

QUEENSLAND KOALA (*Phascolarctus cinereus adustus*) TALKING POINTS

The following items should be in the bag, if they are not let someone in education know. If you discover a new problem with any biofact (broken pieces, loose teeth, etc.), it is your responsibility to let the staff know **and** make a notation with the date, time and your name on the sign out clipboard.

Note: Please return all items to the bag, and make sure lids are secured. Things should be left exactly as you found them.

Note: Do not try to open the Lucite containers with the food. We are trying to prevent animals from getting into the bone room.

KOALA BAG INVENTORY

- Koala skull (male)
- Koala pelt (male)
- Front and rear feet (freeze dried)
- Koala Resource Cards

KOALA RANGE (see map)

- Koalas are found in Australia from north Queensland down the east coast into New South Wales and Victoria and in small parts of South Australia and on some offshore islands (not in Tasmania).
- Home ranges depend on resources available, but generally adult males need about 3.25 acres and females 2.5 acres of habitat. Range of dominant male may overlap that of up to 9 females and subordinate males. In urban setting, koalas will have smaller range.

KOALA HABITAT

- Climate in the north is sub-tropical with summer temperatures into the high 80's and in the 60's during the winter. Further south the temperatures are generally 5-10 degrees cooler. (Remember Australia is in the Southern Hemisphere)
- Live in tall, open eucalyptus forests and in low eucalyptus woodlands. Koalas require a home range containing about 100 suitable eucalyptus trees.
- Trees provide both food and shelter for koalas.

KOALA PHYSICAL ADAPTATIONS

1. Skull/Dentation (see skull)

- Broad, flat skull supports strong, powerful jaw muscles. Females have narrower heads.
- 30 teeth, including large incisors for grasping and snipping leaves, pre-molars and high cusped, interlocking molars for shredding leaves. Gap between incisors and molars allows the tongue to move leaves around the mouth.
- Because eucalyptus leaves are so fibrous, it is common for older koalas to grind away the cusps on the molars, making complete chewing very difficult, if not impossible. If an animal is not able to chew, it will eventually starve.

2. Size/Weight/Lifespan

- Average body length is 23.5-33.5 inches. Males are larger than females.
- Average body weight of males: 17-31 pounds; females: 13-24 lbs.
- Males and females in the southern, cooler areas are larger and heavier than their northern counterparts and have thicker fur.

- Average lifespan in the wild is 13 – 17 years; females typically live longer than males.

3. Body Characteristics/Coat/Fur (see pelt)

- Small, compact body with curved spine, short limbs and strong thigh muscles important for climbing trees.
- Covered by thick, wooly fur to protect from both high and low temperatures and to repel rain.
- Fur varies in color from light grey to brown with patches of white in the chest, neck, and the inside of the arms, legs and ears. The white fur provides some camouflage when seen from the ground and the darker top fur may provide camouflage protection from predatory owls and eagles.
- Fur at the base of the spine is more densely packed and thicker, providing a “cushion” important when sitting on hard tree branches. The base of the spine also features a cartilaginous pad, which provides extra cushion.
- Mature males have a brown, hairless sternal scent gland in the chest center.
- Females have a pouch in the center of the abdomen with an opening toward the bottom of the pouch, facing downward. (see photo)
- Vestigial tail is hidden by fur.

4. Feet/Paws (see picture)

- Front feet (hands) have 2 digits (positioned as thumbs) opposable to the other three, providing a good grip on branches; each digit has a strongly curved, sharp claw. Claws play an important part in gripping tree bark when climbing and when sitting.
- Hind feet have a clawless first digit opposable to the other four clawed ones; the second and third digits are partly fused, with separate claws, but one sheath of skin. The fused toes are used as a comb to groom fur. The absence of the claw on the first digit facilitates climbing backwards down from a tree.

5. Senses/Scent Marking

- Have excellent sense of hearing, which is important for solitary animals, who need sensory information about the others in the community.
- Large, leathery nose provides an excellent sense of smell. The keen sense of smell is important for reading scent markings (territorial and breeding) and in identifying eucalyptus leaves suitable for eating.
- Eyes are small for body size and vision is not well developed. Unlike most other marsupials, koala eyes have vertical slits; it is thought slit pupils can better protect the sensitive eyes of animals, which are both nocturnal and to some extent diurnal. Cats also have vertical slits.
- Both males and females use urine and feces for scent marking.
- Mature males exude a clear, oily, strong smelling liquid from the sternal scent gland. This is rubbed on trees to mark territory and to convey information re sexual maturity, health, rank, etc. during breeding season.

6. Other Physical Adaptations

- Both males and females have cheek pouches for storing food.
- Because of the poor nutritional content and caloric value of their diet, koalas have virtually no body fat.
- Koalas are the only mammals other than primates with fingerprints. They are almost indistinguishable from human prints. These dermal ridges are thought to help with gripping small branches.

- Koalas have the smallest brain size in proportion to body weight of any mammal. The brain surface is smooth, which is typical of primitive animals. This adaptation is thought to help conserve their limited energy resources.
- Unlike any other land mammal, koalas have two sets of vocal cords. The primary set is located in the larynx and is appropriate in size to the size of the koala and produces higher pitched sounds. The secondary set is located in the soft palate and is larger and heavier than the primary, enabling the koala to produce sounds 20 times deeper in pitch than would be expected for their size (larger animals make deeper vocalizations). Whales share this.

KOALA BEHAVIORAL ADAPTATIONS

1. Lifestyle

- Arboreal except when changing trees.
- Generally nocturnal, but also active for periods during the day.
- Live in proximity to other koalas, but lead a solitary life, except when breeding or caring for young.
- Sleep or sit 18 – 20 hours per day; remainder of time used for foraging, moving between trees or grooming. This prolonged inactivity reflects their vital need to conserve energy.
- May need to travel up to 6 miles to find new food source
- Maintain low energy life style secondary to their low energy diet.
- Use posture changes to help cope with extremes of temperature: on a hot day may lie on branch with feet dangling down either side; when it is cold or wet they may curl with their legs against their bellies.
- Hugging cool tree trunks (acacia the favorite) and seeking shade also provide relief from high temperatures.
- Mostly very territorial and do not share food or food trees. An animal entering an occupied tree is subject to aggression in the form of biting, bellowing, growling and scratching.

2. Communication

- Verbal and non-verbal communication is very important in a koala society.
- Vocalizations include very loud bellowing (particularly during breeding season by males to attract females), squawking, snarling, screaming or wailing.
- Scent marking used extensively as noted earlier.

3. Diet

- Koalas are obligate browsing folivores, feeding almost exclusively on the young, juicy, fibrous leaves of eucalyptus trees. They will occasionally also eat the leaves of one or two other native trees.
- They will consume a pound or more of leaves every day.
- Of the 600+ species of eucalyptus found in Australia, koalas are very picky and will eat leaves from only about 10% of them.
- They use their excellent sense of smell to find their favored species and then make secondary selections based on avoiding those with high levels of toxins and other chemicals and favoring those with high moisture content.
- Eucalyptus trees growing on poor soil tend to have higher concentrations of toxins and are thus avoided. Unfortunately, farmers often clear trees growing on good soil and plant crops, thus destroying koala habitat.
- Usually able to obtain all the water they need from the moisture in leaves; if during drought the leaf water content is low, koalas will seek additional water.

- The only other animals able to consume eucalyptus leaves are greater gliders and ring-tailed possums, so koalas have little competition for food.

4. Eating Habits/Digestion

- Koalas have specialized adaptations allowing them to survive on a diet of eucalyptus leaves. (all eucalyptus leaves contain a toxic oil, some more than others)
- Their very slow metabolic rate allows them to retain food in their digestive system for 100 – 200 hours, maximizing the extracted energy.
- Their slow metabolism and low body temperature (lower than most mammals) minimizes their energy requirement and requires koalas to sleep or rest 18 – 20 hours per day.
- The koala liver is adapted to process the toxins from the eucalyptus oil.
- Koalas, unlike other marsupials, are hindgut fermenters and have a very long, fiber digesting caecum (a part of the large intestines up to 80 inches long) containing millions of bacteria that work to break down the tough fibers. (see photo)
- Even with these adaptations, koalas are only able to absorb about 25% of the fiber they ingest and what they do ingest is not high in food value.

5. Breeding/Reproduction/Parental Care

- Sexual maturity: Females 2-3 years; Males 3-4 years
- Courtship behavior of males limited to loud bellowing and scent marking trees to attract females
- Dominant male will mate with all females in his territory.
- Have induced ovulation (egg released during or right after copulation)
- Breeding usually takes place from October through November with most births between December and March.
- Birth interval is generally one to two years
- Litter size almost always one; young called “joeys”
- With gestation of only 35 days on average, young are born blind, very undeveloped and weigh only .02 oz. and are only .8” in length. (the size of a jelly bean) The short gestation period is another energy conserving adaptation. (see photo)
- Born with arms and claws and senses of smell and touch developed enough to allow the tiny joey to climb through the fur to the opening of the pouch and climb in.
- Once inside the pouch they latch onto a teat, which expands to secure the joey and remain there for 6 months. Strong pouch sphincter muscles also insure the safety of the joey.
- At about 26 weeks the joey pokes its head out of the pouch and will leave the pouch at about 7 – 8 months.
- When it first leaves the pouch, the mother feeds it partially digested leaves from her cloaca (Koalas have a cloaca rather than an anus). The downward opening of the pouch facilitates this feeding.
- The richness and food value of koala milk decreases as the joey develops; this is a strategy designed to prepare the young for the quality of the food they will consume as adults.
- Once outside the pouch, at first the young ride on the mother’s back; they stay with the mother from 12 – 24 months, when a new joey is born.

KOALA INTERESTING/FUN FACTS

- Koalas are marsupials – they are not bears
- The closest relative to the koala is the wombat,
- The name “koala” comes from an aboriginal word “gula”; other aboriginal words associated with koalas mean “no water”, referring to the fact that koalas do not commonly drink water.

- Contrary to popular notions, koalas do not “get drunk” by eating eucalyptus.
- Males are called “bucks” and females “does”.
- Eating eucalyptus gives koalas a natural insect and parasite defense; their fur smells of eucalyptus oil.
- An adult male koala can produce a bellowing sound that can be heard almost a mile away.
- Unlike most mammals, who have 13 pairs of ribs, koala have only 11. This adaptation combined with a curved spine and a cartilaginous pad over the end of the spine make it more comfortable to sit on branches and in tree forks.
- Koalas have played an important part in aboriginal folk tales and art.
- So you want to eat eucalyptus leaves? Well, you aren’t koalified enough!

KOALA CONSERVATION TALKING POINTS

1. Status and Historical Population Figures

- IUCN status: least concern; the IUCN Red List recommends surveys and a management plan and lists koalas as one of the top 10 species in the world threatened by climate change.
- In 2012 the Australian government declared them “vulnerable”.
- In the 1800’s about 10 million koalas existed in Australia.
- Commercial hunting for fur decimated the population in the early 20th century; in one month alone in 1927 nearly 600,000 koalas were killed and their pelts sent to the U.S.
- As a result of this hunting, koalas became extinct in South Australia and their numbers were greatly reduced in other states.
- A public outcry and campaign resulted in granting them a protected status in the late 1930’s.
- Today the estimated population is somewhere between 43,000 – 80,000, with the greatest concentrations in Queensland and Victoria.
- In an attempt to protect the species, koalas were introduced to several offshore islands in the early 1900’s and in many cases that has lead to much inbreeding and over browsing of food sources.

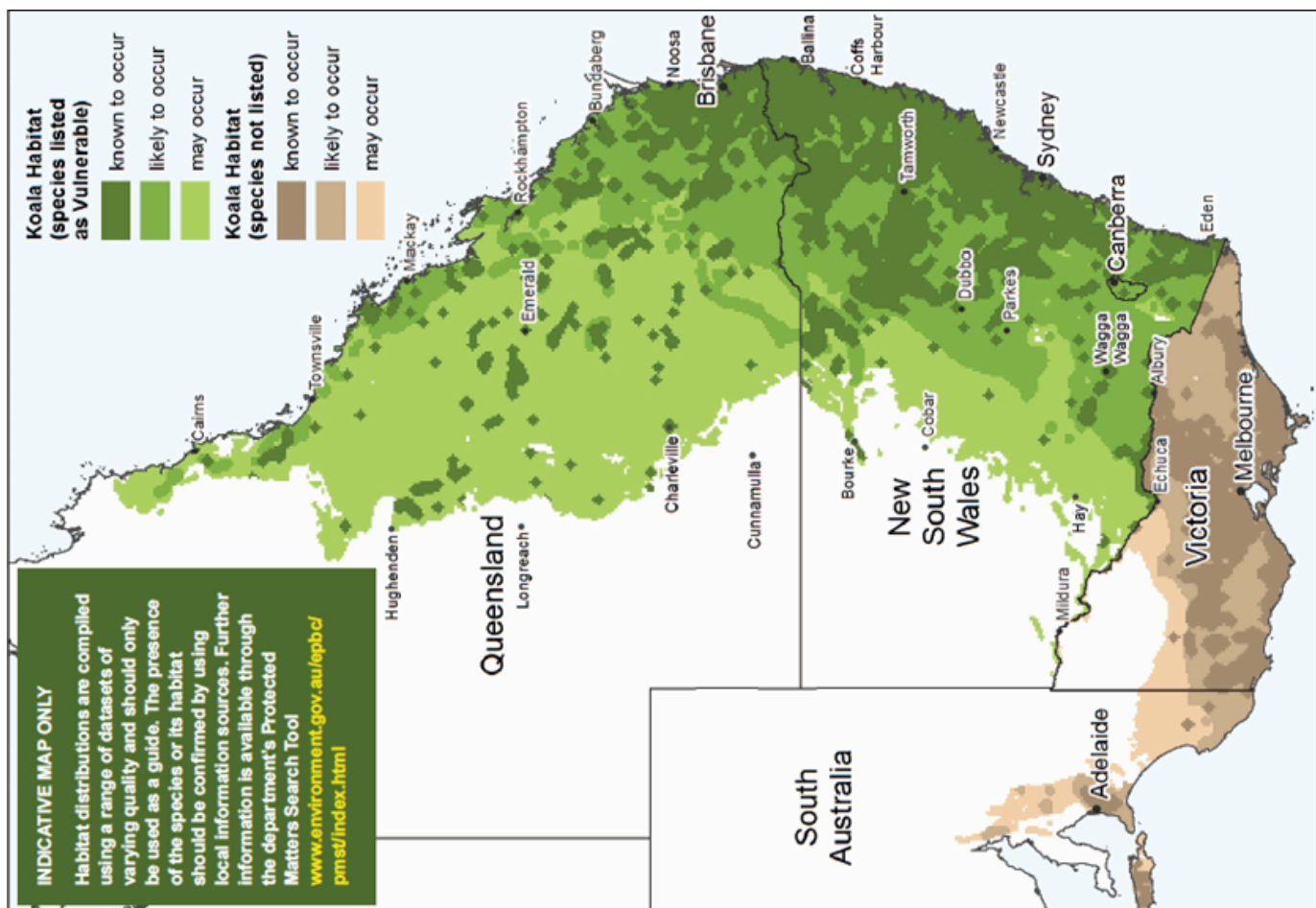
2. Threats to Koala Population and Habitat

- Habitat destruction, degradation and fragmentation are the greatest threats, including:
 - Destroying eucalyptus forest for urban and agricultural development
 - Building roads, railroads and power lines
 - Logging, timber thinning and destruction of undergrowth
- It is estimated that 44% of eucalyptus forests and woodlands have been cleared since Europeans settled Australia; much of the land cleared contained the favored trees.
- Bush fires have wiped out entire areas of habitat, resulting in stressed animals and/or localized extinctions and population fragmentation.
- Additional threats include predation by dogs and cats (introduced species), owls and eagles and other animals and injury or death from traffic, primarily when crossing roads to find new food sources.
- The depletion of the gene pool due to fragmentation of habitat has resulted in inbreeding in many areas.
- Climate change has resulted in changes in tree structure and chemistry, changes in the range of habitat species and caused more drought and wildfires.

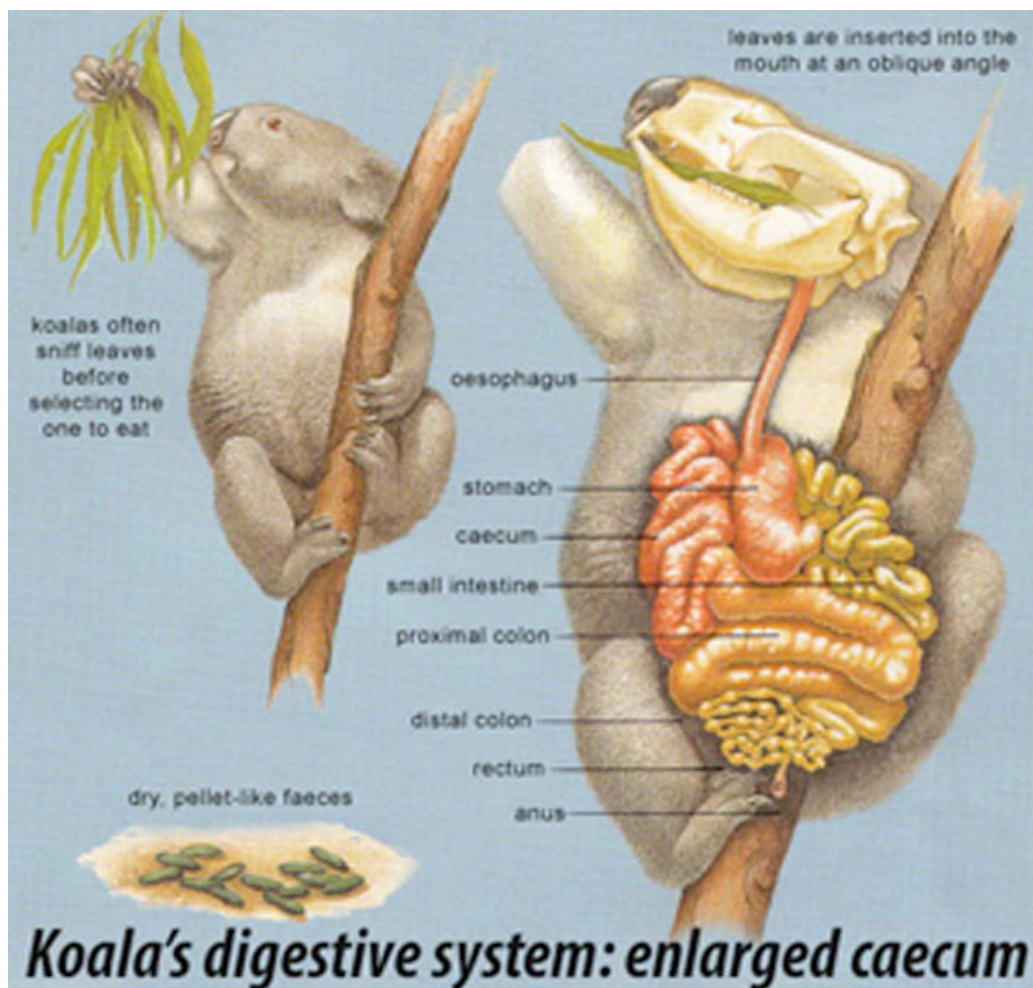
- An epidemic of chlamydia (a sexually transmitted disease) was found in 1985 and is thought to be the result of stresses to the koala caused by predation, scarcity of food and over-crowding. The disease causes blindness, sterility or death. A new and promising vaccine is currently being tested. Chlamydia is believed to be endemic to koalas, but only proves a threat to very stressed or ill animals.

3. Protecting the Koala Population

- The responsibility for protecting koala habitat falls to each Australian state and then to the local governments. While the koala as a species is protected, their habitat and food sources often are not.
- National parks offer protection, but often the preferred habitat lies outside the boundaries of parks and then often on private land.
- There is a campaign in New South Wales to establish a very large Great Koala National Park to protect koalas in their natural habitat.
- In some cases, particularly in offshore islands to which koala were introduced, food sources have been depleted and local governments have re-located numbers of koalas. Culling has also been used in some extreme cases.
- The future of the species depends on preserving existing and establishing suitable new, protected habitat. The koala is beloved in Australia and there is popular support for insuring its viability, but that support must overcome many obstacles.
- We can provide help by supporting organizations such as the Australian Koala Foundation, by learning about koalas and by sharing that information with others.

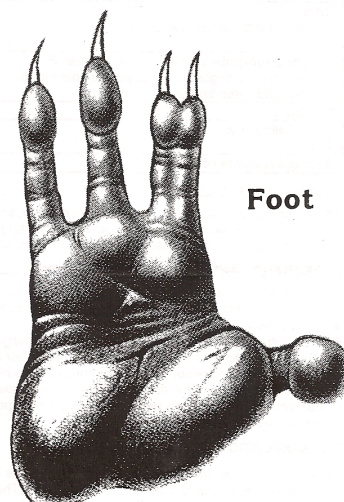








Hand



Foot