Friends of Pallister's Reserve Inc.

Pallister's Reserve is a 254 ha wetland reserve on Masons Road, Orford, owned by Trust for Nature, & managed by the Friends of Pallister's Reserve Inc. Established January 1990

Feb 2026

TRUST FOR NATURE

Next Meeting: Sunday, February 22, 2026

10am: Working Bee *Noon: Lunch* *12:30pm: General meeting*

The Pallisters AGM, previously held in February, has this year been postponed to

Sunday March 22, 2026.

All members are encouraged to attend.

The fresh perspectives of new committee members would be highly valued. Please advise Julia if you'd like to contribute in this way.

February Working Bee Tasks

- Kennedy koala count. Bring binoculars.
- Woolshed maintenance..
- Weeding: Amaryllis belladonna, thistle, coast wattle, … Bring garbage bags, garden gloves, and favourite hoe.
- Mowing

General Meeting

A number of priority items are on the agenda for the February meeting. Included are:

- Julia to report on communications with Emily Dillon, Senior Manager of Trust for Nature Conservation Reserves.
- Ratification of an agreement with Lisette Mill for fox and cat control.
- Discussion of options for improved fauna monitoring.
- Advance considerations for AGM, postponed to March.

Blackwood seeds (Acacia melanoxylon)

Photo: Lorna Kring

Free Naked Ladies

At this time of the year Pallister's uninvited Naked Lady weeds are in bloom.

Naked Lady – Amaryllis belladonna – is yet another of Australia's invasive weeds from South Africa … along with African Weed Orchid, Agapanthus, African Boxthorn, Boneseed, Bridal Creeper, Bulbil Watsonia, Cape Ivy, Blanket Weed, Arum Lily, Capeweed, Soursob, Pigface, … Kevin Sparrow lists dozens of them in his *Environmental Weeds of Warrnambool*.

Bring along good garden gloves – belladonna sap is toxic – favourite hoe, and a couple of black garbage bags to the February meeting day; take home some Naked Ladies for transplanting into your garden.

Grab a few Coast Wattle seedlings while you're at it!

Friends of Pallister's Membership

New Friends are always welcome! By registering as a member you contribute to the ongoing volunteer conservation work of the Friends of the Reserve.

Annual membership is $20 per person or family and may be paid by direct deposit to: BSB: 013-900, Acc: 3180-74368.

Please add your name to your remittance and email a completed membership form.

Pallisters Reserve lies in the traditional Country of the Gunditjmara and Eastern Maar peoples, who never ceded their sovereignty of the Land. We are indebted for their past and ongoing custodianship.

Meetings are held at the Reserve; usually every fourth Sunday except July and December.

Co-leaders: Julia Schlapp 0427 778 265 & Anthony Leddin 0408 333 046 Sec./Treasurer: Trevor Kennedy 5565 8692;
Minute Sec.: Nick Glover; Newsletter Editor: Ross Hicks (pallisters_newsletter@proton.me).

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Analysis of Pallister's Koala Survey Counts

February, 2026

This Newsletter article is a condensed summary of a more detailed report available for download.

In part, this study updates the 2024 report by Trevor Kennedy describing the results of koala surveys conducted up to the end of 2023. Kennedy's report should be consulted for additional background material not presented here.

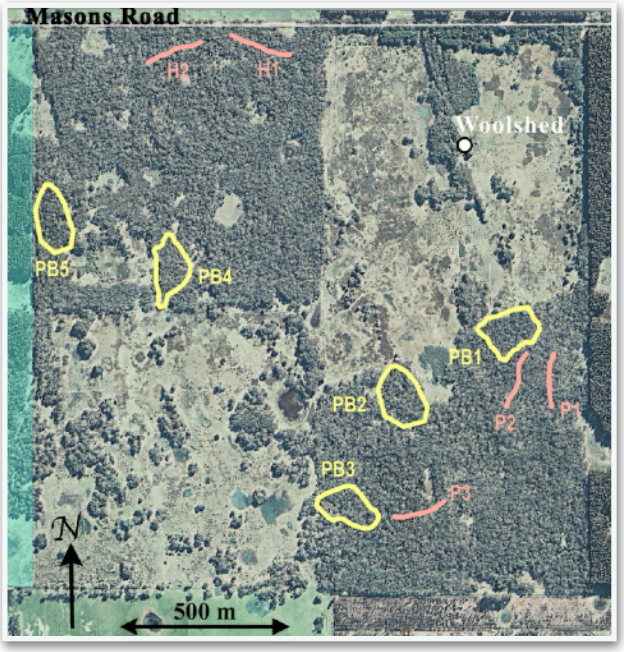
Motivation and Methods

As much as Pallister's koalas are treasured, we would be concerned to see their numbers increase beyond the current moderate population level. When koalas over-populate, eucalypts are defoliated and die, koalas starve, and other arboreal fauna perish. Such disastrous consequences motivate close monitoring of koala numbers on the Reserve.

Additional motivation comes from Australia's 2025 National Climate Risk Assessment, which for SW Victoria, states: "*Many ecosystems, such as Eucalypt woodlands, will have a lower capacity to support biodiversity under future climate change.*"

Direct impacts on our arboreal fauna are therefore anticipated. ***Being the most visible of our arboreal fauna, koalas act as the bellwether species for change, not only for arboreal fauna, but for the Pallister's forest as well.***

With a total woodland area of about 125 ha, our current methods make it impracticable for us to monitor the entire Pallister's Reserve: monitoring is confined to a few fixed transects that cover only a fraction of the woodland.

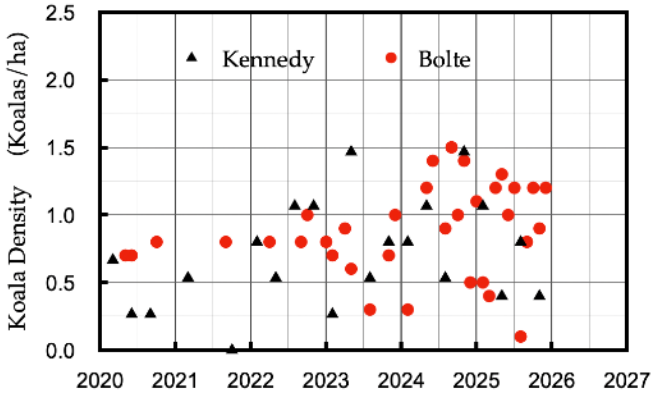


Koala monitoring at Pallister's Reserve. P1, P2,-P3, H1, & H2 are Kennedy transects; PB1-PB5 are Bolte's sites. Hocking's woodland is at top left, Pallister's forest at bottom right. The-tinted area to the left (west) of the map is an agroforestry block that has been logged since this image was captured.

As described in the October 2023 newsletter, in the program instigated by Trevor Kennedy, koalas are counted along five fixed strip transects, three in the historical forest on Bill Pallister's block, and two in the adjacent Hockings block woodlands. Carried out during his regular monthly bird counts, Peter Bolte counts koalas at five 2 ha sites contained within set loops – not coincident with Kennedy's transects.

Statistical Randomness of the Data

Shown below are the total koala densities deduced from the Kennedy and Bolte surveys.



Densities deduced from all koala counts conducted at, Pallister's Reserve.

At first sight, the scatter of these points makes a confronting impression: how can useful information possibly be derived from such dispersed data?

Momentarily overlooking this difficulty, the two sets of data seem *quantitatively – i.e. numerically* – similar. Over the six years of monitoring both data sets yield roughly the same average density and spread – assessed by calculating the standard deviation. Keeping in mind that the surveys are carried out over different locations and that the surveyed areas are imprecise, it is reassuring that the results of the two monitoring protocols are reasonably consistent..

Based on the observed average density and the total forest area, we calculate that close to 100 koalas typically inhabit the Reserve. Approximately 6% of the woodland is surveyed in the Kennedy protocol so that on an average day, only about six koalas are counted. Peter Bolte's survey covers a slightly larger area; his average count is close to eight.

But these are only average numbers: koalas roam the Reserve at will, and depending on their whim, may be present in a survey transect or site come monitoring day. But most are not.

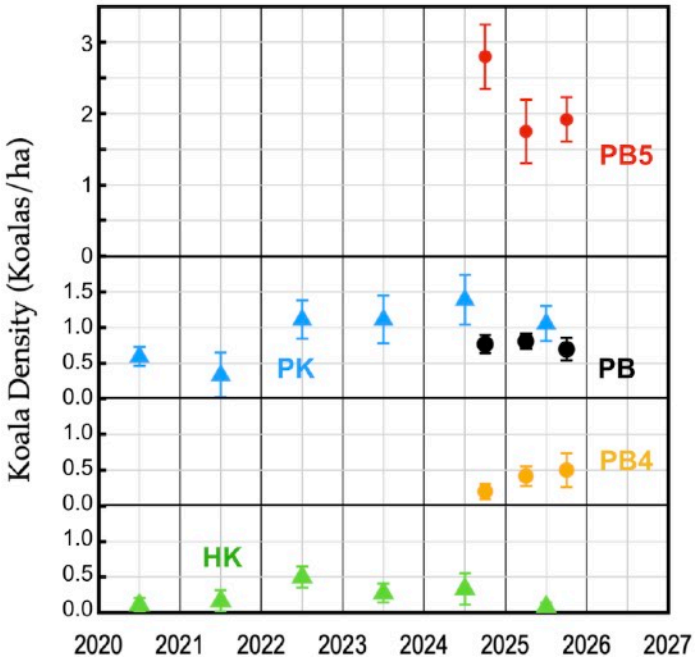
As demonstrated in the full report, it is ***statistical randomness that dominates what is seen in the survey-to-survey counts: the scatter of the data does not primarily arise from volatility in the koala population, but rather reflects the variability intrinsic in the statistics of small numbers.***

Population Density

The ongoing surveys have provided a large quantity of low-quality – *i.e.*, low-count – data. In order to cut through the resultant statistical fluctuations and make the results more transparent, counts made for related transects/sites and different times can be pooled. (Indeed, the densities plotted on the previous page have already been pooled, each set over five different transects/sites.)

Because the counts are combined, more precise estimates of koala densities emerge. Statistical estimates of their uncertainties – expressed as standard deviations – are also calculated. These reduced densities and standard deviations – represented as error bars – may then be plotted for visual interpretation.

Shown below are the results of such an analysis. Counts from the Kennedy and Bolte survey areas in the Pallister's woodlands were separately combined (PK & PB), as well as Kennedy's two Hocking's transects (HK). In addition, the Kennedy data – collected quarterly – are pooled in 12-month intervals; Bolte's more-frequent surveys in 6-month periods.



Koala densities for various locales within the Reserve, averaged over twelve- and six-month intervals. The error bars are standard deviations in the average values for each time interval.

For HK, PB and PB4, the pooled data are statistically compatible with populations that have remained constant over time, however the limited duration of Bolte's PB and PB4 counts hinders firm conclusions.

Although the pooled PK data have large error bars, Kennedy's Pallisters transects appear to have plateaued out after rising from two low-population years in 2020-2021.

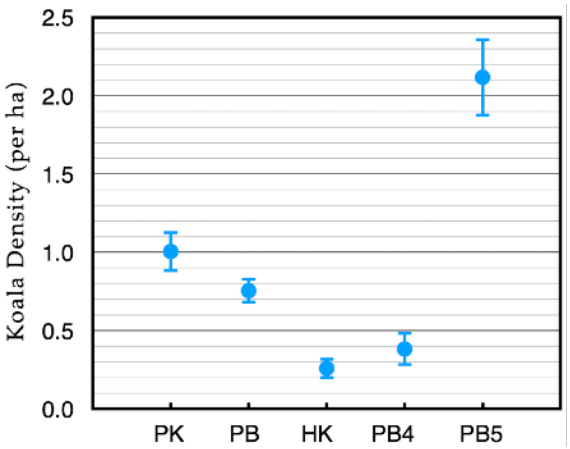
The PB5 site – a special case – will be discussed shortly.

For the most part, however, since 2022 there exists no compelling evidence for striking changes in koala densities on the Reserve. In particular, it is reassuring that no escalating or abrupt increases are apparent.

This conclusion is consistent with that reached by Kennedy following his analysis of survey counts performed up to the end of 2023.

The relative stability of the densities over the years suggests that the various areas of the woodlands are close to their carrying capacity, and is indicative of the koala habitat quality of each locale.

Variations in habitat quality are made clearer by combining the results for transect/site combinations over the full survey history of the Reserve, as plotted below.



Average koala densities deduced for locales within the Reserve. Error bars represent the sample standard deviations, computed from the spread in the data.

Marked changes are seen from one site to another: densities derived for the Hocking's sites HK and PB4 amount to only about one-third of what is obtained from the Pallister's surveys. Large densities are found for the PB5 site along the western boundary.

Given the moderate differences in Ecological Vegetation Class (EVC) between different woodland areas of the Reserve, the density differences seem large. It is known, however, that koala densities respond to numerous factors, including forest age and structural complexity, diversity of food tree species, access to water, and prior histories of koala occurrence, bushfires, and logging.

Underscoring this complexity, foliage chemistry – specifically leaf toxicity and nutritional value – has been nominated as a key element in determining sustainable densities. It has been proposed that "*koala food trees are not passive participants in forest ecosystems but can actively elevate their chemical defenses in response to browsing*."

The high-density PB5 site stands as a special case. It was speculated – November 2025 Newsletter – that the elevated PB5 numbers may in part be due to plantation harvesting in 2024. Unfortunately, there are no prior PB5 records, and the possibility that the high-quality PB5 habitat has always supported a higher koala population cannot be readily dismissed.

Recommendations

1. Anomalous transect/site counts

Almost all our survey counts are consistent with the random statistical variations normally expected around low-count averages.

But what if we obtained a survey count notably higher than average? How can we know if this signals a real physical effect – a mass migration of koalas into the Reserve, for example – or a mere statistical fluke? Statistical rarities do happen!

If only statistical randomness was at play, the probability of a count one or more standard deviations (SD) above average is 0.165 – a not-that-uncommon 1-in-6 chance.

However, the probability of a count two or more SD above average drops to 0.024 – a much-less likely 1-in-42 chance. Such events should raise a red flag – the increased count may point some effect – other than statistical randomness – being active.

A *second* consecutive count 2 SD or more above threshold becomes **very** suggestive: the chance of this happening due to purely statistical randomness is– smaller than 1 in 42^2, *i.e.*, only 1 in 1764.

For the existing Kennedy survey data the 2 SD threshold for concern is 12 koalas spread over five transects; for Bolte's sites it is 16.

The Pallster's koala population could also crash, resulting in very low count numbers. For both the Kennedy and Bolte surveys, zero counts – summed over all transects/sites – falls 2 SD below the average. Zero counts should be noted with concern; two consecutive zero counts would be alarming.

2. Areas with high koala densities

High-density sites are particularly vulnerable to over-browsing and their canopies should be closely monitored, even if they are regularly surveyed and count numbers seem modest.

Koala hot-spots could also be present in infrequently-visited parts of the Pallister's woodlands. If seen, these should be reported and monitored on an ongoing basis.

3. Logging and land-clearing

Logging and land-clearing activities outside the Reserve boundaries displace koalas. By noting such activities in progress, we can raise the level of our monitoring to be better-prepared for consequences.

4. Continue monitoring!

The motivation for monitoring – presented at the outset – remains. Evidence from continued monitoring will improve our understanding of population changes over time. This would be particularly welcome for the Bolte sites, for which there exists only a limited 18-month history.

Summary

Unless it is anomalous, by itself a single survey count has limited significance. However, the accumulation of such counts over years provides valuable insights.

Specifically, our accumulated surveys indicate that koala numbers have remained relatively stable across the Reserve, especially since 2022. With greater assurance, it is also seen that different Reserve locales vary in koala habitat quality.

Acknowledgements

Kudos to Trevor Kennedy and Peter Bolte for instigating our fauna monitoring programs. The importance of the data from these surveys can only increase with time.

… Ross Hicks