

Biodiversity Monitoring for Tanwat Estate
Routine Monitoring as an indicator of Habitat Quality.



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Biodiversity Monitoring Systems for Tanwat Estate.

Introduction

The baseline biodiversity studies carried out by Jooste & Ruffo (Flora), Davenport (Butterflies), Channing (Amphibians & Reptiles) & de Leyser (Birds) in early 2003 have revealed that the Tanwat Forestry estate is an important focus of biodiversity within the Njombe district. A number of species found during the survey are considered rare and/or near endemic to the estate at the district/regional or continental scale. Tanzania Wattle Company Ltd recognises its responsibility to conserve the biodiversity in its landholdings and where possible to increase it by conservation oriented habitat management. In order to be able to determine if the company is being successful in its objectives with respect to biodiversity it is necessary to develop systems of biodiversity monitoring which are reliable, economically and technically feasible within the context of the south-western highlands of Tanzania.

Such a system must be simple to apply and where possible be independent of expert technical assistance. Since biodiversity monitoring necessarily focuses on the differences between species of animals and plants it must be recognised that expert assistance will be needed from time to time. A system which combines in house surveys with occasional verification from experts is likely to prove the most economical.

Since it is not possible to conduct continuous surveys of biodiversity for cost and technical capacity reasons the proposed monitoring system will be based to a large extent on indicators of habitat quality as a surrogate for biodiversity. The assumption being that if habitat quality is either high or improving then the associated ecological processes will maintain biodiversity at natural levels for the area. The proposed methods of biodiversity monitoring will be dependent on an ongoing monitoring of keystone species that require high quality habitat in order to survive or whose survival is dependent on an adequate control of direct human impacts on wildlife.

The monitoring proposed combines three levels of monitoring.

- 1) Ongoing recording of flagship species.
 - a. Recording of observations of Ground Hornbill on a routine basis.
 - b. Recording of observations of small antelope on a routine basis.
 - c. Recording of observations of medium sized carnivores on a routine basis.
 - d. Recording of observations of unusual species on a routine basis.
- 2) Annual monitoring of key habitats for indices of biodiversity.
 - a. Annual count of ducks on the Mchofi dam and wetland area.
 - b. Annual sample survey of plantations for sign of antelope.
 - c. Annual count of birds at key points in the Ruaha Valleys.
- 3) Triennial monitoring of butterflies and birds as indicators of habitat integrity.
 - a. A January survey of butterflies in natural habitats on the Estate.
 - b. A January survey of bird biodiversity in natural habitats on the Estate.

Ongoing recording of flagship species.

Method.

Estate managers and the conservation manager should record all sightings of these rare species whenever they are seen. The manager should have an observation list available in his car in order to record these observations. A proforma recording form is supplied below. These lists should be returned to the conservation manager at the end of each month and the results should be summarised and mapped. It is suggested that the conservation manager obtains a map of the estate attached to a softboard back. The observations should be marked on the map with coloured pins to identify the category of the observation.

Recording of observations of Ground Hornbill on a routine basis.

Ground hornbill are easily recognised birds that are classified as amongst the 'big six' avian species of southern Africa. They are entirely carnivorous and are therefore indicators of a constant supply of a wide range of species including mammals, birds and reptiles. They are able to move over long distances and therefore have a wide range of habitat choice. Preferred habitats are therefore able to supply all of their requirements from a diverse and reliable supply.

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Ground Hornbill

Roberts #463 - Bromvoël - *Bucorvus leadbeateri*



Very large; mainly black; *facial wattles bright red*, blue in centre of throat of male ; *wings white in flight*. Open grassland

to bushveld. SE to NE and N. Uncommon to scarce resident.

Measurements : Length 90-129 cm; wing (33 male) 469-560-618, (10 female) 495-528-550; tail (22 male) 300-345-360, (9 female) 290-324-340; tarsus (21 male) 130-143-155, (7 female) 130-135-140; culmen (30 male) 190-207-221, (10 female) 168-192-215. Weight (3 male) 3500-3671-3937 g, (2 female) 2230-2296 g.

Bare Parts : Iris yellow; skin of face, throat and wattles bright red, bluish on centre of throat in female; legs and feet black, soles whitish.

Identification : Size very large; turkeylike; mostly black; in flight primaries white; red wattles distinctive; female usually has purplish blue also on face, orbital skin and wattles. *Immature*: Browner than adult; facial and gular skin light khaki; bill dark grey.

Voice : Deep booming territorial call of 4-5 syllables, falling in pitch, started by one bird, replied to by second bird in lower tone, bird A: *du, du, dududu*, bird B: *hu, hu huhu*, bird A: *du, du, dududu*, bird B: *hu, hu, huhu*, etc., repeated several times, bill pointing downwards, neck arched and inflated; soft *uhu* contact call; grating *squawk* high-intensity alarm or fear call.

Distribution : Africa S of equator; in s Africa confined to E, NE and N.

Status : Locally common resident, but scarce in settled areas; some local movements. Vulnerable (RDB).

Habitat : Any woodland, savanna, open grassveld, agricultural lands.

Habits : In pairs or groups of usually not more than 8 birds (2-4 adults and 1-3 immatures); mean group size (290) 3,6 birds.

Neighbouring groups chase each other in aerial pursuits.

Forages on ground, walking with stiff rolling gait on terminal phalanges of toes; digs with bill for food. Vocal mostly early morning; also late afternoon. Flight powerful with deep wingbeats, little gliding. Roosts in groups at ends of branches, head tucked into shoulders, bill pointing upwards.

Food : Entirely carnivorous; reptiles (including tortoises), frogs, snails, insects; also mammals up to size of hare.

Breeding : *Season*: October to November; eggs laid earlier after good rains, usually within 10 days of first summer rains.

Nest: Usually hole in tree; also hole in rock face or wall of donga; height above ground (12) 4-5,7-7 m; one cliff nest 120 m above ground; lined with grass and leaves; cavity about 40 cm wide; entrance about 30 cm wide, not sealed as in other hornbills. *Clutch*: (37) 1-1,8-2 eggs. *Eggs*: White, rough textured; measure (27) 73,9 x 51,3 (67,3-79 x 46,9-55,7).

Incubation: (1) about 40 days by dominant female only; female fed by adult males and sometimes by immatures. *Nestling*: (1) 85-87 days; dependent on adults for food for 6-12 months.

Ref. Kemp, A.C. & Kemp, M.I. 1980. *Ann. Tvl Mus.* 32:65-100.

Recording of observations of small antelope on a routine basis.

Small antelope appear to be very rare on the estate and this is most likely to be due to poaching. Monitoring of these should be carried out to verify that the anti poaching programme instituted by Tanwat in cooperation with local communities is effective.

Recording of observations of medium sized carnivores on a routine basis.

Medium sized carnivores are indicators of habitat integrity and the ability of the habitat to supply a variety of both animal and vegetable foods. The diet of the black backed jackal illustrated below is often more than 50% vegetable in origin.



Recording of observations of unusual species on a routine basis.

The presence of new and unusual species of any kind on the estate may signal a change in the habitat quality. It is therefore important to record observations of animals and birds that are uncommon. Details of the animal should be recorded to aid future identification. Where possible a photograph or a field sketch should be made.

Date	Hornbill	Antelope	Carnivore	Other	Comp. No.	Comments

Estate:

Observer:

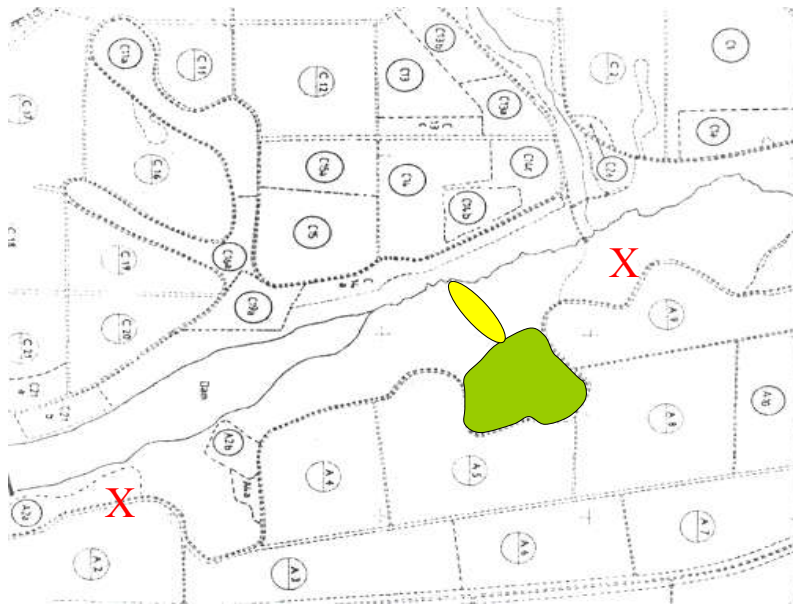
Month:

Annual monitoring of key habitats for indices of biodiversity.

Methods

These tasks should be carried out by the conservation manager. It is suggested that the work is carried out in January - March each year. The summary data should be recorded by the conservation manager who should prepare a table and graphs illustrating the year to year changes in these indices.

Annual count of ducks on the Mchofi dam and wetland area.



The observer should obtain a pair of good 8 x 40 binoculars. Counts should be carried out approximately two hours before sunset. The counts should be conducted from a series of high points overlooking the dam as indicated by the red crosses on the figure. It is not necessary to record the number of species just the total number of ducks seen. The counts should be repeated on 3 consecutive mornings for the purpose of the monitoring the average of the three counts is the important value that should be recorded for a year to year comparison.

Annual sample survey of plantations for sign of antelope.

This should be carried out by the conservation manager. A fixed route should be chosen that passes through the plantations on each estate. In total 3 routes of approximately 2 km in length should be walked in a straight line passing through plantation compartments and natural vegetation areas. The detailed location of these will be marked on the attached map. The number of groups of antelope pellets observed on these transects should be recorded. The survey should be carried out once each year after the end of the dry season but early in the wet season. Probably in late January.

Annual count of birds at key points in the Ruaha Valleys.

Five fixed points in the Ruaha valley complex will be selected and marked on the attached map. From each of these points the observer should count the total number of birds seen during a 15 minute observation period. Observation should be carried out early in the day between 1 and 2 hours after sunrise. The counts should be repeated on 3 consecutive mornings. It should be possible to carry out observation at all five points on a single day. The observations should be made during the middle of the wet season on clear mornings in February or March. For recording purpose the average of the number of birds seen from each point over the 3 day period should be recorded.

Specimen form for recording bird counts.

Day	Point 1	Point 2	Point 3	Point 4	Point 5
1					
2					
3					
Average					

Triennial monitoring of butterflies and birds as indicators of habitat integrity.

In order to detect changes in biodiversity with a higher level of reliability it is necessary to conduct an occasional survey by a specialist in the field. It is suggested that this is done once every three years for birds and butterflies. These surveys should be carried out if possible by the same people who carried out the initial surveys in January 2003. It is recommended that only the bird and butterfly fauna is surveyed since these are more visible, more diverse and more susceptible to habitat change than other taxa.

A January survey of butterflies in natural habitats on the Estate.

This survey should be carried out in January 2006 by E. de Lyser

A January survey of bird biodiversity in natural habitats on the Estate.

This survey should be carried out in January 2006 by T. Davenport.