

Kenya Wildlife Service



Manual for Captive Wildlife Management and Welfare in Kenya

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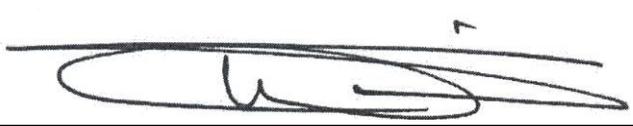
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1. INTRODUCTION

The Kenya Wildlife Service (KWS) is a corporate organization established under the provisions of the Wildlife Conservation and Management Act 2013 to protect, manage and conserve Kenya's wildlife for posterity.

These guidelines provide for the protection, conservation and management of captive wildlife in Kenya and for purposes connected therewith and incidental thereto recognizing that wildlife is an important national heritage of common concern, a public asset at local, regional, and global levels and the need for an integrated ecosystem approach to conserving wildlife resources, and further recognizing that wildlife should be utilized in a manner that does not impinge on cultural values, compromise the quality and value of the resource, or degrade the carrying capacity of supporting ecosystems.

Wild animals can only be kept in captivity for the following reasons:

- a) The animal is critically sick or injured and needs close veterinary observation
- b) Very young orphaned or abandoned animals which require tender care and support in a captive facility
- c) Animals which are being quarantined and tested for various infectious diseases before being transported outside the country or released into the wild
- d) During wildlife translocation operations where an animal species is required to stay in a boma or holding pen for a specified period of time before being moved to a new conservation area
- e) Animals confiscated from smugglers or destined for local or international trade without relevant documents
- f) Research and education

It is illegal to keep any wild animal in captivity in Kenya without the authority of KWS and for reasons other than the ones stated above. Any organization, body, group or individual seeking to establish wild animal captive facility for reasons stated above shall be required to seek permission or authority from the Director General, KWS.

All license holders shall keep up to date records of all animals under their care. In addition to required quarterly reports, all license holders shall submit annual reports to KWS by the end of each calendar year.

2. GUIDELINES FOR WILD CARNIVORES IN THE FAMILY FELIDAE

Introduction

The family Felidae comprises of about 37 species. The small felids (e.g. the serval cat and the caracal) are found in the genus *Felis*, the large cats (e.g. lions and leopards) in the genus *Panthera* and the cheetahs in the genus *Acinonyx*. The species that are likely to be kept under captivity in Kenya include Lion (*Panthera leo*), Leopard (*Panthera pardus*), Cheetah (*Acinonyx jubatus*), Serval cat (*Felis serval*) and the Caracal (*Felis caracal*). These guidelines can also apply to other species of the same genera that may be imported into the country.

Housing Requirements

- Most felids are generally solitary and strongly territorial. These characteristics should be taken into consideration in designing enclosures to house them in captivity. A few exemptions however exist. For instance the lion is a social felid, occurring in prides. They can be housed together easily but the introduction of a new animal should be gradual. Different sized lions should never be mixed for the stronger ones may attack and even kill the weaker or smaller ones. Whereas a male may accept a new female, the females may reject the newcomer. Leopards on the other hand are difficult to co-exist and established animals are very aggressive towards new ones. Female cheetahs are territorial and will be aggressive towards introduced animals. Other species such as the serval cat will be comfortable in pairs or in groups.
- Because they are also good climbers and swimmers, the enclosures should be designed to prevent escape by climbing, leaping or swimming across barriers. Enclosures should be examined frequently to ensure that growth of vegetation does not create an avenue for escape. Trees that could be close to the walls should be kept trimmed down at all times.
- Keeper, visitor and animal safety precautions must be designed into the holding facility. All materials used must be of sufficient strength for the species housed. Because of their strength, enclosures for the big cats should be constructed of at least 9-gauge wire and be at least 8 feet tall with a sufficient inward overhang (≥ 3 feet) or a ceiling.
- The size of the structure will vary depending on the species of cat. For the large cats, enclosures of at least 500- 1000 sq. feet is recommended but the bigger the better.
- To enhance visitor safety if the animals are for public viewing, the viewing area should be at least three metres from the cages. The barrier should also be strong enough to prevent visitors getting too close to the cages.
- To further enhance keeper safety, flares, fire extinguishers and sound generators may be placed in the working areas to deter attacks. If there is ever an attack or an escape, these equipment which are harmless would become handy to spook a cat enough to get away or direct them where they are needed to go. Keepers could also be advised to carry pepper spray and communication radios and should be taught on escape drills regularly. The facility should enable verifying the presence of the cat readily.
- The main entrance to the enclosure should be double-gated, where one goes into one door, closes it behind him in an entryway area, and then opens the second door into the cage. Otherwise, the cat will have a direct line to get out.
- The doors to the enclosures should preferably be guillotine/dropping doors rather than sliding ones. This ensures the doors are always closed unlike the sliding ones which the keepers might forget to lock.
- It is also recommended that the facility should have written protocols describing in detail how animals are shifted and how all mechanisms are checked before entrance into an enclosure.
- Most cats would benefit from a variety of topography such as boulders or large trees trunks or any other type of raised platform for marking territory and observation points. These provisions should be at the middle of the enclosure to prevent escape over the walls. They should be well maintained at all times to prevent injury and should also permit disinfection.

- If to be held for prolonged periods of time, felids should not be housed on concrete floors as this can predispose them to osteoarthritis and pad ulcerations.
- The enclosures shall have a service cage with preferably a guillotine door that can be operated from outside to trap the cat inside so that the keepers can enter into the enclosure to feed and clean. The back of the service cage should have some sort of hole to "bait" the cat into it, then slide the slider shut and lock it. Mechanical squeeze cages can be incorporated to allow limited physical examinations, diagnostics and treatments without the use of anesthesia.
- A shelter to protect from rain, sun and wind shall also be incorporated into the facility. This provision will also provide a dry and clean area for the animals to rest on.
- Some cats (e.g. leopards, etc.) love water and should be provided with a pool. This pool should be flushable with plumbing so that someone will be able to clean it.
- Some species such as the serval cat will prefer habitat with water and tall grass. They will adapt to captivity very well if cover and a nesting box are provided.
- The enclosure needs to have good drainage or be on a slope so that there is no standing water when it rains.
- Even though the enclosure won't take up much room, it will be nice to have a large buffer zone around the cat. Several acres is preferred. A perimeter fence should be erected round the facility. The facility should be situated in a quiet environment away from human disturbance and where this is not possible then a wall should be built around it.

Feeding

- All felids are carnivores and need fresh meat to survive. The diets provided must be nutritious, wholesome and complete.
- The exclusive feeding of skeletal muscle meats without supplementation may result to secondary hyperthyroidism and metabolic bone disease. Such a diet is adequate in terms of protein and energy but unsuitable for calcium and phosphorus metabolism. It contains high levels of phosphate which can lead to chronic calcium deficiency with resulting abnormalities in bones. Thus, meat should contain pieces of bone with sufficient calcium (at least 1%) from a pure calcium source supplemented. About 2g of calcium carbonate (ground limestone) should be added to 1kg of meat. Alternatively, 80g of bone meal can be added. Other trace elements and vitamins should also be supplemented in the diet. Supplements are sprinkled over the meat or rubbed into incisions made into the meat.
- Whole animal food provides a better balance of constituents, eases the passage of food through the digestive system, provides an appetizing meal and is a good psychological stimulus. Such items as hide, hair, feathers and abdominal organs provide the needed roughage. Thus whole carcasses should be provided on a regular basis. Copper deficiencies (characterized by progressive weakness and paralysis of the hindquarters) that has been reported in cheetahs fed entirely on skeletal muscle meats can be avoided by feeding whole animal diets which contain sufficient copper levels in internal organs.
- Commercial carnivore feline diets can be provided if available. However, the consistency of the commercial feeds isn't always liked by the cats for they lack the texture of bones and hides which also keep their teeth clean. Where commercial diets are fed, they should regularly be interspersed with fresh meats.

- Un-inspected meats should not be fed to avoid transmission of diseases and parasites. Excessive fats should be trimmed off the meats.
- Proper amount to feed daily is 1%-3% of the cat's body weight. Young ones will eat more because they are growing fast and should be fed about 5% body weight. They will also need extra calcium for bone growth. The diets should be altered based on body condition and environmental condition.
- Obesity is a common problem in captive felids and fasting days should be incorporated in the feeding regime. The recommended fasting days is once or twice a week for the large cats. The smaller cats however should be fed every day.
- Meats for the smaller species should be cut into small chunks. Regular whole animal diets for these species should include rats, mice, guinea pigs, pigeons, rabbits, chicks, etc.
- Young animals will eat the meat and leave the bones behind. Mineral supplementation should therefore be included at all times
- Fresh clean water should always be available *ad libitum* preferably provided through an underground piping system that can be controlled from the outside.
- Animals fed on meat and bone may frequently develop constipation. If this is observed, a mixture of vegetable oil and liquid paraffin could be added to the food.

Hand raising orphaned/abandoned young felids

- On arrival, the babies are weighed and examined thoroughly, in order to determine whether they have any injuries, signs of disease or congenital defects/disabilities. Also age the animal if possible. All details are recorded.
- Correct hypothermia if present. Use towels, blankets or fine soft grass as bedding. Warm the nest with infrared lamp or ordinary light bulb or hot water bottles underneath the bedding. Provide enough space so that the animal can move close to or away from the source of heat to regulate its temperature.
- Use Lactated Ringers solution or glucose/saline administered subcutaneously or intra-peritoneally to correct dehydration if present and if the animal is unable to take fluids orally. A total of 40ml/kg can be given at one time but avoid giving too much fluid intra-peritoneally.
- The amount of milk given to each animal is determined by its weight. Recommended amount is 35-40% of body weight per day. This can be reduced as the animal grows. Vitamins and calcium should be supplemented.
- After feeding, cubs need to be stimulated to urinate and excrete. In nature, the mother licks the ano-genital area. This not only keeps the den clean, but she builds an immunity that is transmitted to the cubs. Urination and defecation may be stimulated by gently wiping the ano-genital area with a moistened cloth, piece of cotton or cotton bud depending on the size of the animal.
- Good hygiene is very important in preventing disease in young cats. Fresh food should be made up for each feed. Use separate utensils for each animal. After each feed, wash and soak the utensils in a disinfectant solution. Rinse utensils before use.
- Young cats should be inoculated against important diseases. These inoculations are critical to the survival of the cubs. Hand rearing orphaned animals takes a lot of time, love and patience
- At the age of approximately 7-8 weeks they start eating a little meat together with the milk. At the age of 4-5 months they are put on a diet of meat and water.

Veterinary care

- An experienced veterinarian should visit the facility at least once every six months.
- A proper vaccination program for the cats should be devised and implemented appropriately. The keepers should also be vaccinated against known zoonotic diseases such as rabies.
- Regular faecal examinations should be conducted regularly for internal parasites. The animals should be de-wormed on a regular basis. External parasitism should also be monitored and treated on a regular basis.
- Animals in captivity shall not be allowed to breed thus the sexes should be separated and where this is not possible then spaying or neutering shall be highly encouraged.

3. GUIDELINES FOR WILD CARNIVORES IN THE FAMILY CANIDAE

Members of the family Canidae include the Bat Eared Fox (*Otocyon megalotis*), the African Dwarf Mongoose (*Helogale parvula*), the Spotted or Laughing hyena (*Crocuta crocuta*), the striped hyena (*Hyena hyena*) and the African wild dog (*Lycaon pictus*) amongst other species.

Housing requirements for the Bat Eared Fox and the African Dwarf Mongoose

- The following enclosure dimensions are the minimum and every effort should be made to allow for larger enclosures: one or two animals: 2m x 2 m x 1.5m, three animals: 3m x 3 m x 1.5m, a family group (with up to 5 offspring): 4m x 4m x 2m
- Spacious animal exhibits and environmental enrichment avoids overcrowding, undue stress, sanitation hazards, boredom and abnormal behavior such as pacing and aggression.
- Small canids are inquisitive and constantly explore their environment. An enclosure that provides a variety of natural or manmade objects (logs, tree limbs, stumps or vertical structures for climbing and scent marking) will improve their quality of life. Grass, packed earth or similar substrate is preferred, especially for those species that like to dig. Physical and visual barriers allowing temporary escape from conspecifics and humans are highly desirable.
- Concrete floors in cages should be non-slip to avoid animals fracturing their limbs. Watch out for bleeding toe nails, footpads or tooth injury during increased activity in concrete areas. Care must be taken to ensure that enclosures are escape-proof.
- Hose service areas with care to avoid spraying walls with faeces, urine or food. This increases flies and animals are bitten on the ears and other parts.
- Make sure rest places are comfortable and provide hay bedding or wooden beds.
- In the sleeping pens, elevated sleeping boards should be provided in darkened corners and climbing branches as well. Pregnant females should be provided with sleeping boxes with hay in them.
- Marking posts or thick branch should be provided near the nest area

Specific requirements for the striped and spotted hyenas

- Hyenas are large, dog-sized carnivores well adapted to a scavenging mode of existence. Their massive jaws and teeth are unusually capable of cracking large leg bones and ribs, and smaller bones are commonly ingested whole.
- Obesity can be a problem among female spotted hyenas in captivity.
- Brown hyenas are the smallest of the three species while female spotted hyenas are 10% heavier than males.
- The genitalia of the female spotted hyenas mimic that of the male. The clitoris is large and highly erectile, and two sacks containing fibrous tissue closely resemble a scrotum and are located in the same area.
- Although very hardy under the simplest of husbandry regimes, hyena exhibits must be stout enough to withstand their destructive tendencies. Longevities exceeding 20 years are not uncommon.

Housing requirements for the hyenas

- Hyenas are kept in both indoor and outdoor situations. Normally active animals with large territories, a single specimen should have at least 200 square feet, and should be increased by 50% for each additional animal. Indoor exhibits may employ combinations of glass, solid masonry products, or bars for barriers, the last requiring adequate space to protect the public from being bitten.
- They may also be kept outdoors in moated exhibits that have a retaining wall, or behind 9 gauge chain link fencing. Although not good jumpers or climbers, hyenas swim well and are prodigious diggers, and as a special precaution, chain link fencing should be extended 3 feet (1 meter) into the ground and extended at least 42 inches (1.2 meters) horizontally into the exhibit.
- Because of their nocturnal habits, particularly striped and brown hyenas, a nest box or cave should be provided for sleeping needs.
- Periodic feeding of small items will stimulate activity during daylight (visitor) hours, and stereotypic behavior can be reduced or avoided by the addition of rocks, trees, and other impervious objects which can be periodically replaced to increase interest.

Social needs of the hyenas

- Hyenas vary widely in their social needs, and groups should be developed according to the behavioral characteristics of each species. Because female spotted hyenas are larger than males, they dominate them in competitive situations. Spotted hyenas are also the most social of the three species and can be kept in groups containing several members of both genders if specimens are obtained when young. A group containing 5-6 adults is probably as large as can be maintained without too much aggression developing, or causing ultimate injury to the lowest ranking individual. Once a group has become stable and its members' social ranking established, it is not wise to remove individuals from the group unless absolutely necessary. Adult females are especially intolerant of other females and fighting may develop even after only brief separations. In order to maintain the status quo, medical treatment should be conservative when possible. Indeed, it is

"routine" for subordinates to have bite wounds about their shoulders and ears but due to their particularly thick skin, such injuries are usually superficial.

- Striped and brown hyenas are more solitary and do best when kept in pairs. Although establishing pairs of striped hyenas is generally easy, the female being dominant over the male, establishing a pair of brown hyenas can be difficult. Brown hyenas have a unique social order in nature that is seldom broken in captivity. In captivity, most males assume the role of a clan male.
- If breeding does occur, reproduction usually ceases long before either animal is old, the male showing little interest in mating. Females of all species have 1 - 3 young per litter. It is common for spotted hyenas to rear only one young at a time, the largest cub often killing the smaller ones. An isolated den should be provided for females approaching parturition, and escape tunnels are useful when young spotted hyenas are being introduced to their dam's clan. Gestation is 90-110 days, the spotted hyena having the longest gestation.
- It should be noted that hand raised hyenas may become very tame toward humans. Nevertheless, they are very capable of injuring keepers and other caretakers therefore; care should be taken before entering the cage of such animals.

Feeding requirements for the hyenas

- Hyenas do well on felid diets that are based on beef or horse products. Diets of this type that already have the appropriate vitamins and minerals added may be obtained from commercial sources. Similar diets may also be prepared in-house. Whole animal carcasses (rodents, rabbits, or fowl) freshly killed or thawed, may be substituted upon occasion to vary the diet.
- Because of problems with obesity, hyenas may be fasted one or two days a week.
- When more than one animal is maintained within the same cage, at least two feeding areas should be used to reduce aggression.
- Because hyenas are highly adapted to consuming bones, it is recommended to include several bones in their diet every day. Beef and sheep are the best where available. Pig bones will suffice if frozen to prevent trichinosis. All bones are crushed and ingested without difficulty.

Husbandry requirements of the Aardwolf

- The aardwolf is the smallest member of the Hyaenidae. The body hair is rather long and coarse, and those on top of the neck and back can be erected during times of excitement or when the animals are startled to make the animal appear much larger than normal. Aardwolves are capable of making loud growls or roars which, when coupled with mane erection, make them appear quite formidable. Though used primarily as a means of marking their territory, a foul smelling odor can be ejected from anal glands in defensive situations.
- The aardwolf is primarily an insectivore, feeding on termites and ants. Unlike hyenas which have immensely powerful jaws and up to 34 teeth, the aardwolf has weak jaws that contain only widely spaced, vestigial cheek teeth. Only the canines of their 24 teeth

remain "normal" in size, the others appearing to be of little use. The canines are sharp and pointed, and are probably used for defense and in social interactions).

- In the wild aardwolves inhabit open, sandy plains or bush country. When not in search of food, they spend the day in underground dens; often taking over burrows abandoned by aardvarks (*Orycteropus afer*), or crested porcupines (*Hystrix africaeaustralis*).

Housing requirements of the Aardwolf

- Being the size of a medium-sized dog, aardwolves do not need a large exhibit. Because of their general shyness, however, priority should be given to the number of hiding places included within the exhibit.
- For a pair of adults, housing should measure at least 10 feet by 10 feet as long as it contains 1-3 nest boxes, dens, or caves, although larger enclosures may be necessary for some pairing because of compatibility problems.
- Aardwolves do not seem able to jump more than a few feet off the ground, and do not climb well. When kept outside, a shallow dry moat or low (6 feet/2 meter) wall is usually enough to keep them contained.
- Aardwolves are prodigious diggers and this form of behavior should be considered if the animals are to be on natural substrate. Chain link fencing buried three feet into the ground and then extending three feet into the enclosure should be adequate to handle this situation.
- Depending on enclosure size, aardwolves can be housed singly, in pairs, as single sexed small groups, or as extended family groups. Because some pairs will not be compatible, facilities planning on breeding this species should be prepared to try several combinations. Unlike husbandry techniques commonly employed when breeding other carnivores, it is not always necessary to separate male aardwolves from females prior to parturition. Males often act as protectors of the "nursery" den. Gestation averages 90 - 100 days.
- Aardwolves are predominantly crepuscular or nocturnal. They can be kept indoors using reversed light cycles to stimulate activity during peak visitor hours. Facilities keeping this species in outdoor exhibits will see the bulk of their animal activity at dawn and dusk, with little being observed during midday.

Feeding requirements of the Aardwolf

- Due to the sheer numbers of insects consumed in the wild, captive aardwolves, like other insectivorous mammals, should be fed a palatable, high-protein gruel. A mixture of ground meats, dry and/or canned dog food, and evaporated milk, supplemented with vitamins, is used by most institutions maintaining this species. Because of the high caloric content of meat-based diets in comparison to natural ones comprised primarily of insects, the diet should be monitored carefully to avoid overweight situations.

4. GUIDELINES FOR CAPTIVE WILD BIRDS

Wild birds are many and varied but can be generally classified into five main classes according to their feeding habits namely the large wild birds like the ostrich, seed eating pigeons and doves (mourning dove, guinea fowls), parrots and cockatoos, birds of prey and raptors (kites, eagles), omnivorous water birds (ducks), insectivorous birds and nectivorous birds

Housing requirements

- When keeping any birds in captivity its important to house compatible species together for social and territorial reasons. Each distinct group of bird have their own characteristic .Most housing systems are in an aviary with ample space which mimic natural environment .Its basically a large are with trees covered by a net. The area should provide enough air and sunlight together with adequate feed and water as per the need of specific bird. Bird's cages are used to house one or two birds kept as pets in most homes. Large birds such as ostriches are kept in a flock with protective perimeter wire mesh.

Parrots and cockatoos

- Most parrot species are social birds, living in flocks. These birds are fairly species-specific in their flocks. It is better to house a few birds of the same species together, as they will keep each other company and groom each other. However, be aware that sociable birds can become aggressive if there is insufficient space per individual.

Honeyeaters

- In the wild, honeyeaters feed on the nectar in a variety of flowers and insects. When food is limited in captive conditions can result in the birds chasing each other.
- Smaller honeyeaters are quite tolerant to other small birds. It is not a very good idea to house the larger honeyeaters with any of the smaller honeyeaters, as this can be quite stressful for the smaller birds.

Birds of prey and Raptors

- Some birds of prey are social, while others spend most of their life alone. They are also territorial. Black kites and whistling kites are some of the more social raptors and are often found in groups. Most owls and nightjars lead a more solitary and nocturnal.

Raising Captive Wild Birds

Intensive care stage

- The initial, intensive care stage involves placing the bird in a quiet and dark area with a constant temperature of 30C. The area should allow you easy access the bird. This level of care is required for birds that are in shock, extremely debilitated or unable to stand properly. Once the bird is standing properly and its demeanor is good.
- The simplest design for an intensive care cage is a cardboard box with air holes in it. It should be large enough for the bird to stand up in. A hot water bottle (covered with a towel) placed at one end of the box will keep it warm.

- You may design and build your own hospital cage. The cage should have three solid walls and a wire mesh front that can be covered with a towel or cloth to keep it dark and private. It is a good idea to have two different-sized doors; the larger hole should be made in the mesh. The second, smaller door should be big enough to fit your hand. It can go in any of the walls. This small door will be useful when the bird becomes more active and tries to escape. Warmth can be provided by a covered hot water bottle, heater pad, a desk lamp.
- Any bird that is very sick should be housed by itself. This is especially important if the bird has a possible infectious disease.

Restricted movement stage

- For this stage, choose a cage that is large enough for the bird to perch without its tail feathers dragging on the ground. Cover two or three sides of the cage with a towel or old newspapers to make easy to clean.
- The cage should be located in a sheltered area away from noise and pets. In most cases, the bird will feel more at ease if it is kept outside. You can place the cage outside on a table or hang it underneath a veranda.
- For ground birds, a sheltered area on the ground such as under a tree is suitable but make sure that the cage is secure and away from your pets especially cats.

Light aviary stage

- Unless a bird has been in care for a very short period of time (i.e. under a week) it will need to spend time in an aviary with a lot of flight space to build up its flight muscles.
- Flight muscles can degenerate very quickly from a lack of use and can take between a week and a month to rebuild, depending on how long the bird has been in captivity. The size of the aviary you need will depend on the size of the bird. However, the bigger the aviary, the better it is for building flight muscles.
- An ideal size for an aviary is 4m x 4m x 2.5m. Small birds such as honeyeaters need a 1m long cage. Most doves, pigeons, and birds of a similar size will need a 2m long aviary.
- Nest-bound birds can be housed in a hospital cage (three solid walls and a mesh wire front) that has a lid that lifts from the top. This feature makes it easier to feed the bird. The young birds can be kept warm with a heater pad, hot water bottle or a lamp with a 40-watt bulb. However, make sure that they are able to move from the heat source if they get too warm. As the bird starts to perch it can be transferred to a small cage with sheltered sides.
- Bird cages can be enriched with a swings and toys to avoid boredom and stress.

Feeding requirements

Factors to consider

- The main foods consist of seed fruits and small insects and meat for birds of prey
- Size, age, sex, species, size of the bird's crop (if present), size of the bird's ventriculus (stomach or gizzard), reproductive status, disease or injury, energy content of the diet, appetite, ease of force-feeding and the ambient temperature.
- Feeding guidelines include but not limited to:
- Feed adult small birds every two hours during daylight.
- Feed nocturnal birds at night
- Feed as much live food as possible to enhance self-feeding (e.g. insects & worms)

- Have water available in a dish the bird can get its whole beak into.
- Drinking water should always be available, even if you never see them drink.
- Cover the front of the cage for anxious birds.

Quantity and frequency of feeding

- As a guide, juvenile parrots have been successfully hand-raised on the following quantities
- Feed a bird about 10 percent of their body weight. Note that Overfeeding can lead to crop dysfunction, aspirating and death. Remember that young birds are generally poor judges of how much they should eat.
- Juvenile birds will need to be fed every 1.5 to 3 hours until they are weaned. Diurnal birds feed their young from dawn to dusk. For the hand rearer, feeding from 6.30 am until 11.30 pm works quite well.
- Adult birds weighing less than 50g, particularly insectivorous birds accustomed to hunting, may need to be hand or force-fed every 2 to 3 hours until it is established that they are feeding themselves. Care must be taken to ensure that the airway is not blocked by any food after each feed.

Cockatoos and parrots

- African grey parrot (*Psittacus erithacus*) is the most common in this group originating from Kakamenga forest.
- These birds will eat from a bent spoon, as it resembles the parent's beak. To feed them, insert the first part of the spoon into the beak. Feed the young bird until its crop is well rounded. Do not feed it again until the crop is empty. You can learn to identify when the bird's crop is full by feeling it before and after you have fed the bird.

Seed eating pigeons and doves

- These birds feed by placing their beak inside their parents' beak. To stimulate the parent feeding method, hold your left hand over the chick with its beak between the upside "V" created between the web of your index and middle finger. By applying slight downward pressure, you can make the bird gape. Use a syringe to introduce food as they gape. The birds should swallow periodically Do not overfill the crop and wait until it is empty before feeding again. You should only need to feed the bird three or four times a day.

Insectivorous birds

- These birds include flycatchers, bee-eaters, wood swallows, pratincoles and nightjars. The chicks of these birds range in size and shape .They also tend to have a wider mouth.
- In general young birds will gape for food if you tap the "nest". To stimulate feeding behavior touch the top of the beak where the feathers start. Place small food items in their mouth with forceps or the blunt end of a toothpick (for the smaller types). You should keep feeding them until they stop gaping. It is a good idea to dip each food item in water to help the birds swallow and to increase their water intake.

Birds of prey

Small carnivores

- Small carnivorous birds that include kingfishers, butcherbirds, crows, and pheasant birds gape for their food, which can be given to them with forceps. It may take these birds a day or two to get used to you feeding them and, as they grow older, they are less likely to want to take food from you. These small birds can also become imprinted on humans. To overcome this, raise the birds in pairs or put the orphan where it can see an adult bird of the same species. These birds need to be fed four to five times a day.
- Inexperienced carers should not rear large carnivorous birds, such as raptors and owls. Special permits (from KWS licensing office) are required for their rehabilitation. Raptors must be taken to an experienced raptor rehabilitator. The KWS will give you the name of a raptor carer. Moreover, you will need to have a minimum 4m long aviary in which to house the birds. Rehabilitating these birds takes a lot of time and money.

The large carnivorous

- The large carnivorous birds are easily recognized by their curved beak and strong claws. Raptors and owls are easily fed with forceps, but will quickly learn to grasp and tear their food from the instrument. These birds can become imprinted on humans, making it very difficult to release them. You can prevent this by putting a hand-puppet that resembles a hawk on your hand when you feed the bird.
- Although these birds can be fed meat mix, like the smaller carnivorous birds, it is extremely important that natural foods are included in their diet. Bones, fur and feathers are a very important part of their diets. Usually these products are regurgitated up as a casting. If you are unable to get a constant supply of mice or chickens, meat mix can be supplemented with small amounts of cotton wool to take the place of feathers and fur.
- Raptors and owls must be taught to hunt their prey. Rehabilitators use a form of falconry to teach the birds how to catch food. This involves using a rabbit, chicken or other small mammal tied to a piece of rope on a pulley system so that the dead prey can be pulled quickly through the grass.

Nectivorous birds

- Nectivorous birds include small honeyeaters, friar birds, blue faced honeyeaters and miner birds. As a group these birds are quite easy to identify, as most species have a wide, bright orange-yellow mouth and a long, thin beak.
- Although these birds are called Nectivorous (nectar feeding), a high proportion of their natural diet is insects. They are very easy to feed as they gape for food. However, they also have a high energy requirement, which means they must be fed frequently.
- Unfortunately, they imprint on to people, which makes them difficult to release. To prevent this, raise them in pairs, avoid eye contact, place a sock that is the same color as an adult of the species on your hand when you feed the bird and place pictures of adult birds around the cage.

Omnivorous water birds

- Ducks and geese are born in a relatively mature state and are covered in downy feathers. Typically they have webbed feet and are able to feed themselves from birth, only requiring

a bit of encouragement from their parents. In captivity, they learn how to feed themselves with a small amount of encouragement from you. Providing the young with live food will make this process easier.

- Since water insects make up part of the natural diet, their diet in captivity should also include protein. Ideally, their diet should be one third meat mix with greens and seeds.
- To this meat mix you can add a small amount of the following ingredients (1:2 meat mix to greens and seeds): chopped mixed greens (sukuma wiki, spinach or fresh green grass). Food should be placed in a shallow bowl of water to stimulate their natural, dabbling behavior.
- Make sure the ducklings have enough water to dip their bodies into as they start to grow contour feathers.

Avian physiology and Veterinary care

- Looking after adult birds can be very rewarding, although it can also be very difficult. Birds have a bad habit of hiding injuries or diseases until they are so debilitated that you cannot do much to save them
- Parasites are a major contributor to the mortality of captive bird. Some cases proliferated by the capture stress. This should be evaluated in frequent fecal parasitological examinations, tell tale signs as ruffled feathers and watery and wet anal areas
- Vocalization in poor health they is change in pitch, and type of sound made and the quantity, consistency and color of droppings is always indicative.
- Normal is due to their high metabolic rate, high body temperature (around 41 - 43° C) and a fast heart rate (exceeding 400 beats per minute in small birds).
- Most bird medications are available in powder form so that they can be added to water.
- Wing vein is commonly used for administration of iv drugs and taking blood samples for disease investigation
- It is necessary to take care of human bird contact due to public health or public safety concern and prevent the spread of disease in general. Its is against the law to keep wild birds in captivity without proper state permits from Kenya Wild life service.

5. GUIDELINES FOR CAPTIVE PRIMATES

Introduction

There are over 300 species of primates in the world from humans and apes to monkeys and prosimians ("premonkeys"). The smallest primate is the pygmy mouse lemur, which can fit in the palm of the hand. The largest is the gorilla which can weigh more than 400 pounds. Most primates live in warm climates, and most depend on forests for their survival.

Classification

Prosimians

- Includes about 50 species; lemurs in Madagascar, lorises in West Africa and Southeast Asia and bush babies in Africa. These are the smallest in size

- They have arms shorter than legs, strong hind legs for leaping and clinging tree trunks
- Most are nocturnal and have tooth comb, some have visible tails and grooming claws. They also have wet noses and dog-like snout, developed sense of smell and light-reflecting eyes

Monkeys

- Includes more than 200 species, New World in South and Central America, Old World in Africa and Asia, and tarsiers in Southeast Asia
- They are smaller in size, arms equal in length to or shorter than legs with limited shoulder rotation
- They are diurnal (active during the day) in nature
- Their chests are deeper than broad and most have visible tails
- They have nails on all digits (except Callitrichidae—marmosets and tamarins)
- Dry nose, lack snout, weak sense of smell (large teeth may extend the snout)

Apes

- Includes about 14 species; gorillas, bonobos, and chimpanzees in Africa, and orangutans and gibbons in Southeast Asia
- They are larger in size (except for gibbons) with arms longer than legs
- Full shoulder rotation
- They are diurnal
- Have a broad chest, no tails and have nails on all digits
- Dry nose, lack snout, weak sense of smell and lack of hair on face

Feeding

- Proper nutritional management is essential to animal health and productivity. Nutrition plays a role in influencing the animal's susceptibility to disease as well as in managing certain diseases (e.g., diabetes, hyperlipidemia).
- Rations/diets must be formulated to provide for the basic physiologic needs (eg, energy, protein, fats, carbohydrates, vitamins, minerals) of the animal and to ensure optimal growth and productivity. Ration formulation must consider the age, sex, breed, lactation and gestational status, and physical activity of the animal.
- Most primates can be fed a diet based on commercial monkey biscuits or canned primate or marmoset diet. Moderate amounts of assorted green vegetables, carrot, sweet potato, apple, banana, and orange also can be offered.
- Monkey biscuits and the canned products should comprise 50% of the dry-matter intake of most species; fruits and treat items should comprise $\leq 25\%$. High-protein monkey biscuits (25% crude protein) or supplements should be fed to New World primates to ensure that their higher protein requirements are met.
- Regular or high-protein monkey biscuits can be fed to Old World species depending on other components in the diet, although many larger Old World species such as gibbons, orangutans, chimpanzees, and gorillas readily accept higher fiber products.
- Primate feeds should be formulated with very low fiber levels because many of the natural foods consumed by these species appear to contain very high fiber levels.

- Increasing the dietary fiber intakes of larger primate species should be practiced. High-fiber biscuits should comprise at least 50% of the dietary dry matter, with leafy and green vegetables making up at least 40% of the dietary dry matter.
- Cultivated fruits should be used sparingly for great apes and leaf-eating species because, compared with cultivated green vegetables, they are typically high in sugars and simple carbohydrates and low in protein and calcium.
- Some feed substitutes can be made more palatable for some species by soaking them in water or fruit juice.
- Other items that can be included in primate diets include hard-boiled egg, yogurt, and bread. Grapes, raisins, peanuts, crickets, and mealworms are treat items well liked by most species.
- Sunflower seeds, instant rice, cracked corn, and shredded coconut can be scattered around exhibit or holding areas to promote foraging activity. Hay should be provided for nesting materials and diversion and to act as a foraging substrate.
- Meat may be offered to great apes; although meat is often relished by the animals, there is no evidence it is necessary if the diet is properly balanced.
- Because hypercholesterolemia is seen in many captive gorillas, the feeding of meat may be contraindicated.
- For most primates, meals should be offered at least twice daily but smaller species may benefit from even more frequent feedings.
- It is particularly important that New World primates receive an adequate source of stabilized vitamin D3 (cholecalciferol) in their diet if they are not exposed daily to direct sunlight. Marmosets require up to 4 times the amount of vitamin D3 required by other New World primates. Because of potential vitamin D toxicity, commercial marmoset diets should be fed only to marmosets.
- Cases of rickets in some Old World species at weaning have been reported. This may be due to replacement of barred, outdoor primate exhibits with more naturalistic, but indoor, exhibits. While most free-ranging primate species probably satisfy their requirement for vitamin D by exposure to ultraviolet B (UVB) from sunlight, captive animals may rely entirely on a dietary source.
- Infants or juveniles should be exposed to natural sunlight as the best solution, because assuring that a dietary supplement is consumed by a young primate may not be possible.
- All primates require a source of vitamin C. A supplementary source should be included in the diet (e.g., green vegetables, oranges, multiple vitamins, fruit juice, or fruit-juice powders with added vitamin C).
- Members of the subfamily Colobinae are perhaps the greatest challenge in the proper feeding of captive primates. Pregastric fermentation, similar to that in ruminants, occurs in the complex stomach of these species. In the wild, leaves make up a major part of the diet of most colobines (the more frugivorous red colobus is an exception).
- Also, some evidence suggests that a high percentage of colobus monkeys may be sensitive to gluten. A diet consisting of 50% high-fiber biscuit or supplement, 40% green vegetables and fresh browse and 10% fruit is recommended for most colobines.
- Alfalfa pellets or good-quality alfalfa hay can be provided free-choice.
- If a suitable high-fiber biscuit is not available, fresh browse and/or high-fiber green vegetables such as kale, mustard greens, broccoli, celery, spinach, green beans, lettuce,

and escarole should comprise ³50% of the diet, with regular monkey biscuits and canned primate diet comprising ~25% of the dietary dry matter

- Dietary changes always should be made gradually in colobines to allow their stomach microflora time to adapt.
- If a gluten-sensitive enteropathy is suspected, any product that contains wheat, barley, rye, or oats should be removed from the diet.

Health Management

- Management and nutrition are also central to the prevention and control of many infectious and noninfectious diseases. Although infectious diseases require the presence of a specific infectious organism(s) (e.g., a bacterium, virus, parasite), the mere presence of the causal microbe is not usually sufficient to assure that disease will develop.
- Other environmental and host factors influence whether the infected animal develops clinical disease or has reduced productivity as a result of the infection.
- The most effective method of preventing infectious disease is to eradicate and exclude the organism(s) causing the disease. Often, this is impossible or impractical.
- It is necessary to control the infectious disease by minimizing circumstances that favor the spread of the infectious agent, mitigating the environmental circumstances that contribute to development of the disease in the presence of the infectious agent, and minimizing circumstances that increase the host's susceptibility.
- These circumstances that contribute to the development of a disease are termed risk factors for the disease. They can be grouped into several categories: microbe risk factors, environmental risk factors, and host risk factors. Identifying and mitigating the impact of these risk factors is the goal of a management strategy to prevent specific diseases and maintain productivity.
- This multifaceted approach of using management to control and prevent disease is particularly important in dealing with many of the diseases that are commonly found in captive primates. These diseases have either a complex etiology involving the interaction of several microbes or are caused by pathogens for which there are no reliable treatments (e.g., viruses, some parasites).
- Prevention and control of these diseases often depends on implementing management practices to mitigate recognized risk factors for disease. Often these are general management practices, but effective control of many diseases requires the implementation of management practices to address specific risk factors for individual pathogens.
- All primates should be vaccinated prior to being introduced to the facility if there are no records of the same from the donor.
- De-worming should be done routinely to prevent high worm burden that may lead to malnutrition and associated diseases.
- A proper record keeping technique should be adopted and be easily available. All types of interventions including vaccinations and treatment should be recorded.

Housing

- The structure should be strong enough to hold the different primate species.

Prosimians

- Can be housed in structures made of relatively light material covered with wire mesh to prevent entry of rodents
- The housing should provide ample space to accommodate a certain number depending on the capacity required. It should also have certain enrichment noted below.
- The housing should have a service cage where they can be enclosed while the main cage is being cleaned or used for other activities like repair.
- The animals should also be trained to get to the service cages when required.

Monkeys

- The monkeys can have slightly larger houses made of stronger materials as they are quite strong.
- Adequate space preferably with a few trees enclosed within will be ideal. This will be supplemented with enrichments.
- A service cage is also necessary to allow for other activities to be carried out in the main exhibit.

Apes

- Housing for these animals should be of very strong metal to prevent them from breaking loose.
- There should be ample space for them to exercise using various enrichments.
- Service cage is vital especially when require to immobilize them for any purpose.
- Structural Enrichment
 - Structural enrichment is intended to increase the amount of usable space in an enclosure, as well as providing more choices to the animals of where to spend their time. Structures such as artificial trees, platforms, hammocks, hanging ropes and fire hoses provide opportunities to climb, swing and nest high above the ground as many primates would in the wild.
- Social Enrichment
 - Social enrichment applies to the manner in which our primates are housed, as well as to the activities they participate in with animal care staff.
 - Housing primates in appropriate social situations is one of the most significant ways to enrich their lives.
 - Primates have active minds and complex social relationships, and companionship provides a constant source of stimulation.
 - The keepers also provide social enrichment by engaging in games of chase, tickle, grooming, or training sessions with the primates to engage them as well as strengthen social bonds.
- Object Enrichment
 - Object enrichment to provide primates with novel items to explore and manipulate. These items are changed daily or on regular basis to ensure variation and prevent boredom.
 - Food enrichment provides variation in food and how it is presented. Often object and food enrichment go hand in hand.

- Enrichment Items
 - Examples of the types of enrichment that primates could interact with in their enclosures include plastic spoons, crates, and spray bottles, large and small plastic balls often with food hidden inside, plastic barrels, blankets, cardboard boxes, plastic mirrors and forage items like diced fruits and vegetables, popcorn, nuts, or sunflower seeds.

6. GUIDELINES FOR CAPTIVE ELEPHANTS

The management of captive elephants is very challenging: their immense size, strength and intelligence test how well enclosures are able to satisfy their daily needs. Like all highly social animals elephants have well-developed cognitive and sensory capacities designed to adapt them to their respective environmental niches. With their basic needs readily provided for, a stimulating environment is necessary to combat inactivity and boredom.

Outside Enclosures

- Should include a variety of natural substrates
- A pool of fresh circulating water, large enough for several elephants to completely submerge
- Separate source of water for drinking
- Shade structure to shelter from inclement weather
- Rocks, boulders and tree trunks for scratching and conditioning the skin and feet
- Ample room for the elephants to run and exercise unrestricted; minimum of 2 Acres per elephant
- Must be fenced in a manner suitable to contain the species:
 - a) Thick wall steel pipe (minimum 4-1/2 " thick) concreted into the ground
 - b) If horizontals are used they should be made of steel cable or thick wall steel pipe
 - c) If steel cable is used the design must be "slack wire" to deter the elephant from climbing out
 - d) Hot wire fencing is highly effective if installed properly. However hot wire fencing should never be used as primary fencing
 - e) The enclosure should be a minimum of 5 feet high
- No elephant should have direct access to moats that create a safety hazard. If a moat is utilized to contain an elephant it must be designed so that the enclosure side of the moat has a gradual slope enabling the elephant to safely walk in and out of the moat unassisted. Additionally the enclosure side of the moat and bottom should be constructed of dirt, grass or other natural substrate. The enclosure side and bottom of the moat should not be constructed of any hard, unyielding material such as rock or concrete. The moat must be designed to drain so that water and debris does not collect in the bottom. The containment side of the moat (the wall) can be made of any nontoxic material that is proven nonhazardous in the event that the elephant touches, rubs on or ingests the material. Smooth finish concrete or smooth rock is suggested. Machined wood posts and planks can splinter when an elephant rubs on them and creosote used to preserve utility

poles and railroad ties is toxic. The containment side of the moat should be high enough to prevent the elephant from placing his/her chin above the wall.

Shelters

- These may not be required in the tropics especially for adult elephants but may be required for very young ones:
- Shelters where necessary may be provided from inclement weather
- The structure should be constructed of materials capable of withstanding an elephant's force.
 - a) Walls should be made of concrete filled block, or solid concrete slabs
 - b) Alternative materials can be used for the exterior walls if the elephants are not permitted access to the walls by an elephant proof barrier
- Each elephant should have a minimum of 1000 square feet of personal indoor space.
 - a) Floors should be constructed of poured concrete, at least 6 inches thick, pitched to the back, with ample drainage
 - b) Concrete floors should be covered with solid wood platforms or rubber matting
- The shelter should be designed to provide individual spaces, as well as a common space for socialization
- Elephant and keeper areas should be divided. Steel pipe set on two feet centers provide a safe keeper/elephant barrier. The keeper areas should be a minimum of 15 feet wide.
- Ceiling height should be a minimum of 16 feet
- All light fixtures should be recessed
- No electrical or plumbing fixtures may be within the immediate elephant area or an elephant's reach
- No electrical or plumbing shall be routed through an elephant's area or through an area within an elephant's reach
- Chains should never be used to restrain an elephant
- The shelter should be equipped with a restraint chute
- The shelter should have ample ventilation to maintain good air quality
- Windows and skylights are recommended to allow sunlight into the shelter during inclement weather
- The shelter must be equipped with a heat source capable of maintaining the shelter at 65" degrees
- Automatic watering devices should be available for the elephant's free choice access to drinking water
- Elephants must have free choice access to the outdoors during suitable weather
- Enclosures must be maintained free of feces and waste, washed daily, and disinfected weekly. If elephants are confined indoors they must have ample space to ensure that they do not stand or sleep in their own waste.

Nutrition

- Elephants are constant eaters and must have free choice access to clean, nutritious hay or live vegetation (adult=150 pounds per day). Protein level of hay should range from 12% to 17%

- Whole grains, vitamins, minerals and salt should be supplemented on a daily basis. The amount depends on the condition of the individual elephant.
- Each elephant should receive 10-20 pounds of fresh fruits and vegetables per day.
- Trace mineral salt should be offered free choice.
- Elephants should be tested for vitamin E levels. If levels are low they must be supplemented on a daily basis with a liquid form of Vitamin E.
- Fresh browse should be made available every day.

Enrichment

- Elephants are gregarious, with females and calves typically living in a small family unit. Thus they should never be housed alone
- Any herd of less than five individuals is not considered a viable social group.
- Every effort should be made to house elephants in groups no smaller than five.
- Any object that is elephant proof can and should be considered for elephant enrichment
- Nothing takes the place of freedom to roam and live vegetation to eat, but enrichment can alleviate boredom and neurotic behavior.
- The key to successful enrichment is to change the enrichment objects regularly.
- Logs, boulders, piles of sand, gravel, clay and substrate are enriching.
- New sights, sounds, and smells are enriching.
- Keeper directed activities and public exhibition are not considered enrichment.
- The following serve as examples of enrichment items that may be appropriate for elephants as well as an overview

Exhibit Enrichment

- Pools
- Shade structures
- Faux termite mounds
- Variable/Natural substrates
- Dust bathing items: sand, dirt, bagged pine shavings
- Large telephone poles
- Anchors for securing novel items
- Access for large equipment

Dietary Enrichment

- Smaller portions fed more frequently
- Variable feeding times
- Spread out diet to encourage movement
- Chopped or whole produce
- Browse
- Sugar cane
- Low sugar cereals
- Feeder balls, logs, barrels
- Hay nets
- Herbs

Social Enrichment

Sensory Enrichment

- Spices (allspice, cinnamon, cloves, nutmeg, anise, crushed red pepper, etc.)
- Herbs
- Perfumes
- Body sprays
- Hunting lures
- Aromatic oils
- Vaseline

Novel Enrichment

- Large street sweeper brushes
- Tractor, car, motorcycle tires (no steel belts)
- Boomer balls, spools, etc.
- Large plastic barrels
- Large corrugated tubing
- Bowling balls
- Bouncy balls
- Milk crates
- Plastic sleds
- Plastic garbage cans
- Card board boxes

- | | |
|--|--|
| a) Social opportunities: species appropriate social groups | l) Painting, sidewalk chalk (non-toxic) |
| b) Appropriate exposure and responses contra-specifics | m) Harmonica, drum, keyboard, or other instruments |
| c) Communal (unrestrained) housing | n) Sprinklers, misters, water foggers |
| d) Introductions | o) Motion activated shower |
| e) Keeper interactions | p) Chew chains |
| | q) Cardboard carpet tubes |

Safety Considerations

- Large items need to be affixed or contained to keep them away from public viewing areas, out of moats, or causing structural damage to your facility, exhibit barriers, or other enrichment items
- Daily inspection of items, chains, clevis', and quick-links are essential to make sure they are secure and in good shape
- Damaged items may cause injury to the elephants
- Avoid small tires on ground or chain loops that might ensnare the elephant's foot
- Plants or parts of plants may be toxic, a list of such items should be on hand
- Overwhelming panic can lead to injury of an individual or family group members
- Elephants may ingest unsuitable objects such as twine, clevis', screws, etc.
- Use of food based strategies can lead to weight gain, or elephants not consuming important dietary supplements
- Multiple items, spaced out appropriately will help prevent hoarding by dominant individuals

Veterinary Care

- You must have access to a veterinarian familiar with elephants. The more often a veterinarian visits the barn, the more comfortable he/she will become with the elephants. Even if the facility is protected contact, it still is important that the veterinarian and elephant are comfortable with each other.
- Baths should be given daily.
- Foot trimming should be done as needed.
- Fecal examinations should be done twice a year for endo-parasites
- Tuberculosis and general blood tests should be done once a year

Management

- Free contact non-dominance and protected contact are considered viable forms of elephant management.
- Any form of punishment is unacceptable.
- No elephant should ever be struck, poked, prodded or hooked with any object or weapon.
- Electricity does not prevent aggression in elephants and cannot be used for any purpose.
- Chaining is an unacceptable husbandry and management tool
- Food, water and companionship deprivation is unacceptable
- If an elephant continues to display aggressive behavior, alternative positive management protocols must be explored

- Bonded individuals must not be separated.
- Bonded herds must not be separated.
- Species must be con-specific.
- Breeding is unacceptable.
- Elephant rides and off-premises shows are unacceptable.

7. GUIDELINES FOR CAPTIVE RHINOCEROSES

The black rhino has suffered true decimation since the 1960's, making the captive population all the more important. Less than 3,600 remain in the wild.

Housing

- The facility should be very sturdy: a rhino will search for a weak point and will work at it until it gets out
- Housing facilities must be large enough to allow the rhinos plenty of room for exercise. The black rhino especially can be quite active, running the length of their exhibit.
- Two adjacent pens with connecting gates measuring at least 12x6m and 20x20m (or more) should be adequate
- Water troughs should not be elevated too high (<30cm should be adequate). Corners should be rounded to avoid injuries. The whole trough should be within the pen to avoid the rhino stacking its horn underneath the horizontal bar while drinking
- The enclosure must have adequate shade, a mud wallow, and outdoor enrichment items.
- For the white rhinos, a slightly raised concrete slab can be used for feeding but not for the black rhinos which can injure themselves against the slab
- Training chutes are used for blood collection, foot exams, and ultrasounds. Walk on scales are helpful in observing weight changes, which could indicate a health problem.
- White rhinos handle hotter climates well, but do need access to a mud wallow to protect their skin from sunburn and insects. White rhinos don't swim so pools are not necessary and can sometimes be a hazard if they are deep.
- White rhinos are gregarious animals and therefore like to see and be with other animals of the same species. Males can be housed alone but prefer to be housed with at least one female. Females are housed with at least one other female if no male is present, depending on the size of the enclosure

Nutrition

- Successful captive management of black rhinos should include fresh browse daily. This is an important source of natural vitamin E, which is known to be commonly deficient in captive black rhinos. Many captive facilities supplement their rhinos with a powdered form of this vitamin. Additionally grass hays, herbivore pellets, and fresh produce are served. Most of the produce is used for training purposes.
- White rhinos are grazers and should be fed grass hays supplemented with herbivore pellets and fresh pellets as with the black rhinos

Keeper Involvement

- As with all animals, the daily keeper is the most important link to a healthy rhino. Most captive rhinos need to be acclimated to hands on exams, which requires the keeper to be familiar with training exercises. Cracks in the hoof pads are not uncommon, and will require special care. Keepers often facilitate this treatment without veterinary assistance. The veterinary staff usually does minor examinations, but keeper training is what makes the process easier.
- Accurate record keeping is a must because it establishes patterns, which will indicate both health problems and estrus cycles in females. Estrus cycles vary from 18 to 21 days and are often aggressive. The male may “chase” the female for quite a time before the female settles down and allows the male to mount her. She may also battle with him, resulting in wounds. Extreme care should be used when pairing rhinos, especially in smaller areas. The ability to separate the rhinos is a must.

Enrichment

- All animals can benefit from having physical and mental stimuli, and enjoy playthings. This can be large logs or fallen tree to push around, scents to change the smell of their environment or more toy-like items such as balls or puzzle feeders. Keepers and the public can also be a good source of enrichment through training and monitored public animal encounters. Most white rhinos enjoy interacting with the public as long as a good scratching is involved. In spite of their reputation, black rhinos when properly trained they can be tamed for many behaviors.
- Examples of enrichment items include:
 - a) Browse hangers on trees
 - b) Root balls from large dead trees planted upside down exposing rootball
 - c) Logs, hung up or loose
 - d) Shift rhinos back out onto exhibit overnight
 - e) Waterfall and pool
 - f) Misters
 - g) Semi-tactile contact with other rhinos on a variable schedule (especially when housed alone)
 - h) Fruit ice blocks
 - i) Boomer ball with circular openings to put food inside
 - j) Bowling ball
 - k) Hanging tire on a chain
 - l) Bamboo wind chimes
 - m) Painting
 - n) 55 gallon drum, loose or hung on a zip-line
 - o) Recorded audio clips of other rhinos
 - p) Conspecific scents or fecal material

8. GUIDELINES FOR CAPTIVE REPTILES AND AMPHIBIANS

A wide range of reptiles and amphibians are becoming increasingly important as species of commercial value in the vibrant pet industry. Depending on their diverse biological characteristics and ecological requirements, several factors have been considered in captive management for these taxa. Depending on the nature of threats facing populations of given species in the wild, an integrated approach to the subject species' conservation and management is recommended.

The groups of species that are commonly bred /ranchered /reared/kept for the purpose above include: -

- a) Crocodiles
- b) Tortoises and fresh –water turtles (terrapins)
- c) Snakes
- d) Chameleons and Lizards
- e) Amphibians

Crocodile ranching and breeding

- Crocodile farming is done for the following purposes: -
 - a) Tourism (recreation, filming and photography)
 - b) Production of meat
 - c) Production of skins for export
- Crocodile breeding and ranching is a capital-intensive operation. It needs special technical expertise and also takes a relatively long period to begin breaking even and realize economic returns commensurate to the capital inputs to the operation.
- The Kenyan population of Nile Crocodiles is listed in CITES Appendix II. Closed cycle captive breeding shall however be emphasized. Sustainable utilization of the wild populations shall be restricted as complement to the conservation benefits resulting from captive breeding program.

Farm design

- The conditions on the farm shall be kept as close as possible to the natural crocodile environments.
- The facility shall be planned to cater for separate holding ponds for the various age classes (hatchlings, yearlings, growers, and breeders).
- Rearing ponds/enclosures shall be designed in such a way to ensure ease in cleaning, continuous supply of fresh water, definite pond carrying capacities to avoid overcrowding and provision for feeding and transfer from one pond to another.
- Crocodile farms shall have well-constructed and equipped hatcheries and incubators for eggs.

Breeding stock

- Problematic adult Nile Crocodiles may be considered for removal from the wild for breeding purposes.

Personnel

- The personnel shall have basic skills in understanding the subject of crocodiles, their behaviour, ecology and husbandry.

Safety measures

- Facility to take into consideration and ensure public safety.
- Warning signs in at least two languages shall be put in place.
- A crocodile proof perimeter fence must enclose the facility.
- Ponds shall be clearly and well labeled as for the purposes of safety and public education.

Records

- Production records shall be duly maintained with details about the eggs, juveniles and adults e.g. hatchability success rates, sickness, wounds, mortalities.

Tortoise and Freshwater Turtles (Terrapins) Farming

- Four species of land tortoises (Leopard tortoise, Speke's Hinged back tortoise, Bell's hinged back tortoise and Pancake tortoise) and six of fresh water turtles (terrapins) known from Kenya shall be considered under these guidelines. Most of the species are kept for ecotourism or bred for export purposes. The most widely distributed species are the Leopard tortoise; Speke's hinged back and Bell's hinged back tortoises. Pancake tortoise has limited distribution with fragmented populations restricted to dry land rocky areas only. Leopard tortoises are easily bred and they have highest reproductive rates. The Pancake tortoise requires special conditions for breeding and has low reproductive rates. There already exist a number of operations breeding and keeping various species of tortoises and terrapins for ecotourism and/or for export. In recognition of the role these facilities play in tortoise conservation and management, these guidelines will offer an enabling environment for the operations and provide mechanisms of monitoring the activities of the operations and enforcing the legal provisions governing utilization of the species.

Leopard Tortoise

- Much access to outdoor grazing should be allowed.
- Shade in form of low growing shrubs and bushes should be included to allow retreat from the mid day sun. During cold weather, green house or indoor penned area is essential
- In the wild they are typical grazing herbivores. In captivity high fiber diet (grasses and succulents) is recommended to control diarrhea and intestinal parasites. Fruits should be offered occasionally. Fresh supply of water at all times and bones feeds should be supplied as calcium supplement.
- Common health problems include Hexamita parva-urinary tract infections (the symptom is excessive drinking) and viral stomatitis.

African Hinged- back Tortoises

- The captive environment should be matched with the environment from where the breeding stock was collected in the wild. Average standards: high humidity (over 70%),

day temperatures ranging from 24 –28°C, drier substrate (avoid damp conditions), water should be available at all times.

- Typically omnivorous with marked preference for mushrooms, slugs, and snails, mixed fruit, earthworms and fresh shoots of weeds.
- Common health problems include Hexamita infection, large intestinal worms, and eye problems if maintained at incorrect humidity and temperature.
- Hinged tortoises spend much time buried underground. Therefore, captive specimens that are unable to burrow and aestivate do not live very long.

Pancake Tortoise

- The breeding facility should mimic the dry rocky environment as much as possible. In the dry rocky environment, the species' peak activity occurs in early morning and early evening. Much of the day is spend in retreat.
- The species is gregarious in habit.
- Daytime temperatures should be in the order of 25-29°C in captivity and a minimum of 13°C is recommended.
- The species is herbivorous and diet includes grass and succulents; cabbage, lettuce tomatoes and cucumber are readily taken. For egg laying females the diet should be supplemented with multi-vitamins and calcium supplements
- Common health problem is viral stomatitis.

Chameleons /Lizards

- Chameleons prefer hedges, thicket, bush and shrub. However, Von Hohnel's Chameleon prefers thorn- less bushes to avoid catching their tongues in thorns when feeding.
- The enclosures must be completely sealed using appropriate wire mesh to prevent accidental escape and predation.
- Application procedure similar to those for breeding, rearing and ranching of tortoises shall apply.

Snake Farms and Snake Parks

The guidelines provide for displays (ecotourism), breeding of selected species for export, venom extraction, research and conservation.

Farm design

- Clear signs indicating names of snakes
- Marked footpaths for visitors' safety
- The size of the snake box should depend on the size of the snake. All boxes should be kept clean and have a water container and some form of flooring.
- Each cage should be designed to ensure that it is of good sanitation, rectangular in shape and with an opening on top for safety.
- For climbing snakes, some small branches to mimic their habitat should be provided in the facility. Boxes with poisonous snakes should be padlocked and have a form of partition to ensure safety of workers and less or no stress to the snakes.
- Open pens should have a water pond and be kept clean.

Personnel skills

- All the personnel should be well conversant with practical reptile husbandry.
- The personnel should include a qualified member with academic biological background on snakes.
- The farmers and/or their engaged personnel should have good knowledge of basic research and herpetological specimens collection skills.
- Experience regarding handling of specific taxa e.g. poisonous snakes and carrying out other tasks like venom milking will be mandatory.
- Close supervision for on-job training in reptile biology, venom milking, snakebite management and specific husbandry should be offered by experienced and qualified keepers to newly recruited staff for a minimum of one year.
- Personnel must understand the conservation importance and status of the species kept.

Safety measures

- First aid Kit and relevant snake bite serum (2 mono-valent and 4 poly-valent serums) should be kept in a fridge at the facility and be available for inspection by the vet.
- Notice board and warning signage informing visitors not to annoy the animals, handle any snake without permission, and that children must always be accompanied by their parents among other vital and safety information should be displayed
- Visitors should be protected from to poisonous snakes by ensuring that heavy gauge glass or double glass for the front part is used.

Health care

- All snakes should be fed regularly, provided with clean water and appropriate housing.
- Health monitoring of all animals in captivity should be ensured.
- All newly acquired animals should be quarantined inspected and treated for parasitic and other infections prior to inclusion in the main facility.
- Knowledge by the facility personnel of the different common and basic diseases and parasites affecting the housed animals is important.
- Appropriate disease control and prevention measures should be put in place e.g. by isolating any sick animals to avoid spread of infections.
- The enclosures, cages and pens should be cleaned regularly; for instance, crocodile's pen drainage system should be well designed to prevent fouling of nest because this would be a health hazard.

General Requirements for Care of Reptiles /Amphibians

- The enclosures/cages should simulate the species natural environment/habitat.
- Appropriate cage size is very important especially for breeding to avoid
- Overcrowding. Cage size should be dependent on the species habits e.g. arboreal Species like boomslang require large preferably walk-in cages.
- The cages should be relatively big for most of the species and supplied with substrate material
- Some species like lizards, tortoises and non-poisonous snakes e.g. sand & green Bush snakes, need not be kept in cages but in open enclosures.

- The cage should be according to acceptable standard or type. The cage material is very important for security and welfare of the species themselves. Use of wire
- Mesh should be avoided as it can hurt the species. Glass cages are more preferable.
- Pens and sizes should be well designed dependent on the age groups of subject species (hatchling, juveniles, sub-adults, adults)
- Cleanliness of cages/enclosures/pens is paramount e.g. drainage system for the crocodile pens should be standardized.
- Maintenance and care standards e.g. feeding, non-medical care and cleaning of holding cages should be well established. Mixed housing shall be allowed for display purposes only, but shall be only for species, which cannot harm each other. Frequency of cage cleaning should balance between the level of cleanliness necessary to prevent diseases and the amount of stress imposed by frequent handling and exposure of the animal to unfamiliar surroundings and bedding.
- Housing will vary depending on the biological needs of the species and the purpose of the operation. Normal housing should incorporate, as far as possible, those aspects of natural habitat deemed fit for the survival and well being of the animal. Adequacy of maintenance can be judged relative to the natural environment (i.e. the location of the operation) by monitoring a combination of factors such as growth and weight, survival rates, breeding success, activity levels, general behavior and appearance. Environment must include features such as natural materials, refuges, perches, and water baths. Natural foods, light and temperature should be duplicated as closely as possible.
- Live capture. Authorized operators should be conversant with the capture techniques and should choose a method suitable to the species. A potential operator shall seek technical advice from the scientific authority.
- In the process of handling, distress to the animal shall be minimised or avoided altogether. Trained attendants shall be required to determine and use the least amount of restraint necessary and in a humane manner when attending to specimens in the operation.

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