KOALA LAND

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KOALA RESEARCH
COLLABORATION PROJECT

MARK GERADA

COMMISSIONED BY AL MUCCI,
DREAMWORLD AUSTRALIA

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KOALA LAND
ACKNOWLEDGES
THE TRADITIONAL
YUGAMBEH LANGUAGE
PEOPLE OF THE GOLD
COAST, AND ELDERS
PAST & PRESENT.

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PHASCOLARCTOS CINEREUS

PHASCO - FROM THE GREEK 'PHAKOLOS' MEANING POUCH OR BAG

LARCT - FROM THE GREEK 'ARCTOS' MEANING BEAR, AND

CINEREUS - FROM THE LATIN, MEANING ASH-COLOURED

Only a few mammals have fingerprints – humans, primates and koalas. It is thought that fingerprints have evolved for grasping and the ability to feel things through the skin. Koala fingerprints are so similar to human fingerprints that even with an electron microscope, it is quite difficult to tell them apart. What is amazing is that koala prints seem to have evolved independently.
On the evolutionary tree of life, primates and the koala's marsupial ancestors, branched apart 70 million years ago. It is believed that koala finger prints developed more recently because most of its close relatives, like wombats and kangaroos, lack them.

KOALA LAND

The objective of this report is to explore ways of creating a sustainable future for koalas on the Koala Coast, South East Queensland, Australia. For the purpose of this report, the Koala Coast includes the local government areas of Moreton, Redland, Gold Coast, Sunshine Coast, Brisbane, Ipswich and Logan. As indicated by its name, this whole area once had the highest density koala population in all of Australia.

Despite the Federal Government's 2012 decision to classify Queensland's koalas as vulnerable and add them to the Threatened Species List, there remains a lot of work to be done to stabilise diminishing koala populations.

This report sets out achievable solutions for rebuilding koala populations based on information gathered from conversations with the people that have worked with koalas for decades. They are researchers, scientists, vets, carers, wildlife rescuers, zoo keepers amongst many others. This collection of knowledge provides a picture of what we have to start doing now to prevent koalas on the Koala Coast from becoming extinct.

It is clear that existing koala habitats must be maintained and protected and that these remaining fragments must be reconnected to create biodiverse environments where humans and koalas can co-exist. Koalas and the issues that affect their future cannot be addressed in isolation. It is therefore worth considering how the relationship between our lifestyles and the environment as a whole needs to adapt to allow this iconic species to survive.

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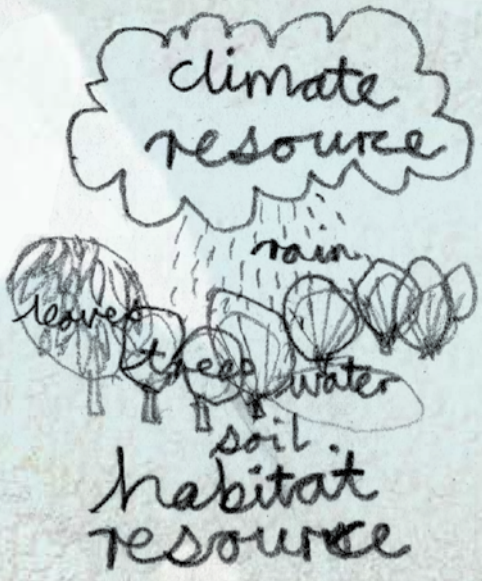
THE PERFECT WORLD



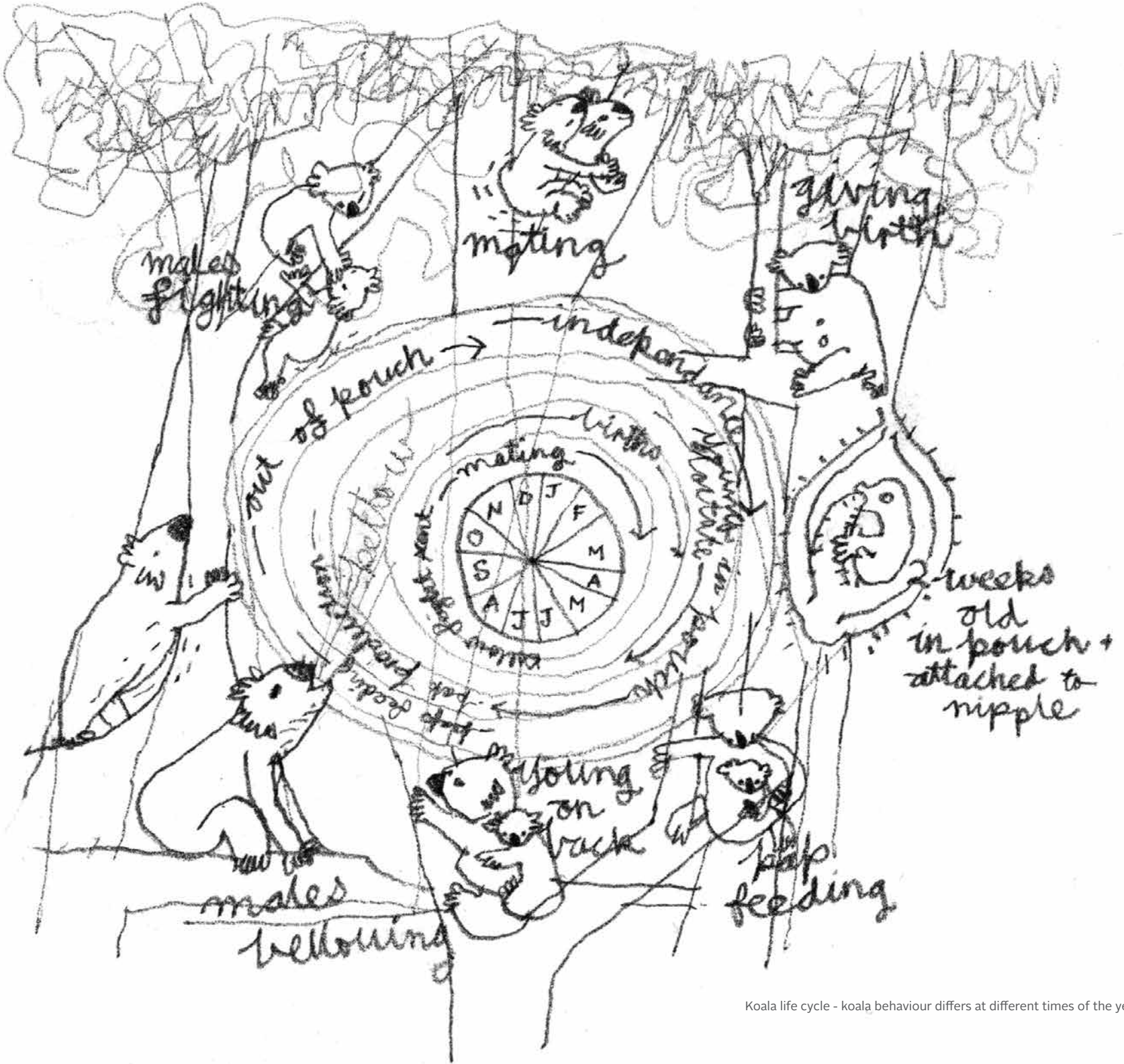
The koala prefers to inhabit low-lying flood plains and regions with volcanic soils. Both are very fertile zones that produce koala food trees and tend to be inhabited by a wide range of other species.

To assume that all koalas need are trees dramatically oversimplifies the koala's present situation and reinforces a common misconception that that the koala is an animal that does not do a lot. Koalas do not simply eat, sleep and breed. They are complex and they are particular.

Koala life follows a regular annual cycle. Males bellow and scent mark in the spring. They fight with each other in the lead up to the summer months which is when koalas mate and give birth. Into the autumn and winter months, young koala joeys develop in their mother's pouch. Later, the joeys travel on their mother's back and begin pap feeding.

The main source of food for koalas in South East Queensland is Eucalyptus tereticornis (Forest Red Gum or Queensland Blue Gum) and Eucalyptus robusta (Swamp Mahogany), which is usually found in swampy areas. Australia has more than 700 species of eucalyptus yet koalas can only eat approximately 25 species within this group. In any particular area, koalas might only eat a few food tree species, and the species koalas select in one area may be totally different from those that koalas select elsewhere.

Koalas need a full suite of leaves to make up a balanced diet. They prefer to eat the tips of fresh new growth where there is more nutrition and less cellulose and tannin. Dr Steve Johnston of the University of Queensland says that younger koala food trees are unpalatable for koalas. This means that koalas will not use young trees for food. Generally, for a koala to select a tree as food, it must be 7-10 years old with a minimum diameter of 10 centimeters at



Koala life cycle - koala behaviour differs at different times of the year.

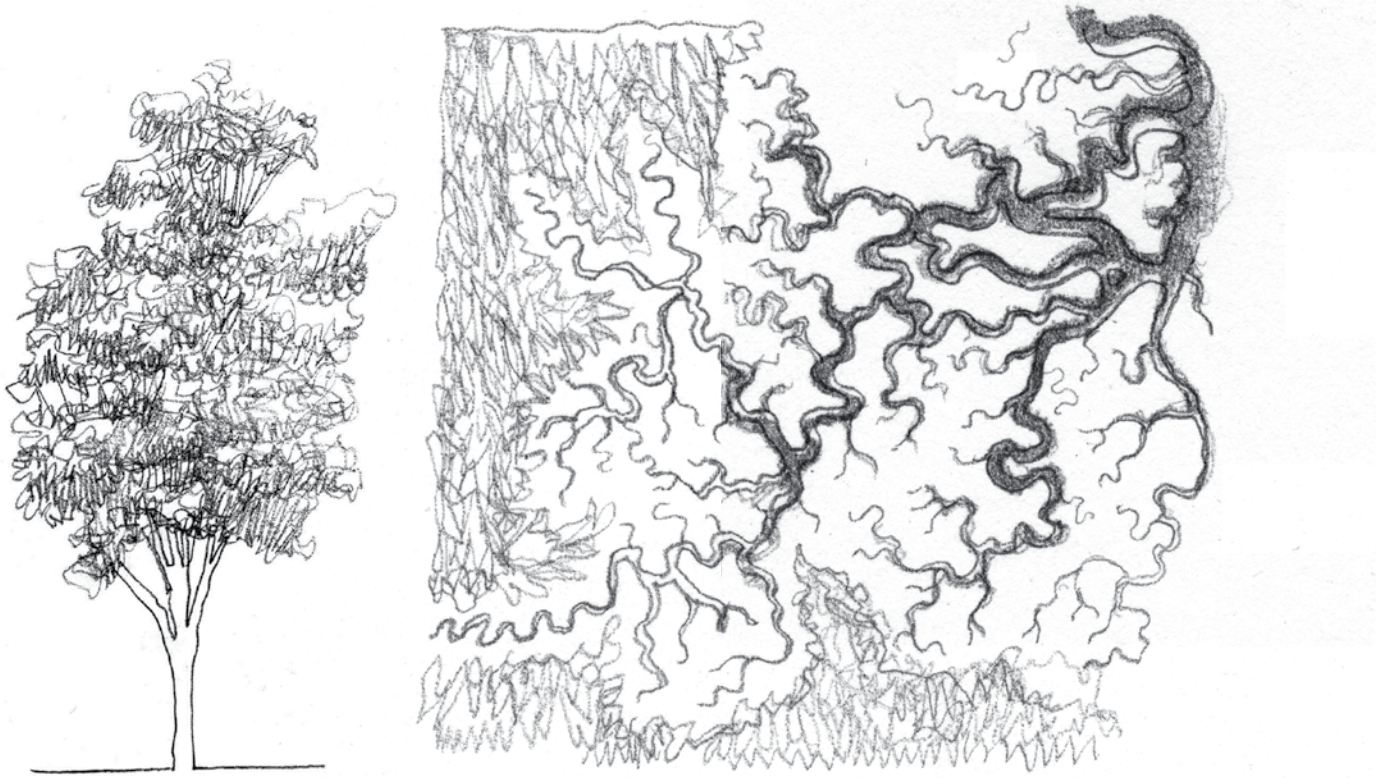
chest height. Koalas tend to favour trees that are 20 years old or more.

Extracting energy and nutrients from eucalyptus leaves is exceptionally difficult, which is why koalas have the largest digestive system of any tree-dwelling animal. When koalas appear sleepy, lazy and drunk, it is because they are putting maximum effort into digestion in order to gain just a little surplus energy. Koalas will eat for up to 3 hours a day and then sleep for 16 hours to digest their food. Koalas get enough water from their leaves, but in the hotter months when leaves are much dryer, koalas will come to the ground to drink water. In the hotter Queensland climate, koalas rest in order to dissipate heat via respiratory water loss. Koalas can also minimise heat stress by panting if necessary. Due to the low-energy concentration of their diet, koalas live on an energy knife edge – they are the living definition of energy conservation.

Koalas spend most of their time in trees, but move between trees frequently. They are capable of jumping between stronger branches of trees however this behaviour is very rare. They mostly move between trees by moving along the ground and their ability to do so is very important. Koalas tend to use between 1 and 9 trees a day, and they can spend time resting in non-food trees. The perfect koala bush habitat requires structural diversity and biodiversity especially in the hotter climates of South East Queensland. It is made up of a mix of food trees and non-food trees with an understorey of shrubs that provide shade in the heat of the day. Koalas do not have a mechanism for dispersing body heat and are at risk of fatally overheating in the summer months. During this period they will only eat in the cool of the evening and in the heat of the day in this period, koalas will come to the ground for shade and retreat into the thick understorey vegetation like acacia. In extremely difficult conditions, they have also been known to retreat into hollows and take cover underground. Although unusual, koalas have even been found in wombat holes during hot weather.

Koala society is complex. Just like humans, they need a sense of place and they need to know that they are safe. They also need to know that other koalas are around. Koala social networks are made up of systems of home ranges which dictate social behaviour. A home range is the area where a koala spends all its time and includes all the resources the koala requires to survive and reproduce. In healthy koala habitats, koalas do not have to compete for resources so competition for food trees and other resources influences how koalas are distributed across a landscape.

A koala's home range represents the perfect balance in that it contains the minimum that a koala requires in order to survive. There can be some overlapping of home ranges as koalas do interact, during the mating season. Koala young are called joeys and typically spend the



River flats and volcanic soils provide ideal habitat for koalas.

first 22–24 months with their mothers. After this period, the joeys become independent and leave the mother's home range to ensure that inbreeding does not occur. Offspring take their genes out of their parents' home range. Some joeys have been tracked as far away as 60 kilometres from their mothers.

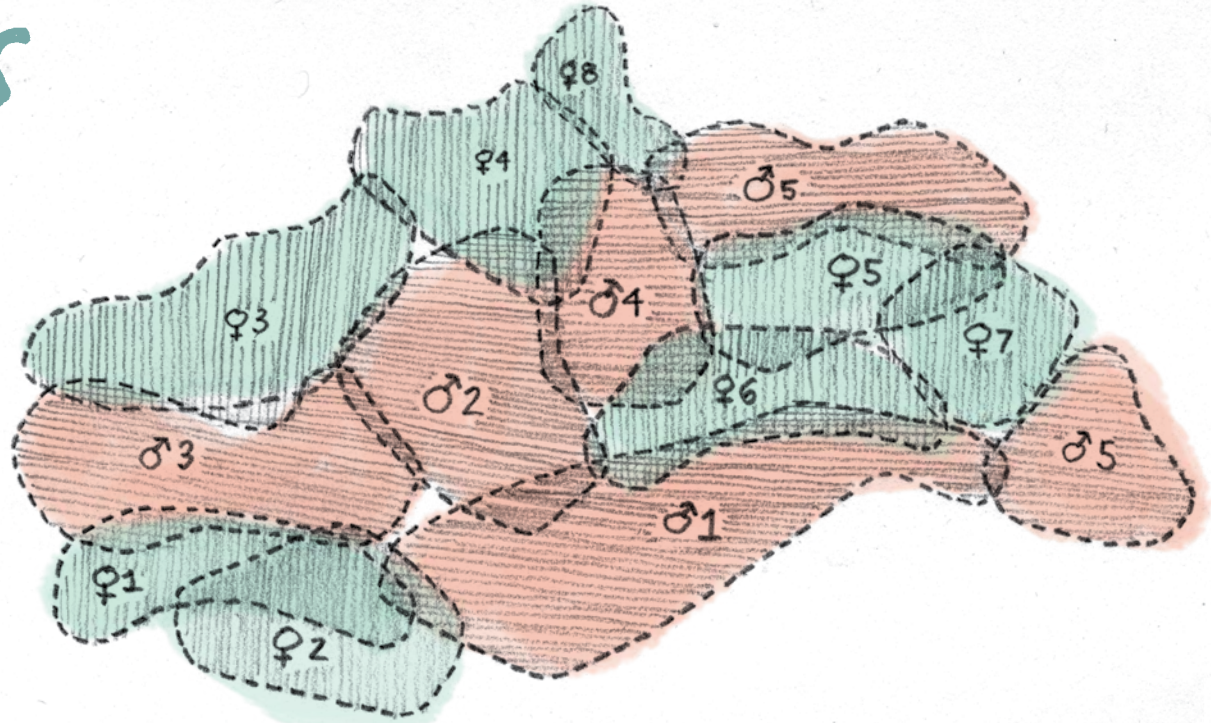
Koalas have a relatively low reproduction rate. Usually they will have offspring every two years but if there is a drought, rates of reproduction will be much lower. Cooler, wetter times result in more tree growth and provide koala populations with more resources in the form of fresh leaves. In these periods koala popuations will give birth to more joeys.

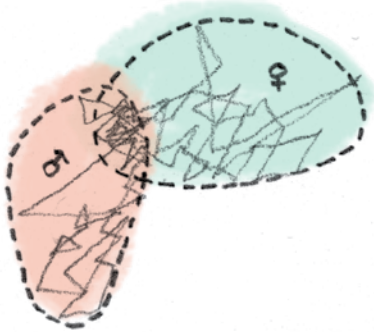
The complex social structure of koala communities requires the koala to have incredibly well developed navigation abilities. Koalas navigate using established pathways as they move around from tree to tree. They also have a finely tuned sense of smell and hearing. A sniff allows them to read what is present in their local surroundings and they can locate sounds from a source hundreds of metres or even kilometres away.

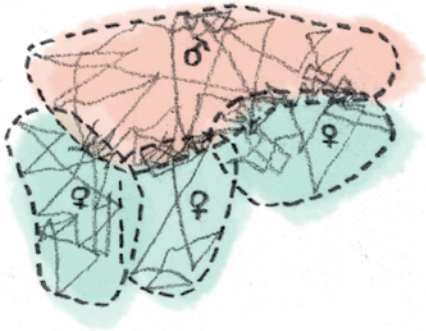
Koalas like a stable environment in the form of large undisturbed tracts of bushland that contain their food trees.

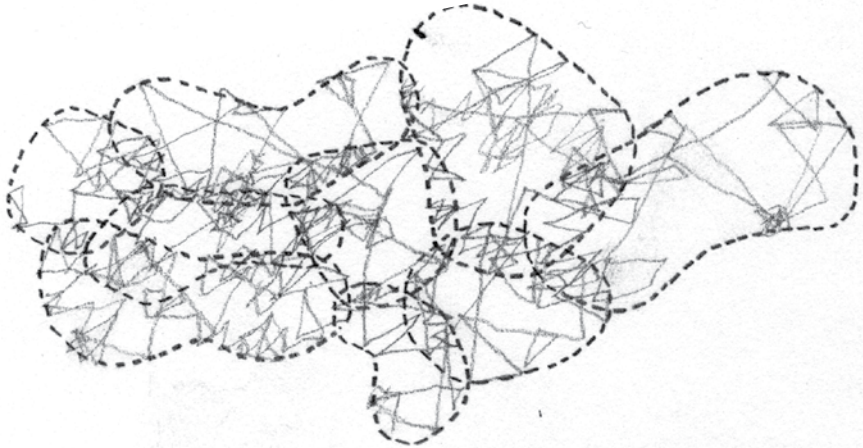
To get from tree to tree, koalas move along the ground.

Koala social networks are made up of a series of homeranges



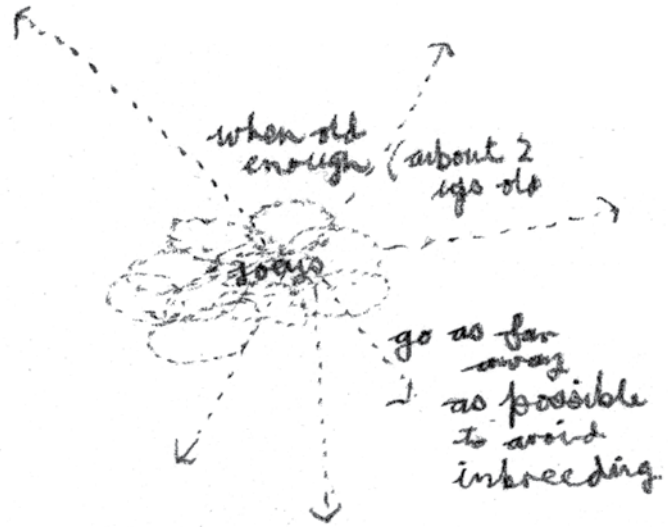


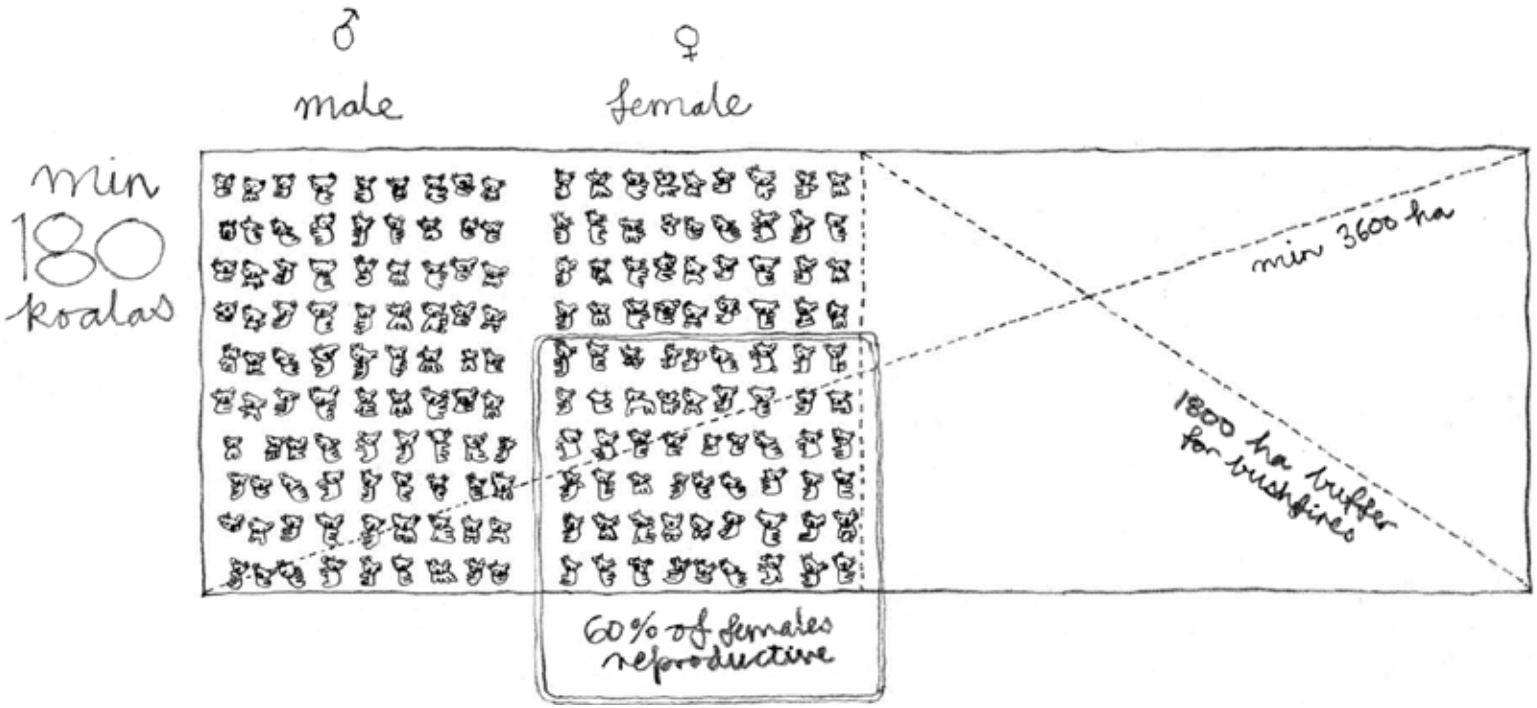




Dr Stephen Phillips, an ecologist and a consultant at Biolink, believes that in the Koala Coast region a stable and healthy koala population should be made up of a minimum of 180 koalas and require a minimum area of 3600 hectares. Of this area only about half will be inhabited at any one time. For the population to thrive and grow, about half of the population needs to be female and 60% of the females need to be reproducing in any year. As a koala population expands, the area required by this population increases proportionally.

Dr Frank Carrick from the University of Queensland adds that koala population figures will differ from region to region depending on the availability of resources.

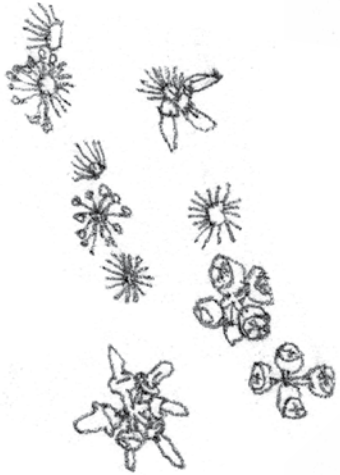


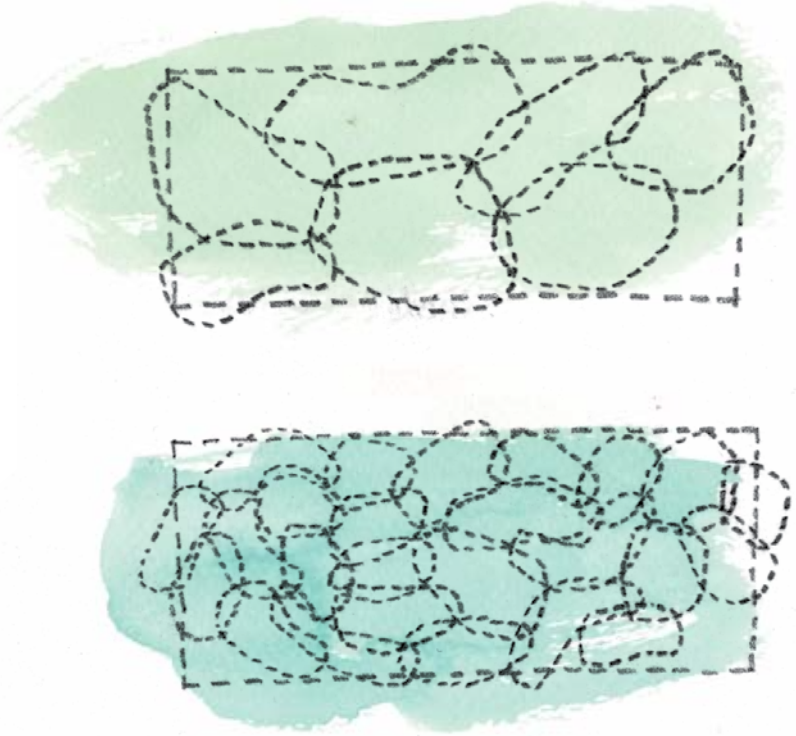


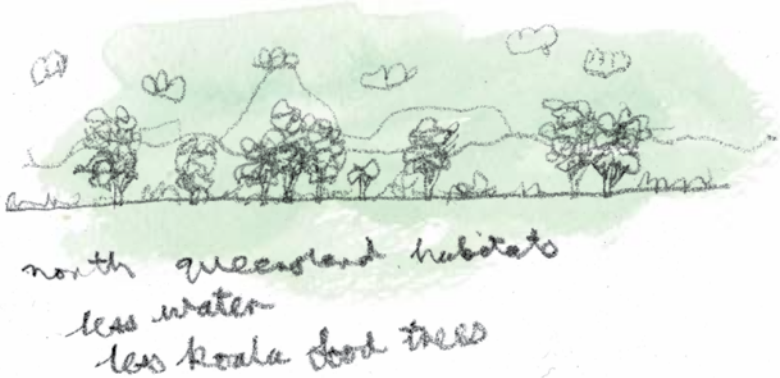
A healthy koala population. *Dr Stephen Phillips*

For example, further north in central Queensland where there is less water and fewer koala food trees, there might be only one koala for every 250 hectares, so an area of 3600 hectares further north would only be able to support about 7 koalas. On the Koala Coast where there is more water and koala food trees, Carrick suggests there could be up to 1440 koalas in a 3600 hectare (0.2 – 0.4 koalas per hectare). Carrick says that the maximum number of koalas a 3600 hectare area very high in resources could be home to is 9000 koalas (2.5 koalas per hectare).

THE MORE RESOURCES THERE ARE FOR KOALAS, THE MORE KOALAS THERE WILL BE







The distribution of koalas across a landscape depends on the availability of resources. *Dr Frank Carrick*

A NATIONAL ICON

AUSTRALIA IS THE ONLY PLACE IN THE WORLD WHERE KOALAS EXIST NATURALLY.

Koalas are a species for special consideration as they are both unique and iconic. Al Mucci of Dreamworld Gold Coast Australia argues that after the panda, the koala is the second most recognised animal in the world.

Mucci observes that koalas make people happy. People come to Australia specifically to see koalas and as such, koala populations significantly contribute to Australia's tourism revenue. To people overseas, the presence of iconic species like the kangaroo and koala is central to the Australian identity. Tourists love the cute and cuddly which is why koalas have been a significant tourist attraction for Australia for more than 50 years. As estimated by in the 1997 report Koalas and Tourism: An Economic Evaluation, Tor Hundloe and Clive Hamilton estimate that Koalas bring in more than a billion dollars per annum to the Australian economy.

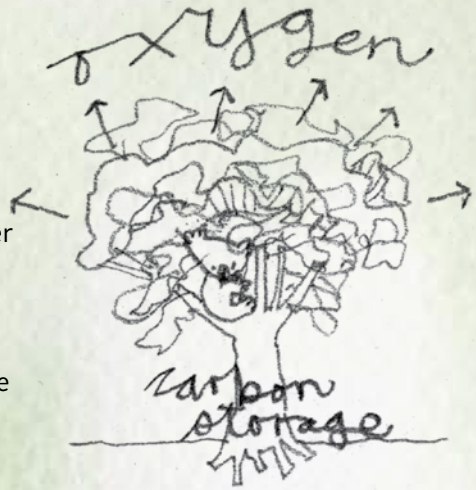
Koalas are an integral part of our ecosystem and a significant biodiversity asset.

The Queensland koala population of the Koala Coast is particularly unique because it is one of the longest known ongoing populations.

These populations have not been manipulated by modern humans, making the pockets of koala habitat that do remain some of the only areas where koalas exist in their natural physical environment.

The health of koala populations intimately depends on the health of their surrounds.

Koalas are inseparable from their habitats and their habitats perform critical ecological services for the wider environment such as oxygen cycling and carbon storage. We can learn so much from koalas and apply this knowledge to understandings of other species, including ourselves.



KOALAS ARE SYMBOLIC OF THE HEALTH OF THE GREATER ENVIRONMENT, OF OUR ECOLOGICAL RELATIONSHIPS AND OUR EXISTENCE AS A SPECIES.

WHAT'S HAPPENING TO KOALAS?

KOALAS ARE PERFECTLY EVOLVED TO LIFE IN THE ONCE UNDISTURBED FORESTS OF THE KOALA COAST. BUT THROUGH THE PROCESS OF MODIFYING THESE ENVIRONMENTS TO REFLECT OUR OWN HUMAN DESIRES, WE HAVE IRREVERSIBLY DESTROYED THE KOALAS' ABILITY TO SURVIVE.

Here's what we've done . . .

In a little over 200 years, the national koala population has dropped from around 10,000,000 koalas to less than 80,000. Some scientists estimate current populations to be as little as 40,000 koalas nationally. The majority of this population reduction has occurred in the last 100 years.

The most concentrated period of koala population reduction was between 1919 and 1937, when koalas were hunted for their fur. In 1924 alone, 2 million koalas were killed Australia wide. In August 1927, 800,000 were killed in a Queensland shooting season. In 1927 the world began to worry that koalas might dissappear forever. In the United States President Roosevelt reacted by making it illegal to own koala fur. By 1937 in response to widespread public outrage, the Australian governement banned the slaughtering of koalas and declared them a protected species in all states. This is arguably Australia's first wide-scale environmental rally.

Today, the central issue for the survival of the koala is competition for land. Koalas and human populations are in direct competition for highly desirable coastal land. The majority of Australian humans and koalas prefer to live in the same places – along the fertile east coast of Australia. However koalas, with their specific habitat and dietry requirements, are left with far fewer options for moving to alternative areas. Koalas need to live in these places. We want to live in these places.

80%
OF KOALA
HABITAT HAS
BEEN CLEARED FOR
AGRICULTURE & URBAN
DEVELOPMENT

AND
80% OF
KOALAS
LIVE ON
PRIVATE
LAND

There are currently few regulations or incentives to monitor koala habitats. Today, the Australian Koala foundation says,

80% of koala habitat has been cleared for agriculture and urban development. And 80% of koalas live on private land.

THIS MEANS THAT 80% OF THE REMAINING KOALA POPULATION IS AT RISK.

If the more optimistic national koala population estimates of 80,000 koalas are correct, then 16,000 koalas are safe and living in protected areas. If the more pessimistic predictions of 40,000 koalas are correct, then only 8000 koalas are safe Australia wide.

Although Queensland has vegetation management legislation that aims to prevent broad scale clearing of koala habitat, much of South East Queensland is subject to clearing for residential purposes.

The Department of Environment and Resource Management's Koala Coast Koala Population Report 2010 covered the mainland portion of Redland City, the eastern portion of Logan City and the south-eastern portion of Brisbane City. It states that through koala monitoring carried out between 1996 and 1999, the "koala population was estimated at approximately 6000 animals". A re-survey of the same region between 2005 and 2006 "indicated that the population had declined by 26 per cent to approximately 4600 animals. In 2008, another round of comprehensive surveys revealed that the population had undergone a steep decline to about 2300 animals, more than 50 per cent population loss in less than three years." (By 2010, there were only 2000 koalas in the Redlands area, a 65 per cent decline since 1999.) In 2009 the Department of Environment and Resource Management considered the koala population to be approaching functional extinction, meaning that there would be so few koalas remaining, they would never be able to repopulate and extinction is unavoidable. Despite the various stakeholders debating the actual numbers, one thing remains indisputable – the koalas of the Koala Coast are in big trouble.

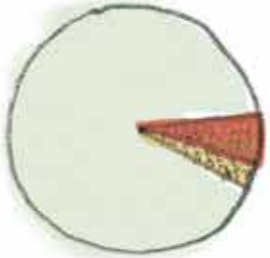
The Population by Age and Sex, Regions of Australia, 2010 (3235.0) survey shows that although this population growth has eased a little recently, the Australian Bureau of Statistics Regional Population Growth, Australia, 2010-11 (3218.0) report revealed that between June

Between 2005 and 2010, as many as 1400 people were moving to the region every week, making it one of the fastest growing human populations in Australia's history.

1788

10 MILLION KOALAS

2012



80% OF KOALA HABITAT HAS BEEN CLEARED

OF THE REMAINING 20%

IF THERE ARE AS MANY AS 80,000 KOALAS

IF THERE ARE ONLY 40,000 KOALAS

16%
PRIVATELY OWNED LAND

64,000 KOALAS ARE AT RISK

32,000 KOALAS ARE AT RISK

4%
GOVERNMENT OWNED LAND

ONLY 16,000 KOALAS ARE SAFE

ONLY 8,000 KOALAS ARE SAFE

2010 and June 2011, South East Queenland's human population was still rising by almost 1000 people every week, which accounted for 69% of the total population growth of Queensland. As a result, South East Queensland also has the fastest growing urban footprint in Australian history. This urban growth is the single biggest contributor to the dramatic drop in koala numbers in the region over the last decade. Queensland is rapidly clearing and building upon the rich and fertile lands that are critical to the koala's survival.

THESE LAND USE DECISIONS ARE UNSUSTAINABLE & CONTINUE TO HAVE LONG TERM EFFECTS ON THE HEALTH OF OUR FLORA & FAUNA AND, BY EXTENSION, SIGNIFICANTLY COMPRIMISE OUR OWN HEALTH.

It is with sad irony that koalas remain the emblem and identity for local governments like Redland City Council at a time when every koala population on the Koala Coast is in decline. As Dr Darryl Jones from Griffith University points out, koalas are a big part of why people choose to live and holiday in Queensland. Yet koalas are simply not coping with Queensland's rapid urbanisation. The ongoing prioritisation of land use for people, rather than for the preservation of existing ecologies, is at the heart of why the koalas are disappearing. This is of critical concern from an ecological point of view and short sighted from an economic point of view. Dreamwold's Al Mucci argues that if we do not rethink the way we use land, the unprecedented and terrifying expansion of Queensland's urban footprint could result in koalas becoming extinct in the zone east of the Koala Coast's M1 Motorway within 5 years. Some scientists predict that this could take place in as little as 2 years.

The Koala Coast was some of the best high density koala population in all of Australia where for over 50 years, koalas have been a significant tourist attraction. The extinction of koalas in this areas would be a tragic loss for the Queensland economy. Iconic places like Burleigh Heads tourist resort would have no koalas. Despite its emblem, Redland City Council would have no koalas.

The Koala Coast would be Koala-less.

We have cleared and built on almost all the river flats and volcanic soil laden areas that can support the koala food trees. Despite the koala species evolving over 16 million years, we have transformed the koala's world into a human landscape in just a few short decades. Koalas are unable to adapt to the changes we have made to the landscape in such a short time period.

THE FOLLOWING IS A MORE DETAILED SNAPSHOT OF WHAT IS HAPPENING TO OUR KOALAS;

WE'RE CUTTING THE TREES DOWN

01. Loss of habitat

We're cutting the trees down.

Trees. Koalas cannot live without them, but many humans cannot live with them.

The obvious effect of widespread urbanisation is the clearing of bushland and koala habitat. If koalas do survive the bulldozers, they have lost the trees that were their homes and become stressed. Loss of habitat reduces the availability and quality of the resources that koalas need to survive and results in what is known as resource clumping, which is where koala distribution becomes more intensified as survivers move to the remaining patches of habitat.

Koala habitat is removed every day and little thought is given to how this bushland is removed. When bushland is bulldozed, every single tree is uprooted and all the understorey vegetation is flattened. This is the technique that is currently employed for land clearing in new urban developments, which not only kills most of the koalas, but also other native resident fauna. The small number of koalas that do survive usually manage to retreat and move into patches of nearby bushland. Their retreat increases the density of populations confined to these reduced areas and causes additional problems as individuals compete for resources and territory. A small number typically attempt to move back into a treeless environment with little success.

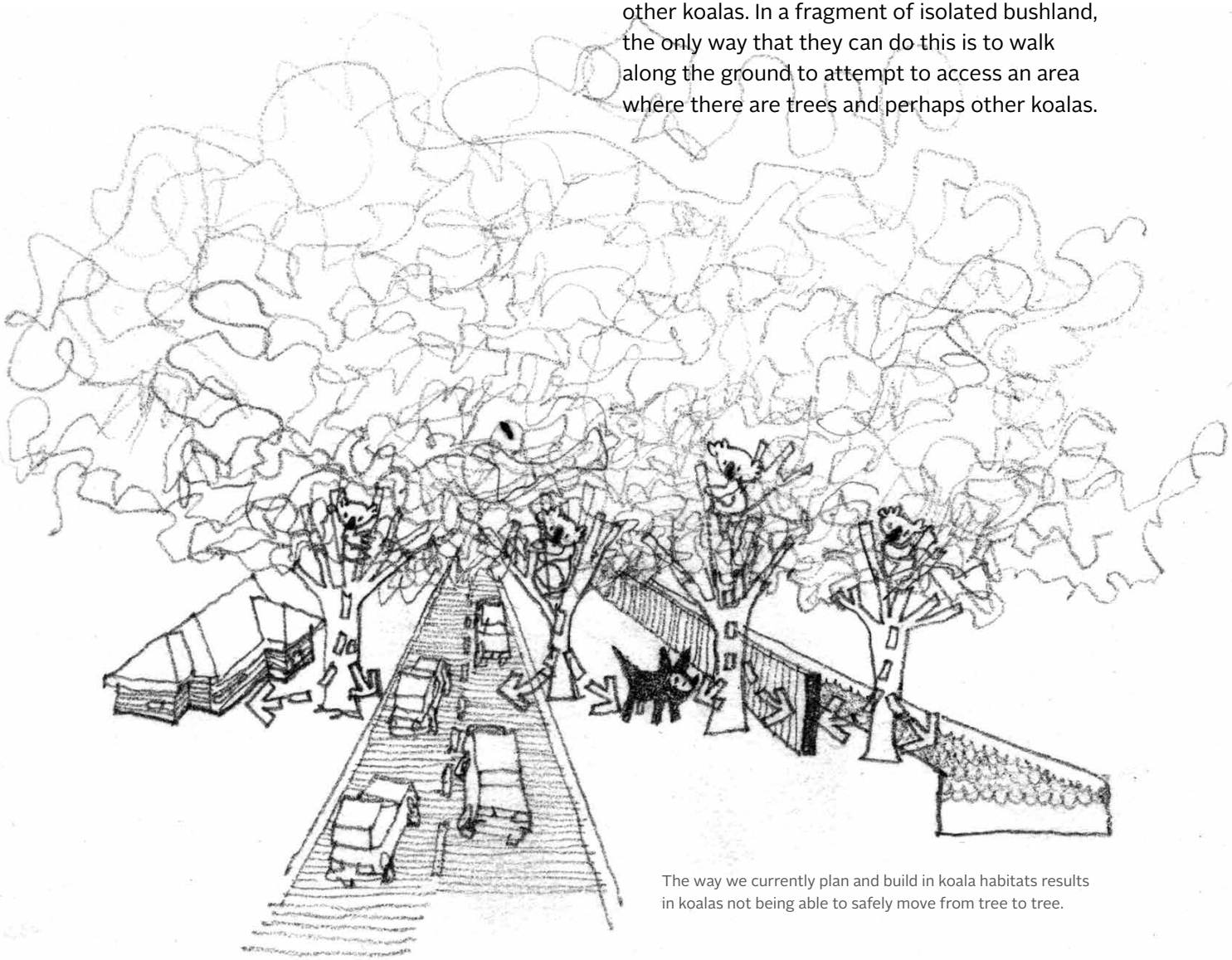
Before clearing the land, developers hire spotters and catchers to remove and translocate koalas before the land is bulldozed in an attempt to conserve the species. However, the captured koalas are usually translocated too close to where they were removed from and will attempt to move back to their home range. This approach referred to as a soft cull as these translocated koalas usually die from the stress of the translocation or their journey back to the cleared land. Some koalas have a small chance of surviving in fringe zones at the edges of less dense urban developments. However within a decade, these koala populations typically also die off as they are cut off from adequate areas of forest and other koala populations.

IF
YOU WERE
TO IMAGINE THAT
THE 160,000,000 YEARS
IT HAS TAKEN FOR THE
KOALA TO EVOLVE WERE
CONDENSED INTO ONE DAY,
THEN CONSIDER THAT WE
HAVE WIPED OUT 99.5%
OF THE TOTAL KOALA
POPULATION IN
ONE SECOND

There is no point in protecting koalas if we do not also protect their habitats.

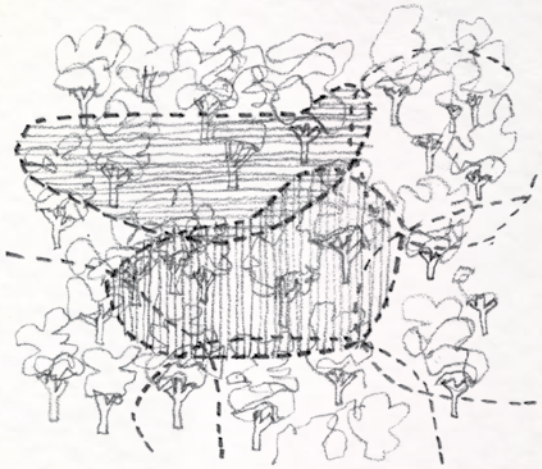
02. Fragmentation of Habitat

The biodiversity of a locality is mostly contained within bushland and reserves. As these areas are broken up, separated and fragmented, animals such as the koala retreat to remaining bushland and become more confined. Koalas need food trees but they also need to be in contact with other koalas. In a fragment of isolated bushland, the only way that they can do this is to walk along the ground to attempt to access an area where there are trees and perhaps other koalas.



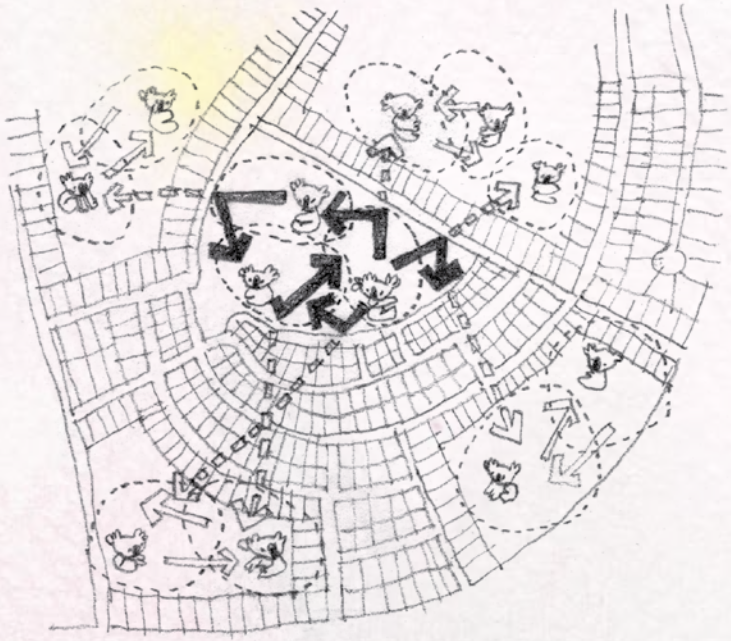
The way we currently plan and build in koala habitats results in koalas not being able to safely move from tree to tree.

WE HAVE NOT PROVIDED ADEQUATE OPPORTUNITY FOR THE KOALA TO RESPOND & EVOLVE.



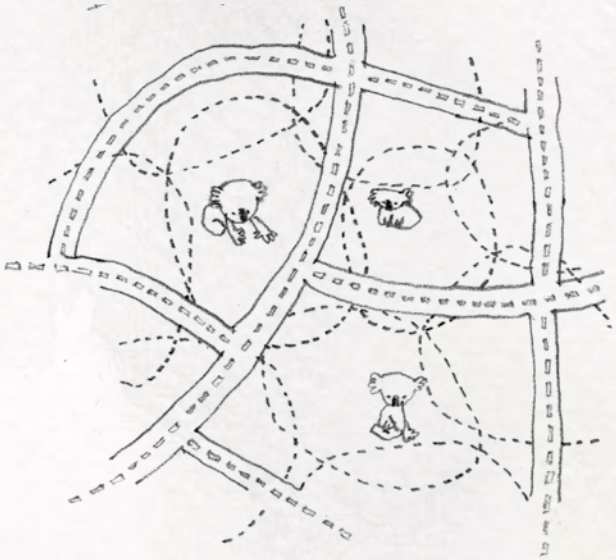
Koala homeranges.

Fragmentation of koala habitat.



Disconnected koala habitats results in inbreeding.

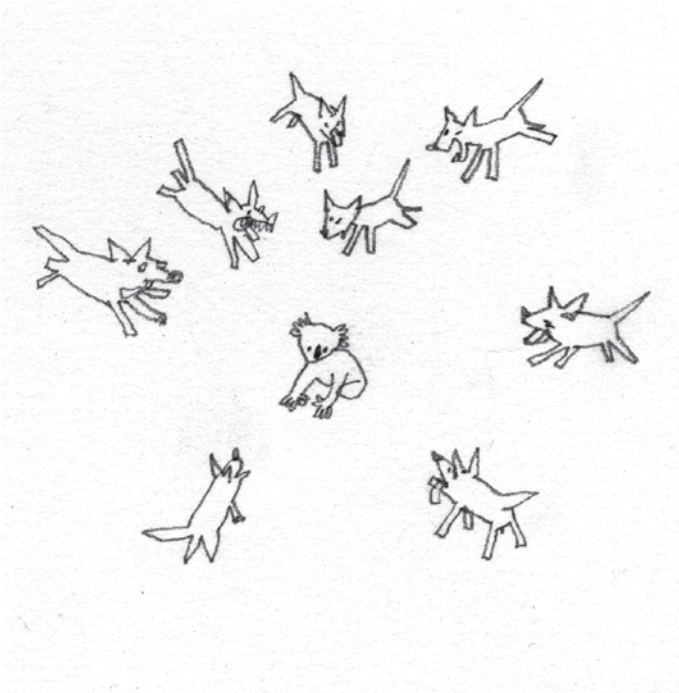
Koalas need to interact.



Poorly planned urban areas disconnect koalas from each other.

However, the urban environment is full of barriers that prevent koalas from easily moving along the ground. Presently, the remaining koalas on the Koala Coast are living in isolated and disconnected islands of habitat.

Fragmented koala populations not only become stressed, but also suffer from genetic issues. In a small fragment of bushland when it is time for a joey to leave its mother, the joey is unable to move away from the mother's home range and from its family gene pool. The koalas become genetically restricted in this way because they are cut off and cannot breed with koalas in other areas. Inbred koalas develop deformities, become more prone to disease and stop reproducing.

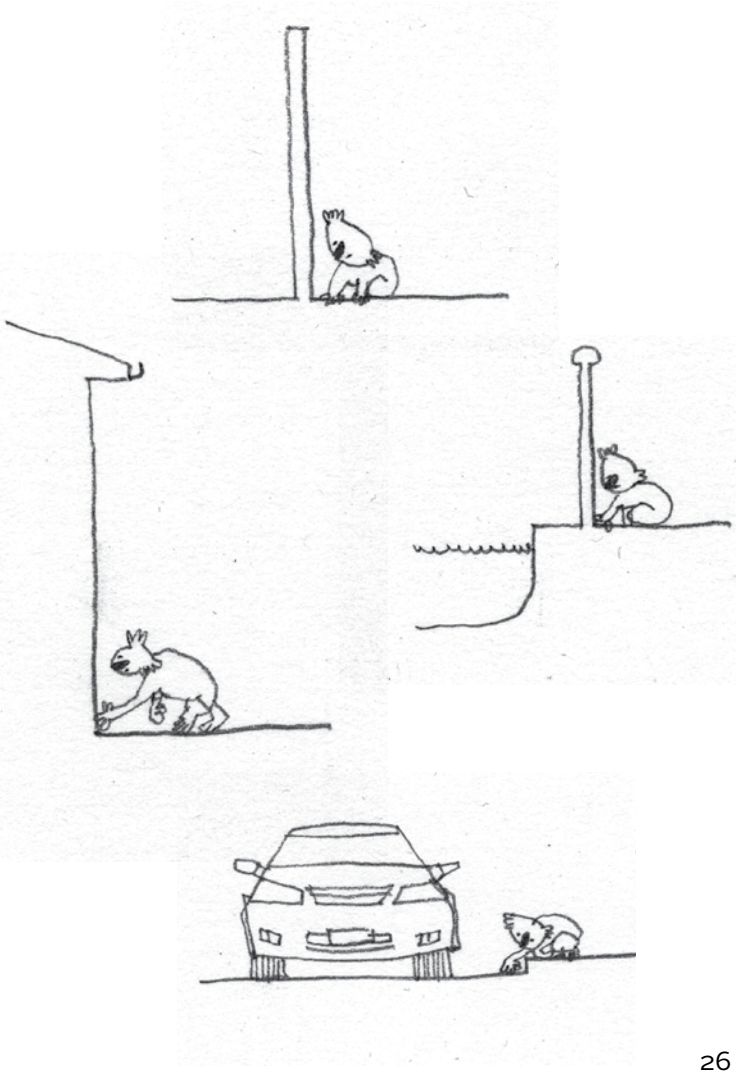


03. Cars and Dogs

The koala living in the urban or semiurban environment has not developed the ability to recognise threats like cars and dogs. Cars and dogs are the biggest killers of koalas in the short term particularly as a fragmented habitat forces koalas to move around on the ground. Roads are also a major threat as they create barriers and separate koala habitat. If a road is in the path of a traveling koala, the koala will cross it, despite the obvious dangers. Collisions with cars have devestating consequences for koalas and according to Wildcare Australia, kill about 300 koalas per year in the Koala Coast alone. The Australian Koala Foundation estimates that about 4000 koalas are killed each year by cars or dogs Australia wide.

According to Dr Steve Johnston of the University of Queensland, between 1997 and 2007, 6500 koalas were euthanised in koala hospitals due to collisions with cars and dogs. 2011 saw 832 koalas admitted to the Australia Zoo Wildlife Hospital. Kelsey Mostyn of Australia Zoo reported that in December 2011 alone, 87 koalas were admitted to Australia Zoo, 32 of which died from their injuries and 28 of which were euthanised.

Cheyne Flannagan of the Koala Hospital in Port Macquarie New South Wales observes, "Without a doubt, the number one killer of koalas in my area are Staffordshire Bull Terriers – a great family dog but a woeful animal when it comes to wild life. Staffordshire Terriers go for everything out of their sense of loyalty and protection of their family pack. Second on the list is Blue Heelers, followed by Alsatians. After that it can be anything - even little Fox Terriers can do harm. We try to encourage potential dog owners to purchase dogs who are less likely to attack koalas such as Labradors and Cocker Spaniels." Cheyne adds that predative wild dogs like dingoes and foxes are also responsible for koala deaths and injuries and that domestic cats and feral cats can injure small koalas.



04. Fences

Fences are a huge threat to koalas as they stop their necessary free movement along the ground. Fences might not directly injure and kill koalas but they can direct koalas into dangerous situations and bring them into contact with cars and dogs. Koalas can also become trapped within fence boundaries, and this is especially the case with pool fences.

05. Stress and Disease

Koalas are also threatened by diseases like Chlamydia. Chlamydia in koalas causes chronic infections in the urogenital and respiratory tracts. The disease causes pneumonia, infertility, blindness and ultimately death. The visible symptoms are conjunctivitis, known as "pink eye", and urinary tract infections which cause incontinence, leading to a condition known as "dirty tail" or "wet bottom".

Up to 70% of koalas in the wild have been living with Chlamydia for quite some time. However the symptoms of the disease only manifest when koalas become stressed and their immune systems compromised. Their immune systems become unable to fight the Chlamydia bacterium, which then becomes dangerous and fatal. Koalas become stressed due to habitat loss, habitat fragmentation, dogs, road trauma and bush fires. It is thought that Chlamydia has always been present within koala populations, but with increased urbanisation and insufficient koala planning, koalas are increasingly showing obvious signs of clinical Chlamydia. Koalas are especially prone to the dangers of Chlamydia when their home ranges are isolated due to fragmentation of habitat – females stop breeding and reproducing and colonies die off.

When koalas are monitored by scientists they are captured briefly and given a health check for Chlamydia and other health issues like urinary tract infections, cystitis, malignancies, bone marrow cancers, metabolic bone diseases and Koala Retrovirus. Almost all koalas on the Koala Coast possess retrovirus. Leaving koalas more susceptible to infectious disease and cancers, it changes the genetic code of koalas by integrating into the germline, thereby changing the genetic material passed from parents to offspring. There is still a lot to understand about Koala Retrovirus – it is testable, but the results are still not 100% fool proof. To add to these complexities, Dr Geoff Pye, a Senior Veterinarian at San Diego Zoo, says there is also a recently discovered Koala Retrovirus B which is a secondary strain of the virus.

Another issue that could effect koala health are tree diseases like Myrtle Rust, a recently arrived fungus that affects many Australian natives including some koala food trees. It is still too early to say what effect this will have on koalas, but given that Myrtle Rust can cause leaves to die as a result of infection, this is likely to affect the availability of koala food.

Researchers have speculated on how koalas have survived despite all of these health issues. As Dr Frank Carrick of University of Queensland says, "The mystery is almost all koalas have Chlamydia, and almost all koalas have Retrovirus, but not all of these koalas are sick or show signs of infection.", The scientific community is becoming more confident that healthy koala populations are able to protect themselves from the symptoms of such viruses and bacterium. This raises the question, do koalas have natural immunities and antibodies?

What is certain is that the dramatic changes in land use along the Koala Coast has been catastrophic for koala populations. Surviving koalas are increasingly stressed and suseptible to the symptoms of theatening diseases. In order to maintain healthy koala popuations, it is critical that we rethink the way we manage land in and near koala habitats.

06. Climate Change

Climate change is occuring and it is changing the Australian landscape. Droughts are becoming more frequent and more extreme. The pace of change is alarming.

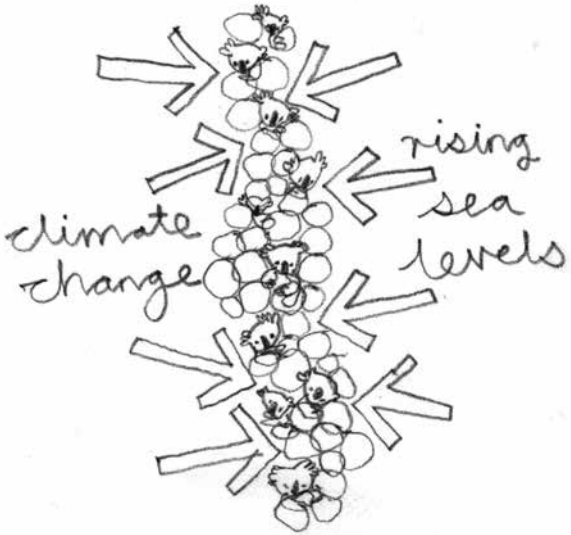
Unlike most other mammals, koalas do not have a physiological mechanism for dispersing body heat. This makes them particularly susceptible to increased atmospheric temperatures which can cause fatal heat stress. Heat can kill koalas quickly. In the summer of 2009, the Gunnedah district lost 25 per cent of its koala population during a 15 day heat wave.

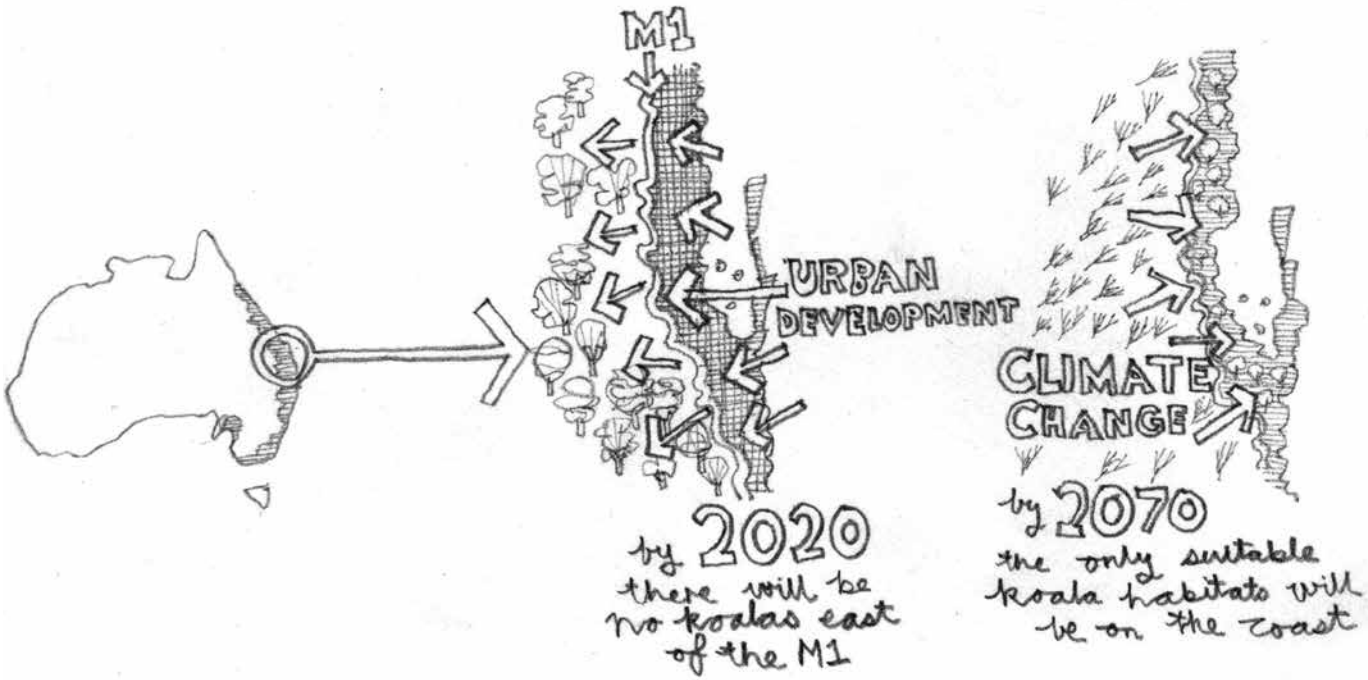
The relationship between precipitation and soil is vital to koala survival across all habitat areas. Drought causes environmental stress for koalas because dryer soils reduce the quality of koala food, minimising the number of trees koalas can eat from. In hotter dryer times, koala distribution across a landscape changes. In response to less available resources, koalas spread out and in severe doughts have been observed to disappear altogether. During times of drought the few surviving koalas become very important because as they enable populations to recover when the drought breaks.

Dryer climates tend to reduce tree heights, which can be problematic because koalas prefer to inhabit taller trees. Drought also reduces the moisture in leaves and results in less new growth and less fresh tips which are the leaves that koalas prefer to eat. Droughts cause tree die back, a phenomenon which has the flow on effect of lowering koala reproduction rates. This hinders a koala population's capacity for survival.

Different trees can respond to drought differently. Eucalyptus tereticornis, the koala's main food source, tend to die back early on in a drought because these trees have little capacity to deal with dry conditions. Another major food tree for the koala is the Ecalyptus robusta (Swamp Mahogany) which tend to grow in wetland areas. If the wetland areas dry up, these trees will also die, forcing the koalas in these regions to move to another location. If these koalas are unable to move they will ultimately die of starvation.

Both urbanisation and habitat fragmentation have resulted in less trees and a dramatic reduction in understory vegetation in our contemporary landscapes. These ecological changes exacerbate the effects of droughts for koalas because there is less shading and cooling available.





As the climate gets warmer and dryer, koala numbers are also affected by a reduction in koala reproduction rates. Dr Sean Fitzgibbon from the University of Queensland says that scientists are unsure if this is due to koalas mating less in times of drought or whether after conception, they then lose their joeys. It has also been found that it is more difficult for joeys to leave their mother's home range in times of drought.

Droughts can be patchy and might only affect certain places within a landscape, forming what is known as a mosaic. Some koalas might survive in the mosaic because small areas of water retention exist in landscapes. These retention zones that remain throughout drought affected areas are vital for the survival of koala populations.

Dr Christine Adams-Hoskin, Dr Clive McAlpine and Jonathan Rhodes have been undertaking climatic modeling of the Koala Coast area. These scientists use climate models to predict rainfall and temperature and are attempting to map suitable climatic zones for koala populations in the future. Alarmingly, their models predict that by 2070 only a very thin strip along the coast will be suitable as koala habitat. Yet, the majority of these zones are highly urbanised areas making it critical that the few remaining patches of coastal koala habitat are protected.

07. Bushfires

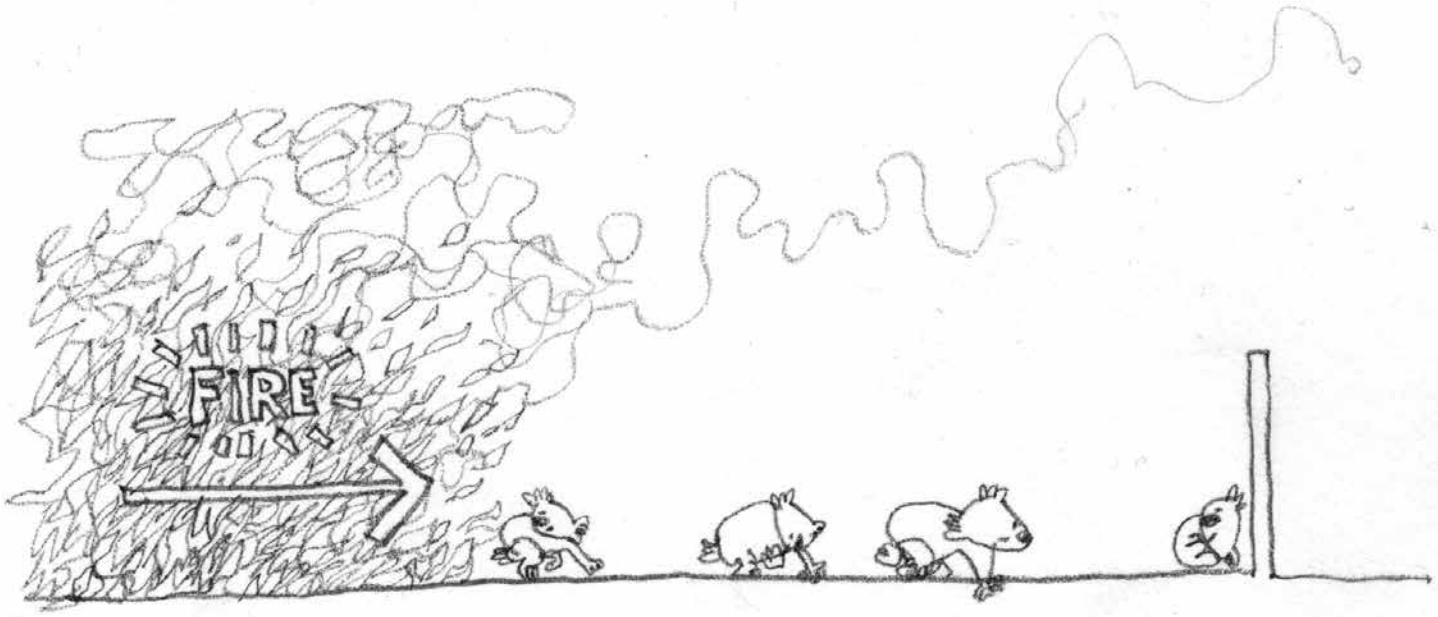
In healthy unobstructed koala habitats, koalas can generally move out of the way of fires. However due to both koala habitats becoming increasingly fragmented and fire intensity increasing due to higher and drier conditions, koalas are more likely to be trapped and burnt to death. To compound this situation, bush fires also cause further fragmentation of koala habitat.

Dr Stephen Phillips of Biolink has been observing the koala population in the Tweed Coast in northern New South Wales for 30 years. In this region, the koala population was stable, but the population suddenly and mysteriously crashed between 2005 and 2010, declining by 50%. Dr Phillips filtered through the possibilities and looked at how bush fires along the Tweed Coast might have effected the situation. There had been three major wild fires between 2006 and 2009 that affected the whole region. As a result, the koala population could not recover by recruiting new koalas from surrounding areas and its population steeply declined. Some of these fires were man-made where people lost control of back-burning and land clearing fires. Such fire events have a devestating impact on all local biodiversity.

08. The Unknown

On top of the above mentioned issues that are threatening and killing koalas, there are further problems that cannot be fully explained. An example of this has occurred in the Brisbane bushlands which is made up of hundreds of hectares and has a koala population of about 500. However, this population has been dramatically decreasing and scientists are unable to identify the underlying cause. Could this be related to stress?

Dr Phillips explains that a 1-2% mortality rate in koala population causes an overall decline in population. In a population of 180 koalas where



females that are reproducing normally, it only takes a few of the reproducing koalas to be killed, for the overall population to decline.

If the koala was pushed to extinction, there would be major uproar. Dr Steve Johnston, says, "But right now, it's not on people's minds, but 80% of people would care." So why aren't we doing more to save our national icon?

The story of the koala and the environmental damage caused by wide spread urban development is a frightening reminder that our current actions effect our own future existance as a species. The environmental stresses for the koala, such as those driven by climate change, will also impact our human communities.

Dr Jean-Marc Hero of Griffith University says that if our Australian ecosystem reaches a state where there are no koalas, then "there's no me and there's no you".

The plight of the koala is evidence that the way we are planning, developing and building is no longer ecologically responsible. Traditionally we have approached the environment as a resource, something to be exploited and modified for our own exclusive requirements without considering the needs of other species. Presently we do not adequately acknowledge that we actually rely on these species and ecosystems – we cannot survive without the trees, the forests and those species living within them. The koala's plight is intimately bound to our own survial.

Currently there is a disconnect between developers and home buyers.

The average home buyer does not have sufficient options – generally home buyers get and pay for what is available and what they can afford. Many home buyers currently do not think beyond what is on the market and there is little public discussion about other ways to live which could be both more affordable and less ecologically destructive.

Australian Bureau of Statistics analysis of census data shows that houses are getting bigger, blocks of land are getting smaller, family sizes are getting smaller and people are increasingly spending more time indoors. Furthermore, new developments around the edges of our cities are rarely well serviced by public transport, increasing our dependence on cars and roads for transport. These areas are generally inhabited by low socio-economic groups, which makes these groups the most vulnerable to rising fuel prices.

Large scale, single developer developments on greenfield land (undeveloped land) are increasingly popular in Australia, yet these developments are often culturally disconnected from the sites that they occupy. We are currently planning and creating soulless communities that, in some areas of the Koala Coast, are already experiencing increased rates of crime and other signs of social instability. Many developments are designed primarily around commercial and economic interests and therefore do not foster a sense of community. They offer limited possibilities for communitiy building.

AS STEWARDS OF THE LAND, ANYONE THAT HAS ANY INFLUENCE ON THE LAND IN KOALA HABITAT IS RESPONSIBLE FOR ADDRESSING THE KOALA ISSUE.

It is not too late

We need to rethink and design more creatively so that koalas and humans can live together.

We need to use space & resources more intelligently.

So far this report has outlined the underlying causes of declining koala populations, particularly in the area of the Koala Coast. However, despite the koala's presently catastrophic situation, there is hope. Dr Bill Ellis of the University of Queensland says, "The koala is quite tough, quite resilient, but they do have their tipping points and koala populations have their thresholds." The Koala Coast population is at this point now. This is why it is critical to start implementing changes as soon as we can.

The koala problem demonstrates that we are at a critical moment for Australian culture and Australian ecology. For the koala to have a future, we must address issues that are central to Australian culture and acknowledge that they are intimately entangled with our ecological and economic sustainability. We need to start taking action now.

In May 2010 the Queensland Government released the South East Queensland Koala Conservation State Planning Regulatory Provisions and State Planning Policy 2/10: Koala Conservation as a starting point for planning for koalas. The act covers the South East Queensland Koala Protection Area, which includes the seven eastern Local Government Areas of South East Queensland - Moreton, Redland, Gold Coast, Sunshine Coast, Brisbane, Ipswich and Logan. In setting out these statutory instruments, major efforts were specifically focused on the Koala Coast because this is the region where koala populations are experiencing the most acute stress and risk of disaster. More information can be viewed at the Queensland Government's website

On 30 April 2012, the Federal Government of Australia announced that koalas in Queensland, New South Wales and the Australian Capital Territory will be classified as vulnerable, adding them to the threatened species list.

These are the first steps in a long process.

In the longer term, to act in the interest of koalas will require us to think differently about the way we plan and aspire to live. To date, urban development and koala conservation

have not gone hand in hand. And although the rate of people migrating to South East Queensland at the time of writing this report has eased a little, new urban developments are still being planned, which provide rich opportunities to do something different. The complexity of these new projects are exciting new design challenges for creative planners and architects. They are also new business opportunities for developers, project managers, builders and tradesmen. There is the potential for more business for everyone, however with a different planning agenda and building outcomes.

We need to rethink and design more creatively so that koalas and humans can live together.

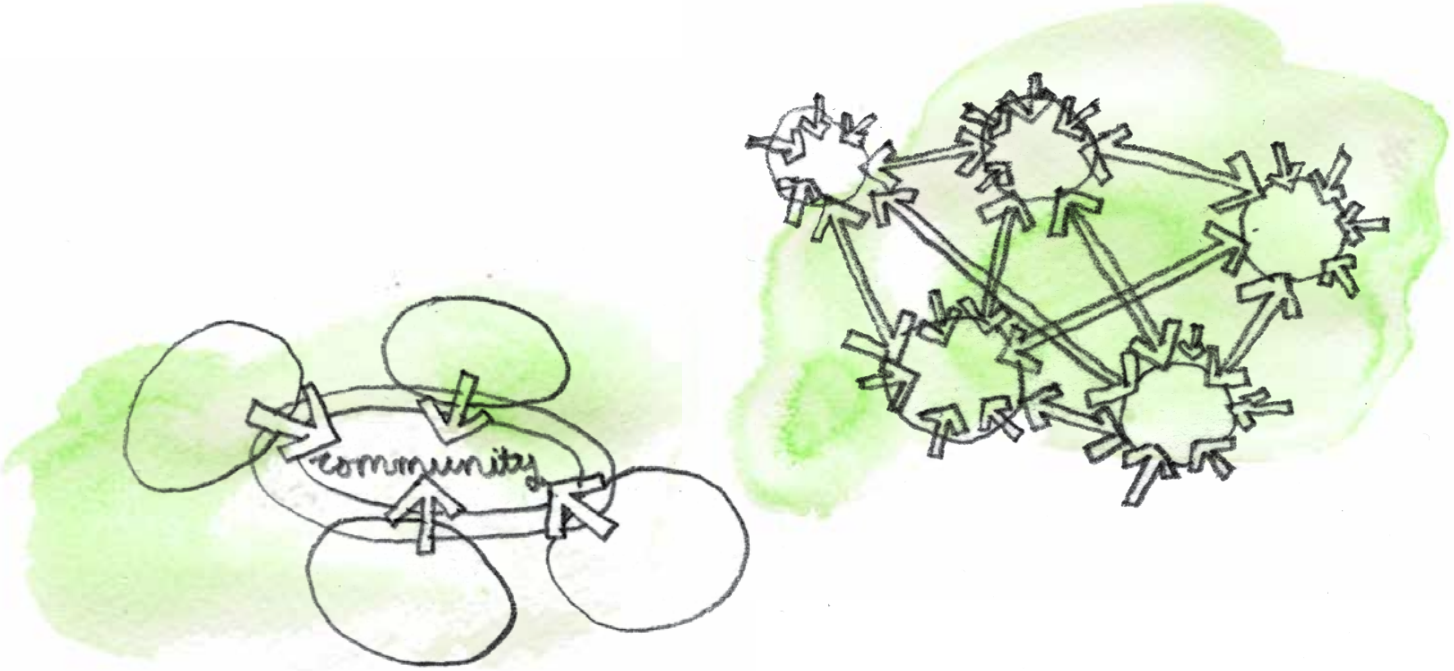
We need to use space and resources more intelligently.

The complexity of ecological issues requires a more interdisciplinary approach. An approach that addresses planning, building, economic and ecological agendas simultaneously. It is impossible to separate out the concerns of each of these fields and address them in isolation – they must be considered as a singular complex entity.

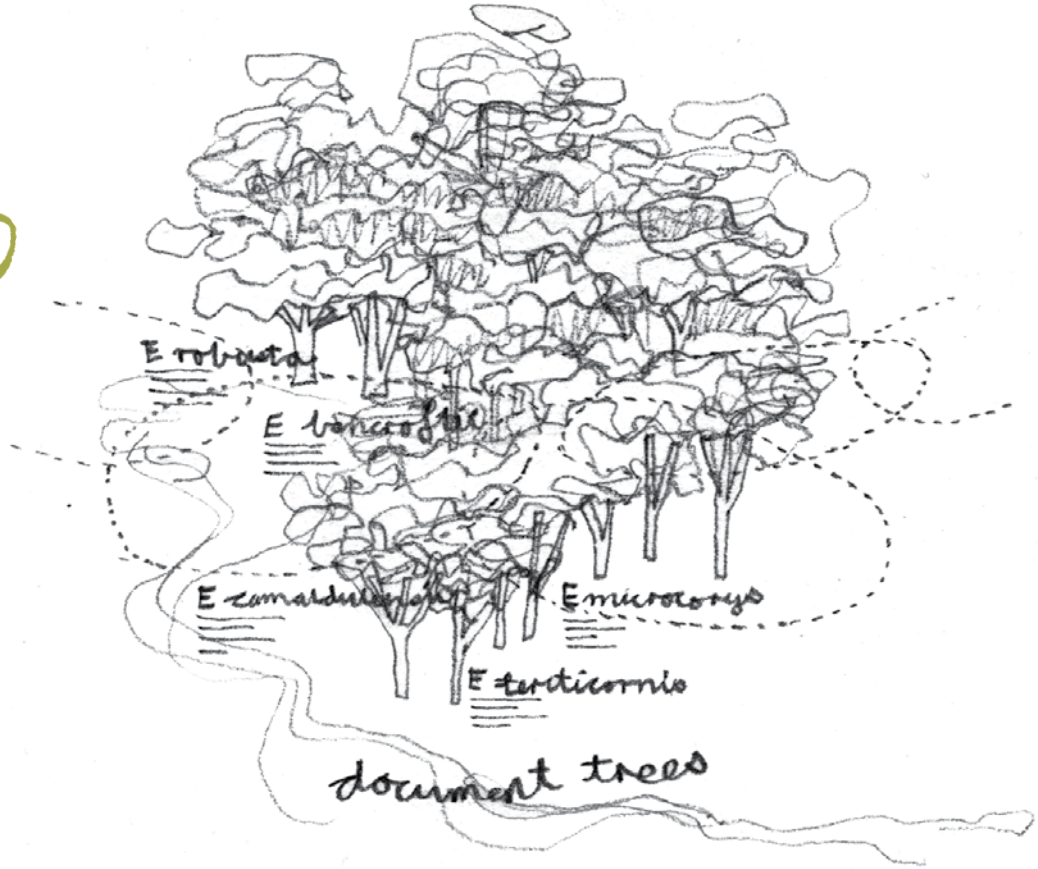
We have to pause, reflect and rethink some of our habits as a species.

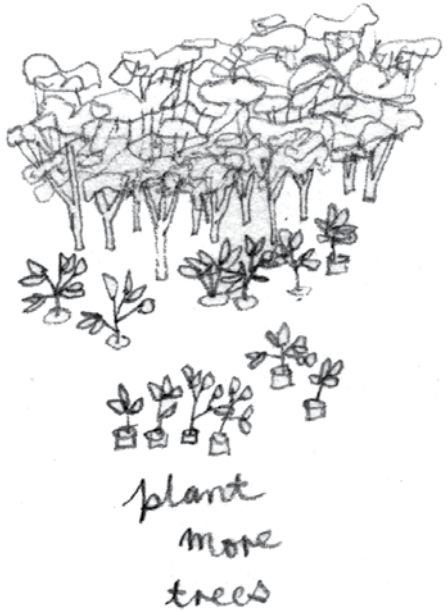
This might seem difficult, but in the long term is critical for the health and vitality of our environment, our lives and our economy. Now is the time to do something different and rethink how we build our communities. It is time to rethink our development assessment process so that developments support ecosystem health rather than compromise it. It is time to adequately value the ecological services these systems provide and which we cannot live without.

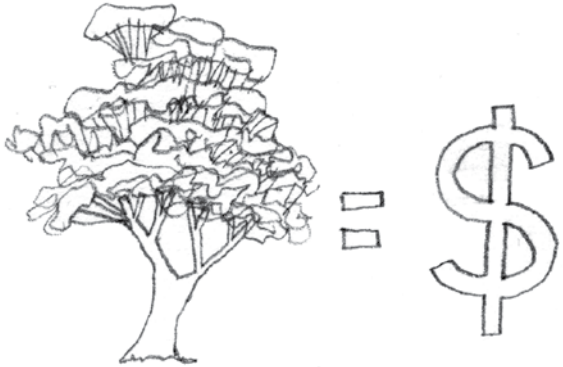
THERE IS ANOTHER WAY.

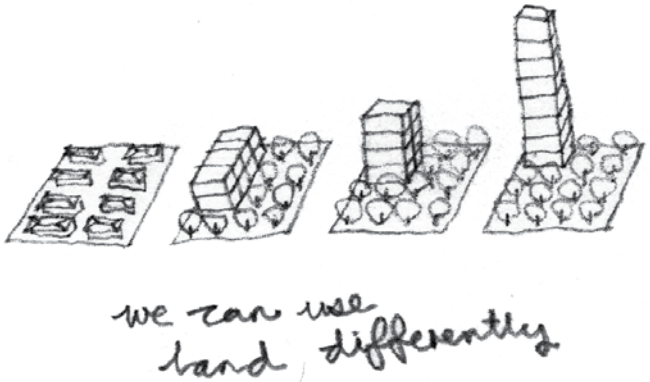


ESTABLISH, DOCUMENT, EDUCATE AND REPLANT.









RECONSIDERING SOME FUNDAMENTALS

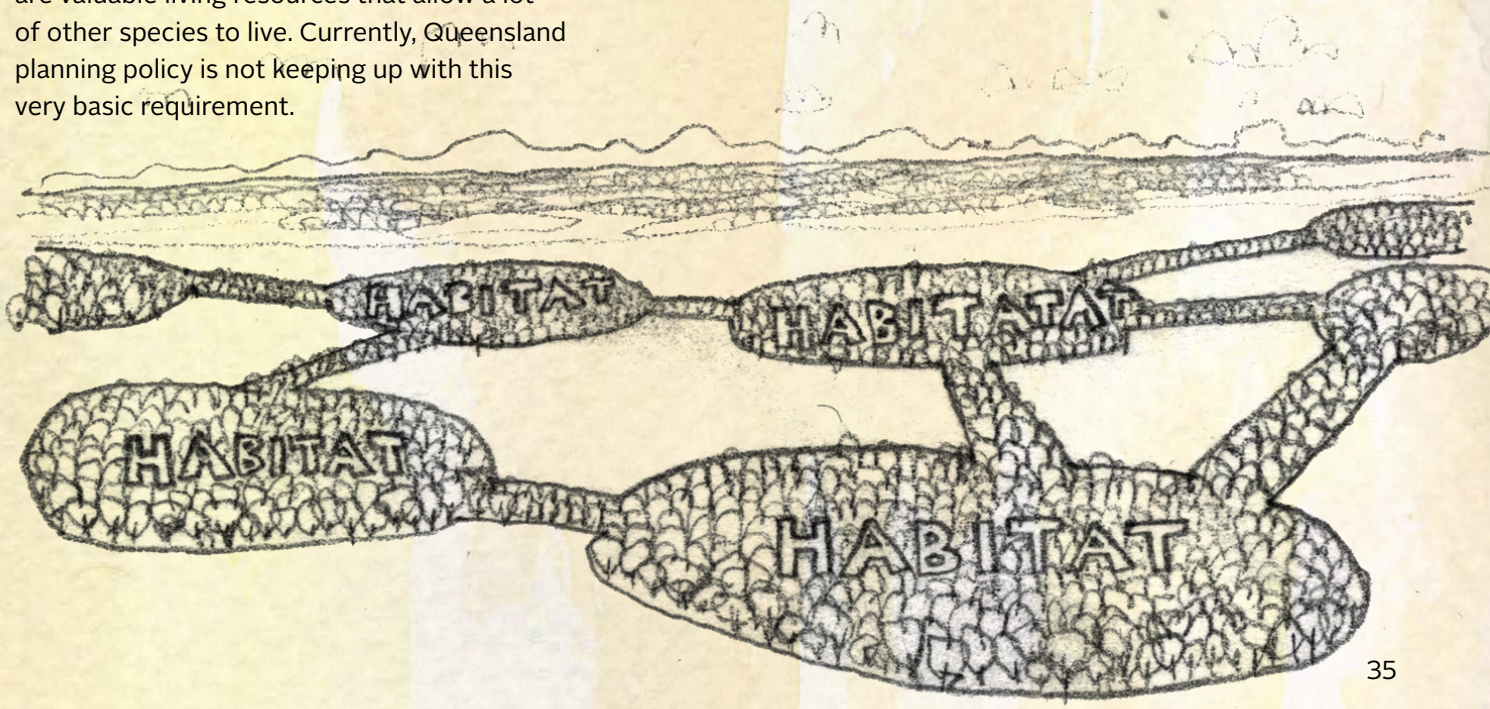
01. Community

Dr Marc Hero of Griffith University says that human identity is shaped by both a selfish component and by a social component, the latter which is driven by the desire to live within a community. To consider identity in this way provides clues for planning future living – and rethinking approaches to human habits. Thinking through social motivations also provides clues for how to work together as stronger communities, something that is currently lacking in many greenfield developments on the Koala Coast. How can we build communities with cultural identity, sense of place, common purposes and common goals.

The Queensland Government's Department of Environment and Resource Management adds, "We need to think about koalas both as members of a species but also as unique individuals – just like we do with our own pets". This concept suggests an individual adoption scheme whereby residents within koala habitats become more directly aware and responsible for their local koalas.

02. Trees

Although the Koala Coast's koala situation is a complex problem, the one thing we do have control over is how many trees we establish or cut down. We not only have to stop removing koala food trees but also have to re-establish large areas with koala food resources. Trees are valuable living resources that allow a lot of other species to live. Currently, Queensland planning policy is not keeping up with this very basic requirement.



Al Mucci of Dreamworld Australia says, "We humans have created a wall between ourselves and nature, and yet, we still like to go on holidays to nature." Deb Tabart OAM of the Australian Koala Foundation adds, "We are scared of trees." She argues that we are scared of branches falling, we still have an aesthetic delusion that eucalyptus leaves are unsightly on our lawns and, quite rightly, we are scared of bush fires. We need better planning policy to protect and value trees and to better live in their proximity. We need more effective bushfire strategies in place and more opportunities to build on bushland networks.

03. Protection of Habitat

The Federal and Queeensland governments, functioning as representatives of the people and the land, needs to acquire areas of koala habitat in order to build up national parks and reserves. These are places that we would collectively own; places for everyone. Dr Stephen Phillips says that these protected lands are like creating a bank for the future.

04. Connections

For koalas, connectivity between habitats is critical. Geographical connections like corridors, bridges and tunnels are the key for allowing koalas to move from one patch of habitat to another. Connections are needed to prevent inbreeding and to maximise genetic diversity. These connections need to be fenced off to keep koalas separate from cars and dogs. If there are fences within these corridors, they need to be designed to allow for koalas to safely go through or over them.

05. Management

Koalas living in urban environments and on the fringes of urban environments often require management by humans. This includes tagging and monitoring and providing medical checkups, genetic screening, genetic enhancing and, as a last resort, translocation to safer areas.

06. Economics

There needs to be a common ground whereby economic structures and government policy are shifted by creating incentives that support koala habitat and allow creative energies to be more focused on planning places where koalas and humans can successfully live together. This means thinking more towards what Ellis calls "Economies of Better", instead of "Economies of Scale". If we plan for better ecological health we can have more resilient, healthy and livable environments for everyone.

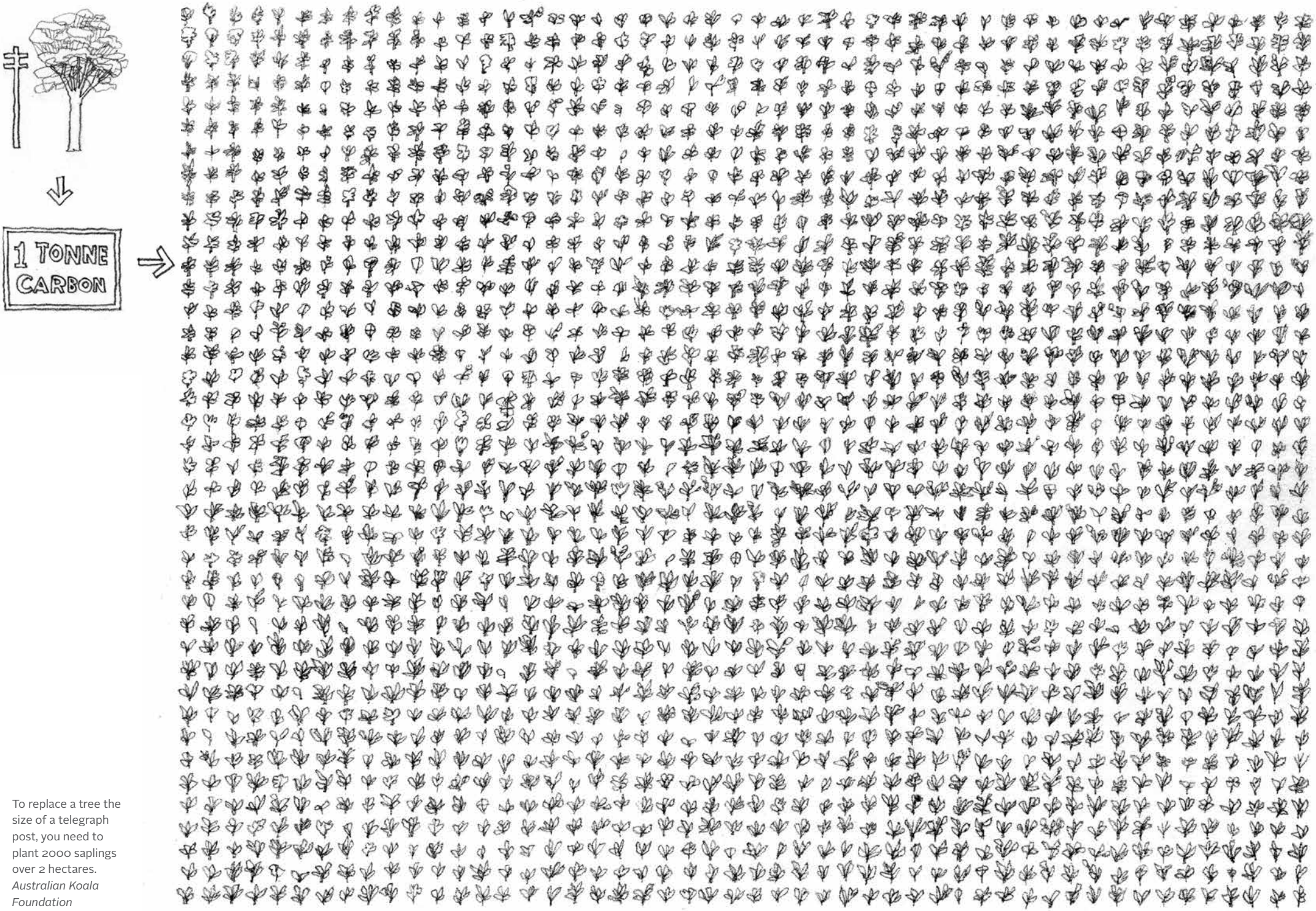
Dr Clevo Wilson of the Queensland University of Technology's Business School has been investigating the commercial value of koalas and in particular, the economics of having koalas within residential areas. He is finding that the presence of koalas in neighbourhoods increases values of properties. The aim of acheiving healthy koala populations can potentially align the priorities of developers and ecologists.

07. Education

There needs to be a different approach to how the issues facing the koala are publicly communicated. Governments need to commit genuine funding to education that engages the community and links our environmental health with the wellbeing of the community. Dr Stephen Phillips of Biolink says, "The importance of bio security to our overall well being needs to be more readily understood - for our environment, our economy, our way of life. The exciting thing about this is that it inspires and opens up more opportunities for everyone." Al Mucci of Dreamworld Australia adds, "Awareness of the need for sustainable designs is a social awakening. It is also a cultural necessity if the luxuries of our current lifestyles are to be preserved. If we are to co-exist with koalas, then the time for creative action is now."

"THE CHALLENGE FOR DEVELOPERS & LOCAL GOVERNMENTS IS TO ENHANCE YIELDS BY INCLUDING KOALAS"

- DR BILL ELLIS, UNIVERSITY OF QLD



To replace a tree the size of a telegraph post, you need to plant 2000 saplings over 2 hectares. *Australian Koala Foundation*

IT'S A SHARED RESPONSIBILITY

Examples of Good Koala Planning

Within and around South East Queensland, there are valuble case studies that have actively implemented koala and wildlife planning strategies with varying degree of sucess. This section gives an overview of these developments and the strategies that have been implemented in an attempt to make residential areas less destructive to local wildlife populations.

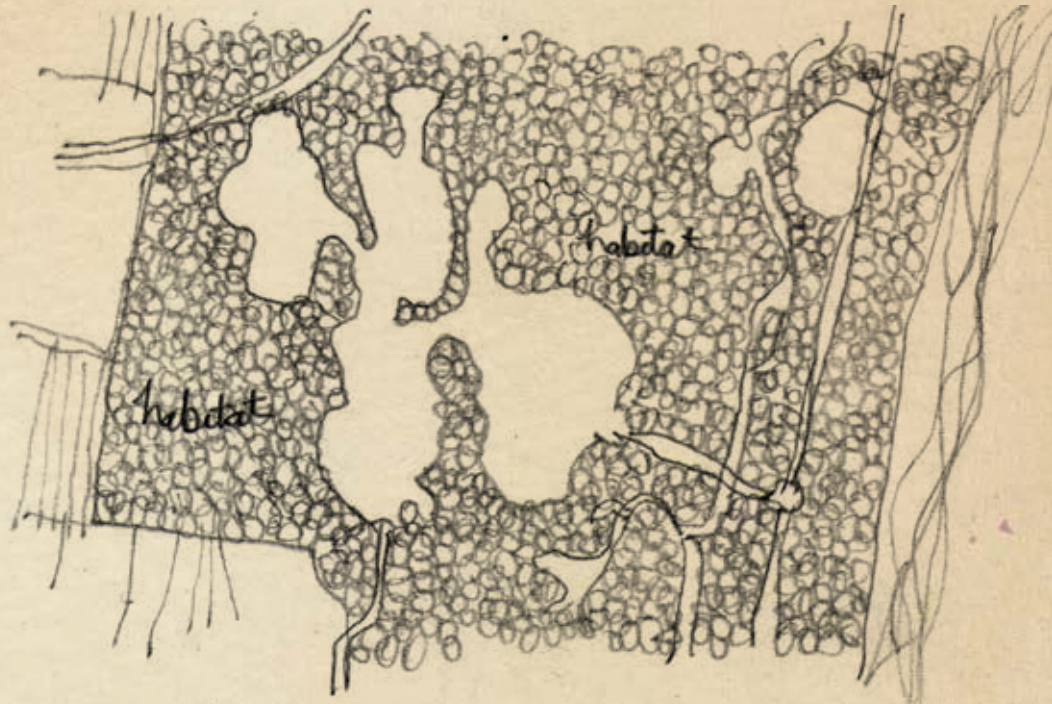
Progressive Residential Developments

01. Koala Beach

Koala Beach residential development is a best practice model for planning for koala conservation in Australia to date. Located near Pottsville in northern New South Wales, Koala Beach is a 300 hectare residential estate of 600 dwellings built on land that was previously a dairy farm. The preparation of the management plans for Koala Beach grew out of a 1993 collaboration between the Australian Koala Foundation and The Ray Group, a Gold Coast based developer.

The Koala Beach development was promoted as a koala friendly place. The development involved building on land that was cleared for cattle and set out larger blocks of land to allow for the planting of new koala food trees. Koala Beach features streetscape planting of koala food trees, which the koalas started using after a 3–4 year period (scientists have said that koala food trees need to be 7–10 years old to be proper food trees). The path area is wider to allow for bigger food trees, which also perform as a better road barrier for both people and koalas.

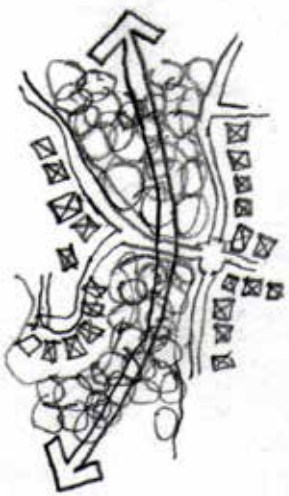
There are speed limits on all roads and no dogs or cats are allowed in Koala Beach. Some people who bought properties in Koala Beach and got rid of their dogs and others challenged the no dogs rule. A strong sense



Koala Beach retains koala habitat and corridors.

of stewardship developed from this issue. The people collectively made a decision and decided that small dogs would be permitted despite small dogs still being able to inflict damage to koalas and being difficult to police. Some members of the community protested and successfully called for the no dogs ruling to be returned. The people stood behind the principles of the development and in doing so developed a strong close knit community.

In order to augment local biodiversity and wildlife populations at Koala Beach, the Koala Habitat and Wildlife Committee was formed and chaired by Tweed Shire Council, New South Wales National Parks and residents. Residents pay an environmental levy of about $100 per year to fund initiatives to support the local koala population. Bush restoration has also been carried out at Koala Beach that involves the replanting of koala food trees. Rare plants are managed which is helping to re-establish threatened plants and grasses like Anthraxon. Furthermore, due to the efforts to conserve koala habitat, 26 other vulnerable species have also been conserved. Bird populations are flourishing as there are also no cats present in the community as well as wild cat and fox monitoring programs. A locally endangered bird called the Bush Stone-curlew has also started breeding again at Koala Beach. The Bush Stone-curlew provides a great example of community stewardship. When the Bush Stone-curlew began breeding, the sight of the parent birds protecting chicks on the ground drew human attention and volunteers began taking shifts to guard the birds from predation during their roosting periods. This kind of pride forms a strong sense of social identity for the community. If residential developments are very large, this type of social identity disappears. Koala Beach has become a desirable place to live because of the values of the community. The area has become an attractive place to raise children in the bush and a place for environmental education. The Koala Beach development has been very sucessful as it demonstrates that other choices can be made and that there are other options for how we interact with our environment.



The number of road crossings at koala corridors are kept to a minimum at Koala Beach.

The success of this community is reflected in a sense of pride in the residents and this has contributed to the increased property vwalue in this area. The economic benefits to this are obvious in comparison to another development - 'Sea Breeze' located just south of Koala Beach. Sea Breeze has lower property values as it lacks the vision and commitment to sustainable living seen at Koala Beach.

While the basic design principles of Koala Beach work, there remains much room for improvement. Although the development was carried out on already cleared land, sadly an extra 6.7 hectare section of Casuarina Melaleuca swamp forest was cleared during building. Also, some of the bigger planted trees were blown over by wind because the roots were not established enough early on in the development. We need to learn from the experience of the developers at Koala Beach and give more attention to protecting clumps of trees in reserves and backyards. Issues such as branches falling on roofs must be considered in order to allow larger trees to remain along-side buildings.

Koala Beach is a valuble case study for future wildlife sensitive developments. It provides rich opportunity to capture the knowledge and experience gained from these experimental types of development processes. This could be achieved through university based research methodologies. These types of developments need to be documented and analysed so that we can collectively learn and establish a best practice for wildlife sensitive residential developments. The outcomes from these experiences must be implemented into mainstream residential developments.

02. Brolga Lakes Estate

The Brolga Lakes Estate is a master planned eco village development on the northern foreshores of Moreton Bay in Brisbane. At the time of writing, the development was in design

Brolga Lakes Estate. Only 24.7% of the site is to be developed as residential and public space. The remainder will be koala habitat, hydroponics and aquaponics.

and planning phase. The property is surrounded by sensitive marine wetlands and located close to existing urban developments. The concept plan by Wayne Drinkwater proposes that 67% of the 158 hectares estate be dedicated to wetlands and regenerated koala habitat, 24.7% be developed into residential hamlets and public space and the remaining 8.3% be allocated to intensive hydroponic and aquaponic production.

While most developers approach residential areas as spaces separate from the ecologies surrounding them, the Brolga Lakes Estate adopts the attitude that peri-urban spaces are important green spaces. Often green spaces in residential developments become weed encrusted cleared lands or non-native forests void of natural fauna. By planning to conserve their green spaces as natural sanctuaries, Brolga Lakes rethinks how these peri-urban spaces can be transformed for the benefit of the environment and the wider local community. These natural sanctuaries will add social, economic and cultural value to the wider urban community. The Brolga Lakes developers hope to demonstrate that carefully planned developments can deliver the regeneration of high quality natural habitat that is not relient on public funding to be maintained. The site aims to be self-sufficient in its use of water, energy and waste management by providing solar energy to all homes and implementing onsite biogas generation.

03. Coomera Waters

Coomera Waters is another example of a development that attempts to be koala friendly. It was built on land that was previously a pine plantation and a mobile saw mill. The residents of Coomera Waters are aware of koala populations and car speeds are reduced through the use of chicanes. However, Coomera Waters still lacks some critical strategies required to support koala populations. Building covenants have been created in koala corridors and residents can own dogs. Most significantly, the development approvals were rushed to beat possible law changes and once approved, bush clearing was fast tracked. The land clearing destroyed significant areas of koala habitat. Although patches of koala habitat remain, monitoring of koalas is showing that there is not enough connected habitat to support a healthy population. In light of this, the inclusion of subsequent koala protection strategies in this development are token and ineffective.

Koala Friendly Towns

04. Gunnedah

Now known as the koala capital of Australia, Gunnedah's koala population has been stabilised and is now one of Australia's largest and healthiest populations. This once declining population increased between 1970 and 1990 and now koalas live in and around the town. The tree planting that took place in the 1990s to stop soil erosion and salinity was helpful for farmers, and, unintentionally helped to stabilise koala populations. A 1992 publication called Koalas & Land use in Gunnedah Shire, was produced by the National Parks & Wildlife Service and was supported by the Department of Conservation and Land Management, Australia – Save the Bush and the local community. This report focused on the importance of koala management, tree preservation and land degradation. The report described that the

creation and expansion of tree corridors allows koalas access to the town area. These koalas have become a great tourist attraction for Gunnedah and signify the ecological health of the locality and of the people and wildlife living within it. Having said this, further tree planting efforts are required in the region as koala habitat only covers 6000 hectares out of an area of half a million. At the end of 2011, the first steps were taken by Gunnedah Shire Council to develop the Comprehensive Koala Plan of Management for the Gunnedah Local Government Area. The council says, "The management plan will guide development planning, whilst seeking to ensure that a permanent free-living population of Koalas will continue to occur over the present range into the future."

05. Lismore

50kms south of the Koala Coast, Lismore koalas experienced a recovery between 1993 and 2010. Koala researchers like Dr Stephen Phillips have observed this population for three koala generations and they are trying to understand why there has been a recovery. Located by the Richmond River, which is a flood plain, the Lismore region was cleared for timber and farming from the 1840s which lead to a huge decline in koala numbers between 1885 and 1930. Phillips believes that the close management of the scattered food trees that remain, has prevented bush fires and ensured that the remaining koala populations have access to trees and access to food resources. Lismore provides a case study demonstrating that there are land management strategies that can be applied in and around built areas that can support healthy koala populations. There is an urgent need to implement some of the Lismore region's successful land management strategies on the Koala Coast.

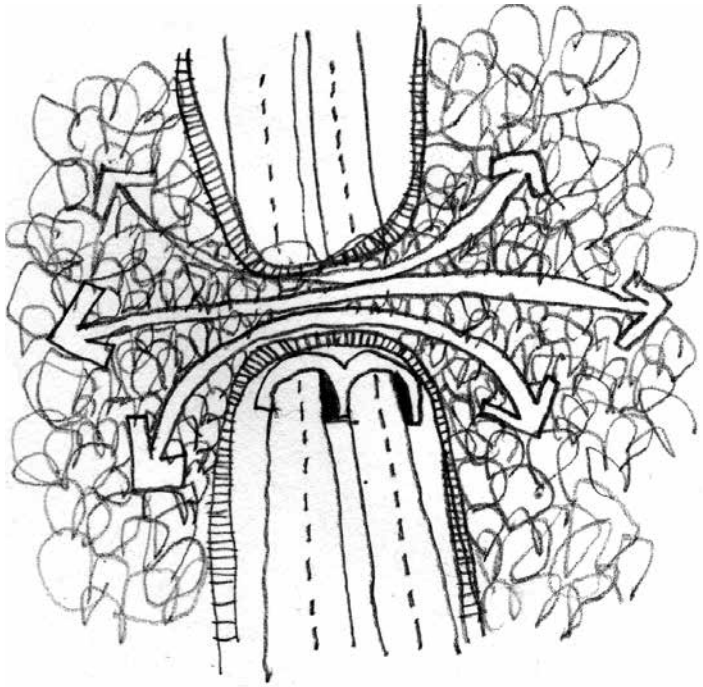
Koala Friendly Road Crossings

06. Compton Road Land Bridge

Dr Daryl Jones of Griffith School of Environment was responsible for having a land bridge built over Compton Road at Karawatha Forest, Brisbane to provide a continuous habitat over an existing road. The vegetation on the bridge is well established and animales like gliders and possums are observed to use the land bridge every night. There is also evidence that koalas are using the bridge although less frequently. Land bridges are the best option for connecting bushland accross roads but Jones observes that future bridges must be wider and provide a more continuous flow of natural habitat.

07. Compton Road Underpass

At Compton Road at Karawatha Forest, a long underpass has been constructed with a cross sections of 3 by 3 metres and a length of 80 metres. Designed to provide access for wildlife, it features a variety of platforms, tubes and logs. In the peak of summer, up to 45 animals, including koalas, were recorded to be using the underpass every night.



Compton Road land bridge - fencing keeps koalas off the road and guides them over the land bridge.

08. Redlands Koala Overpass

A new koala overpass is under contruction to link Conservation Park and JC Trotter Memorial Park near the intersection of Mt Cotton and Alperton Roads. It has been designed for the Redlands Corridor as part of the Koala Retrofit Works Program. This program is aimed at reducing the number of koalas struck by vehicles on Queensland roads by building infrastructure to allow for the movement of koala populations.

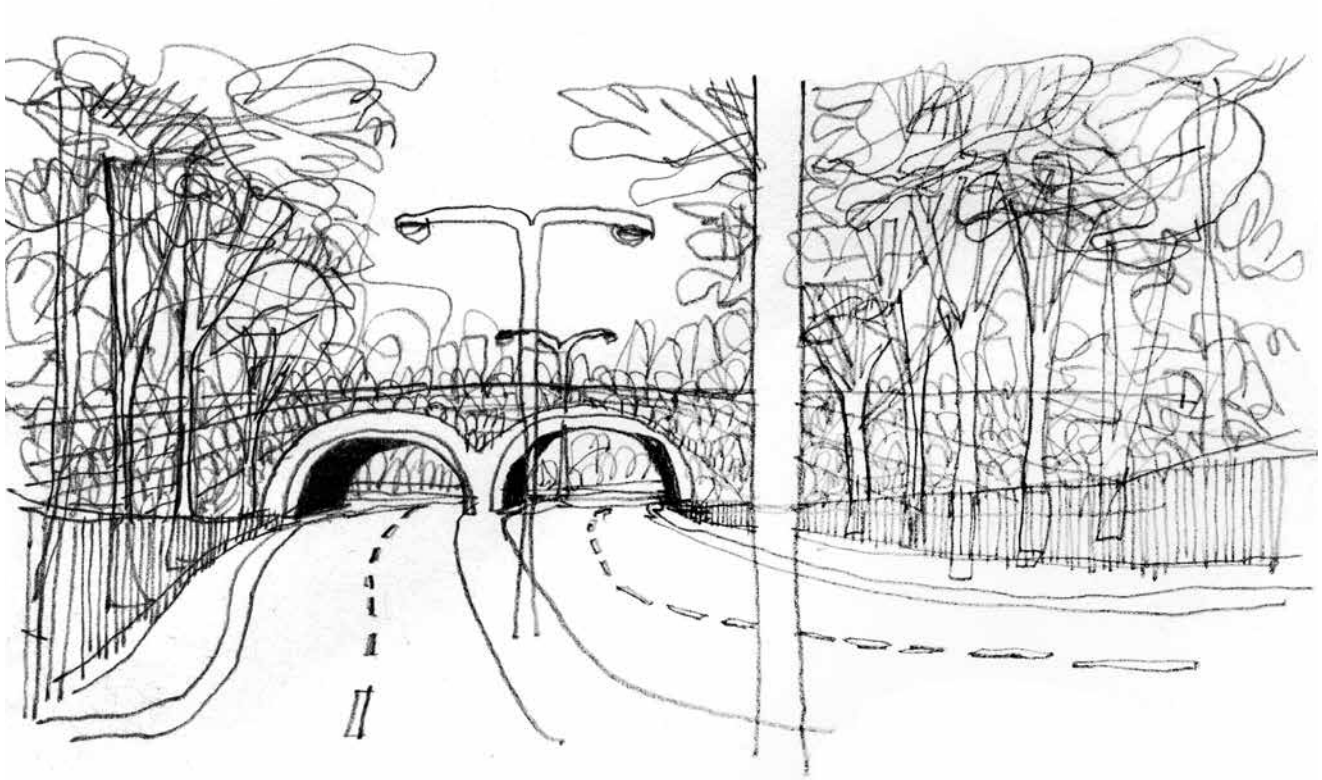
The Department of Environment and Resource Management and Griffith University will undertake a monitoring program to assess the effectiveness of the overpass structure. If successful, the new overpass design will be implemented in other projects across Queensland.

09. Moreton Bay Road Underpass

The Moreton Bay Road Underpass in Capalaba is a koala underpass that goes under the road where it crosses at Coolnwynpin Creek, linking koala habitats on both sides of the road. The underpass features a guide fence to ensure that koalas are directed to the safe crossing point under Moreton Bay Road and kept off the road.

10. Eenie Creek Road Bridge

An alternative to the land bridge concept is to construct roads that float above habitats and corridors in order to leave wildlife habitat intact under certain sections of road. This has been done at Eenie Creek Road in Noosa where a bridge was built over a koala habit corridor. Although this land bridge has been an effective strategy for allowing koalas to safely cross the road, it must be part of a wider wildlife management strategy. Unfortunatley, this is not the case at Eenie Creek, as the approval of an aquatic centre and a sporting area narrows the koala corridor. These nearby developments will make the land bridge less effective as they create a second wildlife bottleneck. This example demonstrates the need for regional wildlife management and planning to ensure that wildlife corridors remain unobstructed and that they do not bottleneck.



Compton Road land bridge.

Other Koala Friendly Initiatives

11. Purchasing at-risk habitat

During Jim Soorley's Lord Mayorship at Brisbane City Council, the process of purchasing at-risk bushland and koala habitat was accelerated. In particular, in 1991 the Brisbane City Council's land purchase protected an area of koala food trees at Karawatha Forest, where the trees were situated on what used to be private lots. This is an excellent example of an effective local government driven initiative.

According to Brisbane City, "Brisbane residents and businesses contribute to protecting Brisbane's most significant natural assets through payment of the Bushland Preservation Levy in their rates account. The levy is used for Council's Bushland Acquisition Program, where the funds are used to protect and enhance Brisbane's natural environment. This helps Council to achieve the Living in Brisbane 2026 vision for a clean, green city." In 2008, Brisbane City Council set a target to purchase an additional 500 hectares of bushland, and by July 2011 this target was achieved.

12. Pinjarra Hills Farm

The University of Queensland's Pinjarra Hills Farm, located fifteen minutes south west of Brisbane, was set up as a dynamic inland ecology research facility. This property showcases what can be done by adopting an eco-model featuring eco-friendly architecture. The Queensland Government, who is slowly restoring and reclaiming land, is interested in models such as Pinjarra Hills as it demonstrates a mechanism to manage koala genetics as well as being a koala breeding centre. Other zoological facilities like Dreamworld Australia's wildlife institution could become centres where genes are captured from koalas living at Pinjarra. This notion provides another example of how rethinking our approach can rebuild future koala networks.

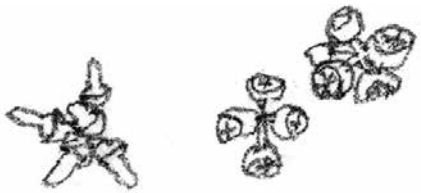
13. Private Land Owners

Brisbane's Mount Gravatt Environment Group, Fox Gully Bushcare, private land owners and environment groups are strengthening koala populations through bushland rehabilitation. These groups are acheiving effective habitat consolidation by facilitating the cooperation of a diverse range of property owners to create appropriate koala habitats. The success of these wildlife corridors connecting properties like Fox Gully, Mimosa Creek, Mount Gravatt Reserve and Firefly Gully demonstrate what a'whole community' approach can achieve. These approaches and initiatives need to be encouraged and rewarded through government subsidies and incentives so that koala habitat consolidation is more attractive across the board.

14. Purchasing Degraded Land

To date, The Department of Environment and Resource Management, in conjunction with Queensland Parks and Wildlife Services, Koala Policy and Operations, has bought eight degraded ex-grazing properties for the purpose of koala habitat regeneration. These properties are relatively small, but are very important as they are located in highly fragmented koala habitats and are recreating koala corridors. At the time of writing this report, more than half of the proposed 61 420 koala food tree saplings had been planted on these properties.

In conjunction with the purchase of degraded land, State Planning Policy 2/10 Koala Conservation sets out performance indicators that respond to the challenge of supporting remaining koala populations. The policy prohibits urban activities outside the urban footprint, restricts the clearing of koala habitat in priority areas and defines koala safe movement criteria. We need to look out for opportunities to re-establish koala habitats and corridors so that this planning policy can be implemented across the entire Koala Coast. The State Planning Policy 2/10 Koala Conservation can be seen at www.ehp.qld.gov.au/wildlife/koalas/strategy/pdf/koala-spp.pdf



15. Kinross Road Structure Plan

The Department of Environment and Resource Management and Redlands City Council have developed a detailed local plan that allows for koala connections in the Kinross Road Structure Plan. This is another example of the implementation of the State Planning Policy 2/10 Koala Conservation. Redlands City Council says that the plan is "a sustainable, integrated and well planned urban community with a distinct sense of place, built upon a strong respect for the natural environment. There is an extensive network of public open space, and land along Hilliards Creek is retained as core habitat for koala populations and other native fauna, protected from development. Other greenspace corridors supplement the koala habitat, providing a connected network of open public space that divides urban and natural areas. A diversity of dwelling types provides choice and affordability within a unique urban place that enjoys the amenity and values of the surrounding environment".

16. Increased plot sizes

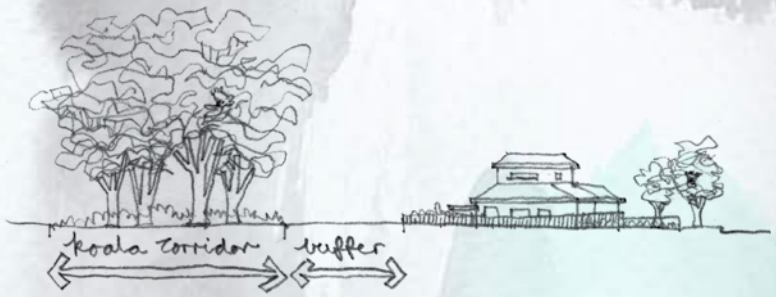
Redland City Council has increased the size of building lots to protect high conservation value bushland. By increasing the land to building ratio, more koala habitat and food trees are retained in backyards.

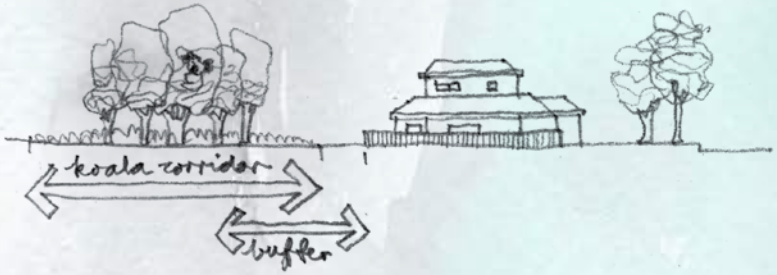
Kinross Road Structure Plan creates koala connections.

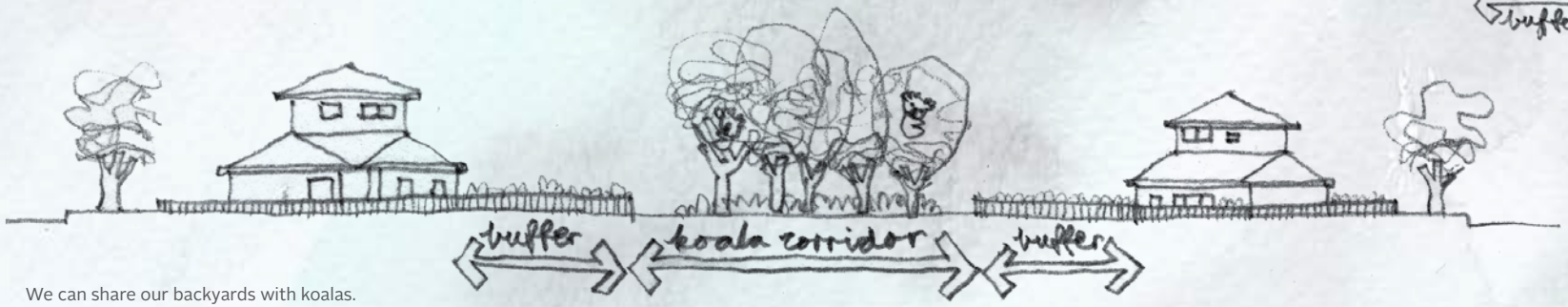
WHERE WE CAN START: IN OUR OWN BACKYARD

WE ARE INCREDIBLY FORTUNATE TO BE ABLE TO SHARE SPACE WITH KOALAS AND HAVE THIS BEAUTIFUL ICONIC ANIMAL COMING THROUGH OUR BACKYARDS.

Residential backyards have enormous potential to function as wildlife corridors for koalas and other native species. Dr Stephen Phillips points out that people living in koala areas are privileged as these are extraordinary and unique places to live. Koala Coast backyards can assist in helping koala populations recover. If backyards are managed properly, scientists like Griffith University's Dr Darryl Jones are very hopeful that koalas will actually use backyards and make them a part of their habitat.







We can share our backyards with koalas.

The Department of Environment and Heritage Protection recommends making fences koala-friendly so koalas can safely move in and out of each property. To make fences climbable, use timber posts and rails, chain wire or slats with at least 1cm gap between each slat.

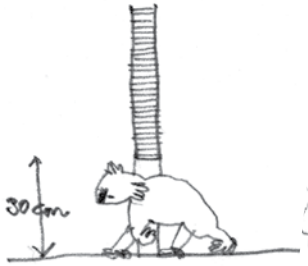
Plant trees close to both sides of the fence so koalas can cross over.

If there are no dogs, talk to your neigbours about creating koala size holes in your fences so that koalas can move through when traversing the ground. These holes should be 30cm by 30cm.

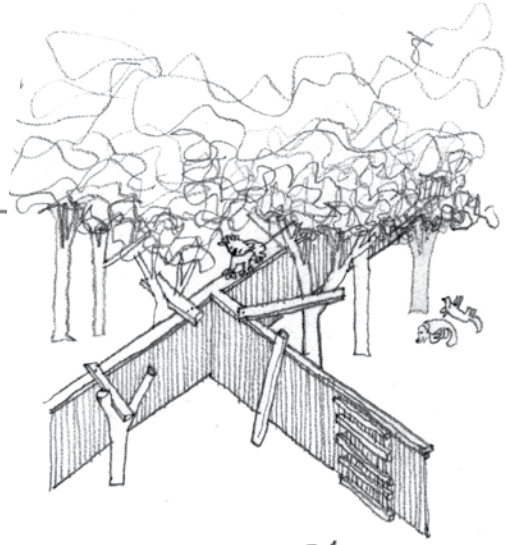
For steel fencing (such as Colorbond), timber corner escape posts can be positioned along fence lines to help koalas leave a property, and better still, these fence posts can have forks that act as koalas perches. The posts should oppose each other where fences intersect. Timber poles should be at least 10cm wide.

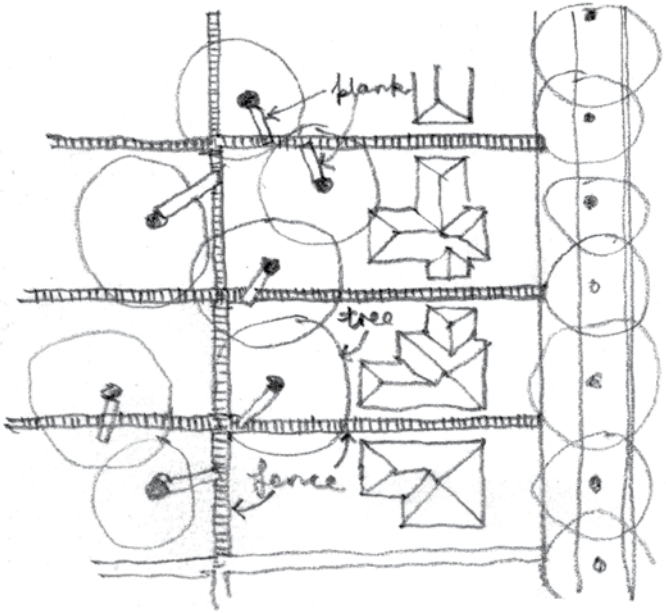
Other backyard initiatives to allow koalas to move between tree to tree above ground level include wider fence tops to provide koala walkways, and the provision of mini bridges, or planks of wood, between fences and backyard koala food trees.

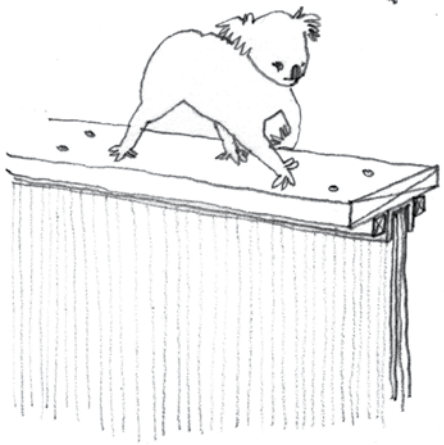
Horizontal fence slats can make escaping a backyard easier for koalas. For metal fencing like Colorbond, a timber pole can provide a means for climbing.



If there are no dogs, koala sized holes in fences allow koalas to move through backyards along the ground.



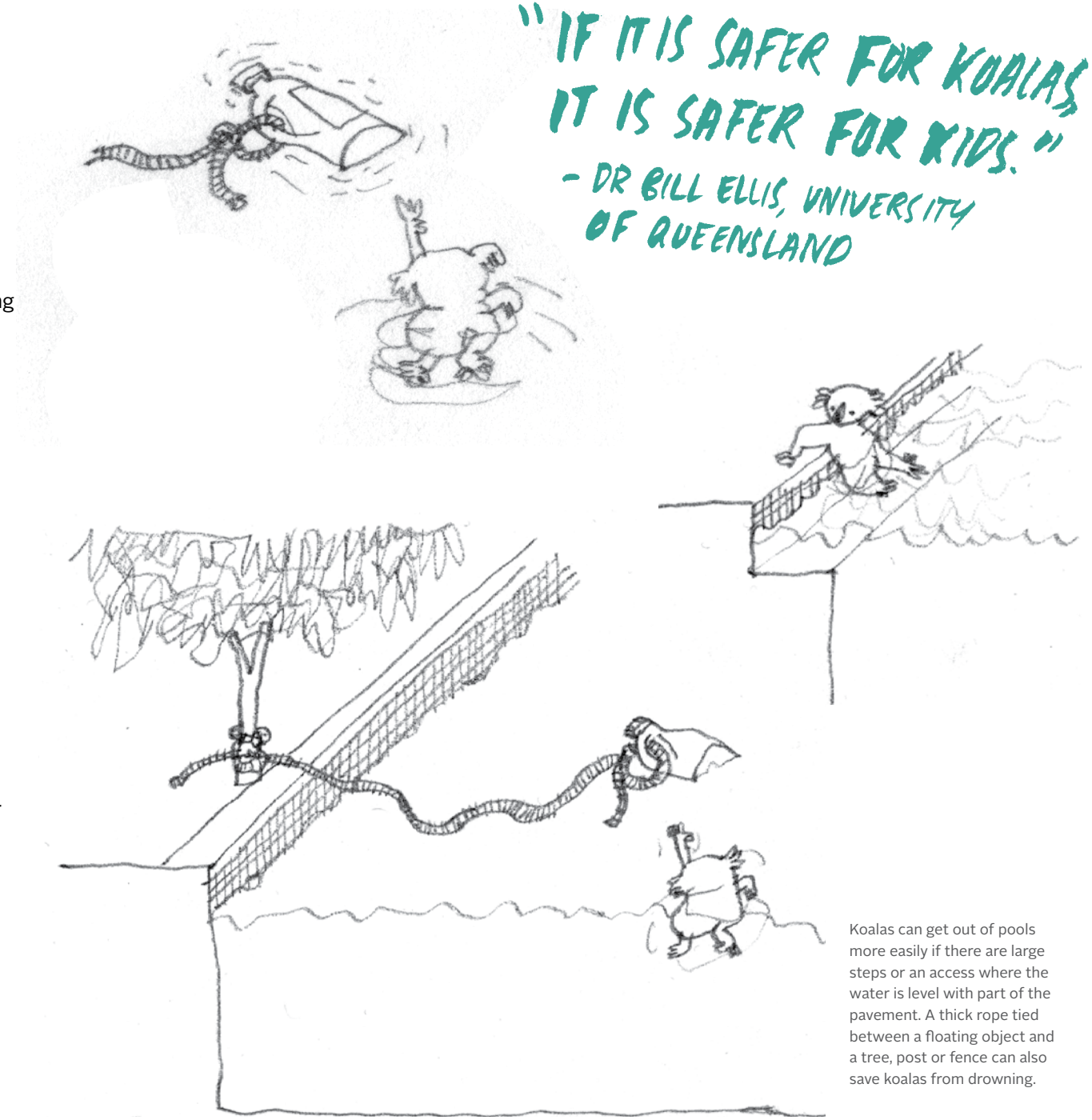




Wider fence tops provide koala walkways. The provision of planks of wood between fences and backyard koala food trees means that koalas can avoid using the ground where there are dogs and other threats.

For swimming pools, the Department of Environment and Heritage Protection recommend using a pool cover that is tight, secure and will not sink if a koala walks on it. Glass, perspex or steel fences can keep koalas out of pool areas. Also, a thick rope wich is attached at one end with a floating object in the pool (like an empty milk bottle) and the other end secured to a tree, post or fence, can save a koala from drowning by giving it something to help it climb out of the pool. There should also be a beach-type access where the water is level with part of the pavement so koalas can get out easily, or steps that are big enough to allow koalas to climb out.

If we want koalas to survive, we have to alter some of our attitudes towards our pets. Ideally residents should be encouraged to choose not to own dogs or cats. However, given that these animals are an important part of many people's lives, this is a difficult regulation to implement. In light of this, dog owners should be required to actively manage their pets in order to reduce risk to wildlife. In and near koala habitats dogs must be locked up at night and they must be leashed when walked. Rigorous dog training accreditation systems, aimed at achieving better coexistence with koalas should be supported by government funding schemes and incentives.



Koalas can get out of pools more easily if there are large steps or an access where the water is level with part of the pavement. A thick rope tied between a floating object and a tree, post or fence can also save koalas from drowning.

PLANNING FOR THE FUTURE - RECOMMENDATIONS

WITH ACTIVE MANAGEMENT, GOVERNING BODIES CAN SUPPORT HEALTHY KOALA POPULATIONS THROUGH A COMBINATION OF PLANNING, LAND MANAGEMENT, REGULATION AND PREDATOR MANAGEMENT.

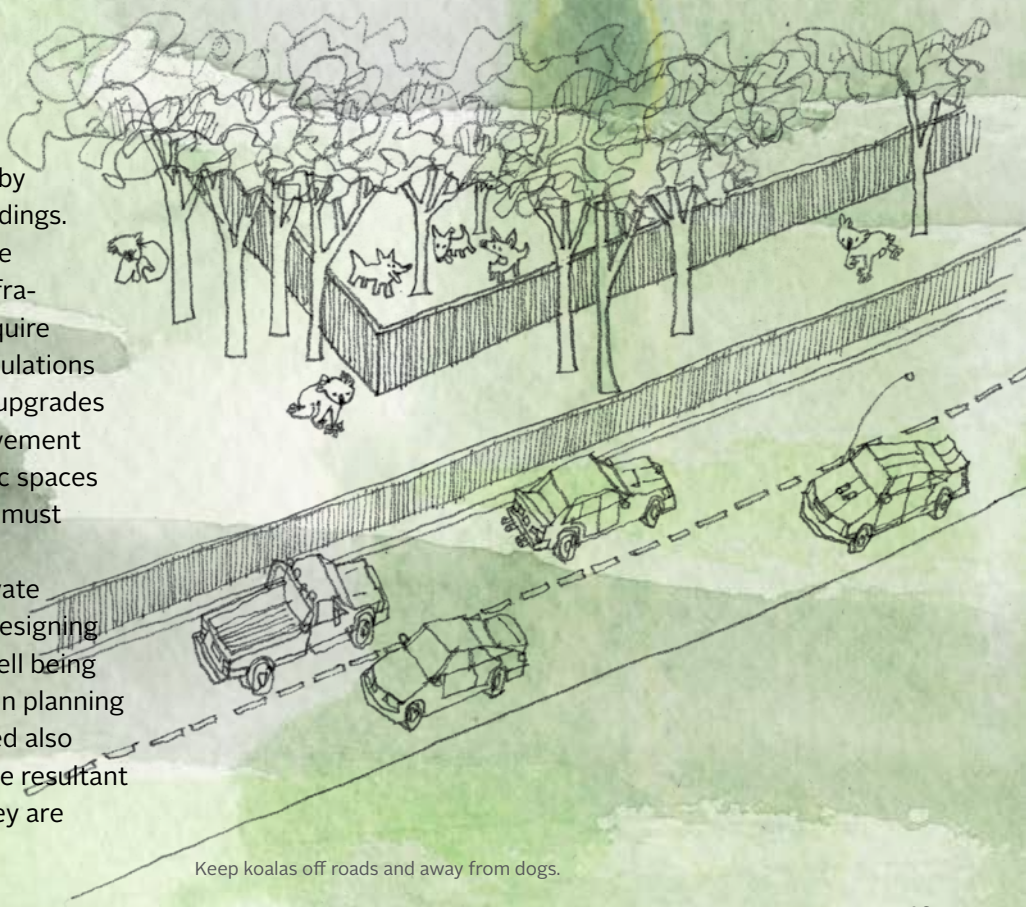
This will create environments that are designed to support koalas and other threatened species. If semi-urban areas are designed to enhance local ecologies and if damaged bushlands are repaired, scientists are confident that koala populations can be stabilised.

The basic rule for the management of an area is simple –

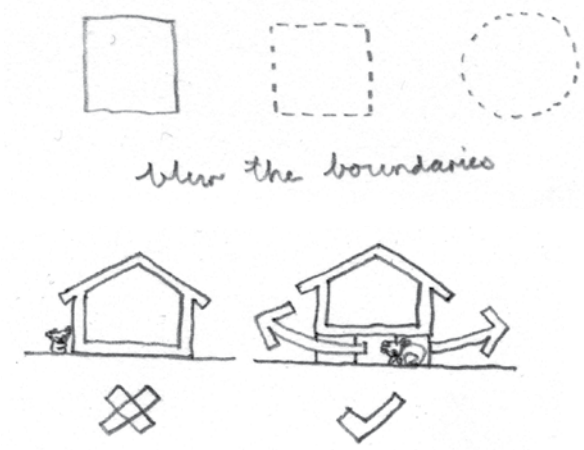
Remove threats to koalas, or keep koalas out.

We have to better manage threats by rethinking roads, dogs, fences and buildings. Koala friendly design elements must be incorporated as standard operating infrastructures. Many koala populations require active management and, declining populations require recruitment. Road design and upgrades must incorporate means for koala movement under and over roads. Barriers in public spaces that hinder movement within habitats must be removed.

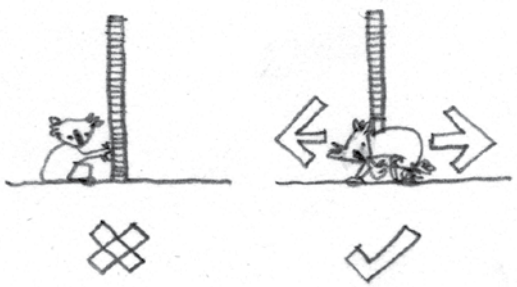
Both government planners and private investors need to shift their focus to designing for ecological health supporting the well being of wildlife and people. Investing more in planning to ensure that better places are created also means more rigorous monitoring of the resultant planning regulations to ensure that they are adhered to.



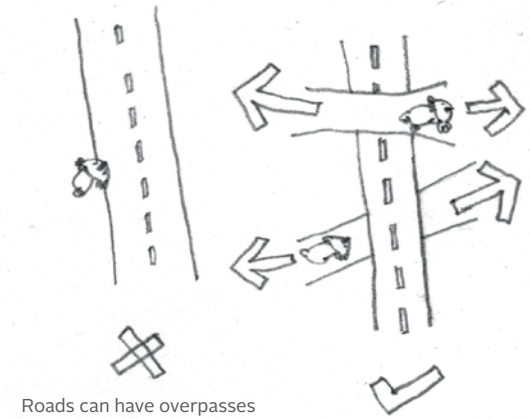
Keep koalas off roads and away from dogs.



New buildings can be raised for koalas to move under.



If there are no dogs, fences can have holes for koalas to move through.



Roads can have overpasses and underpasses.

There needs to be consolidation, which includes protecting koala habitat and rebuilding koala networks. Koala Coast local governments require a stronger and more unified strategy. Koala territories need to be established and these territories must be communicated. People living in and around these zones need to be educated as to how to best coexist with koala populations. We need to establish which koala populations can be stabilised and what to do with the koala populations that are beyond population tipping points.

In the long term, we need to rethink how we use land. We need to think less about competing and planning for exclusive use and instead urgently need to develop plans for sharing land use with multiple species. With this in mind, we have to look out for opportunities to create new koala habitats and new koala corridors. Building on existing guidelines and learning from the sucessful examples covered in the last section, the following section outlines a suite of recommendations, planning ideas and practical strategies that can be implemented to prevent Koala Coast koala populations from disappearing completely.

Policy

01. A Koala Protection Act

Australia requires an act that legislates against human interference with remaining koala populations. This legislation must address the management of koala habitat at a national level. A precendent for this act is the Bald Eagle Protection Act, passed by the United States Government in 1940 and prohibiting the killing or selling of bald eagles. This act was passed as the United States was in danger of losing their national icon forever. The act increased public awareness of the bald eagle and has resulted in a partial recovery of populations in some regions and a slower decline of the species in others. The Australian Koala Foundation believes that a Koala Protection Act could be legislation that stipulates that residents who have koalas on their property cannot harm them or remove their trees, ensuring that all domestic activities are benign for the long term future of koalas.

Another legislation precedent is The Bolivian Bill of Rights. The Law of Mother Nature, or the "Mother Earth" law, draws on indigenous concepts that view nature as a sacred home – the Mother Earth on which we intimately depend. As the law states, "Mother Earth is a living dynamic system made up of the undivided community of all living beings, who are all interconnected, interdependent and complementary, sharing a common destiny." The law gives nature legal rights, specifically the rights to life, regeneration, biodiversity, water, clean air and restoration.

02. Protection of Koala Habitat

There is little value in classifying Queensland's koalas as vulnerable and adding them to the Threatened Species List if the habitats and koala food trees are not protected.

We need to protect all remaining areas

of koala habitat and acquire more land to augment and connect these habitats. Protecting existing bushland means retaining bush corridors to ensure connectivity. Where this is not possible, green corridors need to be re-established between separate protected bushland zones. New residential developments can be greener if bigger proportions of land are allocated to wildlife habitat. When planning for new developments, ideally the valleys and the ridgelines should be kept as bushland. In addition to protecting remaining patches of koala habitat, rules and responsibilities for nearby residential areas must be set out by local governments to minimise the impact urban areas have on koalas and other wildlife. These could be set out as formal agreements between developers or property owners and local governments.

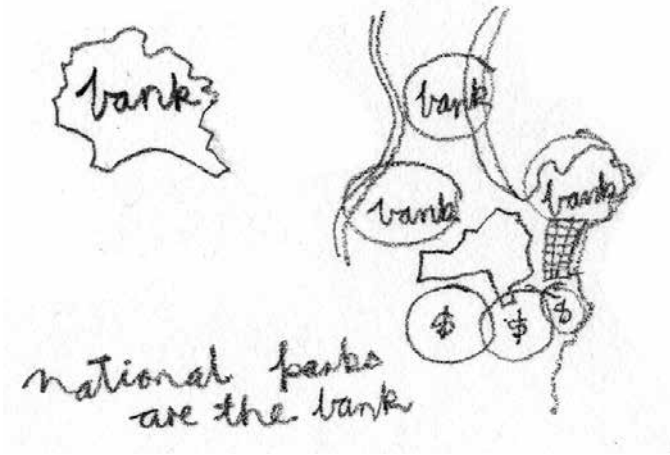
Large protected koala habitats can be increased by government in the form of land purchases. This would further enhance Queensland's National Parks network. National Parks protect flora and fauna, and they are for everyone, representing all Queenslanders. National Parks are about loving the land in which we live.

03. Covenants

Local governments need to set out life long covenants that recognise and protect existing and re-established networks of koala habitat and corridors. For properties within and near koala habitat, local governments could attach covenants to protect local native flora and fauna, enshrining the title so that it is valid even when properties are sold.

04. Koala Levy

New and existing residential developments and town centres in and near koala habitats require a koala protection levy which can contribute towards the building and maintenance of koala habitats, corridors and koala hospitals. A koala levy will engage the community to manage themselves to monitor and help koalas. This will help to build a sense of shared responsibility.



05. Subsidies

Subsidy systems for private land owners and developers that conserve koala food tree habitats need to be set in place. This includes subsidising land owners that assist in the process of re-establishing koala habitats and corridors. Land owners can be rewarded by meeting the requirements of a 'Good Koala Planning' checklist that could be incorporated into the development application process on a local government level and in Queensland's Sustainability Building Rating System. Federal Government might supplement funds on a dollar for dollar basis. By doing this, our governments are investing for the future.

Mapping

06. Koala Mapping

Koala maps are a part of a methodology for understanding koalas across a particular lanscape. Dr Stephen Phillips explains that when he is monitoring and documenting koalas, he sets out a grid system across the landscape which become points of reference that provide a better sense for the condition a koala population is in. In larger patches of habitat, the grids overlap at 300 metre centres, and in smaller patches the grid centres can be closer together to provide more detail. Phillips suggests that science like this can be more cost effective if planned into a koala habitat and surrounding areas in the initial planning stages, even where residential developments and town centres overlap with

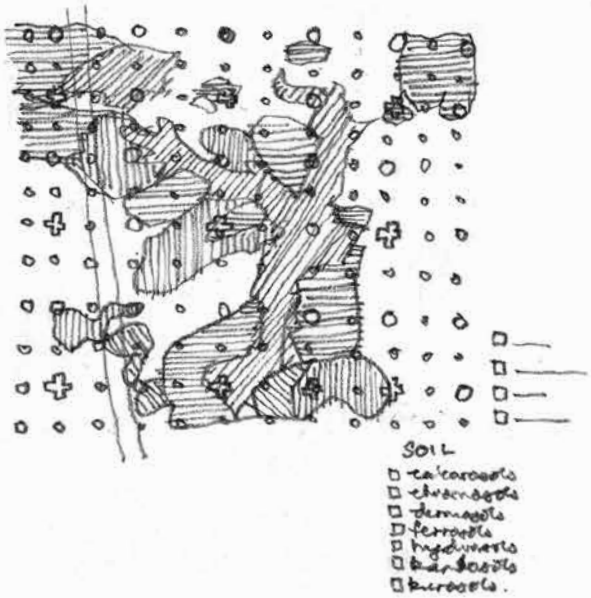
parts of the koala habitat. If grid systems are established as permanent markers, monitoring of koala populations can be ongoing. Rather than starting studies from scratch every time, a fixed grid can be constantly referred to in the future as an ongoing data base that is constantly updated at regular intervals, creating a much clearer and progressive picture of a koala population's health over time.

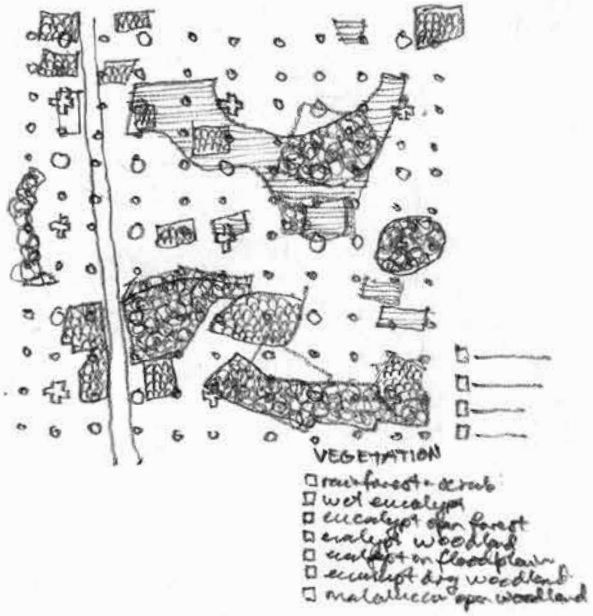
The Koala Habitat Atlas developed for the Australian Koala Foundation is at the forefront of mapping systems – it is a valuable tool however it needs to be further developed and refined.

An excellent initiative is "The Great Koala Count" in South Australia, where the public become "citizen scientists" by using a smart phone app to document koala sightings. This contributed to the building of a database of koala population densities.

07. Tree Mapping

Dr Stephen Phillips recommends that koala maps should be layered with information about vegetation and soil to get an even clearer understanding of why koalas are or are not present in certain areas. In managing and expanding the mosaic tree species, local understandings and awareness of tree species can be developed where local koala food trees are known from neighbourhood to neighbourhood. Because of this variation, detailed tree documentation on koala maps would be an invaluable resource. This process can be initiated in smaller areas, within and around residential neighbourhoods and gradually expanded to include the surrounding regions. This could become a part of the role and management of community enclaves.





When looking for opportunities to spread koala habitat, we need to understand soil and vegetation.

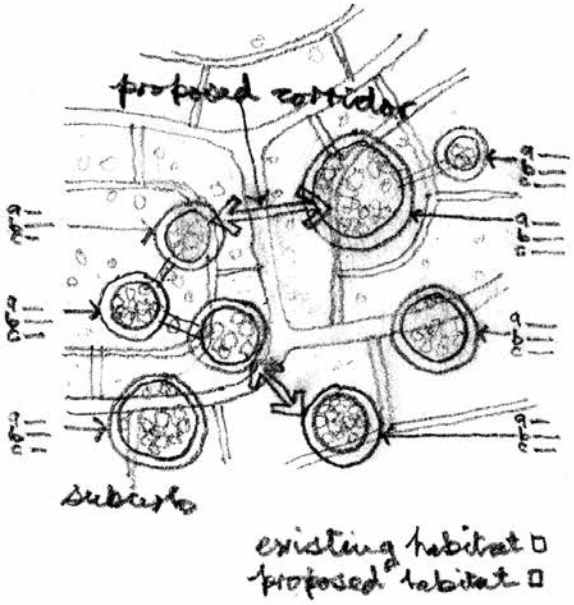
ESTABLISH, DOCUMENT, EDUCATE AND REPLANT.

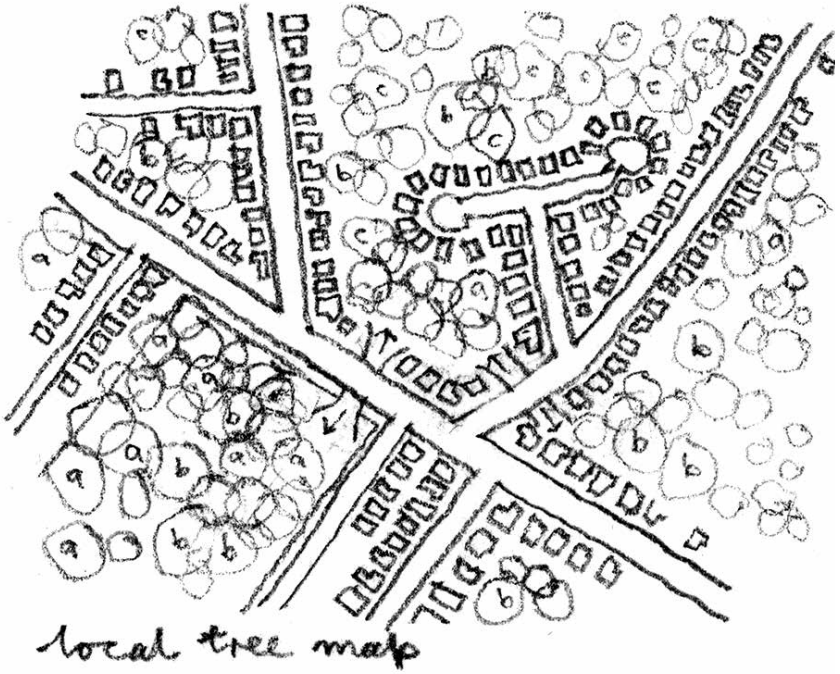
Once a community has local knowledge of their region's vegetation mosaics, koala food trees can be replanted and integrated throughout neighbourhoods. Effective networks of koala habitat and corridors can be re-established through developing koala friendly streetscape landscaping and urban green spaces.

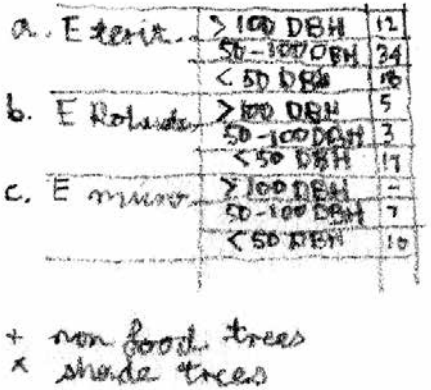
Buildings cannot occur within the drip line of a tree. The drip line is the outermost circumference of a tree canopy where water drips from and onto the ground, and for koala food trees is at least 12 times the Diameter at Breast Height.

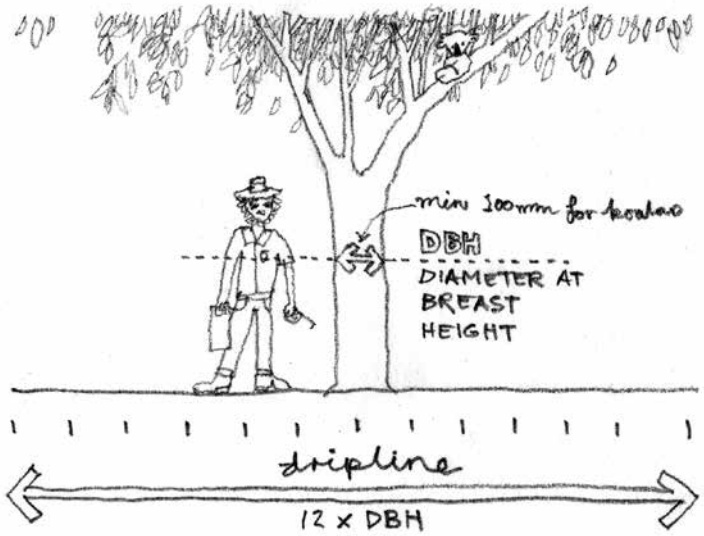
Tree and soil mapping on a local level can lead to a greater system of maps and potentially a national tree documentation system. With a better understanding of the needs of trees, these maps can form a strong basis for the protection of trees under provisions that can be set up by Federal and Queensland government legislation.

An example of a tree documentation system can be seen in Appendix D and F of Redlands Urban Tree Project (Redland City Council's Biodiversity Research Project), which can be found at HYPERLINK "http://www.redland.qld.gov.au/SiteCollectionDocuments/Plans_Reports/Environment_plans/Redlands%20Urban%20Tree%20Project.pdf" www.redland.qld.gov.au/SiteCollectionDocuments/Plans_Reports/Environment_plans/Redlands%20Urban%20Tree%20Project.pdf









Local tree maps will reveal opportunities to recreate koala habitat and corridors.

Planning

08. Buildings and Boundaries

When planning for koalas and humans to coexist, it is important to remember that koala populations are dynamic. Koalas constantly move around along the ground.

Buildings are static, and boundaries are fixed. Human boundaries, like fences and roads, need to be more organic. We need to alter our buildings and backyard designs so that koalas are able to move through, around, under and over without the threat of predators. With this in mind, creative design ideas are required to create better quality higher density living for humans and more space for koala habitat and corridors.

09. Koala Habitats

Planning for bigger zones of koala habitat and functional and safe connectivity between these areas will reduce koala stress levels.

As we develop a better understanding of the thresholds and landscape ecologies in our environment, we can plan future land uses accordingly.

Dr Stephen Phillips says that the minimum land area for koala habitat in the Koala Coast area is 50 hectares. According to Dr Frank Carrick, the absolute maximum number of koalas that a 50 hectare well resourced area of habitat can support is 125 koalas, ideally about 20 koalas. Phillips adds that 50% extra land must be allocated to koalas so that they have the space to move if a bush fire comes through.

10. Koala Corridors

Patches of koala habitat must be connected to ensure the unobstructed movement of koalas to maintain genetic diversity. For these connections to be functional and safe, Dr Phillips recommends that bushland thoroughfares need to be at least 50 metres wide to be effective. Dr Carrick offers an alternative approach, he recommends that the corridor width should be twice the height of the trees in the corridor.

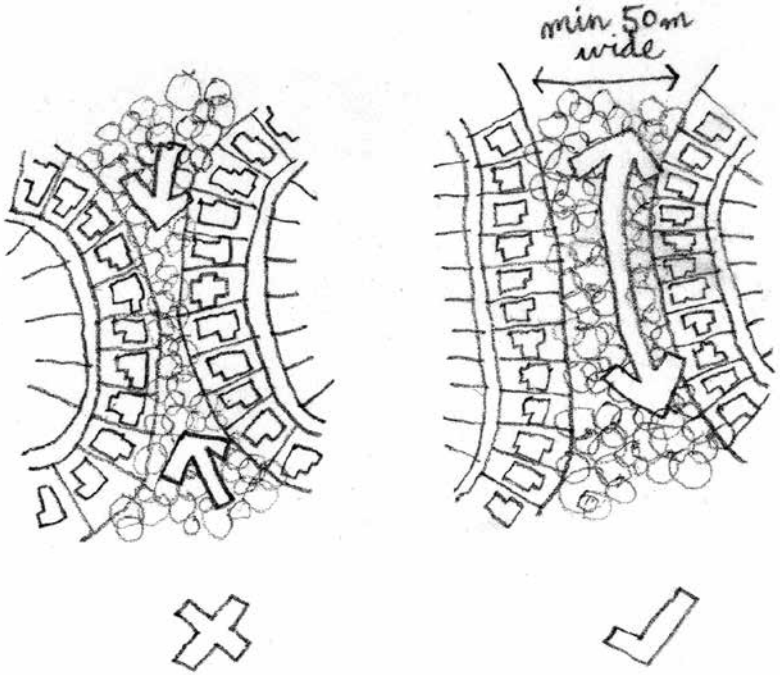
Planning must consider designs for corridors that safely link patches of koala habitat and that are to be free of threats. Guidelines, need to ensure that the corridors do not bottleneck or become fragmented.

11. Lot Sizes

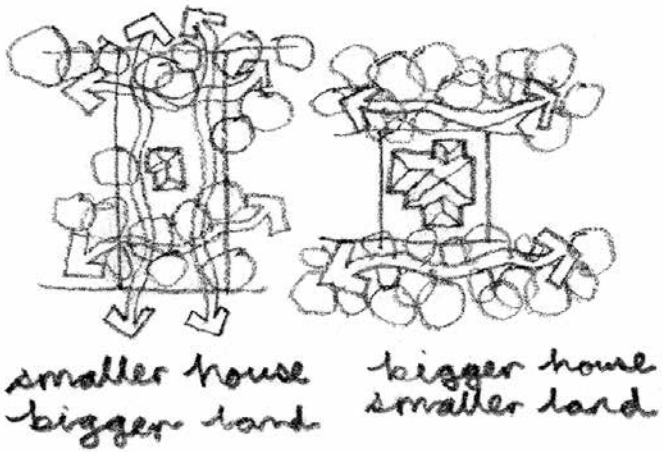
Currently the average Queensland building block is around 600 square metres, however for the above mentioned minimum koala habitat areas to be achievable, block sizes need to be variable.

There are two approaches with respect to how big or small lots of lands should be. One is that lots should be smaller with less backyard areas to form well designed higher density residential areas and larger areas of land for bushland habitat. This approach minimises the overall footprint of the development as well as improving local amenity by providing more greenery and areas for wildlife.

The second approach is to increase residential block sizes so that more koala trees are retained in backyards. This approach also requires minimising building footprints. Backyards become part of the overall greenscape that



Koala corridors need to be at least 50 metres wide.
Dr Stephen Phillips.



There are many ways to arrange dwellings and lot sizes so that koala connectivity can be maintained.

accommodates local koala populations.

It is possible for a combination of both approaches to plot size be implemented. With careful planning, smaller lot higher density and larger lower lot density can work together. This not only allows for more flexibility allowing for more koala movement near koala habitat and corridors, but opens up more options for housing markets.

It is envisaged that town centres can be denser, with larger more penetrable lots towards the edges, closer to koala habitat and corridors. These enclaves of dwellings would use land more efficiently by being smaller and more definable.

Some koala corridors, or parts of, have the potential to be shared areas with passive land uses. This might include privately owned back yards, recreational areas and low scale grazing and agriculture.

12. Fences

While standard fences stop the movement of koalas along the ground, specially planned fences are required to protect koalas from domestic dogs, dingoes and cars. We need to explore the concept of not having fences to define every individual property. In some developments, communities might share common areas such as backyards that could then also be used as koala habitat.

Having said that, fences do need to be constructed to keep koalas out of dangerous areas, especially along the more major roads and arterials. These fences need to guide koalas to locations where they can access road bridges and tunnels. Darryl Jones of Griffith University has designed a koala fence that has a lower rubber section that goes under the ground to stop the smaller digging animals from penetrating the fence.

13. Roads

Gail Tucker of Central Queensland University has been analysing the relationship between driver behavior and reflexes, and is finding that speed is the biggest killer of koalas on roads and most fatalities occur on straight stretches of road where people drive faster. Reduced driving speeds make minor differences to a driver's overall travel time but may save the lives of hundreds of koalas every year in stretches of roads that cannot be fenced. Increasing driver visibility is also important so more lighting at koala crossing hotspots will also help save koalas. Cameras that link back to koala hospitals are also suggested to monitor at hotspots.

Drivers are usually devastated when they realise that they have hit a koala. It is also common for drivers to not realise that they have hit a koala at all. There needs to be more education about how to drive through koala habitats to minimise road fatalities. They need information regarding what to look out for when a koala has been hit by a car. Roadside koala crossing warning signs should also be modified so that they show koalas walking rather than a koala sitting in a tree. To put it simply, koala warning signs need to communicate exactly what a driver needs to look out for.

Local roads require signage and speed reducing devices like speed humps and chicanes, strategies thatwere incorporatedinto the road design at Koala Beach. Speed limits can be variable depending on koala activity at certain times of the year. During the July to September koala breeding season, lower speed limits could be established in the evening hours when koalas are more active.

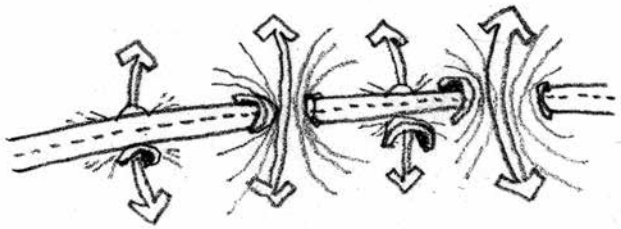
14. Koala Road Crossings - Land Bridges and Tunnels

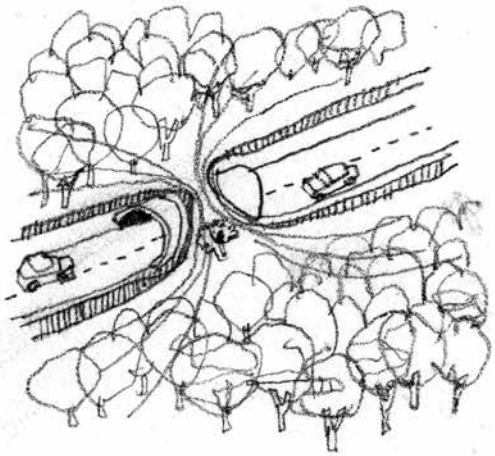
Koala-friendly road design sees the creation of permeable landscapes that allow koalas to move around along the ground and maintain home ranges without having to directly interact with roadways. In the short term, the most important strategy for preventing koala injuries and deaths is to keep koalas off the road by constructing fences along dangerous roads. In the longer term the challenge is to make roads permeable, providing options for koalas to move under and over roads. The resultant land bridges and tunnels are invaluable for all wildlife.

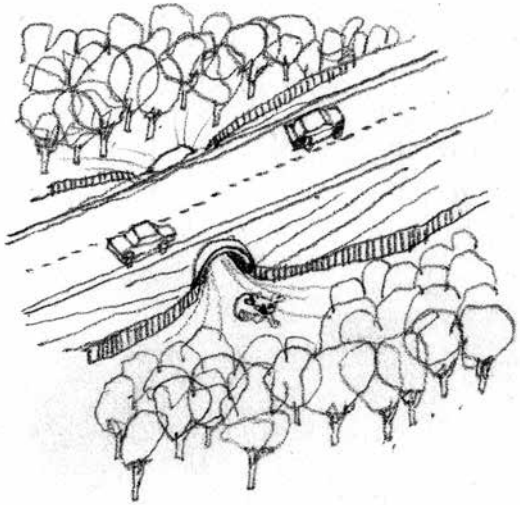
Fauna road crossings and associated fencing in new developments and existing neighbourhoods would need to be funded and managed between the Department of Transport and Main Roads, local government and private property owners.

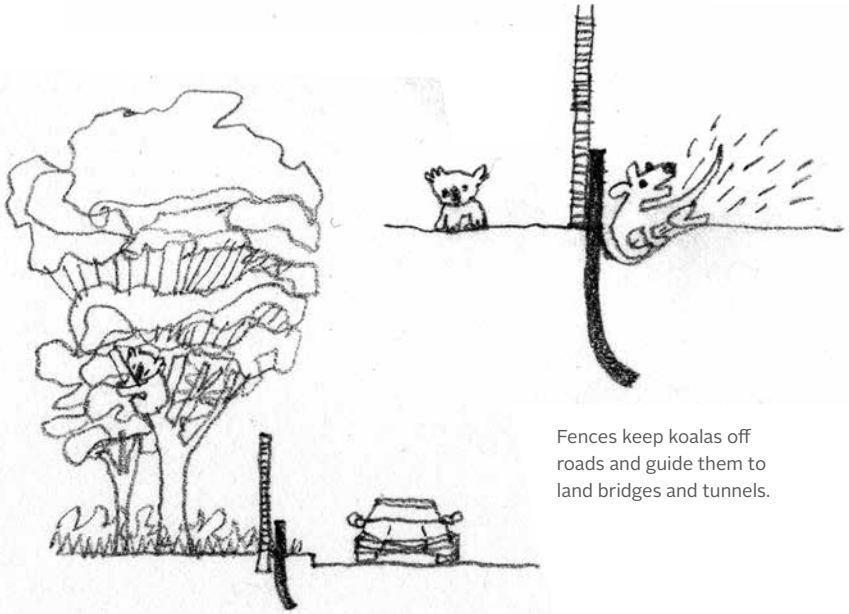
Koalas have been observed using underpasses of various sizes and there are a variety of options that have already been implemented and that are working well. Koalas are slow learners and changing their behaviours around roads remains a huge challenge. To date, the most effective ways of encouraging koalas and other animals to use tunnels has been lining roads with special fences that guide the animals to the underpasses. These fences are made of a mesh, with sheet metal or rubber built below ground level to stop smaller digging animals from passing underneath them. All roads faster than 60km/h that go through koala habitat should have these fences that safely funnel animals into the underpasses.

There are opportunities to work with existing drainage systems and culverts under roads to create connections for koalas. In such situations, little ledges or rails can be installed in drains and culverts so that koalas can move over water in times of rain. Again, there must be fencing to guide and funnel koalas towards these structures. Retrofitting can be expensive, so design strategies for achieving koala connections need

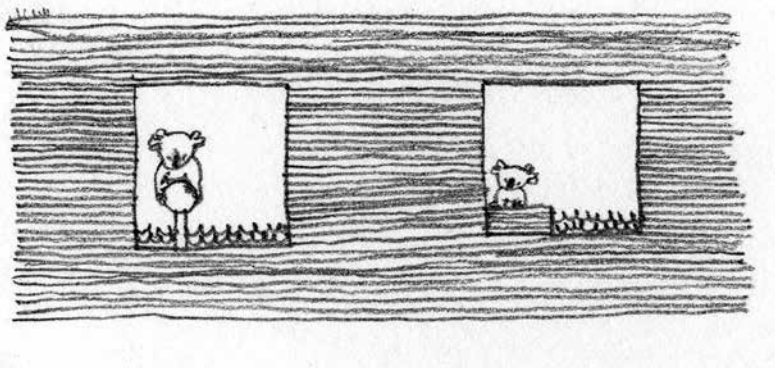




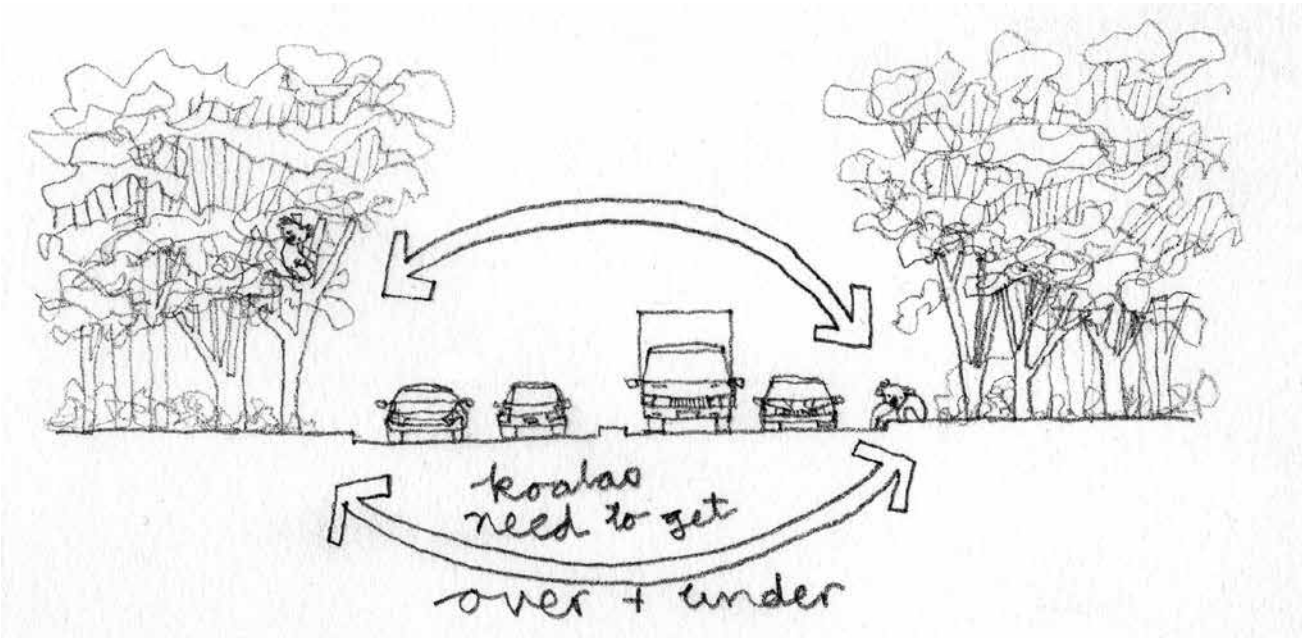




Fences keep koalas off roads and guide them to land bridges and tunnels.



Underpasses require furniture for koalas to safely move through in times of heavy rain.



to be included early on in the planning process. As an approximate costing, at the time of writing, concrete ledges cost about $600 per cubic metre, and treated timber pole systems cost about $50 per metre.

Griffith University in conjunction with Redland City Council have developed recommendations for different types of fauna underpasses. They recommend incorporating koala friendly "furniture" near the openings of culverts and within the culverts, such as horizontal and vertical poles and netting attached to pylons and dead trees. For wider roads, Redlands recommends a separation between lanes, or skylights, to allow for light penetration down into the underpass. It is important that entrance areas are rehabilitated with eucalypts, shrubs and grassy groundcovers and that the underpasses are regularly maintained. Shrubs can also provide shelter opportunities for other species. To date land bridges have been less sucessful for koalas, which suggests that underpasses might be the better option for making roads permeable for wildlife.

15. Planning for Bushfires

Bushfires need to be planned for and managed. Bushfire buffer zones that have little vegetation are required between the bush and buildings. There also needs to be good access to these zones for fire fighters and sufficient water hydrants. Dr Frank Carrick says that a common rule of thumb for bushfire safety is that trees should be a distance of twice their height from nearby buildings. When replanting koala food

trees, bushfire movement must be considered. Having bigger buffers can be used to allow koalas to escape fires. An example of this is in the Lismore region where koalas are able to avoid fires as they come through. This has allowed this region's population to recover.

The traditional fire knowledge and practices of the Yugambeh language people need to be incorporated into bushfire risk management planning.

16. Structure of the Environment

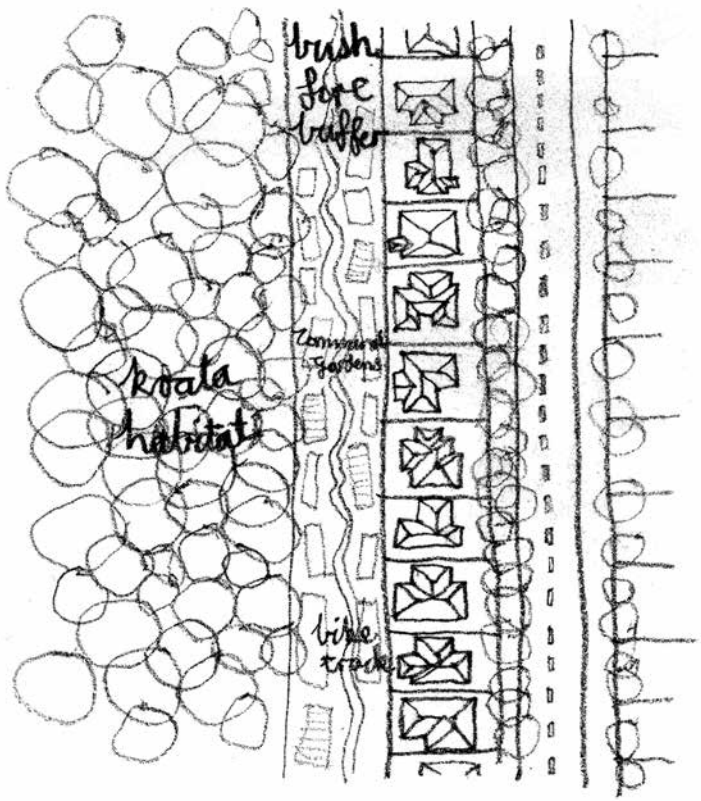
High quality koala habitat has several storeys of vegetation from the canopy to the ground. Understorey made up of smaller plants and native shrubs, provides shading and cooling for koalas in the hotter months and is especially necessary in times of drought. In areas that are being reforested, or where the understorey has been cleared, the understorey will grow back naturally if the weeds are removed and kept under control. Dr Bill Ellis and Dr Sean Fitzgibbon from the University of Queensland are experimenting with landscape modelling. They have found that fast growing non-natives shade trees can be an emergency solution in locations where understorey has been cleared.

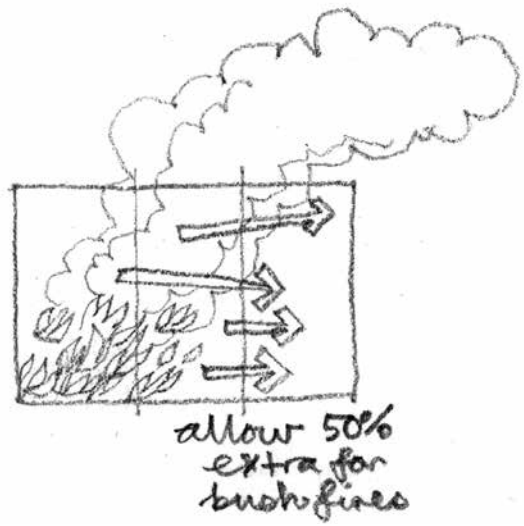
17. Koala Food Tree Replanting

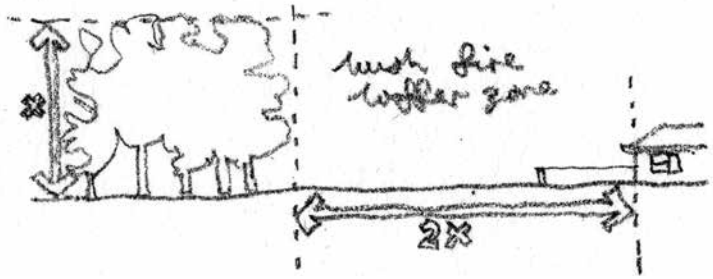
Re-establishing koala habitat is vital for long term koala survival. With so little koala habitat remaining on the Koala Coast, incentives are urgently needed for habitat re-growth on both private and government owned land.

At the time of writing, small koala food tree saplings cost around $1 each. Due to this low cost, a high density of saplings need to be planted in order to account for saplings that do not survive. More developed saplings cost around $35 each. Dr Alistair Melzer of Central Queensland University says that once the plants are in the ground, they have to look after themselves. There needs to be overplanting of saplings to account for sapling competition with faster growing grasses and understorey.

In re-establishing habitats, we need to consider how the process of koala re-population would occur. Might koalas naturally migrate from other habitats? Might new populations be established through translocating koalas from disconnected habitats where they would otherwise have no future? Might these koalas be bred under controlled conditions in the wild like at Pinjarra Hills Farm? Or might these be koalas bred in zoos specifically for release into new habitats?







Bushfire buffer zones are required between koala habitats/corridors and buildings.

18. Cleared and Degraded Land

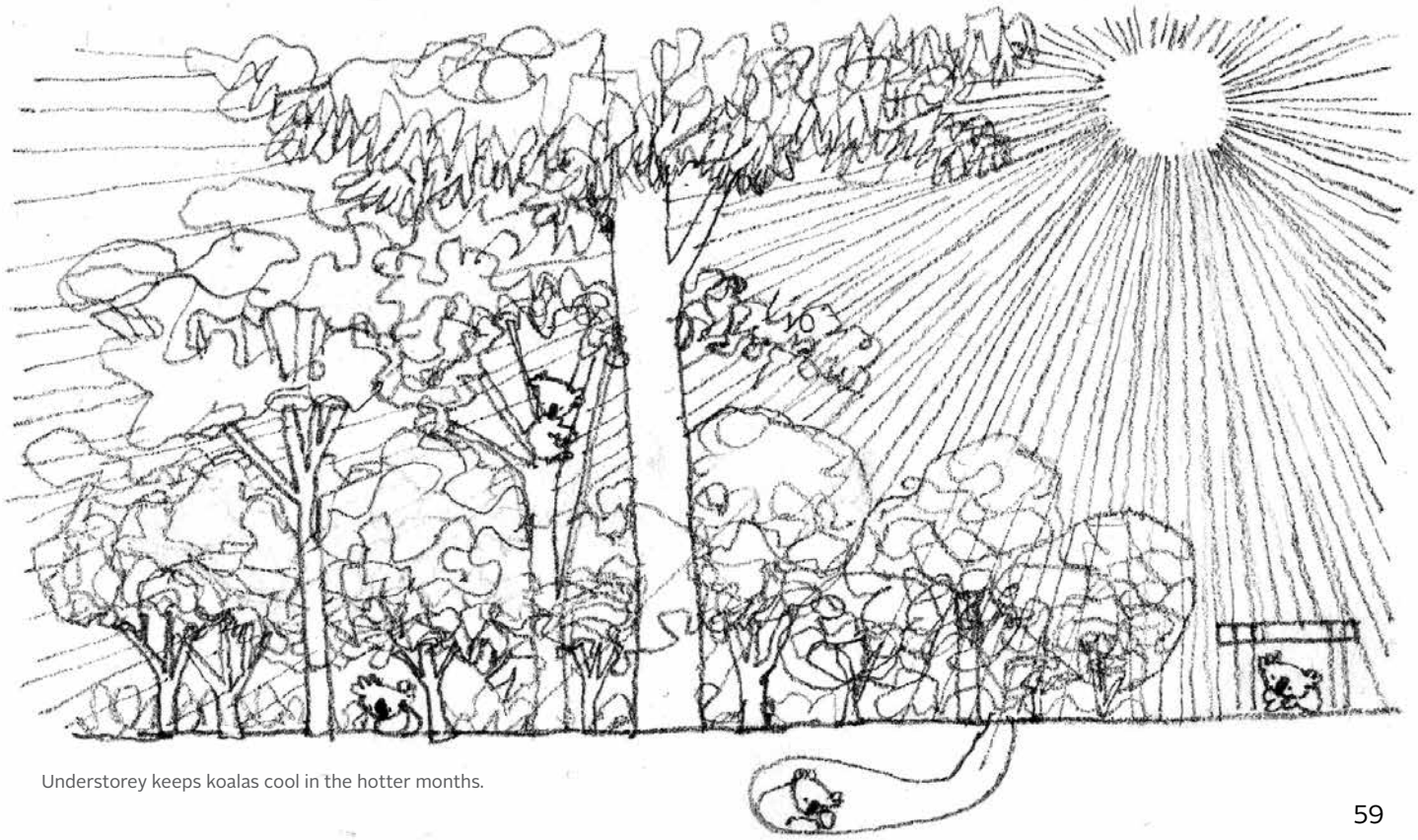
There needs to be an extensive strategic review of agricultural land to pin point opportunities for recreating koala habitat and corridors. By targeting degraded agricultural lands, these regions can again become useful resources in the form of koala habitat. Incentives should be established for landowners who re-establish koala habitat and developers who create koala friendly residential areas on degraded land. State and local governments can set examples by demonstrating how their unused land can be reforested with koala food trees. In some cases, does the government, on behalf of the environment, buy some of these degraded agricultural properties? As mentioned earlier, The Department of Environment and Resource Management is already undertaking such a scheme in the Kinross Road Structure Plan.

WE NEED TO SPREAD KOALA HABITAT.

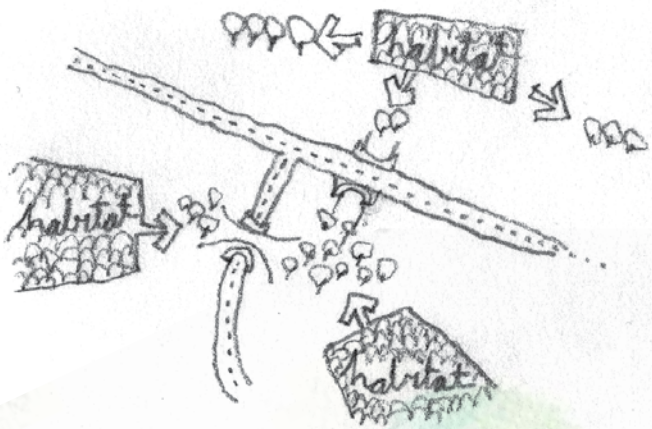
The Queensland government has developed approaches to analyse what is and is not degraded land through the Strategic Cropping Land Act 2011. This planning framework aims to create a balance between agriculture, economics, society and ecology. Strategic Cropping Land addresses competing land uses from the agriculture, mining and urban development sectors. It aims to protect highly productive lands for cropping, and support economic growth for regional communities.

By undergoing heritage studies on particular sites, there also needs to be an exploration in the freeing up of some sugarcane land that can be allocated for new town centres and koala food tree networks. Innovative young property developers in the Sunshine Coast area are already finding parcels of degraded sugarcane land for bamboo planting. The bamboo is harvested and used as a building material for new buildings on the same sites.

Larger areas of degraded land provide excellent opportunities to build koala friendly green fields residential areas that foster the sucessful coexistence of humans and koalas. Landscaped areas can enhance the koala food

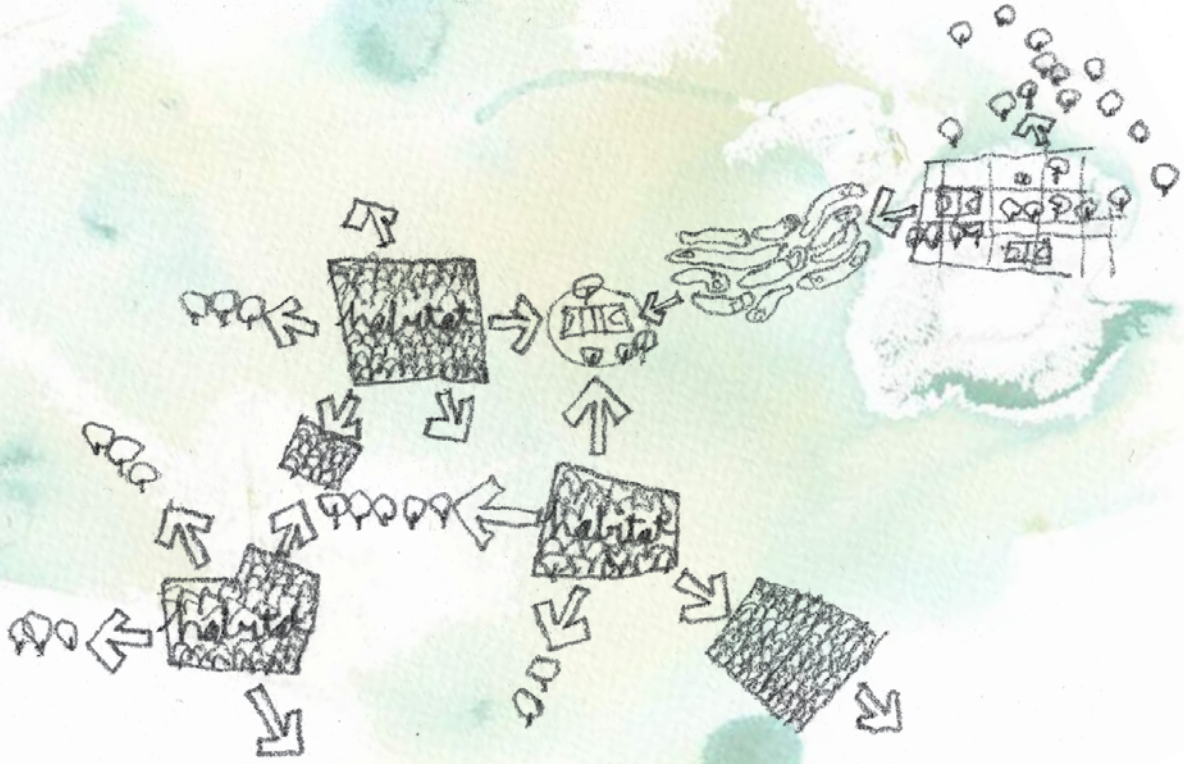


Understorey keeps koalas cool in the hotter months.



network. Existing koala habitats can no longer be cleared to make way for new suburbs. If new residential areas are to be planned, they must be planned as shared human and koala living areas. Utilising degraded lands are the way to achieve this. These new shared environments can demonstrate how to rework existing residential areas and invite koalas back into their old habitats.

Recreating habitat is a slow process that requires patience. It can take 10 to 12 years for koalas to start using rehabilitated areas again, although in some cases, it has been less. This process must start sooner rather than later.



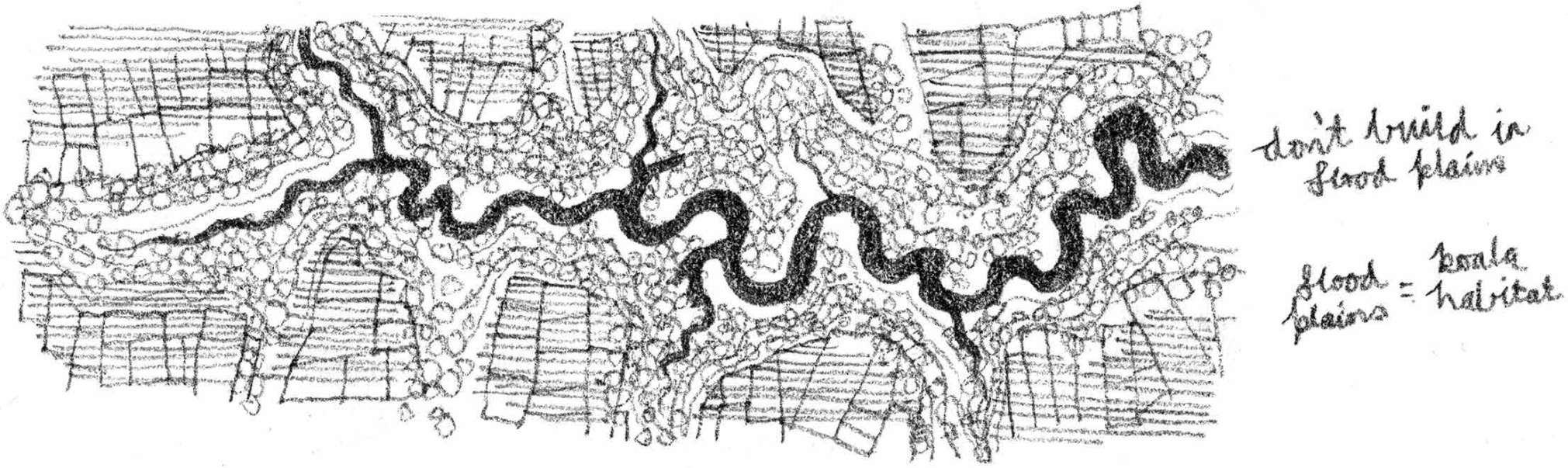
19. Flood Plains

As mentioned earlier, we need to consider the hydrology of an area as a part of the planning process. Floodplains, the most moisture retentive areas, contain the rich fertile soil that koala food trees thrive in, so the ability for soil to retain moisture is crucial to a koala population's survival. The more floodplains are intact as koala habitat, the better chance a koala population will recover after a drought. To ensure that water retention zones are maintained, the hydrology of an area must be a primary factor when planning urban developments.

In light of this, we have to ask the question, should we be building on flood-land? Deb Tabart of the Ausatralian Koala Foundation ponders, "People built in a floodplain and they got flooded. People built in a koala habitat and the koalas died."

Given there is already major fragmentation of koala habitat, future planning needs to reconsider floodplains, especially after the tragic losses caused by the floods that swept through South East Queensland in early 2011. The land that is not rebuilt on could become new bushland reserves. Instead of rebuilding in high risk flood prone areas, these zones could be re-established in memorial to human lives that were lost.

The Lockyer Valley town of Grantham has realigned some of its boundaries and roads. The town is reconsidering land use in the Grantham Reconstruction Area in response to the 2011 floods. Property owners were offered the chance to swap their low-lying land for blocks in a new residential development



on higher ground. Many property owners took this relocation opportunity and the council now owns the title to land in the flood zone and is planning to use it for parkland, market gardens and farming.

20. Walking Paths and Cycleways as Shared Koala Connections

Koala corridors can be established also by the strategic planning of passive human circulation links such as walking paths and cycle-ways. By planting these areas with food trees, such passive spaces could demonstrate how to build multiple land uses into our planning methods. These shared circulation links also feature community gardens and smaller scale recreational facilities.

21. Sharing Golf Courses with Koalas

Golf courses have become safe places for koalas. Koalas can move in between the greens in a safe fenced area without the threat of dogs. Generally golf courses are, well protected from bush fires as they are closely managed and monitored. If golf courses are in the vicinity of koala habitat, they can also be used as koala friendly wildlife corridors.

22. Rethinking Agriculture – Community Gardens

Many industrial scale agricultural approaches take from the earth without giving anything back, which is why we are seeing more regions that were once fertile become degraded and unproductive. Agriculture has become more about pricing wars, resulting in basic needs that are less affordable, and practices that are destroying farms that have been in families for generations. These agricultural practices are also killing the Great Barrier Reef, one of our biggest national treasures.

Our society needs to be more aware of our food and water consumption and our waste disposal. When planning future town centres, consumption and waste needs to be integrated into the infrastructure of the place. The design and development of productive and sustainable gardens and farms will help people to become more self reliant. These initiatives allow households to become more aware of what

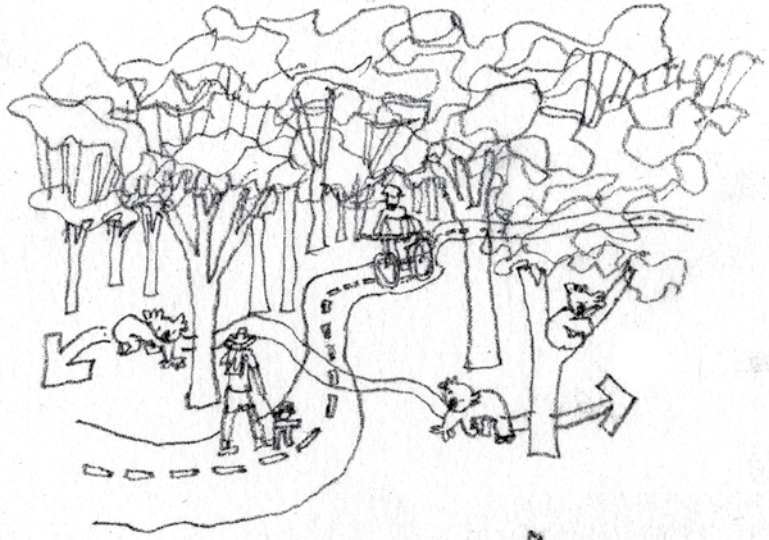
they consume and waste.

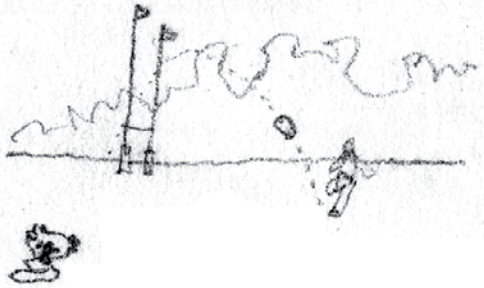
It is about working with nature, not fighting it.

Permaculture is an approach that can be incorporated into a network of community gardens. Permaculture grows out of understandings of natural ecological systems and pre-industrial examples of sustainable land use. Without healthy land, flora, fauna and humans cannot flourish. Permaculture attempts to take care of the land so that all life systems, including those involving humans, can be healthy. In planning for sustainable communities, we require agricultural systems that take care of all people so that everyone has access to the resources necessary for living. Just as healthy ecosystems use outputs from each element to nourish others, we humans can do the same.

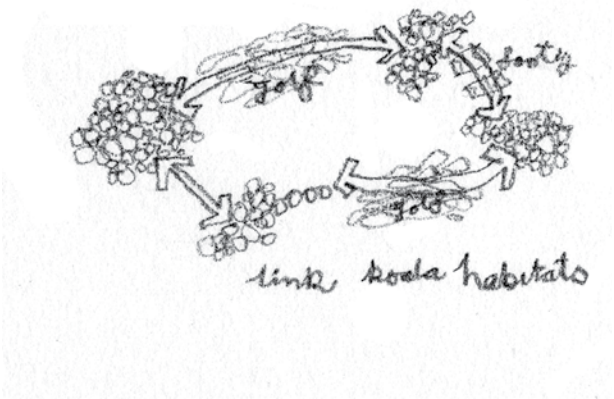
Permaculture, is about working with, rather than against nature. It looks at plants and animals in all their functions, rather than treating any area as a single project system. The whole is greater than the sum of the parts. By acknowledging the relationships between various elements of an ecosystem, permaculture attempts to group plants, animals and insects that are interdependent for mutual benefit. Some plants might be grown for food production,

There are opportunities to share golf couses, bike tracks and walking paths with koalas.





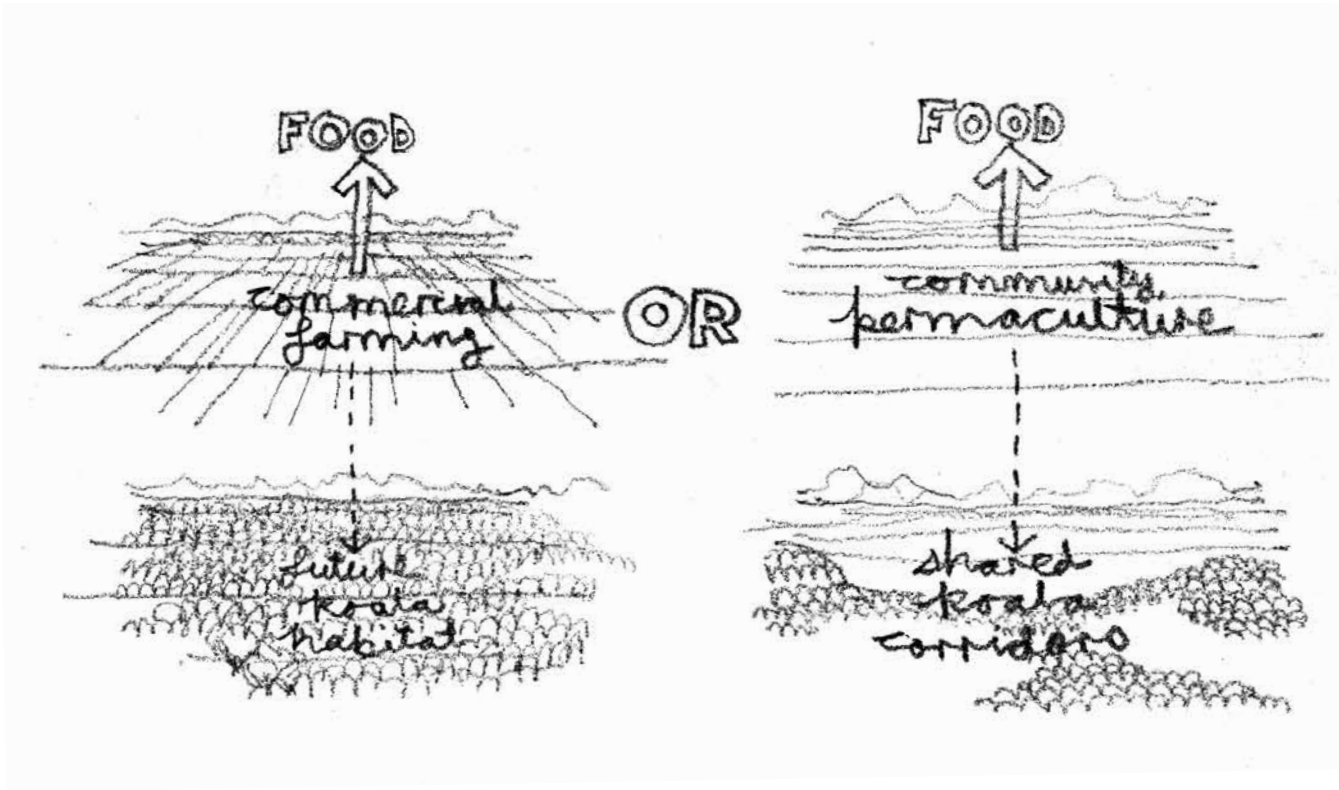
Community gardens - providing local areas with food and shared koala habitat.

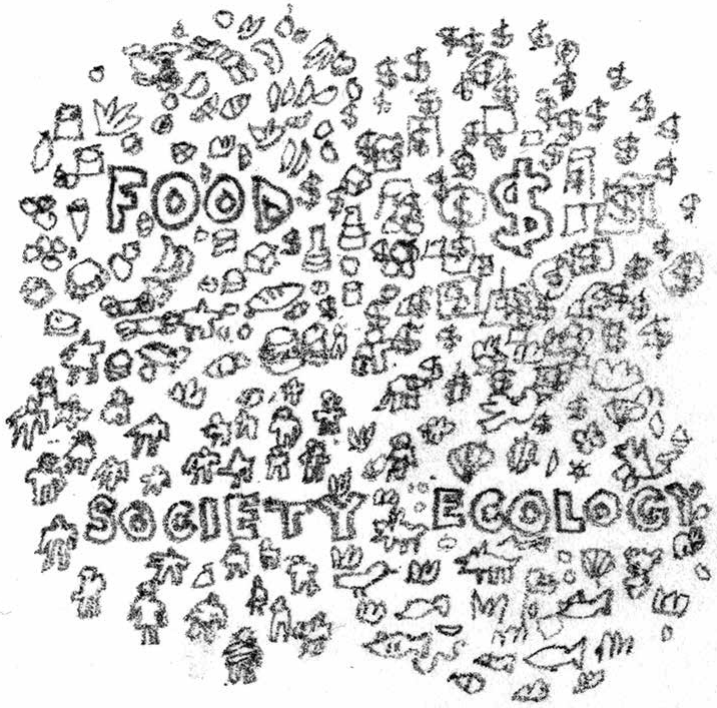


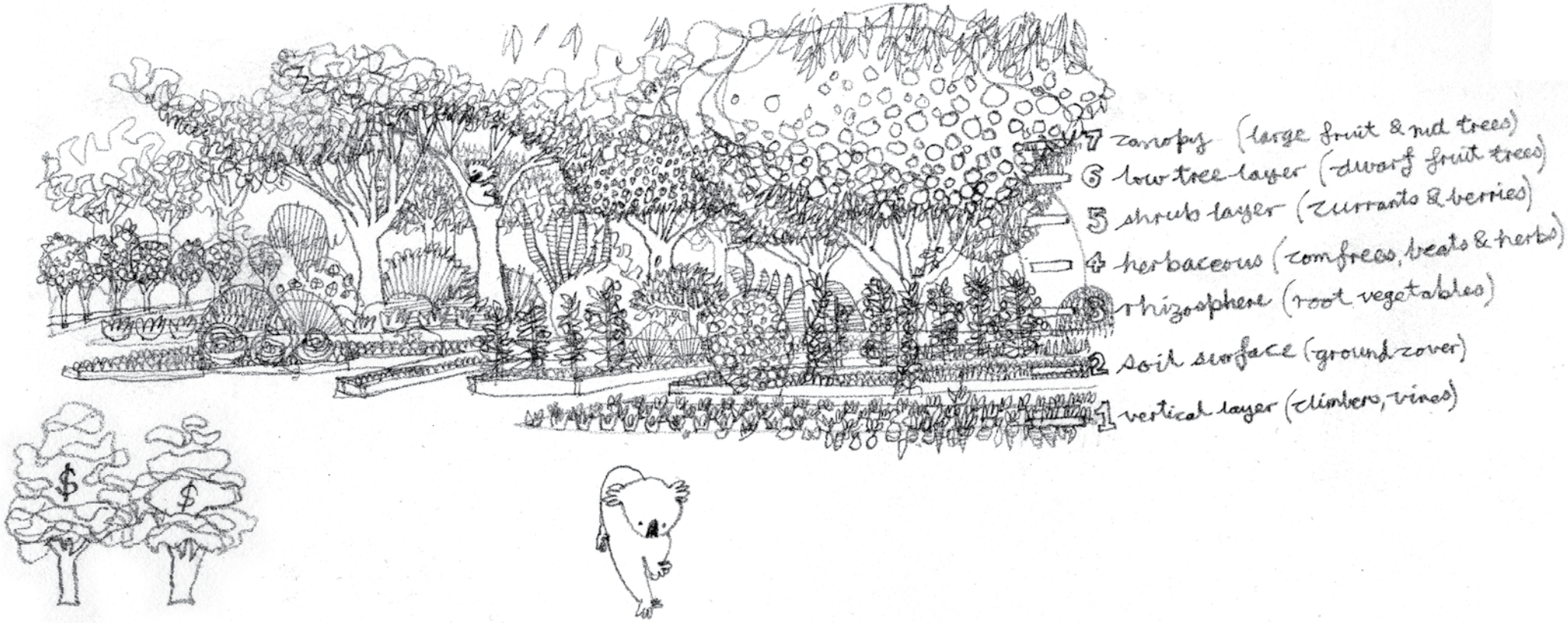
some to attract beneficial insects and others to repel harmful insects. It includes strategies such as companion planting where different food crops are planted close to each other to optimise nutrient uptake, HYPERLINK "http://en.wikipedia.org/wiki/Pest_control" pest control, HYPERLINK "http://en.wikipedia.org/wiki/Pollination" pollination and overall HYPERLINK "http://en.wikipedia.org/wiki/Crop_productivity" productivity. Local indigenous knowledge of the Yugambeh language people and their understanding of the benefits of bush tucker, need to be built into this approach.

Community gardens can be implemented on a large scale. As an integral part of planning for new town centres and reconstructing existing suburbs, governments need to be involved on a level that ensures that we use resources more wisely and minimise waste. The community garden network is something that all levels of society and business can be involved in. The network could be made up of a combination of backyard vegetable patches and large scale market farming. If larger supermarket brands can embrace organic and macro foods because they have identified a market for this type of produce, then they too can play a role in this new approach to the supply of food.

Very importantly, strategically laid out community garden corridors can be used by koalas as links between koala habitats.







Economics

23. Reforestation as an Investment

Carbon dioxide is the major greenhouse gas that contributes to global climate change. Carbon itself has an important role in natural processes such as in photsynthesis and respiration. Trees play a vital role in capturing and storing carbon through a process known as carbon sequestration. We can create opportunities for carbon sequestration by purposefully planting trees, which is one of the most promising ways of sequestering carbon to help mitigate climate change.

By better understanding the relationship between koalas, trees, carbon and money, we can add value to koalas. Valuing trees for their carbon storage potential is increasingly relevant as we enter an age of carbon accounting. Carbon storage will become increasingly valuble, making trees a sound economic investment. This economic perspective offers possibilities and incentives for preserving and augmenting koala habitat. The short term rapid return investment schemes resulting in the credit crisis of 2007 indicates that long term economics can be more stable and sustainable. Recreating koala habitats and corridors as a sustainable resource can provide such a secure investment alternative.

Urban planning that conserves koala habitats and allows for koala populations to thrive should be rewarded. We need to think beyond land exploitation and rapid return development of land. Incentives and rewards should be established for activities that improve land health and biodiversity. Rewards might come in the form of a koala carbon credit system, planting koala trees to offset carbon emissions and

enhancing the carbon bushland matrix.

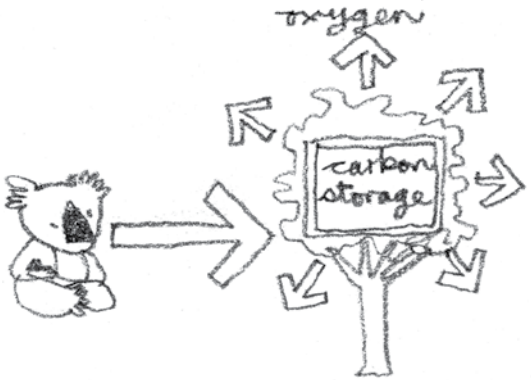
Wade Oestreich of Queensland Parks and Wildlife Service explains that the South East Queensland Koala Conservation State Planning Regulatory Provisions has set out offset criterion that puts a value on trees. “In restricting and offsetting the clearing of bushland habitat in priority areas of the Koala Coast, for each mature koala habitat tree that is removed, five new trees must be planted, or a payment of $900 made to Department of Environment and Resource Management to fund work on acquisitions and rehabilitation”.

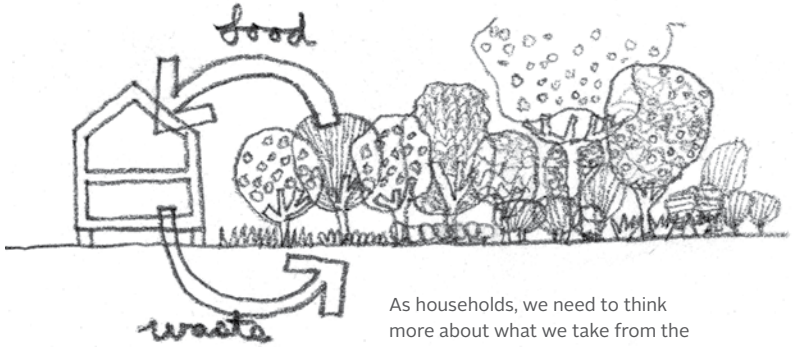
The Australian Koala Foundation considers the value of a large old growth tree differently, claiming that a tree the size of a telegraph pole stores around one tonne of carbon, which is the equivalent to a carbon credit. If this tree were to be chopped down, it would require 2000 saplings covering an area of 2 hectares to replace it in terms of carbon offsetting. At the time of writing, one tonne of emitted carbon dioxide is valued at $23AUD.

If strategic habitat and corridor replanting becomes a part of carbon offset tree planting schemes, these inventive incentives could boost neighbourhood morale, create a better sense of community, and provide opportunities and returns to society. Replanting activities have the potential to involve community - volunteers, conservation societies, community nurseries, universities and school groups. These schemes also provide potential for employment opportunities through JOBS Queensland.

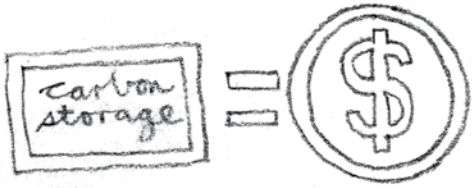
Investing in reforestation ensures the genetic potential and future evolution of the koala.

Dr Steve Johnston says that we have to be more active about monitoring and maintaining diversity in nature and the protection and rebuilding of koala habitats. He argues connective corridors are the vital link between genetics and planning. By considering the landscape and how it is divided from a genetic perspective, genetic potential can be maximised in order to give koalas a better chance of adapting to changing landscapes. A larger genetic base also develops resilience against potential diseases.

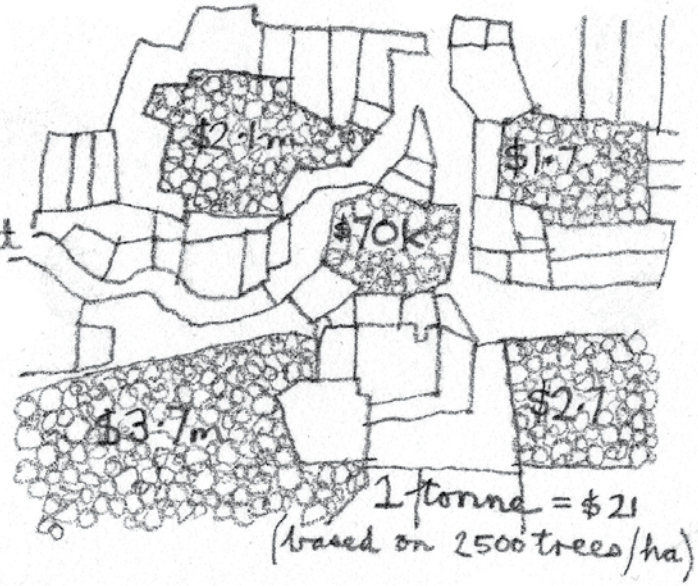


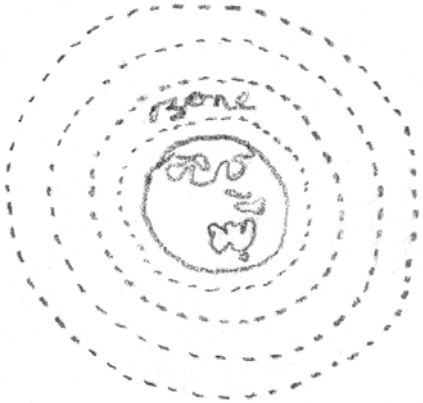


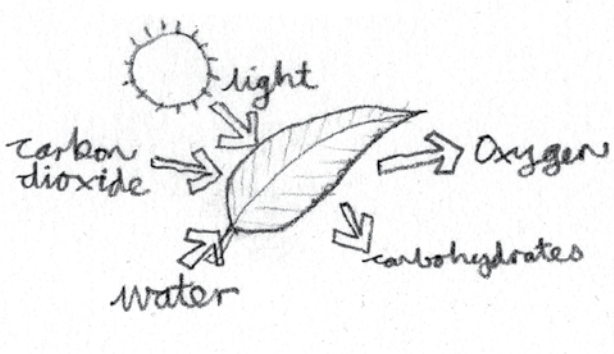
As households, we need to think more about what we take from the environment and what we waste.



Carbon offset and recreate koala habitat.

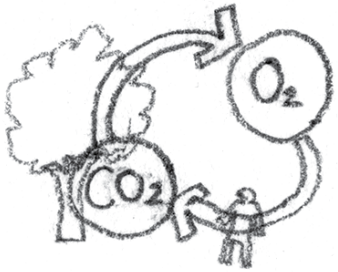


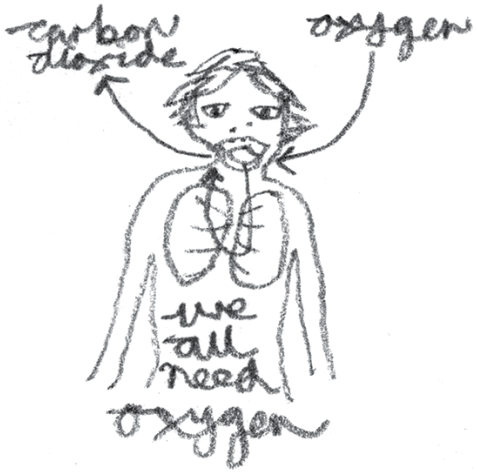


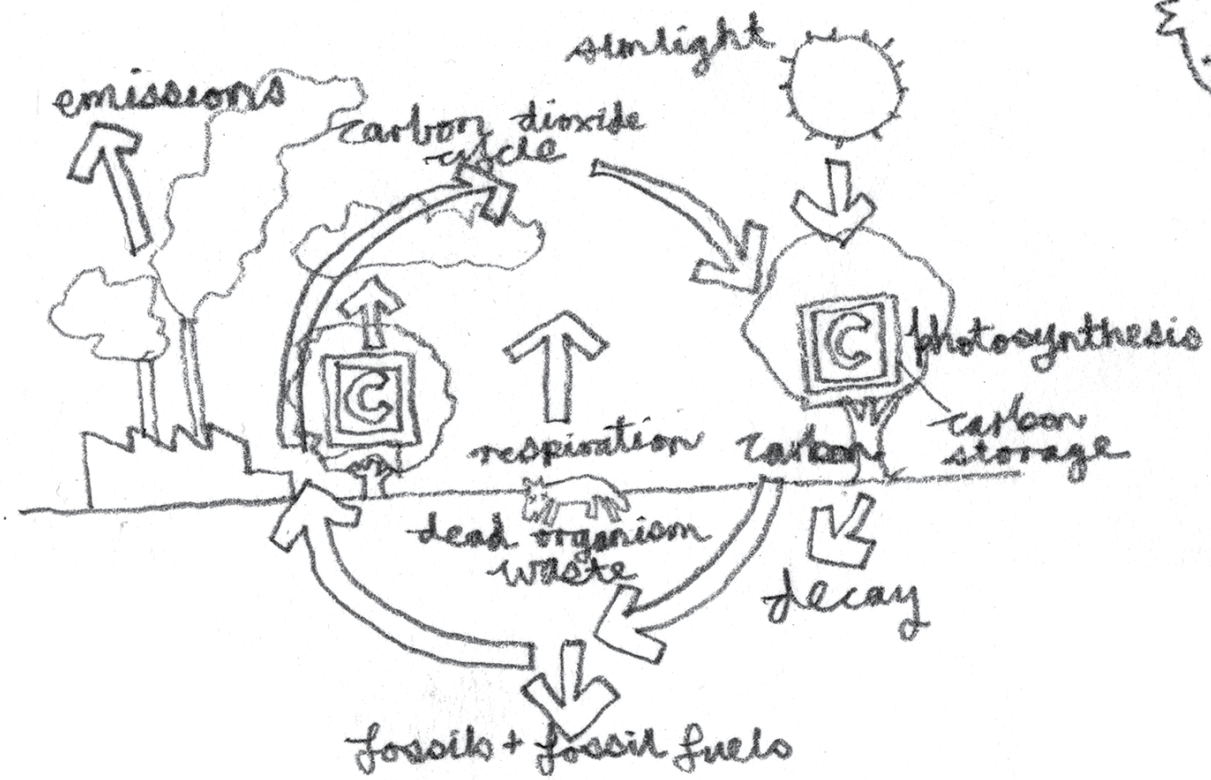


24. Employment

Planting new koala habitats and corridors as well as redesigning town centres requires a shift in the way we think about infrastructure and resources. Rethinking planning approaches has the potential to create jobs. Rethinking architecture and building techniques can also stimulate economic activity. Building roads that are penetrable for koalas, retrofitting existing roads to allow for koala friendly connections and building new koala research centres and genome bank centres could also create jobs.







Management of Koalas

25. The Role of Zoos

Koalas in captivity can play a major role in the protection of wild koalas and their habitats. Zoos play a role educating their audiences people and creating awareness of issues impacting koala habitat conservation. Zoos are also centres for koala research as studying koalas in captivity provides a better understanding of koalas in the wild. Small captive populations can reflect some of the characteristics of wild koala populations.

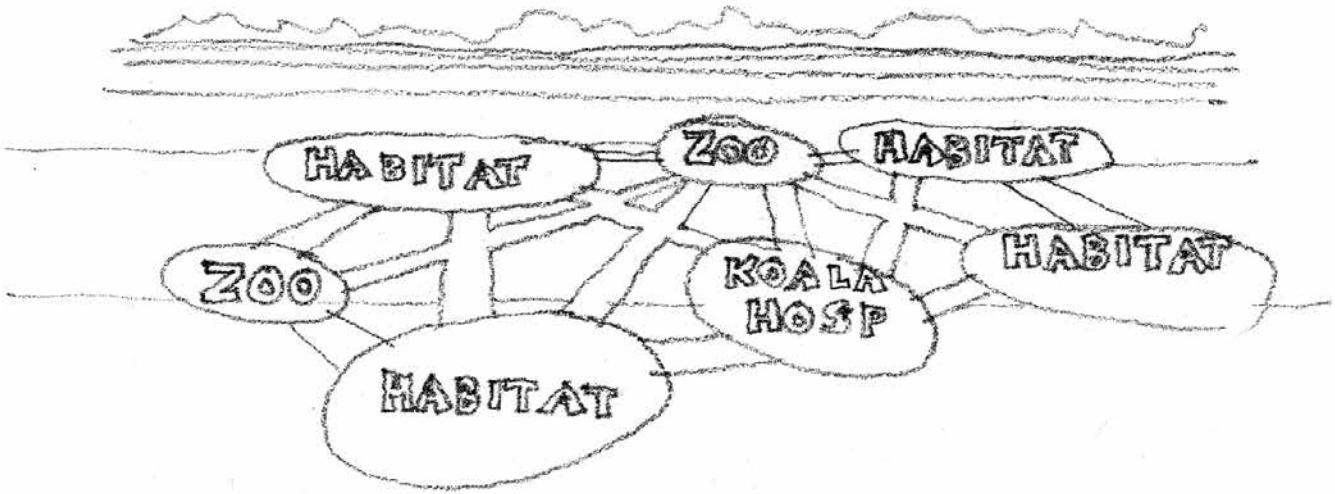
Zoos are well positioned to play a role in monitoring and managing regional wild koala populations. Local zoos can easily control the genetic diversity of their koala populations, which means that the rate of inbreeding within zoos is very low. With the immediate future of koalas in fragmented habitats being threatened by a lack of genetic diversity, captive breeding can play a part in recovering and maintaining the genetic diversity of koalas in the wild.

Zoos are potential places to produce koalas for re-introduction in habitats where we need to both supplement koala populations and re-introduce koalas.

Local zoos like the Koala Breeding Centre within Dreamworld Australia have the potential to become centres for reproductive biology for koalas. These organisations are well positioned to initiate partnerships with local governments, property developers, community, research institutions and other like minded organisations that have a desire to further develop innovative strategic planning. Dreamworld presently collaborates with Griffith University's Environmental Futures Centre and University of Queensland's School of Animal Sciences and is actively investing in conservation and education.

Koala conservation programmes are marketable and can be communicated to the public, to zoo patrons and to potential buyers of properties in and near koala habitat. For example, zoos can be more transparent and direct in their signage and education, and could play a role in demonstrating good environmental practices to increase public understanding of the importance of conservation. A portion of revenue generated from koala interactions such as 'Cuddle a Koala' photographs, should go towards helping koalas in the wild. Zoos might commission books and artworks where funds generated from koala based material can contribute to koala and habitat conservation.

Could zoos plan for free range enclosures that link into koala habitats? Given many zoos own or access properties that supply koala food, could some of these land be developed to support managed koala populations on them as well? Through collaborations between zoos, government, research and property development, could zoos assist in the formation of the connections between fragmented koala habitats?

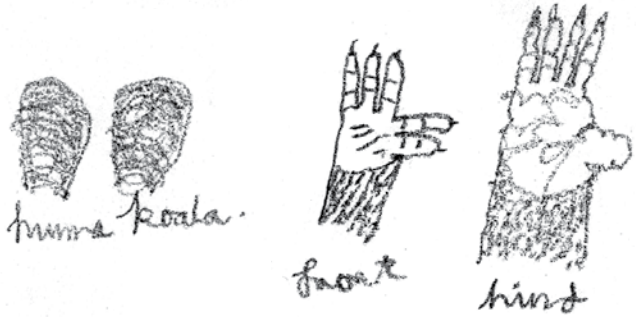


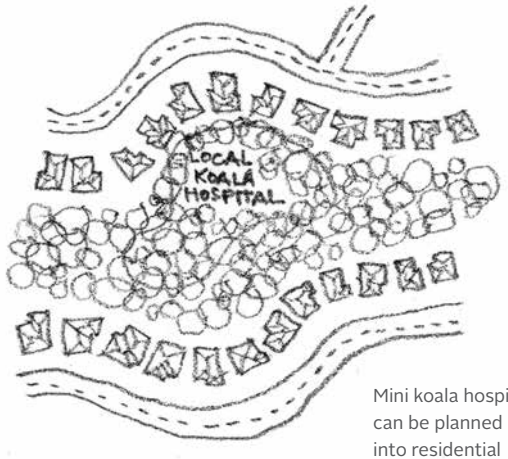
Can zoos and koala hospitals play a bigger role in ensuring

There are many exciting possibilities for a reimagined future zoo. Could some reforested koala habitat in and around new town centres be populated by koalas bred in zoos? Could a future zoo be one that has people living in and amongst wildlife? This could be an exciting new model for redefined human-koala relationships.

As koalas are popular attractions at zoos all around the world, koalas can draw attention to the dire situation faced by their species in their natural habitats of South East Queensland. International zoos are continuing to request trade koalas from Australian zoos to keep their koala gene pools healthy. The notion of revenue generated from these koala transfers could be re invested into koala research and koala habitat conservation in Australia.

The funds raised by these transfers of captive bred koalas to overseas zoos can play a role in conservation of their wild cousins. Some immediate examples of where funds could have impact include fostering of research, the replanting of koala food trees and the creation of new koala habitats.





Mini koala hospitals can be planned into residential developments.

26. Koala Genome Banks

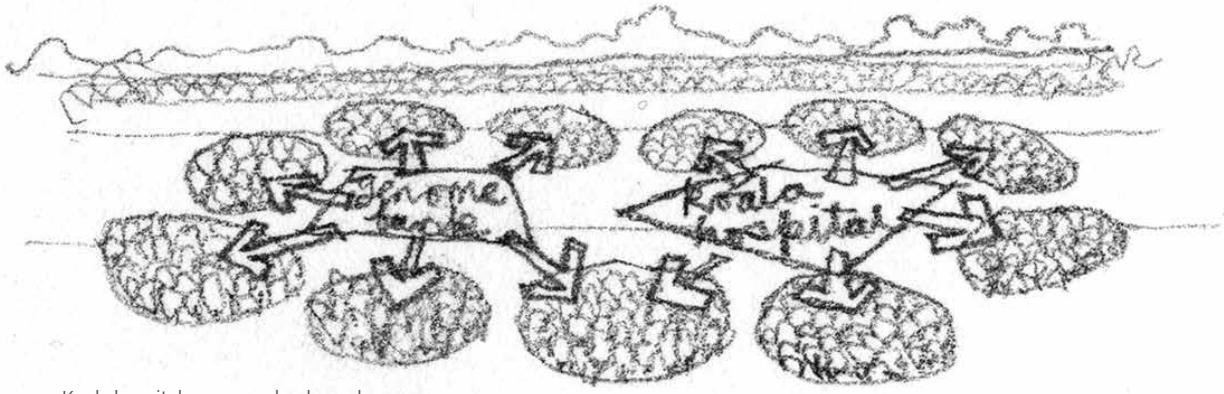
An important back-up plan for South East Queensland koalas is being put into action by The University of Queensland's Koala Research Centre who play an active role as a halfway house for koalas. The centre's hands-on management approach aims to assist koalas in habitats with little future. Funded by both university and private investment, the centre is gaining wider support.

Dr Steve Johnston of the Koala Research Centre explains that the centre works as a genome bank – a vital resource capable of reinvigorating genetically weak koalas populations. Using traditional captive breeding in zoos and assisted breeding techniques like artificial insemination, it is possible to capture the genetic material of threatened populations so that these genes are not lost and can still be available in the future. To date, the Koala Research Centre has already produced 32 koala joeys through artificial insemination. Genes can also be captured during the translocation of koalas (see below).

Dr Johnston and his colleagues are also developing techniques that use frozen koala semen to produce offspring. They also plan to genetically recover reproductive tissue from post-mortem animals that arrive dead in koala hospitals or that have been euthanased because of road accidents or dog attacks (noting that the dead koalas have to be screened for diseases such as Chlamydia before the tissue can be used). Johnston says that in the decade from 1997-2007, 6500 koalas were euthanised in koala hospitals, many of whose sperm could have helped in the genetic exchange programme. While this technology is not necessarily a panacea for all of the koala's problems, it does give koala managers more options for koala conservation. The potential to do this in zoos and koala hospitals already exists. Genetics are captured and zoos and koala hospitals are becoming genetic reservoirs. This is a careful genetic control safeguard that maximises genetic diversity and is a positive contribution to the survival of koalas. It is a necessary genetic backup for the species.

Dr Johnston believes that mini Koala Research Centres should be planned into new and existing residential developments in and near koala habitats. These centres could form networks of koala halfway houses, koala hospitals and genome banks. These mini koala hospitals could be established and funded through the previously discussed levy system. If developers plan to build near koala habitat and home buyers decide to live there, then they become involved in koala conservation. They could play a role in rebuilding populations and habitats by contributing to their neighbourhood's mini koala hospital. The genes collected in neighbourhood koala hospitals could be passed on to a central genetic propogation centre that breeds koalas to build healthy populations in nearby reclaimed and restored habitats.

Communities with definable boundaries, each containing koala genome bank centres, can become units for managing and forming



Koala hospitals, genome banks and zoos can play a role in restocking koala populations.

connections between fragmented habitats. This might occur where it is absolutely impossible to create physical corridors between habitats and in places where the community becomes actively involved and responsible for their local conservation. This management approach could be used to fine tune usable koala habitats that are smaller in area than the recommended size, especially in inner city situations.

27. Translocation of Koalas

Translocation should only be considered as a last resort if all other management options have been exhausted – where there is absolutely no hope of a population's survival. Some Koala Coast populations in decline might be used to restock neighbouring koala populations that have a better chance of survival. Koalas that grow up in a certain locality can adapt to life in another. Koala density and genetic diversity are two critical factors in determining which koalas can be moved and to where. If indeed translocation of koalas is to take place, Dr Stephen Phillips explains that young koalas approaching the ages of 2 years old should be targeted. In an expansive environment, these young koalas would have moved to another home range by this age. The approach for translocation is to augment and supplement however we also need to preserve koalas in situ. As mentioned, Dr Steve Johnston says that breeding in captivity programs are becoming more successful with each breeding season. If incorporated into translocation programmes, these captively-bred koalas might be able to augment the genetic diversity in wild koala populations, especially those in isolated patches of habitat.

The big picture for the remaining South East Queensland koala populations needs to be addressed. Phillips says we might contemplate the koala success stories that are happening west of the M1 Motorway on the Koala Coast. Currently, the koalas of Ipswich and the Hinterlands regions have a better chance of survival than those in other regions. Therefore one option is to translocate overly stressed koala populations to these less developed areas. Having said this, this is a complex idea and extensive assessments of koala densities would need to be undertaken in order to prevent overcrowding. Dr Christine Adams-Hoskin discusses climate change projections in "What's Happening to Koalas?". If her predictions are accurate, then moving koalas west is not a good option due to predicted temperature rises. This indicates that retaining the remaining smaller patches of Koala Coast koala habitat east of the motorway as critically important for the genetic diversity of the species. Increasingly, humans have become the mechanisms for moving koala genes.

South East Queensland might learn from the South Australian koala story. South Australia lost all of its koalas by 1924 due to the fur trade. In response, researchers translocated koalas from French Island in Victoria and established a colony on Kangaroo Island in South Australia. In the early 1960s, due to an abundance of food and no natural predators on the island, these koalas had become overpopulated - a public outcry stopped the culling of the koala population, and some of these Kangaroo Island koalas were relocated to the mainland on the Eyre Peninsular, along the Riverland and in the Mount Lofty Ranges. Koala populations then expanded into the Adelaide Hills and the Adelaide metropolitan area. Queenland has a similar translocation story. In the early 1900s, koalas were introduced to St Bees Island in Queensland and today this population appears to be healthy and genetically diverse. Might some of these koalas be translocated back to the mainland where Koala Coast populations require restocking?

Dr Stephen Phillips explains that a positive aspect of translocating individuals to an area with an existing population, is that these individuals become assimilated into existing social structures. Of course Phillips explains that the right locations and conditions must be carefully researched when moving groups or individuals as koalas that are moved to a location that is too nearby will simply return to their old home range and will generally die. Translocation is an expensive option and generally landowners bear the cost by paying the developer who pays a koala translocator. At the time of writing, moving 12 koalas over a 6 month period costs around $130,000.

KOALA FRIENDLY HOMEBUYER'S CHECKLIST

AS DEMONSTRATED BY THE KOALA BEACH DEVELOPMENT, RESPONSIBLE PROPERTY BUYERS & KOALA AWARENESS CAN ADD VALUE TO A NEIGABOURHOOD.

It can create a better sense of community through providing common collective goals. To promote koala friendly programs and strategies in other neighbourhoods, a Koala Friendly Homebuyer's Checklist should be built into the process of the property search and purchasing system. Such a checklist could then be implemented by local government and communicated through real estate and property developer literature. This will inform people as to how they can support koala populations if they buy land or properties in or near koala habitats as well as in reforested neighbourhoods.

A Koala Friendly Homebuyer's Checklist might include;

1. Documentation of the history of koalas and koala habitat in the area;
2. Remaining koala habitats in the area and information as to if the property was ever koala habitat;
3. Koala numbers in the area;
4. Koala food trees locations in the area;
5. Koala friendly road rules in the neighbourhood;
6. An outline of responsibilities of households for supporting existing populations;
7. An outline of community responsibilities, the local koala network and information of how to helping koalas in the area;
8. Instructions for what to do if a resident injures a koala or sees an injured koala;
9. The closest koala hospital;
10. Expanding koala habitat - the role residents can play in koala food tree replanting, and
11. A list of other fauna in the locality, including other threatened species.


KOALAS
CROSSING
leash your dog
NOV
25
FEB
SLOW DOWN
NOV-FEB KOALA BREEDING SEASON
SLOW DOWN
LOCK DOGS UP AT NIGHT
KOALAS
Find out the correct
KOALA FOOD TREES
to plant in your neighbourhood

IMAGINE

NEW PLACES FOR PEOPLE AND KOALAS

IMAGINE IF TOWN CENTRES WERE DESIGNED TO FOSTER PEOPLE GETTING TOGETHER TO LOOK AFTER THEIR SURROUNDINGS

We need to begin creating radically different places with the capacity to develop distinct identities from within. Communities should be encouraged to take responsibility for the health of their local environmental and have the means to actively improve it.

To move forward, new pragmatic urban design options need to be discussed. People do matter. People want to learn. And many people want better. Many want the destruction of the environment and koala habitat to stop, but right now they could buy a house in an area where clearing has happened, but not know that their new neighbourhood was once koala habitat. There needs to be a stronger link with how and where we live and koala habitat loss. At the moment there are not many ways for people to make this link.

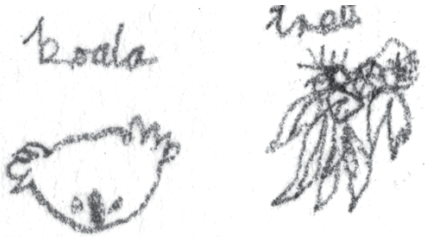
As discussed earlier, new town centres and residential developments can utilise degraded land so that all remaining Koala Coast koala habitats can be protected. This opens up the possibility of re-establishing koala habitats and corridors from the outset of the planning process to strategically link existing koala habitat patches.

Variation in housing types and achieving increased densities by using land for building more efficiently will allow more space for nature and agriculture, and more accessibility for different homebuyers. There is nothing new about setting out variations in density across residential areas, but there is something special in arranging densities and circulation networks for people around the needs of flora and fauna. Combined with the possibility of replanting koala food trees throughout existing residential areas, koala networks can be spread across the entire Koala Coast landscape.

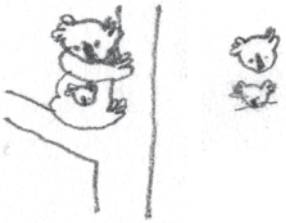
Steven Boyd, a lecturer in Property Development at University of Sunshine Coast, says, “To keep koalas safe now, and to recover koala populations for the future, we are developing creative solutions which will bubble up through society. We are seeking innovative creative property developers.” The property developers of Generation Y are coming through, and they are responding to new markets with new ideas.

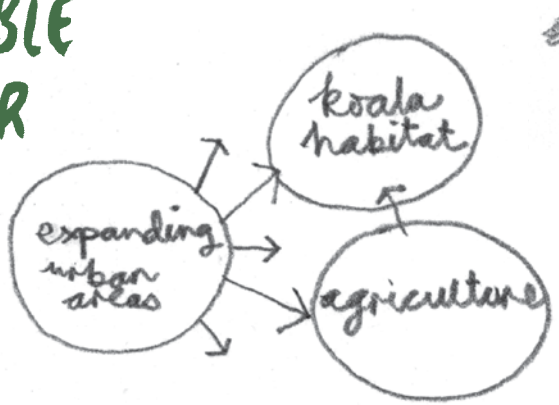
By planning and tayloring human needs and desires to those of koalas, a healthier, more valuable and more beautiful places to live and work can be realised. The ideas included in this document acknowledge social, economic and climatic pressures and consider our rapidly changing ecological relationships. The recommendations laid out in this report have the potential to create a more biodiverse future for South East Queensland characterised by a rich and fulfilling environment for koalas and people alike.

KOALAS ARE INSEPARABLE FROM THEIR HABITATS



Use land differently





new places for living together

HUMANS AND KOALAS LIKE TO LIVE IN COMMUNITIES

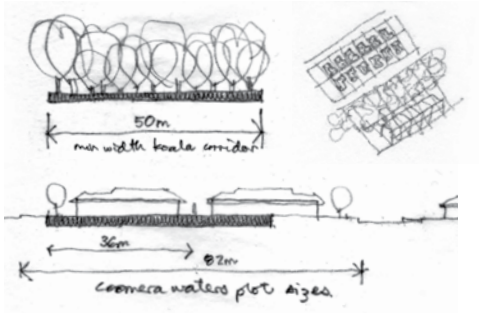
Protect existing koala habitats, expand and recreate a network of new koala habitats and corridors by reclaiming degraded land. New urban developments can still happen, they just need to happen differently.

we can use resources differently + more efficiently

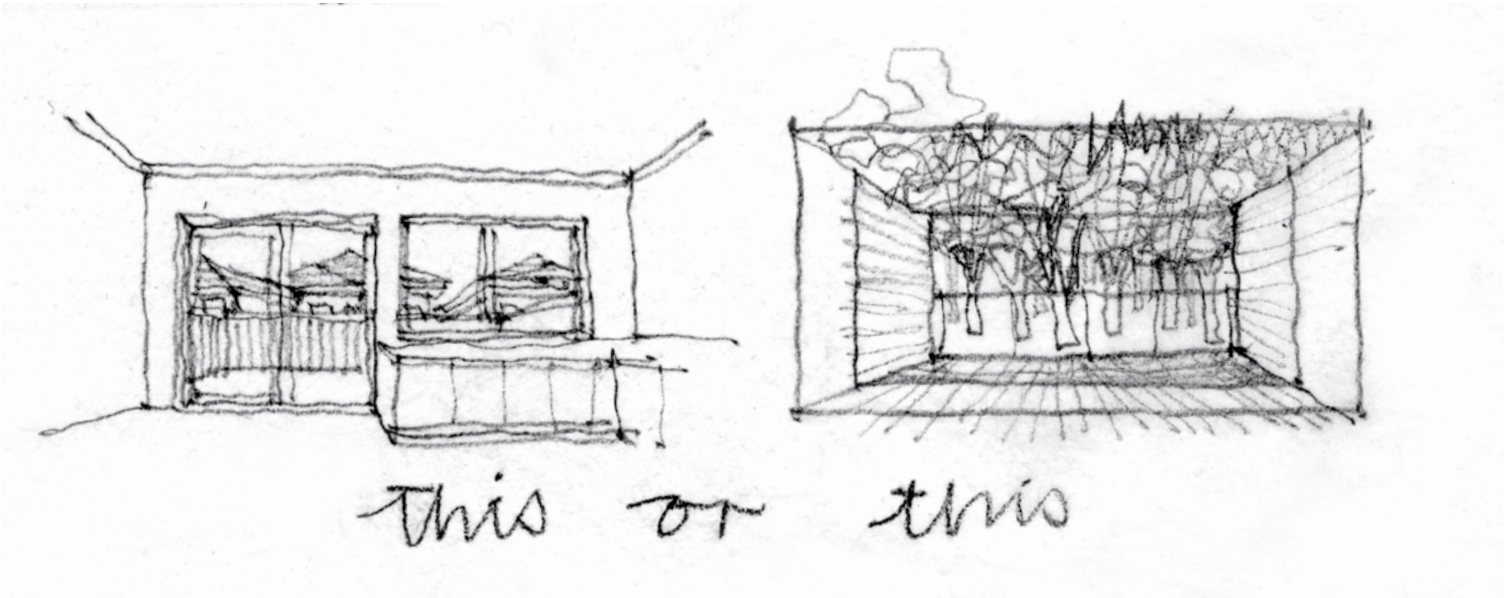
Everyone can be involved, and everyone can benefit.

mixed use
koala habitat
residential
permaculture

Spread koala habitat.

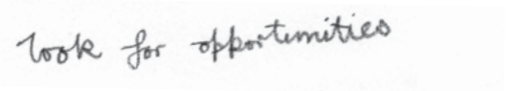


A case study in Upper Coomera and Commera Waters demonstrates how the fabric of existing Koala Coast residential areas can be reimagined. If corridors within existing residential areas are planted with koala food trees, and housing along these corridors re-aligned, koala networks can spread across the entire Koala Coast landscape.



PLACES WHERE HUMANS AND KOALAS CAN LIVE TOGETHER

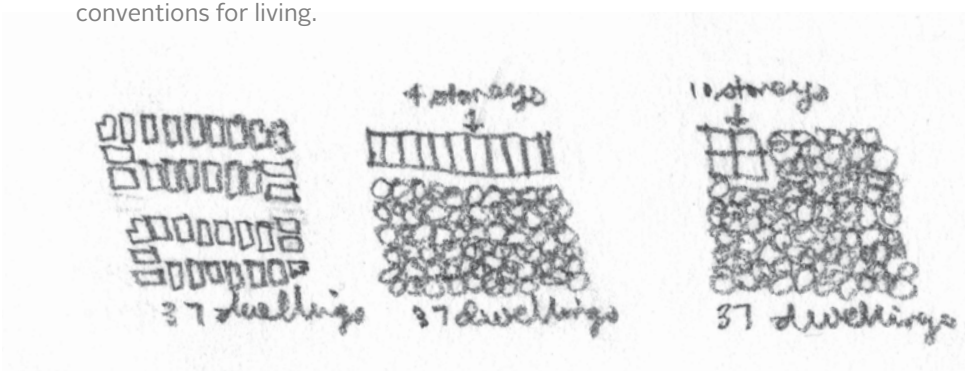
Opportunities for everyone - investors, community, agriculture and Australian flora and fauna.



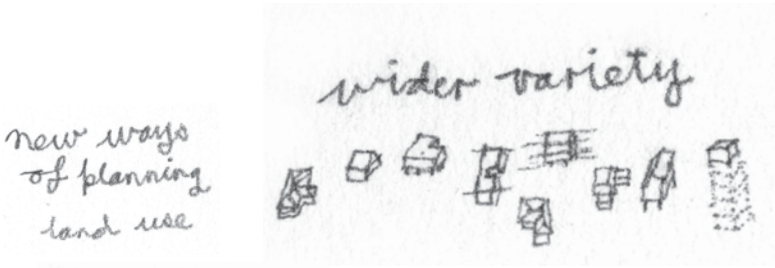
Future residential developments with denser building arrangements surrounded by community garden and koala habitat.

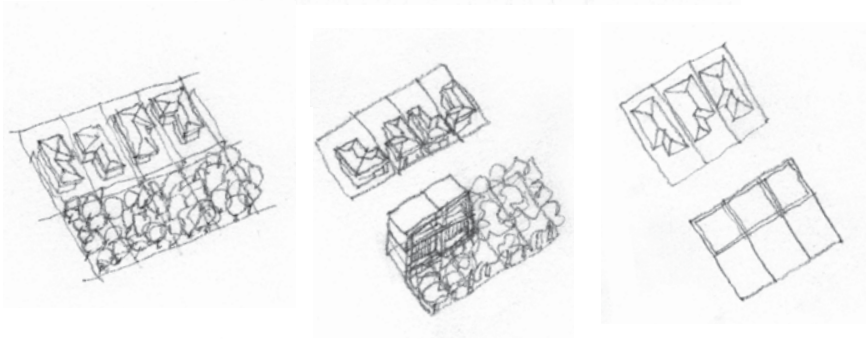
rethink, suburbia

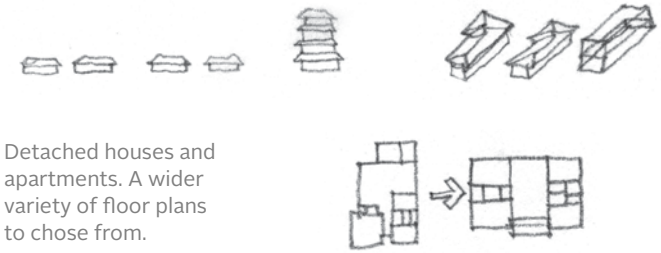
We need to consider different building footprints that allow more ground area for other species. New and healthier conventions for living.



37 dwellings can house around 100 people on 26 hectares in a typical new Koala Coast suburb, allowing for no koalas. A four storey housing solution on 26 hectares allows 100 people to coexist with around four koalas, and a 10 storey solution allows 100 peope to coexist with around six koalas.



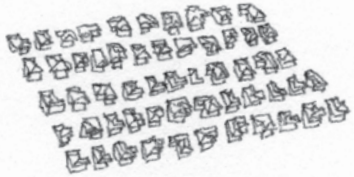


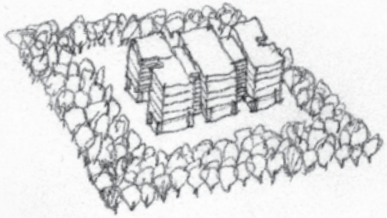


Detached houses and apartments. A wider variety of floor plans to chose from.

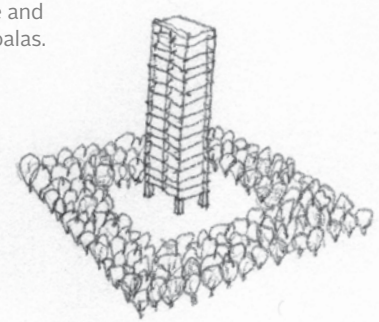
More outdoor space and better homes for koalas.

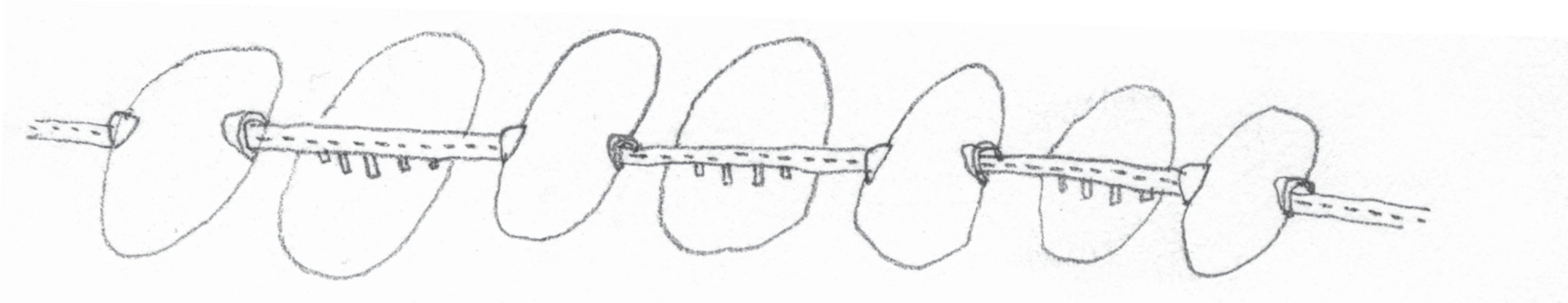
DO THINGS DIFFERENTLY



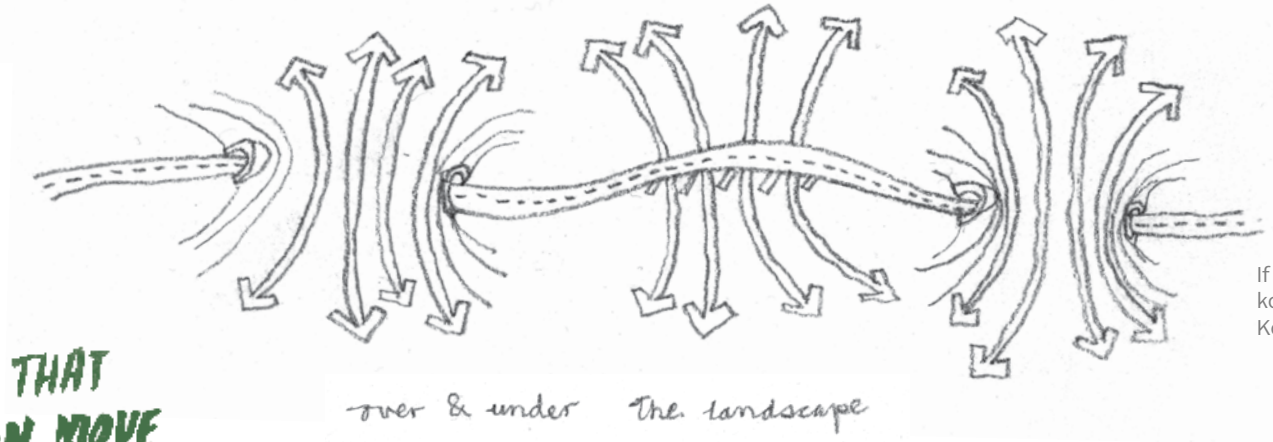


Housing the same number of people and more space for koalas.



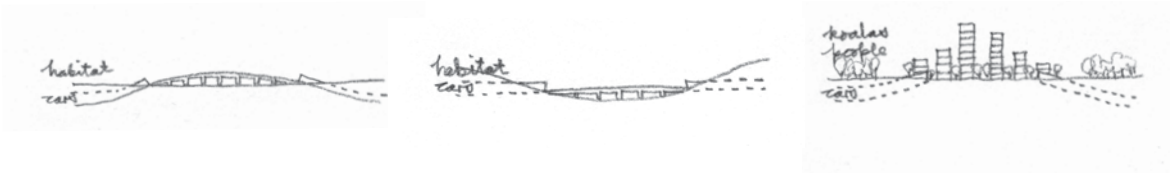


rethink roads

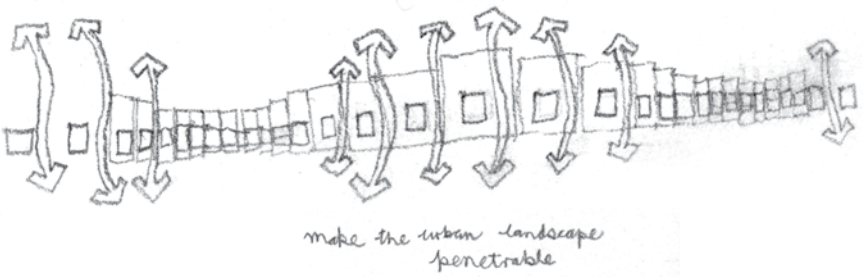


If new roads go over and under, koalas can safely traverse the Koala Coast landscape.

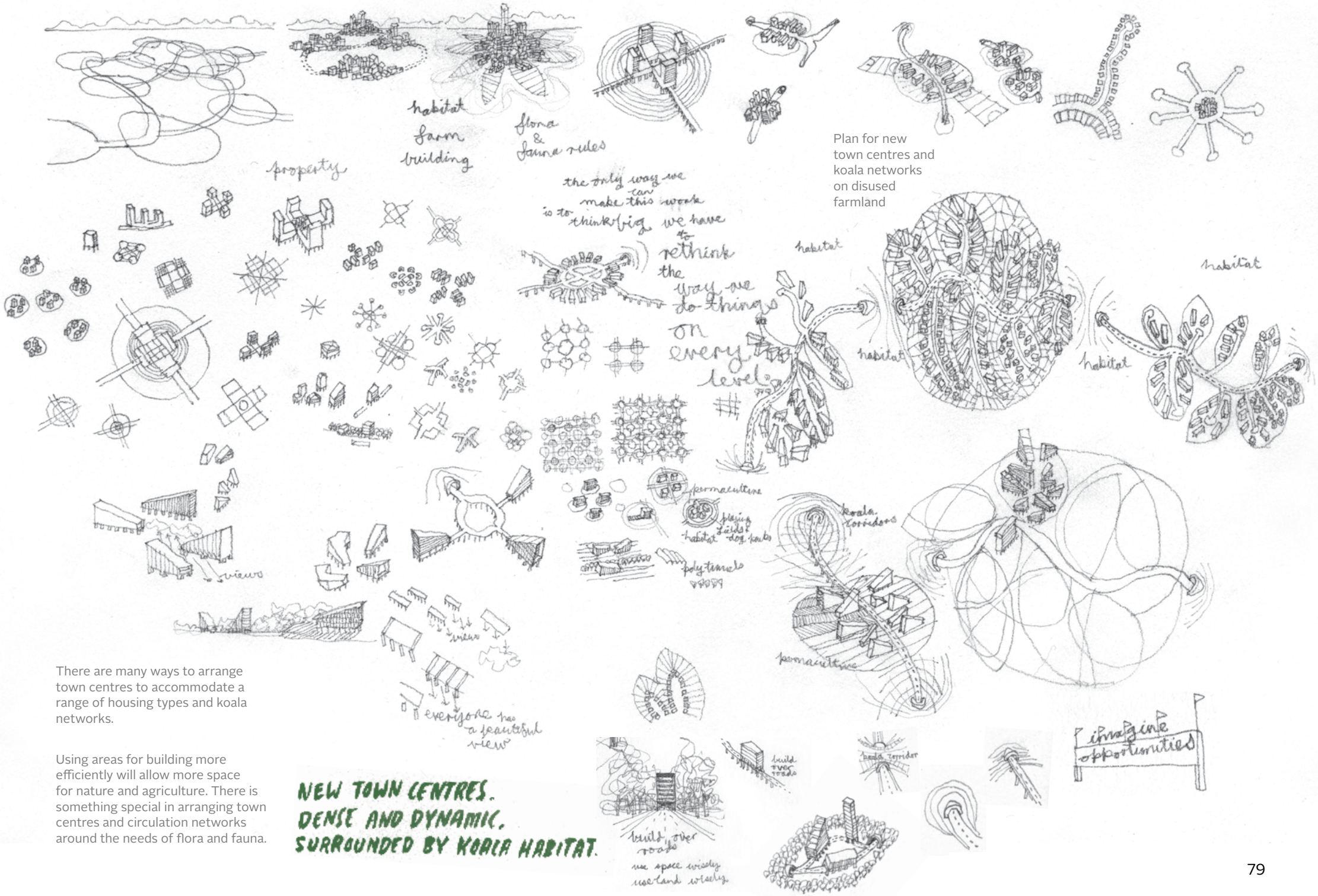
MAKE PLACES SO THAT ALL WILDLIFE CAN MOVE FREELY ABOUT



As the Koala Coast human population increases, penetrable landscapes can be created by building and replanting on disused farmland. Town centres connected by roads above and below the ground will create connectivity for koalas.



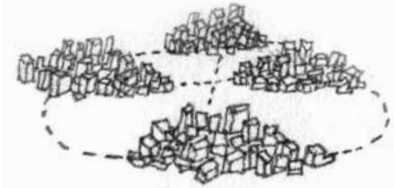
Varying plot sizes not only provides a wider range to select from for home buyers, but allows more opportunites for koalas to move through properties.



Plan for new town centres and koala networks on disused farmland

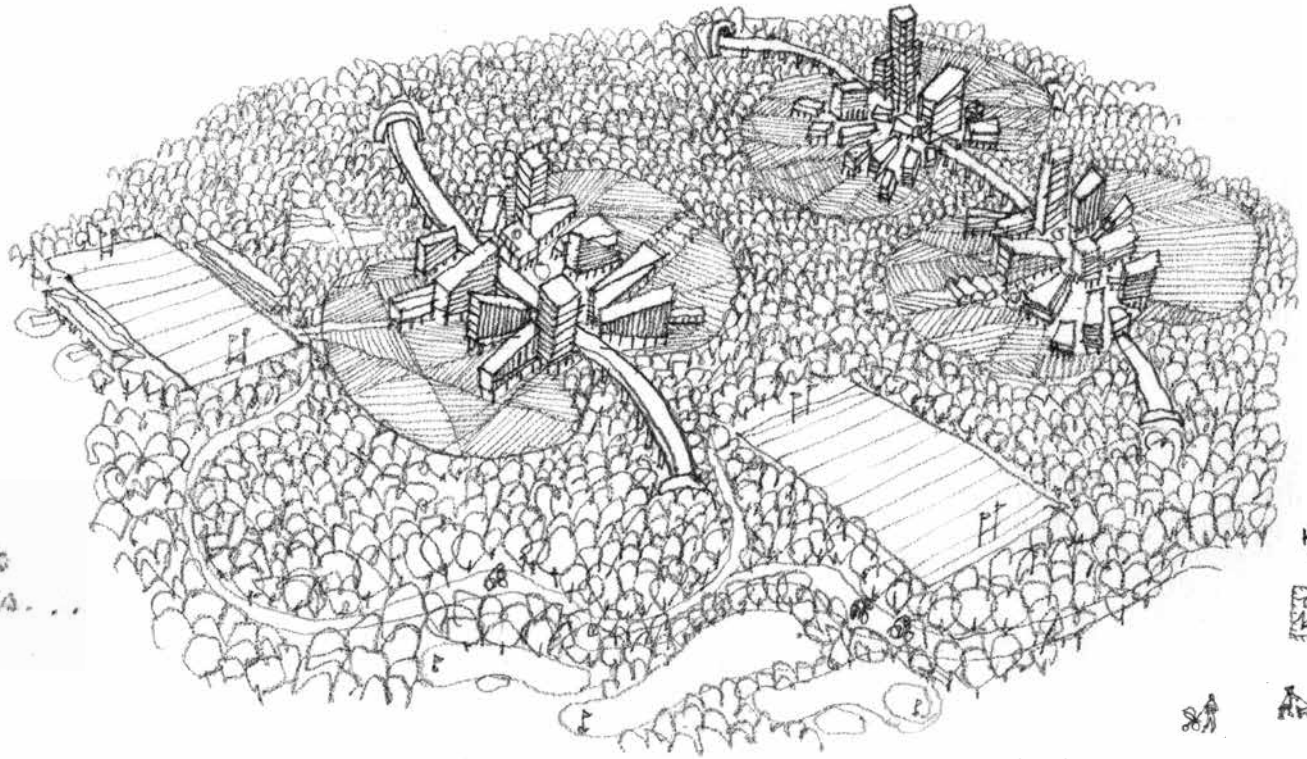
There are many ways to arrange town centres to accommodate a range of housing types and koala networks.

Using areas for building more efficiently will allow more space for nature and agriculture. There is something special in arranging town centres and circulation networks around the needs of flora and fauna.



how about...

make the next development more like this...



the same number of people can live in this beautiful place...

+ koalas

+ food &c

KOALA PASSIVE

housing

dog park

sports fields

parklands

golf

bike tracks

permaculture

koala habitat

town centre

using land differently

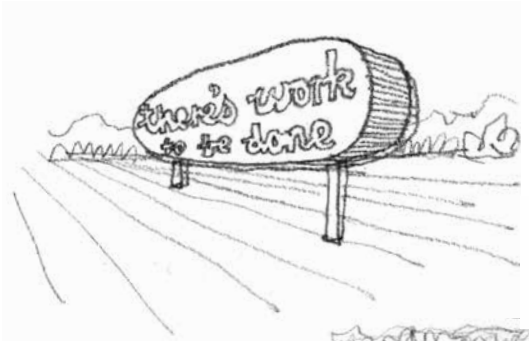
Partnerships between everyone - finance, real estate, development, manufacturing, building and agriculture - will make this dream a reality.

if we can build the southern hemisphere's tallest

&

the world's longest waterfront

then why not do this as well



macro perma

many brands can be involved

organic

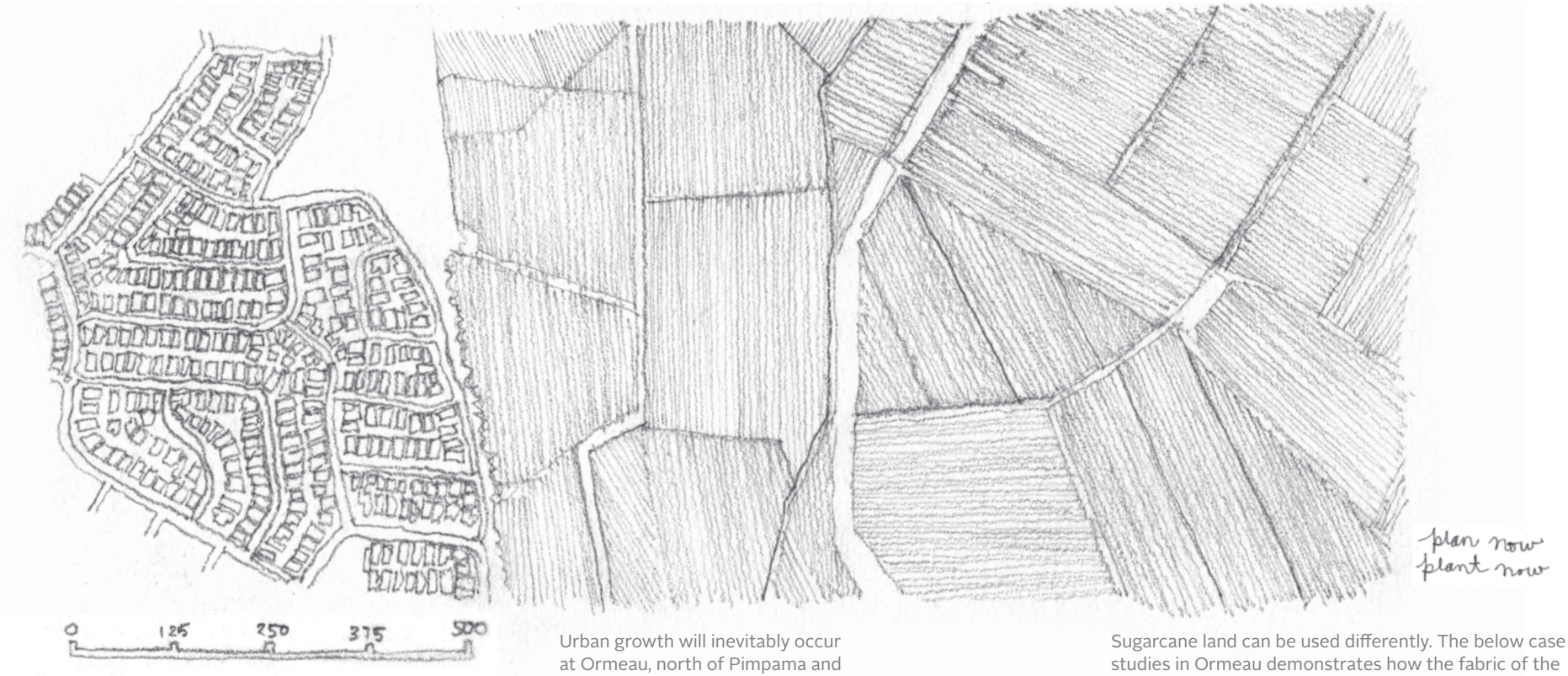
the games are coming to town

permaculture

everyone can get involved

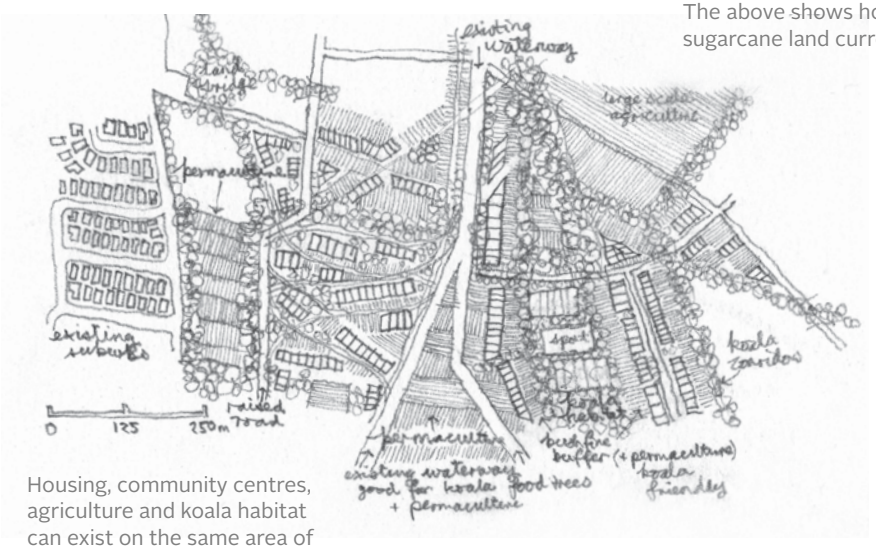
show the world

Queensland has a long history of making big gestures. The Gold Coast has the tallest building in Australia, one of the tallest residential towers in the world, and one of the longest residential waterfronts in the world. Why not create the biggest man made wildlife corridor system in the world as well?



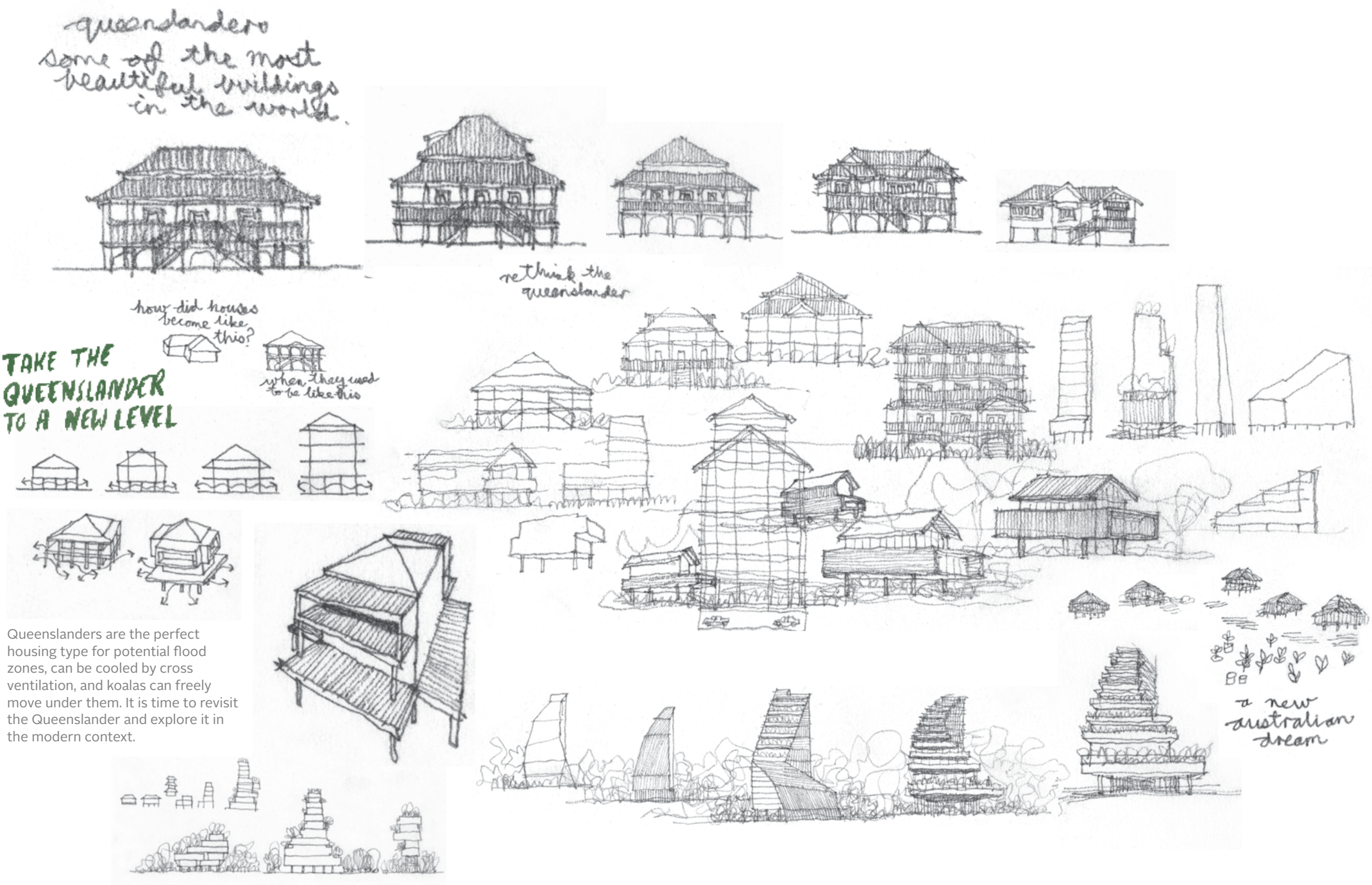
Urban growth will inevitably occur at Ormeau, north of Pimpama and Coomera in the upper Gold Coast. The above shows how suburbia and sugarcane land currently sit side by side.

Sugarcane land can be used differently. The below case studies in Ormeau demonstrates how the fabric of the landscape can be varied to the advantage of everbody and everything. If we plan land use differently, and start planting koala food trees now, koalas and other native fauna will come back to the region.



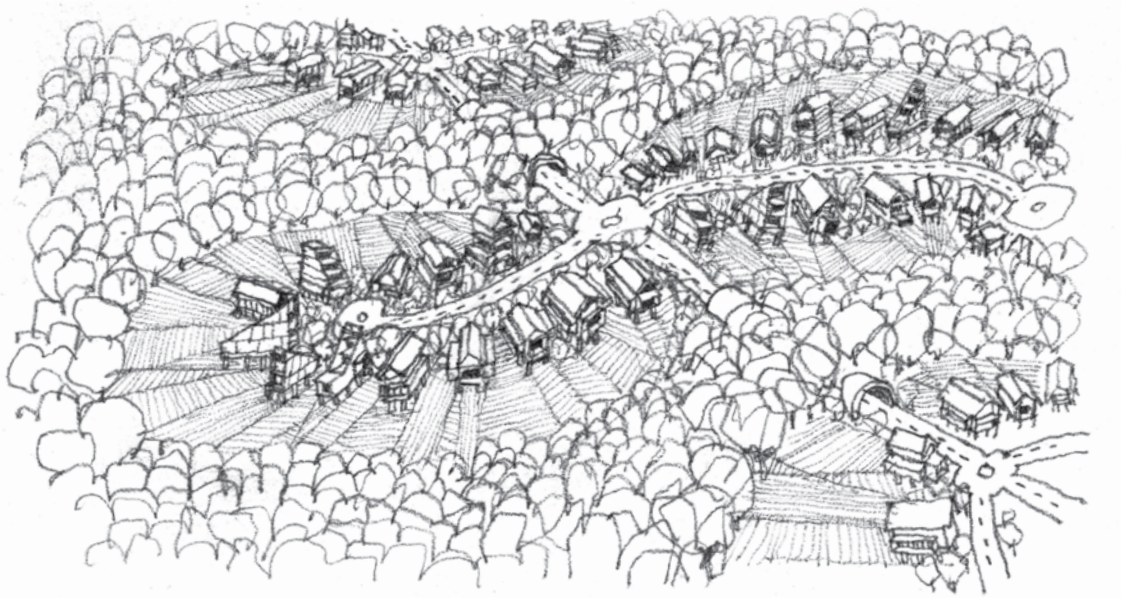
Housing, community centres, agriculture and koala habitat can exist on the same area of land that existing suburban areas take up.

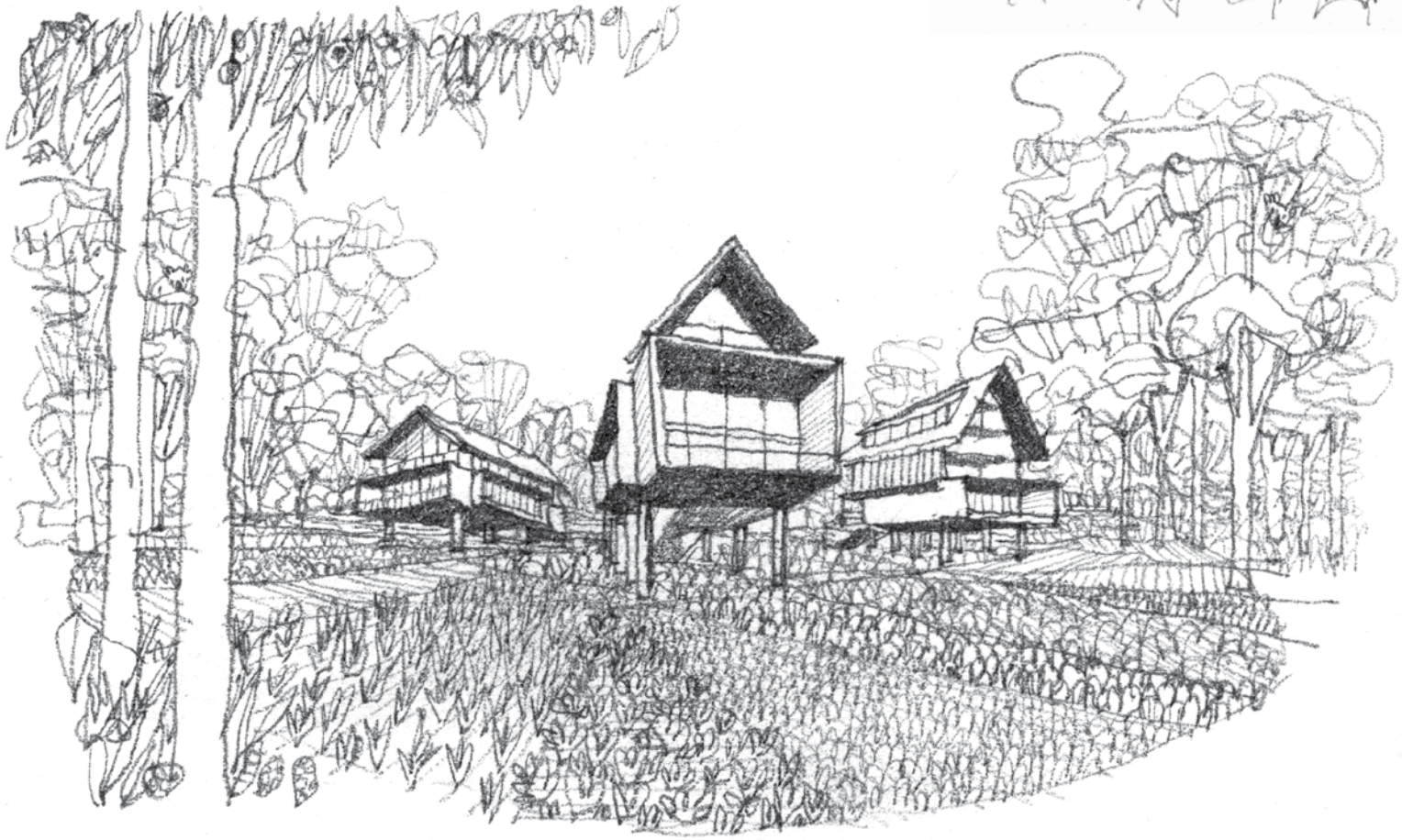
HUMANS AND KOALAS LIVING TOGETHER.



Queenslanders are the perfect housing type for potential flood zones, can be cooled by cross ventilation, and koalas can freely move under them. It is time to revisit the Queenslander and explore it in the modern context.

PLAN NOW
PLANT NOW



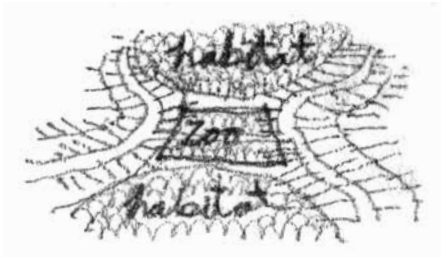


If we plant the trees now, these habitats and corrodors will be thriving ecosystems within the next 10 to 20 years, and our koalas and other native fauna will have a better future.

By approaching planning differently we will create better habitats for ourselves.

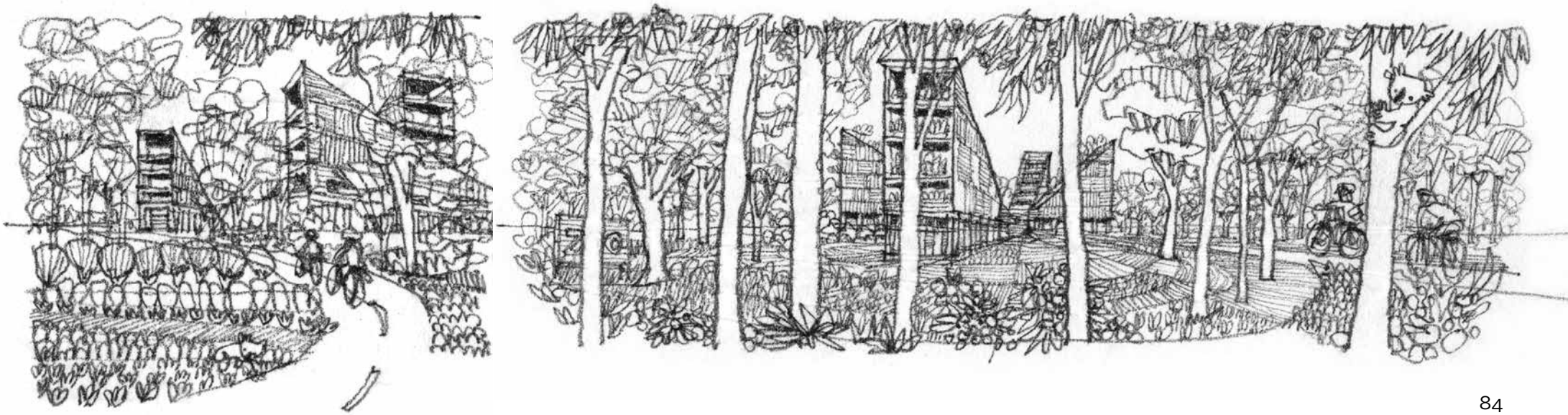
HUMANS AND KOALAS WILL HAVE A BETTER FUTURE

Build wildlife hospitals and mini koala hospitals into new developments



Through collaborations between zoos, government, research and property development, zoos can assist in forming connections between fragmented koala habitats.

Might free range zoo enclosures link into koala habitat? Can reforested koala habitats and corridors in and around new town centres be zoos, or zoo annexes, inhabitated by koalas bred in zoos?

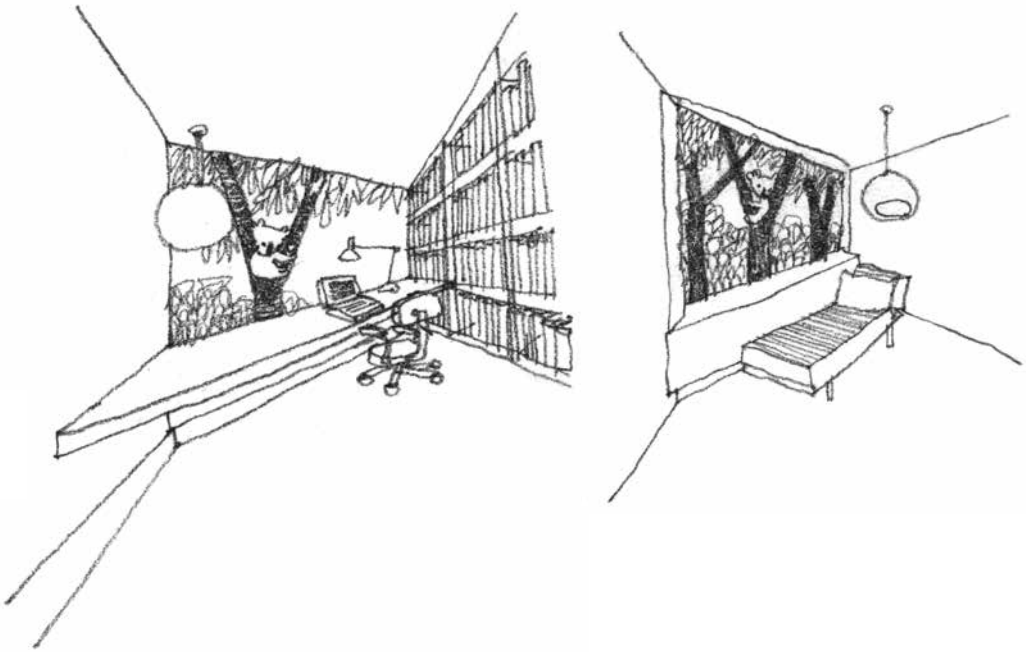


Who wants to
mow the lawn?

We need to think about housing markets of tomorrow. Properties of the future need to reflect changing outlooks and lifestyles.

Marketability

SHARED HOMERANGES



A NEW AUSTRALIAN DREAM...

IN UNDERSTANDING KOALAS, THEY ARE HELPING US TO BE SUSTAINABLE, THEY ARE TRYING TO TEACH US. SOCIETY IS SLOWLY PROGRESSING, BUT WE STILL NEED TO MAKE A QUANTUM LEAP. WE NEED MODELS TO INSPIRE US. WE NEED DEVELOPERS TO TAKE THESE MODELS & GUIDELINES ON.

Dr Stephen Phillips, 2012

KOALA TIMELINE

2013
On April 9, The Australian Museum Director, Mr. Frank Howarth PSM, announced that a consortium of Australian scientists led by Dr Rebecca Johnson of the Museum and Professor Peter Timms of Queensland University of Technology achieved a world-first breakthrough by completing an initial sequencing of the koala genome – the genetic blueprint for koalas.

2012
The inaugural Great Koala Count took place in South Australia on November 28.

2012
Koalas in Queensland, New South Wales and the Australian Capital Territory are listed as vulnerable and added to the threatened speces list.

2011
The Parliament of Australia's Senate Inquiry into the health and sustainability of Australia's koala population.

2010
National Koala Conservation and Management Strategy released.

2008
Australia's prime koala population of South-East Queensland dropped from 6500 to less than 2000 koalas in the last ten years.

2008
The International Union for Conservation of Nature (IUCN) listed the koala on its Red List of Threatened Species as "of least concern".

2006
The Commonwealth Government of Australia advises that the koala is Not Vulnerable.

Draft Koala Conservation and Management Policy Strategy released.

2004
The Australian Koala Foundation made an application to the Commonwealth Government to list the koala as Vulnerable across its natural range under the Environment Protection and Biodiversity Conservation Act of 1999.

2000
The United States of America Government lists the koala as a 'threatened species' on May 9 under the US Endangered Species Act.

1996
The IUCN listed the koala as "Lower Risk/Near Threatened"1993 The Australian Koala Foundation and the Ray Group worked together on Koala Beach – the first property to be master planned and designed with the protection of the environment, especially koalas, as its priority.

1986
The Australian Koala Foundation is formed.

1983
The first koala arrives in Japan.

1979-80
63% of koala population died in Eastern Queensland.

1960
A koala is born in San Diego Zoo, the first outside its native Australia.

1949
The first official koala survey is conducted. The National Survey revealed that many southern, central and western koala populations had disappeared, indicating that their distribution was contracting towards the coast.

1937
Public outrage at koala slaughtering forced Australian governments in all states to declare the koala a 'Protected Species'. This is possibly the first wide-scale environ-mental issue that Australians rallied for.

1936
The world's last Tasmanian Tiger dies in Hobart Zoo, just three months after being declared a protected species. (As a reminder of the koala's situation, the AKF draws an analogy between the koala and the Tasmanian Tiger)

1933
Blinky Bill made his first appearance .

1930
Koala Park, the first private koala sanctuary in Sydney New South Wales, is founded by Noel Burnet.

1927
Lone Pine Koala Sanctuary founded in Brisbane, Queensland, the world's first and largest koala sanctuary. In an August koala shooting season in Queensland, over 800,000 koalas were slaughtered. People all over the world began to worry that koalas would disappear forever. President Roosevelt made a law against having koala fur in the United States of America.

1925
The presence of abundant food for koalas in Southern California allowed the San Diego Zoo to become a recipient of a gift of two koalas.

1924
More than 2 million koalas were slaughtered for their fur. Koalas become extinct in South Australia

1923
Professor Wood Jones releases the first koala onto Kangaroo Island.

1919
The Queensland Government announced a six month open season on koalas – in that period alone, 1 million koalas were killed.

1863
John Gould : "However difficult it may be for the European to discover them in their shady trees, the quick and practiced eye of the Aborigine readily detect them, and they speedily fall victims to the heavy and powerful clubs hurled at them with utmost precision...Like too many others of the larger Australian mammals, this species is certain to become gradually more scarce, and ultimately extirpated."

1844
Robinson links the demise of the Aborigines to the increase in koala populations.

1841
Drawing of the koala from George Waterhouse's Marsupialia or Pouched Animals published.

1817
Georg Goldfuss describes Koala Genus as Lipurus cinereus. The order of priority defines name as Phascolarctos cinereus which means ash-coloured pouched bear.

1816
Henri de Blainville describes Koala Genus name Phascolarctos

1798
European Discovery : On January 26 in the vicinity of Bargo in New South Wales, John Price, who was the servant of Governor John Hunter, made the first recorded observation by a European of a koala. "... there is another animal which the natives call a cullawine, which resembles the sloths in America."

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CEO, Australian Koala Foundation

Dr Steve Johnston
School of Animal Sciences, University of Queensland

Dr Stephen Phillips
Ecologist, Biolink

John Callaghan

Dr Bill Ellis
Koala Ecology Group, School of Biological Sciences, University of Queensland

Dr Sean Fitzgibbon
Koala Ecology Group, School of Biological Sciences, University of Queensland

Dr Clive McAlpine
Associate Professor, School of Geography Planning and Environmental Management, University of Queensland

Dr Frank Carrick
Adjunct Professor, Centre for Mined Land Rehabilitation, head of The University of Queensland Koala Study Program

Dr Alistair Melzer
Koala Research Centre of Central Queensland, Central Queensland University

Dr Jean-Marc Hero
Associate Professor, Environmental Futures Centre, School of Environment, Griffith University

Dr Darryl Jones
Associate Professor, Environmental Futures Centre, Environment, Planning and Architecture, Griffith University

Cheyne Flanagan
Supervisor at Koala Preservation Society of NSW Inc, Koala Hospital, Port Macquarie

Kelsey Engle
Australia Zoo

Dr Rhonda Melzer
Queensland Parks and Wildlife Service, Department of Environment and Resource Management

Jon Hanger
Managing Director, Endeavour Veterinary Ecology PTY LTD

Dr Geoff Pye
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Cathryn Dexter
Applied Road Ecology Group, Environmental Futures Centre, Environment, Griffith University

Dr Delma Clifton
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Wade Oestreich
Queensland Parks and Wildlife Service

Steven Boyd
Lecturer, Property Development, Regional Engagement Coordinator, Faculty of Business, University of Sunshine Coast

Riki Cooper
Copper and Co Construction

Dr Terry Boyd
Adjunct Professor in Property, Faculty of Arts, Business, Informatics and Education, Central Queensland University

Charlie Faye and his mob down at Fingal Head

Adrian O'Doherty
Blog and Social Network

Tega Brain
Sub Editing

Arielle Gamble
Design and Illustration

Pandora Nguyen
Web Design

Mark Gerada
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