

A Visit to Southern Africa

The NCSR Pictorial Series of materials are designed to provide faculty, teachers and other natural resource professionals an informal *PowerPoint* presentation on selected environmental settings. The presentations consist of pictures of the natural environment and feature plants, animals and landscapes of the area. The intended theme is to show diverse audiences interesting aspects of various environments. As a result, the presentation can stimulate learning more about the features of various natural settings and why they are both different and changing.

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Introduction

A visit to Southern Africa is part of the NCSR Pictorial Series designed for presentation to general audiences. It is comprised of images made from photographs of Southern Africa presented in a *PowerPoint* format supported by instructor notes. The purpose of the presentation is to explain and illustrate the wildlife and habitats in the region and stimulate interest in the natural environment and factors that affect the environment. The information in the *PowerPoint* is provided in an informal manner and geared toward audiences with a wide range of ages and natural resource backgrounds.

Presentation

The presentation is designed to show the slides accompanied by comments by a “presenter.” Modifying the *PowerPoint* slides as an automated slide show including dubbing of narrative or music is an alternative.

Instructor's Notes from *PowerPoint* Slides

Slide 1

This presentation is designed to provide a pictorial view of visits to game reserves in the southern African countries of Botswana and Zambia. Both countries are stable and safe for tourists, especially by African standards. They pursue a “tourist friendly” attitude to visitors capitalizing on their conservation efforts. Botswana was caught up in the British-Boer struggles during the colonial period. It peacefully achieved independence from Britain in 1966, avoiding the protracted independence wars of most of the continent. Discovery of diamonds has allowed a moderately prosperous economy to develop. Botswana is approximately 225,000 square miles in area with a population of 1.6 million. The low population density of 7 persons per square mile is a positive factor in the country's conservation efforts.

Its neighbor to the north, Zambia was contested territory with the British and was established as a colony in 1895. Designated North Rhodesia, the area was part of the African national resistance in the late 1950s winning independence in 1963. Economic growth was constrained by the continuing struggle for independence by Rhodesia, Zambia's neighbor to the south. In 1980, independence was gained by Rhodesia - now called Zimbabwe. This allowed Zambia to establish trade routes for its exports; however, politics and inept economic and social management have not allowed the country to reach its full potential. In spite of these problems, the government has established a significant number of game preserves. As noted above, it has pursued conservation policies that foster the protection of native ecosystems and the establishment of an ecotourism industry. Zambia has an area of 290,000 square miles and population of 11.5 million. The country's population density of 40 persons per square mile results in a greater challenge for creating an effective conservation policy than faced by Botswana.

The British influence is clearly present in both countries with English as one of the official languages and universally used. The abundance of wildlife coupled with striking vistas make the countries excellent examples of “wild Africa as we envision it.” Camps are well regulated, comfortable and staffed by knowledgeable guides. The presentation capitalizes on these elements.

Slide 2

Sunrises and sunsets on the wildlife preserves are spectacular. Since game drives start prior to sunrise and extend past sunset, visitors have many opportunities to see and photograph these events.

Slide 3

As the land becomes visible, its unique features are revealed. The landscape of the preserves in this presentation are open veld or savanna (grasslands interspersed with brush, trees and marshes) allowing for excellent viewing and photography. Part of the trip is along the Zambezi River, the third largest in Africa. Being on the water gives a different perspective to visitors and allows observation of animals drawn to the water such as hippopotamus.

Slide 4

Tree shapes against the sky are one of the features first noticed by visitors. The safari was during the winter (dry season) and there was a combination of barren and leafed trees. However most brush areas are dry and there are few flowers in bloom. Winter is the preferred time to visit since the ability to observe and photograph wildlife is best in dry weather.

Slide 5

The topography is varied with rock outcroppings, dry stream beds, permanent and seasonal marsh areas, grasslands, and open fields. The diversity provides habitat for many mammals as well as an amazing number of bird species.

Slide 6

The two large trees are baobab trees. The baobab is leafless for nine months of the year. They leaf-out starting in November with the start of the rainy season. Often referred to as a “tree of life” due to its many uses, the bark of the baobab is used for cloth and rope, the leaves for condiments and medicines while the fruit, called “monkey bread,” is eaten. It also holds water which can be tapped during the dry season.

Legend has it that a god became angry with the tree’s complaints and pulled it from the ground and thrust it back upside down. Thus, it is called “the upside down tree” by some.

The species reaches heights of 98 feet and trunk diameters of 36 feet. There are examples of trees larger than these dimensions such as one in South Africa, which is often considered the largest example alive, and has a circumference of 150 feet and an average diameter of 49 feet. The presentation will show additional pictures of the baobab.

Slide 7

Acacia is a genus of shrubs and trees belonging to the family Fabaceae. They are present throughout the world and are often referred to as the Thorn Tree. In the wild, native acacias provide the food and habitats for a variety of animals, from hoofed mammals and birds to countless species of insects. In fact, giraffe-browsed acacias produce the picturesque, flat-topped tree silhouettes on South African savannas.

The sun palm or african palmyra palm - *Borassus aethiopum* is one of only five palm trees in Africa. It usually grows singly or in small groups. Its fruit is eaten by many animal species.

Slide 8

Botswana's elephant population is the largest in Africa due to strict law enforcement curbing hunting. However, the rest of Africa has not been as aggressive. Between 1979 and 1989, the elephant population in Africa fell from 1.34 million to 625,000. In this ten year span, East Africa lost more than 52% of its elephant population.

The African elephant is the largest living land animal and weighs up to 12,000 pounds. It inhabits the savannah, brush, forest, river valleys, and semi-desert regions of Africa south of the Sahara desert. Besides its greater size, it differs from the Asian elephant in having larger ears and tusks, a sloping forehead, and two "fingers" at the tip of its trunk, compared to only one in the Asian species. As vegetarians, elephants require much food, sometimes consuming more than 500 pounds of plant matter a day. Their trunk is employed to pull branches off trees, uproot grass, pluck fruit, and to place food in their mouths. The trunk is also used for smell, touch and in drinking, greeting or throwing dust for dust baths. In both sexes, the two incisor teeth of the upper jaw grow to form tusks.

Hunters have slaughtered thousands of these magnificent animals for the ivory contained in the elephant's tusks (used at one time in the manufacture of piano keys, billiard balls, and other objects). One major consequence of the ivory trade is the acceleration of evolutionary change in elephant tusk size. As recently as 40 years ago, elephants with massive tusk size still existed, but were nearing extinction as a result of the value of their ivory to hunters. Scientists and conservation managers had long suspected this trophy mentality would accelerate evolutionary change in populations by favoring the weakest individuals (those with smaller tusks in this case are spared by trophy hunters). Their suspicion is now supported by scientific evidence (see <http://environmentalresearchweb.org/cws/article/research/37289>). In Botswana, rangers and guides stated no large "tuskers" remain. In fact, we came across a herd that had many large elephants with no tusks and those tusks which were visible appeared to be appreciably smaller than most of the others we had observed. Our guides reported that small tusk size seemed to have an impact on the behavior of the herd with these animals being more wary or nervous than herds with large tusks.

The hippopotamus (often called Hippos) worldwide population has been reduced to eastern and southern Africa. The current hippo population is estimated at 160,000, and unfortunately, the population is in continuous decline. Although Zambia has a fairly stable population, the killing of these animals continues in other countries. For example, the world's biggest population of hippos has crashed by 95 percent, leaving the giant creature as the latest of the planet's megafauna to be in danger of extinction. Less than 30 years ago, more than 29,000 hippos lazed in the rivers and rainforest backwaters of the Virunga National Park in the Democratic Republic of Congo. Now, after a decade of civil war, naturalists have returned to discover that just 1,300 remain. The main cause of the decimation is hunting by poachers for meat and teeth. Earlier in 2003, hundreds of park hippos were found dead in the Rutsuru River - most had been poisoned. In recent years, hippo meat has become a delicacy in parts of central Africa. Furthermore, the present worldwide ban on the trade of elephant ivory has meant hippo teeth, which can grow to 60 centimeters or more, have become a valuable substitute. This switch is darkly ironic, because hippos are now much rarer than African elephants. The global hippo population is now estimated at about 150,000, but there are more than half a million African elephants.

More information on elephants and hippos appears later in this presentation.

Slide 9

Except for low-lying coastal areas, southern Africa is essentially a high plateau ranging from 3,000 to 6,000 feet in elevation. The central areas are relatively cool due to the elevation with highs of 85° F in October to lows of 40° F in June. (Note: Southern Africa is in the southern hemisphere and seasons are the reverse of those in the U.S.) Rainfall is predominantly between November and March. Vegetation is generally interspersed by open areas. Trees are separated and stand out distinctly, often against the bright blue sky during the winter season.

Slide 10

Since game refuges and the supporting facilities are widespread, visitors with limited time either must opt for visiting only one location or using private air to visit a number of areas. All of the major game areas have a landing area that is accessible by small aircraft. If in the same country for departure and arrival, there is no issue with visas or customs. However, if they are in different countries, visitors must initially land at an international port of entry prior to proceeding to remote or private airfields.

The use of air for transportation has another value other than time savings, it is seeing the land. The next series of photos illustrates that value.

Slide 11

This trip was in August during the dry season and the landscape reflected the lack of water. Starting in late October the rains revitalize the land's ability to support plant growth and the land turns from brown to green. The trees visible in these photos are drought resistant and many are "green" throughout the year.

Slide 12

Dry river beds, such as the one in this photo, are typical of southern Botswana.

Slide 13

These farms are productive only during the wet season since water for irrigation is not available in most of southern Africa. Botswana, where this picture was taken, has very serious water shortages outside the Okavango Delta.

Slide 14

Salt pans are the remnants of seasonal lakes. As the fall season approaches, water rapidly evaporates leaving behind dissolved minerals. In Botswana, the pans receive water primarily from summer rains. Overflow waters from the Okavango Delta periodically reach the area in late winter. During the wet season the pan areas are populated with flamingos and other water birds. In some regions, water and new plant growth bring in tens of thousands of grazing zebras, elands, gemsboks and other antelope. This in turn attracts the predators such as lions and cheetahs. The changing nature of the land is associated with water, which in turn is the critical factor in supporting the wildlife population.

Slide 15

In wet areas such as the Okavango Delta, permanent marshes exist (photos are from that area). The Okavango is one of the world's largest inland deltas. During the dry season waters from the Angola highlands reach the delta and as they recede, the summer rains arrive. This cycle, although resulting in fluctuating water levels, keeps the area wet and often flooded. The perpetual "green season" makes the Okavango one of Africa's most famous wildlife areas.

Slide 16 – no notes

Slide 17

Landing strips are basically dirt strips with oiled runways to help control dust. The camp staff meets arriving guests and transports them to their lodgings. For some, the remoteness of the game refuges are a bit intimidating but they soon learn that those who operate the camps are seasoned professionals and guests do not sacrifice their comfort. What they gain is an exceptional experience observing wild mammals and a proliferation of birds in their natural environment.

Slide 18

This particular area was a dry high plateau and the sparse vegetation reflected the lack of rain during the winter months. For those expecting to be in the African jungle (rainforests) the first view of the land may be disappointing. It also reflects a common misconception of what rural Africa is like.

Africa's topography is incredibly varied. Its mountain ranges, savannahs, plateaus, lakes, rivers and deserts sustain a diverse array of life. A brief description of Africa's topography follows:

Its Olduvai Gorge region is known as the "cradle of humanity," the site of the earliest known human habitation. The northern continent consists of plateaus and basins, many of which filled with sand and gravel to create the Sahara. The arid Sahara is Earth's largest desert. Mt. Kilimanjaro, despite its proximity to the equator, is tall enough to sport glaciers, though they are rapidly melting due to climate change. The converging African and Eurasian tectonic plates created the Atlas Mountains. The Great Rift Valley is one of the world's longest earthquake faults. Lake Victoria is the second largest freshwater lake in the world behind the U.S. Lake Superior. To the west lies the vast, shallow Congo Basin. The Congo Basin is home to the second largest concentration of rainforests on Earth behind South America's Amazon. And, of course, there are the great savannas, such as the Serengeti, which teem with some of Earth's most exotic wildlife. Most of southern Africa rests on a plateau comprising the Kalahari Basin and a mountainous fringe, skirted by a coastal plain.

Slide 19

The dry open areas provide a pallet of browns with interspersed green as the backdrop for our photo safari. Large flocks of guinea fowl are a persistent sight in the southern open areas. These birds spend most of the day seeking and eating seeds and insects. At night they roost in trees for safety much like domestic chickens.

Slide 20

The brown colors provide interesting opportunities for photography playing off differing shades of color, varying textures and the effects of lighting.

Slide 21

We quickly note that the color of the animals often provides a natural camouflage against the brown background. Here, a herd of impalas graze among the dry grasses and leafless trees.

Slide 22

Note the baboon in the upper right which is well hidden in the dry brush. Since the troops of baboons spend a great deal of time moving about on the ground, blending in is important.

Slide 23

The various hyena species are all well camouflaged. Here spotted hyenas (in the right photo) are eating an impala. The impala was most likely stolen from a cheetah, since the cheetah does not have much ability to defend itself against a hyena pack. The cheetah, like the leopard, is a solitary hunter but unlike the leopard, it does not have the ability to take its prey up into a tree so often loses it to the hyenas.

Slide 24

Of course, one of the best animals for blending in is the female lion. While stalking, the lionesses will position themselves upwind of their prey and in high grass. They are then almost invisible to the intended meal. Later in this presentation there are more examples of lionesses under cover as they stalk prey for a meal.

Slide 25

Perhaps to keep from becoming a snack, all the small animals we saw were attired in shades of brown. The squirrels were not unlike the ones we see in the U.S. scampering about gathering food. The mountain hyrax is one of six species, all resident in Africa. Looking somewhat like large guinea pigs, they spend their time on quick excursions to open fields to eat, then returning to the safety of their rock piles. The mountain species is the most adaptable to arid conditions.

Slide 26

Many of the antelopes are shades of brown. The need is obvious, they are prey animals and the less visible the better. In the picture on the left, female lesser kudu silhouette themselves against the blue sky. Another survival mechanism can be noticed even at this distance - large ears. As the wolf said to Red Riding Hood – “The better to hear you my dear.” More information about the antelopes appears later in the presentation.

Slide 27

Termite mounds occur when an above-ground nest grows beyond its initially concealing surface. They are commonly called "anthills" in Africa and Australia, despite the technical incorrectness of that name. In African tropical savannas, the mounds may be very large, with an extreme of 30 feet high in the case of large conical mounds constructed by some species. Three to ten feet, however, would be typical for the largest mounds in most savannas. The shape ranges from somewhat amorphous domes or cones usually covered in grass and/or woody shrubs, to sculptured hard earth mounds (as pictured here), or a mixture of the two. The different species in an area can usually be distinguished by simply looking at the mounds. The sculptured mounds sometimes have elaborate and distinctive forms, such as those of the compass termite which build tall wedge-shaped mounds with the long axis oriented approximately north-south. This orientation has been experimentally shown to help in thermoregulation. The column of hot air rising in the above ground mounds helps drive air circulation currents inside the subterranean network. The structure of these mounds can be quite complex. The temperature control is essential for those species that cultivate fungal gardens and even for those that don't. Much effort and energy is spent maintaining the brood within a narrow temperature range, often only plus or minus one degree celsius over a day.

In some parts of the African savanna, a high density of above-ground mounds dominate the landscape. For instance, in some parts of Zambia, abandoned mounds serve as homes to burrowing animals such as mongoose. Also, native people extract termites through an elaborate process and create a high protein paste that is eaten like peanut butter.

Slide 28

The baobab trees are always striking. Normally they grow singly in relatively open areas.

Slide 29 – no notes

Slide 30

This tree is believed to be over a thousand years old, however, since it does not produce growth rings, that is difficult to prove. What is not hard to prove is its large size which can be seen by its width in comparison to the safari vehicle.

Slide 31

Many of the photo opportunities in southern Africa come from the large and varied bird populations. This is an African fish eagle, similar in color and appearance to North America's bald eagle.

Slide 32

The African wild dog, also called the Cape hunting dog or painted dog, typically roams the open plains and sparse woodlands of sub-Saharan Africa. These long-legged canines have only four toes per foot, unlike other dogs, which have five toes on their forefeet. The dog's Latin name means "painted wolf," referring to the animal's irregular, mottled coat, which features patches of red, black, brown, white, and yellow fur. Each animal has its own unique coat pattern, and all have big, rounded ears. (Coat patterns for the dog may serve as recognition patterns or enhance its camouflage.) African wild dogs live in packs that are usually dominated by a monogamous breeding pair. The female has a litter of 2 to 20 pups, which are cared for by the entire pack. These dogs are very social, and packs have been known to share food and to assist weak or ill members. Social interactions are common, and the dogs communicate by touch, actions, and vocalizations.

African wild dogs hunt in formidable, cooperative packs of 6 to 20 (or more) animals. Larger packs were more common before the dogs became endangered. Packs hunt antelopes and will also tackle much larger prey, such as wildebeests, particularly if their quarry is ill or injured. The dogs supplement their diet with rodents and birds. As human settlements expand, the dogs have sometimes developed a taste for livestock, though significant damage is rare. Unfortunately, they are often hunted and killed by farmers who fear for their domestic animals. The animal pictured here is part of a pack reintroduced in the Botswana game reserve in 2006. As of 2008, the pack had raised two litters and due to the abundance of game and government protection seems to be surviving.

Slide 33

When African wildlife is mentioned, the image of the big cats often comes to mind. Usually lions, leopards and cheetahs are those most identified with Africa. However, there are six other cat species (African golden cat, African wildcat, black-footed cat, caracal, sand cat, and the serval). To most visitors these lesser known cats are seldom seen and rarely photographed. Most are smaller and their habitat is more difficult to access. On this particular photo safari the picture opportunities focused around lions and leopards although we did have a chance to observe cheetahs and an African black-footed cat (the smallest of the wild cats – smaller than our domesticated cats).

Slide 34

Lions are the biggest of the African cats (males weigh 300-550 pounds and females 265-395 pounds). They are the only cats that live in groups called prides. Prides are family units that may include up to three males (one of which is dominant and breeds with the females), up to a dozen or so females, and their young. All of a pride's lionesses are related, and female cubs typically stay with the group as they age. Young males eventually leave and establish their own prides by taking over a group headed by another male.

No physical description of the lion would be complete without some mention being made about its magnificent roar. Only four cats can roar: the lion, tiger, leopard, and jaguar. These four cats have been assigned to the genus *Panthera*, in part because they share this ability. Of these cats, the lion roars the most. It is believed the roar serves to alert other lions of an individual's presence. Roaring choruses of several lions, or a whole pride, also take place. When a lion roars, it can do so with enough force to raise a cloud of dust. Roaring is made possible by a special two-piece hyoid bone in the throat. All of the non-roaring cats have a one-piece hyoid bone. It is said that a lion's roar can be heard 5 miles away. Lions cannot purr.

Slide 35

Only male lions boast manes, the impressive fringe of long hair that encircles their heads. Besides its primary role of protecting the male during fights, it has been discovered that female lions prefer males with bigger and darker manes. Males defend the pride's territory, which may include some 100 square miles. Animals mark the area with urine, roar menacingly to warn intruders, and chase off animals that encroach on their turf.

Slide 36

Female lions are the pride's primary hunters. They often work together to prey upon antelopes, zebras, wildebeest, buffalo and other large animals of the open grasslands. Many of these animals are faster than lions, so teamwork pays off.

The lion's tail is the only one in the cat family with a tassel at the tip. This tassel conceals a spine, which is the last few tail bones fused together. The function of this spine is unknown. The tail is very important for overall balance. Females also use their raised tail as a 'follow me' signal for the cubs. They also use it to signal each other during a group hunt.

The series of photos that follows illustrates a lion pride during a group hunt.

Slide 37

The lion's body is very muscular, with less bone mass than other animals of comparable size. This is also responsible for the grace of movement we associate with members of the cat family. The forebody of the lion is very powerfully built, and has the greatest forebody strength of any cat, except possibly the tiger. This enables the lion to deliver blows with its forepaws heavy enough to break a zebra's back.

Note the lionesses forelegs and paws. The bones of the front legs are twisted in such a manner as to give a great range of motion to the forelimb. Each paw is equipped with soft pads to make its movements quiet. Like most carnivores, lions are digitigrade walkers. This means they essentially walk on their toes. But, the majority of the animal's weight is borne by the main paw pads, which would correspond on a human to the palm of the hand at the base of the fingers. Extra bones in the toe joints give the toes a wide range of motion. The claws are retractable and very sharp. The retractable feature helps keep the claws sharp, and prevents injury during play, etc. The dewclaw on the front limbs is often used as a toothpick. The claws grow as a series of layers. As a layer wears, it is shed, and a new sharp-pointed claw is exposed. The claw on a large lion can be 1 1/2 inches (38 mm) or more from base to tip along the curve.

Slide 38

This series of photos show a pride of lions stalking a herd of cape buffalo.

The African, or cape buffalo is a member of the so-called "big five" group of animals along with the elephant, rhino, lion and leopard. Once popular trophies for hunters, these large and often dangerous animals have continued to capture the imagination for visitors. Buffaloes have earned a bad reputation from hunters and other people who come in close contact with them. They are unpredictable and can be dangerous if cornered or wounded. Though they have been known to ambush humans and are often accused of deliberate savagery; they are usually placid if left alone.

There is only one species of buffalo in Africa, but two distinct subspecies exist: the large savanna buffalo and the much smaller forest buffalo. The forest subspecies is only found in central and west Africa. These photos are of the savanna subspecies.

Savanna buffaloes are large, heavy cow-like animals. They vary greatly not only in size, but in the shapes of their horns and color. Adults are usually dark gray or black (or even look red or white if they have been wallowing in mud of that color) and the young are often reddish-brown. Both male and female buffaloes have heavy, ridged horns that grow straight out from the head or curve downward and then up. The horns are formidable weapons against predators and for jostling for space within the herd; males use the horns in fights for dominance. Lions have been killed by buffaloes using their horns to defend the herd.

Slide 39

We observed these lions over a two day period in the Lower Zambezi Game Reserve in Zambia. This particular lioness was obviously a dominant female. Her particular "watching spot" provided a clear view of the buffalo herd and during the stalking activity her leadership role was evident. Of all the mature females in the pride, she seemed to be in the best physical condition, although all the cats appeared fit.

Slide 40

Concealment is critical to successful hunting. The lions position themselves downwind of their intended prey and observe what is happening. The females shown here have taken advantage of the dry grass that allows them to blend in. In the photo on the right there are two lionesses, the one on the far right is barely visible.

Slide 41

The herd of buffalo numbered about 150 individuals, ranging from mature males to young calves. The herd stays together for protection as well as its social benefit. As we observed these animals, the males often took a position at the periphery of the herd and acted as a defensive shield facing outward. Around noon on day one, the buffalo herd started to move off. The next series of photos illustrates the beginning of the lions following the herd and waiting for an opportunity to isolate an individual from the herd.

Slide 42

As soon as the herd started moving, the lions started to trail them. At this point the closest lions were about 200 yards behind the herd and maintained that position. There was no attempt to close in on the herd.

Slide 43

We were parked off to the side as the lions filed past. Most paid no attention to the vehicle or us. Of course, we were following the rule – no fast movements or reaching outside of the vehicle's envelope. I had the good fortune to be on the side closest to the "parade" and the lion on the right passed within six feet of me and gave me a glance as if to say "keep your distance guy" and then just moved on.

Slide 44

Juveniles get to join the hunt at about one year of age. In this pride we were told there were about four older cubs and they all appeared to be assigned positions in back of the stalking group.

Slide 45

The next day (day 2 of the hunt) we were looking for the pride and came across this young male emerging from the brush. Our guide told us that he was moving because he knew that there was a kill. Being too young to join the hunt, he had been stashed in the brush to await the kill and would not have come out until food was available. He proceeded down the track with us following and to our good fortune he climbed into a tree and turned to look at us affording me to get this photo. Actually, tree climbing is unusual for any lion even young ones.

Slide 46

And here it is. Our guide estimated the buffalo had met his end about 15 minutes prior to this photo. The next three slides show the lions consuming their dinner – if people are squeamish, they may not appreciate these photos – but it is part of the cycle of life.

Slide 47

Soft issue is the first item consumed including that around the face. All lions kill by suffocation when hunting large prey. Lions will clamp their jaws around the prey's mouth and nose and suffocate it in what is often called a 'kiss of death' - they are most often seen using this technique with buffalo. Another technique is to clamp their jaws around the prey's throat, pressing its windpipe closed so that it cannot draw breath and suffocates. Suffocation is a slow death. The struggle can often be very pronounced as the prey attempts to break loose, and it can take a long time depending on the strength of the prey animal and the firmness of the lion's grip. It may occur to viewers that if one lion does the killing why do the lion pride's hunt as a group. The main factor is that the number of hunters forces the prey into a position in which it can be grabbed and killed. Also, if the prey animal breaks away there are backups to finish the job. Most lion hunts do not end with a kill (data indicate one kill in five attempts) so the prey animals often escape. In this picture the kill had just taken place and the damage to the Cape buffalo's face is clearly evident.

Slide 48

After the hunt, the group effort often degenerates to squabbling over the sharing of the kill, with cubs at the bottom of the pecking order. Young lions do not help to hunt until they are about a year old. Lions will hunt alone if the opportunity presents itself, and they also steal kills from hyenas or wild dogs.

Slide 49 – no notes

Slide 50

Gorging themselves, members of the pride need to rest and digest their high protein intake. While we observed them, many of the lions chose to take a nap.

Slide 51 – 53 – no notes

Slide 54

On day 2 we did not see the male pride leader. On day 3, after all the buffalo were gone, he turned up too late for dinner. We watched for a while and after a bit he just got up and headed off to patrol his territory. This male is about 11 years old and in his prime. As he ages he will be challenged by bachelor males and eventually driven from the pride. The new dominant male's first act will be to kill all the cubs to obliterate the old dominant male's genetic line and establish his own.

Slide 55

The area where the kill had occurred was cleaned-up by scavenger birds. What was left of the carcass and bones had been either eaten or dragged off by hyenas. The vultures in the photo are white-backed vultures. The bird in the top of the tree is a Malibu stork - also a scavenger.

Slide 56

Powerful, graceful and arguably one of the most beautiful of all the large cats, the elusive leopard is a master of stealth and survival. By far the strongest climber, it can haul prey twice its own body weight up into a tree where it can feast without disturbance from other predators. Male leopards usually measure 80 cm (2.5 feet) high at the shoulder and weigh between 100-190 pounds. Females are considerably smaller, weighing between 50-130 pounds. Solitary, arboreal and nocturnal, they are difficult to spot in the day. Their nocturnal lifestyle is probably a reaction to human pressures and hunting. In national parks, large game reserves and remote areas such as we visited, they can be seen moving about more readily during the day. Leopards living in golden grasslands have a light buff or tawny coat that is covered with dark, irregular circles called "rosettes," and are the leopards shown in these photos. Unlike the social behavior of lions, a life of seclusion is the way of the leopard and they tend to avoid one another. Highly territorial, their range overlaps that of their neighbors and they only tolerate a trespasser into its home turf to mate. Leopards mark their territory with urine and leave claw marks on trees. They are constantly on the move within their range and know each other's location from these markings and their low, rasping calls.

Slide 57

The Cheetah is the other spotted African cat. The differences between the leopard and cheetah are both physical, behavioral and, most important, genetic. For this presentation I will only discuss the physical differences illustrated in the next slide.

Photo Source:

http://muller.lbl.gov/travel_photos/AfricaWildlifeFolder/AfricaWildlifeFolder.html

Slide 58

If you get caught by a spotted cat in Africa it is important to know which one for two reasons:

- 1.If you survive you can tell your friends and family the true facts; and
- 2.If you don't survive you may be able to leave note so they know what to put on your tombstone.

Two of the three physical appearances are illustrated in this slide.

When the cat grabs you look at its face. Does it have tear stripes from its eyes down its muzzle? If the answer is yes – it is a Cheetah – if no stripes, then it's a leopard. This is a very simple identification key, with no need to worry about other subtle differences like ear shape or spot patterns.

If, for some reason, you fail to get a good look at the face, like being distracted by being dragged away, check the spots. Are they solid black or do they have a brown center surrounded by closely spaced black spots? The rule is, brown center are leopards and all black surely are cheetahs.

Now if you fail to figure this out, there is one last chance. If you find yourself being dragged up into a tree you can be nearly 100% positive it is a leopard since cheetahs are not strong enough nor have the climbing ability to take large prey into a tree for their dinner.

By the way, if you have been caught by a big spotted cat and you are in South America don't worry about its identification. Jaguars are the only large cats found on this continent.

I truly hope you find yourself safe from either spotted cat, but if not, I hope this short tutorial will be of help in knowing who is taking you to dinner.

Slide 59

Interestingly, the leopards we saw were not disturbed by our presence either during the day or at night. The series of photos that follow were taken at several locations and represent the solitary nature of this animal.

Slide 60 – no notes

Slide 61

Noted for their nocturnal behavior, we made a special effort to find leopards at night and photograph them while highlighted by vehicle lights or handheld spotlights. Our game guide's knowledge of the area made this effort successful.

Slide 62, 63 – no notes

Slide 64

This male leopard seemed a bit surprised about being caught in the open. He quickly slipped back into the brush.

Slide 65

The next two slides are of a leopard kill, an event not often witnessed and even less frequently photographed. The fact that this occurred in daytime is also unusual. In the photo on the right the animal is actually resting after the exertion of killing his prey.

Slide 66

Although we could not see where the leopard took his kill (he went into the bush) we assumed he hauled it into a tree.

Slide 67

The African elephant has enormous ears to help them keep cool in the hot African climate. Elephant ears radiate heat to help keep these large animals cool, but sometimes the African heat is too much. Elephants are fond of water and enjoy showering by sucking water into their trunks and spraying it all over themselves. Afterwards, they often spray their skin with a protective coating of dust. Since our visit was in winter, the heat was not a factor. Although poaching of elephants for their ivory has declined since the 1989 worldwide ivory ban, it remains a widespread problem in west and central Africa. Large quantities of African ivory are still finding their way into illegal markets in Africa and beyond in places such as Asia. A more long-term threat to the species, however, is the reduction of habitat available to elephants in the face of expanding human populations.

Two subspecies are recognized: the savannah (or bush) elephant and the forest elephant. Savanna elephants are larger than forest elephants, and their tusks curve outwards. In addition to being smaller, forest elephants are darker, have more oval-shaped ears, and their tusks are straighter and downward pointing (facilitating movement through the forest). All of the photos in this presentation are of the savanna subspecies.

Slide 68

This next series of five slides have photos of an elephant wading across the Zambezi River. The photos were taken as a result of a fortunate coincidence – the elephant decided to wade across at the same spot our boat was positioned on the river.

Slide 69, 70 – no notes

Slide 71

You really get a different perspective of an elephant when he is just a few feet away.

Slide 72 – no notes

Slide 73

A female usually bears her first calf between 10 and 20 years old and bears again every 4-6 years. It takes over a year and a half for an elephant embryo to develop, but at birth, calves can stand within an hour and swim soon after. Baby elephants drink milk from their mother's two breasts until 4-6 years later, when mom bears her next young. Despite a mother's tender care and the protection of the family, only a few calves live to adulthood.

Slide 74

A major challenge for a calf is keeping up with the herd. The herd is very attentive to the young and give them high priority in the social structure. However, herds do move to obtain food and that is also a major driver of behavior. Elephants will make every effort to nurse a sick or hurt calf back to health, even if the probability of success is slim. They will also grieve the loss of a calf.

Slide 75

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Slide 76

Females and young are a reddish-brown, while bulls turn blue-grey with age. There are 11-14 very distinctive white stripes on the sides, a white patch on both the upper and lower throat, two white cheek spots, and a chevron between the eyes. The slender legs are tawny with black and white markings. Males have a small mane on the nape of the neck and along the spine. The spiraled horns are found only in the males and grow to 2-3 feet long, having two twists. Although normally the lesser kudu is primarily active at night and in the early morning, seeking shelter shortly after sunrise, we spotted them during the day. The alarm call is a sharp bark. The lesser kudu is shy and wary, and when startled, flees with the tail held up. The large ears facilitate hearing approaching predators.

Slide 77

The impala was the antelope we saw the most. Even in the dry season there were large herds roaming and grazing in every location we visited. Impalas are medium-sized antelopes that are at home in the savanna and light woodlands of eastern and southern Africa. In the rainy season, when food is plentiful, they may gather in large herds of several hundred animals. Herds offer protection from predators, such as lions. An alert impala will bark out an alarm that puts the entire herd to flight—and a fleeing impala is no easy prey.

Impalas are fleet runners that are able to leap distances of up to 33 feet. They use this technique to escape predators and sometimes, apparently, simply to amuse themselves. The impala can also clear bushes and other obstacles by soaring some 10 feet in the air. Typically, a running impala will simply jump over anything in its path. We witnessed this amazing ability, however my limited photographic skills never allowed me to catch it with my camera.

This graceful antelope is known for its long, spiral horns, which males use to challenge each other in tests of strength. Older impala males stake out mating territories and herd groups of females that they jealously guard against any rivals. During this exhausting mating period, the male must fight off challengers, herd his females, and mate with them. Unsuccessful bids to take over a male's territory usually end with the loser retreating to join a bachelor herd.

Slide 78

We spotted this young antelope near a marsh area. The sitatunga is eastern and southern Africa's only true amphibious antelope. It is distinguished by its long, splayed hooves. These hooves make the sitatunga clumsy and vulnerable on firm terrain, but well adapted for walking through muddy, vegetated swamplands. If one looks closely to the rump area, fresh wounds are visible reflecting a recent clash with a predator.

The common duiker is a tiny, shy antelope with only the males having short horns. The common name refers to a characteristic habit of taking off at high speed in a series of diving jumps when alarmed. In spite of their diminutive size they are probably the most successful antelope species in Africa. Their lifespan is 8-11 years. Widely distributed in southern Africa the common duiker is usually seen at dawn and dusk in open scrub country. They avoid open grassland where there is no shelter.

Slide 79

Several races of wildebeest (also called gnu) exist. The brindled or blue race occurs south of the Zambezi River, the area where we spotted this group. The blue wildebeest is a large animal weighing about 500 pounds. Both males and females have horns. You can note in this photo that it has a dark mane, which turns into a dark, hairy ridge along the backbone. The wildebeest has excellent eyesight and hearing, an aid to survival. Huge herds of these antelopes congregate on the east African savannas, a sight which few who have seen will forget. The migration is the most noted aspect of this antelope's behavior.

The greater kudu is considered by many to be the most handsome of the tragelaphine antelopes, which includes the bongo, eland, nyala, bushbuck and sitatunga. Their beautifully shaped horns have long been prized in Africa for use as musical instruments, honey containers and symbolic ritual objects. In some cultures the horns are thought to be the dwelling places of powerful spirits, and in others they are a symbol for male potency. The horns are seldom used in defense against predators. In wooded habitats the kudu tilts the chin up and lays the horns against the back, moving easily through dense bush. Lions, leopards, hunting dogs and spotted hyenas hunt kudu like they do most other antelope. Cheetahs, smaller cats, eagles and pythons prey on the young. Their numbers are also affected by humans hunting them for their meat, hides and horns, or using their habitats for charcoal burning and farming.

Slide 80

The hippo is an aggressive animal as evidenced by old scars and new. Deep wounds are signs of daily fights that are accompanied by much bellowing, neighing and snorting. Fortunately for hippos, their thick hide prevents serious or mortal wounds from this fighting. (Note photo on the right.) The birds on this male are Red-billed Oxpeckers, which consume ticks or similar insects on the hippos hide.

Hippos have a flexible social system defined by hierarchy and by food and water conditions. Usually they are found in mixed groups of about 15 individuals, but in periods of drought large numbers are forced to congregate near limited pools of water. Compared to other animals, hippos are not very susceptible to disease, so in suitable habitats, their numbers can increase quickly. Their chief predators are people, who may hunt hippos for their meat, hides and ivory teeth.

Hippos are unpredictable. If they are encountered away from the safety of water, anything that gets between them and their refuge may be bitten or trampled. Being fearlessly protective of their turf and young, hippos kill more than 400 people per year in Africa - more than any other wild animal. It is not smart to get too close – hippos can outrun humans and once charging, rarely stop. Most human killings happen in one of three ways. On land, humans simply get in the way of a hippo – usually between the animal and the water – and are killed as the animal tries to get to its “safe environment” the water. When in the water the hippo may surface from under or next to the humans boat swamping or rolling it. Once in the water humans are at a great disadvantage and rarely escape without injury or death. The hippo may simply “crush the person to death” with its powerful mouth and jaws, drag it under water and drown it, or in the panic to escape, the person simply drowns.

Slide 81

Hippos have developed some ritualized postures. The huge open-mouthed "yawn" that reveals formidable teeth is one of the most aggressive. With the long, razor-sharp incisors and tusk like canines, the hippo is well-armed and dangerous. (Photo on left.)

Hippos move easily in water, either swimming by kicking their hind legs or walking on the bottom. Hippos prefer rivers with deep water and nearby reed beds and grasslands, but are also found in salt-water areas near river mouths, and in lakes in central Africa. They are hoofed vegetarians, feeding on grass, fallen fruit, and occasionally on cultivated crops such as sugarcane or corn during the night. They spend most of the day in the water.

Slide 82

The Nile crocodile has a somewhat deserved reputation as a vicious man-eater. The proximity of much of its habitat to people means encounters are frequent. Its virtually indiscriminate diet means a villager washing clothes by a riverbank might look just as tasty as a migrating wildebeest. Firm numbers are sketchy, but estimates are that up to 200 people may die each year in the jaws of a Nile crocodile.

Africa's largest crocodilian, these primordial brutes reach a maximum size of about 20 feet and can weigh up to 1,650 pounds. Average sizes, though, are more in the range of 16 feet (5 meters) and 500 pounds. Hunted close to extinction in the 1940s through the 1960s, local and international protection has helped them rebound in most areas.

The diet of the Nile crocodile is mainly fish, but it will attack almost anything unfortunate enough to cross its path, including zebras, small hippos, porcupines, birds, and other crocodiles. It will also scavenge carrion, and can eat up to half its body weight at a feeding.

One unusual characteristic of this fearsome predator is its caring nature as a parent. Where most reptiles lay their eggs and move on, mother and father Nile crocs ferociously guard their nests until the eggs hatch.

Slide 83

Perhaps one of the biggest surprises for visitors to African wildlife reserves is the abundance of birds. The southern Africa field guide I use lists just under 1,000 species and subspecies of birds. Obviously, I have not seen all of them nor taken pictures of even a small portion of them. I have added pictures of a few of the predominant birds in the areas we visited.

The photos on this slide are part of the large number of water birds.

The white-faced whistling duck is gregarious and the flocks of a thousand or more birds arriving at dawn are an impressive sight. As the name implies, these are noisy birds with a clear three-note whistling call. The habitat is still freshwater lakes or reservoirs, with plentiful vegetation, where they feed on seeds and other plant food.

The purple heron breeds in colonies in reed beds or trees close to large lakes or other extensive wetlands. It builds a bulky stick nest. It feeds in shallow water, spearing fish, frogs or insects with its long, sharp bill. It will often wait motionless for prey, or slowly stalk its victim. It has a slow flight, with its neck retracted. This is characteristic of herons and bitterns, and distinguishes them from storks, cranes and spoonbills, which extend their necks. The long neck of purple heron looks particularly snake-like, with more of an S-shape in flight.

Slide 84

The African fish eagle can be seen flying throughout the southern Africa skies. This beautiful animal, which is related to the North American bald eagle, is a fairly large eagle and can be identified by its distinctive black, brown and white plumage. The adult has a dark body and wings, contrasted with a white head and tail. Widespread in southern Africa, its habitat is usually limited to larger rivers, lakes, pans and dams, with enough large trees on which to perch.

The sound of the African fish eagle has become synonymous with the sound of Africa. It has two distinct calls. While in flight or perched their call is somewhat like that of the American bald eagle. When near the nest, its call is more of a 'quock' sound - the female is a little shriller and less mellow than the male.

The African fish eagle is usually seen in pairs, whether it is inside or outside of their breeding season that stretches from March to September. They share the kills made by either equally between the two of them.

Slide 85

The African green pigeon is not unlike other pigeons in size and shape. Its color is grayish green to yellowish green; their thighs are yellow with mauve patches on the top of the wing. The green plumage provides a great camouflage in the tops of trees. They eat mainly fruit. They are usually gregarious, all in small groups. They forage in trees, flapping to keep their balance, and often hanging upside down.

The African darter, sometimes called the snakebird, is a water bird of tropical sub-Saharan Africa. The alternate name of "snakebird" comes from the swimming method employed by darters. They swim very low in the water, often with just their head and neck protruding above the surface. They spear their prey (mainly fish, but also other aquatic animals such as snakes, frogs and crustaceans) underwater as they swim along. Unlike many other water birds, the feathers of the African darter do not contain any oil and are therefore not waterproof. Because of this, the bird is less positively buoyant and its diving capabilities are enhanced. After diving for fish, the feathers can become waterlogged. To be able to fly and maintain heat insulation, it needs to dry its feathers. We therefore see the African darter often sitting along the waterside spreading its wings drying its feathers in the wind and the sun.

Slide 86

The pied kingfisher is a common, easily seen, black and white crested kingfisher. It is estimated to be the world's third most common kingfisher, and is a noisy bird. Existing primarily on fish, it fishes either from a height by hovering over open water or from a perch. It is the largest bird that is capable of a true hover in still air. It can also deal with prey without returning to a perch, and can, for example, catch a second fish, or eat small prey in flight. These adaptations mean that this kingfisher can hunt over the sea or in estuaries that lack the perches required by other kingfishers. Unlike some kingfishers, it is quite gregarious, and forms large roosts at night. Its nest is a hole in a bank.

The Bruchell's starling is a long-tailed starling with glossy purpled tones. It is one of 18 starling species in southern Africa and generally a monogamous bird that nests in tree hollows.

Slide 87

The Lilac-breasted roller – Botswana’s national bird – is an attractive bird and one of the most commonly seen of the rollers. An inhabitant of dry open brush and wooded areas, it perches prominently on bushes, trees (as in this photograph) and fence poles. It preys on lizards and invertebrates, but is also known to take small birds. Lilac-breasted rollers are also quite tolerant of people, allowing you to get very close in for a good shot.

White-throated swallow – this swallow’s behavior is similar to the commonly seen barn swallow (U.S. and elsewhere). It is a bird of open country and grassland, with a preference for highlands and nearby water. It is often found around man-made structures. The white-throated swallow builds a bowl-shaped mud nest with a soft lining of grass or hair. It is usually near or over water, and is built on a ledge under an overhang on a rock face or on a man-made structure such as a building, dam wall, culvert or bridge. Uninhabited buildings are preferred to houses. The nest may be reused for subsequent broods or in later years.

Slide 88

Not only is the ostrich the largest living bird, it also has the largest egg of any bird species. The diet of the ostrich mainly consists of plant matter, although it also eats insects. It lives in nomadic groups, which contain between five and 50 birds. When threatened, the ostrich will either hide itself by lying flat against the ground, or will run away. If cornered, it can cause injury and death with a kick from its powerful legs.

The Kori bustard is the world’s largest bustard and occurs across sub-Saharan Africa. Although still common in some protected areas, it is currently experiencing rapid population declines across much of its range. Botswana is a stronghold for the species, but it is threatened by habitat loss due to overgrazing and poaching.

Slide 89

The spur-winged goose is unmistakable, being a massive black and white bird, which can get to 39 inches in length. It is, in fact, the largest of Africa’s waterfowl. It is mostly vegetarian (although it will eat small fish) and forages on land. Its method of grazing and liking for freshwater close to arable land can bring it into conflict with local farmers and it is considered to be an agricultural pest in some areas.

Despite wandering into areas far from water, the African open-billed stork is principally associated with extensive stretches of fresh water. It is typically a bird of marshes, swamps and lakes where it feeds primarily on mollusks. The unusual looking bill is specialized for extraction of snails from their shells. This is not done as you might expect, by using the bill as a set of nutcrackers with the snail held in the opening. Instead the open-billed stork steadies the snail with its upper mandible (usually this is done underwater) and then the tip of the lower mandible (which is extremely sharp) is used to slip under the bony shield, which protects the snail. The lower mandible is then used to cut the muscle holding the snail in place and the body of the snail is extracted whole for immediate consumption. Mussels and other bivalves are handled in a similar way with the lower mandible used to slice the muscle that keeps the two halves of the shell tightly closed.

Slide 90

Marabou storks, often referred to as an “enormous ugly bird,” are scavengers and can be found around refuse dumps as well as with vultures around carcasses. However, they do not rely solely on scavenging as they will also catch small rodents and reptiles. Airborne, the Marabou are superb flyers, soaring at high altitudes across the plains. A large male Marabou stork, standing up to 5 feet tall and weighing nearly 20 pounds, is one of the largest flying birds in the world. Their wingspan approaches 9.5 feet.

The yellow-billed storks have remarkable adaptation. These birds are known to have the quickest muscular reflex of the neck, allowing almost all food to be caught in the water. Their long, narrow, curve-tipped bills allow them to catch small prey such as small fish, frogs, insects and worms passing by in the water. Yellow-billed storks are intelligent birds. These birds created a technique to help them catch more prey in the water. They typically use one foot to stir up the water or mud which disturbs and flushes out the prey. Then they submerge their heads quickly in the water snapping their bills on small prey. Yellow-billed storks' bills are great fishing tools.

Slide 91

The slender mongoose lives throughout the savannahs and semi-arid plains of Africa south of the Sahara. They tend to avoid the densely forested and desert regions of central Africa. There are as many as 40 subspecies of this mongoose. It feeds on small vertebrates like rodents, lizards, snakes and birds, as well as their eggs, and insects, like grasshoppers, termites, and fly larvae. They rarely eat fruit.

Warthogs as a member of the pig family, have a naked skin with sparse, long bristles. A characteristic feature of warthogs is the protruding curved tusks, which in boars grow into formidable weapons. These tusks are used to dig up roots, which all Warthogs relish. Their long tail ends with a tuft of bristles. The warthog characteristically carries its tail upright when it runs, the tuft waving like a tiny flag.

Slide 92

The Burchell's zebra is built like a stocky pony. Its coat pattern can vary greatly in number and width of stripes. The stripes are a form of disruptive coloration which breaks up the outline of the body. At dawn or in the evening, when their predators are most active, zebras look indistinct when in a group, apparently confusing their predators. Their shiny coats dissipate over 70% of incoming heat.

Slide 93

The giraffe is the tallest of all land-living animals and the largest ruminant. Males can be 16 to 18 feet tall (from the ground to top of their head) and weigh up to 3,800 pounds. The females are generally slightly shorter, and weigh less than males. Early written records described the giraffe as "magnificent in appearance, bizarre in form, unique in gait, colossal in height and inoffensive in character." Ancient cultures in Africa revered the giraffe, as some modern cultures do today, and commonly depicted it in prehistoric rock and cave paintings. Unknown outside of Africa, this animal so excited man's curiosity that it was sometimes sent as a diplomatic gift to other countries; one of the earliest records tells of a giraffe going from "Melinda" (presumably Malindi) in Kenya to China in 1415. The animal was thought to be a cross between a camel and a leopard, a mistake immortalized in the giraffe's scientific name of *Giraffa camelopardalis*.

Slide 94 – no notes

Slide 95

The Victoria Falls are one of the greatest natural wonders of the world. If you're planning a trip to southern Africa you simply have to witness this mile-long curtain of falling water. As the explorer Livingston said when he first saw them, "scenes so lovely must have been gazed upon by angels in their flight." The Victoria Falls lie between Zambia and Zimbabwe in Southern Africa. The Victoria Falls are just over 1 mile wide and 355 feet high. During the wet season over 19 million cubic feet of water plummets over the edge into the Zambezi River. This incredible amount of water generates a huge amount of spray, which shoots 1000 feet into the sky and can be seen 30 miles away, hence the name "smoke that thunders." The unique geography of the falls means that you can watch them face-on and get to enjoy the full force of the spray, noise and spectacular rainbows that are always present. The best time to view Victoria Falls is during the rainy season from March to May, when they are most impressive.

Slide 96 – 104 – no notes