The dynamics of temporary wetlands in dune slacks at Tangimoana, Manawatu, New Zealand, with special reference to the endangered sand spiked sedge, *Eleocharis neozelandica* Kirk (Cyperaceae).

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Thesis Abstract

Parabolic dunes are a feature of the Manawatu, New Zealand coastline. Moving inland, the dunes form temporary wetlands in deflation hollows (dune slacks) on their seaward side. One of the few remaining natural dune systems left in the Manawatu is located south of the Rangitikei River mouth at Tangimoana, the "Tangimoana dump dunes", a proposed DoC reserve. The area contains excellent examples of temporary wetlands in dune slacks, with early successional vegetation well represented. This vegetation is being eliminated by larger wetland plants and is unable to colonize new habitat, as dune stabilization prevents its formation.

The vegetation of the proposed reserve was sampled and vegetation patterns were related to environmental factors. Foredune, dune plain, slack, marram dune, shrub dune and grassland communities were identified. A low species diversity was found, which included a high proportion of exotic species in the grassland, shrub and marram dune communities. The low number of communities and species richness may be related to the area's youth and the dune's dynamic nature.

Water table fluctuations were monitored in two temporary wetlands, which contained the endangered sand spiked sedge, *Eleocharis neozelandica*, an early successional species. The water table fluctuations were directly related to rainfall and season. A high winter and spring water table in 1995 resulted in dramatic changes in the distributions of some dune slack plants. Control and exclosure plots were used to assess the effects of rabbit browse on the dune slack vegetation. These plots also provided valuable information of the vegetation change to water table heights. Species more suited to permanently wet locations increased greatly, while species suited to more temporary wet areas moved higher in elevation, to around the winter high water line.

Two endangered plants of the Manawatu dunelands, *Eleocharis neozelandica* and *Pimelea* "Turakina" were cultivated and then established at the Tangimoana dump dunes. *Pimelea* "Turakina" appears to be well adapted to the Manawatu dune lands and produced abundant seedlings at Tangimoana. Creation of deflation hollows for *E. neozelandica* habitat was undertaken. *E. neozelandica* was planted in the constructed hollows at three separate elevations, and survived winter submergence at the medium and high elevation sites, of at least seven months at the medium site, and appears to be a valuable and effective management tool for the conservation of dune slack species. The tolerance and growth of *E. neozelandica* and other dune slack species in relation to sand burial, waterlogging and submergence was studied in controlled experiments. They appear to be generally intolerant of sand burial, but all survived submergence and thrived in waterlogged conditions.

Temporary wetlands in dune slacks at the Tangimoana are incredibly dynamic in relation to the water table fluctuations, and changes in species distributions resulting from them. Management solutions need to be active and address these results in order to maintain the indigenous flora of the area.