

Setting Thresholds of Potential Concern for Degradation

Relation to KNP objectives.

Degradation in this context is seen as a loss of landscape function, which includes nutrient cycling, stability and infiltration/runoff (Tongway & Hindley 2004.) Nutrients are acknowledged as one of the main ecosystem drivers and system function cannot be understood without sufficient understanding of nutrient cycling. Nutrient concentrations are related to specific vegetation and soil types and although these systems may be easier to monitor, significant changes in nutrient cycling may be missed by such indirect monitoring systems. Furthermore, if changes in nutrient cycling can be detected before system changes occur, management can be adjusted, if these changes are anthropogenic in origin, before changes become irreversible. Examples of such changes are redistribution of nutrients as a result of the placement of additional artificial waterpoints and the loss of large trees.

To be able to address this objective from the KNP perspective, simple and inexpensive techniques to measure the important aspects of landscape function will be used. Tongway's soil condition assessment (Tongway & Hindley, 2004), for example, is a well developed technique that uses simple field measurements to calculate an index of soil stability, infiltration/runoff and nutrient status/cycling that has been developed as a TPC.

As with the soil water budget, a 'soil budget' exists whereby soil is formed on the one hand, and lost on the other, via erosion; either as a result of natural processes or due to human activities. In the KNP, it is important to determine the extent and magnitude of the latter form of erosion in particular, and to take remedial action where this is necessary

Rationale

According to (Ludwig et al. 2004), functional integrity is the intactness of soil and native vegetation patterns and the processes that maintain these patterns. These processes are related to biodiversity. Thus indicators that can track changes in these processes will help us understand changes in biodiversity. Landscapes with high functional integrity should maintain biodiversity. Loreua et al. (2001) found that in several experiments primary production exhibits a positive relationship with plant species and functional-group diversity and that from a strictly functional point of view, species matter so far as their individual traits and interactions contribute to maintain the functioning and stability of ecosystems and biogeochemical cycles. On the other hand, biodiversity loss may also have ecosystem consequences (Naeem 2002; Ludwig et al., 2004).

Preliminary surveys done on the northern plains taking distance to water and substrate into account, was used in conjunction with results presented in Tongway & Hindley (2004) to set the initial TPCs. These surveys, using a modified Tongway approach, will initially be concentrated around areas that may be impacted as a result of management such as areas around waterpoints and along roads. Monitoring for degradation will only be undertaken in other areas if there is reason to believe that the landscape function there has changed.

TPC

Degradation is reflected in a decrease in the following indices: soil stability, infiltration and nutrient cycling. There is separate TPC's for each.

Using the Tongway approach, the TPC is exceeded when the following indices drop below the given number for a specific terrain unit or in a land type at any point of survey:

Stability index <45

Infiltration <20

Nutrients <10

Or a change of >10 in any index between two consecutive surveys.

References.

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