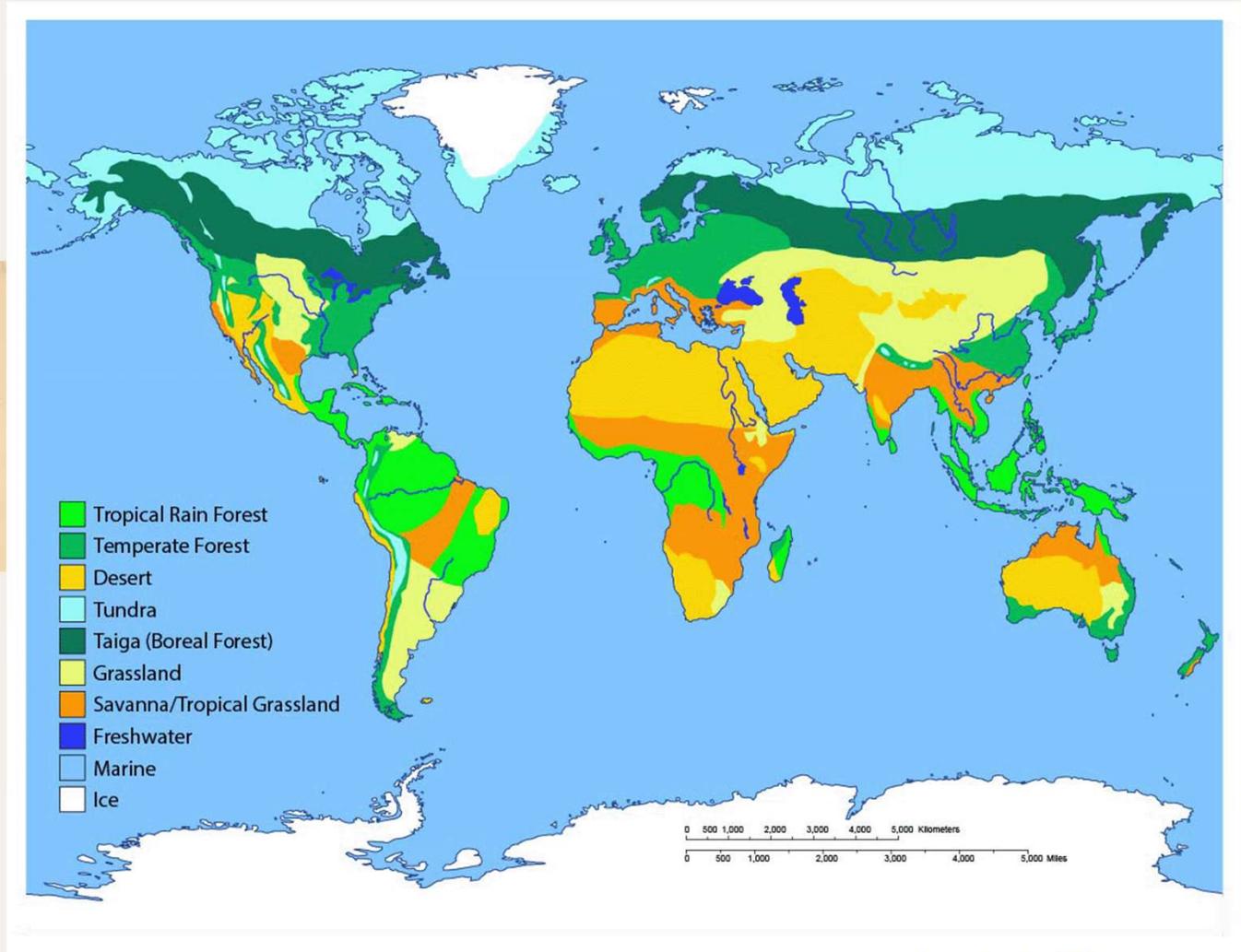
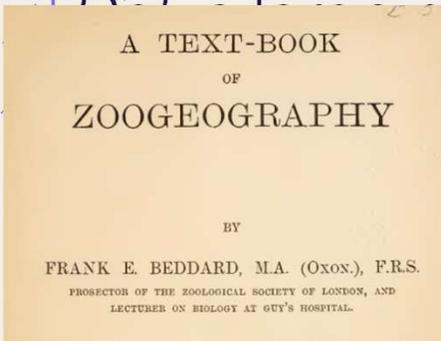


The background is a light beige gradient. On the left side, there are several blue dashed lines representing topographic contours, curving upwards. A white circle is partially visible in the top-left corner. On the right side, there are more blue dashed lines curving downwards, and a white circle is partially visible in the bottom-right corner. A solid orange line runs horizontally across the bottom right, following the curve of the dashed lines.

# Zoogeography

Lesson 3

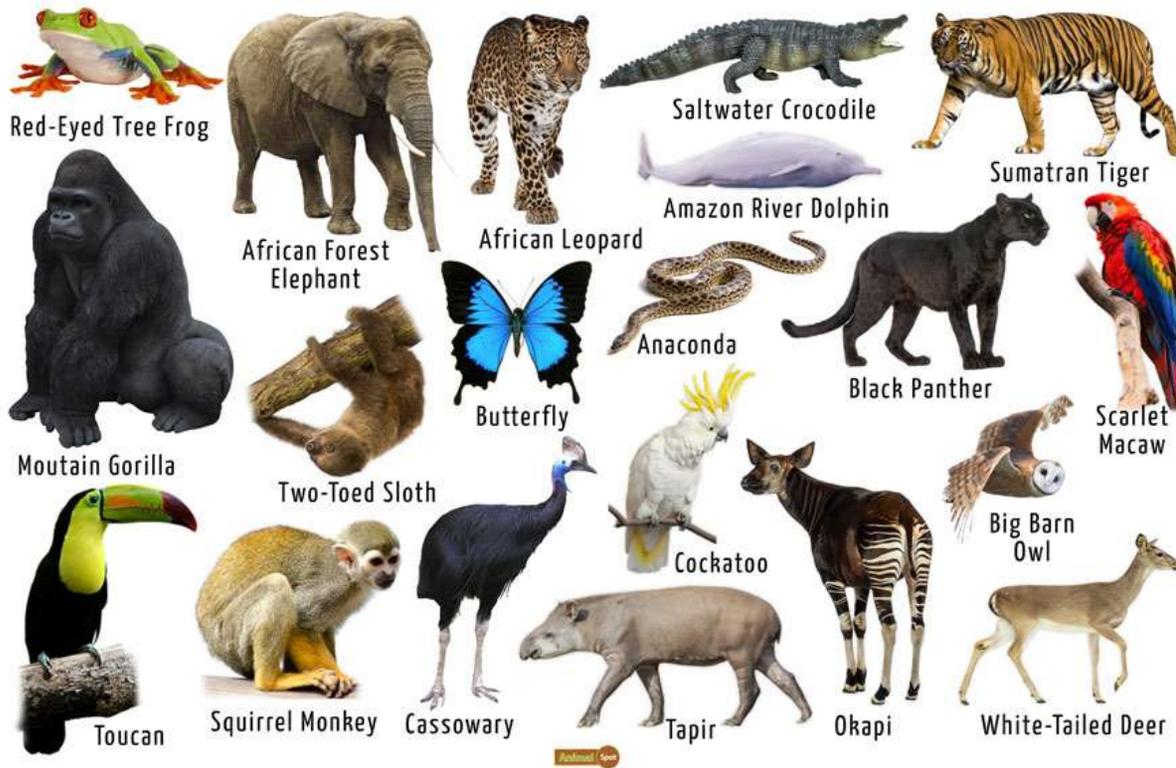
# Biome



# Tropical and temperate rain forest



## Rainforest Animals



### Layers of the rainforests

- The **emergent layer** is the uppermost one, consisting of the tallest trees that outgrow the canopy.
- The **canopy** is the next layer, where the biodiversity is the most. Large treetops are predominant in this layer.
- The layer that follows is the **understory**.
- The last layer of the rainforest is the **forest floor**, which gets the least amount of sunlight.

# Animals in the rainforest layers



## + Animals of the rainforest emergent layer

Animals that live mostly in the emergent layer of rainforests are harpy eagles, macaws, capuchin monkeys, and sloths.

## + Animals of the canopy layer

Howler monkeys, squirrel monkeys, green iguanas, two-toed sloths, and toco toucans are some of the animals that can be found in the canopy.

## + Animals of the understory

The layer under the canopy is teeming with animals like frogs, toads, snakes, and large mammals including red-eyed tree frogs, golden tree boas, greater bulldog bats, and jaguars.

## + Animals of the forest floor

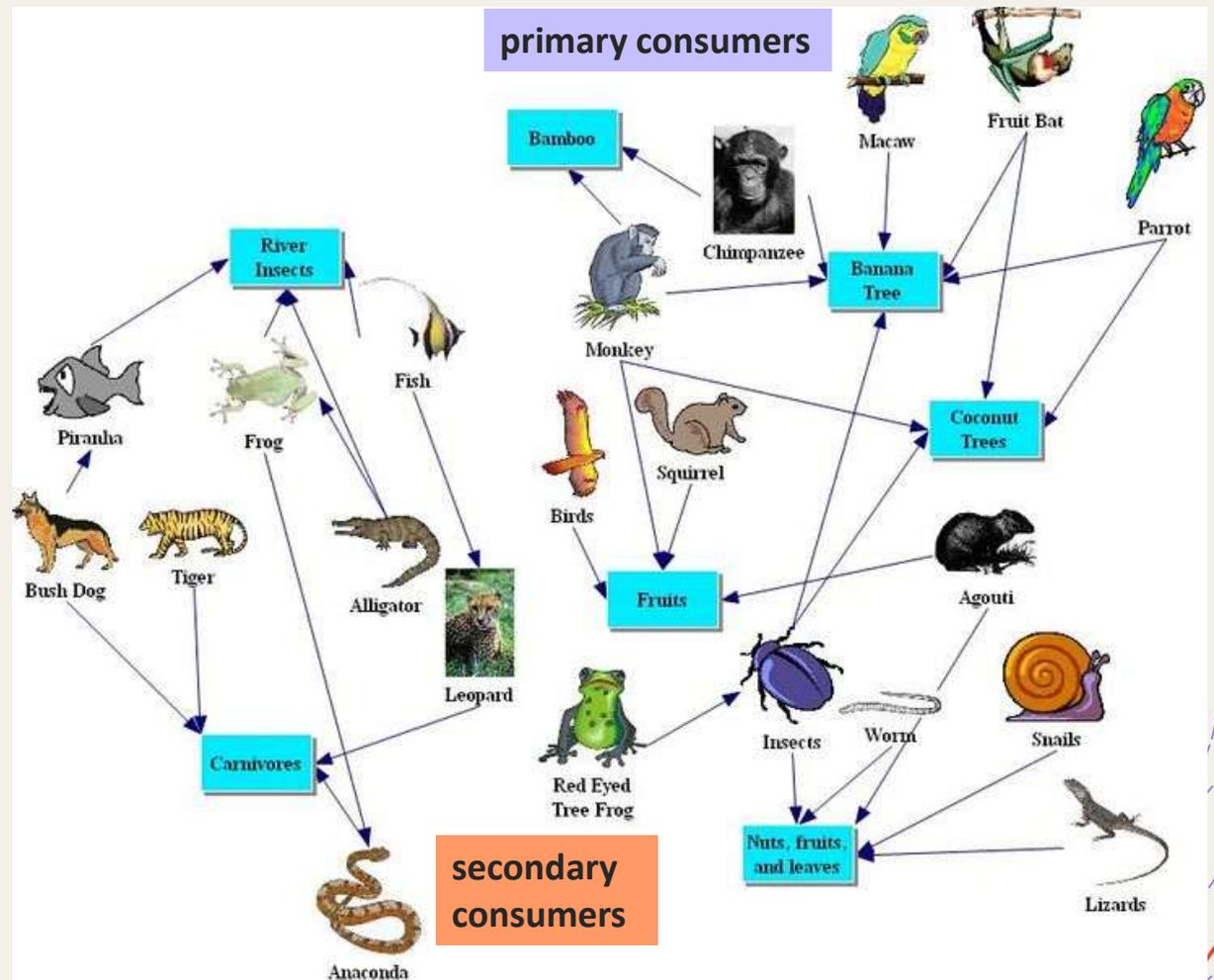
The damp and dark forest floor is home to thousands of insects including a number of spiders and scorpions, while larger inhabitants like the tapir, giant anteaters, agouti, elephants are also there.

# Adaptations of the Rainforest Animals and Birds

- **Camouflage** is an essential tool, and many animals, both predators, and preys use it to blend in with the dense forest backgrounds.
- Due to a high level of competition in these forests, many animals have chosen **a part of the day to be active**, with some being completely sedentary during the daytime becoming busy only during the dark hours (nocturnal). Some may be at rest in the night and be active during the day (diurnal).
- **Nocturnal species** have specially adapted eyes that help them see clearly in the darkness of the night, and also rather dark daytime hours as hardly any sunlight breaks through the upper level of trees to reach the understory and forest floor.
- Many of the smaller animals, including insects, reptiles, and amphibians have **bright colouring** to warn their potential predators, as most often these creatures are poisonous. In the wild, including in rainforests, bright coloration is associated with toxicity.
- Most **primates** living in rainforests have **prehensile tails** to aid them in climbing tall trees and locomote through the branches, especially in the emergent and canopy layers.

# Food chain

Vegetation is the primary producer.



<https://www.youtube.com/watch?v=JkaxUbICGz0>

# Endangered rainforest animals

+ Many animals of the rainforest are considered endangered, with a major percentage having reached a critical stage



*Panthera tigris  
sondaica*



†



†

# Endangered rainforest animals



*Pongo abelii*



*Cacatua*



*Ateles hybridus*



*Anodorhynchus leari*

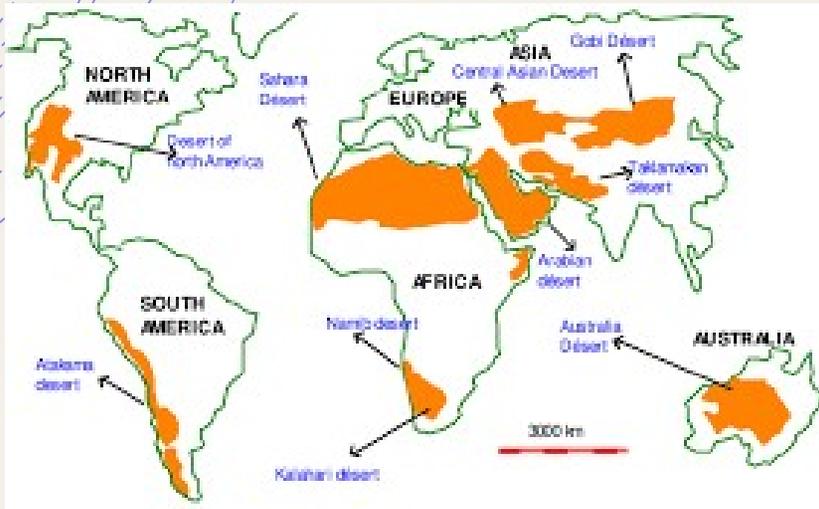


*Gorilla beringei beringei*

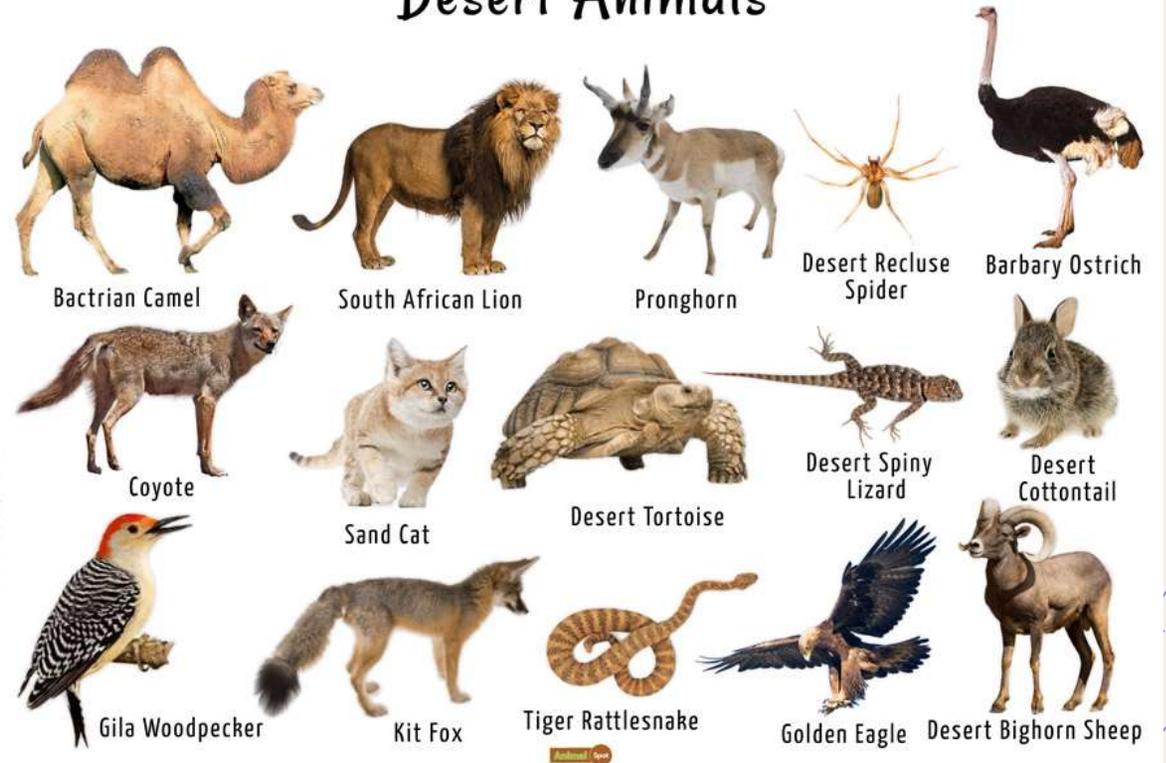


*Rhinoceros sondaicus*

# Desert



## Desert Animals

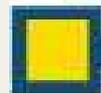


Xerocole species

# Climate graph



## Key



Temperature (°C)



Precipitation (cm)

# Adaptations: How do animals survive in the desert

- + - Burrowing activity during the most hot daytime hours.
- + - Nocturnal or crepuscular activity
- + - for Animals and birds that do not exhibit burrowing activity: choose distinct microclimates
- + - hibernation to survive the hottest months
- + - Migration



*Falco mexicanus*



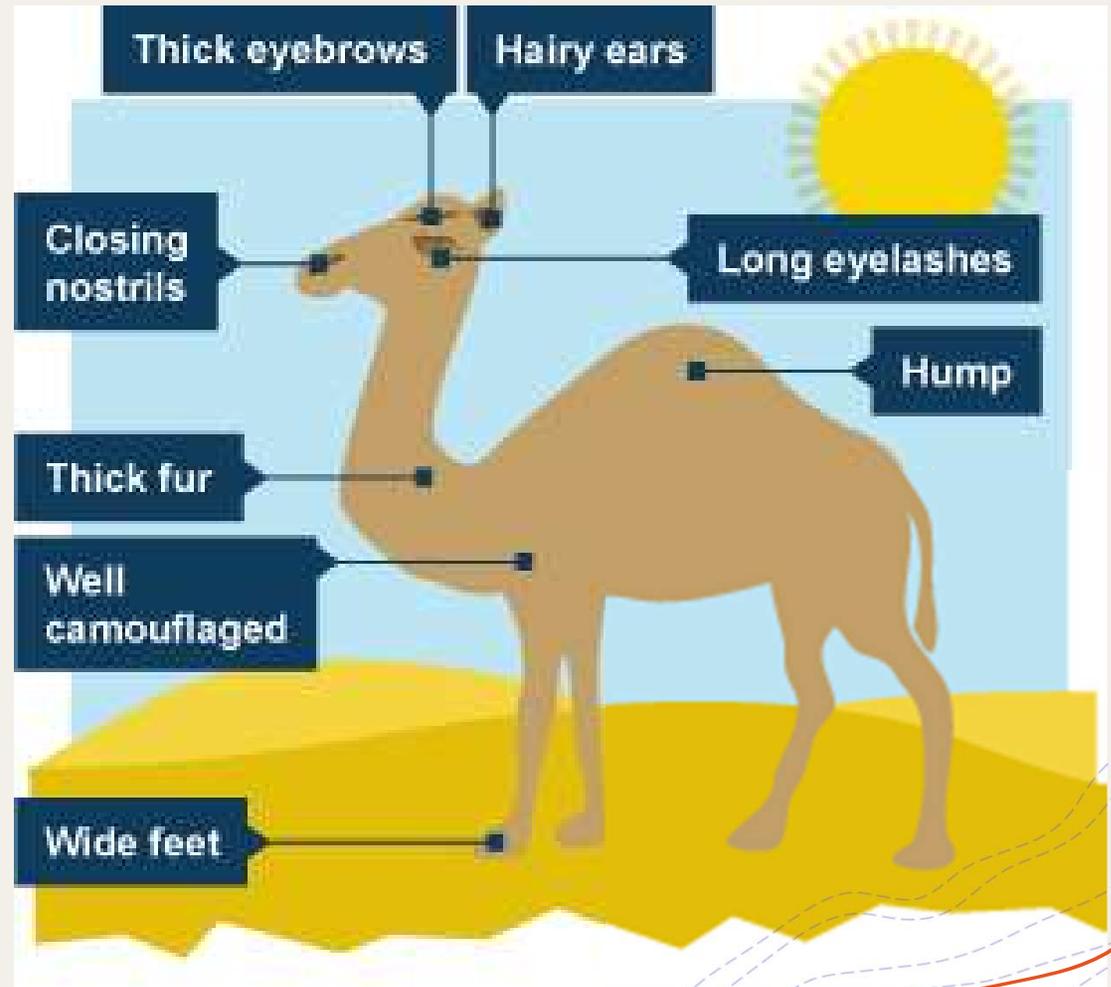
*Gophents agassizii*

# Physical adaptations



1. The bodies of the burrowing animals are capable of **absorbing moisture from the ground**, which is why they prefer to dig into relatively moist areas.
2. The inhabitants of the desert have light body colours, helping them to use **camouflage** for avoiding dangers. (i.e. sandy coloured animals include camels, wild asses).
3. Most of these animals have **long limbs and ears**, which act like car radiators, helping their bodies to stay cool.
4. They have **specialized kidneys** which retain water from urine, so excretion occurs in uric acid form.
5. Through **water uptake**: 1- free water, 2- moisture contained in food, and 3- metabolic water during the cellular respiration process. Some animals are able to receive water from all three sources, while others are able to exploit only one or two methods.

# How animals adapt to extremely arid conditions (i.e. camel)



<https://www.youtube.com/watch?v=hTfBSIYTG4k>



# Desert iguana

- + The desert iguana can stand hotter temperatures than other lizards, remaining active in up to 46° C.
- + It changes colour to regulate body temperature. It is darkest in the morning to absorb more heat from the sun, and turns nearly pure white by early afternoon to reflect sunlight. The desert iguana also has a nasal salt-secreting gland that allows it to void salty body waste while conserving water.



Desert iguanas change to a lighter colour as the day gets hotter. This reflects more light and stops them overheating.

# Diet: What do desert animals eat

Some animals, like camels, and kangaroo rats **derive a lot of moisture from succulent plants** like cactuses. While some species may extract nectar or sap from different plants, others may get their water from the plant parts they eat. Since insects are also aplenty in the desert, they become a regular source of food for many birds, reptiles, and bats.

Carnivores like hyenas, leopards, and lions that are at the top of the food chain, get their share of **water from** the bodies of their **prey**. Some examples of omnivores include coyotes and ravens.

**Metabolic water:** Rodents and some groups of desert birds (e.g., larks) are able to convert these energy sources into water:

1 g of **fat** produces **1.1 g of water**  
1 g of **protein** produces **0.4 g of water**  
1 g of **carbohydrates** produces **0.6 g of water.**



# Conservation Status

The population of many animals and birds of the desert have been reduced to mere hundreds because of overhunting by mankind. The IUCN considers many species as endangered, including the Egyptian tortoise, gazelles, antelopes, Saharan cheetah, fennec foxes, caracals, and pronghorns. Conservation efforts are, however, underway to save them from going extinct.



*Testudo  
kleinmanni*



*Acinonyx jubatus hecki*



*Caracal caracal*



*Antilocapra americana*