CHARACTERISATION OF PHOTOSYNTHETIC ORGANISMS USING GREENNESS INDEX (NDVI) TIME TRACES FOR THE FORTESCUE FIVER FLOODPLAIN

M. Tovar, S. Maier, R. Smith and M. Steber

Satellite Remote Sensing Services - Department of Land Information
65 Brockway Rd, Floreat WA 6014

The Fortescue River floodplain in the Pilbara region of Western Australia is subject to periodic flooding during the summer months, especially during the months of January and February.

Flood conditions on the grazing areas could last for up to a fortnight, and large volumes of water may sit in the so-called Fortescue Basin for most of the year.

Vegetation responses after a flood/rain event are sometimes difficult to evaluate on the ground due to poor access. Satellite derived vegetation indices have been used in Australia to describe vegetation responses on the rangelands for over ten years (Smith 1994).

The widely used Normalised Difference Vegetation Index (NDVI) is a robust vegetation index that has been correlated with the rate of photosynthetic activity (Tucker and Sellers 1986). Long term NDVI data sets have been generated at one kilometre ground resolution for the production of maximum value NDVI composites on a fortnightly or monthly basis. This has been the convention for a number of Australian organisations, such as the Department of Land Information from Western Australia.

However, single date nadir/near nadir NDVI observations might better explain floristic changes than fortnightly image composites for a local area, such as those occurring on semi-arid floodplains. In the Fortescue River floodplain, diverse photosynthetic organisms responded at several rates to mesic conditions.

NDVI data from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the Terra and Aqua satellites offer the opportunity to generate NDVI time traces at 250 m ground resolution and characterise adequately photosynthetic soil cyanobacteria crust, annual herbs and forbs from the perennial component. The length, position and shape of a NDVI curve for microphytic crust over a number of seasons have potential to be an environmental and management indicator in the arid environment. Microphytic organisms play an important function in soil stabilisation, nitrogen fixation and water infiltration (O'Neil 1995).

REFERENCES

O'Neil, A. (1995). Spectral monitoring of climate change. Paper presented to the 1995 International Symposium on Spectral Sensing Research (ISSSR), 1995. Melbourne, Australia.

Smith, R.C.G. (1994). *Australian Vegetation Watch.* Remote Sensing Application Centre, DOLA. Western Australia, pp. 103.

Tucker, C.J. and Sellers, P.J. (1986). Satellite remote sensing of primary production. *International Journal of Remote Sensing* 7: 1395-1416.