The influence of additional permanent water on the resilience of a complex adaptive ecosystem.

A resilient system is understood to be system that can experience a wide range of changes without losing its functional integrity. This resilience is understood to be scale dependent, the larger scales being dominated by geophysical processes and the smaller scales by biotic processes interacting with abiotic ones.

Proposed northern plains research objectives as they relate to the KNP objectives

(as far as the KNP objectives had been developed by the end of 2003)

To understand the relationship between permanent water sources (including sub-surface water) and local and regional biodiversity and ecosystem function with specific emphasis on the antelope rare in the KNP.

To understand the relationship between permanent water sources (including sub-surface water) and local and regional biodiversity, with specific emphasis on rare antelope.

To evaluate the effect of maintaining existing artificial water sources against the effect of restoration to a more natural water provision network on the ecosystem, ecosystem function and processes.

To understand the relationship between artificial water sources and biodiversity

To understand the effect of water provision on herbivore composition and distribution and how these herbivores affect heterogeneity and biodiversity

To inventorise biodiversity associated with piospheres to include distant areas less affected water point effects (refugia)

Develop a practical method for biodiversity surveys and evaluating loss of complementarity

To understand the mechanisms/processes by which different types of herbivores create and maintain suitable forage patches and the effects on keystone/ indicator/sensitive species (specifically scarce antelope)

To understand the effect of surface water provision and the related herbivores on vegetation structure and composition

Understand the mechanisms of herbivore-plant-herbivore and herbivore-plant-predator interactions

To develop guidelines for the placement of waterholes in relation to tourist access

The effect of water provision on the population of scarce ungulates: roan, sable tsessebe and reedbuck

To understand how foraging behavior of dominant species e.g. zebra affects other herbivores via their affects of the vegetation and suitability for predators

To understand the interaction between sodic site ecology and water placement

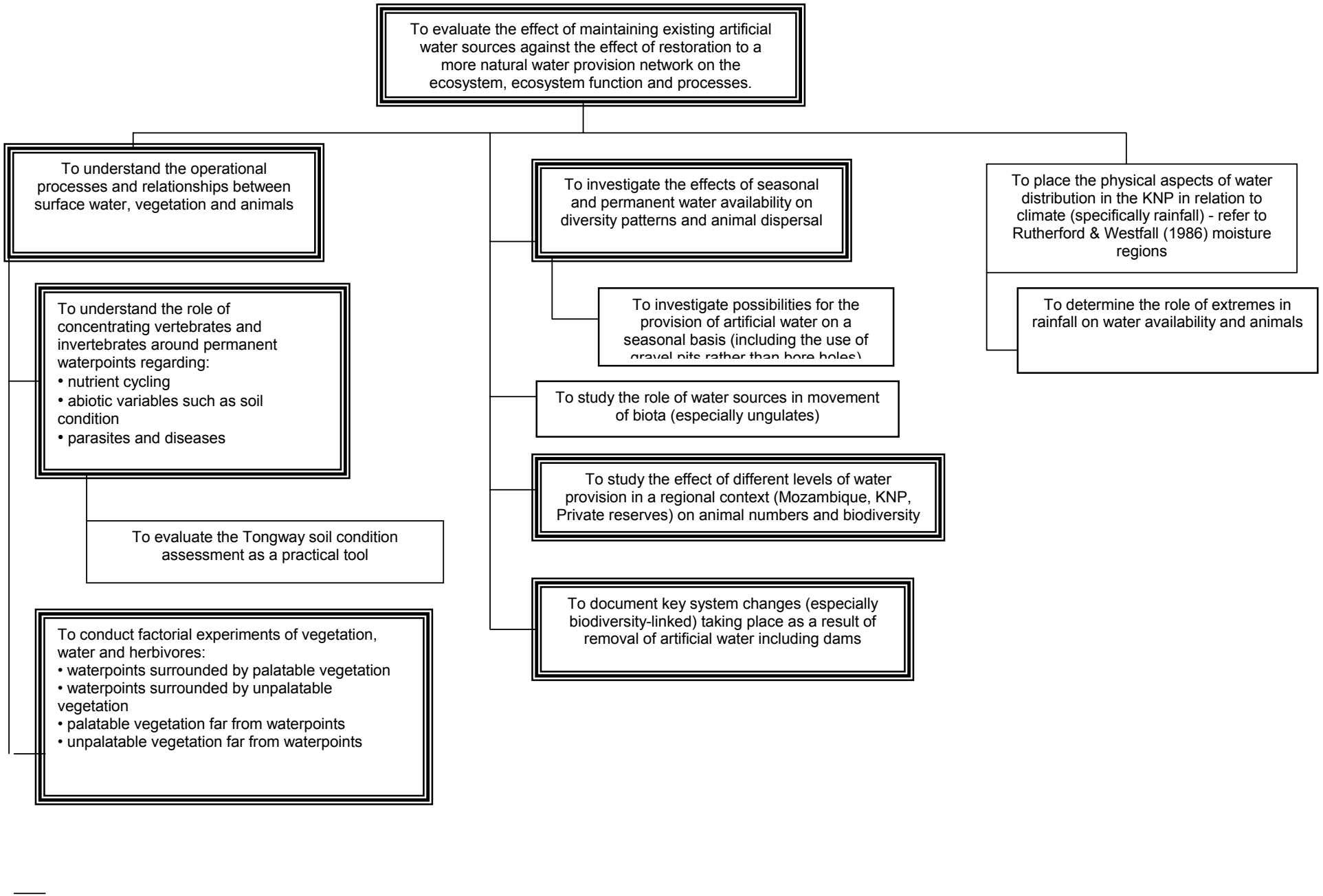
To understand the relationship between herbivore composition and herbaceous species composition

To understand the role of vegetation structure e.g. tall trees (>10m) on smaller biota such as rodents. insects and birds

To understand the role of vegetation structure e.g. tall trees (>10m) on nutrient cycling

To influence public perception around the closure of artificial waterholes in the KNP

Boxes in heavy frames indicate projects that will be specifically addressed in the northern plains programme.


To evaluate the effect of maintaining existing artificial water sources against the effect of restoration to a more natural water provision network on the ecosystem, ecosystem function and processes.
To understand the operational processes and relationships between surface water, vegetation and animals
To understand the role of concentrating vertebrates and invertebrates around permanent waterpoints regarding:
• nutrient cycling
• abiotic variables such as soil condition
• parasites and diseases
To evaluate the Tongway soil condition assessment as a practical tool
To conduct factorial experiments of vegetation, water and herbivores:
• waterpoints surrounded by palatable vegetation
• waterpoints surrounded by unpalatable vegetation
• palatable vegetation far from waterpoints
• unpalatable vegetation far from waterpoints
To investigate the effects of seasonal and permanent water availability on diversity patterns and animal dispersal
To investigate possibilities for the provision of artificial water on a seasonal basis (including the use of
To study the role of water sources in movement of biota (especially ungulates)
To study the effect of different levels of water provision in a regional context (Mozambique, KNP, Private reserves) on animal numbers and biodiversity
To document key system changes (especially biodiversity-linked) taking place as a result of removal of artificial water including dams
To place the physical aspects of water distribution in the KNP in relation to climate (specifically rainfall) - refer to Rutherford & Westfall (1986) moisture regions
To determine the role of extremes in rainfall on water availability and animals