

Modelling koala abundance across Victoria

Scientists from the Arthur Rylah Institute for Environmental Research (ARI) have developed the first state-wide koala abundance model for Victoria.

Why the model was developed

The model has been developed to produce state-wide and regional estimates of koala abundance for Victoria. Estimates of koala abundance are important for the conservation and management of koala populations across Victoria and will be used to inform actions under the new Victorian Koala Management Strategy currently being developed. The model has also been used to predict the impact of the 2019-20 bushfires on koala populations.

How the model was developed

The first step to developing the model was to construct a Koala Habitat Distribution Model (HDM), which was done using field records of koalas from the Victorian Biodiversity Atlas. The HDM uses a range of site information associated with the koala field records (such as tree species and abundance, climate, rainfall and topography) to predict where suitable koala habitat may exist elsewhere across the state.

Koala counts conducted over the last 15 years were then collated and analysed to develop the koala abundance model. Over 2000 different koala surveys were used to develop the model.

Results

Suitable koala habitat

The total area of suitable forest and woodland for koalas in Victoria was predicted to be 2,021,967 hectares. A further 167,098 hectares of suitable habitat in eucalypt plantations was also predicted.

Koala population estimates

The model estimated a state-wide koala population of 459,865, with an estimated 412,948 (95% credible interval (CI) of 324,772–519,578) in native forest and woodland and a further 46,917 (95% CI, 35,998–60,054) in eucalypt plantations.

Three Department of Environment, Land, Water and Planning (DELWP) regions – Barwon South West, Gippsland and Hume – were predicted to support 80% of Victoria's koala population in native forest and woodland, while 91% of the koalas in eucalypt plantations were predicted to occur in the Blue Gum plantations of the Barwon South West region.

A further breakdown of the population estimates by DELWP region are provided in **Tables 1 and 2**.

Table 1: Predicted koala abundance within native forest and woodland.

Region	Predicted abundance	95% credible interval*
Victoria (state-wide)	412,948	324,772 - 519,578
Barwon South West	210,277	163,188 - 267,867
Gippsland	75,134	56,313 - 98,687
Grampians	32,552	17,051 - 57,490
Hume	55,180	25,639 - 111,333
Loddon-Mallee	8,728	3,880 - 17,763
Port Phillip	31,076	20,718 - 45,207

*The 95% credible interval means that, while predicted abundance is provided, the actual abundance could be between the range specified.

Table 2: Predicted koala abundance within eucalypt plantations.

Region	Predicted abundance	95% credible interval*
Victoria (state-wide)	46,917	35,998 - 60,054
Barwon South West	42,581	32,265 - 54,880
Gippsland	1,462	1,040 - 2,002
Grampians	2,534	1,237 - 4,698
Hume	256	104 - 556
Loddon-Mallee	44	15 - 101
Port Phillip	40	21 - 66

*The 95% credible interval means that, while predicted abundance is provided, the actual abundance could be between the range specified.

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Koala density estimates

Koala density was generally higher at lower elevations, in areas with relatively high annual rainfall, low summer temperatures and high abundance of key eucalypt species, particularly Manna Gum, Swamp Gum, Blue Gum and River Red Gum.

Density was predicted to be high through the wetter forest and woodlands of south-west Victoria, as well as Cape Otway, parts of Mornington Peninsula, French Island, the northern and eastern shores of Western Port Bay, and the Strathbogie Ranges and lower Ovens River floodplain in north-eastern Victoria.

Predicted densities within native forest varied up to 13 koalas per hectare, with an average of 0.22 koalas per hectare.

Koala densities in eucalypt plantations varied across the state. In the Strzelecki Ranges, observed koala density in plantations averaged 0.03 koalas per hectare, with a range of 0–5 koalas per hectare. In the south-west, observed koala densities in plantations averaged 0.89 koalas per hectare, with a range of 0–6 koalas per hectare.

Impact of Victorian wildfires

It is estimated that 3% of koala habitat in native forest and woodland in Victoria was affected by wildfires, with 0.59% affected in eucalypt plantations. In total, around 15,000 koalas were predicted to have been impacted by wildfires in the 2019-2020 summer season, or approximately 4% of the state population.

What the model will be used for

The population estimates produced by the model will be used to inform DELWP policy and decisions around the management of koala populations. The estimates will also be used to inform actions under the new Victorian Koala Management Strategy, which is currently being developed.

Next steps

The collection of new data from state-wide or regional koala population surveys that use consistent methodology would improve the model's ability to predict contemporary koala population abundance and trends. Additional surveys in the eucalypt plantations across Barwon South West, and in native forest and woodland across Gippsland and central and northern Victoria, would be particularly useful.

Undertaking further koala population surveys is an action being considered under the new Victorian Koala Management Strategy currently being developed. The data resulting from any future koala population surveys will be incorporated into the model.

More information

A report outlining the development of the model and its results is available on the DELWP website at: <https://www.wildlife.vic.gov.au/our-wildlife/koalas>.



Credit: Marcia Riederer (DELWP)

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