Storm Tides

Coastal communities are at risk

Historical settlement patterns have resulted in Australia having most of its major city developments situated on the coastline. Storm tides are a major natural hazard for coastal regions. Severe storms and cyclones contribute 29 per cent of the total damage cost from natural hazards to the Australian community. In 1999 prices, this amounts to $40 billion during the period 1967 to 1999 (including the cost of deaths and injuries).

Storm tides pose many risks

A *storm surge* is an increase in coastal water levels well above the normal high tide. If the storm surge is combined with daily tidal variation, the combined water level is called the *storm tide*. When the resulting storm tide exceeds the normal tidal range, local beach topography will dictate whether significant coastal inundation will occur.

Flooding by sea water in low lying coastal regions for periods of several hours and over as much as 100 kilometres of coastline can take place, placing property and lives at risk, affecting business activity and the financial security of a region. Evacuation of low-lying areas prior to a storm landfall is required in some circumstances to help prevent loss of life through drowning. Wave action, elevated water levels and surge *run-up* also attack dunes and near-shore structures to cause considerable erosion, as demonstrated in Figure 1.

Incorporating storm tide modelling into Geoscience Australia's risk assessment

Agencies that have limited resources are forced to prioritise their response to natural hazards. The allocation of resources requires careful planning which are assisted by an assessment of a region's risk to a hazard.

By relating the relative level of exposure to a natural hazard across a region to the relative vulnerability, it is possible to derive a rating of overall risk posed by the hazard. The resulting index can be used to produce a 'risk surface' map. An example of a Geoscience Australia risk surface map is illustrated in Figure 2 for surge tide in southeast Queensland. Areas with the greatest level of exposure to storm tide inundation tend to be those that are perceived as the most desirable locations, close to the water.

These maps are invaluable to emergency services in their development of disaster prevention, awareness, preparedness and response plans. This map and other risk surface maps can also be tailored for used by insurance companies, local government, developers, utilities to reduce disruptions to lifelines and the general public.

Figure 1. Severe beach erosion at Palm Beach during severe storms in 1967 (courtesy of EPA).

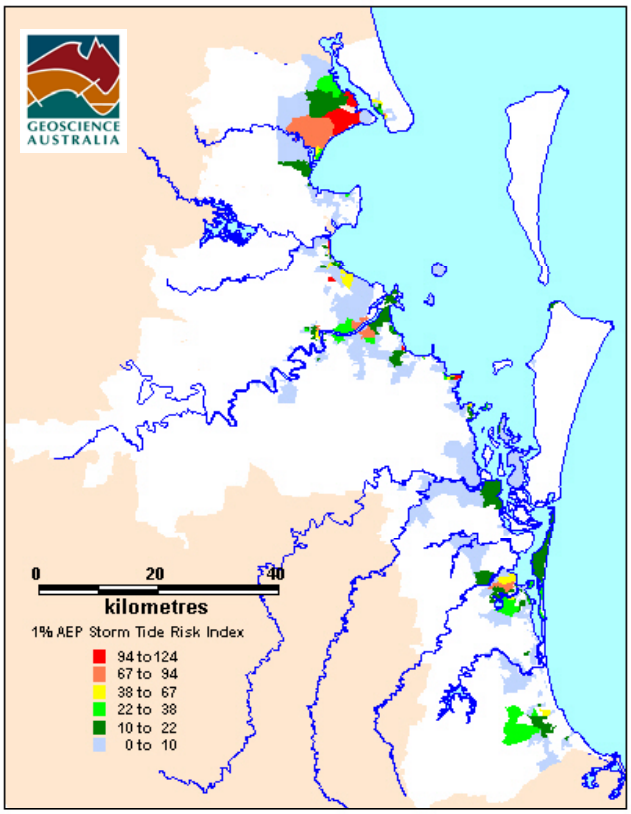

Figure 2. Risk surface map for the 1 percent annual exceedance probability storm tide.