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USE OF SUB-SAHARAN VULTURES IN TRADITIONAL MEDICINE AND CONSERVATION AND POLICY ISSUES FOR THE AFRICAN GREY PARROT (Psittacus erithacus)

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USE OF SUB-SAHARAN VULTURES IN TRADITIONAL MEDICINE AND CONSERVATION AND POLICY ISSUES FOR THE AFRICAN GREY PARROT (*Psittacus erithacus*)

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ABSTRACT

Wildlife populations worldwide are being negatively affected by the illegal wildlife trade. The severity of the impact to both Sub-Saharan vultures and African Grey Parrot (*Psittacus erithacus*) (AGP) populations are explored in this thesis. Many species of Sub-Saharan vultures are used in the traditional medicinal trade. Previous studies have found that vultures have mystical powers attributed to them due to their keen ability to find food. AGP's are sought after for international trade due to their ability to mimic human vocabularies and for their aesthetic beauty.

Due to the illegal, secret, and illusive nature of this trade, the monetary value and direct impact to wild Sub-Saharan vulture and AGP populations is difficult to quantify. A synthesis of existing research relating to these two subjects was conducted to examine the current status of these species, examine the impacts of this trade on these species, and to review existing regulation for its efficacy in establishing and maintaining the sustainable use of these species.

National regulation of vulture use in the traditional medicinal trade is failing at many different levels. There is corruption and those responsible for enforcing the laws are poorly trained. The framework for International regulation of trade in AGPs has been implemented by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), but CITES relies on their members to enact and enforce national regulations for the survival of AGP populations. Previous studies have shown

there are many flaws in this system of regulation also. Many countries in Africa lack sound ecological data for these species. Without knowing even the most basic information such as population, effective quotas for sustainable trade in AGPs cannot be established.

Management of populations of these species needs to include working with local people. Many people in Africa rely on traditional medicine as their primary source of healthcare. Further research will need to include working with the healers and users of the medicinal trade if sustainable harvest is to succeed. Loss of vulture populations could have dire impacts on the healer's ability to heal their patients. Poacher's of AGPs are often living at poverty level; just trying to make a living. Without addressing this issue, implementing regulation for the survival of AGPs will not be effective.

The illegal trade in Sub-Saharan vultures for the medicinal trade, and international trade of AGPs, is negatively impacting wild populations of these species. Without better implementation and regulation at the local, National, and International levels, these species could become extirpated or extinct.

DEDICATION

To my mother Patricia

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CHAPTER ONE

INTRODUCTON

Threats to the survival of most avian species occur on a daily basis and their affects are leading to loss of biodiversity. Out of 9,895 extant bird species in the world, 1,240 are listed as Threatened with Extinction (listed as Critically Endangered, Endangered, or Vulnerable) with an additional 838 species considered Near Threatened (BirdLife International, 2010A). Habitat loss is the major threat to most avian species, including those included in this thesis, Sub-Saharan vultures and African Grey Parrots (*Psittacus erithacus*) (AGP) (BirdLife International, 2010A). However, the second largest threat to these species is exploitation from the illegal wildlife trade specifically African use of vultures for traditional medicine, and the international trade in AGPs (Smith, 2009; WWF, 2010B).

Use of wildlife for food or commercial purposes has been occurring since the evolution of man, but the current rate of harvest is threatening the survival of many species (Redford, 1992). Traditional hunters are finding it more and more difficult to locate target species (Soewu, 2008). Demands on wildlife species are at an all time high due to an ever-increasing human population (Marshall, 1998). Unless effective conservation measures are immediately put in place, some of these species will not survive.

Globally, the wildlife trade includes the annual trade of more than 350 million animals and plants, worth an estimated US$159 billion (Warchol, 2004; TRAFFIC,

2010A). Due to the illicit and secretive nature of the illegal wildlife trade, it is difficult to calculate the illegal trade's portion of the revenue (TRAFFIC, 2010A). Vulture use for traditional medicine and the international trade in AGPs are a part of the illegal wildlife trade (Smith, 2009; WWF, 2010B).

Overexploitation of a specific animal occasionally results in the hunter changing his target animal to another species (Soewu, 2008). Vulture use in the medicinal trade is specific; there are no substitutes (Soewu, 2008). Their ability to locate food from the air has led to the belief that vultures can aid in predicting the future and warding off evil spirits (Mander *et al*., 2007). Users of traditional medicine associate mystical powers with the vultures; this does not seem to be transferred to other animals (Mander *et al*., 2007). With an estimated 80% of the world's population relying on traditional medicine as their primary source of healthcare, depletion of vultures could have a tremendous impact on the health of many people (Akerele, 1993).

In 2007, AGPs were reclassified from a Species of Least Concern to Near Threatened (IUCN Red List, 2010B). One of the main reasons for this reclassification was a great decline of AGP populations in the wild caused by the illegal trade (BirdLife International, 2010B). AGPs are sought after because of their aesthetic beauty, long life, Intelligence, and ability to mimic human sounds (IUCN, 2000).

Global regulations regarding species at risk have been enacted. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was enacted in 1975 and relies on the governments of member countries to enact national

legislation to ensure that international trade does not threaten the survival of species (CITES, 2010A). There are flaws in this system. As an example, little is known about the true extent of both vulture use in traditional healing and the total AGPs lost to the illegal trade; therefore, the effects of illegal trade of these species cannot be quantified. Many countries in Africa are lacking basic ecological data on these species (BirdLife International, 2006). Without these data, effective quotas cannot be established (BirdLife International, 2006).

Global and National regulation is a great start, but species preservation needs to encompass the interests of those involved including government, conservationists, traditional medicinal healers, poachers and consumers. Healers, poachers and consumers may be unaware of the conservation status of the species they are using or capturing. Without this knowledge how can they know the consequences their actions will have on the survival of these species and therefore the effects on their health and livelihood?

This thesis consists of two case studies related to the national and international trade of birds. The overall objective of case study one is to assess the effects of the traditional medicinal trade on vulture species endemic to Sub-Saharan Africa by: 1) examining the use of vultures in traditional medicine and determining the extent of vulture use for traditional medicine, 2) analyzing the current status of Sub-Saharan vulture populations with an emphasis on those species used in the medicinal trade, 3) examining the potential effects of use in traditional medicine on vulture populations,

and 4) determining the relative risk of trade in correlation with other stressors on vulture populations in Sub-Saharan Africa.

The overall objective of case study two is to assess the impact of the wildlife trade on AGP's by: 1) analyzing the current status of AGP populations used in the wildlife trade, 2) examining the extent of the trade in AGP, 3) assessing CITES regulation of AGPs, 4) examining the potential effects of the wildlife trade on AGP populations, and 5) reviewing BirdLife International's recommendations on AGP conservation.

CHAPTER TWO

USE OF SUB-SAHARAN VULTURES IN TRADITIONAL MEDICINE

INTRODUCTION

In most of Sub-Saharan Africa, the current rate of harvest for plants and animals used for traditional medicine is unsustainable, and populations of these species are in peril (Marshall, 1998). The World Health Organization (WHO) has estimated that 80% of the world's population relies on traditional medicine for their primary health related needs (Akerele, 1993). Traditional medicine is described as a "culturally appropriate ethnic health care system which makes use of plant, animal, and sometimes mineral material in its healing and consulting pharmacopoeia to treat physiological and/or psychological ailments. It also includes the use of these items for ceremonial, spiritual and religious purposes associated with the ethnic healing practices" (Beilis & Esterhuizen, 2005). Traditional medicine plays an integral role in many societies where there is either no access to conventional health care or it is not affordable (Ntiamoa-Baidu, 1987). Traditional medicine is dominant in many cultures both because it has been around for centuries, and it is thought to be a "more appropriate method of treatment" (Marshall, 1998).

The illegal trade in wildlife is estimated at $6 billion per year (Warchol, 2004). The illicit and elusive trade in plants and animals for use in medicinal healing is secretive; therefore information on what portion of that $6 billion is derived from illicit

trade is unavailable (Marshall, 1998). The majority of the fauna used in the medicinal trade are from the wild (Marshall, 1998). Extermination of wildlife populations used in the medicinal trade will impact the healer's ability to treat the sick. "The success of any healthcare system depends on the ready availability and use of suitable drugs on a sustainable basis" (Akerele, 1993). Continued human population growth will lead to higher demand for species used in the medicinal trade, which, due to many factors, are already in decline (Marshall, 1998).

Many African vulture species have populations that are in decline due to multiple factors (Thiollay, 2007). These factors include habitat loss from woodcutting and conversion to grassland for livestock, loss of prey due to overhunting, persecution, accidental mortality, accidental and intentional poisoning, and hunting for trade. (Thiollay, 2007; BirdLife International, 2008A). Steve McKean, a researcher at the conservation body Ezemvalo KZN Wildlife, was quoted by South Africa's Star newspaper: "Traditional use as it is currently happening is likely to render vultures extinct in Southern Africa on its own within 20-30 years" (Smith, 2009). While researchers have documented specific species of vultures and their parts that are used in traditional medicine, few data can be found to quantify the impact on vulture populations.

The overall objective of this study is to assess the effects of the traditional medicinal trade on vulture species endemic to Sub-Saharan Africa by: 1) examining the use of vultures in traditional medicine and determining the extent of vulture use for traditional medicine, 2) analyzing the current status of Sub-Saharan vulture populations

with an emphasis on those species used in the medicinal trade, 3) examining the potential effects of use in traditional medicine on vulture populations, and 4) determining the relative risk of trade in correlation with other stressors on vulture populations in Sub-Saharan Africa.

METHODS

An extensive review of the literature was conducted using the scientific databases available at Clemson University's Cooper Library. Databases searched include the Web of Science, CAB Direct, Google Scholar, and BirdLife International's website. Reference librarians assisted in the selection of appropriate keywords and databases. Few articles were found. A second approach was used for those articles that were published. The literature cited section of published articles was used to search for additional peer-reviewed and grey literature sources. Articles not available in the Cooper Library were retrieved through Interlibrary Loan.

The International Union for Conservation of Nature (IUCN) classifies avian species worldwide into categories based on their risk of extinction (IUCN, 2001). This allows for clear and concise definitions based on conservation status which can be used globally (IUCN, 2001). Standards used for classification purposes include rate of decline, geographic distribution, and population size. Classifications are: Extinct (no individuals remaining), Extinct in the Wild (naturalized population outside of its historic range or surviving in captivity), Critically Endangered (extremely high risk of extinction in the wild), Endangered (high risk of extinction in the wild), Vulnerable (high risk of becoming

endangered in the wild), Near Threatened (endangerment in the near future), and Least Concern (species of low risk; species is abundant and widespread) (BirdLife, 2010C; IUCN, 2001).

International wildlife trade is regulated by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (CITES, 2010B). Species regulated by CITES are placed on one of three tiers; Appendix I (species threatened with Extinction and trade permitted in exceptional circumstances only, Appendix II (species not threatened with Extinction but survival relies on trade being controlled and trade regulated by a permit system, and Appendix III (species protected in at least one country and that country has asked other members for help in controlling trade) (CITES, 2010B).

RESULTS

Medicinal Trade and Vultures

The use of animals and their parts for medicinal use is called zootherapy (Costa-Neto, 1999). There is a monetary and human health benefit to both supplier and consumer from the sale of these products (Costa-Neto, 1999). Curative and preventative medicines often include animals and their by-products (Adeola, 1992). Both the monetary and health benefit will be affected by depletion of wildlife populations that this system of healthcare relies on. The threat to wildlife populations is happening throughout Sub-Saharan Africa. It is almost impossible to find a market stall in any major town or city in West Africa that does not have parts of plants or animals for sale for medicinal purposes (Ntiamoa-Baidu, 1987). Marshall's (1998) survey of "wildlife

medicinal for local traditional medicinal purposes" in East and Southern Africa revealed that around 100 animal species were being utilized for traditional medicine. Of those 100 species, 29 species of fauna were noted in need of conservation, research or management (Marshall, 1998). When conventional medicine does not cure the sickness, they are referred to the neighborhood herbalist (Adeola, 1992; Odu, 1987). Wild animals poached for the medicinal trade in national park and game preserves is a serious problem that is eliminating a majority of the wildlife in Nigeria (Adeola, 1992).

TRAFFIC, an organization founded by the World Wildlife Fund, is a "wildlife trade monitoring network" that "works to ensure that trade in wild plants and animals is not a threat to the conservation of nature" (TRAFFIC 2010B). TRAFFIC East/Southern Africa conducted an 18 month review of the traditional medicine trade. They concluded that for Eastern and Southern Africa, the majority of the trade in traditional medicines was for the use of zootherapy (Marshall, 1998). Populations of many species valued as ingredients for zootherapy, whether endangered or common, were reported as becoming more scarce at both the local and national level (Marshall, 1998).

Use of vultures for traditional medicine is to some extent responsible for the swift vulture declines in the sub-continent (Mander *et al*., 2007). In Southern Africa, vultures are a major part of the traditional medicine trade (Mander *et al*., 2007). Vultures are utilized for many ailments such as headaches, but are preferred for effectiveness in providing clairvoyant powers, increased intelligence, and foresight (Mander et al., 2007). Vulture's ability to locate food with their exceptional eyesight

fostered a belief in many that they possess clairvoyant powers (Smith, 2009). Many cultures in Africa believe "health, disease, success, or misfortune are not chance events but the result of the active influence of individuals or ancestral spirits" (Mander *et al*., 2007). Motivations for these demands are betting and gambling, intelligence in school children and improved business success (Mander *et al*., 2007). The brains of vultures are dried and rolled into a cigarette or inhaled as vapors (Smith, 2009). Cook and Mundy (1980) attributed the sale of the vulture parts to its superstitious value. There is no preferred species of vulture, thus most native species are used (Mander *et al*., 2007). Hooded Vultures (*Necrosyries monachus)* were found for sale in Market stalls in Ghana (Ntiamoa-Baidu, 1987). In northwest Nigeria, the parts of a Ruppell's Griffon (*Gyps rueppellii)* were seen for sale in the local market in Sokoto (Cook & Mundy, 1980). A study in Nigeria found Hooded Vultures used by farmers for traditional healing (Adeola, 1992). In Lesotho, Cape Griffon (*Gyps coprotheres*) parts observed in the healer's stall included vertebrae, esophagus (attached to feathered skin of the neck), wing, head, and primary feathers (Beilis & Esterhuizen, 2005).

The different parts of the vulture had a different rate of turnover and price (Beilis & Esterhuizen, 2005). Wings and primary feathers sat in the stall for months and vertebrae sold for R30 while the powdered vulture brain, in higher demand, sold quickly and for R50 per gram (Beilis & Esterhuizen, 2005). In eastern South Africa, the "total annual value of sales of vultures to end consumers in eastern South Africa (excluding the cost of vultures as input costs) is estimated at R1,185,600" (Mander *et al*., 2007).

Sub-Saharan Vultures

Vultures breeding in Africa are considered Old World vultures. They are K-selected species due to their long life cycles and low fecundity enabling them to invest considerable time to their offspring (Piper *et al.*, 1981; Mundy *et al.*, 1992). Of the eight species of vultures in Sub-Saharan Africa, six species have declining populations and are either listed as Vulnerable or Threatened (IUCN Red List, 2010A).

The Cape Vulture or Cape Griffon is found in South Africa, Lesotho, Botswana, Mozambique, Zimbabwe, and Namibia (BirdLife International, 2009C). They nest in colonies located on cliffs and one egg is laid by a breeding pair (Piper *et al*., 1981). Like other species of vultures, Cape Vultures do not kill their prey but feed on the carcasses of large animals and are known to fly extended distances over open areas to forage (BirdLife International, 2009C). Decline of the Cape Vulture is attributed to "accidental poisoning on agricultural land, electrocution on pylons, collision with overhead cables and with vehicles, food-stress during chick-rearing, persecution (including collection for traditional medicines), disturbance at colonies, and drowning" (Mundy *et al*., 1992). They are listed as Vulnerable on the International Union for Conservation of Nature and Natural Resources' (IUCN) Red List (IUCN Red List, 2010A) and Appendix II of CITES, due to a small declining population (BirdLife International, 2009C). If harvest continues at the current pace, Cape Vulture populations in some Southern African countries could become extirpated in the next 44-53 years (BirdLife International, 2009C).

Rueppell's Griffon is found throughout the Sahel region of Africa, from Senegal,

Gambia and Mali in the west to Sudan and Ethiopia in the east (BirdLife International, 2010C). They also occur south through the savanna regions of East Africa in Kenya, Tanzania, and Mozambique (BirdLife International, 2010C). They nest, eat and roost in colonies with one egg laid by a breeding pair (BirdLife International, 2010C). They locate their primary food source, carrion, with their keen eyesight and can be found in a number of protected grassland and woodland areas (BirdLife International, 2010C). Decline of the Rueppell's Griffon is attributed to "habitat loss through agricultural conversion, incidental poisoning, persecution and at least historically, the loss of wild ungulates," nest disturbance, capture for international trade, and are "heavily exploited for trade with birds commonly sold in fetish markets" (BirdLife International, 2010C). They are listed as Near Threatened (IUCN Red List, 2010A) and included in CITES Significant Trade Review (BirdLife International, 2010C).

The African White-backed Vulture (*Gyps africanus*) is found from Senegal, Gambia, and Mali in the west, throughout the Sahel region to Ethiopia and Somalia in the east through East Africa into Mozambique, Zimbabwe, Botswana, Namibia, and South Africa in the south (BirdLife International, 2009B). The most common vulture in Africa, they nest in loose colonies, preferably in tall trees and one egg is laid by a breeding pair (BirdLife International, 2009B; ARKive, 2010B). They are sociable and gather together at perch sites, carcasses, and in air thermals (BirdLife International, 2009B). This species is found in some of the protected areas in all parts of its range and prefer open, wooded savannas (BirdLife International, 2009B). Decline of the African

White-backed Vulture is attributed to habitat loss, decline in food sources such as ungulates, hunting for trade, persecution, accidental mortality, use in the medicinal trade, and poisoning (BirdLife International, 2009B). They are listed as Near Threatened (IUCN Red List, 2010A) and Appendix II of CITES (BirdLife International, 2009B). It is estimated that as a result of these pressures, the African White-backed Vulture population in Zululand (South Africa) could become locally extinct in 26 years (BirdLife International, 2009B).

The Egyptian Vulture *(Neophron percnopterus)* is found in Angola and Namibia in the west, in Ethiopia and East Africa, and their range extends east to the Indian Subcontinent (BirdLife International, 2008B). They are solitary, nest on rock ledges and two eggs are laid by a breeding pair. (BirdLife International, 2008B; ARKive, 2010C). They congregate at feeding sites (BirdLife International, 2008B). Known to live in cities, Egyptian Vultures will feed on many different types of food (BirdLife International, 2008B). Although carrion is its main food source, it also preys on small mammals, insects, organic waste, and even eggs (BirdLife International, 2008B). Decline of the Egyptian Vulture is attributed to desertification of habitat, loss of carrion, particularly ungulates, and diclofenac poisoning in India (BirdLife International, 2008B). They are listed as Endangered (IUCN Red List, 2010.1) and Appendix II of CITES (BirdLife International, 2008B).

The Hooded Vulture is found throughout Sub-Saharan Africa, from Mauritania and Liberia in the west to Somalia and Ethiopia in the east down into South Africa

(BirdLife International, 2009D). They travel in flocks, nest in trees and one egg is laid by a breeding pair (OregonZoo.com, 2010). Like the Egyptian Vulture this species can routinely be found around human habitation utilizing places like slaughterhouses (OregonZoo.com, 2010). Less reliant on carrion than other species of vultures they feed from garbage dumps and on the coast will eat mussels, mollusks, and dead fish (OregonZoo.com, 2010). They are listed as a species of Least Concern (IUCN Red List, 2010A) and listed on Appendix II of CITES due to a stable population and a large range (BirdLife International, 2009D).

The Lappet-faced Vulture *(Torgos tracheliotos)* is found throughout Sub-Saharan Africa, from Mauritania in the west to Somalia and Ethiopia in the east and south into South Africa (BirdLife International, 2009E). They use *Acacia* spp. for solitary roosting and nesting, and one egg is laid by a breeding pair (BirdLife International, 2009E). They act as a scavenger feeding on carcasses but also occasionally hunt for small reptiles, birds, fish, and mammals (BirdLife International, 2009E). Decline of the Lappet-faced Vulture is attributed to widespread accidental poisoning by farmers trying to control predators, persecution as a livestock predator, loss of food source, nest disturbance, and in West Africa medicinal and cultural uses (BirdLife International, 2009E). They are listed as Vulnerable (IUCN Red List, 2010A) and on Appendix II of CITES (BirdLife International, 2009E).

The Palm-nut Vulture *(Gypohierax angolensis)* is found from Mali and Ghana in the west, to Kenya in the east, and south into South Africa (BirdLife International,

2009A). One egg is laid by a breeding pair (ARKive, 2010A). Typically not seen at the carcasses of large animals, they prey on small mammals, and half of the adult diet is made up of vegetable material such as the fleshy husks of oil palm and raffia palm fruits and other fruits (ARKive, 2010A). They are listed as a species of Least Concern (IUCN Red List, 2010A) and on Appendix II of CITES due to a stable population and a large range (BirdLife International, 2009A).

The White-headed Vulture *(Trigonoceps occipitalis)* is found throughout Sub-Saharan Africa, from Gambia and Senegal in the west to Ethiopia and Somalia in the east, and south into South Africa (BirdLife International, 2008A). They roost and nest in trees with usually one egg laid by a breeding pair (BirdLife International, 2008A). This species is also believed to prey on small mammals (BirdLife International, 2008A). As a result of possibly flying lower than other vultures, they are typically the first vulture species to arrive at a carcass (BirdLife International, 2008A). Upon the arrival of other species, they are seen on the periphery (BirdLife International, 2008A). Decline of the White-headed Vulture is attributed to habitat conversion, reductions in carrion, primarily medium sized mammals and ungulates, indirect poisoning, and use in the international trade (BirdLife International, 2008A). They are listed as Vulnerable (IUCN Red List, 2010A) and on Appendix II of CITES (BirdLife International, 2008A).

Effects of the medicinal trade on vulture populations

Harvesting pressures for medicinal use are taking a toll on Sub-Saharan vulture species (Mander *et al*., 2007). An examination of wildlife species used in the medicinal trade in Nigeria documented that a Hooded Vulture was harvested from the savanna region with the head of the vulture used to invoke witches (Adeola, 1992). In the South African region of Zululand, current harvesting and environmental pressures could extirpate White-backed Vulture populations by 2033 (Mander *et al*., 2007). Lappet-faced and White-headed vultures face the same pressures in Zululand, but due to smaller populations, they could be extirpated from the region by 2020 (Mander *et al*., 2007). In the South African providences of Eastern Cape and KwaZulu-Natal, the Cape Griffon population could become extirpated in the next 44-53 years (Mander *et al*., 2007).

The most extensive examination of the effects that use of vultures in the medicinal trade has had on vulture populations was conducted in Lesotho. Registered traditional healers claimed to use one dead Cape Griffon per year which was obtained from those living close to Cape Griffon colonies (Beilis & Esterhuizen, 2005). The dead vultures may have been acquired upon their death from natural causes or intentionally killed by stoning or trapping (Beilis & Esterhuizen, 2005); harvest methods were unclear. The impact of the traditional trade on Cape Griffon Vulture populations in Lesotho is uncertain as all healers are probably not registered and demands for vulture parts rise and fall depending on social and political events (Beilis & Esterhuizen, 2005). To

calculate the Lesotho Cape Griffon population's expected rate of decline from use in the traditional medicinal trade, they did a mathematical extrapolation. They took into account the rate of sexual maturity, the breeding population at the time the study was conducted, annual human population increase, assumed all Cape Griffon Vultures in the Lesotho study came from within Lesotho, and an increase in the need for vulture parts of one extra bird per year (Beilis & Esterhuizen, 2005). They concluded that the annual loss of birds to the traditional medicinal trade would be almost 7% of the breeding population per year (Beilis & Esterhuizen, 2005). The study's conclusion suggested that with that one additional vulture lost to the traditional medicinal trade in one year, the Lesotho vulture population would have no viable breeding pairs by 2012 (Beilis & Esterhuizen, 2005).

The results of a 2007 study established that each year in eastern South Africa, 160 vultures are sold for use in the traditional medicinal trade (Smith, 2009). In Tanzania the numbers are much higher; 1000 are killed per year (Smith, 2009). Vultures are trapped, shot or poisoned by hunters (Smith, 2009). One method of poisoning used by hunters is to poison carcasses so that when the vultures congregate to feed, mass numbers are killed (Smith, 2009).

Risk of trade and other stressors to vulture populations

Vulture populations are in decline throughout Africa due to many factors (Thiollay, 2007). Some of the threats they face are habitat loss from woodcutting and

conversion to grassland for livestock, loss of prey due to overhunting, persecution, accidental mortality, accidental and intentional poisoning and hunting for trade (Thiollay, 2007; BirdLife International, 2008A). Throughout West Africa, Thiollay (2007) found that six vulture species collectively declined both outside and within national parks becoming "virtually extinct over large areas."

The use of diclofenac in the Indian subcontinent is an example of how a single factor can have a catastrophic effect on a species. Accidental poisoning brought three abundant species of vultures to near extinction (Oaks et al., 2004; Green et al., 2004). Diclofenac has been identified as the toxicant responsible for the Asian vulture crisis (Oaks et al., 2004; Green et al., 2004) where populations of three species of *Gyps* vultures (*G*. *bengalensis*, *G*. *indicus* and *G. tenuirostris)* plummeted in South Asia. These species are now listed as Critically Endangered (Swan et al., 2006A). Diclofenac is a common non-steroidal anti-inflammatory drug (NSAID) prescribed globally by veterinarians for use with livestock. Dead domestic livestock is a food source for vultures and secondary poisoning occurs when vultures feed on the carcasses of recently treated animals (Oaks et al., 2004). There is a relationship between diclofenac residue and death of vultures by renal failure with post-mortem findings of extensive visceral gout (Oaks et al., 2004). The same sensitivity to diclofenac shown by *G. bengalensis* in the Indian subcontinent has been shown in the Cape Griffons and White-backed vultures (Naidoo et al., 2009; Swan et al., 2006B). In 2006, the Indian government banned the manufacture of diclofenac. There is, however, a potential

threat to vultures in Africa since the drug is now being distributed by Tanzania to 15 African countries (BirdLife International, 2007B).

Increased use of a poison in Africa is having a negative impact on vulture populations. Carbofuran is used on field, vegetable, and fruit crops as a broad spectrum carbamate pesticide. A ban on all granular formulations was initiated in the United States by the EPA on September 1, 1994 to protect birds (Extoxnet, 1993). This pesticide is extremely toxic to birds (Extoxnet, 1993). Secondary poisoning occurs when scavenging birds eat prey that has ingested the pellets (Extoxnet, 1993). Carbofuran is being used in Kenya by the Maasai as poisonous bait to eliminate large predators such as lions that predate on their livestock (Gavshon & Magratten, 2009). In Eastern and Southern Africa the pesticide is being used by poachers to kill vultures out of fear that the vultures will lead authorities to their activities (BirdLife International, 2009F).

Another long term threat negatively impacting vulture populations is lead. In South Africa, vultures have shown high levels of lead in blood samples (W. Bowerman & M. Anderson, unpubl. data). Vultures encounter many sources of lead in their environment but the probable source of major concern for vultures is ingestion of lead shot and bullets from carrion (W. Bowerman, pers. com). After feeding on a carcass embedded with lead ammunition, the absorption of lead through feeding and exposure through digestion can be enough to kill a raptor (Mateo, 2009). Scavengers are opportunistic and will make use of carcasses abandoned by hunters (Mateo, 2009). Many species of birds have experienced moralities from lead poisoning (Eisler, 1988) but

this threat is even more critical when a population is already threatened. This can affect population viability (Carpenter *et al*., 2003).

Management Implications

The consequences of a decline in vulture populations can have profound implications on ecosystem services and therefore, humankind (Sekerciouglu *et al*., 2004). Scavengers evolved to fill a niche in ecosystems which includes an adaptation to feed on carrion (Sekerciouglu *et al*., 2004). This disposal of carcasses of large animals limits the spread of diseases to humans and animals. (Sekerciouglu *et al*, 2004). Carcasses that are left to slowly decompose over time can become a breeding ground for pathogenic bacteria (Sekercioglu *et al*., 2004; Pain *et al*., 2003). Humans, livestock, and wildlife could potentially be exposed to diseases such as anthrax as a result of uneaten carcasses (Pain *et al*., 2003). With the disappearance of vultures, the numbers of other scavenging animals such as feral dogs and rats could increase with an abundance of available food (Pain *et al*., 2003). This could lead to an outbreak of diseases such as rabies and bubonic plague (Pain *et al*., 2003).

In order for these natural resources to be around for future generations we must develop a plan of action for sustainable harvest (Costa-Neto, 1999). With regard to herbal remedies, steps have been taken to establish dialogue between the two different healthcare organizations, modern, and the traditional (Akerele, 1993). The same progress needs to be achieved in the area of the traditional trade of fauna.

The first step in controlling wildlife exploitation should be to establish an effective quota system of which there is none in West Africa (Ntiamoa-Baidu, 1987). At this point in western Africa, basic information on fauna such as population sizes, composition, and turnover are almost non-existent (Ntiamoa-Baidu, 1987). A comprehensive review of existing data needs to be compiled and evaluated whereupon further studies need to be conducted to collect any necessary data (Ntiamoa-Baidu (1987). Until this information is obtained, sustainable harvest targets cannot be set and enforced (Ntiamoa-Baidu, 1987). When sufficient research is unavailable on the exploitation of wildlife resources "immediate surveys of sites and species for protection" should be conducted, "to ensure that representative samples of all the important habitats in each country are protected and that species needing specific protection are identified" (Ntiamoa-Baidu; 1987).

Zootherapy is a fundamental and longstanding custom of societies worldwide so you cannot simply punish those that practice or utilize this sort of treatment or simply expect them to stop (Costa-Neto, 1999). Thorough research also needs to be conducted regarding the curative use of animal parts by indigenous people (Costa-Neto, 1999). Local governments need to work with the communities to develop and implement a management strategy for protecting biodiversity in the region (Soewu, 2008). Those involved in the medicinal trade will have to play a vital role in the implementation of solutions. Community enlightenment, through education, will have to be a part of the conservation efforts if the changes are to be long term (Soewu, 2008). A change in the

way the healers and users of traditional medicine view the resources, plants, and animals that their very livelihood relies on is a necessity (Soewu, 2008). Government and those involved in the medicinal trade need to work together to implement sustainable harvest measures and strategies to promote propagation or captive breeding of those species already exhausted (Marshall, 1998). “Research efforts should concentrate on status, distribution, seasonal movements, food, and habitat requirements as well as habitat changes resulting from the protection and activities of the animals” (Ntiamoa-Baidu, 1987). The problem with protected areas is that they are typically relatively small, in some cases inadequately enforced, and relentlessly degraded (Thiollay, 2007). For example, poaching of wildlife for food and medicinal use routinely occurs on game reserves and national parks in Nigeria (Adeola, 1992). Integrated Conservation and Development Projects (ICDP) are a conservation strategy being used in Africa (Alpert, 1996). Even though long term conservation and biodiversity success of ICDPs has not been proven, the implementation of some of these projects led to a change in the local’s positions regarding conservation due to their inclusion in the conservation process (Alpert, 1996).

Current attempts at regulation of vulture use in the medicinal trade have been unsuccessful. Better coordination of national legislation and law enforcement will be necessary to achieve a sustainable population. The agencies, those in place responsible for protecting natural resources, need to be more thoroughly trained (Ntiamoa-Baidu; 1987) and corruption at all levels of local and national government addressed (Warchol,

2004). Regulation of this trade at the national level has failed (Marshall, 1998). Those individuals and agencies responsible for regulation and execution of legislation are not aware that products used for traditional medicine are subject to the existing wildlife laws (Marshall, 1998). The employees of the agencies responsible for wildlife management need to be educated on the effects declining populations will have on the traditional medicine trade and the health of their people (Marshall, 1998).

Traditional medicine is an integral part of most Sub-Saharan cultures. Local extinctions of a species will have dire implications for the healers and users of this system of healthcare. Comprehensive research into vulture use in the traditional medicinal trade is necessary to gain an understanding into the impact of trade on vulture populations, methods used to harvest birds and extent of use by unregistered healers.

With six of the eight Sub-Saharan vulture species experiencing a declining population, efforts should be made to understand, educate and enlighten traditional medicinal healers and users as to the impact their use is having on these species. Where possible and with proper management and harvest techniques, utilization of those species with stable populations could take place until those listed as vulnerable or threatened have had a chance to recover.

It is evident from the results of the literature search little is known about the true extent of vulture use in traditional healing. Therefore we are unable to quantify the trade's impact on vulture populations or implement any type of regulations.

Extensive studies on the trade need to be conducted throughout this region. Research should focus on the possible effects the poisons used to kill the vultures might have on the humans using those traditional medicines. Sub-Saharan Africa has many impoverished communities in which people gain health and financial benefits from this trade.

Research indicates that often people turn to traditional medicine because they cannot afford treatment from the modern healthcare system. If Sub-Saharan governments implemented a system affording access to modern medicine by the poor, this might alleviate some of the pressures placed on wildlife species by the traditional medicinal trade. Also, dialogue between the western medicine establishments and traditional healers might help determine whether there are pharmaceuticals available that would be acceptable for traditional use.

CONCLUSION

With the demand for traditional medicine being so high, strategies need to be implemented to prevent exhaustion of wildlife species upon which this form of healthcare relies. Both national and local governments need to work with the traditional healers, vendors, and traders to devise strategies for maintaining biodiversity and for species preservation. If the governments include those in the trade in making decisions regarding management of resources, possibly the secretive and illicit nature of the trade will disappear and sustainable management can begin.

With the exception of the Cape Griffon population in Lesotho, the effect of the traditional medicinal trade on vulture populations has not been quantified. Without this information, effective management strategies cannot be established. For example, if the appropriate level of harvest was known, the government could work with the traders, vendors, and healers to establish sustainable harvest levels for species survival. With many stressors facing each species of vultures, any one related factor could move a species into a more critical level of conservation status thereby pushing it closer to extinction. Most of the research found came from Nigeria and parts of Southern Africa. It is clear much of Sub-Saharan Africa is reliant on traditional medicine for their healthcare. Therefore extensive studies related to vulture use in the traditional medicinal trade need to be conducted in all Sub-Saharan countries to prevent local extinctions of vulture populations.

CHAPTER THREE

CONSERVATION AND POLICY ISSUES FOR THE AFRICAN GREY PARROT (*Psittacus erithacus*)

INTRODUCTION

Wildlife species face threats to their very existence on a daily basis. One threat occurring on a global scale is wildlife trafficking which is also referred to as the wildlife trade (TRAFFIC, 2010A). TRAFFIC, a "wildlife trade monitoring network" that "works to ensure that trade in wild plants and animals is not a threat to the conservation of nature" defines wildlife trade as "any sale or exchange of wild animal and plant resources by people," and "can involve live animals and plants, or a diverse range of products needed or prized by humans-including skins, medicinal ingredients, tourist curios, timber, fish, and other food products" (TRAFFIC, 2010A). Wildlife trade does occur within the borders of many countries, but a sizeable amount of the wildlife trade occurs internationally (TRAFFIC, 2010A).

Globally, the wildlife trade is valued at an estimated US$159 billion, and includes the annual trade in more than 350 million animals and plants (Warchol, 2004; TRAFFIC, 2010A). Thefts of wildlife are referred to as the illegal wildlife trade, and due to the illicit and secretive nature of this portion of the trade, it is difficult to accurately calculate its value (TRAFFIC, 2010A). TRAFFIC estimates it to be worth hundreds of millions of dollars, with some estimates putting the value between US$10-20 billion per year (TRAFFIC,

2010A). Trafficking in endangered wildlife is considered to be the second most profitable transnational crime, placing it just behind the narcotic trade, (Warchol, 2004). Criminologists define a transnational crime as "the illicit procurement, transportation, and distribution of commodities across international borders" (Warchol, 2004).

According to the World Wildlife Fund (WWF), trade in parrots (*Psittacus, spp*.) constitute a large portion of the transnational criminal wildlife trade (WWF, 2010A). Out of all the plant and animal species affected by the wildlife trade, the most exploited group is probably birds (Inigo-Elias & Ramos, 1991). About 4,000 species of birds, involving several million individuals, are subject to the wildlife trade, either internationally or domestically each year (BirdLife International, 2010D). Legal and illegal exploitation for the bird trade continues to threaten populations of the African Grey Parrot (AGP) (*Psittacus erithacus*) as a result of being a heavily traded species (BirdLife International, 2010D). In 2007, the AGP was reclassified from a Species of Least Concern to Near Threatened on the International Union for Conservation of Nature and Natural Resources' Red List (IUCN Red List, 2010B).

The overall objective of this study is to assess the impact of the wildlife trade on AGP's by: 1) analyzing the current status of AGP populations used in the wildlife trade, 2) examining the extent of the trade in AGPs, 3) assessing CITES regulation of AGPs, 4) examining the potential effects of the wildlife trade on AGP populations, and 5) reviewing BirdLife International's recommendations on AGP conservation.

METHODS

An extensive review of the literature was conducted using the scientific databases available at Clemson University's Cooper Library. Databases searched include the Web of Science, CAB Direct, Google Scholar, along with the websites of BirdLife International, The World Wildlife Fund, and TRAFFIC. Reference librarians assisted in the selection of appropriate keywords and databases. A limited number of articles were found. A second approach was used for those articles that were published. The literature cited section of published articles was used to search for additional peer-reviewed and grey literature sources. Articles not available in the Cooper Library were retrieved through Interlibrary Loan.

The International Union for Conservation of Nature (IUCN) classifies avian species worldwide into categories based on their risk of extinction (IUCN, 2001). This allows for clear and concise definitions based on conservation status which can be used globally (IUCN, 2001). Standards used for classification purposes include rate of decline, geographic distribution, and population size. Classifications are: Extinct (no individuals remaining), Extinct in the Wild (naturalized population outside of its historic range or surviving in captivity), Critically Endangered (extremely high risk of extinction in the wild), Endangered (high risk of extinction in the wild), Vulnerable (high risk of becoming endangered in the wild), Near Threatened (endangerment in the near future), and Least Concern (species of low risk; the species is abundant and widespread) (BirdLife, 2010E; IUCN, 2001).

International wildlife trade is regulated by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (CITES, 2010A). Species regulated by CITES are placed on one of three tiers; Appendix I (species threatened with Extinction and trade permitted in exceptional circumstances only, Appendix II (species not threatened with Extinction but survival relies on trade being controlled and trade regulated by a permit system, and Appendix III (species protected in at least one country and that country has asked other members for help in controlling trade) (CITES, 2010A).

RESULTS

African Grey Parrots

AGPs are a medium-sized parrot, mottled grey in color with a red vent and tail (BirdLife International, 2010B). They are native to the primary and secondary rainforests of West and Central Africa (BirdLife International, 2010B). They are found in Guinea-Bissau in the west, through the lowland forests to Cameroon, in the Congo forests east to Uganda and Kenya, and south into northern Angola; twenty three countries in total (BirdLife International, 2006; IUCN Red List, 2010B). There are two recognized subspecies of AGPs: Congo (*Psittacus erithacus erithacus*) and Timneh (*Psittacus erithacus timneh*) (BirdLife International, 2010B).

AGPs are typically found in dense forests, but can be seen at wooded savannas, clearings, mangroves, forest edges, and cultivated areas (IUCN Red List, 2010B). The species is found in a number of protected areas (IUCN Red List, 2010B). The AGP roosts in groups of up to 1,000 individuals on islands, in rivers, or perched over the water in the

top of palm trees (World Parrot Trust, 2010A). They nest in a cavity in high trees and their clutch size is 2-3 eggs (World Parrot Trust, 2010A). AGP populations, estimated to be 680,000-13,000,000, are in decline. This is attributed to trapping for the wildlife trade and habitat loss throughout West and East Africa (IUCN Red List, 2010B). In 2007, they moved from a species of Least Concern to Near Threatened, and are on listed on Appendix II of CITES (IUCN Red List, 2010B). Even though there is evidence of a population decline in most of their range states, global population trends have not been quantified, so it is unclear if they meet the IUCN's Red List criterion for the Vulnerable Category (i.e. declining more than 30% in three generations) (BirdLife International, 2010B).

Trade in African Grey Parrots

The wildlife trade is responsible for threatening the survival and cause of extinction of many species (HSUS, 2010) and this type of trade has sky-rocked in the last two decades (Speart, 1993). Poaching of Rhino horn for use in the medicinal trade continues, even though most Rhinos are listed on Appendix I of CITES and considered endangered (IUCN Red List, 2010C). Through interviews of those involved in the illegal wildlife trade in South Africa, Warchol (2004) found that the trade in birds is much more organized than the other illegal wildlife markets such as trade in Rhino and elephants (Warchol, 2004). "Networks of bird breeders and collectors rely on verbal agreements, email, internet sites, and classified ads in bird enthusiast magazines to order, sell or

trade birds" (Warchol, 2004). The animal's welfare is not typically a concern of the merchants who sell them or the poachers who caught them (Stanton, 2009). Many die of injuries sustained in capture and handling, including dehydration, starvation, and diseases developed due to the horrendous circumstances in which they are housed (Stanton, 2009).

Two categories comprise the commercial use of wildlife; the trade in live wildlife and trade in wildlife parts and products (HSUS, 2010). Research shows trade in AGP's falls into both categories. Like many other parrot species, AGP's are sought after as pets due to their beauty, long life, intelligence, and ability to mimic human sounds (IUCN, 2000). Worldwide, hundreds of thousands of parrots are taken from the wild every year; leading to the greatest exploitation ever, of a family of birds (IUCN, 2000). There are roughly 330 species of parrots worldwide (WWF, 2010A). The 2002 IUCN Red List of Threatened Species lists 28% of the world's parrot species as Threatened with Extinction (WWF, 2010A).

CITES

International wildlife trade is regulated by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which went into effect in 1975. CITES is an international agreement between the governments of member countries, and now has 175 parties (CITES, 2010A). Their goal is the regulation of species to "ensure that international trade in specimens of wild animals and plants does

not threaten their survival" (CITES, 2010A). "CITES is an international agreement to which States (countries) adhere voluntarily. States that have agreed to be bound by the Convention ('joined' CITES) are known as Parties. Although CITES is legally binding on the Parties – in other words, they have to implement the Convention – it does not take the place of national laws. Rather, it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level" (CITES, 2010A).

Species regulated by CITES are placed on one of three tiers dictated by the level of protection they need for their survival (CITES, 2010A). Species Threatened with Extinction appear on Appendix I; trade of those species is only permitted in "exceptional circumstances" (CITES, 2010A). Species not necessarily Threatened With Extinction, but whose survival is reliant on their trade being controlled are listed on Appendix II, and trade is regulated with a permit system (CITES, 2010A; Warchol, 2004). Species protected in at least one country, and that country has asked other CITES parties for help in controlling the trade, are listed on Appendix III (CITES, 2010A). The import, export, re-export of species, is authorized by a licensing system, with each party designating a "Management Authority," responsible for the licensing coordination and a "Scientific Authority," to advise them how trade of that species will affect their status (CITES, 2010A).

Research has shown many flaws in this system of wildlife regulation at both the national and local level. Pet shop owners and bird dealers may have exotic birds that

were obtained with legal CITES permits, but may continue to buy poached birds of the same species, claiming they are the offspring of the original pair (Warchol, 2004). There is no requirement to register the offspring of the legal pair of birds (Warchol, 2004). Another loophole in South Africa and Namibia's regulation of the wildlife trade is related to the sale of CITES permitted birds (Warchol, 2004). CITES' regulations do not require owners of CITES permitted wild-caught birds to transfer the CITES permit to the new owners upon sale of the birds (Warchol, 2004). The original owner can later purchase the same species of birds, poached from the wild, and attach the original CITES permit to the new birds (Warchol, 2004). Thus, this flaw in the system allows for the cycle to continue.

The trade in AGPs has been occurring for hundreds of years. For centuries, they have been taken from the wild in West Africa to be kept as pets (BirdLife International, 2010B; World Parrot Trust, 2010B). AGPs are still the preferred avian pet in the United States, Europe, and the Middle East (BirdLife International, 2010B). There is some trade within the AGP's range states, but the majority of the threat to wild populations comes from the international trade (BirdLife International, 2010B). Senegal, Cameroon, Democratic Republic of Congo, and Tanzania are among the major exporters of parrots (WWF, 2010A). From 1994-2003, range states exported over 359,000 wild-caught AGPs (IUCN Red List, 2010B). Wildlife experts consider this international trade data to be a low estimate, as the mortality incurred prior to export is not included (WWF, 2010A).

Modern transportation allows for the easy transport of animals from the country of origin to consumer markets worldwide (WWF, 2010A). Birds are transported with their wings and beaks tightly taped, stuffed in bras and girdles, or simply as cargo in boxes (Bhagwandas, 2007). In 2007, two different shipments containing AGPs were detained at the airport in Karachi for lack of proper documentation (Bhagwandas, 2007). Both shipments originated in Republique Democratique du Congo (DR Congo) but arrived in Karachi via Bahrain, one on Ethiopian Airlines (Bhagwandas, 2007). The first shipment included two boxes weighing approximately 60 kilograms containing 110 AGPs and the second included two boxes weighing about 50 kilograms containing 100 AGPs (Bhagwandas, 2007). The importer of the first shipment paid US$5 per bird (Bhagwandas, 2007). According to the report, the fine paid by the importers was "a mere fraction of the price these prized birds ordinarily fetch on the open market" (Bhagwandas, 2007). While the shipment containing 100 AGPs was waiting a week to clear customs, 30 of the birds died (Bhagwandas, 2007).

An article on MyFoxAustin.com (2010), reported that in February, 2010, police seized 700 AGPs, confined to 14 crates, just as they were about to be smuggled out of the country. The parrots were about to be loaded onto a flight run by an Ethiopian airline company; their final destination was not disclosed (MyFoxAustin.com, 2010). Many of the parrots were dead; the survivors were turned over to the Ministry of Wildlife (MyFoxAustin.com, 2010). The article suggests that the smugglers were tipped off by someone at the airport, thereby alluding arrest (MyFoxAustin.com, 2010). Just

one month prior, 300 hundred parrots were seized at the same airport (MyFoxAustin.com, 2010).

Effects of the Wildlife Trade on African Grey Parrot Populations

The illegal trade in AGPs is a lucrative business for those involved. A report on AGP trade in Cameroon (Ngenyi, 2003), outlined the profits made by each participant. "A local parrot trapper sales a parrot for US$10 in those villages where grey parrots are found to intermediaries who then sale them for US$15 to those who are intermediates to capture permit holders. Once out of the region, the birds are sold in provinces and cities for US$18-20 and US$20-30. At the international level, a grey parrot that is sold in Cameroon for US$20-30, is worth US$600-800 in European markets and prices may be higher (US$1200 per bird)" (Ngenyi, 2003).

Most of the poaching for the illegal wildlife trade occurs in poorer countries that are rich in natural resources. One example, is the forest region of Lobeke, located in the Southeast corner of Cameroon (Ngenyi, 2002). This region has 283 species of avifauna (Ngenyi, 2002). Eighty percent of the AGPs harvested in Cameroon for the parrot trade come from this area (Ngenyi, 2002). Over 15,000 birds per year are taken from two forest clearings in Lobeke with half of the birds dying from "poor handling" (Ngenyi, 2002).

A new type of trade is emerging, trading in heads and feathers of the AGP. A poacher was apprehended in Cameroon carrying 353 AGP heads and 200 tail feathers

(Harcourt, 2009). The man claimed he was taking them to a witch doctor that was treating his brother who was mentally ill (Harcourt, 2009). Not much is known about this type of trade but a wildlife management leader in Cameroon suspects the heads are exported to China and India, and the tails to Nigeria (Harcourt, 2009). It is possible this type of trade will flourish as economic times worsen and the poor in Africa become more desperate, but also because feathers and heads are more easily stored and transported than live birds (Harcourt, 2009).

The internet is playing a role in this type of trade. In 2009, red feathers from the AGP were for sale for use in crafts and fly-fishing (Harcourt, 2009). One seller was auctioning 125 feathers which were selling from US$0.50 to over a US$1.00 each (Harcourt, 2009). Another seller of AGP tail feathers had them on auction for religious purposes at US$7.00 each (Harcourt, 2009).

Illegal wildlife smugglers seem to have the upper hand when importing into foreign countries. Problems controlling the illegal wildlife trade exist trans-continentally. An article (Speart, 1993) examining the illegal wildlife trade in the United States from U.S. Fish and Wildlife's perspective reported that out of 80,000 wildlife shipments entering the country per year, 95% were cleared on paperwork alone, never inspected. In Newark, an unusual spot check of 50 containers produced illegal wildlife in 30 containers (Speart, 1993). In that same article, an inspector was quoted as saying, "Even if we were doing 50 percent, it doesn't mean anything, since we're only looking at small parts of any shipment. So, even when we're on duty, an importer stands a good chance

of getting something by" (Speart, 1992). In a country as wealthy as the United States, those responsible for policing the wildlife trade are unable to do so for lack of manpower and funding (Speart, 1993). Customs officials at the Kenya-Uganda border, only check that passengers have the proper documentation and that relevant taxes have been paid (Madindou & Mulwa, 2008). The custom officials assumed plant and animal smuggling only occurred at airports (Madindou & Mulwa, 2008).

BirdLife International

BirdLife International focuses on improving the enforcement and implementation of national and international regulation resulting from CITES. In 2006, BirdLife International prepared a review of the status of the AGP and submitted proposals to CITES for the AGP's conservation (BirdLife International, 2006). The review stated that this species was heavily traded, both nationally and internationally, and as a result, wild populations were in decline across most of its range states (BirdLife International, 2006). Another concern was the lack of "systematic population monitoring to support non-detrimental findings and hence, quota allocations" (BirdLife International, 2006). BirdLife's proposals were in response to their conclusions; "current trade levels for the AGP are unsustainable, and therefore likely to be causing significant detriment to the species" (BirdLife International, 2006). Recommendations included a full or partial moratorium on international trade of the AGP in some range states, until scientific data provides "sustainable exportable levels" (BirdLife

International, 2006). They further suggested investigation of the illegal trade of AGPs in some of both their range and non-range states and improvement of law enforcement (BirdLife International, 2006).

BirdLife International prepared a briefing for the meeting of the parties to CITES in 2007. With regard to the conservation of wild bird populations "a more robust precautionary approach must be applied" (BirdLife International, 2007A). "Despite considerable threats, no bird proposals have been tabled. It is regrettable that despite continued, and in some cases worsening, threats to bird species from trade, not a single bird proposal has been tabled at the 14th meeting of the Conference of the Parties to CITES (CoP14) by contracting Parties. Since 1988, the international wild bird trade has been the primary driver in the worsening status (i.e. an uplisting to a more threatened IUCN Red List category) of 15 bird species. Without robust and visible scrutiny of the trade in this major animal group, CITES risks losing credibility" (BirdLife International, 2007A). At the same briefing, they again recommended scientific research into the impact of trade on wild bird populations, and greater participation from member parties, regarding implementation and enforcement of CITES, including funding those responsible with policing the illegal trade in wildlife (BirdLife International, 2007A).

Management Implications

One of the major obstacles to ending the illegal trade in wildlife is the fact that those involved in the illegal wildlife trade live at poverty level (Ngenyi, 2002). They live

for the moment; trying to survive day to day (Ngenyi, 2002). They do not think about the consequences their actions have on the wildlife populations from which they are poaching (Ngenyi, 2002). One solution is in those range states where AGPs occur, that are rich in natural resources, could be managed for eco-tourism (Ngenyi, 2002). Management should be at both national and local level, involving the community around the preserve. If managed for the community as a whole, revenues generated could surpass those earned from the trade in parrots, which due to the trades illicit nature, typically only profit those directly involved (Ngenyi, 2002). CITES regulated trade of AGPs in Cameroon was seen as being an income generating source for the state (Ngenyi, 2003). In 1985, Ghana exported 9,580 AGPs worth US$287,400 (Ntiamoa-Baidu, 1987). Revenue is generated for the states in the form of export permits, fees for hunting licenses, and from foreign–exchange earnings from wildlife exports (Ntiamoa-Baidu, 1987).

Benefit-sharing and education could lead to long term support from the communities for conservation initiatives (Ngenyi, 2002). The community could work in conjunction with nongovernmental organizations (NGOs) and conservationists from the private sector who aid in combating the illegal wildlife trade by monitoring and funding conservation efforts (Warchol, 2004). Benefit-sharing, such as employment of those from the community to patrol and guard protected areas and involvement of locals in collection of ecological data on the AGP, such as bird and nest counts, could gain their support and assistance with proper management of protected areas (Warchol, 2004).

Seven of the ten providences in Cameroon encompass protected areas. Loss of habitat and deforestation has led 75% of AGPs to retreat to those protected areas to forage for vegetation and "saline soil composition for food" (Ngenyi, 2003). Those protected areas are used by trappers as their main capture sites (Ngenyi, 2003). Successful management for eco-tourism could lead to a sustainable AGP population and a halt to habitat destruction. Once a sustainable level is reached, those in excess could be harvested for the trade (Beissinger & Bucher, 1992).

National legislation like that enacted by the United States to enforce CITES regulation of AGPs has proven to aid in alleviating pressures on wild populations from demand. The United States was a major importer of wild-caught birds (WWF, 2010A). Passage of the Wild Bird Conservation Act (WBCA) of 1992 banned the importation of wild-caught birds listed on the various Appendices of CITES. Passage of WBCA has led to captive breeding programs in the United States becoming big business. Captive-bred AGPs make better pets than wild-caught birds (Schmid *et al*., 2006). Studies show wild caught AGPs can develop phobic behaviors towards people, possibly as a result of the trauma suffered from their capture and transport (Schmid *et al*., 2006). Capture methods, nets and lime-twigs, a small branch smeared with a sticky adhesive, take advantage of the AGP's ground foraging in forest clearings; both can cause severe damage to the birds (May, 2002). Also, quarantine in the countries of import can result in a mortality rate between 10 and 100% (Luft, 1994). Typically wild-caught AGPs are in

poorer health and pick their feathers more often than parent-reared or hand-raised birds (Schmid *et al*., 2006).

CONCLUSION

Moratoriums on trade in AGPs should be established by both exporting and importing countries until both biological and ecological data can be conducted in the AGP's range states (Beissinger & Bucher, 1992). Until distribution, status, food and habitat requirements are known, it is impossible to know if those regulations set forth by CITES to protect the AGP are capable of positively impacting population numbers. Quotas cannot be established based on a guess. Effective regulation must be based on scientific research (BirdLife International, 2007A).

Research from around the world regarding the illegal wildlife trade has many commonalities; the illicit and illegal trade in natural resources is thriving, many animals suffer from inhumane handling and care, and those responsible for policing the trade in wildlife are underfunded, understaffed, undertrained or corrupt. International laws regulating the wildlife trade cannot work efficiently if those laws at the national and local level are not enforced. It is difficult to overcome the fact that those who catch the animals are poverty ridden and live from day to day. Perhaps overcoming the latter issue is the most difficult. If we cannot figure out ways to deal with the above issues, AGPs and thus biodiversity for those regions will be lost forever.

CHAPTER FOUR

CONCLUSIONS

Research shows that both the use of Sub-Saharan vultures for medicinal purposes and the illegal wildlife trade in African Grey Parrots are negatively impacting populations of both groups. Global regulation, used for conservation of these species, has been implemented but success has been limited due to lack of enforcement at both the national and local level. Governments need to work with the local people to first gain an understanding of their culture and beliefs, and secondly, to obtain the locals belief that sustainable harvest versus depletion of these species will be of greater benefit to them.

The objectives of the vulture study were to examine the use of vultures in traditional medicine and determine the extent of use in traditional medicine; analyze the current status of Sub-Saharan vulture populations with an emphasis on those species used in the medicinal trade; examine the potential effects of use in traditional medicine on vulture populations; and determine the relative risk of trade in correlation with other stressors on vulture populations in Sub-Saharan Africa.

Use of vulture parts in traditional medicine occurs throughout Sub-Saharan Africa for prevention and treatment of illnesses, and for betting on sports or lottery tickets. There is no preferred species of vulture and many different vulture parts were utilized. Trade in vultures can be a revenue generating business for those involved.

Six of the eight species of vultures in Sub-Saharan Africa have declining populations and are listed as Endangered, Vulnerable, or Near-Threatened. Even though the research has not quantified use of all eight Sub-Saharan vultures in the traditional medicinal trade, use of six of the vulture species is listed as probable, and use of five species was documented in the literature.

This study confirmed use of vultures in the traditional medicinal trade is impacting vulture populations. In Tanzania alone, 1000 are killed per year. Hunting pressures could lead to extirpation of local populations of White-backed, Lappet-faced, White-headed, and Cape Griffon vultures. Methods of capture are of great concern. Poisoning is often used by hunters to kill mass amounts of vulture. This method could have detrimental health effects on people who ingest parts of those birds.

Lastly, vulture use in the medicinal trade along with many other stressors is contributing to the decline of vulture populations throughout Africa. Like many other species, they face habitat loss. Other contributors to their decline are loss of prey, persecution, and accidental and intentional poisoning. Two poisons of major concern are diclofenac and carbofuran due to their acute toxicity to vultures. Diclofenac was responsible for the Asian vulture crises, and is now, due to its current sale in Africa, a threat to African vulture populations.

The objectives of the African Grey Parrot (AGP) study were to analyze the current status of AGP populations used in the wildlife trade; examine the extent of the trade in AGPs; assess CITES regulation of AGPs; examine the potential effects of the

wildlife trade on AGP populations; and review of BirdLife International's recommendations regarding the AGP.

Due to evidence of a population decline in most in most of its range states, AGPs moved from a Species of Least Concern to Near Threatened in 2007. The AGP's declining population is mainly attributed to the illegal wildlife trade. They roost and forage in large numbers, which enables the poachers, who use nets, to capture large numbers of birds when they forage at clearings in the forest. Due to lack of research, global populations cannot be quantified so it is unclear whether they meet the IUCN's Red List criterion for the Vulnerable category.

Parrots are the most exploited bird species in the illegal wildlife trade. Demand for the AGP is due to their beauty, long life, intelligence, and ability to mimic human sounds. From 1994-2003, range states exported over 359,000 wild caught AGPs. The illegal trade in AGPs is made easier by modern transportation methods. When illegal shipments are caught, they usually contain a large number of birds, with many not surviving.

International wildlife trade is regulated by CITES, but without the complete cooperation of the governments of participating parties, international regulation is ineffective.

The trade in African Grey Parrots is lucrative for all involved. Poaching often occurs in poorer countries, with those carrying out the poaching surviving day to day; worried about where their next meal will come from. Over 15,000 AGPs are taken each

year from just two forest clearings in Lobeke, located in the Southeast corner of Cameroon. Trade in the head and feathers of the AGP are on the rise, due to the ease of transport, with the feathers now being sold on the internet.

BirdLife International, the official Red List Authority for birds for the IUCN Red List focuses on improving enforcement and implementation of national and international regulation set by CITES. Their status review of the wildlife trade in AGPs indicates there is a necessity for further research relating to the illegal trade in AGPs in order for conservation of the species to succeed.

Global regulation is a great start, but in order for successful conservation of Sub-Saharan vultures and AGPs to occur, support of local people in these species' range states will have to be gained. Their understanding of the benefits of sustainable harvest is crucial. Use of vultures for the medicinal trade is ingrained in their heritage and those poaching AGPs seem to be focused on the here and now, without regard to the consequences of their actions. Depletion of these species could have dire impacts on the many cultures involved.

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