Zoogeography

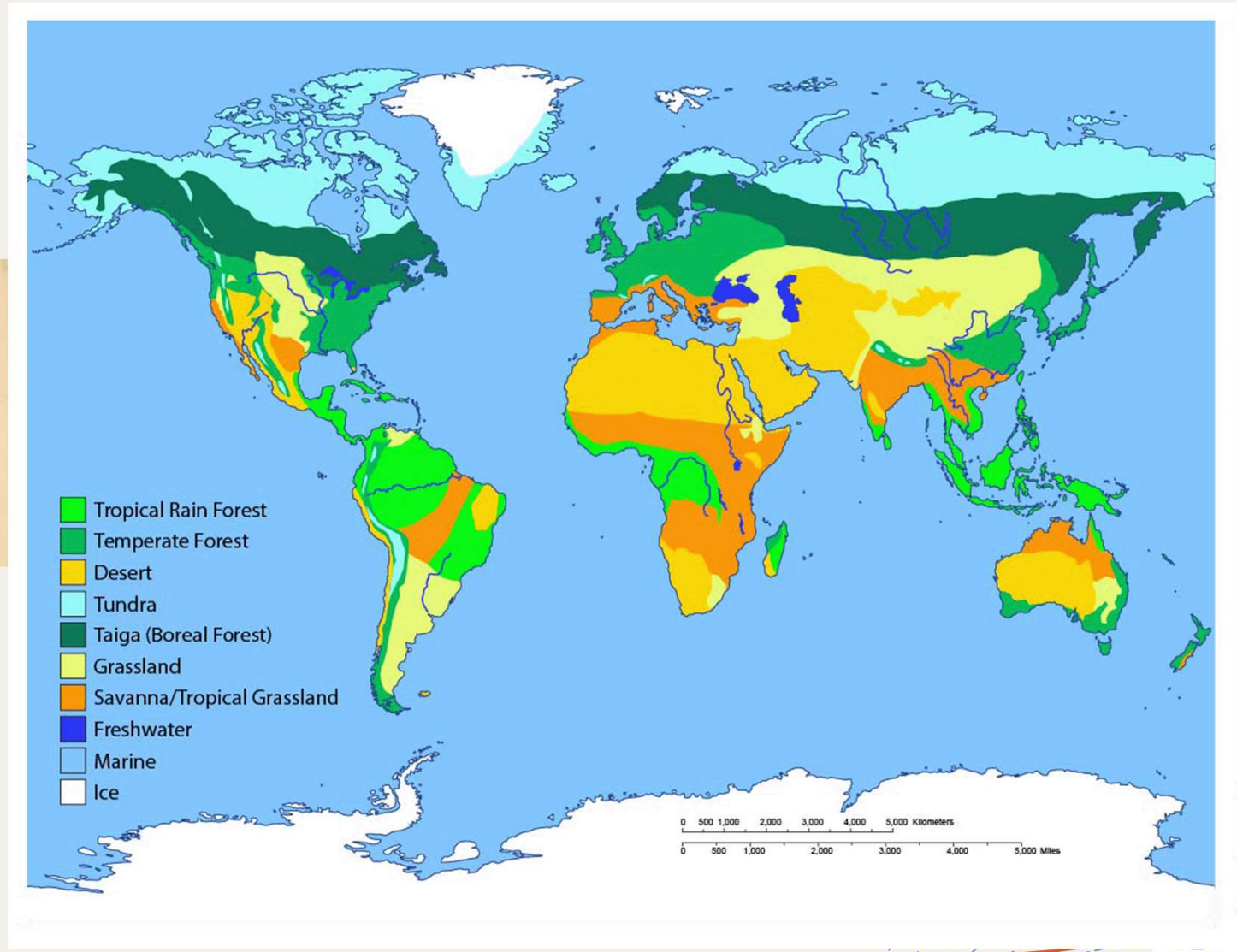
Lesson 4

Biome

A TEXT-BOOK
OF
ZOOGEOGRAPHY

BY

FRANK E. BEDDARD, M.A. (Oxon.), F.R.S.
PROSECTOR OF THE ZOOLOGICAL SOCIETY OF LONDON, AND
LECTURER ON BIOLOGY AT GUY'S HOSPITAL.



Tropical and temperate rain fores

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**

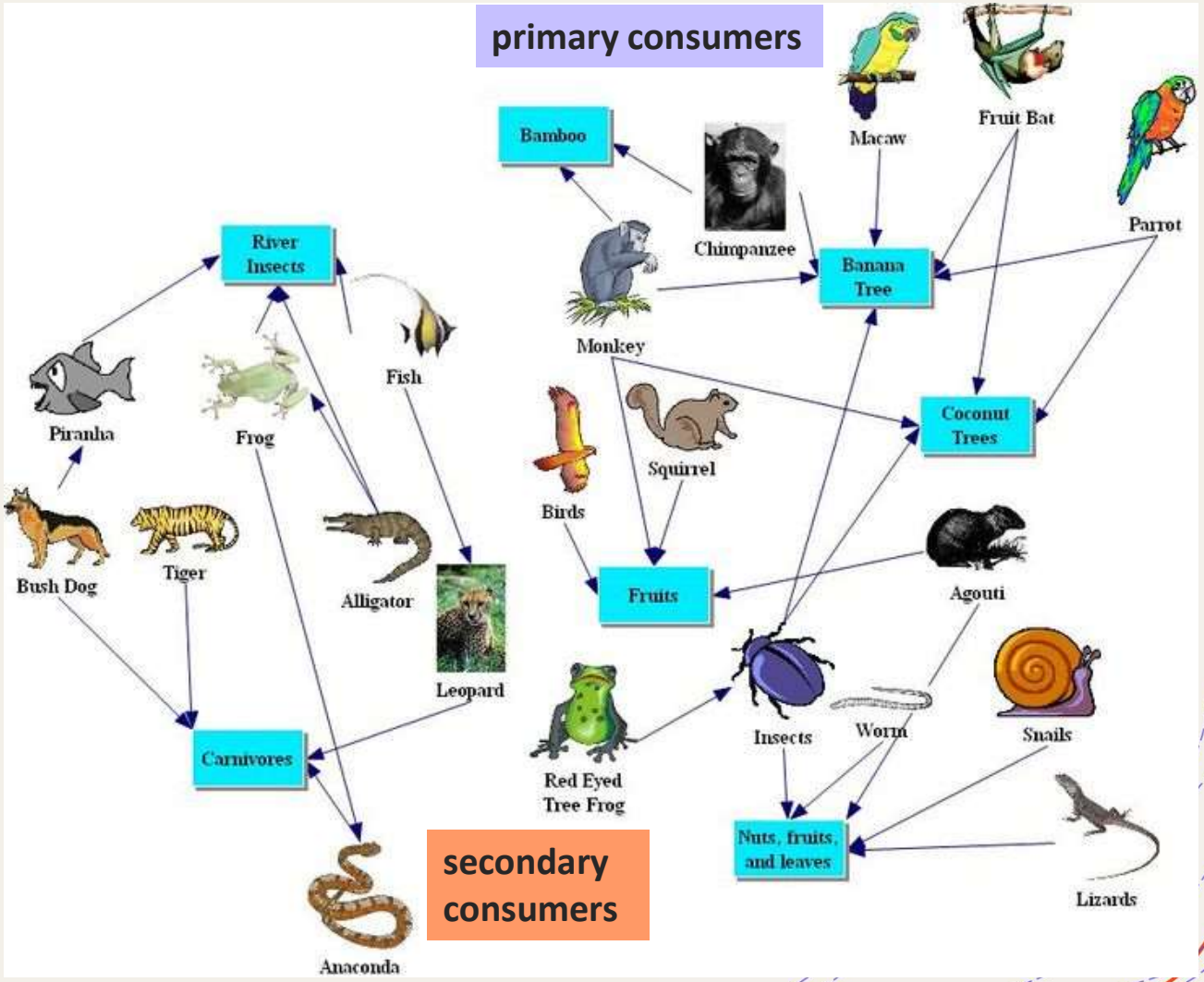
The damp and dark forest floor is home to thousands of insects including a number of spiders and scorpions, while larger inhabitants like the tapir, giant anteaters, agouti, elephants are also there.

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.animalspot.net/

Endangered rainforest animals

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

Panthera tigris sondaica

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Endangered rainforest animals

Pongo abelii

Cacatua

Ateles hybridus

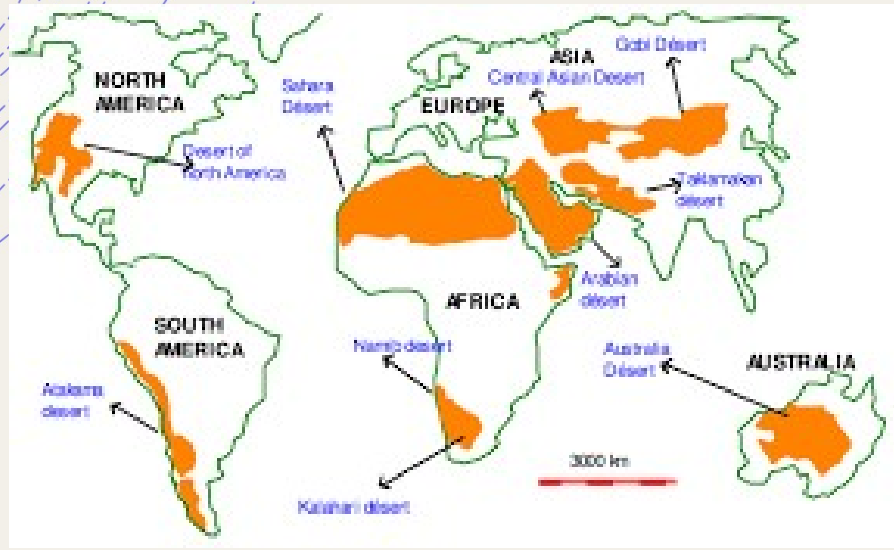
Anodorhynchus leari

Gorilla beringei beringei

Rhinoceros sondaicus

https://www.youtube.com/watch?v=JkaxUblCGz0

Desert



Xerocole species

Adaptations: How do animals survive in the desert

+ - Burrowing activity during the most hot daytime hours.

+ - Nocturnal or crepuscolar activity

+ - for Animals and birds that do not exhibit burrowing activity: choose distinct microclimates

+ - hibernation to survive the hottest mont

+ - 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.

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.

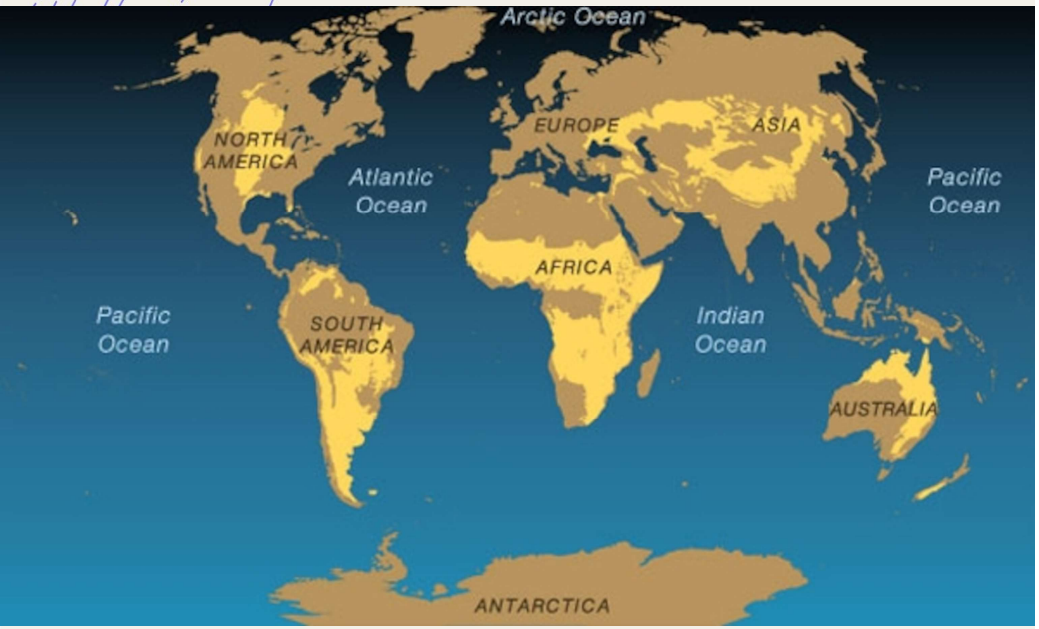
Testudo kleinmanni

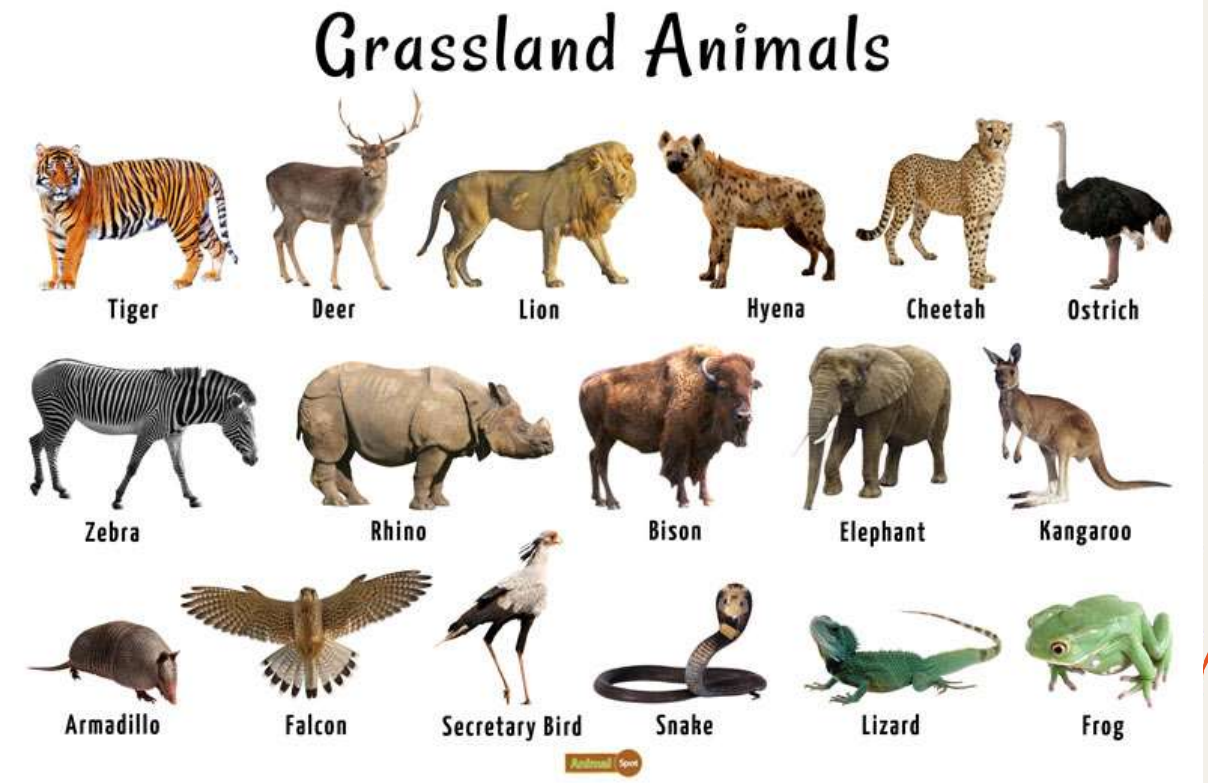
Acinonyx jubatus hecki

Caracal caracal

Antilocapra americana

Grassland (between 20 and 40% of the world's land area)



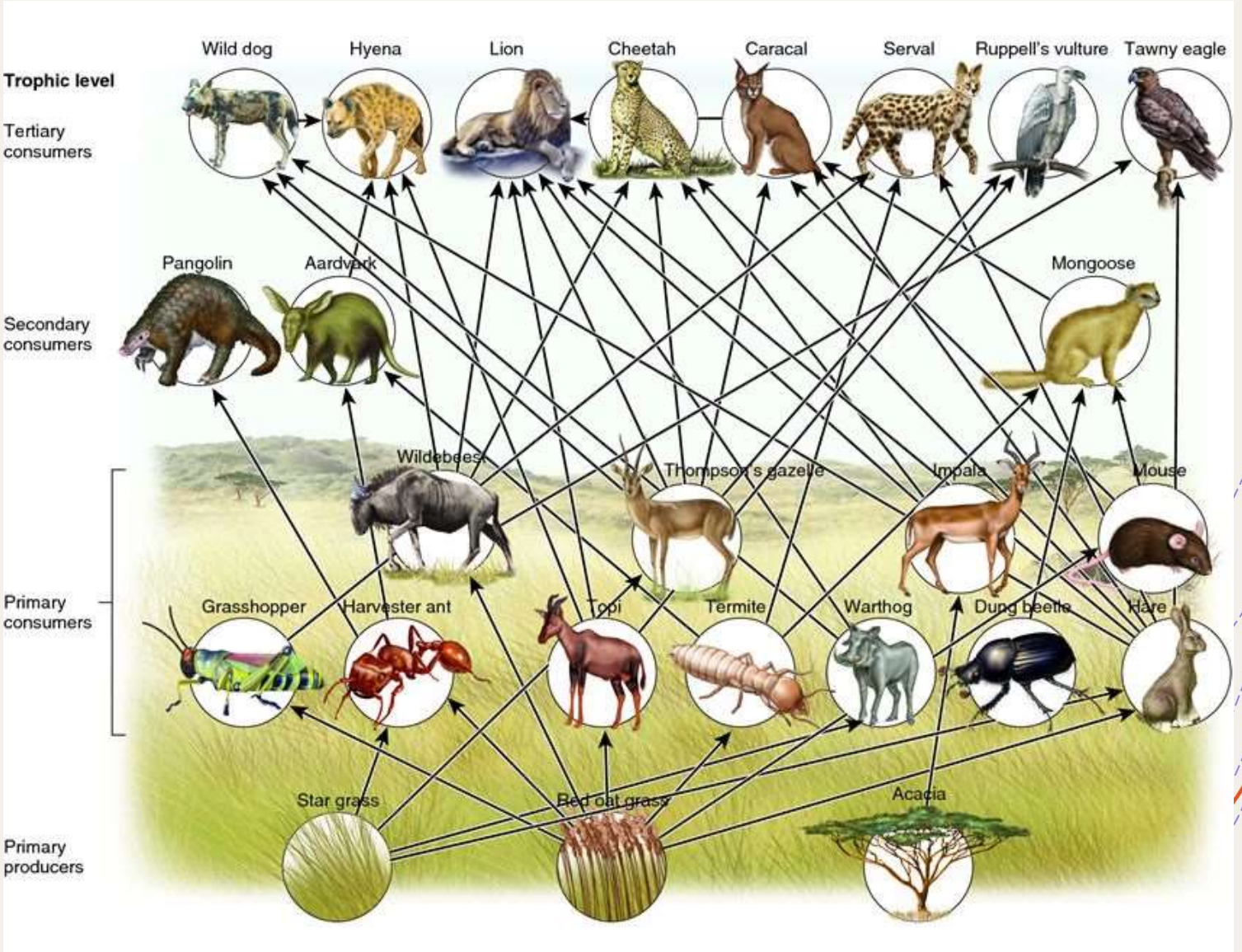


+ Grassland biomes consist of **large open areas of grass**. Trees can be present, but they are infrequent. The animals found in grasslands range from African elephants (Loxodonta africana) to various species of prairie dogs (Cynomys spp.).

+ **Low rainfall**, **wildland fires**, and grazing by animals are three factors that maintain grasslands. In grassland regions, the climate is ideal for the growth of grasses only.

+ Types of grasslands include savannas and temperate grasslands

Food chain


Trophic level
Tertiary consumers
Secondary consumers
Primary consumers
Primary producers
Wild dog
Hyena
Lion
Cheetah
Caracal
Serval
Ruppell's vulture
Tawny eagle
Pangolin
Aardvark
Mongoose
Wildebeest
Thompson's gazelle
Impala
Mouse
Grasshopper
Harvester ant
Topi
Termite
Warthog
Dung beetle
Hare
Star grass
Red oat grass
Acacia

Adaptations

- Many animals have feet, paws, and snouts such that they can burrow into the ground to avoid the daytime heat and stay safe from predators in their otherwise open habitat.
- Most of these species have digestive systems especially evolved for processing grass, which forms a major portion of their diet.
- Numerous animals have body colours to help them blend in seamlessly with their grassland habitat.
- Some animals are nocturnal, adapted with keen eyesight enabling them to hunt in the dark without any difficulty.

- Grasslands occupy nearly 25% of the earth’s surface.
- This habitat type is home to the fastest animal (cheetah), the largest terrestrial mammal (African bush elephant), the largest bird (ostrich), as well as the heaviest snake (green anaconda) in the world.
- The prairie grasslands found in North America have been reduced to about 2% of their original area due to urbanization, endangering the existence of the wildlife it supports.

+ **Humans have had a dramatic impact** on the grassland biome. Because temperate grasslands have **rich soil**, most of the grasslands in the United States have been converted into fields for **crops or grazing land for cattle**. The loss of grasslands due to agriculture has affected several species, including monarch butterflies (*Danaus plexippus*).

+ In the African savannas, **illegal hunting** has resulted in the loss of many **large animals**, including elephants. The elephants protect the grasses of the savanna by crushing trees and shrubs. Without large animals around to stomp down the trees, they can more readily overtake the grasses, **causing savannas to turn into forests**. The resulting loss of the grasses would mean less food for grazing animals such as Grevy's zebras (*Equus grevy*).

+ Grasslands could help **mitigate climate change**: One study found California's **grasslands and rangelands could store more carbon than forests** because they are **less susceptible to wildfires and drought**. Still, only a small percentage—less than 10 percent—of the world's grassland is protected.

https://www.youtube.com/watch?v=XmtXC_n6X6Q