored.

While this WRL submission supports the use of risk and probabilistic-based assessments, global sea level rise projections are ultimately scenario based, without probabilities ascribed to the scenarios. Probabilities for future sea level can only be inferred with expert judgment. If the guidance could prescribe a method for dealing with the probability of future sea level rise, the amount of future disputes in this area will be substantially reduced.

A.11 CBA Guidance Appendix 3 – Non-market valuation and benefit transfer

As stated in CBA Guidance (November 2015), in coastal management non-market goods such as beach amenity or environmental value are important for decision making. While CBA Guidance (November 2015) outlines a number of methods to undertake non-market valuations, issues with such valuations is that they are often complex, time consuming and expensive, hence the most likely option that councils will pursue is benefit transfer, relying on data from previous studies. *Table A3.4 Nonmarket values to use in benefit transfers* presents six Australian studies that can be used to quantify some nonmarket values related to beach amenity. It implies studies available from international resource will be invalid due to location differences. While such differences do exist and will affect the results, the lack of Australian resources means that international studies of benefit transfers may be informative stakeholders. It is suggested that a brief summary of such studies should be included, as well as suggested ways to adjust for differences.

None of the examples of "market-based approaches" presented have any direct relevance to management of the NSW open coast.

A.12 CBA Guidance Appendix 4 – Template for socio-economic characteristics

WRL recommends that potential and favoured data sources for the indicators be listed in the guidance (e.g. ABS).

A.13 CBA Guidance Appendix 5 – Valuing assets under the business as usual case and alternative management options

Table A5.2: Accounting for loss of different types of private property states that there is no economic loss related to the loss of rental residential property. This does not seem to include the scenario of lost properties whose current residents subsequently move outside the LGA.

The methods of accounting for property losses through erosion/recession under a policy of retreat are supported by WRL. The estimation of property losses through inundation needs to be carefully reconsidered. Inundation may only be a rare and episodic event (e.g. 1 hour in 100 years), or could be near permanent at mid or high tides. Provided the building structure has been suitably engineered, episodic inundation may have only minor impacts on a site (e.g. damage to some vegetation). Some of the highest value apartments in Sydney are located on wharves over permanently inundated "land".

CBA Guidance (November 2015) indicates that no capitalisation of risk in property prices should be included in the CBA. This is contrary to research such as Kriesel (1993), which indicates significant property price increases for high risk coastal properties that receive protection. Additionally, Landry & Hindsley (2011), mentioned in Appendix 6, indicated that property prices increase with increasing dune and beach width partly due to the additional protection provided by the beach as a buffer for tides and storms.

The decision to not include capitalisation of risk in property prices is based on anecdotal evidence from NSW for three sites and is not adequately supported by presentation or analysis of Australian and international data/literature. The two sites (Belongil and Collaroy-Narrabeen) where it is claimed that coastal risk has not been capitalised into the market prices in fact have near complete coastal protection works for all private properties (albeit, generally below contemporary engineering standards) and have had no houses lost to erosion for decades. The single site (Old Bar) where property values have declined and it is claimed (probably correctly) that coastal risk is capitalised in the property value does not have any coastal protection works, has a low short term prospect of attaining them, and has had several recent losses of houses.

B. Appendix B – Detailed Section-By-Section Review of Funding Mechanisms Guidance (December 2015)

B.1 Section 2 – Funding mechanisms

It is suggested that the document should emphasise community involvement, awareness and negotiation. This should be started early to identify parties that value the coast highly, can be expected to have a strong interest in coastal management and planning decisions, and may be willing to contribute to the costs.

Some case studies of interest are included in Ware et al (2015), including the relatively complex funding of the Tweed River Entrance Sand Bypass which straddled two state governments, as well as the City of Gold Coast A- Line Seawall, which includes a user-pays model for the protection of private property. The inclusion of case studies will making the Funding Mechanisms guidance more robust.

B.2 Section 2.1 – Statutory rates and charges

Special rates and charges, negotiated funding arrangements, and partnerships are suggested as potential funding mechanisms for coastal management plans that primarily benefit a small number of individuals or properties. In many coastal communities, there is a significant chance that this will include investors or holiday home owners. As they are a potential source of funds, they should merit inclusion into the CBA.

Extra sources of funds to those listed in the document may be available for coastal management.

Appendix C - References

Department of Finance (2006), Handbook of Cost–Benefit Analysis

European Commission (2008) A Guide to Cost Benefit Analysis of Investment Projects, EUR Policy

Kriesel, W., A. Randall, et al. (1993) "Estimating the benefits of shore erosion protection in Ohio's Lake Erie Housing Market" Water Resources Research **29**(4): 795-801

Landry, C.E. & Hindsley, P. (2011) "Valuing beach quality with hedonic property models" Land Economics **87**(1): 92 – 108

Ware, Daniel; Colleter, Gildas; Carley, James and Cox, Ron. An overview of financing models for coastal protection in Australia [online]. In: Australasian Coasts & Ports Conference 2015: 22nd Australasian Coastal and Ocean Engineering Conference and the 15th Australasian Port and Harbour Conference. Auckland, New Zealand: Engineers Australia and IPENZ, 2015: 933-939