Australian Government
Department of Agriculture, Fisheries and Forestry

Ground cover monitoring for Australia

Soils are important to the natural resource base, to agricultural productivity and to the delivery of a wide range of ecosystem services needed by the Australian community. Caring for our Country, the Australian government's natural resources management initiative, is investing in data and information, research and on ground activities to improve soil management. These include the development of methods for monitoring and reporting on wind and water erosion, soil carbon and soil acidity. Direct monitoring of these factors is needed to detect changes in resource condition, and to identify priorities for improving land management practices and soil condition outcomes.

Fence line effect of different ground cover management practices, Ivanhoe, New South Wales.

Photo: J. Leys (NSW DECCW)

Major emphasis is being given through Caring for our Country to improving ground cover management. This is because groundcover has a significant impact on the amount of soil redistributed or lost through wind and water erosion, on the biomass which could contribute to soil carbon levels and on the ability of vegetation to respond to rain after drought. Ground cover changes can be monitored directly through remote sensing. A number of organisations are investing to develop this capacity for Australia.

Spatially explicit monthly ground cover data are needed to improve modelling and monitoring of wind and water erosion, soil carbon and soil acidification. A workshop in November 2009 agreed on a national approach to ground cover mapping. This project aims to automate a remotely sensed (MODIS based) fractional cover method (Guerschman et al 2009) operationally for the nation, and to establish a national network of sensor-independent ground reference sites to validate this product.

Project partners include the Department of Agriculture, Fisheries and Forestry, the Australian Bureau of Agriculture, Resource Economics and Sciences, CSIRO, the Terrestrial Ecosystem Research Network's (TERN) AusCover project, Geosciences Australia and state and territory agencies.

What is ground cover?

Key terms

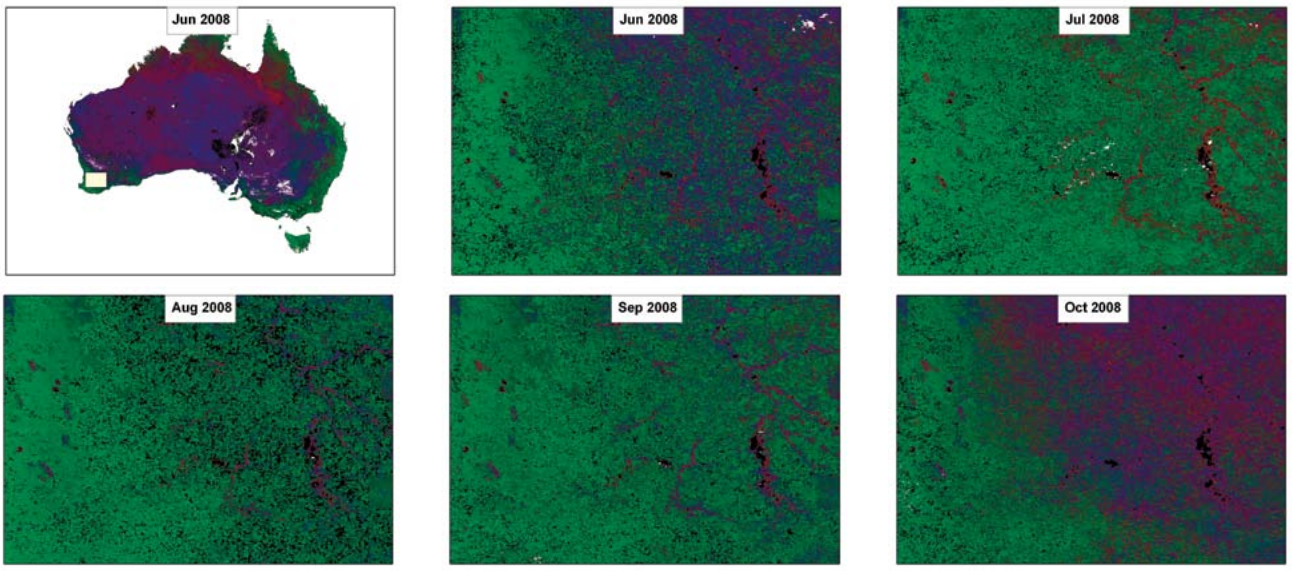
Ground cover: The vegetation (living and dead), biological crusts and stone that is in contact with the soil surface. The non-woody ground cover such as crops, grass, forbs and chenopod-type shrubs may change monthly, making this component a good indicator of land management performance (Leys et al. 2009). Ground cover is a sub-component of land cover and (from a remote sensing perspective) is the fractional cover of the non-woody understorey.

Land cover: The physical surface of the earth, including various combinations of vegetation types, soils, exposed rocks and water bodies. Land cover classes may be discriminated by characteristic patterns using remote sensing. Land cover is distinct from land use. Land use is how humans use the land, e.g. for urban and agricultural land uses.

Fractional cover: The fraction of an area (usually a pixel for the purposes of remote sensing) that is covered by a specific cover type such as green or photosynthetic vegetation, non-photosynthetic vegetation (i.e. stubble, senescent herbage, leaf litter) or bare soil/rock.

Key tasks in progress

1. Preparation of monthly updates of the MODIS (500m) fractional cover archive for Australia which will be validated and the accuracy assessed using site data.
2. Preparation of a statistically robust ground based sampling strategy to underpin validation of the MODIS fractional cover product for Australia.
3. Training to increase the national capacity in site selection, field measurement and data entry for validation of remotely sensed fractional cover.
4. Publication of a national field manual detailing site selection, field measurement and data entry for validation of remotely sensed fractional cover.
5. Algorithm improvement for the next version of the MODIS fractional cover product.
6. Collection of validation data from the national network of sites.
7. Development of a business plan to support improvements in the fractional cover product.



Fractional cover, southwest Western Australia

green = photosynthetic/green vegetation, red = non-photosynthetic/brown vegetation, blue = bare soil.

Download the MODIS fractional cover product at:

www-data.wron.csiro.au/rs/MODIS/products/Guerschman_etal_RSE2009/data/v2.1

Guerschman, J.P., Hill, M.J., Renzullo L.J., Barrett, D.J., Marks, A.S. and Botha, E.J. (2009). Estimating fractional cover of photosynthetic vegetation, non-photosynthetic vegetation and bare soil in the Australian tropical savanna region upscaling the EO-1 Hyperion and MODIS sensors. *Remote Sensing of Environment*, Vol 113, 928-945

Leys, J., Smith, J., MacRae, C., Rickards, J., Xihua, Y., Randall, L., Hairsine, P., Dixon, J. and McTainsh, G. (2009). *Improving the capacity to monitor wind and water erosion: A review.* Commonwealth of Australia (available at nrm.gov.au under 'publications and resources'.

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