

**A SUBMISSION ON THE NSW GOVERNMENT'S DRAFT COASTAL MANAGEMENT BILL 2015**

To: Coastal Reforms Team, Office of Environment and Heritage (OEH)

From: David Atkinson – PO Box 700 Sanctuary Cove Q 4212

A member of: The Coastal Communities Protection Alliance – Wooli Inc. (CCPA-Wooli)

---

This submission addresses the following items concerning the Stage 2 Reforms

Misleading Probabilities

Erosion and Accretion

## **Misleading Probabilities**

The way in which percentage probabilities are applied in the draft Manual is seriously misleading for non-scientists, including coastal property owners and persons contemplating ownership. A preferred recommendation and a fall-back recommendation are provided below to redress this issue.

### ***Our argument***

The following is from page 17 in Part B Stage 3 of the draft Coastal Management Manual, where the coastal vulnerability area permits a range of brown-field development under specific circumstances including: *“relocatable dwellings with disposable infrastructure between the 50 year 50% and the 50 year 10% exceedance line; traditional housing on pile foundations, between the 50 year 10% and the 50 year 1% exceedance line”*

(The draft then adds) *Note, the ‘50 year 50% exceedance line’ is the landward eroded position of the shoreline that has a 50% probability of being exceeded in the next 50 years.*

To non-scientists, the statement that *the landward eroded position of the shoreline that has a 50% probability of being exceeded in the next 50 years* has a straightforward implication – “there’s a 50% likelihood that erosion will exceed this line in 50 years”. But, of course, this is not what the coastal science is saying.

In general terms, levels of probability are factually established by observation and past experience. In contrast, the 50% shoreline projection in the draft is based on mathematical modelling 50 years into the future. All such modelled projections include uncertainties in the magnitudes of the included parameters, along with uncertainties as to whether all relevant parameters have been included. In coastal erosion modelling, both types of uncertainty are unavoidably large.

Accordingly, no ‘probabilities’, in the sense understood by non-scientists, can be applied to shoreline projections, because they are arrived at by modelling which has uncertainties, considerable in the case of long term beach erosion projections. It follows that, in order to communicate meaningfully to non-scientists as well as scientists, the draft’s 50 years shoreline projection should not be described as having 50% probability, but as ‘the most likely 50 years shoreline projection, arrived at by modelling, with its inherent uncertainties’.

The draft’s 90%, 10% and 1% probabilities would likewise seriously mislead non-scientists. These projections in fact display the extent by which the modelled set of shorelines spread either side of the mean projected shoreline. Seaward, they are projections of less erosion, landward of more erosion. Since the mean projection can have no commonly understood probability, neither can these projections.

### **Preferred Recommendation**

We recommend that the intended procedures for arriving at these lines be retained, but that they be re-titled as follows:

- 50% exceedance line to become *the most likely 50 years shoreline projection, arrived at by modelling\**.
- 90% exceedance line to become *the optimistic 50 years shoreline projection, arrived at by modelling\*. (Optimistic because this is the least eroded projection)*
- 10% exceedance line to become *the pessimistic 50 years shoreline projection, arrived at by modelling\*. (Pessimistic because this is the most eroded projection)*
- 1% exceedance line to become *the very pessimistic 50 years shoreline projection, arrived at by modelling\**.

*\* The 50 year modelling of changes in shoreline position includes unavoidable inherent uncertainties.*

These descriptions would, we believe, convey the modelled results in a form that will best enable non-scientists to comprehend and consider the risk levels.

### **Fall-back recommendation.**

We believe that erosion projections expressed as above would gain general acceptance, and generate the desired responses. People's life experience tells them that coastal science cannot forecast 50 or 100 years out 'with 50% probability' where beaches will finish up as the result of global warming. To claim this accuracy, as the draft does at present, would discredit the Act in most people's eyes, from the outset.

However, if the above argument and preferred recommendation is not accepted, we submit that referring to the shoreline projections in terms of their 'exceedance' will be misunderstood, wellnigh universally, outside the scientific/statistically literate community. Typically the comment on the draft is "what's exceedance, it sounds scary and I don't understand it". Importantly also, its use on S.149 certificates would, we believe, seriously devalue coastal properties.

Our fall-back recommendation is that the term 'exceedance' be dropped, and the references to the four lines for 50 years risk assessment be as follows:

- *The shoreline which erosion has a 90% possibility of reaching in 50 years.*
- *The shoreline which erosion has a 50% possibility of reaching in 50 years.*
- *The shoreline which erosion has a 10% possibility of reaching in 50 years.*
- *The shoreline which erosion has a 1% possibility of reaching in 50 years.*

The use of 'possibility', rather than 'likelihood' or 'probability', in these descriptions is appropriate in view of the compounded uncertainties in coastal hazard studies.

## Erosion and Accretion

Despite its title, Clause 28 of the Bill, *Modification of doctrine of erosion and accretion*, addresses accretion but not erosion. The draft clause makes no reference to the title status of land lost to erosion. This is surprising, because the accretion issue will rarely arise, whereas the erosion issue has commenced, for example at Old Bar, and is likely to increase with sea level rise, possibly in large measure.

For those faced with the onset of coastal erosion on their seaward boundaries, two elements in the drafts are most welcome and heartening. The first is the intention to *manage retreat in such a way that people can enjoy their property for as long as possible before having to retreat as their current location becomes non-viable* (draft Manual, Part B, Stage 3, page 18). The second is the replacement of CPA 1979 Section 55M with Clause 27 in the Bill. This change means that, providing the submitted coastal protection works will not unreasonably limit public use of the associated beach, nor threaten public safety, and those proposing the work make the required undertakings, privately funded and executed protective works will be possible.

However, this possibility makes it essential that there be clarity as to the retention of 'fixed' or 'right line' boundaries as eroding private land becomes beach, upon which protective works, qualifying for approval, are to be built. Accordingly, it is recommended that Clause 28 be expanded to address erosion as well accretion, and that an additional clause or clauses be added to ratify 'right line' boundary retention, thereby ensuring that the above welcome intentions can be realised in practice.