Applied Geography 29 (2009) 260–268

Contents lists available at ScienceDirect

Applied Geography

journal homepage: www.elsevier.com/locate/apgeog

Repositioning zoogeography within the nature–culture borderlands: An animal geography of reptiles in southern Ghana

Michael Campbell*

Department of Geography, Thompson Rivers University, Box 3010, 900 McGill Road, Kamloops, BC V2C 5N3, Canada

Keywords:
Reptile
Zoogeography
Livelihoods
Ghana
Animal geography

ABSTRACT

Few studies examine the impact of large reptile presence on local livelihoods in West Africa. This article investigates how land users share habituated and resource areas with pythons, cobras and monitor lizards in southern Ghana. An innovative animal geography approach is used, evaluating both reptiles and people as individually active subjects, this being combined with a positivist zoogeographical and landscape analysis. Cobras, pythons and monitor lizards significantly affected local livelihood decision-making. Reptiles, especially cobras and monitors also adapted to human behaviour by foraging in settled and farmed areas, despite significant losses of dense vegetation habitat over the study period. This study of reptiles as active adapters adds new insights to reptilian zoogeography and conservation policy.

Introduction

Large reptiles in West Africa are feared, respected and even combated by people, these animals being perceived as bushmeat, leather sources, predators, dangerous pests, landuse hindrances and manifestations of evil (Bennet, 2002; Bennet & Takoordyal, 2003; Gorzula & Oduro, 1997; Jenkins & Broad, 1994). Reptilian foraging and habitat spaces in human landscapes increase conflict possibilities. However, few studies have investigated the adaptation of reptiles to human presence and land cover changes, and human reactions to reptile presence (Emel, Wilbert, & Wolch, 2002; Johnston, Gregory, Pratt, & Watts, 2000). Contrasting ecological and social studies fail to evaluate animals as the active subjects within human modified and intensively used areas. For reptile studies, classical zoogeographical works use ecological data field techniques, landscape mapping and generalised statistical models (Bennet & Takoordyal, 2003; Wilson & McCanie, 2004). Landuse studies describe socio-cultural and economic patterns, and sometimes animals as objects in human spaces (Wolch & Emel, 1998).

This provides the rationale for an 'animal geography' approach within human geography, which may complement the classical, positivist zoogeography by evaluating animals as active subjects, rather than passive objects, in human spaces (Bennett, 1960; Philo, 1998; Wolch & Emel, 1998; Yarwood & Evans, 2000). Agency is attributed to 'non-human actants' (Whatmore 1999; 27) (possibly animals) opening more possibilities for the documentation of individual and unique behaviours, otherwise overlooked by statistical generalisation. From this perspective, reptilian presence and adaptive behaviour would be one factor for human decision making. Human behaviour would also be a factor for reptile ecology. Linked to a more positivist zoogeography, this integrative approach may produce a 'new' zoogeography capable of more comprehensive documentation of human-animal relations (Wolch & Emel, 1998).

In West Africa, human–reptile contacts are important in cultural and natural landscapes (Akani, Barieenee, Capizizi, & Luiselli, 1999; Akani, Luiselli, Angelici, & Politano, 1998; Luiselli & Angelici, 2000; Luiselli, Angelici, & Akani, 2001). Reptiles

* Tel.: +1 250 220 3434.
E-mail address: ecol55@hotmail.com.

0143-6228/$ – see front matter
doi:10.1016/j.apgeog.2008.09.001

may affect human behaviour in areas of habitation, food cultivation and/or recreation (Campbell, 1998). Such contacts are nevertheless less studied than those with mammals (Campbell, 2005a; Mendelson, Cowlishaw, & Marcus Rowcliffe, 2003; Ntimoah-Baidu, 1998). In Ghana (population 20 million, area 238,540 km^2 Central Intelligence Agency; CIA, 2004), large reptiles have been described as important in rural areas, especially in forested areas (Bennet, 2002; Bennet & Akonnor, 1995; Gorzula & Oduro, 1997; Yeboah, 1993). In the more intensively utilised savanna areas, increased farming and wood cutting has created more possibilities for human-wildlife contact (Bennet, 2002; Ghana Northern Savanna Biodiversity Conservation Project, GNSBCP, 2001).

The coastal savanna of Ghana is a particularly neglected area for ecological and socio-environmental studies (Campbell, 2005a, 2005b; GNSBCP, 2001). Situated around Accra, the largest city in Ghana, the coastal savanna is possibly the most intensively managed area of the country. Economic activities include irrigated and rainfed farming, wood harvesting, hunting and trading (Elliott & Campbell, 2002; Federal Research Division, 2005). Large reptiles, mostly snakes and monitor lizards, are fairly common (Bennet 2002; Bennet & Akonnor, 1995). A few studies describe human–reptile interactions as important (Campbell, 1998). However, most studies of this area ignore human–reptile interactions, focusing instead on small mammal ecology, bushmeat extraction, other protein sources such as fish and livestock, and/or general environmental degradation (Cowlishaw, Mendelson, & Rowcliffe, 2004; Elliott & Campbell, 2002; Federal Research Division, 2005; Mendelson et al. 2003; Ward, Bortey, & Willingham, 2004; Watson & Brashares, 2004). The purpose of this paper is to examine the extent of human–reptile interaction in the coastal savanna, and the animal geography approach as an innovative evaluation methodology.

Methodology

The field survey period was from May 1995 to November 1996, and from April to June 2000. The study area covered 30 km^2, 20 km west of Accra. It was randomly selected from a survey of the coastal savanna from Accra to the western edge of this vegetation type (Fig. 1). The population of the study area is over 8000 (Census Report, 2002). Despite the proximity of Accra, it is strongly rural, with most people engaged in primary activities. The research design divided the study area according to landuse, to investigate possible differences in human–reptile interactions in areas of differing landuse intensity and landscape features. There were four areas: (1) the village and non-cultivated village margins; (2) the irrigated farms; (3) the rainfed farms; and (4) the non-cultivated dense vegetation, a source of fuel wood, new farmland and hunting opportunities. For the reptile survey there were forty observation points in each of these areas. The observer stood at each point for at least 3 h, at least 10 times, counting all reptiles seen between 8.30 am and 6.30 pm (the main period of human landuse and other disturbing behaviour). Further counting points were used where vegetation or built features obstructed vision. Sightings were included in the analysis where species were identified. Reptile behaviour was measured by number of sightings, movement of the animals (resting, retreating, and feeding) and the dominant cover in an area 10 $\times$ 10 m around the sighted reptile. Three species were used in the analysis, due to their common status: the monitor lizard *Varanus niloticus*; the African rock python *Python sebae* and the spitting cobra *Naja nigricollis*.

A vegetation survey used one hundred 100 $\times$ 100 m quadrats. All the villages are (Fig. 1) surrounded by belts of dense tree/shrub vegetation, 10–30 m wide. Rainfed and irrigated farms are 1–5 ha plots with dense, 2–5 m wide, tree and shrub margins. The non-farmed areas were mostly tree stands, with mixed shrubbery. Trees refer to plants with a distinct bole, 5 m or more in height. Common trees were neem *Azadirachta indica*, mango *Mangifera indica*, and *Fagara zanthoxyloides*, and grasses included *Andropogon guyanus* and *Panicum maximus*. This survey was linked to a GIS (ArcView 3.3 and IDRISI 3.2) analysis of satellite images (Landsat TM, SPOT) covering the entire area, and black and white panchromatic aerial photographs dated 1960, 1986 and 1996 with partial coverage (Fig. 1). Using image features and field information, land cover maps were created by digitising tree/shrub, farm/grass and settlement categories. The area of these land cover types was calculated for 1960 and 1996 for change detection and measurement. Rainfall data was obtained from the Meteorological Services Department in Accra, to compare with local opinions on rainfall change. The data was analysed using Microsoft Excel, and depicted as a line graph.

Approximately 400 people were contacted, individually and in groups, using informal interviews, discussions, activity observations and note taking. The survey protocol involved random selection within areas where activities were practised (farms, hunting grounds, firewood extraction areas, beaches, settlement markets and homes). Interviewees were followed to other sources of information, creating a locally constructed information network. Each person was interviewed at least three times to allow for seasonal and opinion changes. Discussions were concerned with three main topics; (1) sightings of reptiles; (2) incidents between people and reptiles; and (3) longer term impacts of reptiles on people's behaviour and livelihoods. The number of sightings per person was recorded, to determine if most people saw many or few reptiles and whether these observer variations could be distinguished by gender or age. People's descriptions of reptile behaviour were classified into: reptiles retreating on sight, indifference to human approach, approaching people and aggressive attacks. Human reactions to the reptile behaviour were categorised progressively by interviewees into: ignoring the reptile, clapping and stomping, moving a few feet away, leaving the area entirely and refusal to re-enter the area. This classification was used in the analysis. Longer term impacts of reptiles on people were measured according to livestock killed, and decisions on landuse related to the reptile presence. The interviewees were classified according to gender, as some livelihoods were male (hunting, fishing) or female dominated (food trading), or gender neutral (farming, wood cutting). It was also important to determine if reptile presence had different effects on the resource decisions of men and women. Interviewees were also classified according to age ($\geq$40, $<$40) to determine generational change in such behaviour (males $\geq 40 = 98$, $<40 = 118$; females $\geq 40 = 77$,