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AN ASSESSMENT OF THE MANAGEMENT OF THE SHAI HILLS RESOURCE RESERVE IN THE GREATER ACCRA REGION, GHANA

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Abstract

The management of the Shai Hills Resource Reserve was assessed in 2006 after the implementation of a 1992 management plan over a 14 -year period. The aim of the study was to find out if implementation of the management plan has resulted in improvement in animal populations. Censuses were carried out for three mammalian species, namely kob (*Kobus kob*), olive baboon (*Papio anubis*) and bushbuck (*Tragelaphus scriptus*), which are of management interest. Data were also obtained from records available at the Reserve's headquarters on population growth trends of these species over the years. Threats to population growth, like poaching, fire outbreaks, overgrazing and predation, were also studied. In addition, resource availability and evidence of manipulations were investigated. The study revealed that populations of two species are still low in the Reserve except the olive baboons. The results also indicated that lapses in the implementation system and lack of maintenance are the main reasons why the existing management plan failed to achieve its main goal of improving upon the population of fauna in the Reserve. The study recommends the formulation of a new management plan that will address the problem of maintenance in the Reserve. Further recommendations for management have been suggested.

Introduction

Shai Hills Resource Reserve, based on the IUCN (1994) classification system of categorizing protected areas, is in Category III, described as "Natural Monuments". This is because of its natural or cultural features, which are outstanding, or of unique value, because of their inherent rarity, representative and aesthetic qualities or cultural significance (White & Edwards, 2000). This is evidenced by the presence of three caves, which were used by previous inhabitants as hideouts during tribal wars.

The Reserve was originally a game production reserve but later the status changed to a resource reserve. The old management plan for the game production reserve allowed controlled utilization of fauna and other resources through zoning, trophy hunting, fuel production, etc. Currently, the Reserve appears to be experiencing reduced abundance and diversity of its fauna and flora. Issues of controlled harvest are no longer compromised in the new management plan (1992), the prime interest of which is to increase numbers through protection, or conservation without utilization.

The study was aimed at evaluating the implementation of the new management plan, especially on increased populations of faunal species, which is one of the key indicators of a successful management plan for a reserve. It is hoped that when successfully completed, progress made so far and challenges faced by management will be made available to serve as guideline for the improvement in the management of the Reserve. Also, the results may provide the basis for a decision as to whether to replace the existing management plan or to retain it.

Experimental

Study area

The Shai Hills Resource Reserve is located in the southern part of Ghana on the Accra Plains, lying close to the Tema-Akosombo highway (Fig. 1). It

occupies a land area of 51 km², and it was fenced all round but now parts of the fence have collapsed. The mean annual rainfall is 900 mm (range = 760 – 980 mm), and daily temperature ranges from 25 to 28 °C. The Reserve is predominantly dry evergreen savanna interspersed with short trees and shrubs. There are about 212 animal species including four bat species, 13 reptile species, three primate species, 10 rodent species, and 175 bird species (Lemaire-Dowsett & Dowsett, 2005). There are also three historic caves in the Reserve.

Estimation of animal population

Populations of kob (*Kobus kob*), bushbuck (*Tragelaphus scriptus*) and olive baboon (*Papio anubis*) were estimated by counting individuals of a species at six sites (A, B, C, D, E and F), which were randomly distributed in the Reserve. Counting was done from 7.00 to 7.30 h GMT. Six field assistants were at post, one at each site to count the mammals along trails within the period. The time chosen was based on the observation that the mammals generally forage during that period. Data on the following were also obtained from records available at the Reserve's headquarters: population growth trends of the three species over the years, presence of species of conservation significance, threats to the animals like accidents, poaching, fire outbreak, overgrazing and predation. In addition, species of special conservation concern and their effects on the Reserve as a whole were observed. Food and water availability and evidence of manipulations were also investigated.

Results and discussion

Population estimates, animal records and population growth trends

According to records at the Reserve's headquarters, large mammals commonly seen are olive baboon (*P. anubis*), kob (*K. kob*), green

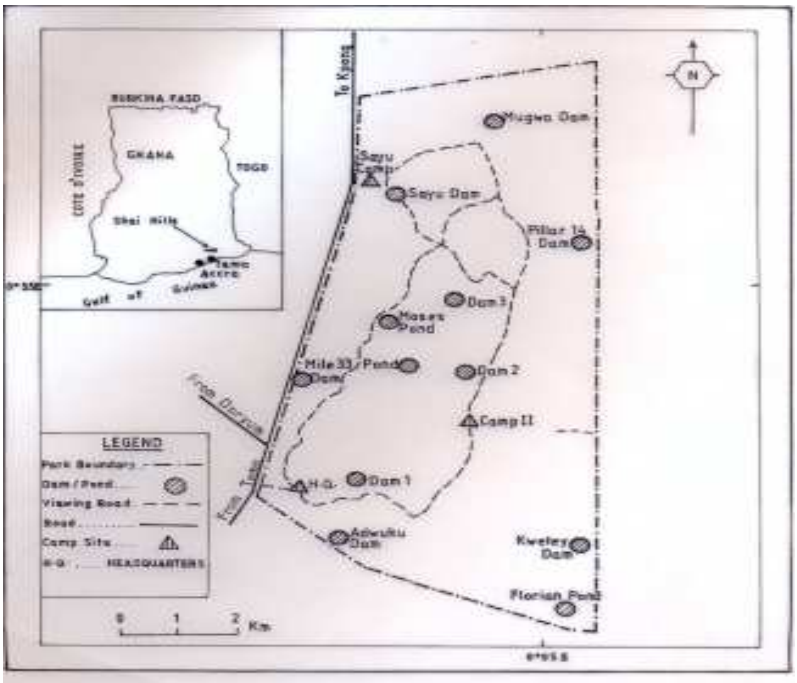

Fig. 1. Location of Shai Hills Resource Reserve

TABLE 1
Population of kobs, bushbucks and baboons

Site	*Number of sightings*		
	Kobs	*Bushbucks*	*Baboons*
A	17	0	42
B	26	0	18
C	0	0	29
D	14	0	37
E	7	0	48
F	23	0	33
Total	87	0	207

monkey (*Cercopithecus aethiops*), and bushbuck (*T. scriptus*). The populations of the species of mammals, kob (*K. kob*), bushbuck (*T. scriptus*) and olive baboon (*P. anubis*), estimated during the study, were 87, 0 and 207, respectively (Table 1). Primates are by far the most numerous mammals in the Reserve. Between 1975 and 1977 the number of baboons was between 180 and 250, divided between troops of 20–30 individuals (Lieberman *et al.*, 1979). Dadebo (1988) estimated the population to be 168. In 2006, field staff on routine patrol recorded total populations of 12 troops of baboons as 321, 115, 35, 210, 278, and 173, respectively, from January to June. According to Management, green monkeys are abundant recently, judging from the encounter rate as compared to the past. The population of green monkeys recorded by field staff in 2006 were 75, 43, 0, 47, 43, and 29, from January to June, respectively. The high population of olive baboons has an adverse effect on the management of the Reserve. At certain times, especially during the dry season, the baboons stray to nearby communities and raid crops and poultry farms, but, because baboons are tabooed by the people in the surrounding communities, they gain additional protection.

Rice (1975) reported a kob population of 69 individuals, and 13 years later another census (Dadebo, 1988) gave a population of 63 individuals. In 1992 (animal records at the Reserve's headquarters), the total kob population was 60, and the kob populations recorded by field staff in 2006 were 234, 58, 189, 105, 135 and 85 from January to June respectively. The population of kobs has been very low from 1975 to 2006. High figures recorded by the field staff during routine patrols are inconsistent with the estimates of this study and previous studies. It is likely that multiple counting was the reason for the high figures recorded. The vegetation of the Reserve is suitable for the habitation of kobs which are grazing animals, which depend on water and open grassland to establish breeding territories to enhance reproduction. It is, therefore, likely that population growth of kobs may be influenced by factors like poaching, inbreeding depression, and predation by baboons on newborn kobs.

Dowsett-Lemaire & Dowsett (2005) reported the sighting of a single large herd of 81 individuals and several smaller herds of kobs. Such small populations with low genetic diversity promote inbreeding depression, which may partly account for the low population of kobs in the Reserve. The best way to tackle the issue of low or negative population growth due to inbreeding depression is by translocation into the Reserve.

The study did not sight a bushbuck though field staff reported their presence. Dadebo (1988) recorded 30 bushbucks, and, from records at the Reserve's headquarters, 50 bushbucks were observed in 2001. The populations of bushbuck recorded by the field staff on patrol in 2006 were 8, 3, 0, 6, 6, and 3, from January to June, respectively. The low numbers of bushbuck recorded by field staff and not sighting any during

the study is very alarming, although it is difficult to see these animals when they occur in low populations. Dadebo (1988) located them at the foot of the hills and in thickets in the plains.

Many other mammals, including oribi (*Ourebi ourebi*) and demidoff's galago (*Galagoides demidoff*), have been seen but the study did not sight all of them. Only six individuals of oribi have been observed (records at the Reserve's headquarters) since Dadebo (1988) reported 11 individuals. The animals with small populations in the Reserve may be facing unfavourable habitat conditions. For instance, there are records of tree hyrax (*Dendrohyrax dorsalis*) in the Reserve but, according to Management, the noisy hyrax has not been heard of for several years probably because the habitat appears too dry for it . Of all the duikers, only a single crowned duiker (*Sylvicapra grimmia*) has been recorded. Even though there are rare and threatened species in the Reserve, there are no special measures put in place by Management to conserve them.

According to Management, Togo hare (*Lepus capensis*) and grasscutter (*Thryonomys swinderianus*) are numerous in the Reserve but the study did not sight them, apart from their droppings. Fossil remains, precisely bones, of wildebeest (*Connochaetes* sp.) were excavated in the Reserve (from records at the Reserve's headquarters) while Management asserts that bones of elephants (*Loxodonta* sp.) were also excavated. These two mammals are no more seen in the Reserve.

There was no detailed investigation into the population trends for reptiles and birds but, according to Management, several different species of snakes are often spotted and that the frequency of encounter with monitor lizards (*Veranus niloticus*), as compared to the past, points to an increase in their numbers. Birds like guinea fowl (*Guttera* sp.) and francolins (*Francolinus* sp.) are believed to be increasing in numbers by considering the encounter rate recently as compared to the past. An intensive study of birds by Lemaire-Dowsett & Dowsett (2005) revealed an impressive 175 different species of birds except for birds of prey, which were poorly represented.

Threats

Wildfires, invasion by cattle, and spread of neem are the main threats to the Reserve. Reports indicate that fire outbreaks have plagued the Reserve since 1995, even though there is a functioning Wildfire Management Unit. Serious fire outbreaks occurred in 1995, 1996, 1997, 2000, 2002 and 2004. According to records and personal observation, wildfires are mostly started by poachers outside the Reserve as an early burning practice that would attract the Reserve's grazers when fresh grass sprouted. It is envisaged that timely control measures would minimize or eliminate the problem of wildfires.

Over the years threats like accidents and poaching have not been so much experienced. Even though baboons are sometimes knocked down by vehicles on the major Tema–Akosombo highway just outside the Reserve, it is not a frequent occurrence. During patrols, field staff seldom come across metal traps and other evidence of poaching. The Reserve used to be completely fenced but stealing of the supporting metal rods at some sections of the fence has resulted in the collapse of the fence at such sections. Some of the fauna, especially the kobs, are killed by the local people for consumption when they stray out of the Reserve. Invasion of cattle for grazing is a common observation in the Reserve. Apart from causing food shortage to wild animals, such animals spread diseases like rinderpest and diarrhoea among the wild animals.

It was observed that the exotic neem tree (*Azachdiracta indica*) was spreading at an alarming rate and was killing the indigenous plant species especially grasses. It, however, also provides fruit for primates and birds which act as agents of dispersal in the Reserve. Acknowledging the effect of the spreading neem

trees in the Reserve, Management has initiated a programme to destroy large numbers of the neem trees. Though the study did not observe any evidence of predation, it is on record that the baboons prey upon young kobs and green monkeys.

Reserve records indicate that poaching is very minimal and could not, therefore, be a major factor in the population declines of fauna. Even though poaching is a major problem in most reserves in Ghana, it is minimal in Shai Hills Resource Reserve because of the high staff density of 5.26 km^2 per field staff. This makes patrolling very effective, with day and night patrols being organized, and controlled burning undertaken to draw animal concentrations to camp sites to enable gunshots and other signals from poachers to be detected quickly. Apart from all staff members being housed in the Reserve, there are also lodging places for visitors and researchers. Thus, the regular presence of tourists, researchers and staff deter potential wildlife offenders. In addition, the ongoing educational programme for communities initiated by Management has undoubtedly helped to restrain poachers from committing wildlife offences.

Available resources

Water availability is often a limiting factor to population growth of many species, especially in arid regions or during the dry season. Even though enough dams and water holes have been provided in the Reserve, they lack maintenance and, therefore, may not serve the purpose of providing enough water all year round for the animals. Sayu dam, for instance, which was constructed by Management, is filled with silt, and the Adwukwu dam, which never dries, is shallow. There are adequate herbaceous plants, shrubs, and browsing plants in the Reserve and the grass cover is good all year round. However, fruit plants, such as banana, mango, pawpaw, guava, etc. are lacking. The neem tree is the only fruiting plant that occurs in abundance. Besides fruits, wild animals also need a wide array of macronutrients like calcium, potassium and sodium, and micronutrients (Robins, 1993), which are obtained from mineral blocks set up in some reserves. No mineral blocks or salt licks were found in the Reserve during the study.

Conclusion and recommendations

The present management plan of the Shai Hills Resource Reserve has failed to achieve its main goal of ensuring increased faunal populations since the Reserve has already lost some of its original fauna. The study recommends a new management plan that will recognize the need for an improved monitoring system and maintenance of infrastructure. Threats to population growth of animals, like inadequate water supply, fire outbreak, animal straying and inbreeding depression can be addressed at the population management level.

It is evident that water is not adequately available during the dry season, hence, the need for the maintenance of existing dams and construction of new ones. To prevent uncontrollable fire outbreaks, it is recommended that reserve boundaries should be cleared regularly to prevent spread of wildfire from outside the Reserve. Also strategic (early and late) burning should be undertaken consistently to enable burnt portions to serve as fire belts to stop wildfires from spreading. The ongoing felling of neem trees is welcome, but there is the need to plant more indigenous fruit-bearing trees in the Reserve. The best solution to inbreeding depression is to transfer populations of similar species from other Reserves to increase genetic diversity and promote successful reproduction. Considering the menace caused by baboons and their reproductive rate, it will be proper to translocate some baboons to augment other populations elsewhere. Re-fencing of the Reserve is also very necessary to stop cattle invasion and straying of animals

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