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# VEGMACHINE – EXTENDING INTEGRATED RANGELAND MONITORING INFORMATION TO INDUSTRY

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## ABSTRACT

An increasing number of producers in the Australian rangelands are requesting objective information on vegetation change and condition to assist in property management. It is now generally accepted that this information cannot be supplied from ground-based rangeland monitoring systems alone and that the integration with satellite-based systems is required (Holm 2000).

VegMachine, a practical software toolbox, allows non-technical users to display, interrogate and summarise satellite-based monitoring data for tailored applications. VegMachine builds upon and incorporates research and development in rangeland monitoring conducted in northern Australia (Wallace and Thomas 1999, Karfs *et al.* 2000). It provides a unique opportunity for producers to integrate satellite-based monitoring information and other relevant information (e.g. land resources, infrastructure, and ground-level data) into enterprise level decision making.

## VEGMACHINE – A MEAT AND LIVESTOCK AUSTRALIA FUNDED PROJECT

VegMachine allows the producer to easily access satellite images for detecting change in cover over time. The program displays any type of satellite image, aerial photograph, digital topographic map, land resource data, infrastructure (roads, fences, etc) and fire mapping. Producers can view images showing where grazing is occurring and monitor the short and long term effects of their management plan at a watering point to an entire paddock and the whole property. Due to the producers' knowledge of their country and management plans, they can utilise VegMachine to verify the effectiveness of their management. VegMachine can assist a new manager to gain information and awareness of the property quickly and easily.

A range of images are available to suit individual producer's interests, depending on what it is they want to monitor (e.g. grass cover, shrub thickening) and over what time period. Spatial images provide the 'where' cover change has occurred during the time period analysed. Analysis can be over an extended period (e.g. three or more years) using a six-colour cover and trend map to monitor the effects of changed management of, for example, a paddock (see Fig. 1). A simplified three-colour cover change image comparing only two years of satellite data highlights areas of significant change annually. Near real-time MODIS satellite images can be used to monitor vegetation cover throughout the current season. Time-trace graphs provide the user with the ability to interpret cover change in terms of condition and trend with respect to seasonality and management. Time-traces can represent areas of multiple scale from watering point, to paddock to property.

Figure 1 is a view of VegMachine showing a cover trend image on black soil plains in the Victoria River District from 1998 to 2001 (left window), and a time-trace graph of cover levels from 1983 to 2002 (right window). Users can draw a line to select an area of interest (black and orange line work in two different paddocks on the same land type and graph). The program automatically graphs vegetation cover levels of the selected areas and compares these against the regional average (blue line – graph). The centre of the image shows a pronounced fenceline effect and indicates cover within this paddock has increased from a below average level. The black line (graph) shows cover levels have been average to below average in this selected area (compared with regional average). Management has changed stocking levels since 2000 and this has resulted in a marked increase in cover leading to recovery and sustained or increased productivity. The regional average also suggests there has been a steady increase in cover levels for this land type, due to a run of good seasons from 1993 onwards.

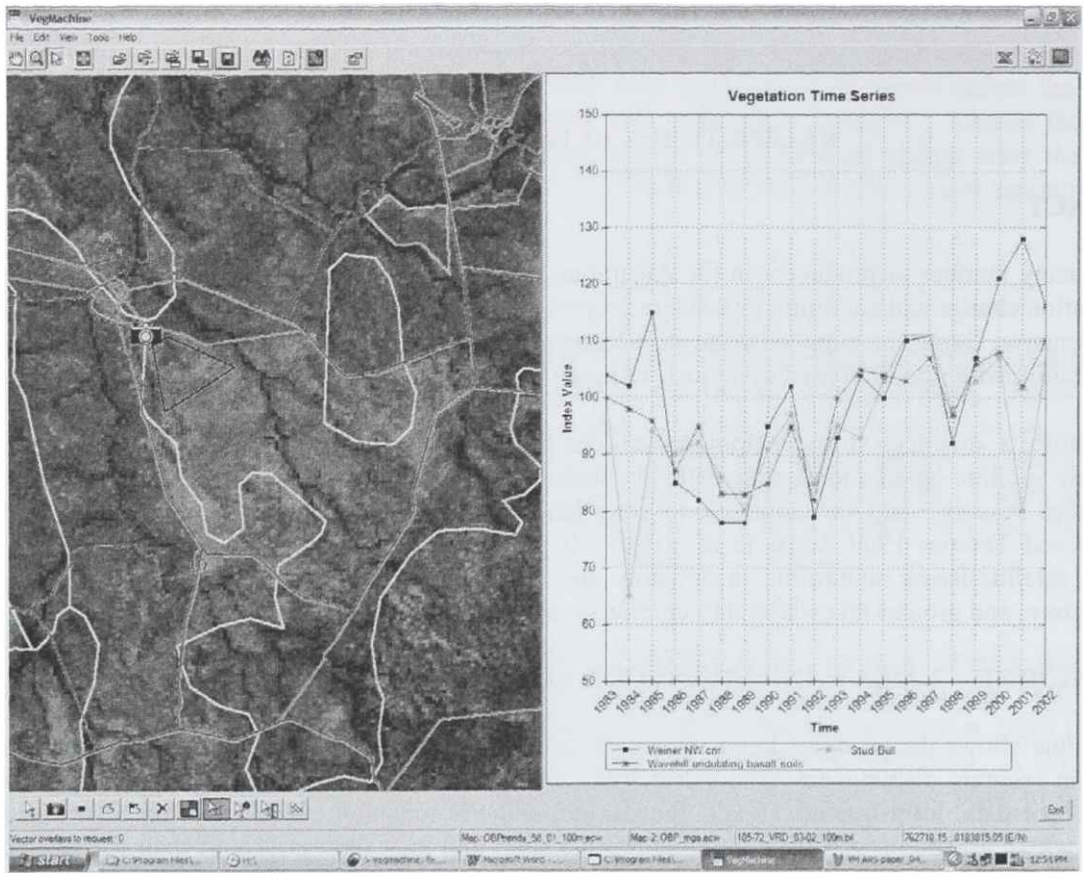


Figure 1. Cover and trend image for 1998 to 2001 and graph of cover levels for selected areas (black and orange lines) and comparison with the regional average (blue line) from 1983 to 2002.

The second area (orange – image and graph) indicates cover levels have remained at or below the average for this land type. This paddock holds the stud bulls for most of the year until required, and is consistently grazed in the favoured area between two creeks. Fire affected cover levels in 1984 and 2001.

By empowering producers with the ability to use data collected by satellites, VegMachine promises to assist producers in monitoring their land and providing information to assess where management changes might be made for maximising economic and environmental benefits.

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