

Localised wildlife extinctions and impacts on the regional population: Lessons from the Koala Coast

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The problem with linear infrastructure:

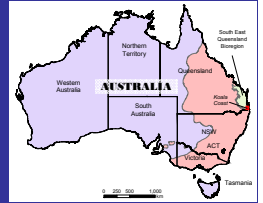
Fauna & road deaths

- Many species affected
 - large home ranges
- Roads major threatening process:
 - clearing; fragmentation; & mortality



Koala Case Study:

- Koala heavily impacted
 - home range; not arboreal
- Conservation status "vulnerable"
 - overabundance SA, Vic



South East Coast

- One of Australia's fastest growing regional populations
- One of the most rapidly expanding "isolated" wildlife
- Semi-rural, bushland, urban
- SEQ Regional Plan to guide urban growth to 2026
- Urban development threatening koala population
- Urban "footprint" established
- High levels of mortality
- However significant numbers of koalas and other wildlife on urban footprint
 - 800/yr
 - Urban harvest rate 10% (roos 15%)

Koala Road Kills South East



Road kills

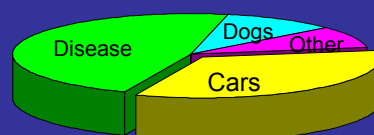
Impacts on the koala population in SEQ

5,000+ koalas hit in SEQ (10 years)

80% die

Roads 35% of mortality causes

Roads kill otherwise healthy animals



Mother & young

Train related mortality

- 39 koalas killed along 10km track
- 12 killed at Ormiston alone
- 8 killed last year
- Serious trauma – amputation = death
- Koalas use rail corridor



The Koala Coast: Koala deaths and vehicles



210+ koalas p.a.

State-roads

1/3 female

75 ♀ – 750 offspring lost

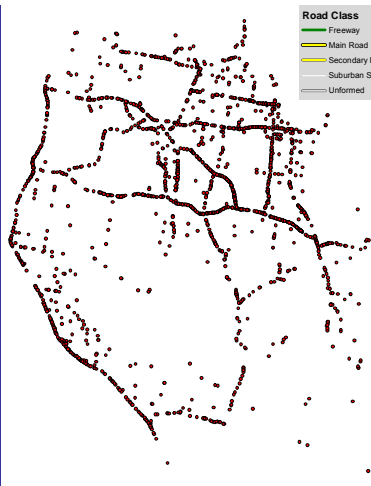


This road kills 18 koalas/year



Road mortality

The pattern of road kill locations traces the arterial or State-controlled roads



Koala mortality and road class

Comparison of koala mortality on all classes of road

All 3064 roads – 1407km
Koala Coast

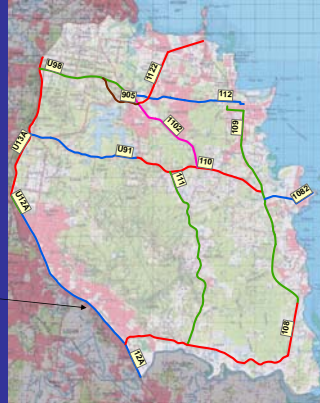


Class	Description	Explanation
1	Freeway	Freeways or Motorways linking cities and characterized by very high traffic volumes, multiple lanes and speeds up to 110km/hr*
2	Major Road	Metropolitan roads, linking major metropolitan areas and characterized by very high traffic volumes, multiple lanes and speeds up to 100km/hr*
3	Main Road	Main traffic route or highway. Speeds up to 100km/hr*
4	Secondary Road	Secondary or alternate traffic route
5	Suburban Street	Urban or suburban street. Speed limit 50-60 km/hr*
6	Un-formed Road	Un-formed road or gravel roads characterized by low traffic volume and low speeds
7	Roundabout	Intersections on main roads controlled by roundabouts that substantially reduce traffic speeds

Mortality on state-controlled roads

Koala mortality on State-controlled roads compared with local roads

Road Number	Road Name
108	Beenleigh - Redland Bay Road
1082	Victoria Point Road
109	Cleveland - Redland Bay Road
110	Redland Bay Road
1102	Capalaba - Victoria Point Road
111	Mount Cotton Road
112	Capalaba - Cleveland Road
1122	Birkdale Road
12A	Pacific Highway
905	Brisbane - Redland Road
U12A	South-East Arterial Road
U13A	Gateway Arterial Road
U91	Redland Sub-Arterial Road
U98	Cleveland Sub-Arterial Road



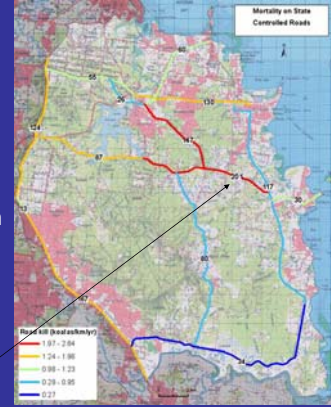
Mortality on state-controlled roads

High koala mortality on State-controlled roads threatens koala population viability

State roads:

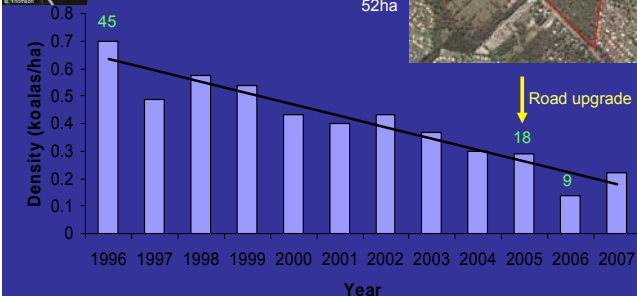
- 26% of *all* koala mortality
- 159 koalas per year
- *Single* largest cause of death
- 7 x higher than local roads
- 1240ha/year habitat needed to offset koala mortality alone

eg MR Redland-Bay Road: 201 koala deaths over 8 years



Population decline

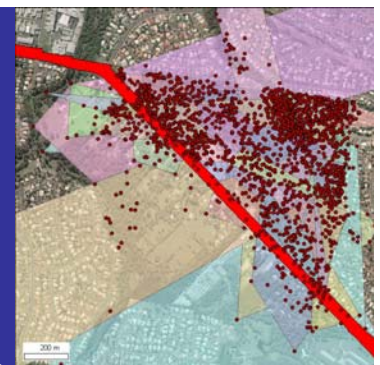
Field Site: Gravel Reserve
(Greater Glider Conservation Area)
52ha



Significant reduction in koala numbers; Only 1 ♀; Approaching effective extinction

Habitat use & roads

- Daily home range use
- Not *just* dispersal
- Koalas need to cross the road every 200m
- All koalas captured on reserve side of road
- Residents v dispersing animals (different)
- No sense of road danger
- Population now approaching effective extinction



Daily home-range movements result in frequent crossing of roads

Need for multiple koala crossing points

Koala radio-tracking & habitat use

Koalas LIVE in urban areas (they are NOT just passing through)!

Strong link between urban and bushland areas

Threats such as roads are a barrier to successful dispersal

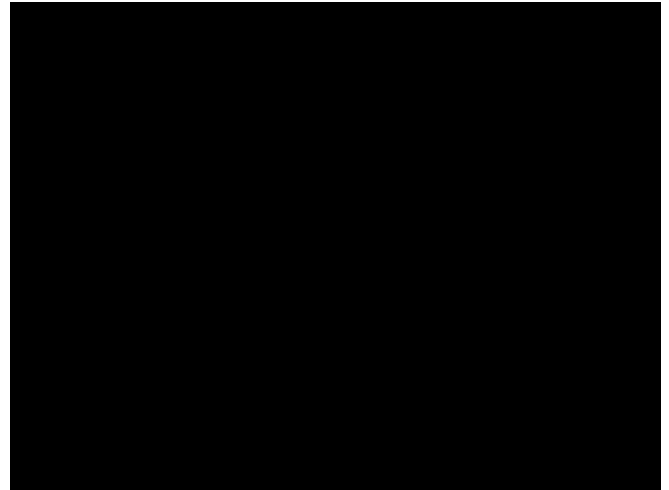
Urban koalas bolster bushland koala population

Collective management of both populations important

Movement of koalas in urban habitat



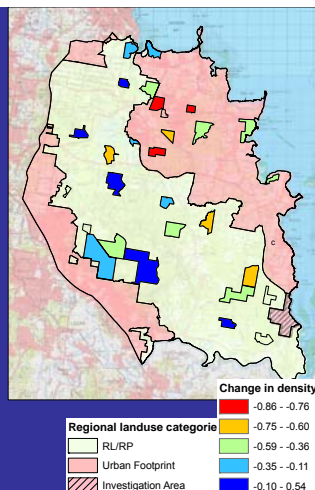
Fencing problematic



Koala population decline

Large declines on urban footprint

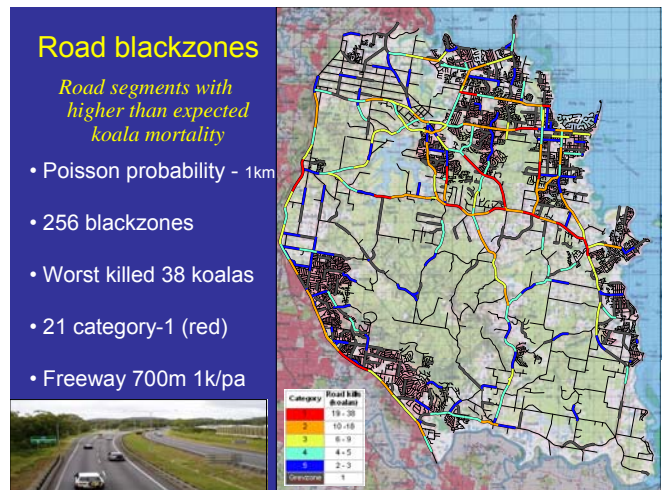
- Decrease in density at approx. half of study sites
- Urban footprint has highest losses
- Declines also in protected bushland
- National park not immune



Road blackzones

Road segments with higher than expected koala mortality

- Poisson probability - 1km
- 256 blackzones
- Worst killed 38 koalas
- 21 category-1 (red)
- Freeway 700m 1k/pa



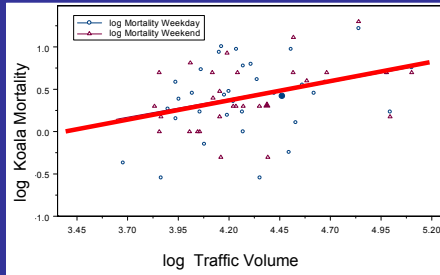
Traffic volume

Traffic volume has a large impact on koala mortality



Volume disproportionate

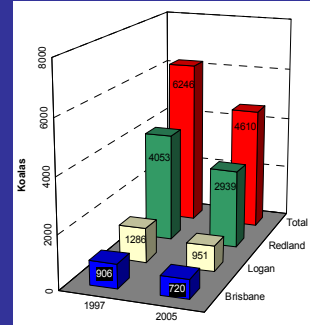
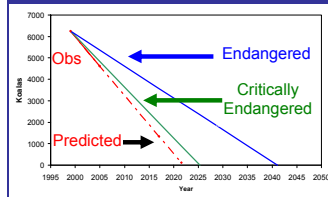
- ↑ volume 10%
- ↑ mortality 14%



Koala population decline

How fast are we losing the koala population?

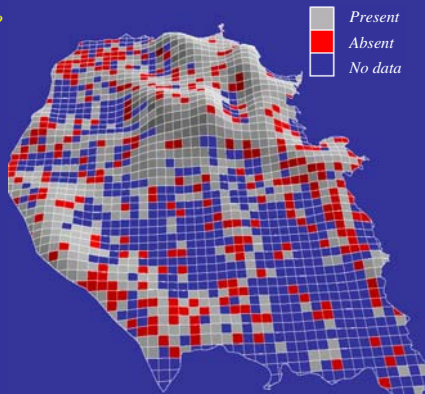
- From 6200 - 4600 koalas in 6 yr
- Redland less than 3000 koalas
- Majority of decline is urban
- Need MVP 5,000 - 7,000 koalas
- Rate of decline increasing
- Also Pine Rivers -40%



Localised extinction

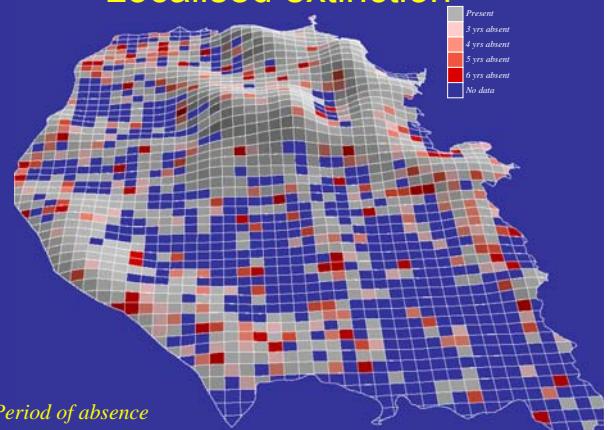
Where?

- Absence: 7300 ± 1800ha (18% ± 5%)
- Period: 3 - 6 years
- No data 39%



Localised extinction

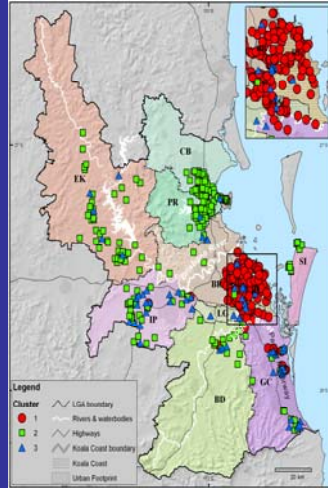
Period of absence



Genetics

Koala populations genetically different

- Koala Coast koalas genetically distinct
- Importance of Koala Coast population
- Genetic isolation caused by roads

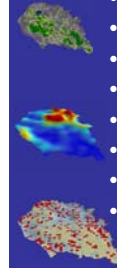


Summary

Lessons from the Koala Coast



- Halt excessive mortality (harvest)
- Restore connectivity
- Improve permeability of urban areas
- Restore a MVP of 5,000+ koalas
- Maintain urban – bushland dynamic
- Recognise bushland reliance on immigration
- Bushland & national park NOT immune
- Prevent localised extinctions
- Acknowledge genetic distinction of regional populations



Thank You!

Acknowledgements

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Redland City

Harriet Preece
Department of Environment and Natural Resources (DERM)



Koala Speed Zone Trial

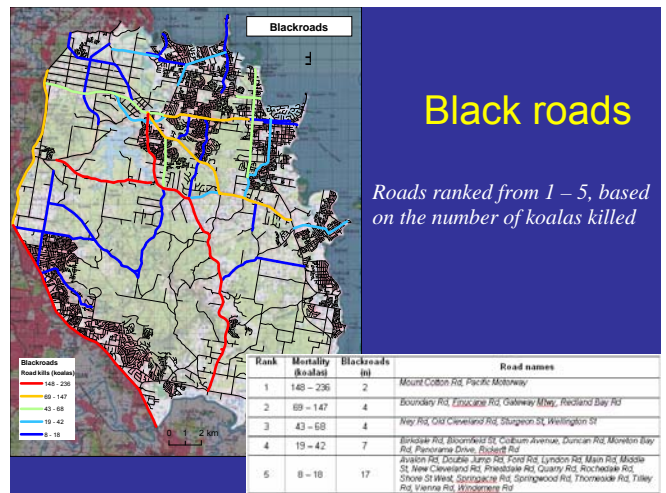
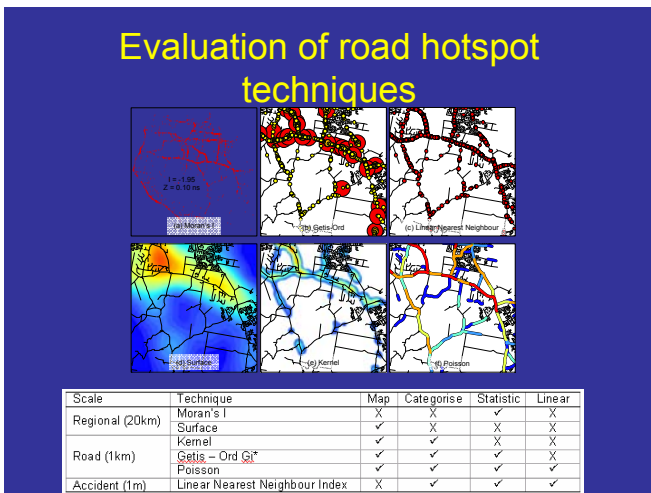
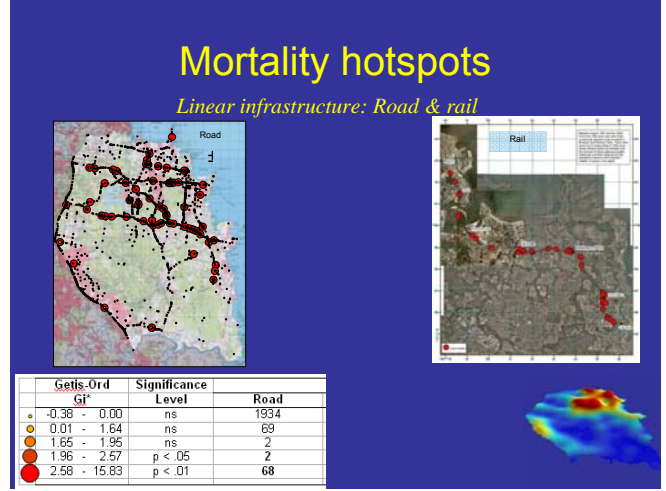
Evaluate effectiveness of road signs in reducing koala road mortality

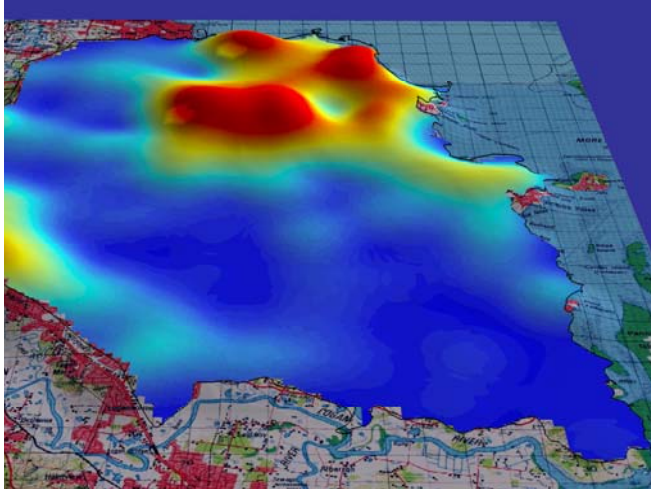
Joint initiative – QPWS, Redland, Dept. Main Roads (1994 -1999)

Differential speed signs on trial roads during breeding season



Dique, D. S *et al.* (2003). Koala mortality on roads in south-east Queensland: the koala speed-zone trial. *Wildlife Research* 30, 127–133.

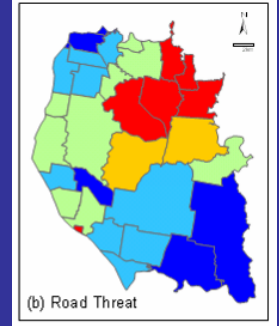




Suburb threat ranking

Which areas are killing the most koalas?

- Estimate mortality risk for suburbs
- Useful visualisation & communication tool
- eg Worst suburb responsible for the death of 700 koalas!



1 Very High 2 High 3 Medium 4 Low 5 Very Low

