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Re-establishing the natural dune barrier coastal protection

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The Magenta Shores golf and tourist development fronts 2.3 km stretch of wind-swept, storm exposed Tuggerah Beach on Australia's east coast. The expected storm bite on this beach during a 1 in 100 year storm event is up to 300 m^3 of sand per linear metre of beach, based in the 1974 storm event. The sand dunes were environmentally degraded by former sand-mining, monoculture of *Chrysanthemoides monilifera* and use as a landfill site. The project aimed to increase the natural defence against storm waves and wind erosion. This was achieved by re-establishing the natural ecosystems associated with the parallel beach ridge landform, typical of a stable coastal Quaternary sand system. Dune slopes were stripped and re-contoured, natural sand trapping mechanisms placed on crests and onshore winds transported the sand to form foredune crests. From the 12 month trials on the re-constructed dunes, the most efficient method of re-establishing foredune *Spinifex sericeus* dominated vegetation was the burial of ripe Spinifex seed head in the moist sand layer. This achieved primary colonisation and development of a soil fungal hyphae network prior to introduction of secondary colonising species. Germination of *Spinifex* depended on its ripeness. Ripe seed coincides with bird swarms on the beach harvesting ripe seed in late December. Monitoring stakes were used as roosts by birds, promoting re-introduction of native plant species requiring germination by digestive tract stimulation. Bush regeneration reduced competition from weeds, allowing native vegetation cover to succeed. The success was achieved by mimicking the natural processes and was measured by cumulation of sand volume in the dunes and the ability to withstand the summer storms. The reconstructed dunes now provide enhanced protection from sand movement and storm bite for built assets and natural ecosystems.

Biography

Senior restoration ecologist with M.Sc. (Macquarie Univ.) Thesis - *The vegetation of bushland in the northern Sydney area* and a Ph.D. (Univ. of Sydney) Thesis – *The vegetation of the sand masses of the mid-north coast of New South Wales*. She has more than 25 years experience. Anne is a specialist Certified Environmental Practitioner under the Environmental Institute of Australia and New Zealand CEnvP Program and has been a member of the CEnvP NSW certification panel. She is a certified BioBank Assessor. Her major research interests include the re-establishment of native ecosystems, impacts of urban development on vegetation and soil, pattern analysis, effects of inundation and salinity on the plant communities, metal concentrations on plant growth and bioaccumulation. She has utilised her research in designing and implementing rehabilitation / conservation programs as part of sustainable developments.

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