

# Gerroa Environment Protection Society

General Manager  
Kiama Council  
Manning Street Kiama

06/02/16

Dear Michael

Would you please circulate this submission to Councillors and ensure it is considered in any decisions Council makes about modifying sand dunes and dune vegetation at Jones and Werri Beaches.

The Gerroa Environmental Protection Society urges Council not to modify the vegetation or structure of the sand dunes at Jones and Werri Beaches that is being promoted by the Beach Care group. These dunes play an important role in protecting residents from damaging ocean surges that are predicted to increase in intensity and frequency. They also provide a habitat of native plants and wildlife.

In the past Jones and Werri Beaches have been damaged by destructive east coast low storm events. Council used considerable resources to construct and vegetate these dunes in the early 90s to protect residents and reconstruct dune habitats.

It's important to acknowledge how well this vegetation helped protect the community during the recent storm surges of 2016.

Commenting on the important role dune vegetation plays at Werri Beach, Thomas Doyle stated in his honors thesis:

*"Coastal dunes and their associated vegetation ecosystems are important factors in any coastal environment. The high wave energy present along the Kiama LGA coastline means the dunes and associated vegetation are the environment's first line of defence. Areas where there is inadequate dune formation, or properties/ structures near the coast can be subject to inundation from the ocean - structural damage from wave attack, accelerated erosion or sand drift (NSW-Government., 2001). For example, during 1915- 1970, Werri beach was not only being infested with Bitou bush (which was degrading the dune stability) but the dunes and associated vegetation on the beach's southern end was completely removed for recreational purposes. During the 1974 storm event, the south end of Werri was completely removed, and the storm cut reached the main road in front of the Surf club, as seen in the photo below, demonstrating the relative importance of dune and coastal vegetation for coastal protection"<sup>1</sup>.*

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<sup>1</sup> Extract: Coastal erosion... A "Shore" Thing? A study into the Erosion, Coastal Processes and Management occurring at Kiama's beach-dune systems. Honors Theses by Thomas B. Doyle

Opposite:  
1974 Beach erosion at the  
southern end of Werri Beach.  
The dunes had been completely  
removed before this storm event



Below  
The 1974 storm surge reached  
resident's homes at Jones Beach.  
There was no dune or dune  
vegetation to stabilise the beach  
in front of these homes at the  
time of this event.



The dune vegetation at these beaches not only stabilises but also builds the dunes, particularly towards the northern ends of the beaches, as they capture and stabilise wind blown sands. This dune building process relies on the stable sea levels of the past 5000 years.

However the CSIRO and Bureau of Meteorology inform us that sea levels are rising by about 2.6 to 2.9mm per year and have already risen by at over 200 mm<sup>2</sup> and sea-level rise is projected to continue.<sup>3</sup> They also inform us that this process amplifies the effects of high tides and storm surges<sup>4</sup>.

It is therefore apparent that the beach stability of the past will not continue. The natural dune building process will be reversed by sea level rise and associated beach retreat, so protection of the dune structure and vegetation is more critical now than ever.

Estimates of future sea-level rise around the Australian coastline by 2100 is likely range between 0.28 and 0.98 metres according to the CSIRO and Bureau of Meteorology and they acknowledge that higher sea levels by 2100 are possible.<sup>5</sup> So Kiama can expect to experience beach retreat, as sea levels rise, and the rate of retreat will be determined by a number of complex factors. The 'Bruun Rule' explains how the seabed draws on the dunes to reestablish equilibrium, *"Unless sand is brought in from elsewhere (beach nourishment), the beach and dunes will provide the material (sand and soil) that elevates the bottom, through erosion. As an approximate rule of thumb, a 1 centimetre rise in sea level will lead to a 1 metre retreat of the coastline"* (appendix 1). So in a worst case scenario, if sea levels continue to rise at current rates, it's possible to experience as much as a metre of retreat every five years.

It is informative to look at the example of Meridian Resort where aggressive beach erosion is impacting on resident's homes at Old Bar, near Taree. The 2014 ABC Bush Telegraph Report highlights the need for comprehensive national planning for coastal erosion and sea level rise and acknowledges the problems associated with devolvement of responsibility to local governments. While this article focuses on planning for development in coastal hazard zones it also reminds us of the importance of informed management of the coastal areas and the conflicts we can expect as rising sea levels impact. (appendix 2)

It would be dangerous and irresponsible of Kiama Council to respond to the Beach Care agenda to manipulate the dune structures and protective vegetation to address the quite irrational claims that these are impacting on beach safety and causing beach erosion. The cyclical nature of beach replenishment will most likely address their surfing concerns over time. However in the medium term we can expect conflicts like this to increase as we confront the serious coast hazards associated with sea level rise impacts on our beaches, surfing and beach culture, beach ecosystems and residential properties and infrastructure.

We urge Council to prohibit any local groups from removing vegetation from the frontal areas of these dunes (other than weeds). Council should not assist the modification of the dunes without a full understanding of the beach hydraulics in the context of rising sea levels.

While we acknowledge the lack of state leadership and high costs of undertaking relevant studies, we ask Council to undertake a coastal zone risk management plan that responds to the reality of rising sea levels.

Howard H Jones GEPS secretary  
Warren Holder GEPS president

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<sup>2</sup> 2016 state of the Climate Report, page 15

<sup>3</sup> 2016 state of the Climate Report page 3

<sup>4</sup> 2016 state of the Climate Report, page 2

<sup>5</sup> 2014 state of the Climate Report, page 16

## Appendix 1

### The Bruun Rule.

(Australian Government - Department of Environment and Energy)

<https://coastadapt.com.au/tools/rules-of-thumb-for-managing-coastal-processes>

In coastal management, perhaps the best known rule of thumb is the Bruun Rule. This provides a rate of shoreline recession under sea-level rise on sandy (unconsolidated) shores.

One of the great strengths of the Bruun Rule is that it provides a clear explanation for why the risks from sea-level rise are not simply the direct effects of inundation, but also takes account of the accompanying erosion and shoreward recession of the coast. As shown in Figure 2, rising sea levels directly inundate only a small portion of the beach (b). However, the cross section of any beach tends to follow its own profile relative to the sea, conditioned by factors such as grain size of the beach material and seasonal variations in storminess. As sea level rises, the nearshore bottom must rise as well to maintain that profile. Unless sand is brought in from elsewhere (beach nourishment), the beach and dunes will provide the material (sand and soil) that elevates the bottom, through erosion (c). As an approximate rule of thumb, a 1 cm rise in sea level will lead to a 1 m retreat of the coastline.

For purposes of precise estimation of the rates of shoreward recession at a single beach (the scale at which coastal managers often work), use of the Bruun Rule is not always appropriate. Its approach is two-dimensional – it does not allow for longshore sediment movement. It assumes no change in wave climate, and that there is a depth beyond which there is no transfer of sediment between the nearshore and offshore. These assumptions will in many real-world cases be unrealistic, and caution needs to be exercised in considering whether application of the Bruun Rule will provide a realistic solution. Three-dimensional models are available that take into account more processes, such as longshore sediment movement, but these are of course more complex to use. The NSW Government (2010) recommends that, where the Bruun Rule is to be applied, surveys are carried out to accurately determine the input parameters.

For further information on the Bruun Rule and its application, see Section 4.1 of [Information Manual 2: Understanding sea-level rise](#) and Section 6.4.3 of [Information Manual 3: Available Datasets](#).

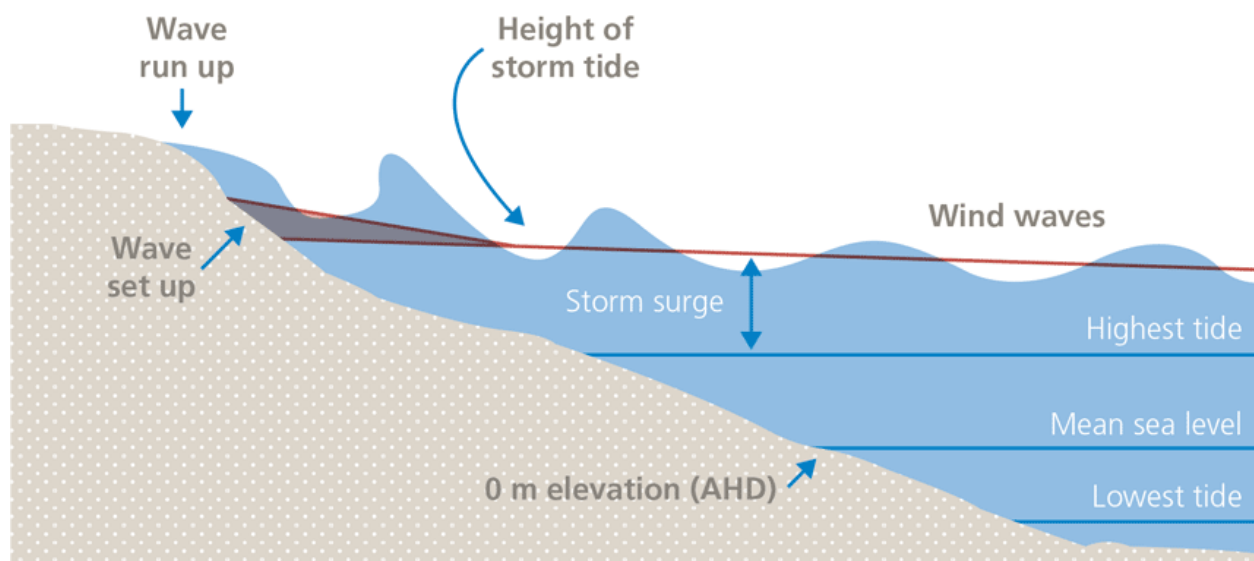
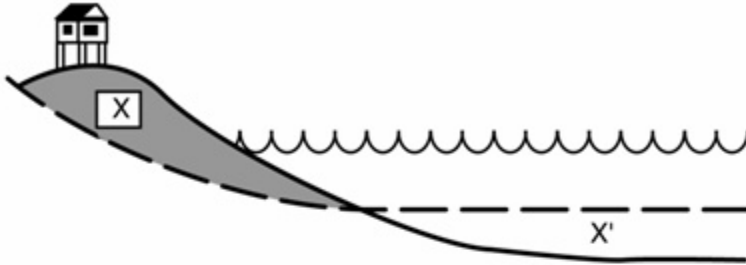
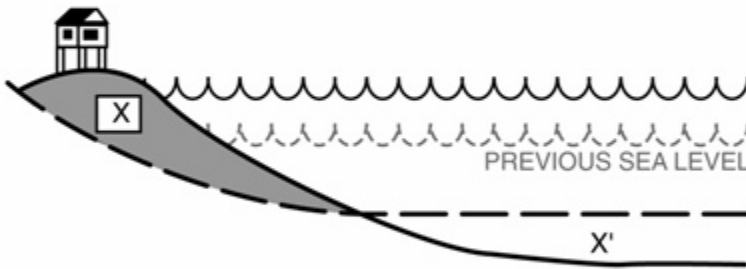


Figure 1: Components of storm tide and breaking wave processes. Source: DSE 2012, © The State of Victoria Department of Sustainability and Environment 2012.

**(a) Initial Condition**



**(b) Innundation**



**(c) Subsequent Erosion**

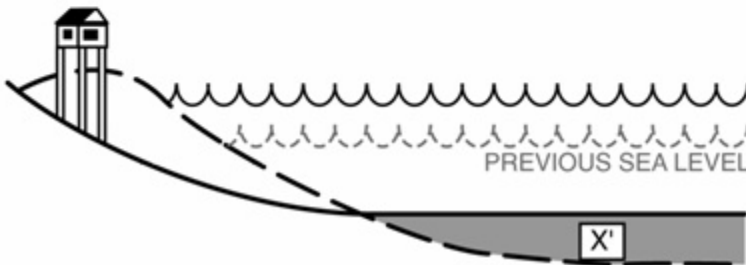


Figure 2: How the Brunn Rule works. A one-meter rise in sea level implies that the offshore bottom must also rise one metre in order to maintain the cross-shore beach profile. The material to raise the offshore bottom may come from shoreline erosion in the absence of beach nourishment. Source: Titus et al. 1986, reprinted by permission Taylor & Francis LLC, (<http://www.tandfonline.com>).

[1] The mean wave height (trough to crest) of the highest third of the waves.

## Appendix 2

ABC Bush Telegraph Monday 7 April 2014:

<http://www.abc.net.au/radionational/programs/bushtelegraph/coastal-planning/5364818>

### Coastal Council Holding Back the Tide

When Neil Brown bought his unit in the Meridian resort at Old Bar, near Taree a decade ago, he thought it was his retirement dream come true. But Neil's unit, one of 41 in the Meridian resort, is in danger of falling into the sea. 'Some people say oh yeah it's just people trying to protect an asset, it must be all those wealthy people from Sydney and their holidays houses, when it couldn't be further from the truth.'

Neil's unit once stood 60 metres from the water, but the waves now lap less than 40 metres from his door. It's even worse for some 18 to 20 other properties at Old Bar that are perched right on the edge of the scarp, that drops several metres to the ocean below. This week the Greater Taree City Council held a community meeting to outline its plan to build a rock wall along the land's edge, to halt the erosion. But construction of the wall will effectively destroy what's left of the beach, as walls create a 'gouging' action in the water. Council's Laura Black says it's been a 'emotionally loaded' decision, with the community divided over whether or not to sacrifice the beach. "There's no doubt over time we will lose the sand beach in front of the rock revetement wall.'

University of Tasmania law lecturer Jan McDonald says with projections of sea level rise as a result of climate change, these conflicts are likely to increase 'quite dramatically' over the next 20 to 50 years. She says comprehensive national planning for coastal erosion and sea level rises has gone backwards in recent years. 'The way that regulation for coastal hazards has emerged over the last ten to fifteen years in Australia is to take state planning systems... and largely devolve responsibility for coastal hazard management and planning to local governments.' 'Despite repeated calls for greater national coordination of these issues there has been quite significant disparity across the states.'



'But also within states there's quite significant differences in the approaches taken by different local government areas. 'Partly dependent upon the demographic and the socio economic features of that particular area but also as a consequence of their different resource base and whether or not they've got the money to do the mapping and the resources to do the subsequent coastal planning.'

A major report released last week by the UN's Intergovernmental Panel on Climate Change described as 'piecemeal', Australia's approach to planning for sea level rises. Professor McDonald refers to the so-called Bruun Rule, 'a basic rule of thumb where you have a sandy beach the basic rule of thumb is that for every metre of sea level rise, you will

see 100 metres of inward erosion.'

She says rock walls are not a silver bullet for dealing with coastal erosion, and that 'planned retreated' is an idea whose time will come. 'I would certainly like to see state leadership in relations to which circumstances would trigger planned retreat.' 'There's a number of places that are introducing staged approval mechanisms, or a rethink of the development when erosion reach a certain point.' Meanwhile at Old Bar, Neil Brown says he worries every time there's a storm that may cause further erosion.

'We certainly cringe. I've never watched weather patterns so closely in my life!'