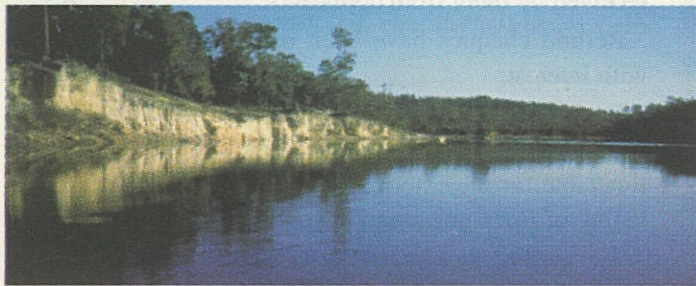


Controlling acidity in coal fields



The voids in Australia, which are created by open-cut mining, are fast becoming some of the country's biggest and deepest lakes, according to Mark Lund from WA's Edith Cowan University's (ECU) Centre for Ecosystem Management.

In order to examine final void water

quality enhancement, Dr Lund's research team joined a collaborative Australian Coal Association Research Program Grant-funded project with mining companies, government agencies and WA's Curtin University.

The team focused on understanding some of the physical and chemical processes occurring within the Stockton, Ewington I and Ewington II voids in Collie, WA and

finding ways to reduce acidity inside the void using a biological approach.

Dr Lund said the ECU research team initially looked at adding organic matter to create a suitable environment for sulfate reducing bacteria in the voids.

"This approach has been successfully used in wetlands to treat acid mine

drainage discharges," Dr Lund said.

"The aim was to test its effectiveness within a void receiving diffuse sources of acidity rather than point sources.

"Laboratory and field trials found that there was an initial reduction in acidity, but this was due to neutralisation by the material, rather than through bacterial activity.

"In Collie, the low sulfate concentrations in the voids work against a bacterial mediated solution."

Dr Lund said the use of cow manure resulted in a prolonged increase (over a year) in pH of one to two units.

"Phosphorous is found in the voids at extremely low concentrations and adding it in conjunction with organic matter stimulates algal growth, which in turn provides food for fauna.

"Increased biodiversity and production all help to stabilise the lake and reduce acidity."

Dr Lund said the ECU team recommends that as much organic material as possible be left in the shallow areas of the final lake.

"One possibility is that the upper slopes (which are usually contoured for safety reasons) are planted prior to flooding 'grow' the organic matter.

"Other possible sources of organic matter include mulch, sawdust, hay, windlees, manures and sewage.

"Naturally, consideration would have to be given to the proposed end use of the void and possible health and safety issues associated with some of these materials.

"The team suggests that consideration be given to use fertilisers to encourage algal growth, in voids low in nutrients."

Dr Lund said to reduce the contribution made by runoff to acidity within the voids, the team hopes in the future to trial a narrow wetland trench around the wetted perimeter of the lake that would intercept and treat runoff.

Dr Lund is again collaborating with his Curtin colleagues, representatives from other WA universities, industry and other partners to establish a centre for sustainable mine voids to continue research in this area.