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8 April 2011

Mrs Freyni du Toit
Administrator: Grassland Society of Southern Africa
PO Box 41,
Hilton,
Pietermaritzburg, 3245

Dear Freyni

Nomination of Ms S Ndlela for the GSSA Student Award.

I hereby nominate Ms S. Ndlela for the GSSA Best Grassland Student Award within the Centre of African Conservation Ecology of the Nelson Mandela Metropolitan University.

This nomination is based on the excellent standard achieved by Ms Mgqatsa (the degree is awarded *cum laude*), the relevance of this study to the domain of grassland science and the fact that she achieved this within the proscribed two year study period.

Her MSc dissertation is entitled “Trends in vegetation patchiness loss and implications for landscape function: the case of *Pteronia incana* invader species in Ngqushwa District, Eastern Cape”. Please find attached a copy of the abstract of this dissertation.

I trust that this is in order. Please do not hesitate to contact me for any further details.

Yours sincerely

Prof. Graham Kerley
Director: Centre for African Conservation Ecology
Head: Department of Zoology

Trends in vegetation patchiness loss and implications for landscape function: the case of Pteronia incana invader species in Ngqushwa District, Eastern Cape.

S Ndlela

ABSTRACT

Excessive sediment delivery is a severe environmental problem in many rural catchments in the Eastern Cape, particularly the communal lands. Land use changes, particularly land abandonment, grazing and other forms of alteration to land surface cover have given rise to a mosaic of vegetation and bare soil surfaces which reflect an interplay between patchy vegetation and geomorphic processes. However there is a paucity of studies that have analysed temporal changes in landscape connectivity, particularly patch dynamics. In this study, the analysis of the spatial and temporal trends in vegetation patchiness as guided by the Landscape Function Analysis (LFA) model was performed, and their implications for landscape connectivity and functionality determined.

Fieldwork was conducted whereby vegetation patterning was examined using line transects in order to characterise landscape organisation. Sediment sinks in the form of run-on zones were surveyed on a hillslope and their co-ordinates taken. The GPS points of the run-on zones were overlaid on a curvature surface in order to analyse the relationship between run-on zones and microtopography. High resolution imagery for 2001, 2004 and 2009 was used to provide an understanding of the spatial dynamics of vegetation patchiness, monitor temporal changes in patchiness loss and assess the implications for landscape function. Landscape spatial metrics were used to depict land cover trends.

At patch scale, *P. incana* is arranged in isolated patches interspersed by large bare surfaces over the entire hillslope. The crusted nature of the bare soil surfaces results in reduced infiltration rates and increased runoff. The inter-patch surfaces are considered runoff and are an expression of erosion initiation. At the hillslope scale, vegetation-bare

surface mosaics generate runoff and constitute sediment source and pathway patterns. The mosaics are punctuated by very isolated small microtopography-related sink zones where some of the runoff generated by the bare areas is trapped by grass vegetation which has colonised them. Temporal trends analysed between 2001 and 2009 show that the loss in patchiness has resulted in the enlargement of bare surface areas and increased connectivity between bare surfaces. The increased connectivity is an indication of “leakiness” characterised by large amounts of sediment being removed from the system. The presence of run-on zones within concavities on the hillslope provides isolated elements of functionality in the hillslope system, as they are buffers reducing connectivity between hillslope components and providing areas for successful grass growth. These zones are recommended as starting points in restoration efforts.