

Abstract

This project aims to increase knowledge of vegetation changes in arid and semi-arid areas in central Australia. Most of these zones are located across remote, sparsely-populated, large and geographically diverse regions, making them difficult to study (Burns et al., 2014). Satellite imagery and geographic information systems (GIS) are viable options to decrease the knowledge gap in time- and cost-effective ways and to understand how vegetation changes in areas with atypical annual seasons. The main goal of this thesis is to use modern techniques to understand vegetation dynamics occurring during 1989 – 1999 in Finke Gorge National Park (FGNP). During this time, land managers placed a fence around some park boundaries and removed a significant number of wild horses to enable the vulnerable vegetation to recover. An ensuing eight-year field study observed and documented changes. This thesis intends to do the same, using remote sensing (RS) and GIS techniques. A supervised classification of soils and plants is done using data collected during field surveys. Principal components analysis (PCA), a data reduction technique, is used on multitemporal images to enhance continuous spatial and temporal changes and to extract factors that can be attributed to land management efforts at FGNP. Visual interpretation of components and analysis of classification information allowed for exploration of vegetation dynamics at an appropriate spatial and temporal resolution to understand variation and trends across time. The resulting components are compared to results of previous field surveys conducted at the time. The principal components indicate there are natural and human-derived sources of variation. Rainfall and other environmental factors play a major role on vegetation recovery of areas inside the fence, however, components also indicate that other sources of variation, such as land management practices conducted in the area, are contributors to variation. The field survey results are comparable to the thesis results; however, modern technique use provides a different perspective of trends and variation.