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Active and Passive Management in Gashaka Gumti and Kainji Lake National Parks, Nigeria

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ABSTRACT

Numerous global environmental challenges and diverse ecosystems require different approaches to protected areas management due to various human activities to which they are subjected. Management approaches in Kainji Lake and Gashaka Gumti National Parks were studied through field observations and interview methods. Eleven management practices were identified in the two parks, these are: boundary demarcation; buffer zone management; controlled bush burning; creation of waterholes; creation of saltlicks; track, trail and road management; antipoaching patrol; research and monitoring; parachute patrol; erection of viewing hides and transboundary management. 84.21% of the management practices are active in Kainji Lake National Park while only 15.79% are passive. Active management constitutes 77.78% in Gashaka Gumti National Park while only 22.22% make up passive management. Higher levels of active management intervention is needed in the two parks to maintain specific biodiversity values and to improve services such as ecosystem restoration, game viewing and accommodation for tourists.

Key words: Active and passive management; interventions; biodiversity; conservation values

INTRODUCTION

Management, in general terms, refers to the direction or controlling of actions and activities. It is an expression that usually implies responsibility and accountability. There are many views regarding the management of protected areas. Although management of national parks is a form of control, ecological management is however necessary in many areas in order to preserve its biological diversity, especially when the area is inflicted by a variety of disturbance regimes. Searle (2000) advocated that any combination of approaches that ensures the most restoration and maintenance of wildness is viable. Methodologies used in protected area management differ from place to place and a park is usually managed in a way that retains natural or semi-natural features, and considered to be

desirable. The management goal is to protect the 'ecological integrity' which needs to be based on a solid program of ecosystem science. Emergence of several global environmental challenges demand various approaches for the management of protected areas. Diverse ecosystems require different approaches because ecosystems are dynamic, changing due to various activities to which they are subjected. The management approach for any protected area is usually based on the objectives for establishing the area and the protected area category.

Active and passive management are two common management approaches to biodiversity protection in protected areas. According to Zoltan (2011), these two extremes biodiversity management approaches are linked to a range of ecosystem services including existence values.

Passive management emphasizes the protection of wilderness and its expansion through rewilding of abandoned lands, while active management promotes the maintenance of cultural landscapes, associated species and habitat diversity through farming, grazing, forestry and other activities. Bonner (1992), also submitted that management approaches in protected areas can either be passive or active. Active management otherwise referred to as intervention management of protected area means that enforcing prohibitions against various activities inimical to the area is not only done but pro-active steps are also taken to prevent or reverse change in an area. Protected area category is applied with respect to management objectives and this relates to the aims of management rather than the current status, so that several categories can be subject to wilderness restoration. While examining the two management types in protected area, Borza and Vancura (2009) stated that practically, active management is not usually suitable for every wild and wilderness area, giving example that active management interventions might be required to maintain specific defined biodiversity values areas. It can be a restoration intervention in a wild and wilderness area and may be time-limited to undo past damage while in others; changes have been so profound that continued, long term intervention will be needed such as the disappearance of some important species, control of invasive species and prescribed burning in certain habitats and conditions. Brooks, Mettermeier, da Fonseca, Gerlach Hoffman Lamorcux *et al.* (2006) submitted that regions of the world with highest species diversity require urgent attention through a more active type of management because most of these habitats persist as small fragments within a metric of human occurrence.

Passive management on the other hand refers to non-intervention method of managing protected areas; it is the management of the ecosystem that allows nature to take its course, leaving the biodiversity to regenerate on its own without any form of interference. Passive management is considered by a relatively small number of wild and wilderness area managers as the basic management tool. Passive management is not only legitimate; it is also cheaper to manage protected areas where the main objectives are ecosystem dynamics and wilderness. The

management plan of protected areas provides opportunity to shift from passive to more active management. According to Bonner (1992), the first essential of active management is the definition of objectives to be achieved the protected area and this is always clearly stated in the management plans. Also, the values to be protected and the planned objectives for the management which is a major component of the protected area management plan mandates that management plans must include management activities to be undertaken to protect the values for which special protection of management is required. With global environmental challenges due climate change and its inherent problems, management of protected areas cannot be left without any form of intervention hence, compromises have to be based on scientific practices towards effective management in order to achieve conservation objectives.

Dudley (2008) stated that effective management may entail minimum levels of intervention, for example in large wilderness areas, or “intensive care”, or in small habitat or species management areas. Effective management usually involves a wide range of stakeholders, including government agencies, Non-Governmental Organizations (NGOs), private entities, indigenous peoples and local communities. He further opined that implementing appropriate management for a protected area is fundamental for its effective conservation of biodiversity. The study therefore aimed at examining management style of two national parks in Nigeria (Kainji Lake and Gashaka-Gumti) with a view to characterize and differentiate between active and passive management within and outside the National Parks towards effective management of the protected areas.

MATERIALS AND METHODS

Study Area

The study covered two National Parks in Nigeria, Kainji Lake, the first and Gashaka-Gumti, the largest conservation enclave in Nigeria. The two National Parks are in category II of the International Union of Conservation of Nature (IUCN) categorization. They are managed by the Nigeria National Parks Service (NNPS).

Kainji Lake National Park

Kainji Lake National Park lies between Latitude $9^{\circ}40'N$ and $10^{\circ}30'N$ and Longitude $3^{\circ}35'E$ and $05^{\circ}25'E$, covering an area of 5,340 Km/Sq (Figure 1) It is composed of two non- contiguous sectors, Borgu and Zugurma separated by Kainji Lake and the hydroelectric dam complex. There are eight (8) ranges and a central squad in Kainji Lake National Park, these are Kali; Kemenji; Kulho, Ibbi, Worumakoto; Kuble Oli and Doro ranges with the central squad. The entire park is in two of the most sparsely populated areas of the country. The climate of the park had been divided

into two distinct seasons, rainy and dry season. The wet season usually begin in May and last till November while the dry season commences from December to April. North East trade wind blowing across the Sahara which is characteristically cold, dry and dusty, predominate over the study area between November and March, this is known as the harmattan season. Relative humidity values vary directly with rainfall values but somewhat inversely with the values for evaporation.

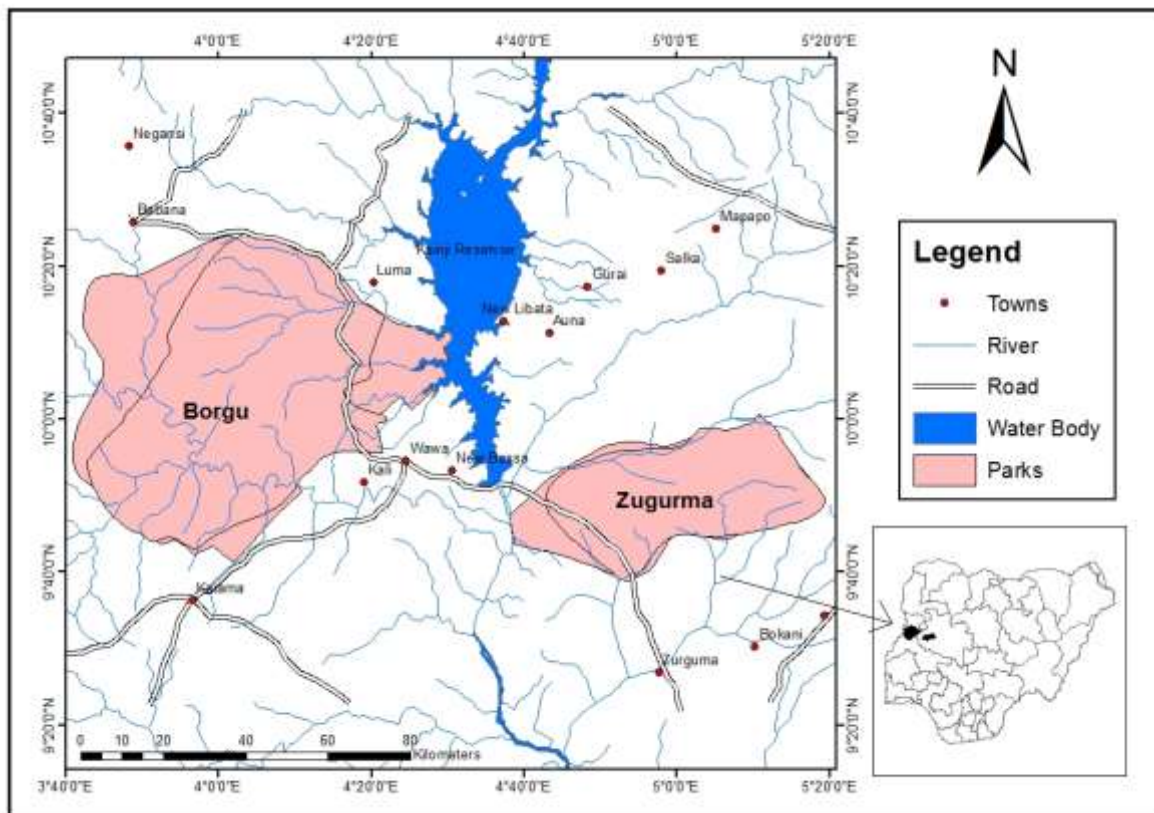


Figure 1: Map of Kainji Lake National Park showing Borgu and Zugurma sectors

Evaporation rates are higher during the drier months with the peak in March /April at the end of the dry season. Lowest evaporation occurs in August during the peak of the rains when relative humidity is at its highest. Drainage system is maintained by five rivers in the Borgu sector, these are Oli, the largest of the rivers, Timo, Menai, Sadoro and Doro rivers. Zugurma sector however is drained with rivers Manyara, Nuwa, Zurugi, Yampere and Lanser with the last two being seasonal.

The vegetation is typical Northern Guinea Savanna, and classified into seven sub-types according to Afolayan (1977) and Milligan (1979) which are *Burkea africana* / *Detarium microcarpum* woodland, *Azelia africana* woodland, *Isoberlinia tomentosa* woodland, *Terminalia macroptera* woodland, *Diospyros mespiliformis* dry forest, *Acacia* 'complex' dry forest and Riparian forest and woodlands. Among the grasses which dominate the vegetation of Kainji lake National Park is *Andropogon*

gayanus, *Andropogon tectorium*, *Hyparrhenia rufa*. The shrub species include *Piliostigma thonningii*, *Strichnos spinosa*, *Gardenia* sps and *Annona selegalensis*.

Fauna species of Kainji Lake National Park include Buffalo (*Syncerus caffer*), Roan antelope (*Hippotragus equinus*), Senegal kob (*Adenota kob*), Lion (*Panthera leo*), Leopard (*Panthera pardus*), Nile crocodile (*Crocodilus niloticus*), Monitor lizard (*Veranus niloticus*), Python (*Python sabae*) among others. Over 180 species of birds have been recorded including such nationally uncommon species as Pink-backed pelican (*Pelecanus rufescens*), African darter (*Anhinga rufa*), Little bittern (*Ixobrychus minutus*, Secretary bird (*Sagittarius serpentarius*) Spotted thick knee (*Berhinus capensis*), Long-tailed nightjar (*Caprimulgus climacurus*), Abyssinian ground hornbill (*Bucorvus abyssinicus*) and Red-shouldered cuckoo strike (*Campephaga phoenicia*). Rare palearctic migrants such as *Falco Subbuteo* and Common

cuckoo (*Cuclus canorus*) have been recorded in this park. The shores of Kainji Lake are wintering grounds for hundreds of palearctic water birds. Twenty eight (28) of the forty two species of the Sudan- Guinea Savanna that occur in Nigeria have been recorded at this site (Birdlife, 2001)

Gashaka Gumti National Park

Gashaka-Gumti National Park is located in the mountainous region of northern Nigeria, adjacent to the international border with Cameroon and immediately to the north of Mambilla plateau. It derived its name from two of the region's oldest and most historic settlements, Gashaka and Gumti villages in Taraba and Adamawa states in the country. (Dunn, 1999). It lies between longitude 11° 11' and 12° 13' East and latitude 06° 55' and 08° 05' North (Figure 2) covering an area of 6,731 Km Sq. Gashaka Gumti has five (5) ranges and a central squad, they are Gamgam; Mayo Selbe; Toungo; Fillinga and Gumti ranges with the central squad.

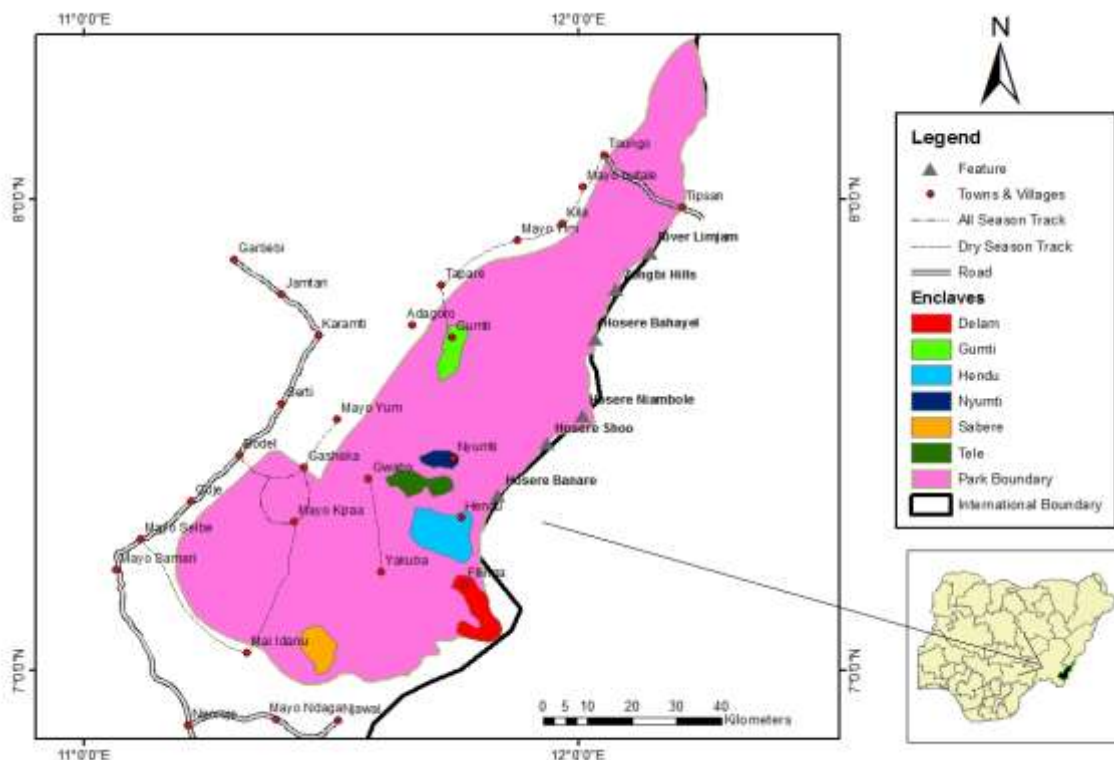


Figure 2: Map of Gashaka Gumti National Park and the surrounding villages

Gashaka Gumti National Park experiences two marked seasons, dry season (November to March) and the rainy season which is from April to October (Chapman & Chapman 2001,

Ogunjemite 2008). Gashaka Gumti area exhibits a climate typical of the Guinea savanna zone although this varies considerably with respect to latitude and altitude. Four major rivers form the drainage system of Gashaka Gumti National Park; Rivers Kam (Mayo Kam), the park's largest river, Gashaka, Gam-gam and Yim which is in the northern sector (Toungo). The major rivers of Gashaka Gumti act as reservoirs of biodiversity, offering ideal and safe habitat to the endangered hippopotamus (*Hippopotamus amphibius*), crocodile (*Crocodilus niloticus*) otters (*Lutra lutra*) and a great number of fish life (Dunn, 1999).

The vegetation of Gashaka Gumti is diverse and composed of four distinct vegetation zones Chapman and Chapman (2001) and Akinsoji (2003), these are:

Savanna woodland: this is divided into: southern guinea savannah woodland, the northern guinea savannah woodland occurring in the southern and the northern part of the park respectively and the scrub savannah.

Lowland rainforests: Emergent and sub emergent tree species with tangles of climbers and secondary colonizers occur here. It is mostly found at the middle altitude with elevations of about 300 meters to about 600 meters within the Park, they are referred to as gallery forests when they occur along river valleys and found to be extensive.

Montane forests: this occur at elevations above 600 meters, and it is found occurring at the same time with

Montane grassland: this is found at the altitudes above 1300meters above sea level in the park, it is created over time by frequent burning of the plateau.

The various vegetation types are home to different populations of rare and endangered fauna species such as chimpanzees (*Pan troglodytes*), colobus (*Colobus* sp) , Golden cat (*Felis aurata*), African civet (*Civettictis civetta*), buffalo, *Syncerus caffer*, waterbuck, (*Kobus defassa*), baboons (*Papio anubis*), western hartebeest (*Alcelaphus buselaphus*), giant eland (*Taurotragus derbianus*); Kobs (*Kobus kob*), red river-hog *Potamochoerus porcus*; giant forest hog (*Hylochoerus meinertzhageni*)

Data Collection and Analysis

A combination of field observation and interview methods were employed to elicit information on the management style adopted in the two protected areas. This was done through visits to the all the ranges of the two parks over a period of four seasons, two wet seasons and two dry seasons. An interview guide based on activities on management of the parks was prepared and used for the interview. It covers burning regimes, schedule of anti-poaching patrol, grading of jeep tracks, buffer zone and boundary management of the parks amongst others. Experienced park officers and rangers in Ecology, Research and Monitoring (ERM) unit of each of the park were designated and involved in data collection. The park protection unit was closely followed during patrols, burning exercises and other activities to have first-hand information on management practices in both parks. Within the ranges, the various activities carried out in managing the parks were noted. Data obtained were descriptively presented.

RESULTS

Active and Passive management

Results showed that eleven (11) major management practices were identified in the two parks, eight (8) active management practices were identified in Kainji Lake National Park, these include buffer zone management; erection of viewing hides; creation of waterholes; reinforcement of anti-poaching with the use of parachute for monitoring illegal entry and activities from the air, research and monitoring, communities conservation awareness through enlightenment, track and road maintenance as well as controlled bush burning. Three (3) other practices were passive in Kainji Lake National Park, these are boundary demarcation, creation of salt licks and transboundary management because it does not share boundary with any other protected area.

However, seven (7) practices were active in Gashaka Gumti National Park and four (4) were passive. Active management activities in Gashaka Gumti National Park are control of illegal activities through anti-poaching patrols, research and monitoring, communities' conservation awareness through enlightenment, tract and road maintenance, buffer zone management, controlled bush burning and transboundary protected area management.

Waterholes creation, creation of saltlicks, erection of viewing hides and parachute patrol due to the mountainous terrain of were passive in Gashaka Gumti National Park.

Active management practices in the two parks are more than passive with 84.21% and 77.78%

active management as against 15.79% and 22.22% passive management in Kainji Lake National Park and Gashaka Gumti National Park respectively as shown in Table 1.

Table 1: Management practices in Kainji Lake and Gashaka Gumti National Parks

Management Practice	Kainji Lake	Score	Gashaka Gumti	Score
Boundary demarcation	X	1	√	2
Buffer zone management	√	2	√	2
Controlled bush burning	√	2	√	2
Creation of salt lick	X	1	X	1
Creation of artificial waterholes	√	2	X	1
Track, trail and road management	√	2	√	2
Anti-poaching patrol	√	2	√	2
Research and Monitoring	√	2	√	2
Parachute patrol	√	2	X	1
Erection of viewing hides	√	2	X	1
Transboundary management	X	1	√	2
% Active management		84.21%		77.78%
% Passive management		15.79%		22.22%

Key: √ = Active management = 2

X = Passive management = 1

Creation of Waterholes

The two National Park had natural waterholes while only Kainji Lake had constructed/artificial. Kainji Lake National Park had the highest waterholes with a total of 41, 35 natural and 6 artificial/constructed (Table 2). A total of 32 natural waterholes

were identified in Gashaka Gumti National park, there were however no created/artificial waterholes. This could probably be due to the terrain of Gamgam which was mountainous, however only natural waterholes were observed in Gashaka Gumti National Park.

Table 2: Waterholes in the Kainji Lake and Gashaka Gumti National Parks

Park	Natural	Artificial	Total
Gashaka Gumti	32	Nil	32
Kainji Lake	35	6	41

DISCUSSION

Five management practices were similar in the two Parks; both parks carry out the same management activities for vegetation and

habitat improvement with exception of a few activities that are peculiar to each of the park because of location and terrain. This may be as a result of the parks being under the same

administration, the Nigeria National Park Service. The higher percentage of active type of management is in agreement with Borza and Vancura (2009) who reported that certain areas require active management interventions to maintain specific biodiversity values.

Artificial waterholes were created at strategic points in both Borgu and Zugurma sectors of Kainji Lake National Park to mitigate drought and prevent animals from moving too far before getting water during the dry season.

Burning is an annual management practice in the two national parks. The study showed that two burning regimes were established for managing the wild during the peak of the dry season. This is to prevent wild fire which may be destructive to the vegetation and the animals as well as to allow and enhance visibility during game viewing when tourists visit the parks.

Saltlicks and waterholes are areas of importance for management of the parks because of the concentration of game at these points for essential minerals and water during the dry season. Due to the fact that poachers often seize the opportunity of animals around salt lick and waterholes to hunt, protection efforts were observed to be intensified around salt lick areas in Gashaka Gumti National Park, tents were pitched by park wardens and rangers around this area to give added protection to the resources. Animals whose activities were observed around this area include Warthog, Buffalo, Waterbuck, Kobs, Red flanked duikers and Kobs. Although saltlicks were not created in any of the park, the additional protection given to this area in Gashaka Gumti National park was recorded as a management effort towards effective protection. Saltlicks areas were not given additional protection in Kainji Lake National Park

Increasing population of dwellers around support zones of the parks put further threats on the animals in search of water especially during the dry season. Creation of waterholes was therefore accorded one of the topmost priorities among management practices in Kainji Lake National Park to prevent animals from straying too far from the park and buffer zones in search of water especially in the Zugurma sector

although the waterholes were not limited to Zugurma sector, This management practice was in response to the recommendation in the 2006 management plan of Kainji lake National Park to create waterholes for animals. Waterhole creation was not an active practice in Gashaka Gumti National Park probably due to the many rivers which are available for animals.

Park tracks and trails were observed to be graded once a year especially after rains. In Gashaka Gumti National park, the road networks for park protection and game viewing were maintained during the study period. Information gathered from park engineering section revealed that accessible roads within the park are annually graded for easy accessibility by tourists. New jeep tracks were opened, of note is the one along Mayo Kam, the biggest drainage of Gashaka Gumti National Park and were observed graded throughout the period of the study. New culverts and bridges were constructed during the study period in Gashaka Gumti National Park. This was to allow easy access into the ranges during the raining season; trails within the arboretum were also observed maintained during visits to the park. Kainji Lake National Park also maintains the tracks and trails but this was not on annual basis.

Protection activities in the parks were given utmost priority as poaching and illegal activities were threats most prevalent in the parks. Patrol is rotated among protection staff, and this is carried out from the various beats, posts, ranges, sector and the central squad as the case may be. A patrol team usually consists of at least three to seven park rangers keeping surveillance on the protected areas within a particular jurisdiction for a week after which another team takes over. Shifting among protection staff is done for patrol activities however, the peculiarity of each range and the season determines intensity of patrol activities. It was gathered that illegal activities within the park is higher in the dry season hence surveillance of the parks was more intense during this period. Anti-poaching patrol is an active management activity in the two parks. Monitoring of illegal activities from the air with the use of parachute was an advantage that

Kainji Lake has over Gashaka Gumti National park. This patrol activity was also possible due to the terrain of Kainji Lake which is different from the mountainous type of Gashaka Gumti. Research and monitoring activities are active management practices in the parks. Both Kainji Lake and Gashaka Gumti National Parks have research units which oversee all research being carried out both by researchers from institutions in the countries and those from other countries. Viewing hides for observation of animals during game viewing and research purposes is active in Kainji Lake National Park but was not active in Gashaka Gumti National Park. This could be attributed to the mountainous terrain of the park which already makes it possible for animals to be observed without having to climb.

Transboundary management of the park is active in Gashaka Gumti National Park due to the shared boundary it has with Faro National Park. The unique montane ecosystems of Gashaka Gumti, Faro and Tchabal Mbabo National Parks with associated fauna and flora are the focus for which the transboundary project was launched. The transboundary arrangement aimed at protecting resources in the region which include the Nigerian - Cameroon chimpanzee, hyena, and the unique montane forest which acts as pleistocene refugia to the high-level biodiversity of the region which include forest, savanna and other endemic plants and animal species. The border

between these parks was observed to be under surveillance and patrol in order to guard against inimical activities threatening these resources.

Among the activities observed for the transboundary management of Gashaka Gumti and Faro National Parks is the working alongside local communities to boost conservation efforts of the area for effective protection, increased community awareness in the border area and the park guards working with traditional authorities and community groups.

CONCLUSION

The study has shown that both active and passive approaches of management are practiced in Kainji Lake and Gashaka Gumti National Parks with active approach of management being higher than the passive. The two parks are of great biological and sociological importance and their design and planning for delivery of conservation objectives were in accordance with international standards. Although indication from knowledge and experience in protected area management has shown that passive and non-intervention management is a cheaper way of managing areas designated for research and wilderness which are among the objectives for category 11 protected areas. However, active management is needed for improvement of services such as game viewing, accommodation for tourists and ecosystem restoration.

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