



August Ecosystem Function Analysis Course:

An overview by Justin H. Jonson (MSc NRM student UWA)

There is no shortage of land in need of rehabilitation in Western Australia, or for that matter around the world. Whether the focus is on mine site rehabilitation, or the reconstruction of the fragmented ecosystems, there is much work to be done. In order to appropriately address these challenges, methods to quickly and accurately measure changes in ecosystem health need to be applied. The Centre for Land Rehabilitation has recently provided an opportunity to gain tools to address these issues.

On August 29th and 30th, David Tongway presented a workshop and field study on Landscape

Function Analysis (LFA). Drawing on 38 years of work and experience in ecological processes with the CSIRO Sustainable Ecosystems unit, Dr. Tongway has developed a method for assessing and recording changes in ecosystem health.

Landscape Function Analysis is a monitoring procedure that uses simple indicators of landscape processes to assess how well an ecosystem is functioning. This information can then be used to measure changes in the soils' biogeochemical cycles. LFA can rapidly assess 'soil health' and is therefore an excellent method for monitoring changes that result from land rehabilitation efforts. The core of the technique lies in assessing the ecological processes that regulate the flow, capture, and cycling of scarce and limiting resources.

In the course of the workshop, participants were guided through the theory of LFA, procedures for data acquisition in the field, and a framework for interpretation of the results. Participants learned how to set up transects, identify patch and inter-patch zones, and record LFA indices according to their condition. These indices were then interpreted to identify Nutrient, Stability and Infiltration Index percentages of the soil.

The long-term application of the LFA technique flows from repeated measurements of field data, presenting a time-series measurement of changes in landscape processes. The techniques applied involve a purposeful change from traditional methods of looking for species indicators, to a new examination of the functional relationships that exist between the biological and physical components of an ecosystem.

Landscape Function Analysis is therefore a useful tool for those involved in land rehabilitation. It offers practitioners a means of measuring baseline conditions at the beginning of a project, changes in conditions following on-ground interventions, and finally measuring the ultimate success of the rehabilitation effort.

As a Masters student in the Natural Resource Management program at UWA, the opportunity to develop knowledge and tools that can be applied to monitoring changes in landscape health and function was of great value. Individuals interested in learning more about LFA, can access the CSIRO web page at: <http://www.cse.csiro.au/Research/Program3/efa/index.htm> or contact The Centre for Land Rehabilitation at UWA.

More photos from this course can be viewed on the CLR website:

http://www.clr.uwa.edu.au/education_&_training/photos_from_the_august_course_field_work



David Tongway, centre, discusses EFA field techniques with EFA course participants(Photo: J. Jonsen)

Some of the current CLR projects:

From Research Officer Matthew Braimbridge -

- Evaluation of effectiveness of deep ripping practices on pit floor materials at Boddington Bauxite mine.
- Assessment of fertiliser requirements of rehabilitated forest areas at Boddington Bauxite mine.
- Assessment of embankment stabilisation methods at Worsley refinery.
- Rehabilitation of bauxite residue disposal areas (BRDA) at Worsley refinery.
- Assessment of hardsetting properties of soils and amelioration techniques at Iluka's Yoganup mine site.
- Assessment of factors influencing rates of seedling establishment at Boddington Bauxite mine.



CLR Workshop on Hydrological Monitoring: Soil Covers on Mine Wastes and Disturbed Lands and Performance Assessment

Tuesday 14 December 2004, 8.15am - 4.30 pm UWA

Relevance:

- Importance of hydrology to landform and mine site closure strategies
- Cover design for waste containment facilities - landfills, waste dumps, tailing storages
- Impact of land use on catchment and landscape hydrological behaviour

Contents:

- Essentials of (un)saturated water flow in soil
- In situ monitoring techniques - small and large scale
- Integration with vegetation and ecosystems under the mediterranean and semi-arid condition characteristic of Western Australia

Cost:

\$475 incl. GST (discount for students).

Background:

This course will be of particular interest to mine-site personnel involved with the decommissioning of

tailings-storage facilities and waste-dumps where vegetated store/release covers are required, due to the geochemical nature of the mine-wastes. It will also be of interest to those involved with the rehabilitation of disturbed lands, both mining and non-mining situations, where achieving suitable hydrological properties in the surficial-soil profiles is central to ecosystem establishment, development and sustainability. The mining industry, in particular, has much to gain from past and current knowledge on hydrological behaviour at the scale of catchments and landscapes, as applied to decommissioned landforms at mine-site closure.

Presenters:

Dr Glendon Gee

Soil Physicist, Batelle Pacific Northwest Laboratories, Richland, Washington USA

Dr Anton Kepic

Geophysicist, Curtin University of Technology

Dr Christoph Hinz

Soil Physicist, The University of Western Australia

Dr Graeme Campbell

Geochemist, Graeme Campbell and Associates, Bridgetown

Dr Peter Cull

Director, ICT International Pty Ltd, Armadale, NSW

Contact:

Number of places are limited.

Register now with the Centre for Land Rehabilitation, School of Earth and Geographical Sciences M087, UWA, Crawley, WA 6009.

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