USING 15 YEARS OF LAND COVER CHANGE DATA TO INFORM CONSERVATION PLANNING

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Understanding land cover change is pivotal to the success of any conservation action – given that landscape transformation poses the most serious threat to biodiversity persistence. The recently established Kruger to Canyon Biosphere Reserve (K2C) has immense conservation potential, but for it to be an enduring conservation triumph, detailed knowledge of land-use change trends is an imperative. Being able to track, and predict these changes into the future, should enhance the coordination of the conservation agenda with the requirements of competing land-uses. This is a process called conservation planning, and it is a well-developed method to incorporate spatial constraints, costs, the needs of other land users , other land uses and biodiversity data into a transparent, comprehensive decision framework. Equally important, is being able to assess the exact nature of land cover change from biodiversity-friendly land cover classes and assess transition potentials between cover classes. This is important so that priority areas with the highest likelihood of persistence into the future are selected; there is little point in selecting areas that have high transition probabilities. Quantifying spatial patterns is an imperative for long-term conservation planning: a 'salt & pepper' loss effect of priority conservation classes may be less of a concern for biodiversity persistence and corridor establishment than losing large stands of the same type of cover. Conversely, 'salt & pepper' gains of conservation-hostile cover classes may be more difficult to manage regionally for conservation than 'block' gains would be. We argue that land cover change analyses are one of the only ways to quantify transformation risk for particular biodiversity-friendly land cover classes.

For the period 1993 – 2006, winter Landsat images were obtained, tracking annual changes in 15 cover classes. Images were preprocessed courtesy of the Meraka Institute, CSIR using the OSSIM preprocessing method; supervised classification and change analysis was performed on these processed images. Post-classification refinements were done based on expert knowledge and using *ad hoc* historical aerial photographs to validate historical change. Further analyses quantified the spatial nature of the change in core cover classes with reference to biodiversity persistence and management feasibility. These analyses were computed annually, as well as for only 3 time periods, so as to achieve 'bigger picture' results and avoid transient effects.
Significant change occurred along the escarpment, and especially in Bushbuskridge municipality. Much of this change appears to be largely settlement driven – since 1993 settlement and associated activities have experienced a spatial increase of >20%. There is a noteworthy inverse relationship between settlements, in contrast to 'healthy- ' and 'impacted- natural vegetation': as settlement increases, so too does 'impacted vegetation', whilst 'healthy natural vegetation' decreases. 'Impacted vegetation' increases are largely associated with the peripheries of 'settlement areas', but 'healthy natural vegetation' achieved both 'block' losses (near the escarpment and Bushbuckridge) and 'salt &

pepper' losses in the central and northern K2C. The year 2000 shows an anomalous settlement change due to extreme rainfall in the area, leading to uncharacteristically green vegetation and subsequent spectral confusion in the classification.
Whilst human population increases over time will have contributed to the changes/interactions between the settlement-degraded-healthy vegetation cover classes, almost certainly, and possibly more importantly, are the other socio-economic drivers (i.e. poverty) responsible for the transitions that are being observed. The implications of this for conservation planning and long-term management decisions will be discussed.