

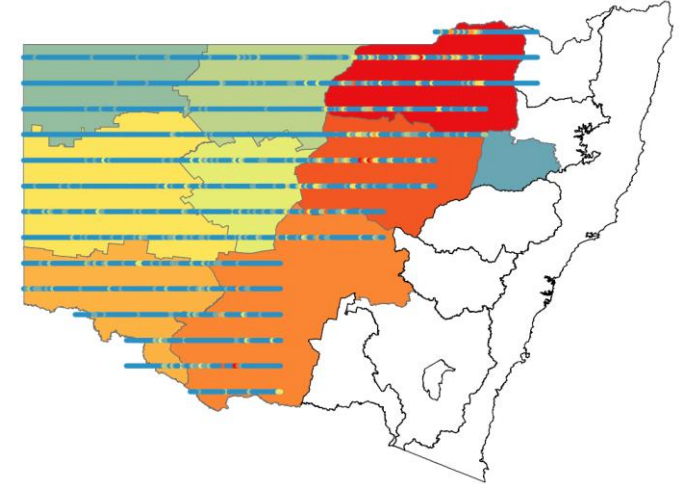
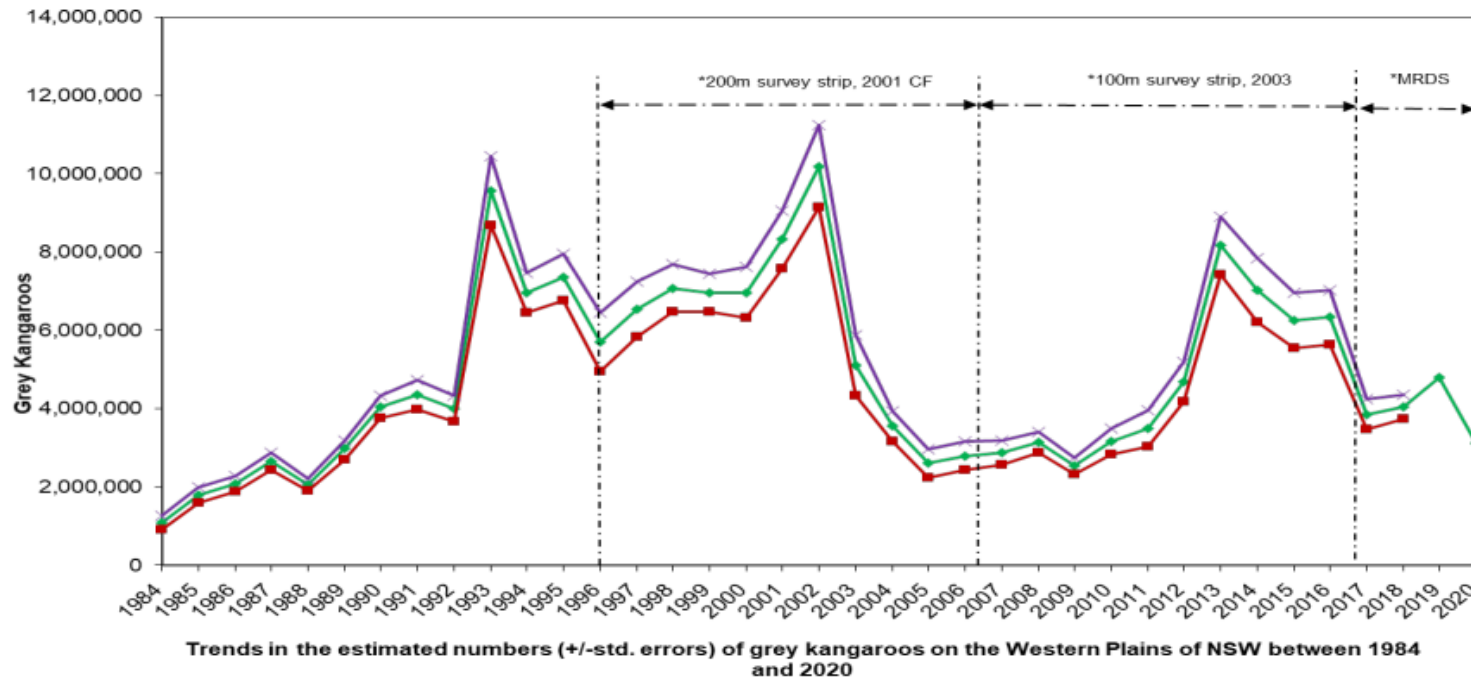


The great counting fallacy

Claire Galea
Independent
Biostatistician

The survey methodology

1. The methodology has changed 4 times with no validation
2. Less than 1% of the area is surveyed
3. Not all areas are surveyed every year – climate impact



The survey methodology

4. Survey precision (CV) – the higher the percentage the less accurate (aim <20%)
5. Correction factor – to account for the inaccuracy in visibly spotting Wallaroos they multiply the actual number by 1.85 ~ double.
6. Clusters - “the recommended number of clusters of kangaroos should be 60-80 for reliable modelling”

Kangaroo management zone	CV (%)
Glen Innes High	12.5
Medium	35.2
Armidale High	36.0
Medium	16.4
Upper Hunter High	19.6
Medium	46.3



These are individual animals not clusters

Table 3. Number of transects flown, total survey effort (km) and raw counts of macropods for each of the two survey strata within the three kangaroo management zones.

Kangaroo management zone	Number of transects	Survey effort (km)	Raw counts			
			Eastern grey kangaroos	Common wallaroos	Red-necked wallabies	Swamp wallabies
<u>Glen Innes</u>						
High	30	225.0	910	107	84	46
Medium	34	255.0	951	101	53	30
<u>Armidale</u>						
High	37	277.5	1,030	54	11	19
Medium	22	165.0	667	118	13	123
<u>Upper Hunter</u>						
High	35	175.0	534	58	16	30
Medium	37	277.5	506	70	21	13

Statistical Modelling



- There are three key assumptions that must be adhered to when using the methodology applied by Cairns:
 1. “Objects on the line or point are detected with certainty”
 - Every kangaroo is actually seen (they are not)
 2. “Objects are detected at their initial location”
 - Kangaroos do not move or move in groups (but they do)
 3. “Animals are randomly and evenly distributed throughout the survey area”
 - Kangaroos are scattered evenly across the whole area (but they are not)

Statistical Modelling

- The raw data is not represented
 - When the data does not “behave” Cairns’ manipulates it to conform
- No consideration of **climate**
 - Bushfires, floods, droughts – are not accounted for in the modelling
- Lack of model fit
 - How well the models work for the data is not always reported
- How the quotas are established
 - These are based on long term averages and are just a value + or – that average without consideration of other factors.



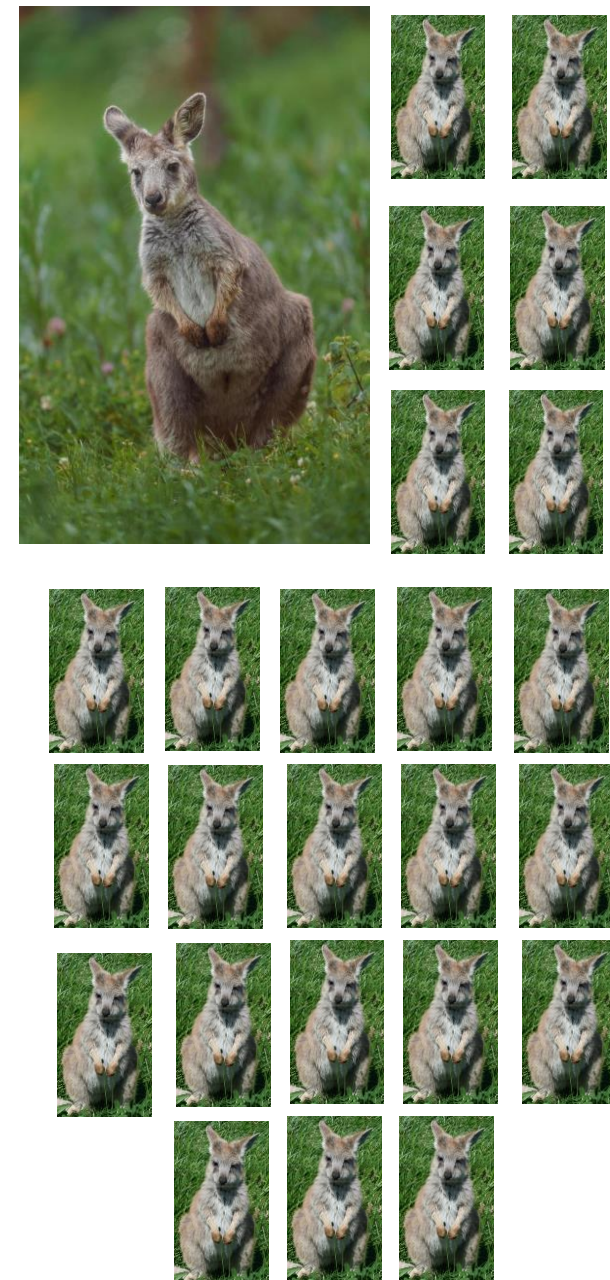
Implausible population estimates

- DPI clearly stated that Wallaroos stop breeding during times of drought
- Between 2015-2018 the population of Wallaroos increased by 269% ~ 90% per year even though the Northern Tablelands were declared in drought\
- Wallaroos 24 joeys a year

2019
Northern
Tableland
s Survey

Year	Population	Density	% Change	Quota	% Population
2014	44,669	0.8	-72.7	24,509	15.0
2015	234,927	4.3	426.0	4,467	10.0
2016	451,594	6.8	92.2	35,239	15.0
2017	176,058	3.2	-61.0	67,739	15.0
2018	184,002	3.3	4.5	26,409	15.0
2019	48,502	0.9	-73.6	27,600	3.7
2020	6,859	0.1	-86	6,782	14.0
2021				0.00	0.00

Had the quota been reached in 2020,
there would have only been 77 kangaroos
left



Back to the hot water....



- The very same methodology is used for counting kangaroos and wild horses
- When Cairns was questioned in the NSW kangaroo inquiry about why his work on counting kangaroos had not been ***independently*** peer-reviewed he stated
 - “my work for horses has been peer reviewed and it uses the same methodology”



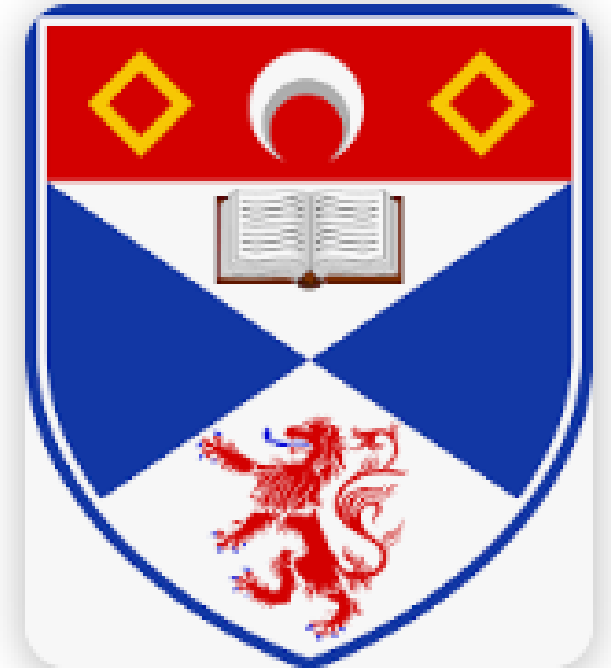
It was never independently peer-reviewed but rather the company that designed the software Cairns uses “reviewed” the methodology

So, what did the company have to say.....

University of St Andrews

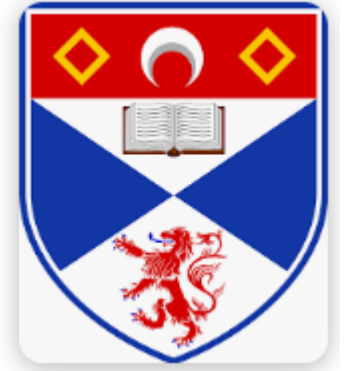
Who reviewed
the work?

- In 1997, two researchers from the University of St Andrews, Scotland (Steve Buckland and David Borchers) obtained funding from British research councils to develop the distance sampling software.
- The software is still actively being developed and is **owned and operated** by an inter-disciplinary research center within the University of St Andrews (CREEM): Centre for Research into Ecological & Environmental Modelling



CONFLICT OF INTEREST!

University of St Andrews stated that:



- *“Estimation of population trends over time is difficult based on this methodology”*
- *“The high rate of growth reported appears to exceed published maximum growth rates”*
- *“It is arguable whether an inference should be made to the areas not surveyed in each block”.*
 - The assumption in the report is *“animal density is zero in non-surveyed areas”* – which means that **no extrapolation methods should be applied to any areas un-surveyed as this will cause a significant inflation of the population**

Where are we now?

- Despite having spoken on Ray Hadley's show, 2SM and 2CC Canberra about the counting fallacies for kangaroos...
 - No-one will listen
- Despite fighting hard for a recount of the wild horses – which in turn will show the counting fallacies in kangaroos...
 - Nothing has happened



- Despite years of screaming these fallacies to anyone who would listen...
 - Nothing has changed



Thank you to
everyone in this
room, across
Australia and
around the world
for never giving up
on the kangaroos