A Quest to Research the Welfare and Social Dynamics of Wild Australian Brumbies

WORDS BY Dr Andrea Harvey
BVSc DSAM(Fel) DipECVIM-CA MRCVS MANZCVS (Animal Welfare)
University of Technology Sydney

Dr Andrea Harvey is a veterinary specialist and animal welfare scientist, who is currently writing up her PhD research on the welfare and social dynamics of wild brumbies in New South Wales and Victoria.

She grew up on the Island of Guernsey in the Channel Islands, she trained as a veterinarian and became a veterinary specialist in small animal and feline internal medicine.

So, how does a small animal vet from the United Kingdom end up doing a PhD on the welfare of wild Australian brumbies?

I always had a deep passion for horses, riding since a young child and owning horses since I was 14 years old. When I moved to Australia in 2011 to live with my Australian partner (also a veterinarian and horse lover), I brought my Connemara x TB mare over with me.

We're fortunate to live on a 700-acre property nestled high on the NSW Southern Tablelands, perfect country for horses and an opportunity to fulfil my dream of training youngsters. In my search for a young horse, I stumbled across a brumby rehoming organisation with yearling brumbies looking for homes. After some research, I decided that they would be perfect, fulfilling my training dream and saving them at the same time.

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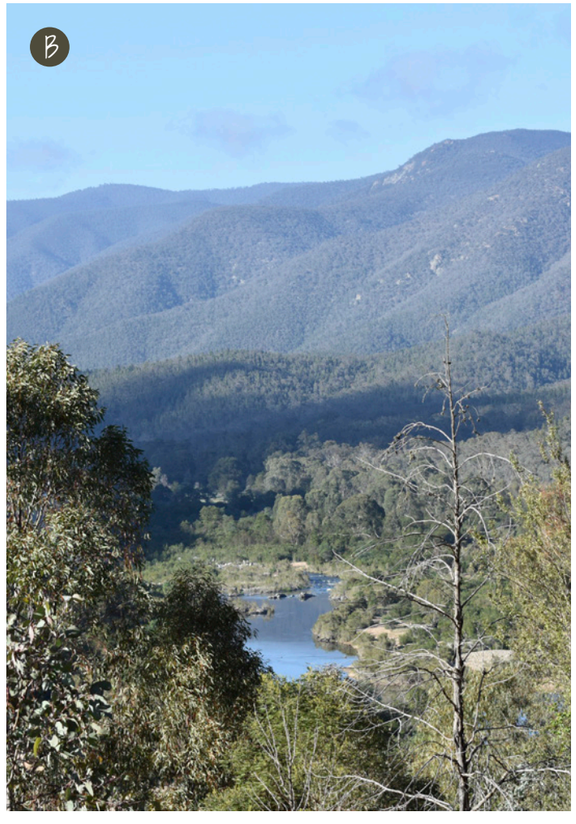
This was the beginning of my love affair with everything brumby; ensuring they had the best welfare, training them, learning more about their history, and discovering the socio-political controversies surrounding the management of wild brumbies. The management of brumbies is exceedingly contentious, with environmentalists wanting brumbies removed from National Parks, and brumby advocates wanting them protected.

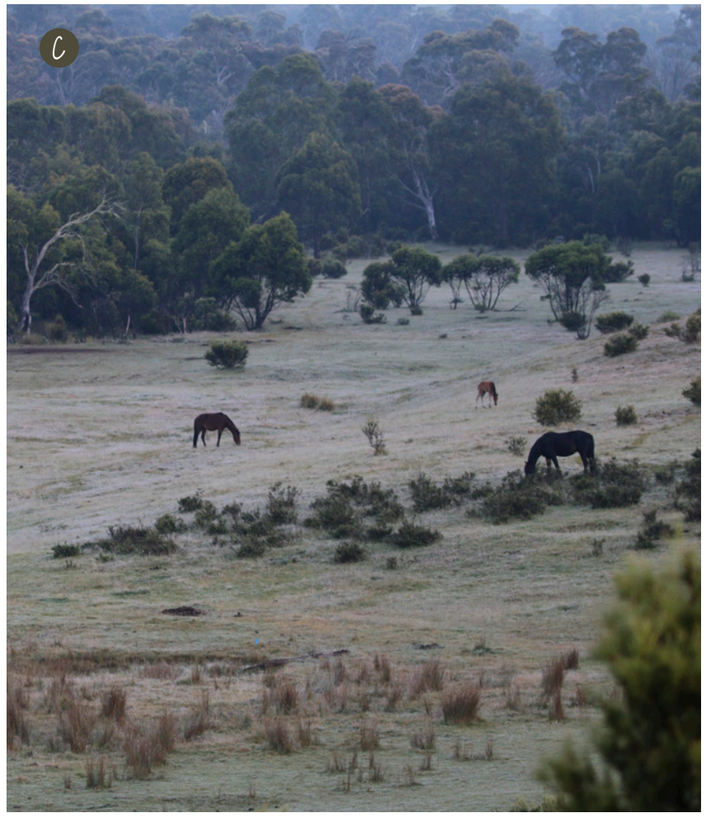
Brumby stallion, Cooleman Plain, Ksciusko National Park, New South Wales. Photo by Dr Andrea Harvey.

Over four years, Dr Andrea Harvey's research has taken her from the Kedumba valley in the Blue mountains (Image E), where 'The Man from Coxs River' was filmed, to the large open plains of northern Kosciusko national park (KNP) (Image D), the rugged alpine heathlands, mountainous woodland regions and lower snowy river of southern KNP (Image B), the source of the Murray river bordering between KNP and the Victorian alpine national park (Image C), and the vast expansive heathlands of the Bogong High Plains in Victoria (Image A) .

Dr Andrea Harvey (Image E) is a veterinary specialist and animal welfare scientist, who is currently writing up her PhD research on the welfare and social dynamics of wild brumbies in NSW and Victoria.

All images courtesy of Dr Andrea Harvey.





Having read extensively around the arguments on all sides of the debate, as an animal welfare veterinary scientist, it struck me there was something obvious missing from the debate. What about the horses themselves? How were they faring in different regions? What was their health and welfare like? What problems might they be facing? What implications might this information have on management decisions?

I became aware that whilst years were being spent arguing about the fate of the brumbies, bringing in new legislation, and even taking a national parks organisation to court, what was actually happening in the lives of the brumbies themselves had been lost sight of. The arguments had become more of a power struggle between different groups of people.

The politics of wild horse management in Australia has been rife since the 2000 Guy Fawkes aerial cull yet over the 19 years since, then there has been absolutely no scientific evaluation of the welfare of wild brumbies in different regions, which means their welfare has never truly been taken into account in an evidence-based manner.

Whilst many brumby supporters view the newly passed 'Brumby Bill' related to Kosciusko National Park as an historic victory for the brumbies, is it really a victory for their welfare? Or just a victory for people that want to see them there for their heritage value?

If we truly care about the welfare of the brumbies themselves, we should also want to ensure that they are experiencing enriched lives with minimal suffering, and not lives that are merely a constant struggle for survival.

I decided that I needed to get out into the bush with wild brumbies and conduct some original scientific research to provide answers to some of these important questions.

Not knowing what I would end up finding, I embarked on a PhD, a four-year period dedicated to collecting objective scientific data on the brumbies. In order to obtain additional expertise in animal welfare science, I also undertook a further post-graduate veterinary qualification (Membership of the Australian & NZ College of Veterinary Scientists in Animal Welfare).

The PhD Aims

The aim of Dr Harvey's PhD was to obtain objective scientific data about the health, welfare and social organisation and behaviour of wild brumbies in different regions of NSW and Victoria.

She hopes that her data may be useful to incorporate into management plans. She wants to bring animal welfare to the heart of future management discussions and decision making.

What is animal welfare?

There is, perhaps surprisingly, a lot of confusion about what animal welfare means. It is a term that is used a lot when we talk about animals and their management, but it is frequently misused and confused with animal rights.

Animal rights is an ethical position regarding how we ought to treat animals.

Conversely, animal welfare is a state experienced by the animal themselves. To put it simply, it relates to how the animal is feeling, whether they are having pleasant (e.g. comfort, content, playful) or unpleasant (e.g. hunger, pain, fear) mental experiences.

For example, if we are talking about the right of brumbies to remain living in the wild, this is an ethical position, but does not take into account assessment of their welfare.

If we want to make an informed decision about what may be the 'best' or most 'humane' outcome for an animal then we need to incorporate evidence-based assessment of the animals' welfare.

IMAGES A & B: Kosciusko National Park Alpine brumbies.

IMAGES C, D, E & F: I had 60 cameras altogether. In one location, I used all these cameras to monitor the entire brumby population really closely, continuously, for two years. The camera traps were especially important in woodland areas.

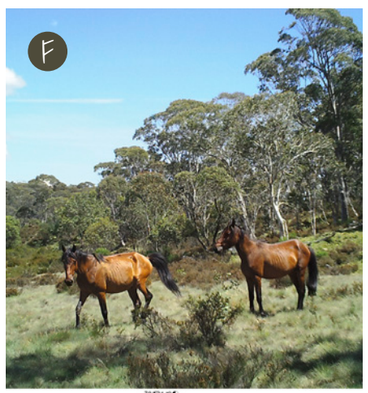
Images courtesy Dr Andrea Harvey.

CAUGHT ON CAMERA!

The camera traps can take photos and video clips, so Dr Harvey could observe the horses as if she was standing right next to them, enabling her to pick up really insightful information on indices that are impossible to obtain from a still photograph, such as their demeanour, gait, behaviour, and even their respiratory rate and pattern.

Dr Harvey has ended up with hundreds of thousands of camera trap images of horses that she is now closely analysing. The example pictures demonstrate the quality of camera trap images, and how you can also obtain information about the social groups and behaviours of the horses and spatial proximity to other individual horses.

By having cameras across a large area, Dr Harvey could also get an approximation of the horses' home ranges by evaluating on which camera locations individual horses were captured.



The Five Domains model allows us to assess an individual animal's welfare based on current scientific understanding of the positive and negative experiences that animals experience. It comprises four physical domains of welfare; 'nutrition', 'environment', 'health', and 'behaviour', and a fifth domain of 'mental experience'. Measurable indices from domains 1-4, are used to 'cautiously infer' the animal's positive or negative mental experiences in domain 5.

Assessing the welfare of wild horses

It's one thing trying to evaluate the welfare of domestic horses that you can closely observe and examine. Free ranging wild horses residing in vast rugged landscapes that might be difficult to even observe let alone get close to, adds another dimension to this challenge! So, the first stage of my research was designing a protocol for how the Five Domains Model could be applied to wild horses. This was followed by investigating the utility of direct observations and camera trapping (using motion sensored cameras attached to trees), to obtain both, still images and video recordings.

Assessing animal welfare

Animal welfare relates to how an individual animal is feeling so, how can we assess how their experience? Mental experiences are subjective, so they cannot be measured directly. We also have to be very careful that we do not anthropomorphise, attributing how we might feel to conclude how an animal may feel. This is because every species has unique physiology, behaviour, nutritional, environmental and social requirements.

In animal welfare science we use the scientific knowledge we have on the species in question and measure indirect indices that may reflect how the animal is feeling. We rely on available neurophysiological evidence to evaluate some mental experiences and we have evidence of the links between measurable indicators of physical states and related mental experiences.

Body condition for example, is a measurable physical state that can give an indication of hunger. Certain behaviours can be used as indices of pain, such as rolling, gazing and/or kicking at the abdomen that horse owners recognise as a sign of abdominal pain (colic), or lameness as a sign of limb pain.

After reviewing all the available peer-reviewed literature on wild horses and the health and welfare assessment of domestic horses, I then developed a grading system for objectively grading the welfare of individual horses based on available scientific information.

Finally, over time, I applied this grading system to individual horses across different regions and habitats. I also correlated these welfare grades to other population parameters such as herd size, foaling rates, home range, and habitat type, in order to identity any links between these more easily measurable indices and welfare grades.

Out in the bush collecting data on wild brumbies

Out in the bush in the Blue Mountains and different regions of the Australian Alps, I spent a lot of time camping out in a swag to enable me to perform daily direct observations of horses from dawn until dusk, perform ground surveys of the different habitats, collect faecal samples for parasitological evaluation, and also collect any skulls that I came across so that I could estimate age of death from the horse's teeth.

...it struck me there was something obvious missing from the debate. What about the horses themselves? How were they faring in different regions? What was their health and welfare like? What problems might they be facing? What implications might this information have on management decisions?

I placed many motion sensored cameras across each location, downloading images and renewing batteries on each trip. I had 60 cameras altogether. In one location I used all these cameras to monitor the entire brumby population really closely, continuously, for two years. In other locations I just had the cameras up for two-month periods before moving them to the next location, in order to obtain information on as many horses as possible, in different locations and habitat types.

These cameras were vitally important as they allowed me to get close up photos of horses, providing much more data than would be possible when viewing horses directly from a distance. These close-up images are also much more accurate for assessing indices such as body condition score, the integument (skin/coat) and the condition of their hooves.

In addition, the camera traps capture information on horses that I would never be able to directly visualise. This is especially important in woodland areas, where the dense bush prevents being able to directly see and monitor the majority of horses. Given that woodland areas represent the most common habitat type across the Australian Alps and the Blue Mountains, it would be impossible to obtain adequate data on the horses in these regions without the use of these camera traps.

IMAGE A: My first three brumbies. Although we had other horses already, given that brumbies have strong social bonds and are used to being in herds with other horses of similar ages, in order to optimise their welfare and social experiences, I ended up coming home with three yearling brumbies.

IMAGE B: A mare and yearling filly from the Blue Mountains in New South Wales.

All photos courtesy Andrea Harvey.

What about limiting reproduction to reduce population growth rates?

As part of her research, Dr Harvey has also been investigating immunocontraception as a way of limiting reproduction to reduce population growth rates, completing an immunocontraceptive trial in groups of captive brumbies at sanctuaries.

Immunocontraception is a form of fertility control, with 2 main types of immunocontraception having been used in wild horses to date; PZP (porcine zona pellucida vaccine), which prevents fertilization in mares, and the GnRH vaccine, Gonacon, which prevents mare from cycling, and can also be used to reduce testosterone and fertility in colts and stallions.

At the current time, however, neither of these immunocontraceptives agents are available in Australia. Dr Harvey therefore trialled an alternative GnRH vaccine that is available in Australia, and evaluated it in both mares and stallions to assess whether it was effective at preventing reproduction.

She further evaluated it in young colts to assess whether it was effective at preventing testicular development and so whether it could be used as a form of 'chemical castration'.

Further to this, she has carried out some preliminary feasibility assessments for dart administration to horses in the regions where she was researching them in the wild.

Dart administration is usually the most practical way of administering these fertility control agents to free- roaming animals. However, it isn't as easy as it sounds, as it is imperative to have a clear line of sight of the horse and the site of injection, and be able to get within 20-40 metres of the horse, in addition to being able to locate individual horses again for the follow up injections that are re-quired.

So, in her feasibility study, Dr Harvey evaluated how many horses could be individually identified based on natural markings, whether the same individual horses could be located on a 2nd occasion, how close it was possible to approach each horse, and whether it was possible to locate them again on the same day if they fled during the first approach.

Meanwhile, back at home a brumby sanctuary is formed

Throughout my research, more brumbies continued to find their way to us and we ended up turning our 700-acre property into a private brumby sanctuary now housing a range of brumbies from Guy Fawkes, Oxley River, Kosciusko, and the Blue Mountains National Parks. The aim of our brumby sanctuary is to provide these brumbies with a refuge for life, and to exemplify 'gold standard' welfare for brumbies across all Five Domains.

To achieve this, they are housed in large herd sizes with a mixture of ages and sexes. All stallions are gelded, and we also have the colts on the immunocontraceptive trial.

They are in paddock sizes big enough (approx 200-acres) to match their approximate home range sizes in the wild, and of rugged terrain with mixed native pastures. This helps to keep them active and as near a natural diet as possible to prevent them becoming overweight and developing subsequent metabolic disorders like laminitis.

Hills, gullies and wooded eucalyptus areas provide excellent shelter, and several dams provide water for drinking as well as playing and bathing. All of this enables them to have the best parts of a natural lifestyle, whilst at the same time benefiting from preventative health care (vaccination, worming, foot trimming, dental care) and veterinary treatment when required, and supplementary feeding as needed.

They are all gradually handled as this is important in enabling healthcare to be provided without causing them distress. Prior to handling they are trained with positive reinforcement to walk calmly through yards and into a race, so that if any healthcare is needed prior to handling having been completed, they can easily receive this without distress. I train them all myself, at their own pace, using equitation science/learning theory-based techniques, prioritising their training around enabling them to calmly receive preventative health care.

Brumby veterinary work

Myself and a colleague have also performed all the veterinary work for a large brumby rehoming organisation for the last few years. We geld 25-30 brumby stallions there each year in addition to providing preventative health care advice such as deworming, and treating other common ailments.

This also contributes to the research as we are able to age the horses that are coming in, and identify and document common health and welfare problems that are present.

Back to the desk for data analysis

I now have an enormous volume of data on Brumbies across these different regions, obtained from the direct observations, thousands of images and videos of over 600 horses, and around 300 faecal samples. I am now on the less exciting part of the research which is the desk work! This involves analysing all this data which includes application of my 5 domains welfare grading system, identifying common health and welfare issues, evaluation of population and social dynamics, faecal parasitological analysis, and statistical analysis of all of these results.

Once all the results are known, I will then be looking at what the implications of the results may be for wild horse management, and how the results may be utilised and incorporated into future wild horse management plans. Perhaps my work may also serve to resolve some of the conflicts around wild horse management, but that might be a wish too far!

Dr Harvey's research has now been completed and she is in the process of writing up her results for publication in peer reviewed scientific journals. Further articles about Dr Harvey's research will be published in this Magazine once the original research papers have been published.