

## CURRENT RESEARCH

### Indicators of Ecosystem Rehabilitation Success

This project has recently entered Stage 2 – “Verification of Indicators and Transfer of Monitoring Technology” – with the appointment of Vicki McAllister to a two year Masters programme based at UWA. A Masters student has also been appointed at the University of Queensland. The project will be administered by ACMER and involves collaborative research by personnel from the CLR, CSIRO and the University of Queensland.

Stage 1 involved assessment of the feasibility of using Ecosystem Functional Analysis (EFA) as a cost-effective indicator system to assess how well ecosystems reconstructed on mined land were functioning. This stage, which involved five mine types across a wide climatic range, demonstrated proof of concept in that indicators were able to represent the development of ecosystem processes for successful and for less successful, rehabilitation.

The Objectives of Stage 2:

- Conduct a programme of scientific verification of the EFA indicators on various mine types-coal, bauxite, mineral sands, iron ore, metaliferous) using conventional field and laboratory measurements.
- Develop further the links between existing methods of vegetation assessment and EFA.
- Report the results of testing the hypothesis that reliable indicators for assessing ecosystem rehabilitation success on mine sites can be identified, using the rapid field-based techniques of EFA, by preparing papers for peer review and publication in the scientific literature.
- Communicate the EFA techniques and the results of the Stage2 study to minesite rehabilitators, regulators and

community groups through the use of demonstration workshops and an interactive EFA manual on CD-ROM for the mining industry.

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(The CLR is holding a workshop with the same title – “Indicators of Ecosystem Rehabilitation Success” on August 16<sup>th</sup> at the Perth Zoo. Presenters will include: David Tongway, Richard Hobbs, Jonathan Majer, Harley Lacy and Libby Mattiske. Different approaches to monitoring successful rehabilitation will be examined, including EFA.)

### ROLE OF PREFERENTIAL WATER FLOW FOR ROOT GROWTH AND SOLUTE LEACHING IN CLAYEY SUB-SOILS

This research project aims at a better understanding of preferential water flow through clay soils and the implications for development of chemical and biological fertility, plant growth and solute leaching. This information is an essential prerequisite to develop suitable physical, chemical and biological



techniques for ameliorating hostile mining and agricultural sub-soil.

The research will be focused on rehabilitated gold residue at the Boddington Gold Mine and is supported by Boddington Gold Mines and Alcoa World Alumina, together with funds from the ARC SPIRT scheme.

Using dye tracer techniques, water flow dynamics and the hydrologically active soil fraction are determined, and related to root growth and solute leaching. The project will result in providing a novel method to assess the potential for plant growth and hence for the success of mine rehabilitation.

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## PROPOSED RESEARCH

### Rehabilitation Handbook: Properties and Management of Regolith and Rock Materials from mines in the Yilgarn Craton.

A new project is currently being developed, with Professor Bob Gilkes, to examine the properties of regolith materials with respect to their handling as mine wastes. The project will focus on the Yilgarn region. A report detailing related literature and the background of the project has recently been completed. This will be circulated to appropriate mine staff in the near future.

The aim of this project is to develop a handbook of regolith and rock materials which will, by the examination of geological context, mineralogy, chemical and physical properties, together with rehabilitation experiences, provide a link between the stages of evaluation of management options for the identified waste materials. Establishment of such linkages will allow pre-mine planning of

# CENTRE FOR LAND REHABILITATION

landform constructions that satisfy requirements of landform stability, drainage and revegetation, and incorporation of these factors into EIS documents and company budgets.

To aid in the identification of regolith materials, colour photos will be included in the handbook, along with tabulated physical and chemical properties of each material and associated management problems and options.

The proposal will shortly be circulated to mining companies operating in the Yilgarn region and additional support will be sought from MERIWA.

## PROFESSIONAL COURSES

### SOIL BIOLOGICAL FERTILITY

18<sup>th</sup> and 19<sup>th</sup> April UWA Perth

The aim of the workshop is to provide a fundamental understanding of soil biological fertility.

It will focus on the potential for maximizing the biological fertility of soil and its benefit to crop production and soil sustainability. The workshop will be structured around presentations, practical laboratory sessions and discussion groups. The content is aimed at agricultural extension officers, consultants and those who will benefit from a greater understanding of the biological aspects of soil fertility.

Cost: \$400

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### MINEWASTE CHARACTERISATION AND TOPSOIL MANAGEMENT

4<sup>th</sup> to 6<sup>th</sup> July Kalgoorlie

Designed for, rehabilitation personnel, environmental engineers, environmental consultants, mine engineers, geologists and others concerned with optimising management and rehabilitation of mine waste. The courses will include presentations on key topics in

morning sessions followed by hands-on practical work in the laboratory. Staff from Soil Science at UWA will assist in the presentations, as well as mining practitioners.

Cost: \$1320 (includes GST)

### INDICATORS OF ECOSYSTEM REHABILITATION SUCCESS

16<sup>th</sup> August Perth Zoo

Presentations on various concepts of assessing rehabilitation success will be given by David Tongway, Professor Richard Hobbs, Professor Jonathan Majer, Associate Professor David Jasper, Dr Libby Mattiske and others. This workshop will introduce different approaches, including Ecosystem Functional Analysis and allow time for group discussions.

Cost: \$220 (include GST)

### REHABILITATION ISSUES FOR MINE CLOSURE

17<sup>th</sup> August Perth Zoo

An examination of issues from both the regulators and operators perspectives, to clarify criteria for closure and completion, as well as discussing case studies from recently closed mines.

Cost: \$220 (incl GST)

### ENVIRONMENTAL MONITORING IN MINING

27<sup>th</sup> and 28<sup>th</sup> September UWA

Responsible environmental management is a major challenge for the mining industry in the 90's. To respond to the many practical challenges on a mine site, environmental officers are required to monitor a wide range of parameters in engineering, physical, biological and social sciences. This course will directly benefit environmental officers and technicians working in the mining industry and having responsibility for the implementation and conduct of rehabilitation projects, water and soil sampling programs, vegetation and fauna surveys. The course will also be of interest to those working within regulatory bodies involved with mining and consulting practitioners.

Experienced presenters have been chosen from both industry and The University of WA, in order to provide a balance between the theory and the practice.

Cost: \$440 (include GST)



### ESSENTIAL OILS

10<sup>th</sup> November Walpole  
12<sup>th</sup> November Toodyay

Departing slightly from our usual focus, the CLR is putting on two field days, revolving around the steam distillation of essential oils, such as Lavender and Pelargonium.

Jeff Allen, a member of the National Herbalists Association of Australia manufactures stainless steel stills of varying sizes which he will bring from Victoria and will also talk about the quality and properties of oils.

For more information about any courses, or if you would like to join our database for notification of events and news, please contact: Sandra Maynard 08 9380 3827 email: [sandra.maynard@uwa.edu.au](mailto:sandra.maynard@uwa.edu.au) or look at our website:

<http://www.clr.uwa.edu.au>