Recovery of ground-dwelling invertebrate diversity in restored bauxite mine sites and rehabilitated residue sands in south-western Australia

Mrs Dilanka Mihindukulasooriya[1], Dr Richard Harris[1], Prof Jonathan Majer[1], Dr Deborah Pritchard[1], Dr Vicki Stokes[2], Dr Ian Phillips[2]

[1]Department of Environment Agriculture, School of Science, Curtin University, [2]Environmental Research Department, Alcoa of Australia Limited

Invertebrates are described as ecosystem drivers in restored ecosystems because they perform numerous ecological functions. This study compared the recovery of ground-dwelling invertebrate and functional group diversity in a chronosequence of rehabilitated sites within two distinctly different restoration projects associated with Alcoa's bauxite mining operations in south-western Australia. In mined jarrah forest, salvaged topsoil is directly transferred and used to restore pits post mining (BMA). In residue areas of Alcoa's refineries on the swan coastal plain, rehabilitation involves use of novel soil created from bauxite residues (RSA). Ground-dwelling invertebrates and functional groups in each restoration area were compared to those found in neighbouring remnant vegetation. Sampling was undertaken over a two-year period, covering both the wet and dry seasons. Surface active invertebrates were sampled using pitfall traps and invertebrates were extracted from litter samples using heat extractor funnels. Invertebrates were sorted to ordinal level and then classified into functional groups. Ants (family Formicidae) were sorted to species level and classified into functional groups in relation to stress and habitat disturbance. Soil invertebrate abundance and functional group diversity increased with age since rehabilitation and increased more rapidly in BMA than RSA. Invertebrate functional group diversity was higher in BMA, but abundance was lower than RSA. Ant functional group diversity and abundance were higher in BMA than RSA. Encouraging the return of diverse functional groups can enhance the ecosystem function in both restoration systems over time and help achieve the goal of returning a self-sustaining system.