

The South Australian Koala Conservation and Management Strategy





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Minister's Foreword



Koalas are one of our best loved native species – for both locals and overseas visitors alike.

The *South Australian Koala Conservation and Management Strategy* aims to protect koalas from threats such as traffic, dogs, disease, bushfires and reduced food quality due to global warming.

The Strategy is a positive step towards safeguarding the welfare of koalas in this State, increasing the social, educational and economic benefits of having koalas, and reducing the negative impacts that over-abundant koala populations may have on their habitat.

The South Australian Government is also working toward establishing an International Koala Centre for Excellence. This will provide opportunities for unique visitor experiences, strengthen private sector partnerships and optimise research initiatives.

One key area of research will be to investigate ways to minimise the negative impacts of global warming on koalas by using our State's substantial experience in tackling global warming.

This Strategy brings together government, the community, natural resources managers, experts and scientists to look at ways of working together to manage and conserve our koala population long into the future.

A handwritten signature in white ink, reading 'I Hunter', set against a dark grey background.

The Hon Ian Hunter MLC
Minister for Sustainability, Environment and Conservation





What will this Strategy do?

This Strategy has been developed to identify and acknowledge the key conservation and management issues which are having, or could have, an impact on the health and welfare of koalas and on their habitat across the State.

It provides actions and timeframes to guide what needs to be done to manage and/or reduce these impacts.

The South Australian Government is committed to:

- **Safeguarding the welfare of koalas,**
- **Increasing the social, educational and economic benefits of having koalas in South Australia, and**
- **Reducing the negative impacts that over-abundant koala populations may have on broader ecological communities.**

The Strategy is designed to be accessible by anyone who has an interest in koalas and their habitat, or is looking for a sense of direction about what the issues are and what needs to be done to conserve and manage koalas in South Australia.

It is not designed to be a step-by-step technical field guide to koala management. It does not outline detailed scientific data or complex ecological restoration criteria.

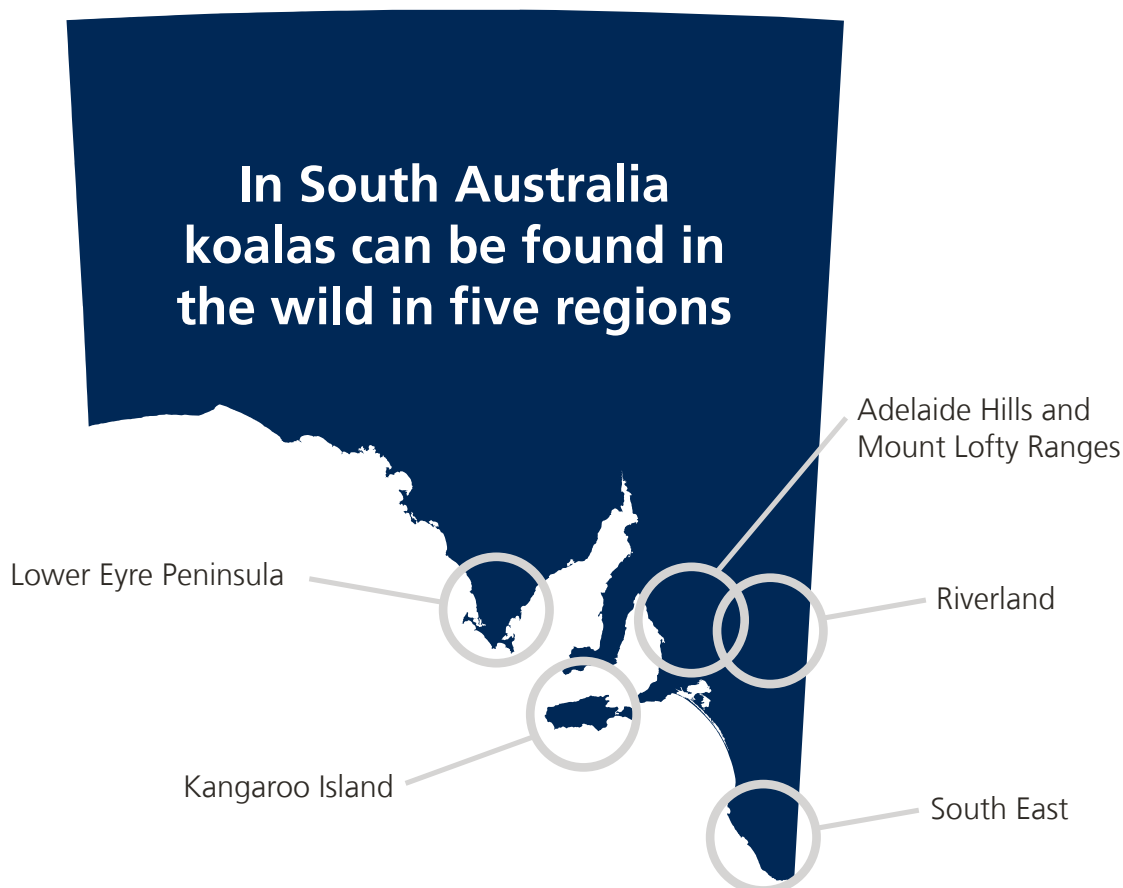
Land managers, non-government organisations, industry, scientific researchers and individuals are all encouraged to get involved in activities to manage the State's natural resources.

Koala conservation and management issues covered by this Strategy

The successful implementation of this Strategy depends on sustained commitment by a variety of stakeholders, ongoing and timely exchange of information between land managers, researchers, and community groups; and regular monitoring and reporting on progress to enable land managers to alter their plans where required.

Stakeholders who will be involved in, or responsible for, actions include State and local governments, industry, research scientists, veterinarians, non-government organisations, zoos and wildlife parks, community groups; and individual members of the community. Outcomes benefiting koalas may also be delivered by Natural Resources Managers through conservation activities that are undertaken on a landscape scale or for other species. In implementing the Strategy there will be leading stakeholders that will need to ensure that attention is given to the most effective use of resources.

The culling of koalas in the wild and/or the deliberate introduction of disease are not supported by this Strategy as a means of koala population control.





Specialists

Scientific Research
Bushfire Emergencies
Permanent Captivity

Natural Resources Managers

Habitat Loss or Fragmentation
Forestry Plantations
Over-browsing
Over-abundance

Kangaroo Island Koala Management Program
Translocation
Prescribed Burns
Kangaroo Island Koala Management Strategy

Koala Strategy

The Community

Koalas on Roads
Koalas in Backyards
Koala Rescue
Climate Change

How was this Strategy developed?

Through collaboration, consultation, partnerships, expert advice and citizen science.

This Strategy was developed through an extensive community and expert consultation process during which people said:

- Koalas are of great importance to the people of South Australia;
- The natural environment in which koalas live is fundamental to everyone's health, wellbeing and way of life;
- Koalas should be protected and the landscape should be managed to provide enough food and shelter, not only for koalas but for all native animals and plants which depend upon it;
- Where koalas occur in over-abundant numbers they need to be managed appropriately so that they do not significantly damage the trees upon which they depend;
- If sick and injured koalas are rescued they should be provided with veterinary treatment;
- Community education is needed to help to reduce the number of koalas being hit by cars bitten by dogs or drowning in swimming pools; and
- More research is needed into the health status of koalas in South Australia.



The Great Koala Count

The Citizen Science project: The Great Koala Count was conducted on 28 November 2012. It was a joint initiative between the Department of Environment, Water and Natural Resources, the Barbara Hardy Institute of the University of South Australia, the Adelaide and Mount Lofty Ranges Natural Resources Management Board, the Commonwealth Scientific and Industrial Research Organisation and ABC 891 Adelaide.

Koala sightings were recorded using a Smartphone 'App' with GPS technology or online via a website. The Community were also invited to complete a survey and talk about their views about what they liked or didn't like about koalas; and what they thought should happen with koalas.

- About 1,000 South Australians participated in the Great Koala Count,
- More than 1,500 koala sightings were recorded, and
- Over 1,000 photographs of koalas were submitted.

The Great Koala Count provided valuable information which helped to inform this Strategy. Results of the count showed that temperature range, elevation and rainfall were the best predictors of koala occurrence, with most suitable habitats in Kangaroo Island, the Adelaide Mount Lofty Ranges and the tips of South Australia's three peninsulas. The population estimate of koalas in the Adelaide Hills and Mount Lofty Ranges was approximately 114,000.



Implementation of this Strategy

***The State Government can't implement this Strategy alone.
We all need to get involved; it will only work if we all play our part!***

The Strategy is divided into sections. Each section, relating to a different koala conservation or management issue, defines the **Desired outcome** for that issue, sets out the **Strategy actions** which will be undertaken to address the issue, identifies **Progress indicators** which will be used to measure level of success in implementation of those actions, identifies the **Stakeholders** who will primarily be responsible for carrying out those actions and sets **Timeframes** for when the actions should be addressed. Each section also contains supporting **Background information** which explains the issue and discusses some of the current, or possible, conservation and management approaches.

Koala conservation and management are things that we can all help to achieve; whether it be keeping our dogs under effective control or slowing down whilst driving on roads where koalas might be crossing. Private landowners can plant trees to contribute to wildlife corridors, others can volunteer as authorised koala carers and we can all try to live more sustainably to help reduce the broader impacts of climate change.

Implementation of this Strategy will have financial costs and benefits for government, industry, business and the community, resulting in:

- increased costs from improved measures to meet the desired outcomes of the Strategy;
- lower cost over time because the future costs of koala conservation and management will be substantially reduced by timely investment, and
- benefits from natural resources management including conservation of co-occurring species and ecosystems, sustainable land use practices and increased opportunities for ecotourism.

Resources from State and local governments will be supplemented by ongoing and potentially increased commitments from community organisations, the private sector and philanthropists to assist in the achievement of the Strategy's objectives. Outcomes benefiting koalas may also be delivered through conservation activities which are undertaken for other species. In implementing the Strategy there will need to be attention given to the most effective use of resources.

How will the BIG decisions be made?

The Department of Environment, Water and Natural Resources will provide advice across government and work with the community, industry, landowners and stakeholders to establish relevant strategic direction and policies which will guide landscape and koala conservation and management. South Australia's eight regional Natural Resources Management (NRM) Boards play a central role in engaging communities and working with the State Government to decide NRM priorities, develop regional plans, and help resolve difficult challenges. State Government and the Natural Resources Management Boards play an important role by coordinating community leadership and community consultations to determine how wildlife issues are best managed in their region. This will lead to productive and integrated partnerships that foster the conservation and welfare of koalas.

Progress review

The Department of Environment, Water and Natural Resources will coordinate a review, including public consultation, of the Strategy after a period of seven years.

Timeframes

The timeframes nominated for each issue within the Strategy are indicative only.

Short-term objectives should be adopted within three years of the release of this Strategy, medium-term objectives within five years, and Long-term within ten years.

Habitat loss, fragmentation and land management



Desired Outcomes:

To conserve and manage koala habitat.

Strategy Actions:

1. Manage, restore and monitor areas of koala habitat within broad wildlife corridors.
2. Develop and implement options to protect koala habitat on public and private land.
3. Develop standard koala monitoring/habitat assessment protocols.
4. Develop Codes of Practice and best practice guidelines to minimise negative impact on koalas of works, such as urban development and land clearance.

Progress Indicators:

1. Koala habitat is effectively managed and incorporated into existing multi-species conservation and land management programs.
2. Increased consideration of koalas and their habitat is demonstrated in planning processes.

Stakeholders:

State and Local Governments, Natural Resources Management Boards, Land Managers, Industry and the Community.

Timeframe:

Short to medium-term.

Background information

Koalas in South Australia live on public and private land, including national parks, forestry reserves, agricultural land, in urban street trees and in people's backyards.

Loss or fragmentation of habitat can have a negative impact on koala conservation and management. Koalas have a specialised, low-energy, low-nutrient diet. This means that they have a limited amount of energy available for travel between patches of preferred food trees. Loss of favoured trees or broader habitat across these various land types can lead to koalas becoming isolated in small pockets of trees surrounded by open areas or urban development. The removal of trees can cause stress to individual koalas and where koalas occur in over-abundant numbers, or they cannot naturally disperse into neighbouring habitat, they can damage their food trees through over-browsing.

If left unmanaged over-abundant, or isolated, populations of koalas could have a considerable impact on their habitat, other species and their own populations. Active management is required in order to prevent habitat degradation and, in severe cases, the starvation of koalas.

Habitat mapping is an important tool to develop a clear understanding of the potential distribution of the koalas, and the quality of their habitat, across the State.

Where land uses require significant changes to be made to koala habitat, such as timber harvesting and urban development, land managers and companies are encouraged to adopt relevant policies and best practice guidelines or procedures to minimise welfare impacts on koalas.

Favoured Eucalyptus food trees for koalas in South Australia include:

- Rough-barked Manna Gum (*E. viminalis*),
- SA Blue Gum (*E. leucoxylon*),
- River Red Gum (*E. camaldulensis*),
- Swamp Gum (*E. ovata*),
- Messmate Stringybark (*E. obliqua*),
- Brown Stringybark (*E. baxteri*), and
- Peppermint Box (*E. odorata*).

Koalas and Plantation Forests



Desired Outcomes:

The risk of koala injury from forestry operations is minimised.

Strategy Actions:

1. Adoption of industry standards for best practice koala management in plantation forests. Best practice in koala management through internationally recognised and independently accredited processes such as Forest Stewardship Council and Australian Standards.
2. Compliance action taken if koalas are harmed during forest harvest.

Progress Indicators:

1. Increased awareness and improvement of koala management issues in plantation forests.
2. Industry standards developed and adopted by Forest Managers.
3. Reduced number of incidents of harm to koalas during forest harvesting.

Stakeholders:

Industry, Independent Auditors, State Government, Wildlife Rescue Groups and Veterinarians.

Timeframe:

Short term.

Background information

In 2013 concerns were raised about the impact of plantation harvesting on koalas. Since that time the State Government, the timber industry and wildlife care groups have worked together to address the issues. There have been very few instances of harm to koalas reported in South Australia. Timber harvested in South Australia is generally sourced from managed plantations. The Department of Primary Industries and Regions South Australia's Forestry division supports the growth of South Australia's forestry and wood products industries. South Australia's largest plantation area is located in the Green Triangle area, in the state's South East. The Green Triangle forests, which include the Gambier, Mount Burr and Penola Forest districts, are South Australia's largest area of wood production and contain many unique areas of native forest. Other major regions for commercial plantations are located on Kangaroo Island, Mount Lofty Ranges and the Mid-North.

All major forest plantation managers in South Australia demonstrate their commitment to sustainable forest and land management through sustainability certification programs that are independently audited. This is achieved through voluntary participation in internationally recognized certification programs such as ISO 14001 Environmental Management Systems, the Australian Forest Certification Scheme and the Forest Stewardship Council. This includes identifying the potential impact of forest operations on the environment, wildlife, associated communities or the viability of the business; developing forest operation policy and plans that address these potential impacts. This gives consumers the option of supporting responsible forestry by purchasing products with an independent, global and credible label for forest products.

The Green Triangle Regional Plantations Committee has launched industry-wide policy and guidelines designed to protect koalas living in Blue Gum plantations. The industry-wide guidelines were developed by an industry working group in consultation with Government and local wildlife carers and aimed to find a zero harm outcome for koalas while maintaining the economic, environmental and social benefits of plantation forestry. While a consistent approach within the Green Triangle is supported, koala management occurs in a different context on Kangaroo Island. Aspects of the Green Triangle approach may be adapted on the Island in consultation with local stake holders in recognition of the specific challenges associated with management the Kangaroo Island Koala population.

The State Government will continue to work with the industry to implement policies and guidelines with a focus on improved planning, identification, monitoring and protection of koalas in plantations.



Over-browsing pressure by koalas



Desired Outcomes:

Browsing of Eucalyptus trees by koalas is kept to sustainable levels.

Strategy Actions:

1. Assess koala abundance and the extent of crown defoliation to identify potential over-browsing at an early stage.
2. Protect favoured trees and re-vegetate, where appropriate, provide additional food sources, facilitate koala dispersal, and reduce the effect of fragmentation.

Progress Indicators:

1. Monitoring indicates a reduction in the extent of over-browsing.
2. Native vegetation is protected where over-browsing is at risk of causing significant impacts.

Stakeholders:

State Government, Land Managers and Community groups.

Timeframe:

Short to medium-term.

Background information

South Australia has only relatively small areas that contain suitable koala habitat with the right mix of preferred food trees. This puts pressure on those areas where koalas are present in high densities, such as in the Adelaide Hills and Mount Lofty Ranges and on Kangaroo Island.

Overbrowsing is usually a result of an over-abundance of koalas in an area (e.g. more koalas than the habitat can support) and sometimes can be as a result of habitat fragmentation which does not allow adequate dispersal of the koalas. This can be the case in peri-urban areas, or isolated stands of trees, where surrounding land use makes it difficult for animals to move between suitable food trees.

Monitoring and early detection of overbrowsing by koalas leading to tree canopy depletion is essential for successful long-term habitat management. Some evidence of overbrowsing of stands of Manna and Blue Gum trees is emerging in the Adelaide Hills area. Monitoring of these areas will help to establish if this dieback is a direct result of overbrowsing by koalas or not and to rule out any other causes.

A method for scoring tree condition (to record scale of damage) can be used when assessing over-browsing impacts, and changes in condition over time.

Land managers can monitor and replant as part of broader conservation and landscape management plans. Isolated trees which are being damaged can be protected by banding the trunk or main branches with a one metre high ring of sheet tin.

Where severe over-browsing is a direct result of over-abundance of koalas in a particular location consideration may need to be given to manage the number of koalas in that location over time in order to attain an environmentally sustainable koala population (see section on: 'over-abundant populations of koalas').

Individual landowners may choose to revegetate their property to facilitate koala dispersal and reduce the effect of fragmentation.

Further research into ecological and tree physiological factors that are associated with koala distribution and over-browsing impacts and monitoring the impact of climate change on koalas is required.



Over-abundant populations of koalas



Desired Outcomes:

Management programs are developed and implemented to maintain koala populations at sustainable densities.

Strategy Actions:

1. Develop methods for determining where over-population of koalas is causing, or could cause, unacceptable risks to vegetation and/or other species.
2. Develop strategies to protect priority areas of native vegetation to prevent koalas becoming established or to allow recovery from koalas over-browsing.
3. Investigate and apply non-lethal means to reduce koala populations or impact.

Progress Indicators:

1. Over-abundant koala populations are stabilized or are reducing.
2. Native vegetation is protected from over-browsing pressure by koalas.

Stakeholders:

State Government, Land Managers, Wildlife Rescue Groups and Veterinarians.

Timeframe:

Short to medium-term.

Background information

Koala numbers are declining in parts of their natural range. However across South Australia koala populations are mostly stable or increasing. In some regions (such as in the Adelaide Hills and Mount Lofty Ranges) koala numbers are increasing and may become over-abundant and as a result begin to over-browse their food trees.

Over-abundance of koalas means that koala numbers in a particular area have increased to such an extent that their habitat can no longer support them. They basically become at risk of eating themselves out of house and home, they strip the trees of leaves and the trees die. In these extreme cases it's not a matter of just planting more trees or reducing the fragmentation of the landscape, there needs to be a coordinated management approach to gradually reduce the number of koalas in the area over time to a sustainable level (see next section on Kangaroo Island Koala Management Program).

The culling of koalas in the wild and/or the deliberate introduction of disease are not supported by this Strategy as a means of koala population control.

Surgically sterilising koalas (as has been done successfully on Kangaroo Island) or using slow-release hormone implants to prevent conception (as has been done successfully in Victoria)

are both expensive and intrusive management options to control koala numbers and they may not be practicable over large areas. However environmentally sustainable koala population management through habitat restoration in conjunction with the surgical sterilisation of koalas in critically damaged natural areas can be considered as an option for addressing issues of locally over-abundant koalas. The following key points need to be considered when developing a strategy to manage numbers of koalas at any given site:

1. Early detection of high koala population levels and signs of canopy depletion is essential for successful management. Other potential causes need to be investigated and ruled out as the cause of canopy depletion.
2. Where canopy depletion is apparent in 50% or more of food trees favoured by koalas in the area under consideration, a population control strategy, including an ecological rationale, may be prepared by the Department of Environment, Water and Natural Resources.

Any management action should estimate a sustainable population density, or the desired population level, for a particular location using a koala population model. Such models enable koala population numbers and densities to be compared between the same location at different times and between different locations.

Kangaroo Island Koala Management Program



Desired Outcomes:

The number of koalas on Kangaroo Island maintained at sustainable densities.

Strategy Actions:

1. Continue to implement and refine management programs to regulate koala densities to a level below that which causes severe tree defoliation.

Progress Indicators:

1. Sustainable populations of koalas (0.75 koalas / ha) and restoration of damaged habitat.

Stakeholders:

State Government and Land Managers.

Timeframe:

Long-term.

Background information:

Koalas were introduced to Kangaroo Island in the 1920s when 18 animals from Victoria were released in Flinders Chase National Park at the western end of the island. The releases were intended to safeguard the species from extinction on the mainland. Their numbers increased significantly and the Kangaroo Island Koala Management Program began in 1997, following an independent assessment of the increasing koala population on the island and its impact upon the survival of certain Eucalypt species on which the koalas were selectively feeding.

In 2001, a further comprehensive Island-wide survey revealed that the koala population was around 27,000 koalas on the Island. This over-abundance of koalas placed immense pressure on the limited areas of suitable koala habitat.

The program is based on the management of an environmentally sustainable koala population through habitat restoration and the surgical sterilisation and translocation of koalas from critically damaged natural areas. The Kangaroo Island Koala Management Program identifies a sustainable density of koalas to be 0.75 koalas/ha and it utilises non-lethal management options and involves no culling of koalas. The program has been effective in reducing koala numbers through non-lethal measures, resulting in an improvement in tree condition in areas where management has been undertaken.

Since the program began, over 10,000 koalas have been sterilised, of which nearly 4,000 have been relocated to the South East of the state making it one of the largest wildlife fertility control programs in the world. In addition tree condition is monitored annually to determine the effectiveness of the program and to inform management as to where and when further habitat restoration and koala management is required.

Ongoing management is critical to ensure the koala densities reach a sustainable level.

To apply fertility control techniques at the population level it is necessary to be able to predict population trends under various levels of fertility control, so that the most effective program can be devised and implemented. This is achieved through construction of a computer model that simulates koala population fluctuations under a range of recruitment and mortality levels.

A regular koala population census is being conducted on the island. The census shows significant reductions in koala density in areas where management has been focused. Two issues are emerging (1) koala population numbers building up in commercial blue gum plantations where management is difficult; and (2) an increasing number of landholders restricting access to their properties now that the koala population is smaller.

Koala translocation



Desired Outcomes:

Koalas handled during translocation actions have good welfare outcomes.

Strategy Actions:

1. Develop and implement a Code of Practice for the translocation of Protected Wildlife, including koalas, in South Australia.
2. Adopt national guidelines for the translocation of koalas when developed.

Progress Indicators:

1. Minimised incidents of harm to koalas during translocation.

Stakeholders:

State Government.

Timeframe:

Short to medium-term.

Background information:

Translocation is defined as the deliberate movement of wild individuals from one area with free release in another. The South Australian Government does not generally support the translocation of koalas as a primary management tool. It should only be undertaken following considerable discussion and investigation due to the potentially high level of mortality of animals.

Translocation of koalas is expensive, and much of the available koala habitat in South Australia contains koalas. There can be no guarantees that individual koalas will adjust well to a new habitat. Translocation is logistically complex, and requires detailed protocols for the different component tasks.

The decision to translocate should be based upon a combination of the feasibility of fertility control, the known history of defoliation at the site, the current extent and severity of defoliation, animal health status, information on the trend in koala numbers at the site, potential impact on other species and the availability of suitably large areas of appropriate habitat. Koalas must not be translocated into habitat close to managed eucalypt plantations as this may increase the probability of adverse interactions during harvest.

When undertaking translocations, the decision on whether to include fertility control will depend partly on the availability of release sites of adequate size, habitat quality and connectivity to accommodate an expanding population.

Sterilisation or contraception of animals to be translocated gives greater flexibility in selection of release sites by allowing release into smaller habitat patches, and greater confidence that future over-browsing problems will not be set in train.

Consideration should be given to the issue of how quickly an area may become re-populated by the influx of neighboring koalas from surrounding areas where there may be abundant koala populations – the vacuum affect.

Translocation can only be considered as part of an integrated program to manage a population, not as a means to dealing with excess animals. All translocation programs should include an on-going program of fertility control in the population remaining at the over-browsed site. The control strategy will consider an estimate of the maximum sustainable population density, or the desired population level for the site. This can be achieved by either translocation or fertility control, or a combination of both, depending on the alternatives available in each case. The habitat quality at the proposed release site and the density of resident koala populations must also be taken into consideration.



Koalas and roads



Desired Outcomes:

The number of koalas hit by cars is reduced.

Strategy Actions:

1. Encourage safe driver behaviours and increase awareness of wildlife crossing roads through the placement of warning signs.
2. Provide ladders for koalas to climb over dividing walls on freeways and expressways.
3. Adopt national guidelines for road design in koala habitat when developed.

Progress Indicators:

1. Fewer incidents of koalas being hit by cars.

Stakeholders:

State and Local Governments, Wildlife Rescue Groups, Veterinarians and the Community.

Timeframe:

Short-term.

Background information

While koalas spend much of their time feeding or sleeping in trees, they also need to come to the ground to move between trees within their home range. This on-ground movement mostly occurs at night but koalas can be active any time. In the breeding season (September - February) koalas will start spending more time moving on the ground as adult males seek mates and juveniles disperse into new home ranges.

For koalas living in or near urban areas much of their habitat is criss-crossed by roads. On-ground movement across roads places these koalas at great risk of being hit by cars, particularly at night. This risk increases where traffic volume and speed are greater and where road position and road design create 'black spots' where koalas are hard to see. When an animal appears from nowhere in front of a car there is often little that can be done by the driver to avoid it.

Obedying speed limits makes roads safer for everyone, including wildlife. Wildlife warning/crossing signs can be placed at sites where koalas are known to cross roads to warn drivers to be extra vigilant and watch out for koalas.

Personal safety, and the safety of other drivers, should always be thought about before attempting to help an injured animal. Anyone who finds a sick, injured or orphaned koala should contact a wildlife rescue group or a local veterinarian as soon as possible. Drivers should not stop and get out of their car on busy roads or close to hazardous bends.

The Department of Environment, Water and Natural Resources will continue to work with the Department of Planning, Transport and Infrastructure (DPTI) to consider design options to minimise the access of large wildlife (koalas, kangaroos etc.) onto freeways, expressways and railways and to allow animals that do enter the area to exit as quickly and safely as possible. These Departments will assess the viability and effectiveness

of measures including, but not limited to, speed limits, ladders over barriers on freeways and expressways and exclusion fences.

DPTI has the responsibility for installing signs to warn road users of animals which can cause 'significant damage or loss of control to passenger vehicles or serious injury to road users resulting from collisions'.

The primary purpose of the warning signs is to enhance the safety of drivers.

National guidelines for road design in koala habitat will be adopted as and when they are developed.



Koalas in backyards (dogs and swimming pools)



Desired Outcomes:

The number of koalas being bitten or harassed by dogs or drowning in swimming pools is reduced.

Strategy Actions:

1. Encourage responsible dog ownership and koala safe fencing.

Progress Indicators:

1. Fewer incidents of koalas being injured by dogs or drowning in swimming pools.

Stakeholders:

The Community, Wildlife Rescue Groups and Veterinarians.

Timeframe:

Short-term.

Background information

Koalas and Dogs: Koalas come to the ground and move between trees mostly at night. They are good climbers and can easily climb over fences into backyards where dogs may be present. Dogs can be curious, aggressive or fearful when a koala enters into their territory. They may challenge the koala and this can lead to confrontation. Koalas have sharp claws and teeth and will defend themselves. Many koalas which are challenged by dogs sustain bite wounds. Even relatively minor bite wounds can lead to the koala needing to be euthanized. Most cases of conflict between koalas and dogs occur in the breeding season (September – February). This is when koalas are most actively moving around between trees.

It is not possible to stop wild koalas moving around between trees. However, there are things which dog owners can do to reduce the likelihood of their pet getting into conflict with a koala. Dogs are capable of seriously harming a koala. Responsible dog ownership means dog owners accepting that this is a possibility and being prepared to take a few simple steps to minimise interaction between their dogs and koalas. These steps may include keeping the dog inside the house overnight, fencing off a dog play area with koala exclusion fencing, installing either 'koala proof' or 'koala friendly' fencing (which either keeps koalas out of the property altogether or, once in, allows them safe passage to get out quickly) and training the dog to remain calm when koalas are nearby. Keeping dogs under effective control when away from home, on public or private land and especially in 'off-leash' areas, is equally important. Dogs must not be allowed to roam or chase wildlife. Roaming dogs pose a significant threat to koalas. Not only is this against the law but it keeps pet dogs safe and away from koalas.

Koalas and Swimming pools: Most people have heard that the name 'koala' is thought to come from a word meaning 'no drink' derived from an Aboriginal dialect of eastern New South Wales. It is true that most koalas generally get enough water from the gum leaves that they eat which usually contain about 50% water or from dew or rainwater on the surface of leaves. However koalas do drink water if, due to heat or prolonged drought, the water content of the leaves is reduced. In periods of hot weather it is not uncommon to see koalas seeking a cooling drink from backyard ponds, swimming pools or pet's water bowls and some have even learnt to seek water from people carrying water bottles. Koalas can fall into backyard swimming pools and drown. Although koalas can swim (when they have to) they can have difficulty latching on to the smooth, vertical sides of pools and cannot pull themselves back out. When a pool is not in use, it is a good practice use a pool cover that is tight, secure and will not sink if a koala walks on it. Installation of pool fencing with a design of transparent glass, Perspex or vertical steel posts will keep koalas out of the pool area. Some new pool designs incorporate a beach-type access where the water is shallow and level with part of the pavement, or have large steps rather than a ladder, these allow koalas to get out of the water easily.

Sick, injured or orphaned koalas



Desired Outcomes:

Sick, injured or orphaned koalas receive appropriate care and attention.

Strategy Actions:

1. Approve koala carers to hold the necessary permits to provide an effective intervention response.
2. Adopt state and national guidelines for all aspects of care, handling and management of captive, sick, injured or orphaned koalas as they are developed.

Progress Indicators:

1. Increased community capacity to drive koala conservation and care.

Stakeholders:

State Government, Wildlife Rescue Groups, Veterinarians and the Community.

Timeframe:

Short-term.

Background information

Many people get upset when they find a sick, injured or orphaned koala. Where possible they want it to be 'rescued', rehabilitated and released back into the wild. But koalas have specialised needs and can be difficult to care for. Many do not cope well with the stress of sickness or injury and this is why only veterinarians, or people with extensive experience in the rehabilitation of this species, are permitted to care for them. In 2010 the Department of Environment, Water and Natural Resources implemented the '*Koala Intervention Policy*' which, for the first time in South Australia, allowed for a network of approved koala carers to take an active role in the rescue, rehabilitation and release of koalas across the State. These carers work in partnership with experienced veterinarians, zoos and wildlife parks to provide emergency triage response and rehabilitative care for sick, injured or orphaned koalas. They also contribute to gathering intelligence on koala distribution, numbers, emerging diseases and disease patterns.

Release criteria. A koala is 'ready' for release back into the wild when:

Physically ready: The koala is fully weaned, has fully recovered from injury and/or disease. Its weight and condition is within the appropriate range for its age and sex. It has appropriate fitness levels and it has acclimated to prevailing climatic conditions. The koala is not considered to be a biosecurity risk.

Behaviourally ready: The koala can recognise and consume appropriate naturally-available food and it is not attracted to sights, sounds or smells that are specific to captivity.

Approved koala carers are people who have been able to demonstrate that they have the necessary expertise and experience in caring for koalas. They have appropriate facilities and access to sustainable fresh supplies of at least three types of suitable koala food tree species daily. They can recognise the subtle signs of pain and ill-health in koalas and have agreed to abide by the protocols described in the Department of Environment, Water and Natural Resources' permit conditions and the '*Guidelines for the Captive Management of Koalas in South Australia*'.

- Koalas cannot be kept as pets in South Australia so the koala carers take care to not tame koalas to the point that they cannot be released.
- Each koala must be assessed by a veterinarian, experienced koala carer, Warden or other nominated DEWNR Officer and certified as fit to return to the wild before it is released.
- Koalas must not be released until they are '*physically*' and '*behaviourally ready*' (see box).
- Koalas must be released close to the point-of capture, unless the environment is unsuitable.

If you find a sick, injured or orphaned koala you should contact a wildlife rescue group or a local veterinarian as soon as possible. You could also volunteer at a wildlife rescue group.

Climate change and 'CO₂ fertilisation'



Desired Outcomes:

Transition to a low carbon economy to safeguard the environment.

Strategy Actions:

1. State Government initiatives to transition to a low carbon economy.

Progress Indicators:

1. Implementation of adaption and mitigation measures against climate change which capitalize on opportunities for growth in green industries.

Stakeholders:

State Government, Business Sector, Industry and the Community.

Timeframe:

Short to medium-term.

Background information

In 2009 the International Union for the Conservation of Nature published the 'Red List' of species around the world destined to be hardest hit by climate change. This list included the koala. Koalas are particularly vulnerable to the effects of elevated CO₂ levels on eucalyptus nutritional quality. Increased atmospheric CO₂ levels tend to result in faster plant growth through a process known as 'CO₂ fertilisation'.

However, while plants grow faster, experiments have shown that it also reduces protein levels and increases tannin levels in plants' leaves. As CO₂ levels continue to rise, koalas will need to cope with increasingly nutrient-poor and tannin-rich *Eucalyptus* leaves.

The difficulties of digesting *Eucalyptus* leaves, combined with limitations on how much koalas can increase the size of their gut, means that koalas may no longer be able to meet their nutritional demands.

Scientists suggest that koalas could respond in two ways:

- Firstly, koalas could meet their nutritional needs by spending more time feeding and thus eating more. However, there is a limit to how much koalas can increase the size of their guts. In addition, eating more leaves causes them to pass more quickly through the koala's digestive system, resulting in less thorough digestion and decreased nutrient uptake. This could also increase over-browsing pressure in areas where there is already a high density of koalas.
- Secondly, koalas could develop a greater selectivity in leaf and tree choice. Younger, more nutritious leaves, however, also tend to possess more tannins. Koalas could also be more selective about the trees they select, though this would involve greater travelling time to find the best trees.

All South Australians are responsible for adapting to climate change impacts where they have the capability to do so. Living a more sustainable lifestyle by reducing individual carbon footprints can go some way to actively contributing to preserving the environment for future generations and the wildlife which depend upon it. Changing current patterns of consumption, taking public transport, installing solar panels or a rain water tank, recycling more waste or simply turning lights off when not needed can help to reduce energy consumption and greenhouse pollution.

At the Climate Change Conference in Paris in December 2015, South Australia was recognised as a world leader in fighting climate change with our commitment to a low carbon economy. In 2006 South Australia became the first State to pass legislation committing to renewable energy and emissions reduction targets. In 2013 the Government committed to low carbon generation by 2025 in recognition of the economic development potential of this industry. In 2014 the State's renewable energy targets were increased by 50% by 2025.

Adaptation actions minimise the negative impacts of climate change and maximise the opportunities that may arise from this change.



Research into health status / genetic structure



Desired Outcomes:

The health status and genetic structure of koala populations in South Australia is better understood.

Strategy Actions:

1. Promote and encourage research into the health status and genetic structure of koalas and develop appropriate strategies to reduce vulnerability of koala populations to disease.
2. Implement standardised protocols for data collection and sharing of research findings.

Progress Indicators:

1. The prevalence and clinical features of koala diseases are determined.
2. The role that genetics and environmental factors play in the development of koala diseases are determined.

Stakeholders:

Research agencies, Universities and State Government.

Timeframe:

Short to medium-term.

Background information

Koalas in South Australia have generally been considered to be free of disease. However, several cases of conjunctivitis associated with the bacterial organism *Chlamydia* were identified in 2012 in koalas in the Adelaide Hills and Mount Lofty Ranges (AMLR) region, leading to a larger study in 2014 confirming a much higher prevalence of subclinical *Chlamydia* infection than initially thought. Koalas in the AMLR also appear to have a higher prevalence of kidney failure than koalas in other states due to deposits of oxalate accumulating in the kidneys, however the cause remains unclear. Mange, due to the *Sarcoptes* mite, has also been detected in some koalas in AMLR, whilst Koala retrovirus is present in both the AMLR and on Kangaroo Island. It is still unclear as to how much of an impact these conditions have, or will have, in South Australian koalas, but they are a cause of concern for the health and welfare of the koala populations and may create demands on the time of Government agency staff, veterinarians and voluntary wildlife carers.

Koalas in South Australia are not genetically diverse. This is because they were originally introduced from a small number of animals brought from Victoria so they are very closely related (in-bred) and, as a result, have a very low genetic variability. A lack of genetic mix can lead to the development of physical abnormalities, increased health issues and a reduction in ability to adapt to change. The presence of diseases may be indicative of South Australian koala populations, and habitat, being under increasing stress.

Further research is required to investigate the prevalence and impact of diseases, such as *Chlamydia*, in the South Australian koala population. Strategies can then be developed to reduce the vulnerability of koalas to these diseases. For instance, researchers have developed a vaccine that could help prevent

further spread of *Chlamydia* infection and whilst vaccinating every koala across the State would be near impossible, it may be possible to vaccinate rescued (sick, injured or orphaned) koalas during rehabilitation, prior to release back into the wild.

The State Government is working toward reinvigorating Cleland Wildlife Park including developing it as a koala 'Centre for Excellence'. This will provide opportunities to offer unique visitor experiences, strengthen private sector partnerships and optimize community and science research initiatives.

Other research priorities identified to date include:

- The relationship between the low genetic diversity of South Australian koalas and population fitness.
- Surveys of genetic diversity in koalas in the South East of the State to see if there is any indication that the remnant genotype is geographically restricted within that area and investigation into the practicality and value of artificially disseminating the diverse genotype(s) more widely through the South Australian population.
- Investigation into the role of genetics and environment in the development of kidney diseases.
- Investigation of infectious pathogens in South Australian koalas such as *Chlamydia*, koala retrovirus and mange.
- Research into ecological and tree physiological factors that are associated with regional koala distribution and over-browsing impacts.
- Monitoring the impact of climate change on koalas and their ability to adapt.

Bushfires and prescribed burns



Desired Outcomes:

Veterinary intervention is provided for koalas that have been affected by State Emergencies.

Strategy Actions:

1. Coordinate efficient and safe responses to intervene with koalas impacted by bushfires.
2. Fire management planning.

Progress Indicators:

1. Effective responses to emergency incidents involving koalas.
2. The role that genetics and environmental factors play in the development of koala diseases are determined.

Stakeholders:

State and Local Governments, non-Government organisations, Wildlife Care Groups and the Community.

Timeframe:

Short to long-term.

Background information

Bushfires: Large landscape bushfires are a major threat to individual koalas. Crown fires (a fire that burns and spreads through the canopy of trees) are a particular problem because koalas can become trapped at the top of trees and cannot escape. They have exposed skin areas on their hands, feet and face which will be impacted first by radiant heat. They also succumb to smoke inhalation.

Prescribed burns: Authorised and coordinated fire management strategies (prescribed burns) are implemented by the State Government to minimise the risks associated with the frequency, size, intensity and frequency of large landscape bushfires. Prescribed burns are conducted in a patchwork or mosaic pattern, which aims to reduce the risk of a significant bushfire in parks and reserves while maintaining environmental values. This mosaic pattern also provides wildlife with safe refuge whilst the vegetation regrows.

No unauthorised personnel can enter the incident controlled bushfire zone, or an area which has been subject to a prescribed burn, BEFORE they get the all-clear from the Emergency Service which is the designated Control Agency, for example, the Country Fire Service is the Control Agency for a bushfire.

It is not possible to remove wildlife from an area before a fire (bushfire or prescribed burn). But following either incident it is possible for suitably qualified and experienced wildlife care organisations and rehabilitators to assist authorities with the recovery, treatment, and rehabilitation of wildlife affected by fire in a coordinated and safe way.

Authorised response in a State Emergency: In response to a State Emergency incident such as a major bushfire the State Government's Department of Primary Industries and Regions South Australia will activate the South Australian Veterinary Emergency Management Inc. (SAVEM) to support and work in the emergency area alongside other agencies. SAVEM will get supplies and veterinary and non-veterinary volunteers into the area after it is re-opened by the Controlling emergency services.

Do not enter a recent fire-affected area as it may be unsafe.

If you find a koala which appears to be affected from a bushfire you should contact a wildlife rescue group or a local veterinarian as soon as possible.



Koalas in captivity



Desired Outcomes:

The welfare of koalas held in Zoos, Wildlife Parks, travelling exhibitions and other public displays is a priority.

Strategy Actions:

1. Develop and implement a Code of Practice for the Public Exhibition and Demonstration of Protected Wildlife in South Australia.
2. Promote the social, educational and economic benefits of having koalas in South Australia.

Progress Indicators:

1. Minimise the number of incidents where the welfare of koalas are impacted in captivity.

Stakeholders:

State Government, Zoos South Australia and Wildlife Parks.

Timeframe:

Short to medium-term.

Background information

Koalas may be held in captivity for several reasons. They may be held for short periods following rescue from injury or disease, or for research. They may be held for long periods for public display or because, post- rehabilitation, they are unlikely to be able to survive in the wild. In any case, it is important to ensure that they are cared for in an appropriately humane manner.

Koalas in zoos and wildlife parks are popular visitor attractions and make an important contribution to the State, national and international tourism industry. These facilities also play an important role in educating visitors about the conservation and management of koalas and their habitat.

Koalas have specialist animal husbandry and veterinary needs. It is essential, therefore, that displays are maintained at high standards. ZoosSA and Wildlife Parks develop and distribute comprehensive information resources which promote better understanding of the koala, its status and actions needed for its conservation and management.

The '*Guidelines for the Captive Management of Koalas*', developed by the Department of Environment, Water and Natural Resources sets minimum standards and conditions for captive koala management in South Australia. This document provides guidance about where care and rehabilitation should (and should not) be used, including the rehabilitation-for-release of koalas. Koalas which are intended for eventual or immediate release should not be placed on public display without prior approval.

Through experiences and interpretation that engage visitors on a deeply emotional and even spiritual level, zoos and wildlife parks play an integral role in increasing people's sense of connection to the natural environment.

The State Government's Cleland Wildlife Park provides opportunities to offer unique visitor experiences, strengthens private sector partnerships and optimises community and science research initiatives.



About Koalas - did you know?

- Koalas are marsupials – mammals whose young are born at a very early stage of development and are then nourished in a pouch.
- Koalas breed from September to February with a single young being born after a 33 to 35 day pregnancy.
- The baby koala, called a “joey”, remains in the mother’s pouch for approximately six months.
- Weaning occurs at one year of age and koalas are sexually mature at about 3 years of age.
- Southern male koalas can weigh up to 15 kg and females up to 10 kg.
- Koalas are ‘crepuscular’ i.e. are most active just around dawn and dusk.
- Because of their low energy diet of eucalypt leaves, koalas must rest for much of the day – they are often active for only about four hours out of the 24 hour day, usually after dark.
- Koalas fur is different in different parts of Australia. In the southern parts of Australia, it is longer, darker and shaggier than in the north in order to keep them warm in the cold southern winters.
- Koalas do not normally share trees (except to mate and rear their young, or where they occur in over abundant densities) and, in prime quality habitat, have territories ranging from 1.2 to 1.7 hectares.



Source Documents

South Australian Legislation and Administrative subordinate Policies

- *National Parks and Wildlife Act 1972* and subordinate Regulations
- *Animal Welfare Act 1985* and subordinate Regulations
- *Native Vegetation Act 1991*
- *Natural Resources Management Act 2004*
- DEWNR Koala Intervention Policy and Procedure
- DEWNR Kangaroo Island Koala Management Program

Koala Strategies Guidelines & Reports

- National Koala Conservation and Management Strategy 2009 – 2014
- Guidelines for the Captive Management of Koalas in South Australia 2010
- Victoria's Koala Management Strategy 2004
- Senate Committee Report – Environment and Communications Reference Committee – 'The Koala – saving our national icon'. 2011.
- "A framework and guideline for strategic thinking and decision-making about koala management in the Adelaide and Mount Lofty Region" by Steven Cork, Ecolnsights
- Green Triangle Koala Management Guidelines for Plantation Harvest Operations
- Lismore City Council – Koalas in our backyard
- Queensland State Government Fact Sheet – Koalas and Car

Books

- 'Koala – Origins of an Icon' by Stephen Jackson
- 'Reducing the Impacts of Development on Wildlife' by James Gleeson and Deborah Gleeson

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