

Establishing Sustainable Ecological Communities on Mine rehabilitation – Case study Ravensworth Operations, Hunter Valley, Australia.

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A growing number of mine sites have increasingly strict rehabilitation conditions placed on them by government agencies to produce sustainable Ecologically Endangered Communities (EEC's). We still have no real evidence that re-establishing a pre-determined list of plant species, is possible, let alone it becoming sustainable.

We investigated the use of forest topsoil, substitute capping materials, and organic ameliorants (coarse wood mulch and OGM, a municipal waste product) seeded with an array of species drawn from local EEC's and adjacent vegetation, in a statistically valid field design covering 0.7ha.

Results for the seeding of 50 species onto 9 treatments (n=6) are shown together with an analysis on sustainability of plant populations.

We found that most of the species seeded emerged initially. Many other species were also contributed by substrates which already contained a native soil seed bank amounting to a staggering total of 120 native species (considering that soil was sourced from areas highly modified by past land use). Not all these species are sustainable as some were only represented by one individual or did not show signs of reproduction. On analysing the data further, 80 species had at least 6 individuals, a number arbitrarily chosen to represent a possible "sustainable" population. Treatments that maximise the number of these populations were identified.

Data was also compared to the ideal species mix found in EEC's. Whilst the seeding mix was selected from EEC species, successfully established communities on the different constructed substrate types were all moving away from the typical EEC composition.

We conclude that establishment of a larger than expected variety of species is possible on mine rehabilitation, but that attaining a desired composition may be more difficult.