

Module 5: Ecological Terminology

To learn even more about birds...

- ▶ Take the online *Fundamentals of Aviculture course I and II!*
- ▶ *A comprehensive course for all that takes a deeper look into the lives and science of birds.*
- ▶ Visit www.fundamentalsofaviculture.com



Module 5: Ecological Terminology


Biodiversity & Adaptations

**What roles do birds play
in our environment?**



The Order of Life

Complexity

- 
- ▶ Biosphere - layer around the Earth that contains all life (includes below ground and ocean depths)
 - ▶ Ecosystem - areas within biosphere with specific climate and organisms
 - ▶ Community - many different species living together within an ecosystem
 - ▶ Population - one species group within a community
 - ▶ Organism - an individual living thing

What do I eat?

- ▶ Trophic means feeding
- ▶ Producers include photosynthetic organisms like
 - ▶ Plants
 - ▶ Algae
 - ▶ Certain types of bacteria
- ▶ Consumers = Primary, Secondary, Tertiary (animals that consume other organisms)
 - ▶ Levels of Consumers depend on what they eat *AND* if they get eaten
- ▶ Biotic factors are living (predators, parasites)
- ▶ Abiotic factors are non-living (water, weather)

Feeding Niches

► Herbivore = consumes plants

- Browsers eat from trees
- Grazers eat ground plants

► Carnivore = consumes animals

- Predators are adapted to be hunters
- Prey is adapted to avoid predation

► Omnivore = consumes both plants & animals

- Many bird species consume both plant material and insects, for example

► Detritivore = consumes dead organic material, putting nutrients back into ecosystem

- These birds are adapted to consume decaying animals and are able to withstand bacteria loads



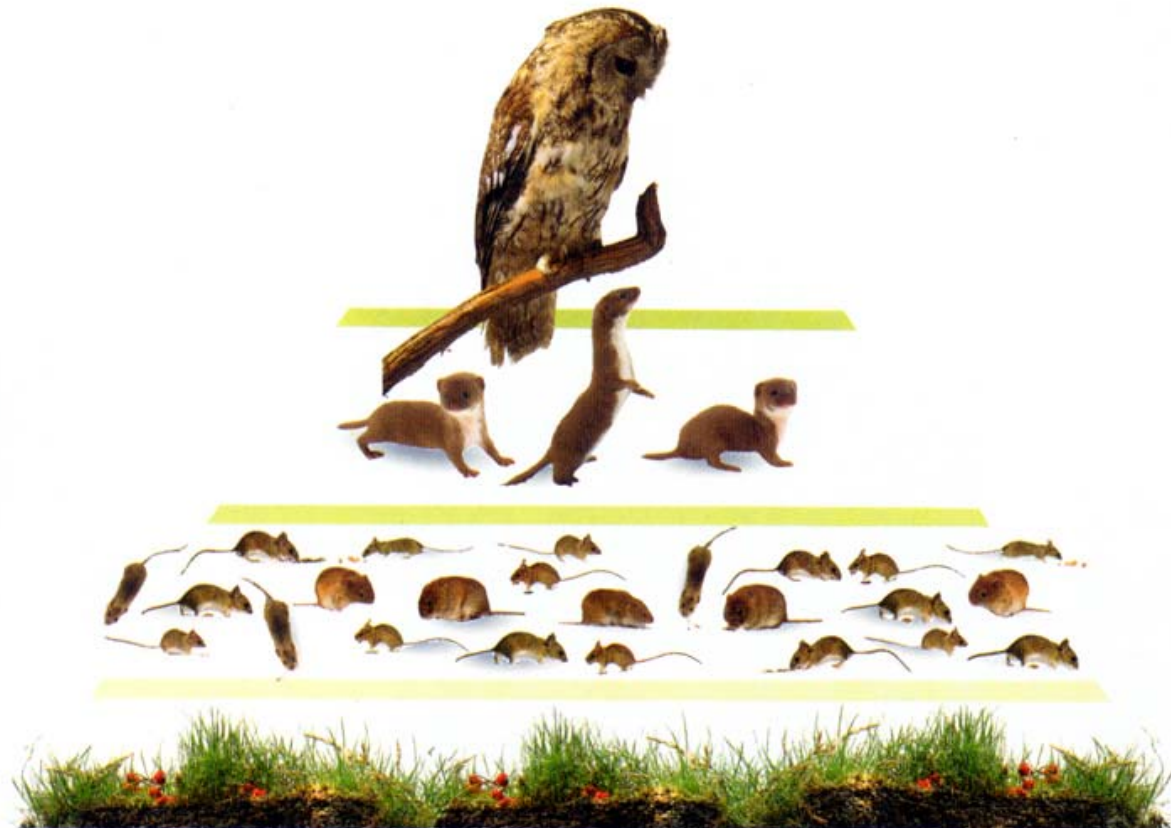
Trophic Levels

Tertiary
Consumers

Secondary
Consumers

Primary
Consumers

Producers



Where do I live? Habitat types

- ▶ Habitat = an organism's home
- ▶ Elimination = Disposing of waste
 - ▶ Arboreal animals live in trees and, therefore, aren't concerned with where their waste goes
 - ▶ Terrestrial animals live on or in the ground and tend to eliminate away from their home
 - ▶ Helps to avoid predators, harmful bacteria, etc
- ▶ Niche = organism's job or lifestyle
 - ▶ What it does in its habitat

When am I active?

- ▶ Nocturnal = active at night
 - ▶ examples: some owls, kakapo
- ▶ Diurnal = active during daylight
 - ▶ examples: robins
- ▶ Crepuscular = active at dawn and dusk
 - ▶ examples: nightjars, barn owls

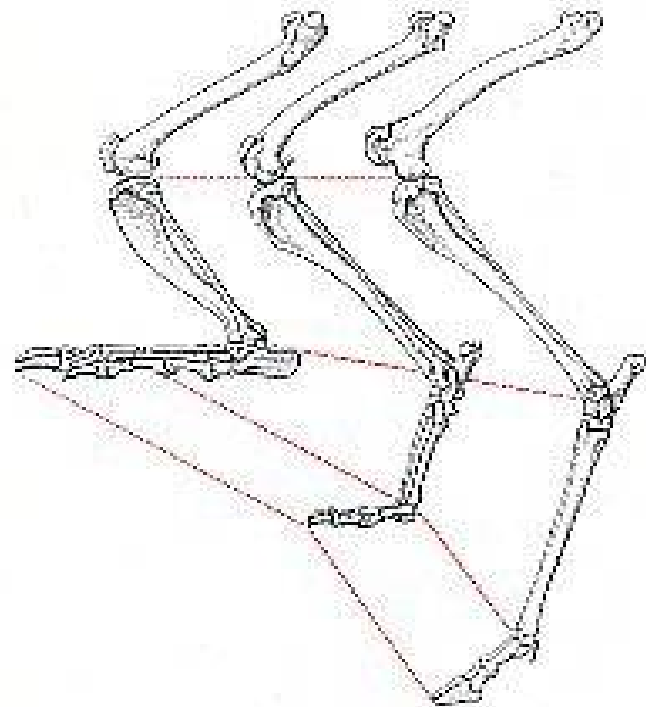
How do I thermoregulate?

- ▶ Homeothermic/Endothermic = warm-blooded
 - ▶ examples: mammals & birds
- ▶ Poikilothermic/Ectothermic = cold-blooded
 - ▶ examples: reptiles, amphibians, fish, insects, etc.



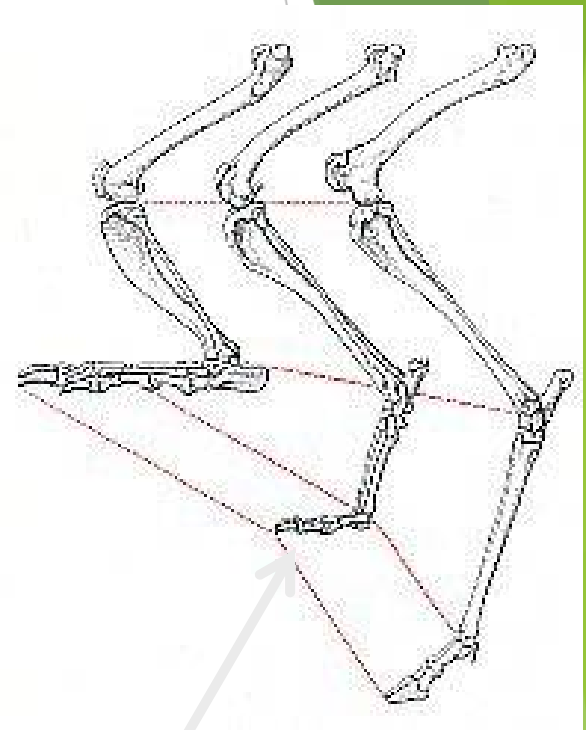
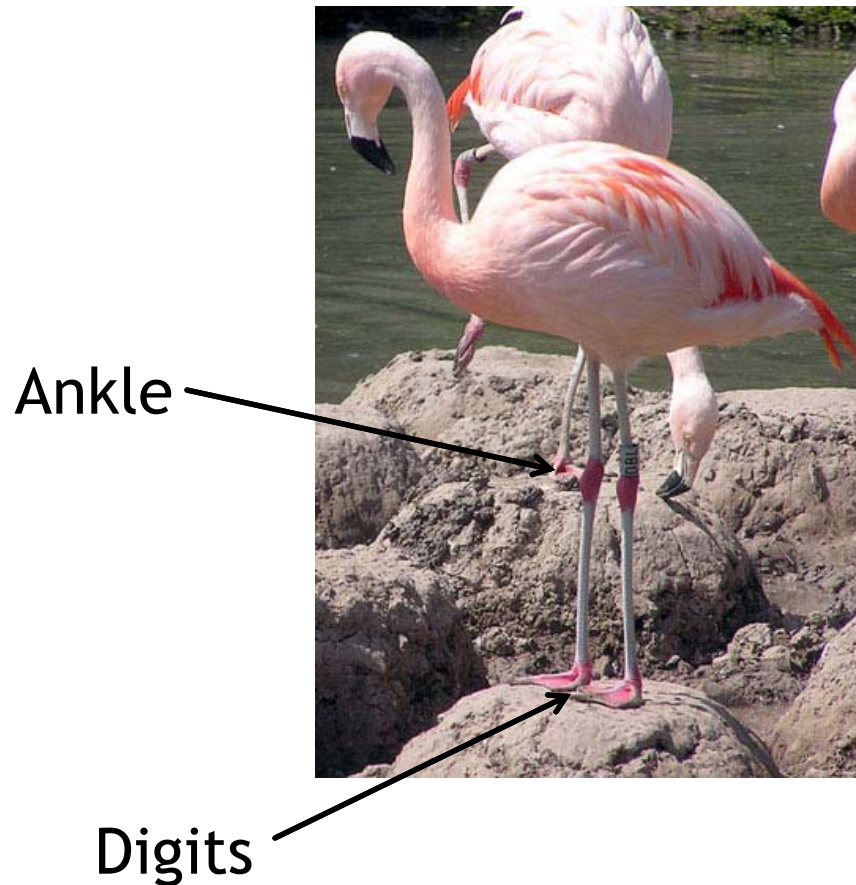
Modes of Locomotion

- ▶ Plantigrade - whole foot (heel to toe) makes contact with ground
- ▶ Bears, apes including humans



Modes of Locomotion cont'd

- Digitigrade - walks up on digits (toes)

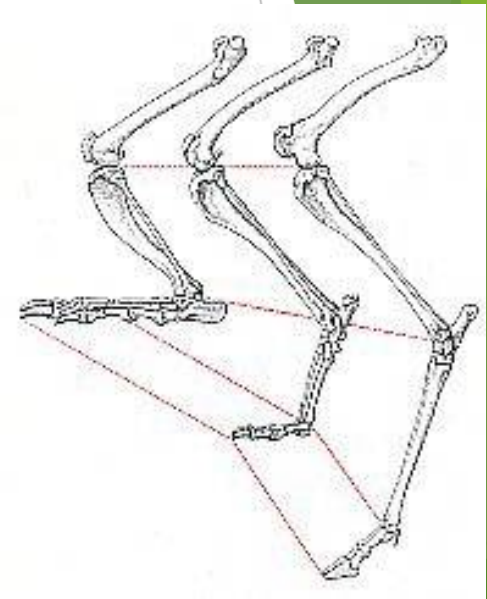


All dogs and cats are digitigrade as well.

Birds need to be fast to get off the ground so they run on their digits.

Modes of Locomotion cont'd

- Ungulagrade - walks up on toenails (aka hooves)



Prey animals need to try and move faster than their predators who may be digitigrade!

Modes of Locomotion cont'd

► Swimming

- Any movement through water
- Examples include birds like ducks and penguins, as well as fish and marine mammals (dolphins, whales, etc.)



► Gliding

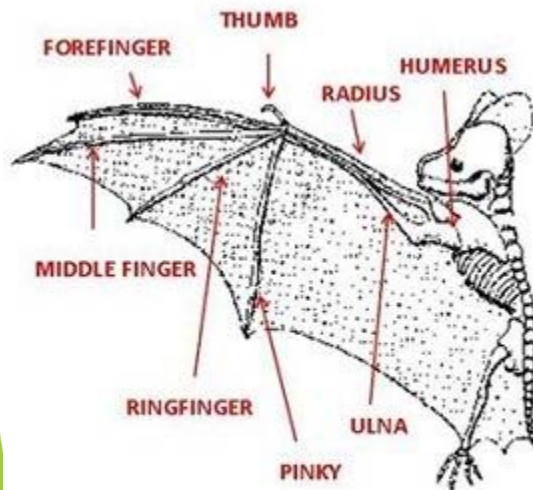
- Using air currents to coast from one place to another
- Examples include flying squirrels and birds who use gliding in addition to flying like the albatross



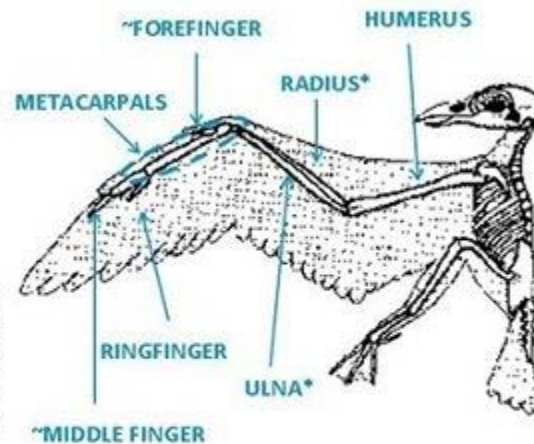
Modes of Locomotion cont'd

► Flying

- Moving through the air using beating wings
- High energy activity!



BAT



BIRD

What does “troph” mean again?

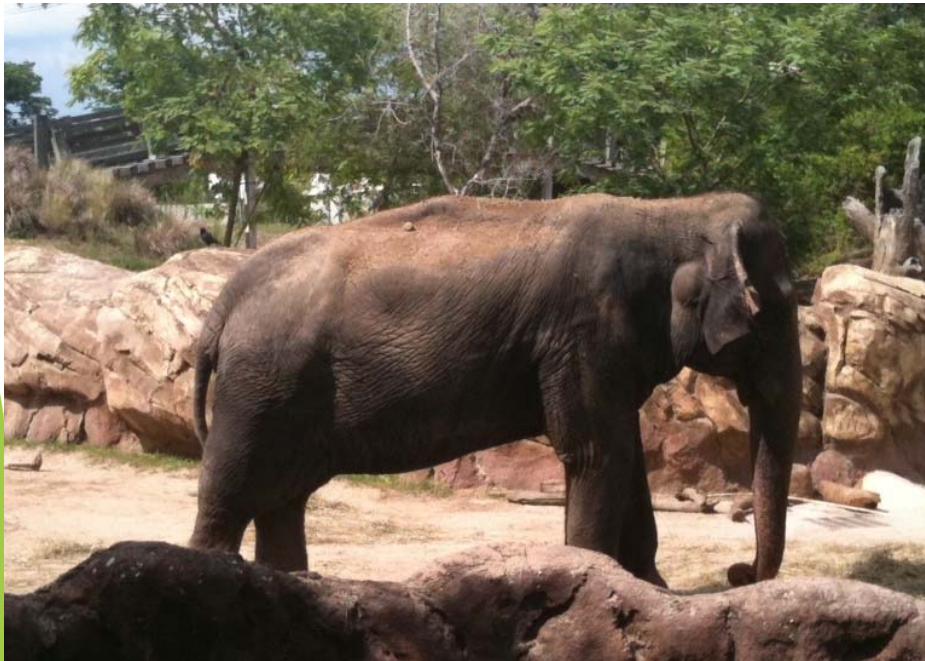
- ▶ Animals = Consumers = Heterotrophs



- Plants = Producers = Autotrophs

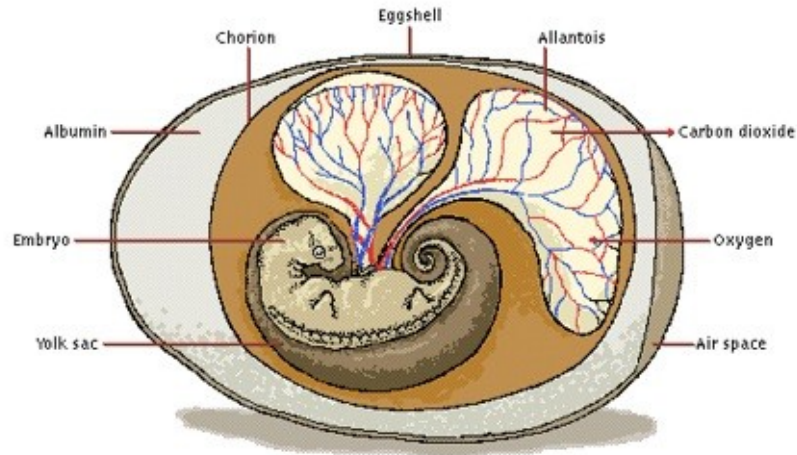
Methods of Reproduction

- Asexual: one parent (simple organisms)
- Sexual: two parents (more complex organisms)



- ▶ Placental - offspring develops inside mother's body until birth
 - ▶ examples: mammals

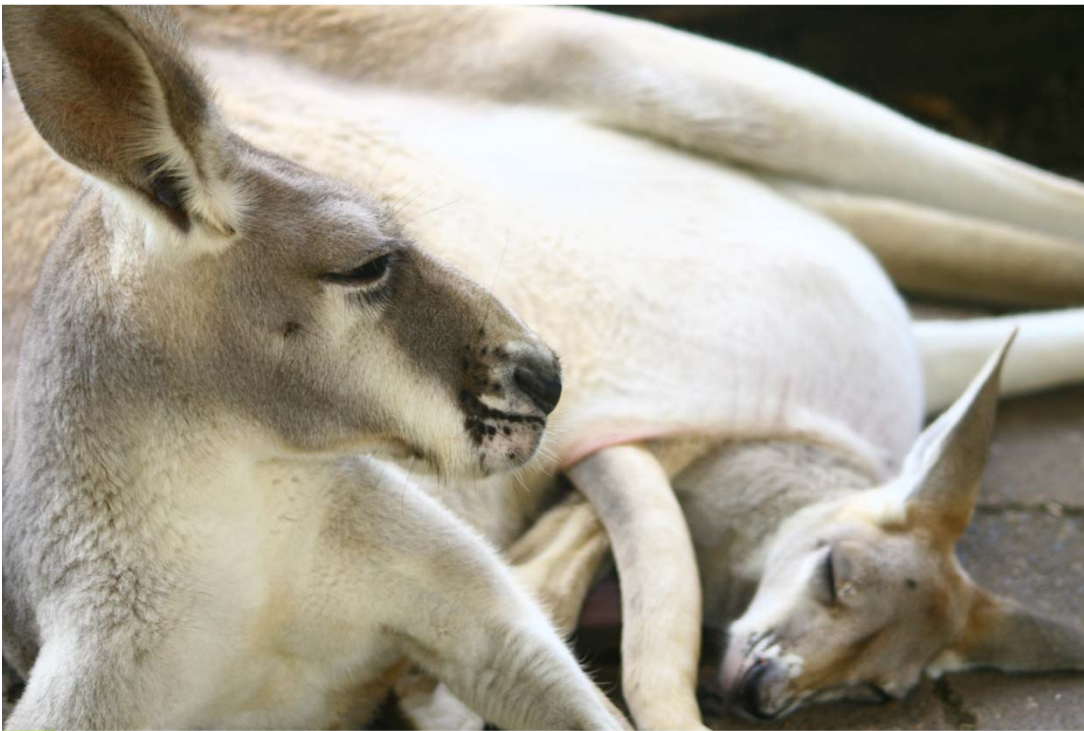
Methods of Reproduction cont'd



- ▶ Egg-laying -- offspring develops in an egg outside the mother's body
- ▶ examples: birds, amphibians, fish, reptiles, insects, etc.



Methods of Reproduction cont'd



- ▶ Marsupial -- offspring is born 'premature' and finishes developing outside the mother's body in her pouch
 - ▶ examples: kangaroo, opossum

Methods of Reproduction cont'd

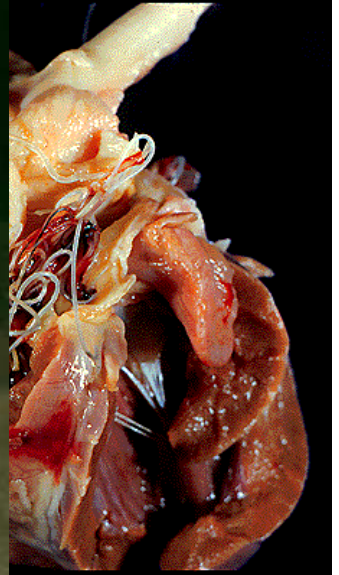
- ▶ Monotreme - Only 2 species in this category:
 - ▶ Platypus and Echidna
- ▶ Monotremes are the only mammals to lay eggs but also produce milk for young.
- ▶ They have both avian and mammalian characteristics



Ecological relationships

- ▶ Predation: predator - prey relationship (+ / -)
- ▶ Parasitism: parasite feeds on living host (+ / -)
- ▶ Parasitoidism: parasite feeds on host that dies (+ / -)
- ▶ Commensalism: One organism benefits, the other is neutral (+/o)
- ▶ Mutualism/Symbiosis: 2 species cooperate for mutual benefit (+/+)
- ▶ Competition: 2 species struggle for same resource (-/-)

EXAMPLES of RELATIONSHIPS



PICTURE 1



PICTURE 2



PICTURE 3



PICTURE 4



PICTURE 5



PICTURE 6



Keep this in mind...



These terms detail
how living things
have adapted to
their environments
and how they
survive when living
with other
organisms.

Focus on: The Kaka parrot

Length: 38 - 44 cm

Weight: 340 - 400g

Similar species: [Kea](#)

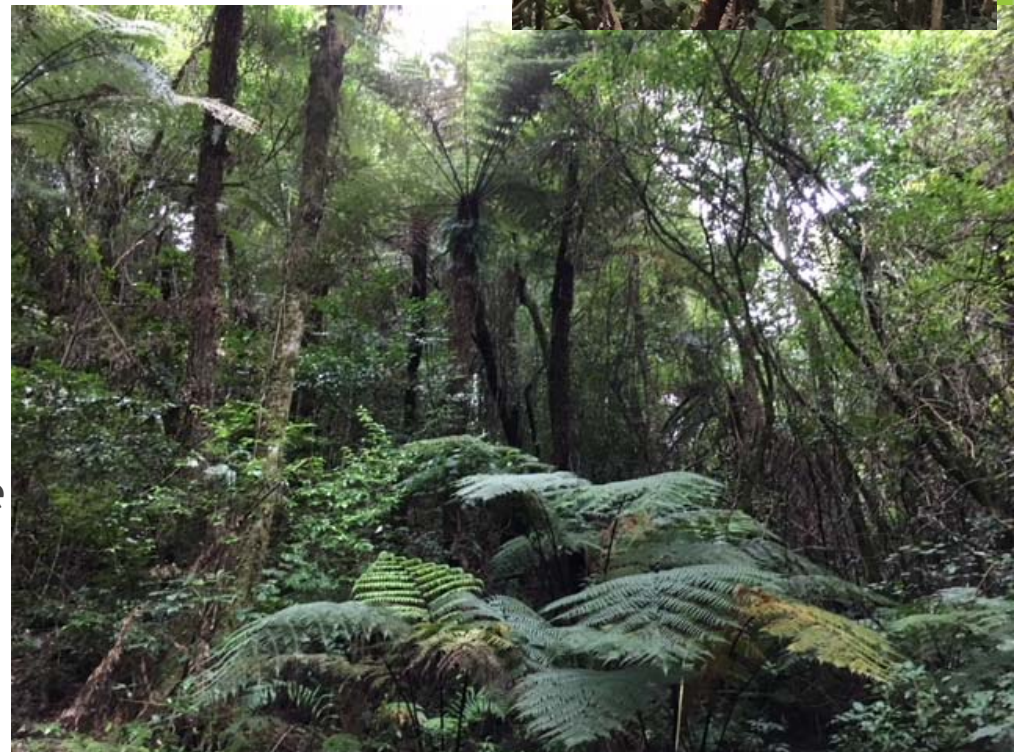
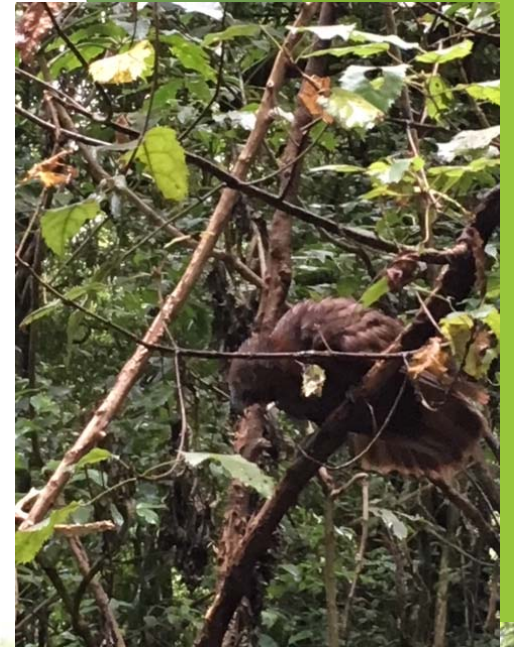
A large olive-brown forest parrot with grey-white crown, bright red-orange underwing and deep crimson belly and under-tail coverts.

Males have a noticeably longer and deeper upper mandible and bigger head than females which is apparent when the two are seen side by side.



Distribution

- ▶ Kaka are rare to uncommon in their native forests throughout the three main islands of New Zealand
- ▶ They are more common on islands where control of mammalian predators is undertaken
- ▶ Reintroduction programs have been remarkably successful at a few sites.
- ▶ A large wild kaka flock is a feature at the Pukaha Mt Bruce National Wildlife Centre in the Wairarapa, and kaka are commonly seen throughout Wellington.
- ▶ Kaka also visit Auckland and Hamilton cities during winter, but there are few sites there where they are regularly seen.



Conservation



- ▶ Sanctuary Mountain Maungatautari is a community lead project at heart, with passionate and dedicated supporters, many of whom have donated both their time and their resources to support the project.
- ▶ The preserve is governed by a trust made up of members from the community, landowners and local iwi representatives.

Protecting Wild Habitat

- ▶ Sanctuary Mountain Maungatautari is a taonga (a natural resource which is highly prized) to mana whenua (local Māori who have a connection with the maunga).
- ▶ Mana whenua work closely with the trust to ensure the maunga is restored to the lush and vibrant ecosystem it was in the time of their fore fathers.
- ▶ The fence includes more than 850,000 staples, 50,000 battens, 8,500 three meter posts and 240km of high tensile wire.
- ▶ An electronic surveillance system operates 24 hours per day to detect fence breaches.
- ▶ The volunteer effort in maintaining just the fence and monitoring pests alone involves an average of 365 hours per month.



Sanctuary Island: The Fence

- ▶ Because of the mainland situation, the creation of this ecological island required completely enclosing the perimeter of our 3,400-hectare mountain with a 47 km pest-proof fence.
- ▶ The fence around Sanctuary Mountain Maungatautari is the longest pest-proof fence in the world, measuring an enormous 47km long.
- ▶ This fence excludes all mammalian pests (other than mice on the main mountain), pets and livestock from getting over, under or through it.
- ▶ Since the completion of the pest-proof fence in 2006, several mammal species have been totally eradicated from Sanctuary Mountain Maungatautari.



The Fence

- ▶ Successfully fencing around a mountain had some unique challenges and required innovative solutions to ensure that the finished product met stringent quality control standards.
- ▶ The fence runs through some extremely steep terrain, crosses 42 streams, and provides access via pest-proof access gates to adjoining land-owners.
- ▶ It has specially designed water gates allowing for the movement of water and freshwater wildlife, including fish tunnels to allow large fish to move freely past the gates.



Let's learn more about the Kaka!



- ▶ Article on the Kaka's natural history
- ▶ The Plight of the Kaka: the H.I.P.P.O. Dilemma Activity
- ▶ Kaka Recovery Programs Activity

About the author: Dr. Jason Crean

Jason Crean, MS Bio, EdD is a degreed biologist and avid aviculturist, specializing in the propagation of green aracaris and white-backed mousebirds, President of The Avicultural Society of Chicagoland, First VP and Education Committee Chair for the American Federation of Aviculture, and moderates the Avian Raw Whole Food Nutrition groups on Facebook. Crean often speaks to avicultural groups across the country and acts as consultant to zoos and other institutions, including the Chicago Nature Museum and Wildlife Genetics lab at Loyola Medical Center in Chicago, Illinois. He also runs a live animal education program that does free interactive programs for a host of different audiences to increase the presence of aviculture.

Crean is also a biology instructor at the high school and university level. He is also a curriculum designer and instructor in the Education Department at Chicago Zoological Society. Crean has been awarded the highest honor a teacher can receive, the Presidential Award for Excellence in Science Teaching by President Obama in 2009, the 2010 High School Science Teacher of the Year by the American Association for the Advancement of Science, as well as awards from the National Science Teachers Association, the National Association of Biology Teachers, the Illinois Science Teachers Association, among others. He has authored several curricula, including the award-winning "Zoo Genetics" curriculum (www.xy-zoo.com) and "Harry Potter Biology" curriculum (harrypotterbiology.com). He was also recently awarded the Golden Apple Award. He serves as President for the Illinois Science Teachers Association, President for the Illinois Association of Biology Teachers, and sits on the Board for the Association of Presidential Awardees in Science Teaching and the National Science Advisory Panel for the national College Board.

- ▶ Dr. Crean is pictured with a wild Kaka at New Zealand's Sanctuary Mountain when he was an invited speaker at the Parrot Society of New Zealand's 2018 Convention.



Special thanks



- ▶ Thanks to Sanctuary Mountain volunteer guide Graham P. for the wonderful education while visiting.
- ▶ Here Graham illustrates the markers used to determine if mammals have made their way into the preserve.
- ▶ The black pads to which he's pointing are baited and leave an ink on the feet of the mammals.
- ▶ Small footprints are then left on the white as they scurry across, which is a signal to scientists that there is an invader present.

For more information on Sanctuary Mountain, visit <https://www.sanctuarymountain.co.nz/>



For all questions, please contact us at
education@afabirds.org

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