CONSERVATION ATTITUDES AND PATTERNS OF BIODIVERSITY LOSS IN THE OHANGWENA AND OSHIKOTO REGIONS OF NAMIBIA

A research thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Conservation Biology at University of Namibia

By

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Abstract

Biodiversity loss discussions are usually characterised by broad ranging views. Patterns of wildlife decline and attitudes towards conservation have received minimal attention in the north central communal areas of Namibia. Wildlife decline has been primarily attributed to life styles, climatic change and the disruption to conservation activities during the war for independence (1966 – 1989). This thesis examines attitudes towards wildlife and conservation, and patterns of biodiversity loss in areas of low and high human densities in the north central communal areas of Namibia, between July 2003 and May 2004. The stratified sampling method was used to investigate attitudes and biodiversity loss within the Eengodi, Epembe, Ongenga and Omuntele constituencies, where 119 households were interviewed. Results indicate that predators are perceived as vermin, with over two-thirds of interviewed households not wanting predators on farmlands. Communities located closest to parks had a higher incidence of negative attitudes towards wildlife, probably due to incursions by conflict animals from the park. Non-consumptive values of wildlife ranked highest on the list of primary benefits of having game animals on farmlands. The study shows a persistent decrease in biodiversity for surveyed constituencies. Large mammals were impacted first, with an 88% decline in sightings over the past three decades. Respondents reported 21 species present in the region; however, areas settled for more than 40 years reported no large mammals. Respondents reported a lack of coordination in conservation efforts; of 89 households practicing wildlife conservation, only 20% coordinated these practices with other community members. Respondents felt that wildlife could be conserved if every individual accepted the responsibility for protecting it. Given the lack of coordination and structure of conservation efforts in the region, the implementation of some form of structure, which promotes community-based natural resource management, such as establishing communal conservancies, could reverse the decline in wildlife.

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Declaration

I, Josephine Ndimulipeni Henghali, hereby declare that this thesis is my own original work and that this document has not previously in its entirety or part been submitted at any university in order to obtain an academic qualification. No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any other form, or any means (e g. electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the author, or the University of Namibia on her behalf.

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CHAPTER 1

INTRODUCTION TO THE STUDY AREA

1. Regional geography

The regional geography highlights physical features such as biogeography (flora and fauna), size and human density, which relate to the economy and the infrastructures of the area. The study area is located in the Ohangwena and Oshikoto Regions, but the description of the regional geography embraces all four Regions (Ohangwena, Omusati, Oshana and Oshikoto), as all these Regions were treated as one homeland before independence. This chapter introduces the main features of the study area to the reader and provides the background necessary to understand the problems addressed in the thesis.

1.1 Physical features

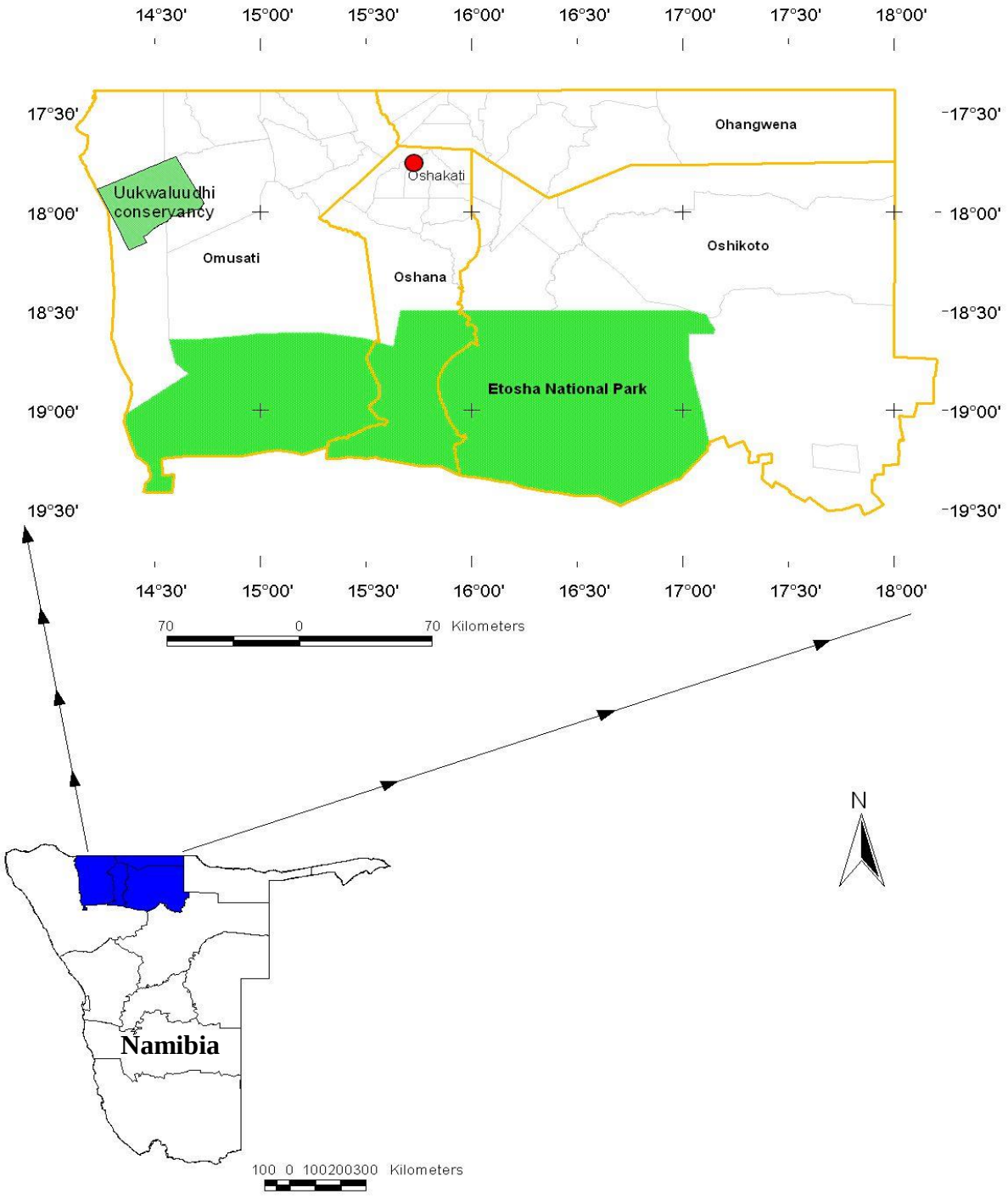
The north central communal areas of Namibia (i.e. the Ohangwena, Omusati, Oshana and some parts of Oshikoto Administrative Regions) are located between 14º and 18º south and 17º and 19º east (Fig. 1). The area borders Angola in the north, where people and both domestic and wild animals move freely between the two countries. The southern boundary of the study area borders the Etosha National Park, and wildlife is known to move out of the park into these areas despite the fence, which marks the park's boundaries (Berry 1997; DANC 1984, 1985). There are higher concentrations of wildlife in the Kunene region in the west, where several communal conservancies have been developed (O'Riordan and Stoll-Kleemann 2002). In the

east, where the north central communal areas border with the Kavango region, limited wildlife has been reported (DANC 1984).

The north central communal areas are semi-arid with scarce and erratic precipitation; rainfall varies in amount, distribution and timing. The average rainfall ranges from 300 mm in the west to 500 mm in the east (Quan and others 1994a). The rainy season lasts from October until April with the peak in February. The highest recorded rainfall was 1 022 mm in 1950 and the lowest was 40.5 mm in 1987 at Ombalantu in the Omusati Region (Namibia Meteorological Service's records between 1930 and 2001). Periods of low rainfall, lasting as long as four to nine years or more are a frequent occurrence in the north central communal areas, when compared to rainfall data for the entire country. The region has a mean annual evaporation of 2 800 mm in the west and 2 600 mm in the east (Barnard 1998).

The temperature ranges between –3 °C to 40.2 °C, with day and night temperatures varying substantially (Erkkilä and Siiskonen 1992; Namibia Meteorological Service's records between 1944 and 1985). In winter, the night temperatures drop below 7 °C with a mean of 4.18 °C (± 5.85) and frost occurs occasionally, while the day temperatures may reach 35 °C with a mean of 30.7 °C (± 3.38). The months of October, November and December are the hottest with a mean temperature of 36.4 °C (± 3.4)

Figure 1: The location of the study area.



Note: Thick yellow lines represent regional boundaries while thin grey lines represent the boundaries of the constituencies.
Source: Own data compilation

The soils of the north central communal areas are comprised solonetzic, halomorphic, lithosols, planosolic and arenosol soil types, typically as sandy and thin topsoil overlying sodic horizon (Barnard 1998; Janson 1991). The flood pans ("*oshanas"* in local language) are characterized by thin topsoil with slow water penetration, which plays a role in the standing water of the *oshanas*. In the woodland parts of north central communal areas, the sandy soil is up to 300 meters deep, with weak cohesion and high absorptive capacity (Erkkilä and Siiskonen 1992; UNIN 1986). The soils are poor in both humus and other plant nutrients (especially phosphorus) and are highly susceptible to erosion (Barnard 1998; Janson 1991).

Water is a limited resource in the north central communal areas. The only natural permanent water source is the perennial Kunene River to which few people have access. During the rainy season, water accumulates in the *oshanas*. A combination of local rains and heavy and widespread runoff from rains in Angola cause the periodic floods, also called *efundjas,* that flow into the *oshanas*. These floodwaters then boost the recharging of the underground water systems (Erkkilä and Siiskonen 1992). During the dry season, people and their livestock depend on water delivered by pipeline from the Kunene River at the Calueque water station, and water extracted from shallow aquifers through shallow dug wells, and boreholes (Quan and others 1994b; UNIN 1986).

1.2 Biogeography

Vegetation consists of dry woodlands, seasonal inundated grasslands and palm-marula mixed woodlands (Quan and others 1994b; Barnard 1998). The western part of the north central communal areas is dominated by mopane tree (*Colophospermum mopane*) savannah. Seasonal inundated grass plains characterize the central parts with marula (*Sclerocarya birrea*) and real fan palm trees (*Hyphaene petersiana*), while the eastern side is dry woodland occupied by *Burkea Africana, Pterocarpus angolensis, Terminalia sericea, Acacia erioloba* and *Combretum* species (Janson 1991). The dwarf shrub savannah fringed with halophytic species typifies the south-central part. The vegetation of the area has been and remains threatened by clearance for agricultural land, collection of large amounts of wood for traditional Owambo building and fencing methods and overgrazing (Quan and others 1994b). The most advanced depletion of vegetation was noted in central Cuvelai, which is a floodplain as well as the most densely populated area (Ashley 1994; Quan and others 1994b).

The north central communal areas of Namibia were once home to a rich and diverse assemblage of wildlife species, largely due to higher rainfall in the area compared to southern parts of the country (UNIN1986). However, these areas are currently ranked as high in mammal richness but poor in numbers of all wild mammals compared to all other communal lands in Namibia (Barnard 1998). Wildlife populations that historically roamed freely in the dry woodland and seasonally inundated grassland habitats of these regions have declined dramatically (Comley and Meyer 1997; Quan and others 1994b). DANC (1984 and 1985) states that the

assessment of wildlife numbers and distribution in the north central communal areas was not possible during the war for independence between 1966 and 1989, when circumstances hampered formal game patrols.

However, assessments conducted after the war indicated that the wildlife populations and ecological integrity in these communal areas have been eroded through a combination of factors, including land clearing for crop production, gathering of wood for fires and building materials, and livestock overgrazing, resulting in habitat loss and fragmentation.

The Oshiwambo-speaking Namibians, like other cultures throughout the world, have long been dependent on their environment for food and shelter. Hunting activities produced game meat that served to augment other food sources. Wildlife also provided hides, skins and horns, which were used for clothing and tools (Williams 1994). Shakujungua (1991) points out that traditionally Oshiwambo-speaking language groups prefer eland (*Taurotragus oryx*) meat and bone marrow (locally known as *omukopwingo*) to any other game meat.

In Oshiwambo tradition, the hunting expeditions are overseen by the chief, who is responsible for opening seasonal hunting grounds at the beginning of the dry season (Williams 1994). This traditional hunting season matches current modern hunting law that, according to UNIN (1986), is restricted to the months of June and July. The traditional hunting tools of the local people, including dogs, pitfalls, and bow and

arrow, harvested a significantly lower number of animals, thus contributing tosustainable utilization of game species. Once superior weapons were introduced by the industrial world harvests increased substantially and game species went into sharp decline.

The western central administration deprived the communities of ownership rights over wildlife utilisation since 1884 (Marker and others 1996). In the absence of community control over wildlife utilisation, individuals began utilizing natural resources unsustainably. Public utilization was prohibited and coordinating joint hunting operations was probably impractical. Van den Breemer and others (1995) explain a similar situation in Zimbabwe, where game was legally a no-access resource. In practice, however, wildlife became open-access and was exhausted. Quan and others (1994b) describe the situation as follows: "The general open access conditions on the rangelands encourage everyone to act for themselves, and to make use of whatever pasture and wood resources they can, while it is available".

1.3 Human densities

The north central communal areas occupy 56 118 km^2 of Namibia, and are the most populous areas with 778 857 people, comprising 43 % of the national population (Erkkilä and Siiskonen 1992; Friedrich 1997; NPC 2001). These communal areas are further divided into 40 electoral constituencies with 127 925 households. The sizes of the electoral constituencies range from 209 to 13 391 km^2 each, and

household densities range from 0.35 to 10.87 households per square kilometre (NPC 2001).

Barnard (1998) indicates that cattle-owning pastoralists, ancestors of today's Herero and Oshiwambo (also called Aayamba)-speaking Namibians, immigrated into the area between the tenth and seventeenth centuries from east-central Africa. Today, the rural residents of these areas are mostly Oshiwambo-speaking Namibians, consisting of seven language groups: Kolonkadhi, Kwaluudhi, Kwambi, Kwanyama, Mbalantu, Ndonga and Ngandjera. Although these people have mingled over the years, the boundaries of their dialect districts are still respected and each language group has its own chief (Williams 1994).

1.4 Economic activities and infrastructures

The north central communal areas of Namibia are characterised by mixed subsistence farming comprising of dry land cultivation and livestock rearing. The land is portioned in two-to-three hectare cultivated plots, with homestead and communal grazing portions that are mainly less arable land (Quan and others 1994b). The accommodation of an ever-increasing human population has caused successive sub-divisions of cultivated plots and subsequently has led to severe environmental degradation (Janson 1991).

The systemized herding of cattle in shifts by a number of households is an important co-operative effort that effectively strengthens the manpower available to individual

households. The raising of livestock is primarily a man's responsibility and a number of households cooperate, with the men taking cattle-herding shifts during the rainy season and shifts to look after cattle at cattle posts during the dry season (Pallett 1994; Schneider 1994). On their off days, the men or boys from each household help with household activities that would not be possible if every household looked after its own livestock every day (Schneider 1994).

Crop cultivation is always a stationary activity around the homesteads, while cattle rearing moves regularly between heavily populated and overgrazed areas and peripheral areas. Cattle are sent out to cattle posts in less populated areas around April/May and brought back in October/November, when oxen are needed for ploughing.

The construction of the Etaka canal, the distribution of pipeline systems in some parts of the north central communal areas, as well as the exclusion of grazing cattle in Angolan pastures, have had negative effects on strategic practices (i.e. one man having cattle on several cattle posts to minimize the loss of cattle through drought periods and disease outbreaks) [Schneider 1994; UNIN 1986]. The recent practice of individual farmers fencing off large grazing portions of communal areas has interfered with seasonal grazing patterns that have been applied over the years, and have exacerbated the land pressure in the remaining communal lands (Quan and others 1994b; Schneider 1994). These modern practices of establishing permanent water points, fencing off larger tracts of communal lands for private grazing and the

cutting off of Angolan grazing lands by demarcated Angolan and Namibian border, increased overgrazing in the area (Pallett 1994).

The primary economy of the Oshiwambo-speaking language groups consists of subsistence farming. Every homestead in rural areas acquires a plot for dry-land cultivation through communal land tenure. Pearl millet *(Pennisetum glaucum),* also called *omahangu* among the Oshiwambo-speaking language groups, is the staple food in the area. The Oshiwambo-speaking language groups also nurture various cultivars of sorghum (*Sorghum africana*), cowpeas (*Vigna unguiculata*), groundnuts (*Arachis hypogaea*), barmbara groundnuts (*Vigna Africana*), pumpkin (*Citrullus lanatus*) and a variety of melons that supplement the staple food (*omahangu).* The cat's whisker/spider flower (*Cleome gynandra*) and pigweed/cockscomb (*Amaranthus thunburgii*), also collectively called *ombidi/omboga* by these language groups, are indispensable vegetables that compliment *omahangu* porridge, and they are accessible to almost everyone in the rural areas during the rainy season.

The north central communal areas fall into the State Veterinary (SV) District Ohangwena, Omusati, Oshana and Oshikoto, formerly called Owambo SV district. In 2004/5, the numbers of livestock reported in this SV district included 685 285 cattle, 646 784 goats, 25 680 sheep, 401 130 poultry, and 78 778 donkeys (Bishi 2006). Individuals obtain livestock through inheritance and bartering. Livestock, primarily cattle, is the most important economic factor because it is inheritable. The household's herd of cattle serves as the stock of wealth, source of milk, meat, traction

that refers to ploughing as well as other draught work and manure for fertilizing the field crops of the family (Barnard 1998; Pallett 1994). According to traditional law, land is not inherited; instead a headman re-sells the plot of a dead man through communal land tenure.

Since the arrival of westerners in the country, Oshiwambo-speaking language groups started working as migrant labourers in mines, on white owned farms and in public sectors in central and southern parts of the country. The migrant labour became an important component of their economy, although it increased the burden on women forcing them to take over men's responsibilities in the household (Schneider 1994). This trend of migrant labour reached an advanced stage, in which many men of working age were not only kept away from rural areas, but more importantly, their acquired skills were not being disseminated back into the grassroot communities and were utilized elsewhere.

In the north central communal areas, the equal accessibility to infrastructures is generally hampered by scattered human settlement patterns that do not form distinct villages like in other communal areas in the country (Owambo Roads Master Plan 1992). For example, the Ministry of Works, Transport and Communication (May 1999) reports that paved road networks covered a distance of 622 km in the north central communal areas while gravel road networks covered 1 101 km. Electricity, education, communication, transport, banking and health infrastructures also are insufficient in the area. These facilities are mostly available in urbanised centres and

accessed easily only by households that are located along the tar roads (NDP2, 2001/2002- 2004/2005). The northeastern part of the area is severely underdeveloped, and about two-thirds of the people walk more than 5 km to the nearest health facility. Some areas do not even have radio reception (NDP2, 2001/2002- 2004/2005).

CHAPTER 2
HABITAT CONDITIONS AND RESEARCH OUTLINE

2.1 Presenting environmental perspectives

Human-wildlife conflicts are of increasing concern to people practicing sustainable land use in present-day society (Fiedeldey and others 1998; Messmer 2000). Barnard (1998), Soulé and Sanjayan (1998) describe that in Namibia, up to 90 % of large wild mammals live outside protected areas on farmlands where the interaction of these animals and people is very frequent. The attitudes and perceptions of local people towards wildlife and conservation were little known in the north central communal areas of Namibia, which accommodates 43 % of the national population. In these communal areas, which comprise the Regions Ohangwena, Omusati, Oshana and some parts of Oshikoto and make up 7 % of the total land surface, the level of co-existence between people and wildlife was not previously investigated. Drought, disturbance of wildlife migrating routes, clearing of the land for crop production, tree felling for building materials, hunting, overstocking and increased human population and settlements appropriated niches previously filled by large mammals in these areas (Barnard 1998; Quan and others 1994a; Swanson 1997; Tarr 1997). The socio-cultural aspects of wildlife that attracted people to settle in these areas of the country, as described by Williams (1994), were not appraised after 1995, when communal communities were granted rights over wildlife utilisation through community conservancy agreements. Thus, there is a need to measure the wildlife tolerance in north central communal areas and to identify its impact on wildlife decline and conservation.

While wildlife decline has been discussed in the north central communal areas of Namibia, the key time periods of its decline were not analysed in the last three decades. The north central communal areas of Namibia served as a war zone during the war years and that circumstance hindered the formal patrols of Nature Conservation personnel (Maletsky 2005; DANC 1984). There is also little information on current wildlife distribution in these communal areas.

The lack of information regarding attitudes and perceptions towards wildlife and conservation, the key time periods of wildlife decline, and the current distribution of wildlife in the north central communal areas of Namibia motivated the assessment of these three topics. Structured personal interviews were conducted in the Ohangwena and Oshikoto Regions to identify the potential of the north central communal areas for the rehabilitation and maintenance of essential ecological processes and life-supporting systems, by integrating cultural and biological aspects into natural resource management.

The term “wildlife”, as used in this research, refers to mammalian wildlife and a few large avian species including ostrich (*Struthio camelus*), ground hornbill (*Bucorvus leadbeateri*) and guinea fowl (*Numida meleagris*). The researcher acknowledges and respects the equal importance of all components of wildlife classes, but their inclusion is beyond the capacity of this study.

2.1.1 Physical aspects and land tenure

Namibia is known for its arid ecosystems. Sixteen percent of the 824 200 km² total area of the country is hyper-arid and unsuitable for agriculture of any kind (Marker and others 1996; Barnard 1998). The land is currently divided into five major land use categories: 43 % freehold rural land (commercial farmland), 39 % communal farmland, 14 % national parks, 3 % diamond area and 0.7 % urban land (records of Ministry of Land, Resettlement and Rehabilitation 2004; Namibia Agricultural Union 2004). The division of land use as commercial, communal and national parks is illustrated in Figure 2. For centuries, people in Namibia have relied on ecosystems to meet their basic human needs such as food, water and shelter. This makes it crucially important to sustain these natural ecosystems for human livelihoods and indeed, human survival (Barnard 1998). In the north central communal areas of Namibia, where half of the national population resides, socio-economic and political factors have exerted significant pressure on wildlife, resulting in unsustainable land use practices over the last six decades (Ashley 1994).

Although Namibia gained independence in 1990, a painful human history of colonial government and apartheid engineering has moulded current land ownership and socio-economic patterns. Consequently, two strikingly different types of land ownership characterize the land management activities outside of protected areas today: single owner commercial farmlands and cooperatively leased communal farmlands (Figure 2). Commercial farmlands are mostly owned by local white commercial farmers, with livestock production being the dominant economic activity

(Ashley 1994; EIU 1995; Hunter 2004). The colonial regimes designated the communal farmlands for collective use (primarily subsistence livestock and crop production) by local black communities that include Ovawambo, Herero, Damara, Nama, Okavango, San (bushmen) and primarily Lozi speaking people of the Caprivi Region.

Historical processes that have formed current land ownership patterns include land conflicts, which resulted in the relocation of black communities to marginally habitable areas most were subjected to the effects of the veterinary cordon fence, designed to control the spread of cattle diseases from northern farmlands to southern farmlands in Namibia. As a result, the more productive and disease-free areas were allocated to white settlers, while more marginal areas became communal farmlands for black Namibians (Adams and Werner 1990; Quan and others 1994a). The expropriation of more arable lands by European settlers, and the relocation of black people on less fertile lands was intentionally plotted to provide whites with more productive land and force blacks into cheap labour on the white-owned farms (Hunter 2004).

2.1.2 Wildlife distribution

Namibia has a wide variety of wild mammals; over two hundred mammal species are believed to be indigenous (Barnard 1998; Schoeman 1988). Namibia supports 24 % of the African continent's mammal species diversity. The country possesses approximately 20 % of the world's population of free-ranging cheetah (*Acinonyx*

jubatus) and Africa's largest population of unfenced black rhinoceros (*Diceros bicornis bicornis*), which is approximately 97 % of the world's population of this subspecies (Barnard 1998; Marker and others 1996). The black-faced impala (*Aepyceros melampus petersi*) is endemic; and the Kaokoveld elephants (*Loxodonta africana*), known as the desert dwelling elephants, have adapted exclusively to Namibia's arid conditions and are considered a unique population (UNIN 1986).

Namibia has unique patterns of mammal distributions. For instance, the Namib Desert, one of the world's oldest deserts, is the only desert that harbours elephant, rhino, lion (*Panthera leo*) and giraffe (*Giraffa camelapardalis*) [Schoeman 1988]. Apart from the Namib Desert and adjacent arid areas in Kaokoveld and Damaraland these four species are found primarily in several game parks, reserves and game farms. The gross distribution of wild mammals is distinguished by low richness in the southwest, with the lowest rainfall, and high richness in the northeast, with the highest rainfall patterns (Barnard 1998; UNIN 1986). Some species such as kudu (*Tragelaphus strepsiceros*), oryx (*Oryx gazella*), common duiker (*Sylvicapra grimmia*) and steenbok (*Raphicerus campestris*) are naturally found in most parts of the country, while lechwe (*Kobus leche*), tsessebe (*Damaliscus lunatus*), roan (*Hippotragus equinus*) and waterbuck (*Kubus ellipsiprymnus*) concentrate only in the more humid north-eastern parts of Namibia (Erb 2004; Comley and Meyer 1997). During the war, the distribution and number of wildlife were not monitored continuously in north central communal areas due to circumstances that hampered formal patrol over the area (DANC 1984).

The numbers of African wild dogs (*Lycaon pictus*) only appear stable in the 60 000 km² area in the northeastern part of the country, where approximately 4 000 km² are within a protected zone however, they are known to range opportunistically throughout the country, where they are persecuted (Barnard 1998). The largest portion (90 %) of Namibia's cheetah population is found on privately owned commercial farmlands, where competing predators (primarily lion and spotted hyena) have been exterminated (Marker and others 1996). In Namibia, like much of the world, the vast majority of biodiversity is found outside of national parks (Soulé and Sanjayan 1998; Barnard 1998). Commercial farmlands harbour 80 % of the country's large mammal species while 10 % is found on communal farmlands (Barnard 1998; Marker 2002; Morsbach 1987; Richardson 1998).

2.1.3 Wildlife decline

Despite Namibia's remaining broad variety of game animals, four wild mammalian species, including white rhinoceros (*Ceratotherium simum*,) Cape warthogs (*Phacochoerus aethiopicus)*, the quagga (*Equus quagga)* and the yellow winged bat (*Lavia frons*) have gone nationally extinct (Barnard 1998). The same author asserts approximately 50 % of the country's mammals were conditionally labelled as a conservation concern in the late 90s. Van der Merwe (1983) reports that black rhino, Cape buffalo (*Syncerus caffer*), tsessebe, reedbuck (*Redunca arundinum)*, red lechwe and both brown (*Hyaena brunnea*) and spotted hyena (*Crocuta crrocuta*) face local extinction. The Government responded by putting some of the herbivore species into a protected area (Waterberg Plateau Park). In addition, tremendous work has been

done to save the black rhino by non-governmental organisations, state government and local communities. Although the numbers of African wild dogs, cheetah and black rhino declined substantially in the last century, Namibia is still one of the important range states for wild populations of these endangered and threatened species (Barnard 1998; Marker and others 1996).

UNIN (1986) reports that, historically, most Namibian people co-existed with wildlife and that game species have been a notable part of their culture. The country's biodiversity started declining on farmlands after 1884, when the German administration declared central governance, centralising wildlife resource control (Marker and others 1996). Wildlife habitats have shrunk and become fragmented through environmental degradation as a result of almost all land use forms in Namibia. The over-utilization of woody vegetation for fuel, homestead construction and fencing of crop fields, usage of fire for clearing the crop land or improving of grazing pastures, and bush encroachment, have resulted in low productivity of the land and have reduced its aesthetic values (Barnard 1998). Game species were over-hunted, and in some cases exterminated, as was the case with the removal of lion and spotted hyena from commercial farmlands. Some wildlife abandoned particular areas due to a shortage in forage (Marker and others 1996).

Landowners on commercial farmlands were granted wildlife utilisation rights in 1967, and game started increasing. In contrast, wildlife continued to decline on communal lands, where these natural resources still belonged to the state (Ashley

1994). In the north central communal areas, like many communal areas of Namibia, substantial numbers of zebra (*Equus burchelli*), elephant, oryx, springbok (*Antidorcas marsupialis*) and blue wildebeest (*Connochaetes taurinus*) disappeared in the last four decades, due to the loss of habitat and illegal hunting by local residents and corrupt South African officials (Ashley 1994; Owen-Smith 1996; Schoeman 1996; UNIN 1986). Private, high-ranking governmental officials and local people carried out illegal hunting in the 1970s that resulted in drastic decreases in the numbers of rhinos, elephants and zebras (Braun 1995). Braun (1995) also explains that the granting of permission to black Namibians to buy rifles in 1978 led to the exploitation of these people by Portuguese refugees and middlemen from neighbouring Angola, who paid them to hunt rhinos and elephants. Tönjes (1996) reports the Oshiwambo speaking language groups had guns in early 1900s, but the lack of ammunitions limited the usage of those powerful tools to only purposes considered more important than hunting.

2.1.4 Wildlife conservation

The utilization and protection of natural resources were essential parts of the nomadic lifestyle of Namibia's earliest inhabitants, the Khoi and San people (BAA 2004). In addition, the trans-human practices of subsequent settlers also served to minimize land pressure, through the movement of some family members with livestock to places with good grazing, returning to permanent residential places where women and children live, during the rain season. Hunting activities were restricted to dry seasons, when most ungulate species had passed the crucial stage of

raising their young (Williams 1994). The imposition of western central administration interrupted the traditional natural resource management, the system of common property that served to conserve wildlife (Ashley 1995).

The pre-independence administration attempted to counteract wildlife decline through establishing game reserves, also known as protected areas. Since 1907, when the first game reserve was established in Namibia, the country has had over 14 % of the land portioned as protected area; this is 4 % more land than is recommended by the World Conservation Union (IUCN) [Barnard 1998]. However, in spite of 14 % of land being reserved for wildlife, Barnard (1998), Marker and others (1999) describe that some species of particular conservation concern, including cheetah and wild dog, are mostly found outside the protected areas, due to interspecies competition. Further evidence that protected areas are not adequate habitats for wildlife conservation practices has surfaced in Namibia, as well as in other parts of the world (Woodroffe 1999). Marker and others (1999) describe that 90 % of the national wild cheetah population occurs outside of game reserves, and Stander (2005) reports an average of 28 lions killed annually on Etosha National Park's borders by farming communities over the last 20 years. These figures concur with Braun 1995; Montgomery 1988; O'Riordan and Stoll-Kleemann 2002; Van den Breemer and others 1995; Wykstra 2002; Schoeman 2002; Woodroffe and Ginsberg 1998, who praise the community-based wildlife management because protected areas do not shield wildlife populations from conflict with neighbouring farming communities. Some wildlife species require larger home ranges and others cannot

prosper in reserves due to interspecies competition; the areas concerned do not provide all habitat requirements for all species.

Another prominent conservation model was the granting of rights over wildlife utilisation to commercial farmers in 1967. The legislation granting ownership over wildlife for commercial farmers was initiated through the Nature Conservation Ordinance 31, in response to the decline in biodiversity on freehold farmlands (Marker and others 1996). The devolving of ownership over wildlife to commercial farmers resulted in an abundance of wildlife species on commercial farmlands and allowed commercial farmers to directly benefit from wildlife (Richardson 1998; Yaron and others 1994). This legislation resulted in a 50 % increase in wildlife species and an 80 % increase in wildlife numbers on these farmlands, due to good management of remaining wildlife, relocation and re-introduction of new game species (Erb 2004; O'Riordan and Stoll-Kleeman 2002; Marker and others 1996). In addition to Nature Conservation Ordinance 31, game populations on commercial farmlands increased due to waterpoint development (O'Riordan and Stoll-Kleemann 2002). The populations of kudu, oryx and springbok increased by 40 % between 1973 and 1980 and cheetah numbers also increased (Marker and others 1996).

The most dramatic conservation measure was the rhino-dehorning project of the late 1980's. This practice helped to save black rhinos from local extinction during the time when rhino horn was in high demand and poaching was rampant throughout Africa (Curtis 1989).

One of the most powerful conservation tools that has recently emerged in Namibia is community-based conservation (Western and Wright 1994). In 1995, the Government approved a community-based wildlife management approach, whereby communities would be granted rights to manage and benefit from wildlife within their boundaries (Barnard 1998). This conservation practice has proven to be among the most effective means for promoting conservation, since local communities derive direct benefit from biodiversity conservation practices (Kremen and others 1999; Margules and Pressey 2000). Community-based conservation has been developed on both commercial and communal farmlands where individual farmers enter into agreements to collectively manage wildlife populations on their farmland and share benefits evenly. Currently, there are 25 conservancies covering 24 % of commercial farmlands (Erb 2004). Forty-four registered communal conservancies encompassing 33 % of total communal farmland are currently carrying out substantial development in wildlife use and management; 41 additional groups are applying for registration on communal farmlands (Nakanuku 2006; Davis 2003/4; O'Riordan and Stoll-Kleeman 2002). Although community-based conservation has become popular in communal farmlands, only one communal community conservancy, Uukwaluudhi Conservancy (5 800 ha) had officially registered from the north central communal areas of Namibia by the end of 2004 (Nakamhela 2004) [Figure 3]. The north central communal area communities of King Nahale, Sheya Shuushona and Uukolonkadhi/Ruacana are among 15 conservancies registered in 2005, pushing the number of registered communal conservancies in the country to 44 (Nakanuku 2006; Nambambi 2005; Smit 2006).

2.1.5 Perceptions of Wildlife

FAO (2004) explains that the Namibian people co-existed with wildlife prior to the invention of the western central administration in 1884. The perceptions of wildlife have gone through tremendous changes since that time, including ownership rights over wildlife. Initially, wildlife was considered the property of traditional communities, until the state assumed full ownership of all wildlife. During the 1960s, due to declining numbers of many wildlife species, the government granted wildlife utilisation rights to commercial farmers. Currently, although wildlife belongs to the state, commercial farmers and communal conservancies have utilisation rights to one degree or another (BAA 2004; Marker and others 1996).

Before 1950, commercial landowners eliminated wild herbivores to reduce grazing competition with livestock, while lion, hyena and wild dog were eradicated due to their conflicts with livestock farming interests (Marker and others 1996). Marker and others (1999) also explain that farming culture was such that some commercial farms were listed for sale in the 1960s as "free of wildlife" as a positive selling motive.

Van den Breemer and others (1995) delineate that the colonial administration's denial of lawful utilisation of wildlife resources by rural communities in Zimbabwe contributed substantially to the perception of wildlife as a nuisance and as a threat to people, livestock and crops. These authors further explain that these laws prohibiting utilisation of wildlife actually caused wildlife to become open-access. As a result,

subsistence hunting or poaching reduced these natural resources more than other factors.

When wildlife utilisation rights were offered to private landowners in 1967, commercial farmers gained economic incentives for conserving wildlife, because they could legally market wildlife species (Marker and others 1996). Marker and others (2002) and Barnard (1998) assert that commercial farmers' perceptions have evolved from considering of wild herbivores as competitors for grazing, to realising that they could economically benefit from game. These economic benefits include trophy hunting revenues, selling of live animals, marketing game meat and ecotourism. In fact, commercial farmers have benefited far more from wildlife species earnings than the State has (UNIN 1986). In 1991, the wildlife benefit to private landowners was about N$ 56 million, compared to N$ 23 million for the State (Barnard 1998). Until the mid-1980s, the process of issuing licenses for wildlife harvesting was not properly regulated on commercial farmlands, but utilisation of game animals was in full swing (UNIN 1986).

Wildlife resources have also been beneficial to communities that formed conservancies. By allowing communities to become partners in the custodianship of their region's wildlife resources, these jointly managed conservation programmes supported the conservation process substantially (O'Riordan and Stoll-Kleemann 2002; Owen-Smith 1989). Owen-Smith of the Endangered Wildlife Trust now the Integrated Rural Development and Nature Conservation (IRDNC), described the

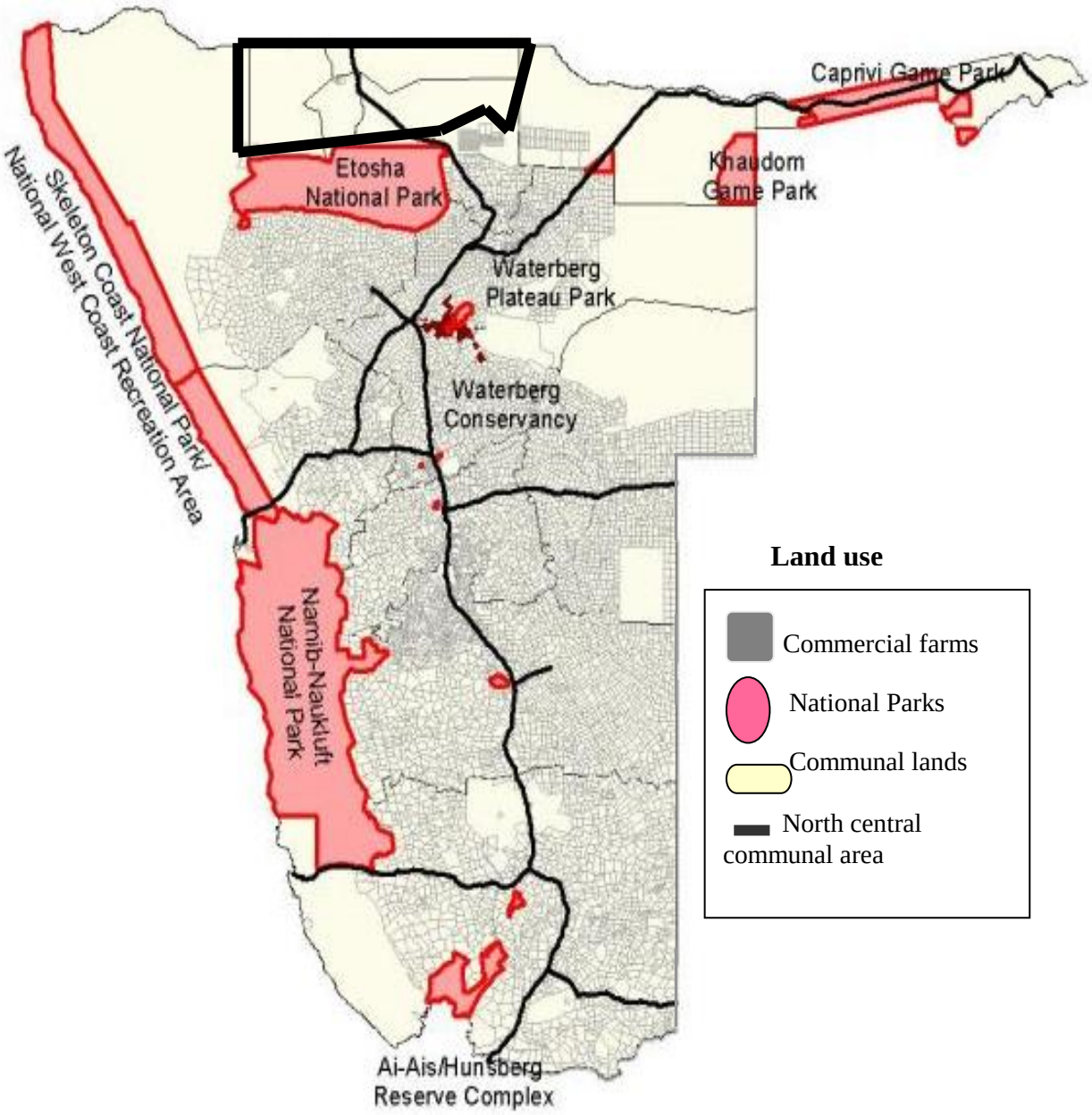
importance of involving local people in conservation efforts as follows: “The local people, appointed by their own communities, act as watchdogs against poachers. If we did not gain support and active involvement of people living in and around our wildlife areas, then efforts aimed at conservation would fail. Much had gone wrong elsewhere in Africa and in Namibia as well, because the support of local people was lacking. A great deal of this country’s heritage had been lost because conservation has been imposed on local communities” (Jones 1989).

Wildlife numbers continued to decline in communal farmlands, where those natural resources still belonged to the state, and rights over utilisation of game species were not granted to the people who lived in those areas (Ashley 1994). Any form of consumptive wildlife use became a poaching practice on communal farmlands, and black Namibians were denied access to guns and forbidden to hunt by law (UNIN 1986). African societies historically have had a stable coexistence with wildlife, where their chiefs and headmen served as the cornerstones of traditional customs that bound and regulated human communities and oversaw wildlife consumptive rights (FAO 2004; Tönjes 1996; Williams 1994). Deprived of that power by the western central administration, the authority of traditional leaders (chiefs and village headmen), who historically held the overall responsibility for resource management, was reduced to only providing access to land, collection of fees and settling community deputes (Quan and others 1994b).

The abolition of the traditional authority over natural resources during and after the colonial administration has led to central government's inability to put sustainable law enforcement procedures in place in order to protect wildlife and other natural resources. This lack of ownership of community resources by local people has become one of the primary components that led to the severe over-utilisation of natural resources and heavy poaching in communal lands (Quan and others 1994b; Van den Breemer and others 1995).

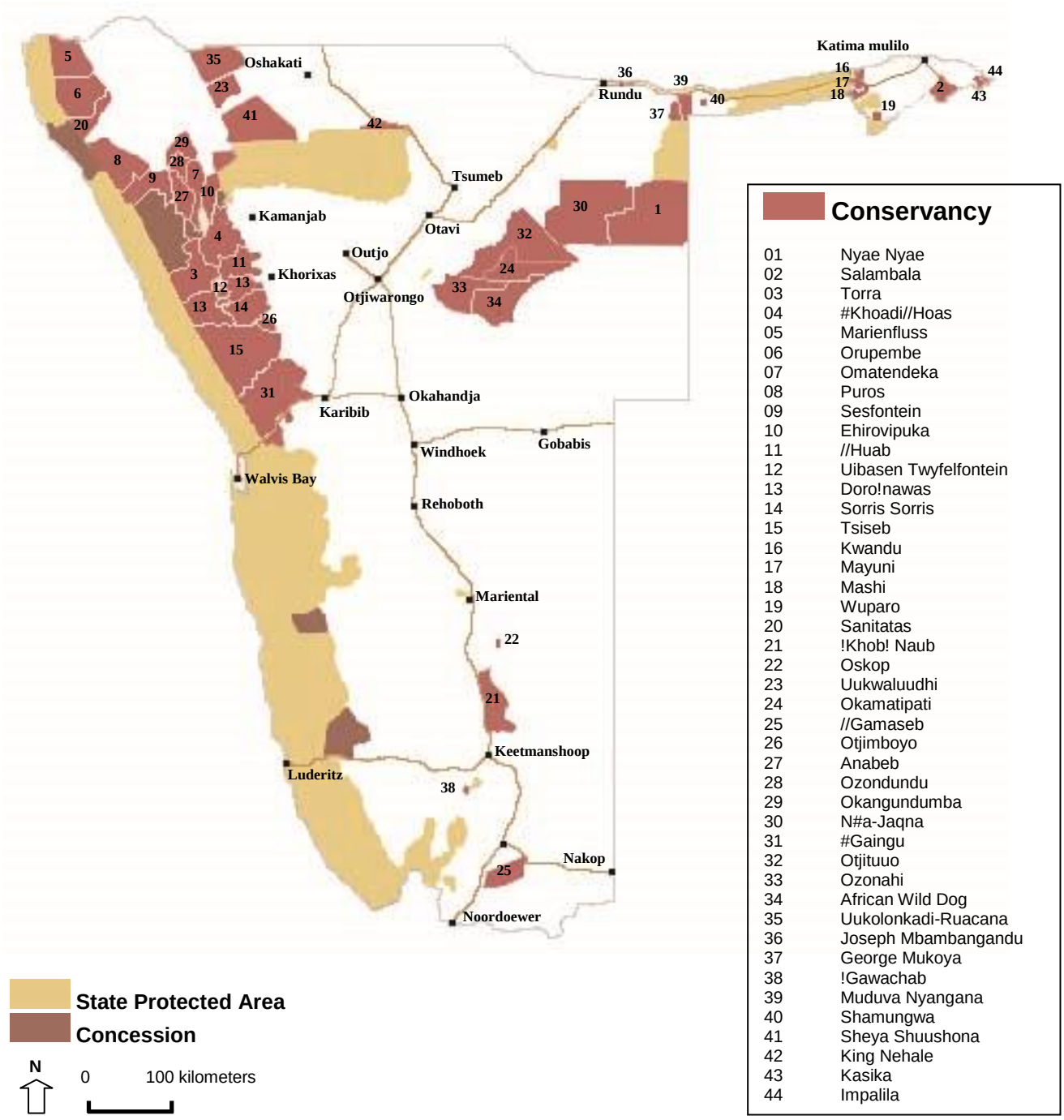
The establishment of protected areas, as described by Ntiamoa-Baidu (1995), O'Riordan and Stoll-Kleeman (2002) has been perceived as the long-term resolution for the rapid destruction of forests and dwindling wild animal populations in many African countries including Namibia since the early 1900s. The focus of central government has been preservation of wildlife, while excluding local communities from its management (Hinz 2003). The establishment of the Etosha National Park, which previously served as the hunting grounds for Oshiwambo, Herero and San-speaking people, did not involve consultation with those communities, nor did it include their perceptions of wildlife conservation (Berry 1997). Consequently, the farming communities encroached on the National Park's boundaries and acted as sink zones instead of buffer zones (FAO 2004; DANC 1985, 1986, 1988; Stander 2005). According to Furze and others (1997), conservation efforts often fail to achieve intended goals when local people are unsupportive and are not meaningful partners of the conservation programmes.

Figure 2: Namibian primary land use



Source: Laurie Marker 2002, p 25

Figure 3: Registered communal conservancies, national protected areas and concession



Source: EarthBound, MET 2006.

2.2 Problem formulation

The north central communal areas of Namibia were reported to have had the worst wildlife loss records in the country as compared to other communal farmland in the 1990s (Ashley 1994). Discussions of reasons for wildlife loss did not take into account the perceptions of local people regarding the presence or absence of wildlife. Lessons learned from successful implementation of conservation programmes in Namibia and in other parts of the world suggest that the feelings and beliefs of local people towards wildlife and land use play a vital role in either sustaining or degrading wildlife populations (Western and Wright 1994).

The political likelihood of creating new strictly protected areas in the north central communal areas or other communal lands in Namibia is unlikely due to increasing human populations and the environmental conditions, which require large portions of land to sustain wildlife populations. Owen-Smith (1986) asserts that further apportionment of farmland for wildlife species would only aggravate already strained land resources. The contradiction between the area requirements necessary for viable wildlife populations, which are beyond the borders of protected areas and the land requirements of ever-increasing human populations necessitate community-based biodiversity management approaches (Schoeman 2002; Woodroffe 1999; Marker and others 2002; Woodroffe and Ginsberg 1998). Therefore, a need exists to measure the wildlife tolerance in the north central communal areas, which have suffered the highest records of wildlife losses in the country and where community-based wildlife management approaches have not yet been widely implemented.

The degradation of wildlife populations has been described for the north central communal areas of Namibia. Quan and others (1994b), Williams (1994), Ashley (1994), Mendelsohn and others (2003) identify that wildlife decline has been a result of habitat loss and over-utilization in the past century. However, the time frame during which wildlife decline occurred and the current distribution of wildlife has not been described for those areas where Nature Conservation game patrol was limited during the war.

2.3 Research objectives

Williams (1994) explains that human activities, which impact the environment, are mainly influenced by environmental views and judgments. This sociological aspect of human-wildlife interaction has not been assessed in north central communal areas, and in particular, the environmental views and judgments of the general public have not been examined. As the human population keeps increasing, land use must be diversified to cater to basic human needs. The people of the north central communal areas have yet to benefit significantly from wildlife, and wildlife do not yet contribute in any substantial way to their livelihood, as is currently happening in some parts of Namibia. In order for game animals to flourish and become profitable for the community, the perceptions of local people toward these species must be assessed and integrated into protection and conservation programs. Time patterns of wildlife decline compared with the current distribution of wildlife, are crucial for rehabilitation and reintroduction of wildlife species in the area, and must also be assessed. This research examines attitudes and perceptions towards wildlife and

conservation, a necessary first step toward the coexistence of humans and wildlife. The research also examines the key time periods of the decline of wildlife species and current wildlife distribution in the north central communal areas. The answers to these research questions will help to identify wildlife species that still survive in the area and those that have gone locally extinct. This research aims to assemble baseline information that could be useful to wildlife conservation stakeholders in implementing more sustainable approaches toward remaining wildlife, and which could be beneficial in future reintroductions of species that have gone locally extinct.

2.4 Research questions

This research addresses the following questions: 1) What are the primary values that people in the north central communal areas of Namibia attach to wildlife? 2) If the communities derive benefits from game animals, what conservation work is being performed to ensure the sustainability of these benefits? 3) Regardless of the benefits of having wildlife, what is the level of wildlife tolerance of the general public in the north central communal areas? Are some wildlife groups more tolerated than others? 4) What are the time lines of wildlife decline in these areas over the last 35 years? Did different species of wildlife decline during the same time periods across the region, or did they decline at different rates? 5) What was the wildlife distribution in the north central communal areas during the study period? Which game species are still found in the different areas of the region?

CHAPTER 3

RESEARCH METHODS AND TECHNIQUES

3.1 Survey design

Structured personal interviews were designed and conducted to evaluate the attitudes and perceptions of local residents towards wildlife, to ascertain the time periods of wildlife declines and current distribution of wildlife in the north central communal areas. A standardized questionnaire was developed, tested in a pilot study, and verbally administered. Ten households were pre-tested in the Epembe constituency and all ten responded to all relevant questions. The heads of households (husband and wife) were purposefully chosen, due to their status as the decision-makers of the households. The participation of other family members was not prohibited. Global Position System (GPS) coordinates were taken and recorded for every surveyed household in order to geo-reference the spatial patterns of perceptions towards wildlife. These data were then utilised to determine and map the areas with wildlife restoration potential, through the use of ArcView G.I.S (version 3.2).

The questionnaire (Appendix III) was designed to maintain the consistency of questions presented to the survey participants. The main questions addressed wildlife species decline and determined the species remaining in the areas at the time of the interviews. The assumption was made that if a certain wildlife species was last seen in a specific year, that species had been in that particular area for some years before the last sighting. In addition to visual sightings, the tracks, calls and droppings of game animals were used as an indicator of the presence of wildlife species in the

area. Thus, the numbers of animal sightings reported in the findings of this research include all these indicators of wildlife presence in the study area and they should not be considered as if they were all visual evidence. The attitudes toward wildlife were assessed through asking the respondents to describe the primary factors that contributed to wildlife decline in the area, including the willingness of communities to share natural resources with wildlife; awareness of wildlife conservation among the communities; poaching of wildlife species; and human-wildlife conflicts. Since the interviews can be considered a form of oral history, it is important to note that the participants' reports of wildlife presence and rate of wildlife decline are estimates.

Reported declines of wildlife species were categorised into three groups according to size and diet: large mammals (elephant, eland, kudu, oryx); small mammals and birds [duiker, steenbok, springhare (*Pedetes capensis*); ground hornbill, guinea fowl]; and carnivores [lion, leopard (*Panthera pardus*), cheetah, wild dog, jackal (*Canis species*)]. Only a few of the most common species of these groups were selected, because including of all game animals that fall into these categories is tedious and could exhaust the interviewees during the conversation process. The time frame of wildlife decline was classified into seven periods: pre-1968, 1968-1978, 1979-1988, 1989-1998, 1999-2000, 2001-2002 and 2003/4.

Participant reports of the presence of wildlife species were categorised into three groups to prevent lengthy narratives that could detail every single species. The groups were: large mammals (elephant, kudu, oryx); small mammals and birds [springbok

(*Antidorcas marsupialis*), duiker, steenbok, springhare, rabbit/hare (*Lepus species*), porcupine (*Hystrix africae-australis*), aardvark (*Orycteropus afer*), honey badger (*Melivora capensis*), baboon/monkey (*Papio ursinus/ Cercopithecus aethiops*); ostrich, ground hornbill, guinea fowl]; and carnivores [lion, leopard, wild dog, caracal (*Felis caracal damarensis*), jackal, wildcat (*Felis lybica*)]. The number of wildlife species in these categories differed from the groups discussed earlier, because here, the interviewees listed all that they considered as game animals and which were present in their communities.

3.2 Sampling methods

A personal interview survey was conducted among Oshiwambo-speaking language groups. One hundred and nineteen households were interviewed from four electoral constituencies of the north central communal areas.

The assessment of wildlife loss, potential of wildlife conservation and attitudes of rural residents toward wildlife in the north central communal areas of Namibia was quantitatively assembled through the administration of the questionnaire. The quantitative approach to collecting data was taken, as a researcher did not have enough time to observe how respondents conduct their daily lives and report from that context; rather they were asked to explain how they act and their feelings toward wildlife. Although this method does not give the in-depth understanding of the problem that the qualitative approach could offer, the quantitative approach was chosen because it is quicker, cheaper and as Lebeau (1996) explains larger samples

of quantitative method give data that are more comparable, thus allowing the understanding of the issues faced by the larger population. Further, the target population was deemed to be too large for the qualitative research method to be feasible. The large geographical size of the study area, coupled with the lack of existing information on household locations in the region, made it impractical to carry out any simple random sample methods whereby the sample units (surveyed households) could have been spread throughout the whole region. The sample units were picked from electoral constituencies that were of different sizes and of varying human population densities (Table 1). LeBeau (1996), Keulder (2002), Agresti and others (1997) apply the same sampling method under similar circumstances. Explicit stratification by language group was not performed; instead, the study design was stratified according to the human population densities in the area. These were higher in some parts of the study area than in others. Low human population densities were defined as an electoral constituency containing an average of fewer than two households per square kilometre. High human densities referred to an average of more than two households per square kilometre in the electoral constituency (Table 1).

Table 1: Household density in the surveyed constituencies.

Constituency	**Area (km²)**	**No. Household**	**Household per km²**
Eengodi	7 809.5	2 775	0.35
Epembe	1 810.2	2 267	1.25
Ongenga	320.2	3 478	10.87
Omuntele	1 629.3	3 711	2.28

Source: National Planning Commission 2001

The household densities varied. Thus, instead of using non-overlapping sample units, the stratified sampling method was used to capture households in both the high and low human population densities of the study area (Bryman and Cramer 2001). Four electoral constituencies: Eengodi and Omuntele in Oshikoto, and Epembe and Ongenga in Ohangwena, were selected.

Due to the absence of clearly demarcated residential areas in the rural areas, the closest household to the office of the electoral constituency councillor was used as the starting point. Keulder (2002) used this procedure to assess public opinion and consolidation of democracy in Namibia. This systematic sampling method (Manly, 1996) was used to cover 40-km² areas in each electoral constituency. A 2 km spacing distance between sampled households was predetermined in order to spatially separate sampled households and to utilize travel time most effectively. The distances from sampled households were determined by GPS using waypoints. Thirty households were sampled from Eengodi, Epembe and Omuntele constituencies and twenty-nine households were sampled from Ongenga constituency. Drivable roads were taken within those constituencies.

Regional councillors in sample units (constituencies) were contacted for permission to interview the people in their areas. The message about the interview was disseminated through the local radio station. In order to minimize potential resistance from possible survey participants, three local assistants from each constituency were recruited to support the data collection.

3.3 Data analysis

The data were entered in Microsoft Excel and then transferred into SPSS (version 12.0.1) for statistical analysis. Standard descriptive statistics were used to evaluate frequencies of variables across the four electoral constituencies. The inferential statistics were implemented to assess the degree of variation of the variables among the four constituencies. The non-parametric Kruskal-Wallis H test was specifically used to identify the differences within same variables among the constituencies surveyed (Bryman and Cramer 2001). The Mann-Whitney U test was used to determine the effects of one variable compared to the other, such as gender, education or the length of time the heads of households had lived in their respective villages, as well as the action taken against predators sighted in the wild.

The "*KW* X^2" and "U^a *Z*" represent Kruskal-Wallis H and Mann-Whitney U tests respectively. Spearman's rho Correlation Coefficient was used to gauge the direction and strength of the relationship between pairs of variables. The "r_s" represents the correlation coefficient of Spearman's rho test. The "*P*" $\leq$ 0.05 denotes the significance of certain variables being widely divergent from that of the population for Kruskal-Wallis H and Mann-Whitney U tests. The "P" represents significant difference for Spearman's rho Correlation Coefficient if its value is $\geq$ 0.01. The approach in which the significance of correlation is calculated is strongly determined by the number of cases for which there are pairs of data. The larger the number of cases (i.e. above 250 cases) the likely the correlation will be significant at P $\leq$ 0.05 unlike chi-square that set a cut point, a level of significance also called a level of

probability at $P \leq 0.05$. In case of correlation calculation, the fewer the number of cases, the lower the level of significance (Bryman and Cramer 2001). The "*df*" represents the degree of freedom within the groups of variables. The "*df*" is always equal to three among four surveyed constituencies and it varied among education levels of heads of households and among the time periods the heads of households had lived in their villages. The 'N' denotes the number of variables within which the correlation was gauged using Spearman's rho Correlation Coefficient test.

The author preferred the distribution free tests, the Kruskal-Wallis H and Mann-Whitney U tests, because they are independent of assumption about the precise form of the distribution of the sampled population. The nature of survey data is ordinal, which means the ranking of scores was not scaled. For instance, a 'yes' response was not more important or greater than a 'no' response and 'primary education level' was not better than 'not attending school level'; the distribution of sampled population scores was not known. The Kruskal-Wallis H and Mann-Whitney U tests were preferred to the median test because these tests compare the number of times a score from one of the samples is ranked higher than a score from the other sample rather than the number of scores which are above the median. This way, if the two or more compared groups are similar, then the number of times the scores are ranked equally should be the same for two or more groups.

To identify the perceptions of rural residents toward wildlife, the current wildlife distribution was compared with hunting activities. Attitudes towards wildlife were

evaluated through correlating the wildlife presence and wildlife conservation awareness of local communities. The perceived value of wildlife was correlated to local communities' wildlife conservation efforts, as reported during the interviews. Correlations were also made to understand whether communities with higher wildlife abundance and richness scored higher in wildlife conservation awareness than the communities that had lower wildlife abundance and richness. Comparisons were made to investigate whether areas that were settled longer by humans had fewer wildlife species numbers in comparison to areas that were recently settled.

CHAPTER 4

LITERATURE REVIEW

4.1 Perceptions of wildlife and conservation

Pearsall (1999) explains 'perception' as "intuition and insight regarding, understanding and interpreting of something". Furze and others (1997) describe the perception of nature, of which wildlife is a part, as being socially constructed and patterned and the ways people see and use nature are the products of how they perceive it.

Utilisation of wildlife has been dominant in the discussions regarding natural resources in the north central communal areas of Namibia. Williams (1994) reports that game meat served as a subsidiary diet to Oshiwambo-speaking language groups and that wildlife skins and horns had been essential items for clothing and tools. UNIN (1986) points out that traditional hunting seasons coincided with natural seasonal cycles, in order to reduce disturbance at critical times such as during calving seasons. Therefore, community-based conservation was practiced historically, but was discontinued, largely due to political pressure. Communal conservancies were legalised in 1995; however, communities' perceptions of wildlife conservation in the north central areas were not established prior to this study, with the exception of a survey conducted by Hinz in 2003.

Hinz (2003) conducted his study in most areas of the country, to include some parts of the north central communal areas of Namibia. However, Hinz's study did not look at the general public as such. Instead, he investigated the optimal method of incorporating customary law in the revised Nature Conservation Ordinance of 1995. He also assessed mechanisms for the inclusion of traditional authorities in the management and utilisation of protected areas. Ashley (1994) explains that the general public lost trust in traditional authority due to the collaboration of traditional leaders with the colonial government. Hinz's research focused on people living inside protected areas; people having been evicted from protected areas; people living adjacent to protected areas; people living in areas that already had a history of being considered as potentially protected areas; people living in areas with wildlife and the established structures to protect it; and people living in areas with the potential for reintroduction of wildlife. The perceptions of the general public towards community conservancies still remain to be established.

4.2 Time lines of wildlife decline and distribution

Ashley (1994), Barnard (1998), Shoeman (1996) and UNIN (1986) report a decline of wildlife in north central communal areas of Namibia. A baseline for the numbers of wildlife species in these areas was established in 1926 when the ground census of twenty-nine selected wild mammals and two avian species was conducted in the Etosha Pan-Owambo regions (Berry 1997). This census affirmed the presence of thirty wild mammal species plus two avian species in the north central communal areas. Seven species were not present within the boundaries of Etosha Game Reserve

at the time of the census. Berry also reports the mortality of approximately 4 000 wildebeest in the north central communal areas due to drought in 1959 and that wildlife populations of Etosha and north central communal areas had been integrated until 1973, when the park was completely enclosed with 850 km of game-proof fencing.

Marker and others (1999) explain that commercial farmers on north central commercial farmlands (south of Etosha) eradicated lion, hyena and wild dog from their lands in the 1950s in order to reduce livestock predation and killed off high numbers of wild herbivores to reduce foraging competition with livestock. These same authors explain that some commercial farms put on sale in the 1960s were declared 'free of wildlife', as a positive incentive for potential buyers and that when the spread of Foot and Mouth Disease was linked to migration of game, a 2.8 m high game-proof veterinary cordon fence was erected in 1961 to prevent the movement of wildlife and the spread of disease. The prevention of game movements from north of the veterinary cordon fence to the south in the early 1960s indicates the presence of wildlife on communal areas north of the fence during that time. DANC (1984) reports that formal patrols of wildlife had been deterred by the war situation in the north central communal areas. This situation hampered efforts to pinpoint the time frame of wildlife decline in these areas.

Hinz (2003) states that some portions of communal areas in the Oshikoto and Omusati regions have potential for the reintroduction of wildlife. Ashley (1994)

describes the north central communal areas as having not only the highest diversity of wild mammals, but also the highest records of wildlife decline compared to all communal lands in the country, without indicating exactly which areas accommodate the remaining species. The current distribution of wildlife in north central communal areas has not been previously discussed.

CHAPTER 5

CONSERVATION ATTITUDES AND BIODIVERSITY

5.1 Questionnaire findings and statistical analysis

The first section of this chapter presents the details of the survey responses and notes the similarities and differences in opinions regarding wildlife decline and perceptions towards wildlife, in four surveyed constituencies.

Forty-five of the survey respondents were individuals, of whom 15 were individual men and 30 were individual women. Seventy-four of the participants were family groups, which consisted of 11 men-only groups; 11 women-only groups; and 52 mixed groups of men and women.

5.1.1 Wildlife perceptions

5.1.1.1 Importance of free-roaming wildlife

Of 119 interviewed households, 104 recognized the importance of free-roaming wildlife in their communities for various reasons (Table 2, Appendix I). Household location influenced the perceptions towards free-roaming wildlife. Households located far away from Etosha National Park had higher (*KW* $X^2 = 12.96$, $df = 3$, $P = 0.005$) perceptions of the importance of free-roaming wildlife (28.3 ± 1.13 interviewed households per constituency) than households that bordered the park (21 households). The numbers of households that reported a variety of factors being of importance for having free-roaming wildlife in the communities appeared different in Table 2, those differences were not significant among the most frequently reported

essential factors, throughout all four constituencies. These factors included aesthetic value (*KW X^2 = 3.90, df = 3, P =0.272*); wildlife deserves to live (*KW X^2 = 6.18, df = 3, P =0.103*); and educational value of wildlife (*KW X^2 = 3.27, df = 3, P =0.352*). In fact, when asked the importance of having free-roaming wildlife, respondents across the surveyed areas listed the aesthetic value of wildlife as the most frequent choice.

5.1.1.2 Benefits from having wildlife

As presented in Table 3, Appendix I, 114 households considered having wildlife to be widely beneficial. The perceived benefits were affected by household location, education of heads of households, exposure to wildlife-rich places and the presence/absence of wildlife in the community. Of 92 households that perceived aesthetic value of wildlife as a benefit to having game animals on farmlands, Omuntele, a constituency with low wildlife diversity (Figure 4, Appendix I) and bordering the Etosha National Park, had fewer households (16 households) that viewed the aesthetic value of wildlife as beneficial compared to the other three constituencies (25.3 ± 3.05 households) [*KW X^2 = 15.62, df = 3, P = 0.001*].

In the Eengodi constituency, no (*KW X^2 = 37.75, df = 3, P = 0.001*) households reported the educational value of wildlife as a benefit of having wildlife in the community, as compared to the other constituencies (11 ± 8.0 household). The education levels of heads of households correlated with the perception of wildlife on farmlands as having an educational value. The number of households that realised

the educational value of wildlife increased (r_s = *0.194, N = 117, P = 0.036*) with the education levels of heads of households. Six out of 12 households whose heads had senior secondary through tertiary education recognised educational value of wildlife compared to 27 of 103 households whose heads had lower than senior secondary education. The number of households whose family members visited wildlife-rich places correlated with aesthetics as a benefit of having wildlife on farmland (r_s = *0.277, N = 119, P = 0.002*) as well as with the financial value of wildlife (r_s = *0.433, N =119, P = 0.001*). Thirty-five out of 37 households whose family members visited wildlife-rich places viewed aesthetics of wildlife as a benefit compared to 57 out of 82 households where none of the family members visited wildlife-rich places. Twenty-nine households whose family members visited wildlife-rich places also viewed the financial value as a benefit of having wildlife, compared to 26 households whose family members did not visit wildlife-rich places.

5.1.1.3 Action taken against carnivores seen in the wild

Forty-seven out of 119 interviewed households took action against a predator seen in the wild (Table 4, Appendix I). The gender, education and the time period the heads of households lived in the area influenced the action taken toward the predator sighted in the wild. More (r_s = *-0.353, N = 40, p = 0.026*) individual men respondents (five out of 15) tracked and killed predators seen in the wild than individual women respondents (2 out of 30). All 29 households whose heads of households lived in their villages less than 10 years did not track and kill predators

spotted in the wild, compared to 14 households whose heads of households lived in their villages over 10 years (*KW X^2 = 14.15, df = 6, P = 0.028*).

5.1.1.4 Places where wildlife should live and sharing of farmland with wildlife

Table 5, Appendix I, presents the opinions of households interviewed regarding sharing farmland with wildlife and where game animals should live in Namibia. The willingness to share farmlands with wildlife was affected by human densities and livestock predation. More households (56 households) interviewed in the Eengodi and Epembe constituencies thought wildlife should live on farmland (*KW X^2 = 19.82, df = 3, p = 0.001*) than households (36 households) interviewed in Ongenga and Omuntele constituencies. Although Ongenga and Omuntele constituencies had more (*KW X^2 = 19.97, df = 3, p = 0.001*) households that felt that wildlife should only live in game parks (23 households), when compared with Eengodi and Epembe constituencies (4 households), the latter constituencies had a higher (*KW X^2 = 21.72, df = 3, P = 0.001*) intolerance of predators (38 households) on farmland than Ongenga and Omuntele constituencies (13 households). Forty-seven out of 54 households that reported goat predation were from Eengodi and Epembe constituencies.

The education level of heads of households did not affect the perception of where wildlife should live in the country (r_s = *-0.032, N = 117, P = 0.732*).

5.1.2 Factors affecting wildlife perceptions

5.1.2.1 Sources of income

Forty-four interviewed households were solely agro-pastoral farmers, with no additional income source other than farm products. Sixty-five households had remittance from family members and some professional jobs in addition to farming as income sources of the households. Nineteen out of 54 households that did not have additional income, perceived that wildlife had financial value, in comparison to 36 out of 65 households with additional income (U^a *Z = -2.191, P = 0.028*). The communities perceived the importance of free-roaming wildlife and its associated benefits similarly, regardless of additional household income.

5.1.2.2 Farming practices

The farming practices of the surveyed constituencies were characterised by crop and livestock production (Table 6, Appendix I). All surveyed households had crop fields and 84 of those households bred cattle. The Eengodi constituency had most (*KW* X^2 *=32.41, df =3, p = 0.001*) households that raised cattle (27 households) in comparison to the other three constituencies (19 ± 6.55 households). The number of cattle per village was inversely proportional to the number of households per village. There were more cattle in constituencies with fewer households per village, and the Eengodi constituency had the highest number of cattle per household (Table 6, Appendix I).

More households owned goats than cattle in the north central communal areas (Table 6, Appendix I). There were smaller (*KW X^2 = 23.23, df =3, P = 0.001*) herds of goats in higher human populated areas per household (17.95 ± 14.41 goats) than in lower human density constituencies (30.5 ± 24.6 goats). Although the herds of goats were smaller in areas of higher human population, most households owned goats and therefore, higher numbers of goats were found in those areas than areas with lower human densities (r_s *= 0.514, N=30, P = 0.004*).

One hundred and seventeen interviewed households reared chicken (Table 6, Appendix I).

Livestock possession affected predator discrimination. Of the 24 households that saw predators in the wild, the 14 households that owned goats, tracked and killed these predators, while the 10 households that did not own goats did not attempt to kill the predators.

5.1.2.3 Wildlife species causing damage to crops and actions taken

Various wildlife species conflicted with crop farming activities in the surveyed area. Eighty-one households reported experience of wildlife raiding crops. Table 7, Appendix I, presents the wildlife species that were considered the primary crop raiders. The presence of wildlife species in the communities affected the perception that those species threatened crop production. The Ongenga constituency reported common sightings of springhare, as compared to other mammals this might be a

factor in 21 out of 60 households reporting springhare as the primary problem animal affecting crops were from that constituency.

Only two households from Ongenga constituency reported elephant and kudu as crop raiders. However, these reports relate to historical events, as these herbivores were last sighted in this constituency between 1968 and 1988.

Twenty households that experienced crop predation from wildlife had killed the wildlife concerned, while nine households scared these animals away.

5.1.2.4 Wildlife species causing livestock predation and action taken

Most livestock predation was experienced in areas where jackal sightings were reported. Fifty-four out of 102 households that raised goats had experienced predation in the last two years before the interviews. Forty-seven households identified jackals as the culprits in goat predation; three households identified caracal and hyena, while four households did not know which predators preyed on their livestock. Forty-seven households that had experienced goat predation were from the Eengodi and Epembe constituencies, where jackal sightings were higher than in the other two constituencies at the time of the interviews (Figure 9 a & b Appendix II). Of 87 households that possessed cattle, only three households had experienced predation in the last two years. Hyena and leopard were cited as the cause for this predation.

Of those who raised chicken, 20 households experienced predation in the past two years. Fifteen households identified yellow mongoose (*Cynictis penicillata*) as being responsible for chicken loss, nine households identified striped polecat (*Ictonyx striatus*), four households identified genet (*Genetta species*) and African wildcat as the source of predation, while two households did not know what preyed on their chickens.

As shown in Table 8, Appendix I, 31 households reacted to livestock predation through some action. Eighteen households reported setting a trap and killing the predator as the primary action taken against predators.

5.1.2.5 Formal education of heads of households

Primary education and no school attendance dominated the responses to the question regarding formal education of the heads of households in the north central communal areas. Fifteen heads of households interviewed in Eengodi constituency never received formal education and the highest formal education of remaining heads of households was secondary education. In Omuntele constituency, 23 heads of households had primary education; the remainder reported higher education (Table 9, Appendix I).

An increase in the level of formal education coincided with recognition of educational benefit from having wildlife in the community (r_s = *0.194, N = 117, P = 0.006*). Although a smaller proportion of heads of households (24 heads of

households) had higher than primary education, over one-third of those households still reported wildlife as having educational benefit, when compared to households with primary or no formal education.

5.1.3 Wildlife conservation perceptions

5.1.3.1 Community awareness of conservancies

Community conservancies were associated with a wide range of advantages (Table 10, Appendix I). The awareness of natural resource management among interviewed households was not affected by bordering emerging community conservancies or by formal education. Eengodi and Omuntele constituencies, which are close to the King Nahale emerging conservancy, had fewer households that knew about conservancies than Epembe and Ongenga constituencies, which are situated far away from any conservancy. Of the 119 households interviewed, fifty-eight households knew what a communal conservancy is, but five of these households were unaware of the advantages that the conservancy holds for its members (Table 10, Appendix I). Knowledge of conservancies was not influenced by level of education (r_s = *0.102, N = 57, P = 0.450*). The level of education held by heads of households did not appear to play a role in their level of awareness concerning the concept of conservancies. Cooperation in wildlife resource management and financial benefits dominated the perceived advantages of having a conservancy.

Out of 119 households interviewed, 37 households had family members who had visited places rich in wildlife, such as game parks, game farms and conservancies.

Of those that had the opportunity to visit these places, 34 family members realised the various benefits of these places, with the majority recognising financial opportunities (Table 11, Appendix I).

5.1.3.2 Wildlife conservation efforts

In the absence of ownership rights over wildlife utilisation, community members carried out numbers of conservation-related practices (Table 12, Appendix I). Epembe and Ongenga constituencies had more households ($KW\ X^2 = 9.25,\ df = 3,\ P = 0.026$) that stopped killing wildlife (39 households) than Eengodi and Omuntele constituencies (29 households). More individual men told fellow community members to stop killing wildlife than individual women ($r_s = -0.502,\ N = 37,\ P = 0.002$). Despite fewer individual men being interviewed during the survey, seven out of fifteen men told other community members to stop killing wildlife, in comparison to one out of thirty interviewed individual women. The time period heads of households lived in the area influenced their telling community members to stop killing ($KW\ X^2 = 13.37,\ df = 6,\ P = 0.037$). Where the heads of households had lived in their villages for more than 10 years, encouragement to their fellow community members to stop killing was reported more often (15 of 87 households) than in areas where heads of households had lived in their villages for less than 10 years (3 of 29 households).

The gender and the time period the heads of households lived in their areas influenced their attitudes towards killing or not killing of wildlife. Of the 15

individual men interviewed, none reported that they had never killed wildlife, while six out of 22 individual women who practiced conservation activities reported that they had never killed wildlife (r_s *= 0.363, N = 37, P = 0.027*). More households (12 of 29 households) whose heads of households lived in their villages fewer than 10 years reported 'never kill' as a conservation practice in comparison to (5 of 87 households) households whose heads lived in their villages more than 10 years (*KW* X^2 *= 29.74, df = 6, P = 0.001*).

Twenty-five heads of households out of 119 heads of households felt that they did not conserve wildlife in their communities. The number of heads of households that did no conservation work did not differ statistically among the four constituencies (*KW* X^2 *= 0.99, df = 3, P = 0.804*). Similarly, there was no significant statistical difference between individual male and female respondents who were not involved in conservation (U^a *Z = -0.333, P = 0.739*).

5.1.3.3 Potential for wildlife protection

The potential for wildlife protection was characterised by various factors among the communities (Table 13, Appendix I). The opinion that every community member should be responsible for wildlife protection differed between constituencies (*KW* X^2 *= 14.03, df = 3, P = 0.001*). The Eengodi constituency had the most (29) households that felt wildlife could be protected if every community member became responsible for wildlife protection, compared to the other three constituencies (19 ± 4.35 households). The idea of protecting habitat to enhance wildlife protection also

differed between the constituencies (*KW X^2 = 9.74, df = 3, P = 0.021*). Ongenga, the highest human populated constituency, had nine households that felt wildlife protection could be possible if habitat would be protected, compared to the other three constituencies (2.66 ± 1.52 households). Gender did not influence the views toward wildlife protection significantly (*U^a Z = -0.251, P = 0.802*).

There was no correlation between possibilities of protecting wildlife and education levels of heads of households (r_s *= 0.056, N = 116, P = 0.551*) among the constituencies, except in the Ongenga constituency, where education levels of heads of households correlated with habitat protection as a means of protecting wildlife (r_s *= 0372, N = 29, P = 0.047*). All six households that had no formal education from Ongenga constituency did not think that habitat protection was required in order to protect wildlife, compared to 14 out of 23 households that had primary through tertiary education, which opted that habitat protection was needed to protect wildlife.

The view that nothing could be done to protect wildlife varied between the constituencies (*KW X^2 = 8.68, df = 3, P = 0.034*), where Omuntele constituency had 11 households that felt wildlife could not be protected, while there were no households from Eengodi constituency that thought wildlife could not be protected in their communities.

5.1.3.4 Who should protect wildlife in the community?

No consensus was achieved regarding who should be responsible for the protection of wildlife (Table 14, Appendix I). The Omuntele constituency had the least number of households (*KW X^2 = 7.937, df = 3, P = 0.047*) that felt that it is every community member's duty to protect wildlife (13 households), compared to the other three constituencies (21.6 ± 2.07 households). Education levels of heads of households affected the perception of protecting wildlife as an obligation of the headmen (r_s = *-0.032, N = 100, P = 0.008*). Twelve households, whose heads had no education, and nineteen whose heads had only primary education, thought that headmen should be responsible for wildlife protection. None of eight households those heads of households had senior secondary and four households those heads of households had tertiary education felt that the headmen should be responsible for protecting wildlife.

Of the households that were undecided, eight and six households were from the Omuntele and Ongenga constituencies respectively (Table 14, Appendix I).

5.1.4 Observations concerning time frame of wildlife decline

5.1.4.1 Large mammals

Large mammals (elephant, eland, kudu, oryx) have disappeared completely from densely human populated areas and areas located further away from game parks.

The rates of decline for elephant and kudu differed between constituencies over time (*KW X^2 = 17.02, df = 3, P = 0.001*); (*KW X^2 = 27.10, df = 3, P = 0.001*). Elephants

were seen in all constituencies up until 1968, as reported by 42 households (Figures 4 a – d, Appendix II). However, at the time of the interviews only one elephant sighting was reported in the Omuntele constituency, which borders the Etosha National Park. In the past 14 years elephants have only been seen in the Omuntele and Eengodi constituencies, with the last sighting reported in Eengodi in 1992. Kudus were last seen in the Ongenga constituency between 1979 and1988, and in the Omuntele constituency between 1968 and1978. Kudus were reported to be present in the Eengodi and Epembe constituencies at the time of the interviews. In 2003/4, Eengodi constituency accounted for 10 of 18 reported kudu sightings since 1968 (Figure 4a, Appendix II).

Overall, eland were considered a rare sighting compared to oryx and kudu (Figures 4a-d, Appendix II). The rate of eland decline was similar to that of the oryx in both Epembe and Ongenga constituencies, where all sightings were before 1968. Five recent sightings of oryx were reported in the Omuntele constituency only between 2002 and 2003/4.

5.1.4.2 Small mammals and birds

All five species of small mammals (duiker, steenbok, springhare,) and birds (ground hornbill, guinea fowl) showed decline over time, but they were still present in all four surveyed constituencies at the time of the interviews.

The rate of decline in duiker differed between constituencies (*KW X^2 = 46.38, df = 3, P = 0.001*) over the last 35 years. The greatest decline in this species occurred in the Ongenga and Omuntele constituencies, where 19 duiker sightings have been reported since 1968; with only four of those sightings having been noticed at the time of the interview (Figure 5 c & d, Appendix II). The decline of duiker sightings in Eengodi and Epembe constituencies was first noted in 1998, and a substantial decline occurred in the Epembe constituency between 1998 and 2003/4, when the sightings decreased from 27 in 1998 to 18 sightings in 2003/4 (Figure 5b, Appendix II).

Figures 5 a-d, Appendix II, illustrate that over time the decline of steenbok was not as dramatic in either the Eengodi or the Epembe constituency, as it was in the Ongenga and Omuntele constituencies. In the Eengodi constituency, one of out 28 households reported steenbok decline since 1968, while in the Epembe constituency two out of 29 households reported steenbok decline since 1968. In contrast, 12 out of 18 households in the Ongenga constituency and 14 out of 21 households in the Omuntele constituency reported steenbok decline since 1968. Thus, the rate of decline differed significantly among the four constituencies (*KW X^2 = 42.81, df = 3, P = 0.001*).

The Epembe and Omuntele constituencies had a higher (*KW X^2 = 30.03, df = 3, P = 0.001*) springhare decline (4 ± 1.5 sightings /10 years) than Eengodi and Ongenga constituencies (0.4 ± 0.89 sightings /10 years).

Ground hornbill declined more (*KW X^2 = 44.78, df = 3, P = 0.001*) in the Omuntele constituency since 1968, where ten out of eleven households reported ground hornbill decline since 1968. The other three constituencies reported more recent sightings, and were less inclined to describe ground hornbill as being in decline since 1968 (Figures 5 a-d, Appendix II).

The number of guinea fowl sightings had been constant in some constituencies until 2002. Eengodi, the constituency with the lowest human density, only noticed the decline of guinea fowl after 2002, while 13 households in Epembe constituency and eight households in Omuntele constituency reported a decline in guinea fowl over the past four years.

5.1.4.3 Carnivores

The rates of decline in carnivores (lion, leopard, cheetah, wild dog, jackal) varied across all four constituencies between 1968 and 2003/4 (Figures 6 a-d, Appendix II).

The rate in the decline of lions was not directly related to human density in the north central communal areas. Epembe, one of the least human populated constituencies, reported its last lion sightings between 1979 and 1988, and Ongenga, holding the highest human population of the surveyed constituencies, reported their last lion sightings between 1999 and 2002. Both Eengodi and Omuntele constituencies reported lion sightings at the time of the interviews (Figures 6 a-b, Appendix II).

The decline in leopard sightings over the last 35 years, when compared to other carnivore sightings, was the least severe. Except for Ongenga constituency, where no leopard sightings were reported since 1968, leopard sightings were consistent between 1968 and 1998 in the other three constituencies (Figures 9 a-d, Appendix II). Although leopard sightings were reported in Eengodi, Ongenga and Omuntele constituencies at the time of the interviews, Eengodi constituency had the highest reports of leopard sightings in 2003/4.

Cheetah was the most rare carnivore in the entire study area. Only eight households reported cheetah sightings in the last 35 years (Figure 6 a-d). The most recent sighting was reported in the Eengodi constituency between 2000 and 2002 (Figure 6 a, Appendix II). In the Ongenga constituency, where most heads of households had lived for more than forty years, there had been no cheetah sightings in the last 35 years (Figure 6 c, Appendix II).

Thirty- six interviewed households reported African wild dog sightings in the last 35 years, of which nine were in 2003/4 (Figure 9 a –d, Appendix II). The most recent sightings of African wild dog were reported in the constituencies with lowest (Eengodi) and highest (Ongenga) human populations.

Jackal sightings dominated the carnivore group. In the Eengodi constituency, all thirty interviewed households reported jackal sightings in 2003/4; in Epembe constituency, 28 households reported jackal sightings during the same time period

(Figure 9a–b, Appendix II). Jackals were not seen in Ongenga constituency after 1978. This carnivore species declined in Omuntele constituency from 20 sightings in 1968 to seven sightings in 2003/4.

5.1.5 Primary factors which caused wildlife decline

Various factors were perceived as contributing to the decline of wildlife in the north central communal areas**.** Figure 7, Appendix II, illustrates the primary factors contributing to the decline of wildlife, with emigration being cited as the dominant cause in all four constituencies. The Ongenga constituency had the highest number of households per village, compared to the other three constituencies (9.33 ± 2.31 households). The majority of households interviewed in this constituency (21 households) believed that habitat loss was a primary cause of the decrease in wildlife (*KW* $X^2 = 18.62$, $df = 3$, $P = 0.001$).

Most household heads ($r_s = -0.256$, $N = 106$, $P = 0.008$) without a formal education thought that human activities in the communities scared wildlife away (12 of 31 households), while household heads with primary through tertiary education did not consider this factor significant in reducing wildlife numbers (6 of 75 households). Thirteen households could not decide on the primary factor responsible for wildlife decline.

5.1.5.1 Human population densities

The numbers of households as well as the number of people per village varied widely amongst the surveyed constituencies. The Ongenga constituency had the fewest reports of wildlife presence in 2003/4, but had more than twice as many households per village as Eengodi and Epembe constituencies where more wildlife diversity was reported. When these figures were compared with census data (NPC 2001), Ongenga and Omuntele constituencies had similarly high human densities, although the units surveyed for this research were not exactly the same as those used in the census. The number of people per village did not influence the number of people per household, as the average number of people per household was similar in all four constituencies regardless of high or low human densities (*KW* $X^2 = 1.89$, $df = 3$, $P = 0.596$).

5.1.5.2 Length of time the heads of households lived in the villages

The time periods that heads of households lived in their villages were longer in higher human density areas than in lower density areas that tended to be more recently settled (Table 16, Appendix I). The Eengodi constituency had no respondent who lived in the area for more than 29 years and 14 heads of interviewed households had lived in this constituency for less than 10 years. In the Ongenga constituency, however, 16 heads of households had settled the area more than 39 years ago. This constituency shows a total absence of large mammals and the highest number of reports citing habitat loss as the primary cause of wildlife decline.

5.1.5.3 Poaching

Wildlife poaching had decreased in the study area. One hundred households interviewed had poached wildlife and 18 of these households continued to poach at the time of the interview (Figure 8 Appendix II,). The number of households that had poached wildlife showed a significant decline over the last 15 years (*KW X^2 = 25.86, df = 6, P = 0.001*), with 56 households having stopped poaching between 1988 and 2003/4 compared to 22 households between 1968 and 1988.

The continuation of poaching and restraining from poaching were independent of wildlife distribution. The Epembe constituency, with the second highest wildlife sightings, had six households which were still actively poaching at the time of the interviews, followed by Ongenga, a constituency with the lowest wildlife sightings that had five households that continued to poach, while Eengodi constituency had only three households poaching. Eight out of 19 households that had never poached were from Eengodi constituency, where the highest sightings of wildlife species were reported at the time of the interviews.

5.1.5.4 Species being poached

The Ongenga and Omuntele constituencies, with high human densities and few wild mammal sightings, had 49 households reporting birds were being poached (*KW X^2 = 9.19, df = 3, P = 0.027*) in comparison to 31 households in Eengodi and Epembe constituencies, which had lower human densities and more diverse wildlife species present at the time of the interviews (Table 17, Appendix I). Households from

Epembe constituency poached both more rabbit/hare and small ungulates (*KW X^2 =10.88, df = 3, P = 0.012; KW X^2 = 14.88, df = 3, P = 0.002* respectively) than the other three constituencies.

The gender of individual survey participants was a major factor in participation in wildlife poaching. Fourteen out of fifteen individual men (93 %) had poached in comparison to twenty-three out of thirty individual women (77 %). More individual women (23 individuals) poached birds than individual men (9 individuals) (r_s = *0.417, N = 38, P = 0.009*). Five individual men poached small ungulates while no individual women poached those species (r_s = *-0.510, N = 38, P = 0.001*).

Among the households that poached game species, only six households had preferences within wildlife species; the rest reported poaching anything edible.

5.1.6 Observations concerning current wildlife distribution and diversity

Overall, the households interviewed reported the presence of large mammals 16 times, the presence of small mammals and birds 390 times, and carnivores 126 times (Figure.9, Appendix II). The households interviewed from Eengodi, the lowest human populated constituency, reported the presence of wildlife 278 times, of which 10 reports were large mammals, 189 reports were small mammals and birds and 79 reports were carnivores. None of the households interviewed in Ongenga, the highest human populated constituency, reported the presence of large mammals and only two households from that constituency reported the presence of carnivores.

5.1.6.1 Growth trends of present wildlife

To understand the growth trends of the current wildlife populations in different constituencies, interviewed households were asked whether the wildlife species currently present were increasing, remaining constant, or decreasing (Figure 10-12, Appendix II). Overall, 290 reports of nineteen persistent wildlife species in the constituencies indicated a decline; 179 reports indicated populations remaining constant; and 63 reports presented an increase in wildlife sightings. Carnivores made up 32 reports of the overall wildlife increase, followed by small mammals and birds, which contributed 31 reports. One hundred and thirty-six observations of small mammals and birds reported numbers remained consistent, and 224 reports indicated a decrease.

Eengodi, the constituency with the highest presence of wildlife, reported 41 increases in presence of wildlife, including one report of a large mammal, the kudu [Figure 10, Appendix II]. One hundred and twenty two reports of wildlife growth trends remaining constant were from the Eengodi constituency (Figure 11, Appendix II). However, this constituency also accounted for 117 reports of decrease in wildlife presence. Only the Eengodi and Omuntele constituencies reported large mammals to be on the decrease (Figure 12, Appendix II).

5.2 Wildlife in contemporary context: a synopsis

The second section of this chapter presents an analytical report of the survey data. It details geographical potential of wildlife conservation in the north central communal areas.

5.2.1 Perceptions of wildlife

5.2.1.1 Essence of free-roaming wildlife

Social benefits of wildlife were identified as the most important value by the majority of the households, and people were more aware of these social benefits than of the economic benefits. Hinz, (2003), Mauney (2004/5) and Quan and others (1994b) explain that people in north central communal areas regarded wildlife as a social asset. The high number of households that perceived social benefits of wildlife might be attributed to the historical usage of natural resources in these areas. Besides subsistence consumption, the traditional utilisation of wildlife included social aspects, such as the use of skins for special clothes (i.e. carrying baby princes, king's wife's dresses) and medicinal value such as using horns for healing madness (Hinz 2003).

According to Barnard (1998), the lack of utilisation rights of wildlife in communal areas has largely restricted the economic benefits of tourism to craft sales and employment in lodges. Because of the banning of legal wildlife ownership in 1884, interviewed communities, not all of which practice community conservancy, had never known the profitability of wildlife through activities such as trophy hunting,

and this may have affected most people's perception towards the economic benefits of wildlife. Only a very small number of households placed an economic value on wildlife utilised as bush meat.

Although free-roaming wildlife was perceived as being essential for its aesthetic value, people in north central communal areas also knew that wildlife had economic value. The proximity of a given constituency to protected areas seemed to influence the people's perception regarding economic benefits. Households in the Omuntele constituency, which neighbours the Etosha National Park, reported more economic benefits than other constituencies. Households from this constituency might be more aware of the economic benefits the park derived from tourism revenue than households in other constituencies. In addition, the majority of households that had family members who visited a wildlife-rich place felt that there was an economic benefit to having wildlife, most likely due their awareness of entrance fees charged to view the wildlife.

The low number of wildlife present in Epembe, Ongenga and Omuntele constituencies may have contributed to their belief that there is an educational value to having and seeing wildlife. For instance, in these constituencies, many of the respondents did not know what some of the animals even looked like, as it had been many years since the species had disappeared. However, in the Eengodi constituency, where wildlife was more common, people still knew about some of the species, because they saw them in their area and did not see a need for education

pertaining to wildlife. The presence or absence of wildlife appeared to be an important factor affecting perceived educational value of wildlife.

The significance of level of formal education of the heads of household lies in their ability to influence the attitudes of other family members towards wildlife conservation. This point is well illustrated in the Ongenga constituency, where the majority of heads of households had primary to tertiary education and thought that habitat protection was required to protect wildlife. When the heads of households had secondary or tertiary education, the majority of them thought that it was not the responsibility of headmen alone to protect wildlife in their farming communities. Families in which heads of households had no schooling did not have the same understanding of the importance of habitat protection, thus demonstrating the impact of the education level of the heads of households on community perceptions.

5.2.1.2 Places where wildlife should live and willingness to share land with wildlife

The deprivation of legal wildlife benefits and loss of wildlife habitats may have affected the perceptions of the majority of the survey participants on where wildlife species should live in the country. The Omuntele constituency expressed strongly negative attitudes towards the presence of wildlife outside of protected areas, possibly as a result of their closeness to Etosha National Park. There was an awareness of the economic benefits government derives from the park's entrance fees. However, the community reported that wildlife conflict caused them economic loss, and they were not compensated for having the wildlife on their lands. This

problem has been reported before (Van der Breemer and others 1995; O'Riordan and Stoll-Kleemann 2002), and may be why households from this constituency were less supportive of the idea of having wildlife share the farmland with livestock.

Likewise, most households from the Ongenga constituency did not want wildlife sharing the farmland with their livestock, as they felt that the habitat was too degraded to support wildlife as well as livestock. Some even suggested that a portion of land should be fenced and wildlife reintroduced into the area once the vegetation had recovered sufficiently. This local concern reflected the realisation that land degradation had taken place in the highly populated areas of the north central communal areas (Barnard 1998, Ashley 1994).

The exclusion of predators from farmland was important in the constituencies where higher livestock predation was reported. The negativity towards predators in the Epembe and Eengodi constituencies could have been a result of the high livestock predation reported, causing many people from those two constituencies to think that carnivores should not be part of their communities. Similar attitudes were reported on commercial farms in Namibia, where high numbers of cheetahs were killed annually by the farmers who perceived cheetahs as problem animals, compared to farmers who did not regard them as problematic (Marker and others 2002). Livestock comprises a vital economic asset for Oshiwambo-speaking groups, and any interference with their welfare could provoke an attempt to eradicate the cause of loss (Hinz 2003; Pallet 1994; Quan and others 1994)

5.2.1.3 Who should be responsible for wildlife protection?

It was common understanding in the north central communal areas that wildlife should be protected. The breakdown of traditional systems of common property by colonial and post colonial administrations (Barnard 1998) caused uncertainty among communities as to who should protect wildlife on communal lands. This uncertainty was possibly reflected by the significant non-response to this question in the survey and widely varying opinions of who should protect wildlife on communal land. Although a high proportion of households realised that every community member should take part in wildlife protection, heads of household who did not attend school thought that headmen were the primary people responsible. This perception might have been based on the tradition that wildlife together with the communal land belongs to the traditional authority and headmen are the subordinates of the king (Hinz 2003; Malan 1995). The powers that headmen exercise in the community may be the reason why some people think they are responsible for wildlife protection (Quan and others 1994b). Analytical thinking by heads of households who had education enhanced their understanding of wildlife survival, and the understood the fact that the involvement of the entire community is vital.

The denial of rights over wildlife by the colonial administration could have made people think that the government should be responsible for wildlife protection in their community, because wildlife species were government property (Hinz 2003; Marker and others 1996). The existence of non-governmental conservation

organisations may help to explain responses suggesting that an outsider should protect wildlife in the communal lands.

5.2.1.4 Wildlife conservation possibilities

There was a strong feeling that wildlife could be protected on farmland. The interviewed communities' belief that wildlife could be conserved on farmland, in spite of few realised economic benefits, reflected the interest the people had in these natural resources. The large number of reports that wildlife could be protected if every community member participated in conservation practices, indicates that people have become aware that individual efforts do not achieve that goal. This cooperative wildlife management dream forms the foundation on which maintenance, restoration, rehabilitation and enhancement of natural resources stand (CANAM 2004/5). The larger number of households that felt that wildlife could still be protected in Eengodi and Epembe may have been influenced by the multiple reports of wildlife present in those constituencies at the time of the interviews. People from those constituencies saw wildlife in their communities and they felt that if effective protection could be applied, these natural resources could be perpetuated. The realisation of the need for cooperative management of natural resources was what triggered the conservancy movement on commercial and communal farmlands in Namibia (CANAM 2004/5).

Land degradation is well documented in densely populated areas (Ashley 1994); households in densely populated areas of Ongenga and Omuntele constituencies

recognised that a wildlife habitat is the prerequisite for wildlife protection. Although the Eengodi and Epembe constituencies are much less densely populated than the Ongenga and Omuntele constituencies, households nonetheless also recognised the need for wildlife habitat in order to accommodate wildlife.

Although negative attitudes exist towards wildlife in the Omuntele constituency, which borders wildlife-rich Etosha National Park, all households recognised the fact that, although legal wildlife utilisation was not allowed, this was not the sole reason for these negative attitudes. This constituency had the second highest number of heads of households who had lived in their villages for over 40 years. The degradation of vegetation in this constituency possibly made people think that nothing could be done to protect wildlife. Negative attitudes towards wildlife were also prevalent in the Epembe and Ongenga constituencies, even though they do not border a wildlife-rich area and do not experience the problems associated with wildlife moving onto the farmland from these areas. The reports that wildlife could not be protected not only reflect the intolerance towards wildlife on the farmlands, but the lack of suitable habitats, as well.

5.2.2 Primary factors affecting wildlife perceptions

5.2.2.1 Human-wildlife conflicts

Eengodi, Epembe, and Omuntele constituencies reported more human-wildlife conflicts than Ongenga, the most densely populated constituency. These higher incidences of wildlife conflict were attributed to the local abundance of wildlife

species that caused damage to crops and livestock predation. Although springhare and steenbok were the primary crop raiders, any economic loss to human livelihoods affects people's perception towards wildlife (Marker 2002). These reported incidences were consistent with O'Riordan and Stoll-Kleemann (2002), who explain that rural people bear damage caused by wildlife and receive no tangible benefits from having it in their communities.

The lethal actions applied by the survey participants were taken to minimise both crop damage and livestock predation. The attempts to eradicate problem animals have been documented worldwide, wherever human-wildlife conflict occurs (CCF 2003/4). A higher number of individual men, compared with individual women, reported killing problem animals. This may be a result of tradition, even though the labour division has been shifting over the past 100 years. In the Oshiwambo tradition, it is the men's responsibility to look after livestock and protect the household properties (Malan 1995; Schneider 1994). The high incidence of killing predators seen in the wild, reported by households that had lived in the village longer than 10 years, might be related to frequencies of problems. The households that lived longer in the same area may have experienced livestock predation repeatedly compared to households that had just settled in the area. The frequency of livestock losses could have forced these households to take action. Marker and others (2002) found that commercial farmers who lost more cattle to predators reported a higher number of cheetah removals.

Although the majority of the households reported lethal means of protecting crops and livestock, a higher number of heads of households who had a senior education scared predators away rather than killing them. This may be due to a broader understanding of the benefits of species survival.

5.2.3 Wildlife conservation awareness

Wildlife conservation was well known in the survey area. Most households were aware that wildlife needed to be conserved. It was reported that most of the conservation work done presently was being done individually, rather than with the assistance of any organised programme. The attempts towards conservation of wildlife were interpreted in various ways.

5.2.3.1 Understanding of conservancies

Knowledge regarding conservancies had reached portions of the survey area. It was interesting to note that within a constituency, some people had heard about conservancies and others had not. This patchy coverage of information could have been the consequence of limited communication media in the rural areas.

The reported advantages of a conservancy were similar to those reported for the benefits of having wildlife in the community. Households that had heard about conservancies showed little understanding of the potential advantages and benefits of conservancies run by joint natural resource management.

5.2. 3. 2 Households with members who have visited places rich in wildlife

The low number of households whose family members have visited wildlife-rich places may be in part explained by the exclusion of the general public from wildlife reserves during the colonial era (Hinz 2003). Travel expenses also prevented the general public from visiting wildlife-rich places in post-colonial times. The public interest in viewing wildlife species has been the motivating factor driving families to wildlife-rich areas. The establishment of conservancies could bring wildlife back closer to people, while substantially reducing the travelling costs currently needed to see wildlife. There was an understanding that there was an economic benefit to having wildlife. The perception that wildlife–rich places have monetary benefits probably resulted from the knowledge that entrance fees are charged to visit these places.

5.2.3.3 Wildlife conservation practices

Wildlife conservation practices were conducted by individual households. These solo efforts evolved as a result of a breakdown of common property systems that were maintained by traditional authorities during pre-colonial times (Quan and others 1994b). The lack of coordination in utilisation of wildlife overshadowed these individual efforts and caused wildlife decline (CANAM 2004/5). Households that had never killed anything and those that still hunted at the time of the interviews, reflected individual conservation as well as utilisation of wildlife.

The high number of reports of community members who had stopped hunting showed increased awareness that killing is the primary human-induced factor causing wildlife decline. Community members may have stopped hunting after they realised that wildlife had declined in number. The cessation of hunting could also have been a result of the absence of wildlife from the area; Malan (1995) explains that hunting activities were more frequent where wildlife was abundant. The fact that it was mostly men who had told other community members to stop killing wildlife could have simply been a reflection of the fact that men head the households and are in command (Malan 1995). Similarly, more women reported never having killed anything as a conservation action, which might be due to the Oshiwambo tradition where women are regarded as agriculturalists and men are pastoralists and hunters (Hinz 2003; Schneider 1994).

The different rationale for ‘never killing’ and ‘stopped hunting’ as conservation actions of households that had lived less than 10 years in the villages was possibly affected by new exposure to wildlife. More recently-settled households were from densely populated areas (Ashley 1994) and they had never hunted, possibly due to their awareness of wildlife decline. The low proportion of recently-settled households that had stopped hunting might imply that it takes several years of occupation for the households to realise the decline of wildlife species; people need time to understand that over-hunting causes a detrimental impact on wildlife.

5.2.4 Wildlife decline

The decline in numbers, as well as the extinction of some wildlife species, was noticed in all surveyed areas. However, substantial sightings of some wildlife species were reported at the time of the interviews, especially in the areas where human density was lower and people had settled only recently.

5.2.4.1 Large mammals

Despite the continuing decline and disappearance of large herbivores from the north central communal areas of Namibia during the last four decades, some of these species were still present. Kudu, oryx and elephant were present in some areas at the time of the interviews, while eland had disappeared from all constituencies where interviews were conducted.

Elephants persisted in north central communal areas until the early 1990s, more than a decade after the illegal large-scale hunting of elephants outside the protected areas in the 1970s (Braun 1995). With north central communal areas being very close to Angola, where the Portuguese were reportedly urging local Namibians to act as scouts and hunters for ivory, this illegal hunting posed more of a threat to elephants. The illegal hunting was exacerbated by the permission granted to black Namibians to purchase guns in 1987 (Braun 1995). Nonetheless, some elephants survived this illegal hunting in the surveyed area. The survival of elephant in the area beyond the 1970s implies that factors other than the illegal ivory trade have also contributed to the fate of this species. Another factor that contributed to the elephants' decline in

these areas was probably the drought that reportedly lasted for nearly the entire decade of the 1980s (Braun 1995).

Braun (1995) states that the drought lasted from 1982 to 1989; Marker and others (1999) indicate that drought lasted for fifteen years (1979-1995) and, according to the records of Namibian Meteorological Service (1930-2000), 1987 was the worst single year of drought in the century. Therefore, the last sightings of elephant during the early 1990s suggest that the disappearance of elephant from the area was more related to drought than illegal hunting.

However, longer persistence of elephants in the Eengodi constituency could have been due to fewer people living in the areas, which was only settled between 1974 and 1983. These findings also explain how crop cultivation appropriated habitat from elephant. Elephants lived in harmony with cattle-owners for decades. According to Houghton (1965), this eastern part of the north central communal areas had served as grazing areas long before 1940. The disappearance of elephants from the Eengodi constituency within less than 20 years of crop cultivation, shows how incompatible the presence of elephants is in crop growing areas.

Elephant sightings reported in the Omuntele constituency before the interviews in 2003/4 could have been Etosha National Park residents, which broke through the park's fence and ventured out. According to Berry (1997), elephant, lion, hyenas and

domestic stock still break through the park's fence, despite the high cost invested in electrifying a substantial section of the border fence.

Elephants disappeared from Ongenga constituency before 1979 and from Epembe constituency some time prior to the CITES ivory ban in 1989 (Owen and Owen 1992). This local extinction could have been due to illegal hunting. These two constituencies had been settled for longer period than Eengodi and Epembe constituencies as well, thus reducing the amount of habitat available for the elephants as result household encroachment. Due to the large body size of the elephant, a substantial amount of forage is required for each elephant, and according to both Ashley (1994) and Quan and others (1994b), much of the forage had been depleted from the Cuvelai areas, where the Ongenga constituency is located.

The earlier decline and extinction of eland and oryx from most surveyed areas preceding that of mega-herbivores such as elephant, rhino and giraffe, is a totally different scenario from what occurred on commercial farmlands. The commercial farmlands have abundant oryx and eland, while mega-herbivores were perceived as primary competitors to livestock and therefore had been systematically eradicated from these farmlands since their formation in 1884 (Barnard 1998; Marker and others 1996). In contrast, elephants persisted longer than eland and oryx in the north central communal areas.

Eland and oryx disappeared before kudu possibly because they have larger home ranges (8 000 to 14 000 km² for eland and 1 002 to 2 750 km² for oryx), and eland are known to migrate (Apps 2000). These behaviours might have subjected them to the negative effects of the veterinary cordon fence (game proof) as well as Etosha National Park's fencing developed in 1961 and 1973, respectively (Berry 1997). Previously, the fauna of Etosha and the former Owamboland were integrated and about 3 000 eland were known to migrate to Etosha from eastern areas (Berry 1997). Another reason why oryx declined in this area may have been that the people in these regions preferred oryx meat, so the earlier disappearances of both eland and oryx, as compared to kudu, could have been a consequence of preference. In addition, Comley and Meyer (1997) and Apps (2000) describe oryx as a primary grazer, but also an opportunistic feeder. This feeding behaviour could result in oryx being one of the first large ungulates to be negatively affected by cattle competition; the species probably suffered from nutritional stress and then moved out of the area (Comley and Meyer 1997; Apps 2000).

Eland are considered special among the Oshiwambo-speaking language groups. Eland meat and bone marrow are considered the most preferred wildlife products, and eland stomach was used as a dress for the king's wife in the Oshiwambo tradition (Shakujungua 1991; Hinz 2003). This species had not been observed in Eengodi, Epembe and Ongenga constituencies since 1988. The recent sightings of eland and oryx in Omuntele constituency could be Etosha Park residents that broke through the fence.

Kudu persisted in some surveyed areas, despite the lack of community-based resource management. The survival of kudu is of particular interest, as the kudu's home range is quite small, generally 3.6 to 5.2 km², but tends to be larger in drier areas (Apps 2000). This small home range, together with the absence of both the legal right and incentives to manage wildlife among local communities, should have put this species at greater risk to hunting and starvation. However, current kudu sightings were mostly reported in Eengodi, the constituency that had the least number of people per village and was most recently settled. In addition, one household from the same constituency reported an increase in kudu sightings, which could indicate that kudus were re-occupying the area from elsewhere, possibly from the Manketti farmlands. In Manketti, illegal fencing of communal farmland in the Oshikoto Region by some wealthy individuals is reported by Jonathan and others (1998). This communal farmland is located in Eengodi constituency. This increase in kudu sightings could also be the result of the reported decline in hunting activities in the survey areas and specifically, even less hunting activities in the Eengodi constituency. The high number of cattle in the Eengodi constituency could have caused bush encroachment (ADP2 2001/2003- 2004/2005), inadvertently creating favourable kudu habitat (Barnard 1998; Schoeman 2002). These observations also could indicate that the Eengodi constituency is still a suitable habitat for large ungulates, the kudu in particular.

5.2.4.2 Small mammals and birds

Unlike large herbivores and carnivores, the three small herbivores (duiker, steenbok, springhare) and two bird species (ground hornbill and guinea fowl) were present in all surveyed constituencies at the time of the interviews. While the sighting numbers of these herbivores were inversely proportional to human densities, their presence in all surveyed areas reflects their ability to survive almost anywhere, and that they have received some protection from the community.

The reports of duiker and steenbok in 2003/4 in all surveyed constituencies, including those for the most densely populated areas, agreed with Apps (2000) and Comley and Meyer (1997), who describe these animals as the most successful antelope that can survive in areas denuded of most other game species. The Ongenga constituency, which has 67 people per km² (NPC 2001), still contained duiker, steenbok, springhare, ground hornbill, and guinea fowl. In fact, springhare sightings actually increased in a few parts of this constituency. Aardvark and porcupine also were among the small wildlife present in this densely populated area. Comley and Meyer (1997) report that steenbok will even eat small birds and rodents in cases of vegetation shortage. The small body size of these wildlife species, coupled with a wide range of feeding behaviours, may help explain their survival in vegetation-denuded areas.

Although most households reported a decrease in small herbivore numbers, their persistent survival, despite of small home ranges and the reluctance of some species

to evacuate their territories (i.e. steenbok), may indicate that people in the surveyed areas have no intention of eradicating them. Some households have stopped hunting and others have tried to persuade their fellow community members to conserve game species. Interestingly, one head of household interviewed from the Ongenga constituency commented that springhares survived inside of his crop fence because he asked the neighbours not to harm them. The reports of increases in sightings of duiker, steenbok, springhare, hare, honey badger, porcupine, aardvark and guinea fowl, while low, showed the presence of conservation work in the area. The presence of these game species in areas of dense human population could also be due to the adaptation of these animals to people.

The highest numbers of ground hornbill sightings were reported in the Ongenga constituency, despite having the highest human density. This may be due to the minimal effect that humans have on this particular species. The observations agreed with many verbal reports that this black bird has been associated with myths in the Owambo tradition, including bad luck if you disturb or kill them (Helvi Mokaxwa, personal communication). Tönjes (1996) reports that hollow call of ground hornbill is regarded as a bad omen in Oshiwambo tradition announcing the mourning of one of prominent personalities. Therefore, this superstition has probably played a vital role in the survival of ground hornbills.

The Eengodi constituency, having the fewest number of people per km², showed other evidence of wildlife protection. This constituency had the lowest incidences of

hunting activity; the fewest lethal actions taken against livestock predation or against predators seen in the wild; and the lowest number of households opposed to free-roaming wildlife. These observations help explain the increase shown in the sightings of all small herbivores in this constituency. The exact number of households that must practice conservation work in the community in order to ensure the survival of most wildlife species was beyond the scope of this research. However, other constituencies that had fewer households than Eengodi constituency doing conservation work sighted fewer small herbivores and birds, showed a lower rate of wildlife increase and reported fewer consistent sightings.

5.2.4.3 Carnivores

Most of the large and medium-sized carnivores were still present in some parts of the north central communal areas of Namibia. The number of sightings and individual carnivore species reported were higher where large numbers of herbivore and omnivore species were present in the surveyed areas.

Cheetahs, the fastest land animal, were the first carnivore reported disappeared from the surveyed area. The disappearance of cheetah from most of the surveyed areas occurred earlier than 1970, before the large-scale decline of cheetahs that was reported in the country in the 1980s (Marker and others 1996). This earlier disappearance was probably caused by farmers killing cheetah to protect livestock, although eradication of this species by pastoralists is arguable, because the most effective tools (rifles and trap cages) were not accessible to most communal farmers

at the time. It has been documented, in the Oshiwambo tradition, a "back strap" made of cheetah skins was used to carry the king's sons on one's back, however, this tradition was practiced minimally, since there were only seven kings (chiefs) at the time (Hinz 2003). Another possibility was the emigration of cheetah to commercial farmlands, where, according to Marker and others (1996), the eradication of lion, hyenas and wild dog in the 1950s along with the establishment of permanent water points resulted increases in the sightings of many wildlife species including the cheetah.

Leopard and jackal, species which are able to adapt well to modified habitats (Woodroffe 1999; Apps 2000), disappeared earlier than lion and African wild dog from the most populous areas as well as from the earliest settled constituency, Ongenga. This may be due to communal households having far less food wastes and rubbish for disposal, thereby not providing adequate food sources to leopard and jackal. By comparison, cities and towns, where the adaptation to modified habitats of these species was observed, significant food waste is generated, providing a niche to these species. The sightings of African wild dog reported in the Ongenga constituency could be explained by long distance exploratory probes, which are commonly seen in this species (Comley and Meyer 1997). The wild dogs sighted in the Ongenga constituency could have been dispersers from the northeast of the country, or possibly from Angola, which borders this constituency, since the majority of Namibia's wild dog population occurs in the northeast area of the country (Barnard 1998; Apps 2000; Lines 2004/5).

The most recent sightings of carnivores were reported from Eengodi constituency, where the prey base was also reported to be higher. Although the lion sightings in this constituency at the time of the interviews were believed to be escapees from Etosha, the leopard and wild dog sightings were reported by too many households (15 and 7 households respectively) to be escapees only, and are likely to be residents of the area. The reports of lion and leopard in the Omuntele constituency, where a smaller prey base was observed and where human density was the second highest, could again have been the consequence of escapees from the neighbouring Etosha National Park. The park's escapees wander around neighbouring villages before either returning to the park, or falling victims to farmers. The Omuntele constituency reported highest numbers of carnivores killed (4 leopards, 2 hyenas and 1 lion from one village in one year), with a matching decrease in carnivore sightings. DANC (1984, 1985, 1986), Berry (1997) and Stander (2005) also report substantial numbers of carnivores killed by farming communities in the vicinity of Etosha National Park. Households that were closer to the park reported more species killed than those further away.

The decline of wild dog numbers was probably due to the expansion of the human population. Despite the increase and consistent sightings of prey in the Eengodi constituency, all households that saw African wild dogs in 2003/4 reported a decrease in this species. One household from this constituency explained that wild dogs had become scarcer and the sizes of the packs had decreased substantially. The continuing decline of wild dog in the north central communal areas, in the absence of

lions, could possibly be due to human persecution, disease and pup desertion (Comley and Meyer 1997; Barnard 1998; Apps 2000). The higher rate of human settlement in Eengodi constituency also correlates with the findings of Lines (2004/5), who reports that expansion in human population caused the wild dog's decline.

There were very few recent reports of leopard or caracal throughout the constituencies interviewed. However, the Eengodi constituency, while reporting only a few sightings, reported a constant number of leopard and caracal sightings showing the potential that this constituency has to harbour wildlife. Therefore, this area might be an important player in the development of a community-based natural resource management programme.

Jackals were the most populous carnivores in the survey area. Despite the jackal's cunning behaviour and ability to survive almost anywhere (Apps 2000), they disappeared from Ongenga constituency in the 1960s. The reports of either increasing or consistent sightings of jackal in the other three constituencies may indicate that suitable habitats were still available for this species in those constituencies. The majority of reports of jackal sightings were from Eengodi and Epembe constituencies, where most livestock predation was also reported. The increase in jackal populations was reported on small stock commercial farms in southern Namibia, where farmers tried to hunt jackals down. In response, jackals reproduced more rapidly than usual (Snow 2005; Tim Miller, personal

communication). Thirty-three percent of all the households in areas where jackals were present reported that they killed wildlife species that caused problems to their farming practices, including preying on crops or livestock, or predators that were spotted in the wild.

The similarity between African wildcat and domestic cat species made it difficult to quantify the presence of African wildcat in the survey area. The confusion shown by interviewed households in differentiating between the African wildcat and the domestic cat is reflected by most authors of southern African mammal books (Apps 2000; Comley and Meyer 1997; Alden and others 2001; Kingdon 1977). The similarity of African wildcat's faeces and tracks to those of the domestic cat and the nocturnal behaviour of African wildcat made it hard to distinguish them from domestic cats. Although some households reported the presence of African wildcats, it remained unclear whether or not these were being confused with domestic cats.

5.2.5 Primary causes of wildlife decline

Although the survey participants reported a number of factors that caused wildlife decline, most of them did not believe that wildlife species that had existed in their communities had perished. Despite the fact that 82 % of the interviewed households hunted and 25 % killed game species that damaged crop or preyed on livestock, 76 % believed that wildlife moved from the area to live somewhere else. The sedentary human settlements and hunting by individuals probably prevented the local people from realising human impacts on wildlife. In the past, it was reported that the

traditional authority did not allow a hunting group to kill more than two animals at any one time (Hinz 2003). Although hunting practices had been a part of their culture, it seems that people failed to comprehend that the utilisation of wildlife was not sustainable due to human population growth. On the other hand, the earlier disappearance of some species such as the cheetah possibly caused the people to think that wildlife had moved on to a preferred habitat. The concept of wildlife emigration could also have been fostered by an *omulova*, defined as a sole wild animal that occasionally comes into populated areas, where, in most cases, people kill it before it can return to the suitable habitat. The sole report of kudu presence in Epembe constituency, at the time of the interviews, could have been an *omulova*. The sudden appearance of wildlife probably made people think that there was a place with substantial numbers of wildlife species, from which these *omulova* came.

Habitat loss was reported as directly proportionate to human densities. More households linked wildlife decline with habitat loss in the Ongenga constituency than in other constituencies. Other researchers found that there was prominent vegetation degradation in the Cuvelai area located in the Ongenga constituency (Ashley 1994; Quan and others 1994b; Barnard 1998). These reports of vegetation degradation in this constituency had possibly made people link habitat loss to wildlife decline.

However, a minority of households reported habitat loss in the Eengodi constituency. This finding is supported by the higher number of wildlife species sighted in the area at the time of the interviews. This could indicate that people from this constituency

felt there was still potential habitat for wildlife. The households in highly degraded areas that did not indicate concern about habitat loss and those who showed their concern about it in less degraded constituencies may reflect the habitat fragmentation that exists throughout these constituencies.

The "guiding away of wildlife" that was reported in Omuntele constituency may be attributed to the monitoring of game animals in Etosha National Park (i.e. aerial game counts) that was not seen in areas further away from the park. Human activities as a disturbance factor to wildlife was only reported in Eengodi and Epembe, the most recently settled constituencies. These observations regarding wildlife disturbance showed that the longer communities have been exposed to the problem, the less aware they became of how their activities affect wildlife behaviours. The extended period that people have lived in Ongenga and Omuntele may help to explain why people in these constituencies have little perception that their activities are detrimental to their environment. The gunshots reported mostly in Epembe could explain the significant decline of carnivore species in this constituency in the 1980s, at the same time the war took its toll in north central communal areas.

5.2.5.1 Human and livestock densities

The human settlement rate (2.7 %) per annum in the surveyed areas is higher than the 2.2 % national population growth rate (Van Schalkwyk 2004). Humans settled in the four surveyed electoral constituencies surveyed at different times and the highest settlement rate reported in the least populated areas was possibly due to the

availability of virgin arable land, which was no longer available in populated areas. Through continuous settlement, grazing lands are declining, as each household establishes its own crop field. In addition, the higher number of households per village resulted in higher numbers of people per village, as seen in the Ongenga constituency, which had more than twice the number of people per village than the Eengodi and Epembe constituencies.

Human population was observed as an important factor that influenced the number of livestock per village. Densely human populated constituencies had fewer cattle and more goats. These findings were consistent with those of Ashley's (1994) who projects that accelerating human population growth is causing an increase in livestock numbers, which in turn reduces the potential of the land to support livestock. The lower number of cattle reported in densely populated areas was a result of more cultivated plots (per village) replacing grazing land and wildlife habitat with cultivated land, resulting in fewer livestock and less wildlife. The growth in livestock numbers causes overgrazing and degradation of land resources that eventually reduces livestock numbers. Quan and others (1994b) also indicate that although the 1992 Directorate of Veterinary Services (DVS) Report shows an increase in cattle numbers, there was a declining ratio of cattle to people due to drought and disease in north central communal areas.

In the north central communal areas, the decline in numbers of livestock and wildlife can be attributed to lower forage resources. Other parts of the world have seen a

similar reduction of wildlife numbers in conjunction with human population growth (Woodroffe 2000). However, the length of time an area has been settled also plays a role in determining the availability of forage resources. The Eengodi and Epembe constituencies had almost equal numbers of households per village, but the time that most people had lived there differed. In Eengodi constituency, where all interviewed heads of households had lived in the area for less than 30 years, more households kept cattle, with twice as many cattle herds as those households in the Epembe constituency, where more households had lived for over 40 years. In Epembe, the land had become overgrazed. The low number of heads of households in the Epembe constituency who had lived there a long time may also be the result of the low productivity of the land in that constituency. Fewer people had settled in this area at least in part because the majority of the land is not hospitable. This could have caused the lower numbers of both people and livestock in this constituency.

The observation of higher numbers of goats per village in highly populated areas is supported by the research of Quan and others (1994b), who explain that most farmers in the north central communal areas had switched from cattle to goats because goats were more drought resistant and browsed a wider range of forages.

5.2.5.2 Wildlife utilisation

The high number of households that had hunted revealed the impact humans had on wildlife in the north central communal areas. The higher proportion of households that hunted birds in areas that had low wildlife diversity may be explained as a shift

in hunting behaviours; people began hunting more birds because there was no other wildlife species available to them. These observations agree with those of Pallet (1994) and Ashley (1994), who described how people in northern Namibia turned to hunting of birds after mammals were nearly exterminated. Epembe, a constituency where a variety of wildlife species were still present, showed a balance of utilisation of both birds and small mammals, compared to the Ongenga constituency, where people seem to have hunted more birds.

The decline in hunting activities may be explained by the reports of a decline in wildlife species. Several households in Eengodi and Omuntele constituencies and only one household in Epembe reported the presence of large ungulates. Irrespective of the presence of large ungulates, the number of households that hunted large ungulates was similar in all constituencies. The Eengodi constituency had more wildlife and a lower number of households that hunted. This may be due to the notion that headmen in this constituency that headmen were responsible for wildlife protection.

CHAPTER 6

PROSPECTS FOR FURTHER INVESTIGATION

Many wildlife species have nearly disappeared from densely populated constituencies of the north central communal areas of Namibia, and people in these areas perceived wildlife more as a social asset than an economic asset. Existing wildlife conservation efforts are carried out for subsistence consumption and non-economic benefits. Most people are aware that a collective conservation effort is required in order to sustain the long-term survival of wildlife.

Expansion of human settlements and an increase in livestock numbers have appropriated the habitats of wildlife species in the north central communal areas of Namibia. Small mammal species were widespread in the survey area, compared to large mammals and carnivores. Although drought had some effects on the wildlife decline, this trend was inversely proportional to the length of time the area had been settled, as well as inversely proportional to human densities. Conservation practices, whereby individuals stopped hunting (as a conservation tool) when game became scarce, showed minimal effects on wildlife numbers.

Most remaining wildlife species were found in the least populated constituencies and this is also where most conservation practices were reported. All utilisation and most conservation efforts were conducted individually. This lack of organised utilisation and management of wildlife was a key factor in explaining the low numbers of

wildlife species present. Although remnant habitat and the substantial presence of certain wildlife species occur in some of the constituencies, these populations cannot be expected to be viable in the long-term, so long as there is a lack of local institutional frameworks such as community-based natural resource management programmes. The lack of community ownership over wildlife in communal lands has further exacerbated the problem and impacted wildlife perceptions. The prohibition of wildlife utilisation in communal areas has resulted in most people perceiving these species as having only aesthetic benefits, with few people realising the economic value of wildlife.

Most people living in close proximity to protected areas such as Etosha National Park recognised the economic benefits of wildlife, but their attitudes were negative, since they could not access these benefits due to the lack of ownership or utilisation rights. Furthermore, Berry (1997) attributes the hostility of farming communities surrounding Etosha National Park towards wildlife to the fact that wildlife moving through the fences results in high crop and livestock losses. Communities typically retaliate by killing these species, particularly predators (Berry 1997). Conversely, people living far from protected areas were unaware of the economic benefits of wildlife. However, their attitudes towards wildlife were less negative.

The conservation of wildlife species living on farmlands is crucial to Namibia's economic and ecological well being, bearing in mind that over 80% of Namibia's wildlife lives outside of protected areas (Barnard 1998; Marker 2002; O'Riordan and

Stoll-Kleemann 2002). In 2000, N$ 150 million of the N$ 23.8 billion Gross Domestic Product was derived from wildlife-based industries (Erb 2004). It therefore becomes clear that the Omuntele constituency, bordering Etosha National Park, an area where substantial wildlife remains, requires active local institutional structures, such as conservancies, that empower local people to manage and benefit from these natural resources to ensure their conservation.

Similar steps are required in the Eengodi and Epembe constituencies, where wildlife species are still abundant and the establishment of conservancies could boost both wildlife numbers and people's willingness to conserve these species. The establishment of conservancies is the most appropriate option for the long-term survival of wildlife while accruing sustainable benefits to people in some parts of the survey area. Due to the high human density in the survey area, compared to existing communal conservancies elsewhere, the form of utilisation could be modified from direct utilisation of wildlife to indirect use of natural resources. For instance, instead of conservancies solely regulating conservation practices, they could also coordinate agricultural aspects, such as the transportation of livestock to abattoirs; negotiate the cost of livestock in quarantine camps; subsidise the cost of the tractors which cultivate crop fields, using revenue from the conservancies' coffers. These activities would fall in line with the objectives of the National and Regional Development Plan (NDP2 2001/2002-2004/2005).

The establishment of an efficient wildlife conservancy must be done in conjunction with the promotion of conservation awareness, which in many cases remains undeveloped. People in the north central communal areas need to be well informed about community-based wildlife management and sustainable use options in order to achieve the National Vision, which is to improve the quality of life of the Namibian people by year 2030 (Namibia Vision 2030, 2004). The Government is in the process of land reform to provide landless Namibians with land and to narrow down the disparity in benefits from natural resources among Namibians. In commercial farmlands, land is being made available through the 'willing seller, willing buyer' system. On the communal farmlands, people are being resettled on unoccupied communal lands and communal land rights of ownership are being granted (Hunter 2004; Blackie 1999). The resettlement programmes target citizens from all walks of life and this process could complicate conservation efforts outside protected areas. Rural people, who may be less aware of conservation ethics, may embark upon unsustainable activities towards wildlife. It is crucial that people living in both low and high wildlife density areas are sensitised to the potential benefits of sustainable resource use.

There are various sectors at the grass roots level that could be targeted to promote conservation on the ground. Community leaders such as headmen and youth groups could be targeted and encouraged through Community Based Natural Resource Management Programmes to become involved in the facilitation of natural resource management activities in their daily leadership practices. As a result of men in the

north central communal areas being drained away as emigrant labourers, women, carry most of the burden of responsibilities traditionally shouldered by men (Malan 1995; Schneider 1994), and are a huge untapped resource that could be integrated into natural resource management programmes.

The facilitators of existing conservancies could visit non-conservancy areas to share their experiences and encourage these communities to follow in their footsteps. Non-governmental organisations and the private sector could assist by forming enterprise partnership with communities and developing marketing strategies for emerging conservancies. The scientific sector could work with emerging conservancies on aspects such as vegetation monitoring, improving rangeland and assessing habitats, with a view to re-introducing game species.

The north central communal areas require the diversification of economic activities in order to sustain its population, comprising nearly half the nation. Vision 2030 aims to increase existing conservancy land from 4,080,224 ha in 2004, to 15,000,000 ha in 2030 (Namibia Vision 2030). Oshikoto and Ohangwena regions form part of the projected conservancy expansion area. In order to achieve this national goal, the assistance of individuals, non-governmental organisations, the private sector and government is required to facilitate the collective management of natural resources in the north central communal areas.

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APPENDIX I

TABLES

Table 2: Rationale for having free roaming wildlife in community (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
A					
Wildlife is aesthetic	29 (29)	27 (27)	24 (24)	20 (20)	100
Wildlife deserves to live	0 (0)	0 (0)	3 (75)	1 (25)	4
Wildlife is vital for children's education	1 (33)	2 (67)	0 (0)	0 (0)	3
B					
It does not matter whether children see wildlife or not	0 (0)	0 (0)	0 (0)	1 (100)	1
It does not matter where children see wildlife	0 (0)	1 (17)	0 (0)	5 (83)	6
Wildlife scares people to walk in woods	0 (00	1 (25)	1 (25)	2 (50)	4
Wildlife conflicts with farming activities	1 (100)	0(0)	0(0)	0(0)	1
There is no more wildlife habitat left	0(0)	0(0)	1 (50)	1 (50)	2

Source: Own data compilation

Table 3: Perceived wildlife benefits to people (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
There are benefit from having wildlife	29 (25)	30 (26)	28 (25)	27 (24)	**114**
There is an aesthetic value to having wildlife	28 (31)	26 (28)	22 (24)	16 (17)	**92**
Wildlife has financial value	11 (20)	12(22)	14 (25)	18 (33)	**55**
There are educational benefits from having wildlife	0 (0)	3 (9)	19 (58)	11 (33)	**33**
Wildlife species are edible	7 (23)	7 (23)	6 (19)	11 (35)	**31**
Wildlife attracts tourist	5 (19)	10 (39)	6 (23)	5 (19)	**26**
Wildlife provides no benefit	1 (20)	0 (0)	1 (20)	3 (60)	**5**

Source: Own data compilation

Table 4: Action taken against predator spotted in wild (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Track predator and kill it	4 (29)	6 (43)	3 (21)	1 (7)	14
Ignore it	14 (29)	8 (17)	13 (27)	13 (27)	48
Scare it away	5 (15.2)	8 (24.2)	10 (30.3)	10 (30.3)	33
Run away from it	0 (0)	0 (0)	2 (67)	1 (33)	3
Predators saw you before you spot it	1 (13)	4 (50)	0 (0)	3 (37)	8
Did not see predator in wild	6 (46)	4 (31)	1 (8)	2 (15)	13

Source: Own data compilation

Table 5: Places where respondents felt wildlife species should live (%).

A.	**Eengodi**	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Wildlife should live on farmland	27 (29.4)	29 (31.5)	20 (21.7)	16 (17.4)	92
Wildlife should only live in parks	3 (11)	1 (4)	9 (33)	14 (52)	27
Total	**30**	**30**	**29**	**30**	**119**
B.					
Wildlife should live anywhere in country	27 (30.3)	27 (30.3)	19 (21.4)	16 (18)	89
Wildlife should live where tolerated	0 (0)	2 (67)	1 (33)	0 (0)	3
Total	**27**	**29**	**20**	**16**	**92**
C.					
All predators should live in parks	17 (63)	21 (72)	7 (35)	6 (38)	51

Source: Own data compilation

Table 6: Possession of livestock among the households interviewed (% and standard deviation in brackets).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
No. Households had cattle (%)	27 (32)	25 (30)	12 (14)	20 (24)	**84**
No response	0 (0)	1 (100)	0 (0)	0 (0)	**1**
Min – max no. cattle/ household	0 – 190	0 – 80	0 – 32	0 – 60	
Mean no. (SD) cattle/household	**37 (±40)**	**22 (±19.6)**	**5 (± 9)**	**14 (±15.7)**	**19**
No. Households had goats (%)	24 (23)	30 (29)	22 (22)	26 (26)	**102**
Min – Max no. goats/ household	0 – 100	8 – 100	0 – 35	0 – 70	
Mean no. (SD) Goats/ household	**28 (± 27.5)**	**33 (± 21.3)**	**14(±11.6)**	**22 (±15.7)**	**24**
No. Households had chickens (%)	29 (24.8)	30 (25.6)	28 (24)	30 (25.6)	**117**
Min – max no. Chicken /household	3 – 60	3 – 13	0 – 15	2 – 40	
No response	1 (100)	0 (0)	0 (0)	0 (0)	**1**
Mean no. (SD) Chicken/ household	**9 (± 10.2)**	**7 (± 2.8)**	**6 (±3.7)**	**9 (± 7.1)**	**7**

Source: Own data compilation

Table 7: Wildlife species reported as causing crop damage.

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Springhare	16	11	21	11	**59**
Steenbok	6	3	7	10	**26**
Jackal	8	7	0	2	**17**
Duiker	4	2	0	2	**8**
Porcupine	7	1	0	1	**9**
Rabbit/hare	2	0	2	4	**8**
Others *	0	2	3	3	**8**

*Others include: elephant, kudu, baboon/monkey, yellow mongoose, striped polecat and rock monitor (*Varanus albigularis albigularis*).
Source: Own data compilation

Table 8: Actions taken by households against livestock predation.

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Trap and kill it	1	6	4	7	**18**
Scare it away	1	3	1	2	**7**
Track and kill it	2	1	0	0	**3**
Herd livestock	2	1	0	0	**3**
No response	1	0	0	0	**1**

Source: Own data compilation

Table 9: Heads of households with primary to tertiary education (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
None	15 (46)	12 (36)	6 (18)	0 (0)	**33**
Primary	10(17)	12 (20)	15(25)	23 (38)	**60**
Secondary	5 (42)	1 (8)	3 (25)	3 (25)	**12**
Senior secondary	0 (0)	3 (38)	3 (37)	2 (25)	**8**
Tertiary	0 (0)	1 (25)	2 (50)	1 (25)	**4**
No response	0 (0)	1 (50)	0 (0)	1 (50)	**2**

Source: Own data compilation

Table 10: Knowledge of the community conservancy concept and its benefits (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Households knew what a conservancy was	9 (16)	18 (31)	17 (29)	14 (24)	**58**
Households knew the value of having a conservancy	9 (16.7)	18 (33.3)	16 (29.6)	11 (20.4)	**54**
Financial benefit	4 (19)	6 (29)	5 (24)	6 (28)	**21**
Cooperation in wildlife resource management	3 (15)	6 (30)	5 (25)	6 (30)	**20**
Eco-tourism	0 (0)	6 (55)	4 (36)	1 (9)	**11**
Aesthetic value of wildlife species	4 (50)	2 (25)	2 (25)	0 (0)	**8**
Children's education	2 (33)	4 (67)	0 (0)	0 (0)	**6**
Subsistence consumption	0 (0)	0 (0)	1 (33)	2 (67)	**3**

Source: Own data compilation

Table 11: Visits to areas rich in wildlife and perceived benefits of these places (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
A. Household members visited these areas	12 (32)	8 (22)	9 (24)	8 (22)	**37**
B. Perceived benefits					
Financial to the owner	10 (29.5)	8 (23.5)	8 (23.5)	8 (23.5)	**34**
Conserve wildlife species	1 (33.3)	0 (0)	1 (33.3)	1 (33.3)	**3**
Educational to visitors	3 (60)	0 (0)	1 (20)	1 (20)	**5**

Source: Own data compilation

Table 12: Conservation practices among households interviewed (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Totals**
A. Households practicing conservation					
Household conserves wildlife	26 (29)	21 (24)	20 (22)	22 (25)	89
Never killed anything	8 (47)	4 (25)	2 (11)	3 (17)	17
Stopped hunting	13 (20)	19 (29)	17 (26)	16 (25)	65
Told others to stop killing wildlife	5 (28)	6 (33)	3 (17)	4 (22)	18
Kill only problem animals	4 (57)	1 ((14)	0(0)	2 (29)	7
Kill only chronic problem animal	2 (100)	0 (0)	0 (0)	0 (0)	2
Performed other* conservation work	4 (22)	6 (34)	2 (11)	6 (33)	18
B. Households not practicing conservation					
Household does not conserve wildlife	4 (16)	5 (20)	9 (36)	7 (28)	25
No attempt made	1 (14)	0 (0)	4 (57)	2 (29)	7
Still hunt	2 (13)	5 (31)	4 (25)	5 (31)	16
Kill problem animals	1 (50)	0 (0)	1 (50)	0 (0)	2

*Other conservation works: let birds drink from water wells, birds feed on pearl millet, conserved fruit trees where birds sought shelter and nesting.
Source: Own data compilation

Table 13: Views on wildlife protection in farming communities (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
A. Wildlife can be protected if:	29 (30)	26 (26)	23 (24)	19 (20)	**97**
Everyone community member is responsible	29 (33.7)	24 (28)	16 (18.6)	17 (19.7)	86
Wildlife habitat is protected	0(0)	4 (25)	9 (56)	3 (19)	16
Hunting activities are organised	0 (0)	1 (100)	0 (0)	0 (0)	1
B. Wildlife cannot be protected	0 (0)	4 (19)	6 (29)	11 (52)	**21**
There is nothing to protect	0 (0)	0(0)	1 (33)	2 (67)	3
Nothing can be done to protect wildlife	0 (0)	4 (24)	5 (29)	8 (47)	17
No response	1 (100)	0 (0)	0 (0)	0 (0)	1

Source: Own data compilation

Table 14: Opinions of interviewed households on who should protect wildlife (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Households believed someone else protects wildlife	30 (29)	27 (27))	24 (24))	21 (20)	**102**
It's every community member's responsibility	20 (25)	24 (31)	21 (27)	13 (17)	**78**
Headmen's responsibility	12 (36.4)	11 (33.3)	8 (24.3)	2 (6)	**33**
Government's responsibility	9 (31)	11 (19)	6 (12)	9 (38)	**35**
Outsider's responsibility	2 (25)	4 (50)	1 (12)	1 (13)	**8**
Unknown	0 (0)	0 (0)	0 (0)	1 (100)	**1**
Undecided	0 (0)	3 (18)	6 (35)	8 (47)	**17**

Source: Own data compilation

Table 15: Average human densities of surveyed constituencies (standard deviation in brackets).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
No. villages interviewed	19	23	19	23	**84**
Mean no. households per village	28.9 (±17.0)	27.4 (±25.5)	79.0 (±53.3)	42.6 (±27.6)	**43.6 (±38.4)**
Mean no. people per village	299 (±190.4)	300 (±214.1)	859 (±550.6)	420 (±289.5)	**466 (±403.8)**
Mean no. people per household	12 (±7.67)	12 (±5.65)	10 (±6.02)	9 (±4.56)	**11 (±6.08)**
No. households interviewed	30	30	29	30	**119**

Source: Own data compilation

Table 16: Duration the heads of households had lived in their villages (%).

Time period	**Eengodi**	**Epembe**	**Ongenga**	**Omuntele**	**Total**
<1 year	3 (75)	0 (0)	0 (0)	1 (25)	**4**
1-4 years	4 (44.5)	1 (11.1)	2 (22.2)	2 (22.2)	**9**
5-9 years	7 (44)	4 (25)	2 (13)	3 (18)	**16**
10-19 years	4 (24)	5 (29)	3 (18)	5 (29)	**17**
20-29 years	12 (41.4)	6 (20.7)	5 (17.2)	6 (20.7)	**29**
30-39 years	0 (0)	9 (64)	1 (7)	4 (29)	**14**
≥ 40 years	0 (0)	4 (14)	16 (57)	8 (29)	**28**
No response	0 (0)	1 (50)	0 (0)	1 (50)	**2**
Total	**30**	**30**	**29**	**30**	**119**

Source: Own data compilation

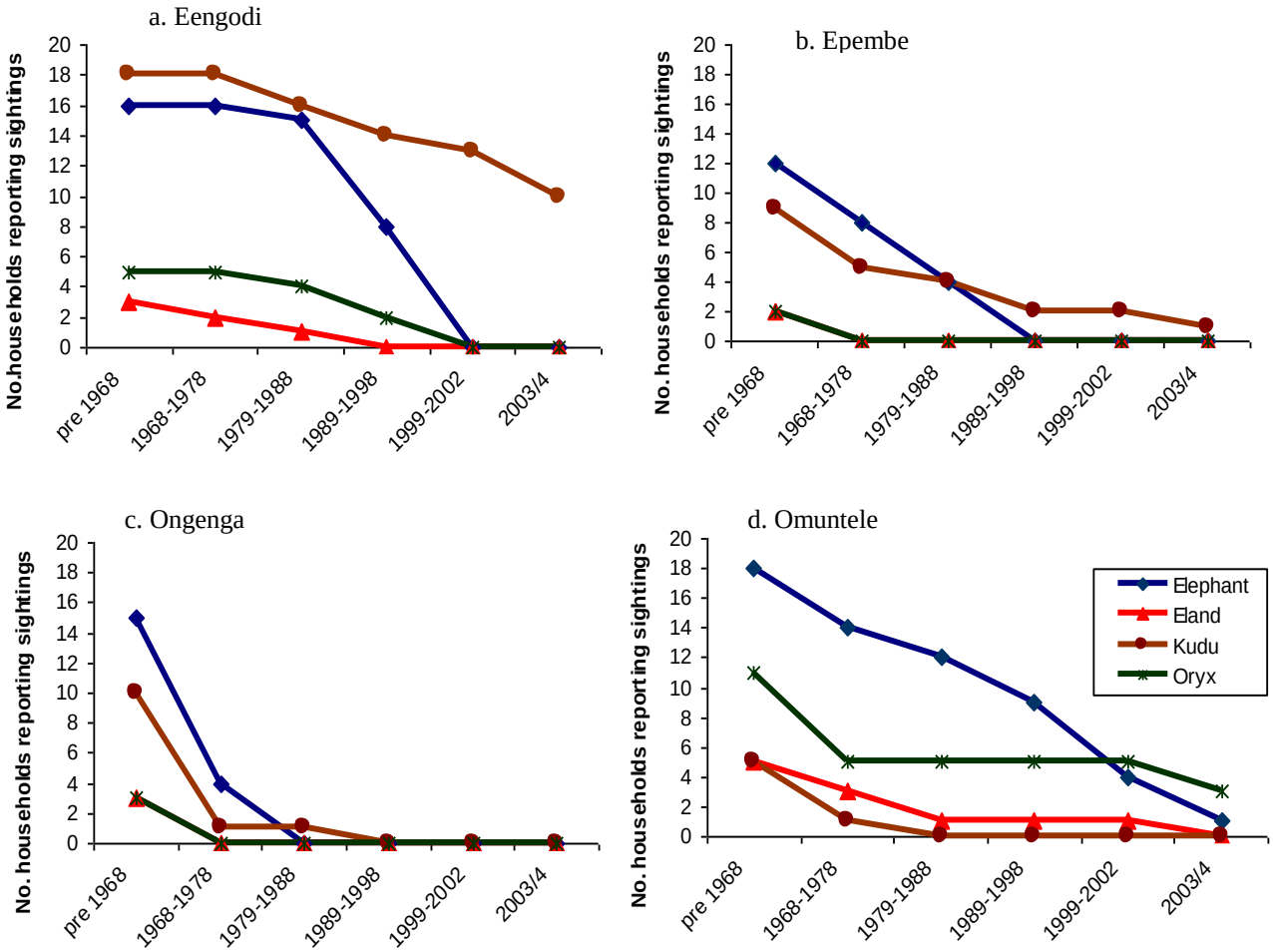
Table 17: Wildlife species poached by interviewed households (%).

	Eengodi	**Epembe**	**Ongenga**	**Omuntele**	**Total**
Birds	13 (17)	18 (18)	25 (33)	24 (32)	76
Rabbit\hare	4 (21)	10 (53)	2 (10)	3 (16)	19
Small ungulates	4 (23)	10 (59)	1 (6)	2 (12)	17
Large ungulate	1 (25)	1 (25)	1 (25)	1 (25)	4
Any edible game	4 (27)	2 (13)	3 (20)	6 (40)	15
No response	1 (100)	0 (0)	0 (0)	0 (0)	1

Source: Own data compilation

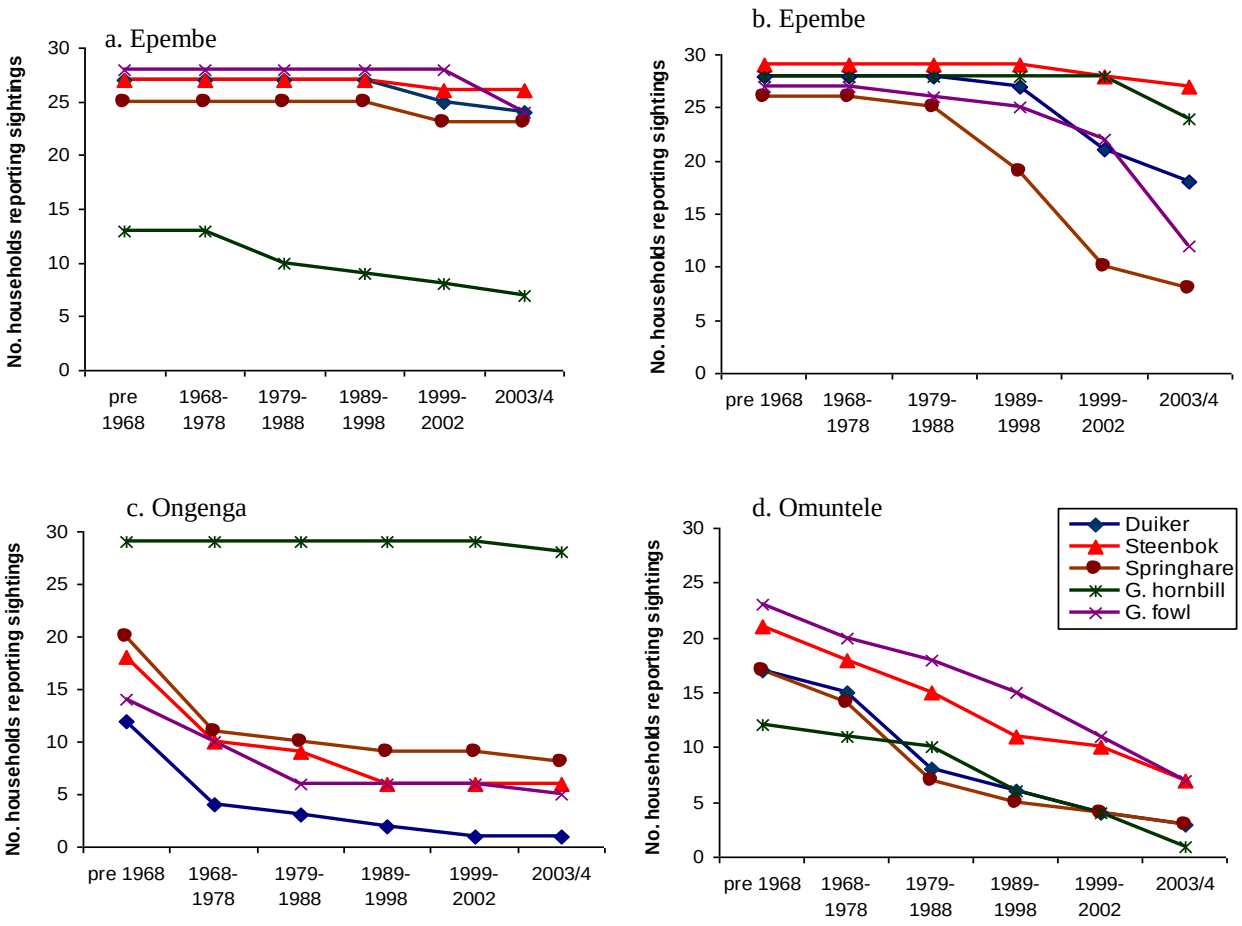
APPENDIX II
FIGURES

Figure 4: Large mammal decline over 35 years (pre 1968 – 2004)



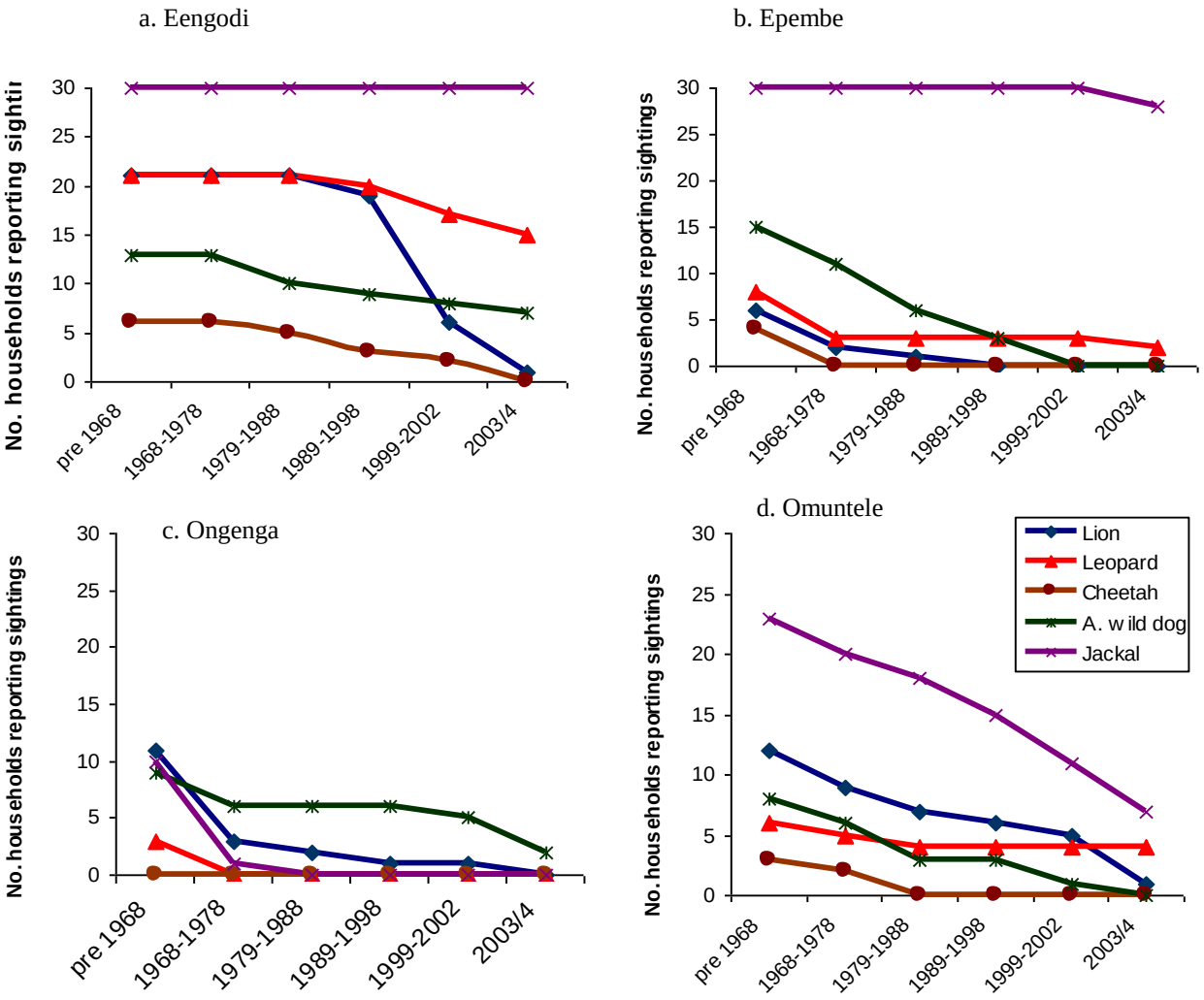
Source: Own data compilation

Figure 5: Decline of small mammals and birds over 35 years (pre 1968 – 2004)



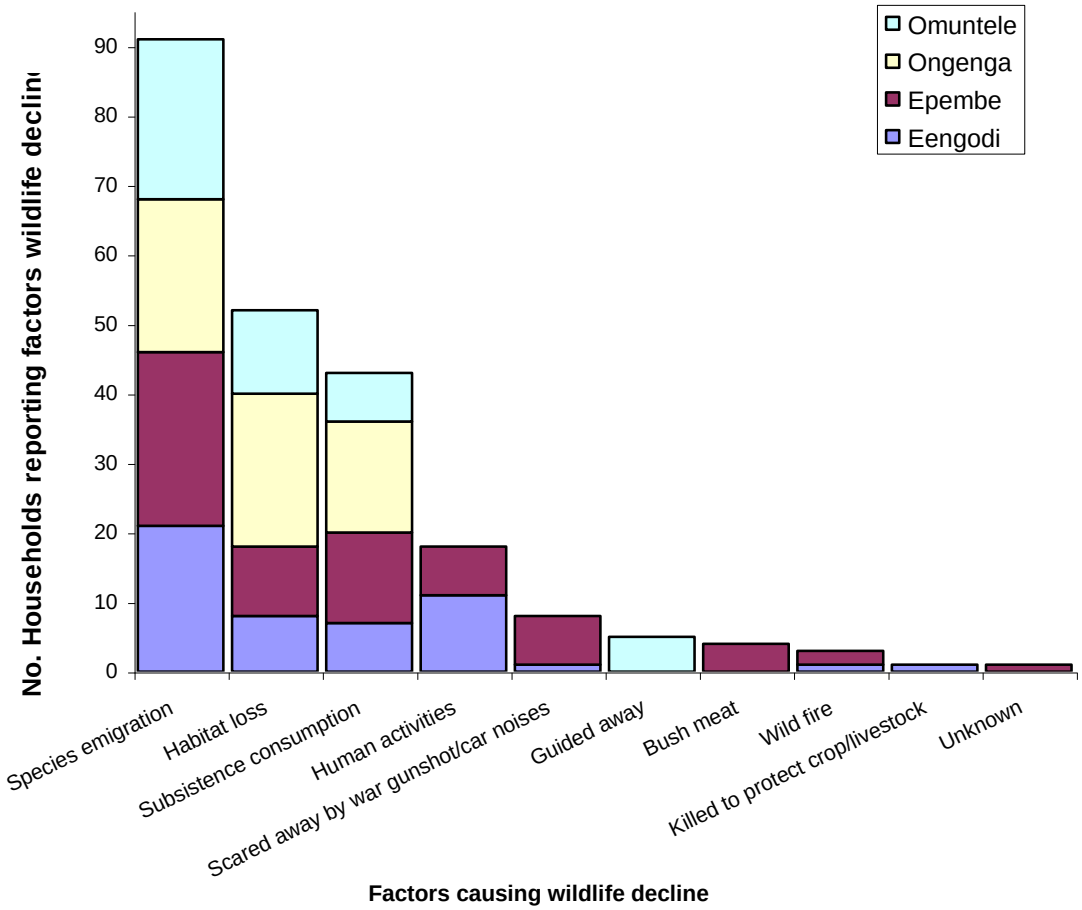
Source: Own data compilation

Figure 6 a – d: Decline of carnivores over 35 years (pre 1968 – 2004)



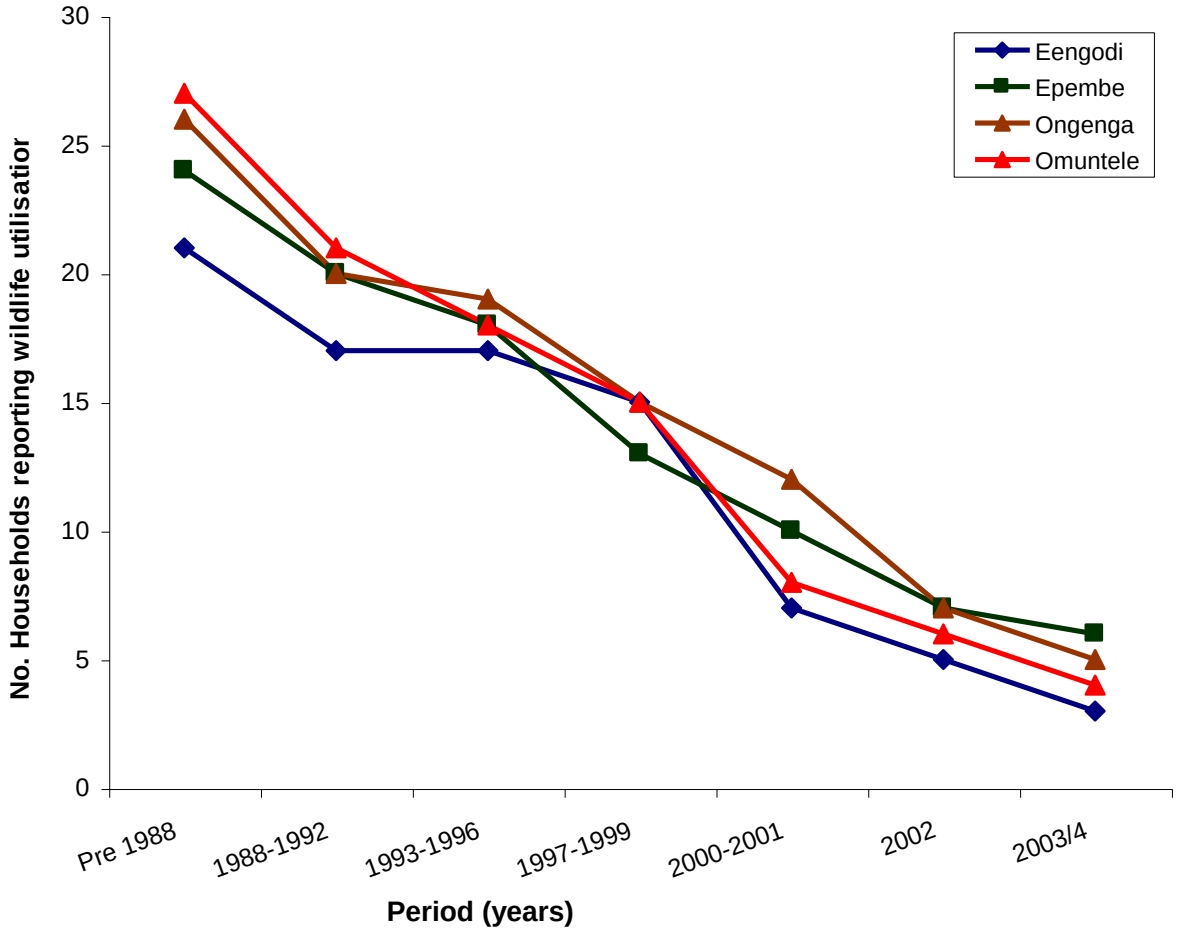
Source: Own data compilation

Figure 7: Primary factors perceived to cause wildlife decline.



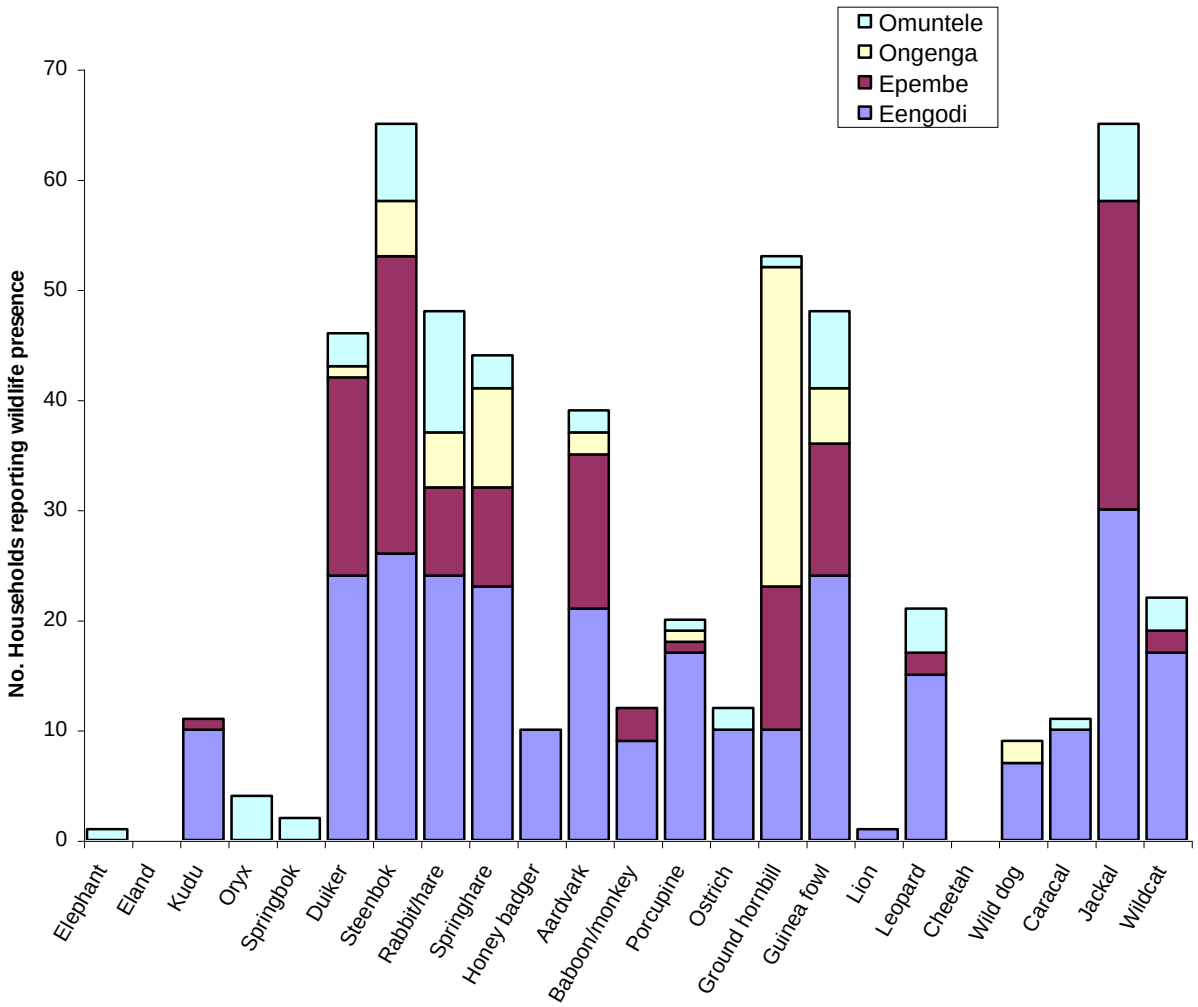
Source: Own data compilation

Figure 8: The decline of wildlife poaching over 16 years (1988-2003/4).



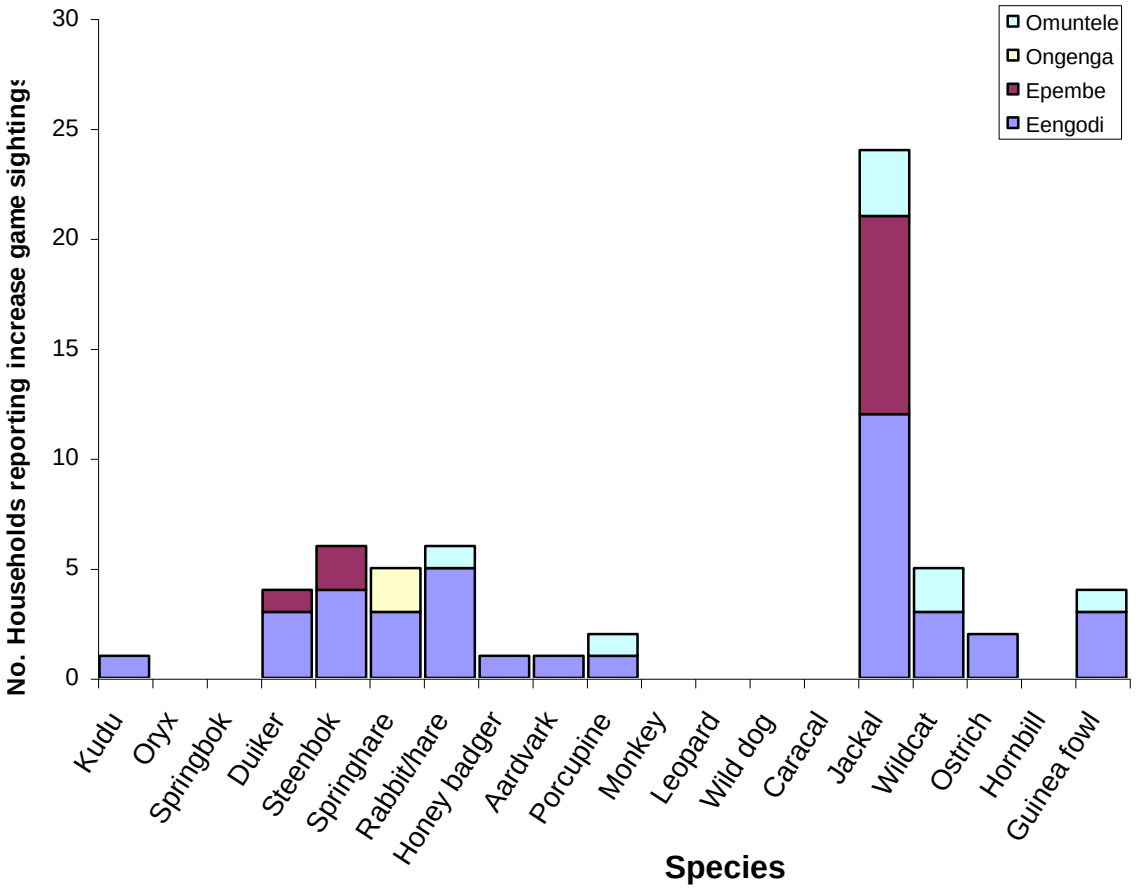
Source: Own data compilation

Figure 9: Sightings of individual wildlife species within 12 months before the interviews.



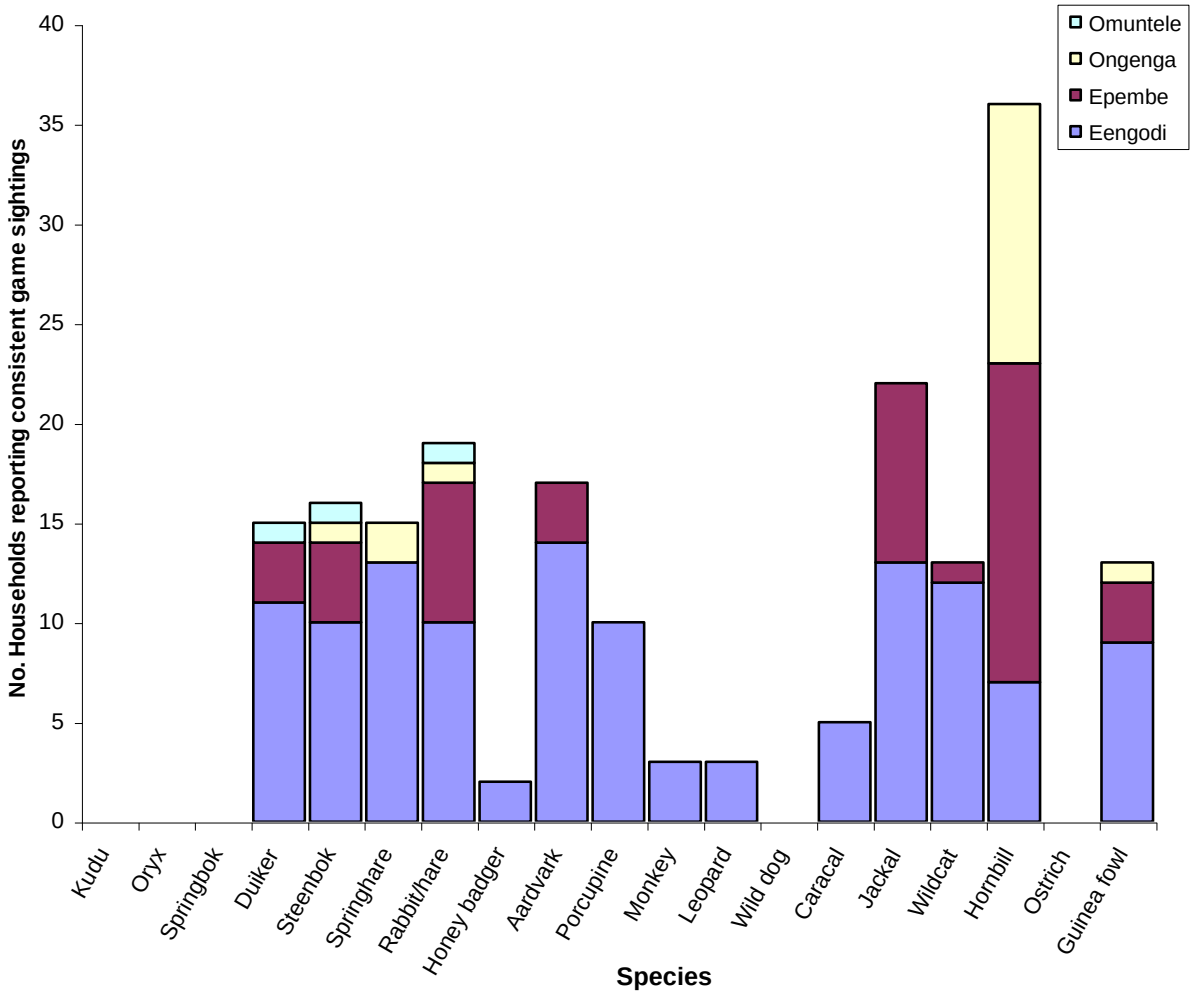
Source: Own data compilation

Figure 10: Accounts of wildlife species increase at the time of the interviews.



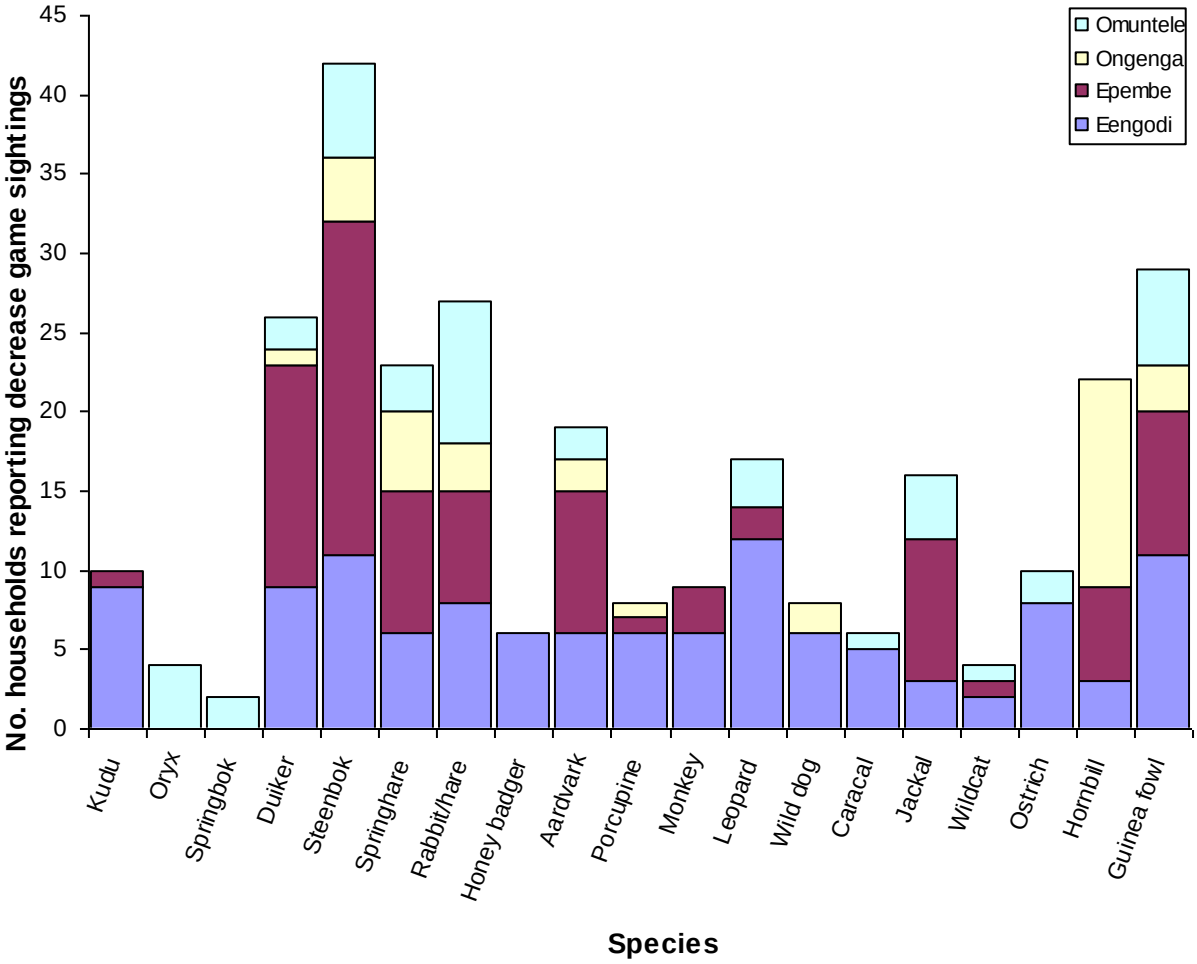
Source: Own data compilation

Figure 11**:** Accounts of consistent sightings of wildlife species in interviewed constituencies at the time of the interviews.



Source: Own data compilation

Figure 12: Accounts of wildlife species decline at the time of the interviews.



Source: Own data compilation

APPENDIX III
THE SURVEY QUESTIONNAIRE

Questionnaire No: _____
GPS Coordinates
E: _____ W: _____

Study Area

1. Date _____

2. Electoral constituency code: _____

3. Region: _____ Constituency: _____ Village: _____

Demographic information

4. Number of people live in the village: _____

5. Number of households in the village: _____

6. Number of people live in the households: _____

7. Household members interviewed

8. The highest passed standard of head of household:
Tertiary education __ senior education __ secondary education __ primary education __ none __

9. How many years have you lived in this village?
<1_____ 1-4 _____ 5-9 _____ 10-19 ____ 20-29 ____ 30-39 ____ > 40 _____

10. Apart from farming, do you have any additional income resource (s) to your household? **Y/N**

Livestock possession

11. Do you have livestock? **Y/N**

12. If yes, how many of the following livestock type do you have?

Livestock type	Cattle	Goat	Chicken
Livestock number			

Biodiversity loss

13. When last did you see the following game species?

Game species	Time scale					
	2003/4	2002-1999	1998-1989	1988-1979	1978-1968	Pre 1968
	≤1	1-4	5-14	15-24	25-34	≥35
Elephant						
Eland						
Kudu						
Oryx						
Duiker						
Steenbok						
Springhare						
Ground hornbill						
Guinea fowl						
Lion						
Leopard						
Cheetah						
African wild dog						
Jackal						

---

14. Which game species do you currently see in your area and what are the sighting trends (I= increased, II= remained constant, III= decreased, IV= do not know, V= no answer) of those species?

Game species	**Presence**
Elephant	
Kudu	
Oryx	
Springbok	
Duiker	
Steenbok	
Rabbit/hare	
Springhare	
Honey badger	
Aardvark	
Baboon/monkey	
Porcupine	
Lion	
Leopard	
Cheetah	
African wild dog	
Caracal	
Jackal	
African wildcat	
Ostrich	
Ground hornbill	
Guinea fowl	

15. If decreasing, what are the most important factors influencing the decrease in wildlife?

Wildlife emigrated		Habitat loss	
Subsistence consumption		Trapped and removed	
Selling game meat/ bush meat		Wildfire	
Killing for protection of crop and livestock			
Human activities		Do not know	
Gunshots and car noises		Not applicable	

Human-wildlife conflict

16. Did you experience problems with wildlife on your crop? **Y/N**

16a. If yes, which species? _____

16b. If yes, how do you deal with the problem?
Kill animal ___ fence off your crop field ___ ignore the problem ___
do not know __

17. How many livestock have you lost to predators (African wild dog, caracal, jackal, African wildcat, leopard, cheetah, spotted hyena, brown hyena, lion), domestic dog, theft in your area and when?

Livestock type	predator	livestock number	time period
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

18. What do you do when you find out that you lost livestock to predator?
_____

20. What do you do when you spot a predator in the wild?
_____

Wildlife utilisation

21. When last did you hunt wildlife species, which species and what preferable species?
When _____
Species hunted _____ _____ _____ _____ _____ _____
Preferred species _____ _____ _____ _____ _____

Wildlife conservation awareness

22. Do you know what "community conservancy" is? **Y/N**

22a. If yes, what value do you see in "community conservancy"?

Financial benefits		Eco-tourism	
Cooperation in management of natural resources		Other (specify)	

---

23. Have you ever visited game rich-areas (game park, conservancy, circus, zoo)? Y/N

23a. If yes, why?

Opportunity come (drove with who wanted to stop)		Wanted to	
Family members wanted to		Other (specify)	

---

24. Did you see any benefit in having a conservancy, game parks, circus or zoo? **Y/N**

24a. If yes, how

Financial for the owner		Help sustaining wildlife species	
Education for visitors		Other (specify)	

_____

Attitudes toward wildlife

25. Do you think it is important for your future generation to see wildlife roaming freely in their natural habitat? **Y/N**

25a. If yes, how?

Aesthetic		Other (specify)	
Wildlife deserve to live			

_____

25b. If no, why?

It does not make difference whether they see them or not		Other (specify)	
It does not make difference where they see them (natural habitat, game park, or circus)			

Conservation awareness

26. Did you conserve wildlife in your community? **Y/N**

26a. If yes, how did you conserve wildlife species in your community?

Never killed anything		Only kill chronic problem animals	
Stopped killing		Only kill problem animals	
Told other to stop killing		Other (specify)	

_____

26b. If no, why not?

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27. What do you think should be done to protect wildlife in your community?

All community members should be responsible for wildlife protection in the area		There is nothing to protect	
All hunting activities should be organised by the whole community		Nothing can be done to protect wildlife	
Wildlife habitat should be protected		Other (specify)	

_____

28. Who do you think should protect the wildlife in your farming community?

Every community member		Government officials	
Headmen		Other (specify)	
Outsider		Do not know	

Attitudes toward wildlife

29. Where do you think wildlife should live in Namibia?

Anywhere in the country		All predators in parks	
Only where people tolerate them		Only in parks	
Only on conservancies		Other (specify)	

---

30. Do you like wildlife sharing the grazing land with your livestock? **Y/N**

31. What benefits do you see from having wildlife?

Aesthetic		Financial value		Education for children	
Food		Tourism		Other (specify)	

_____