

2021 Feral Horse Aerial Survey

Bogong High Plains and Surrounding Valleys

Report



Parks Victoria

2023

Executive Summary

A population of feral horses was surveyed in an area centred around the Bogong High Plains, in the Alpine National Park, in June 2021. The survey used a sight-resight (mark-recapture) survey method, from a helicopter. This survey continues to build on, and compare information obtained from six previous surveys, undertaken in 2005, 2007, 2009, 2012, 2015 and 2018 using the same method.

Horses have been removed from this area by Parks Victoria and will continue to be managed by Parks Victoria, in accordance with the Feral Horse Action Plan, to prevent the considerable damage that feral horses cause to alpine ecosystems. The ongoing surveys allow us to understand changes in abundance of feral horses over time, which is important for informing Parks Victoria's management decisions and for understanding the effectiveness of management.

The estimated abundance of feral horses in the survey area at the time of the June 2021 survey is 252 (95% confidence interval: 195-350). Feral horse abundance on the Bogong High Plains has varied over time. Results of this survey, coupled with those of previous surveys and details of feral horse removals over time demonstrate that sustained effort is required to achieve ongoing reduction in abundance. They also show how interruptions to the removal program have resulted in inefficiency. Consequently, far greater effort is now required to minimise the impacts of feral horses on the Bogong High Plains than would have otherwise been required if the removal program had been able to continue uninterrupted.

Further monitoring will enable better understanding of how feral horse abundance and the associated level of threat to natural values change in response to any further management action. Future surveys could consider a broader area where horses may occur in the landscape. These surveys should be designed to enable estimation of abundance across the broader landscape as well as enabling comparison with results of previous surveys.

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Introduction

A discrete population of feral horses exists in the Bogong High Plains area, south of Falls Creek, in the Alpine National Park. Feral horses pose a risk to the significant natural values of the Bogong High Plains (including waterways, endangered alpine peatlands, and several threatened flora and fauna species), through pugging, trampling, selective and close grazing, and dust bathing. Managing the impacts of feral horses in Victoria's national parks is necessary to meet obligations under the National Parks Act 1975 (Vic.), Flora and Fauna Guarantee Act 1988 (Vic.), Environment Protection and Biodiversity Conservation Act 1999 (Cwth) and the international Ramsar Wetlands Convention.

The *Protection of the Alpine National Park: Feral Horse Action Plan 2021* (2021) outlines the management objective of removing all feral horses from the Bogong High Plains and preventing new incursions. The Action Plan also includes an action for Parks Victoria to periodically repeat surveys of feral horse populations in the Bogong-Cobungra area.

Parks Victoria has undertaken regular aerial surveys since 2005 to estimate the size of the Bogong High Plains feral horse population, assess changes and support evaluation of management effectiveness. This report presents the results of an aerial survey undertaken in June 2021.

The 2021 survey area included the Bogong High Plains and surrounding valleys south of Falls Creek (see map in Appendix 1). A reconnaissance flight of the Mt Nelse area and state forest in the surrounding Cobungra area was also undertaken.

The survey used a sight-resight (mark-recapture) survey method, undertaken by observers in a helicopter. This survey used the same method as six previous surveys, undertaken in 2005, 2007, 2009, 2012, 2015 and 2018, enabling comparisons to be made.

The objectives of the survey were to:

- Estimate the abundance of feral horses on the Bogong High Plains, Alpine National Park, in a way that allows comparison to the results of previous surveys.
- Undertake reconnaissance of the Mt Nelse area and areas of state forest adjacent to the Bogong High Plains, in the Cobungra area, to record any evidence of feral horse presence detected.

Survey and Reconnaissance Methods

Study Area

The survey and reconnaissance activities were conducted over approximately 46,850 hectares of national park and state forest. The area was divided into three blocks (see Appendix 1):

1. The Mt Nelse block (approximately 6,000 ha searched for evidence of feral horse presence);
2. The Bogong High Plains block (approximately 23,000 ha where feral horse abundance was estimated from sight-resight surveys)
3. The Cobungra block (approximately 18,000 ha searched for evidence of feral horse presence).

The Bogong High Plains block is in the Alpine National Park, near Falls Creek in north-east Victoria. The area is characterised by flat open alpine grasslands and heathlands, with the peripheral areas consisting of open and closed

snow gum forest, graduating to a tall Alpine ash forest. The elevation of the study area ranges from 1400m ASL to 1760m ASL. There are two significant river valleys within the study area (the Cobungra and Bundara Rivers). Surveys were undertaken to estimate feral horse abundance in this area. The survey to estimate feral horse abundance focused on the Bogong High Plains block, with an area of approximately 23,000ha. The survey area and transects were the same as used in previous surveys undertaken in 2005, 2007, 2009, 2012, 2015 and 2018.

In addition to the population survey, reconnaissance flights were flown over the Mt Nelse area, east of Falls Creek and in state forest south of the Great Alpine Road in the Cobungra area). These reconnaissance activities involved observers in the helicopter searching for visual evidence of feral horse presence at the time of survey.

Survey design and field methods

The feral horse population survey was carried out using a sight-resight (mark-recapture) survey method, from a helicopter (Dawson 2005; Dawson & Miller 2008). Each section was flown twice, one day apart, with Day 1 being the 'sight' opportunity, and Day 2 being the 're-sight' opportunity. A total of two days was spent flying. The survey was carried out on the 21st and 22nd of June 2021. Surveys were performed using a contracted helicopter carrying four persons: pilot and Parks Victoria Air Observer in the front seats and two Parks Victoria surveyors in the rear seats.

Prior to the surveys a training, familiarisation and induction session was undertaken for all participants, including the pilot. The same observers were used on each day of the survey. One observer had participated in previous aerial surveys of the Bogong High Plains feral horse population. Survey of the Bogong High Plain block used parallel transects spaced 1 km apart (Appendix 2) The same transects were flown on both days. Transects were flown at a constant height of 150 metres above ground, with a speed of approximately 100km/hr.

For the Bogong High Plains block, transects began in the northern part of the study area, closest to Falls Creek, finishing in the southeast corner of this section, near Mt Battery. The transects in the northern part of the Bogong High Plains Section were flown in an east west direction, as this aligns with the orientation of the plateau and is the most efficient and effective way to cover this area. The southern part of the Bogong High Plains section (Youngs Tops area) was flown in a north south direction, to account for the variability in the landscape and to enable safe and effective survey of the deep river valleys. This flight path aligned with the orientation of the slopes maximising the ability to locate horses, whilst maintaining a relatively constant speed and height above ground and not flushing horses from open country into denser vegetation where they may have been harder to see.

Transects were recorded by the helicopter's inboard GPS (Global Positioning System) (enabling the second day's flight to follow the first day's flight – Appendix 2), as well as a hand-held GPS (to be downloaded for reporting purposes).

Horse sightings

Horse sightings were made and recorded as follows: The aircraft was flown along a pre-determined transect. When an individual or group of horses was sighted, the helicopter was directed to their location. The helicopter was flown to a location above the group of horses and flown slowly in a high circle around the group, maintaining the same height as the transects are flown. This allowed identifying information about the horses to be collected and photographs to be taken prior to the horses dispersing. Where possible, the helicopter was hovered for several seconds while a count of the size of the group was made. The aircraft was oriented, so observers were not looking into the sun, reducing glare off the windows. Photographs of the horses were taken at the same time. Information recorded was group size, group identification number (a unique number given to each group to identify it from other groups), time and location (using waypoint from a GPS).

Photographs were taken using two digital cameras – a Nikon D80 SLR Digital Camera with an 18-135mm zoom lens, and a Panasonic Lumix digital camera with 30X optical zoom and 20-megapixel resolution. Settings for these cameras were set on high speed, high resolution and multiple shot. Sufficient photos were taken to enable the identification of each horse and group sighted. This typically required between five and thirty photographs of each group, depending on the group's size.

Once this initial information was collected, and photographs taken, the helicopter flew closer to the horses. Information collected during this time to 'mark' individual horses for identification was age, sex, colour (general body coat colour – Appendix 8), specific marks or features and associations within the group. Face and leg markings were key identifying characteristics. The face markings were defined as a blaze, stripe, snip or star, with the size, shape and colour of this noted. The leg markings were defined as socks or stockings, and the leg that they occurred on was noted. See Appendix 6 for marking pattern template. Once all information was collected, and photographs taken, the photograph numbers were recorded. The helicopter then resumed its flight path by returning to the transect at the location where it left the transect to observe that group.

The reconnaissance flights in the Mt Nelse and Cobungra areas were undertaken to inspect these areas for any evidence of feral horse presence at the time of the observation. This involved flying at a height of around 150m while searching for horses and evidence of their presence. Surveillance continued until the reconnaissance areas had been covered by the observers.

Analysis method

The data sheets and photographs were reviewed after the survey and each group of horses was assigned an identification number. Identifying features of each horse within a group were examined to determine which horses were seen once (either on day 1 or day 2) and which were seen on both days. Group size and composition were used to help determine whether the horses were re-sighted. Observations from previous surveys affirm the assumption that groups generally remain stable over a short period (one day to the next). The location that horse groups were observed was also used to aid in identifying re-sightings, as observations from prior surveys indicate groups generally do not move far from Day 1 to Day 2. The combination of group size and composition, together with individual markings, and the locations that groups were seen from Day 1 to Day 2 gave observers confidence in the reliability of their identification of individuals.

Population size was estimated using the Chao estimator (Chao 1988), following the methodology adopted for previous Bogong High Plains feral horse surveys (Dawson 2005, Dawson and Miller 2008). The Chao estimator allows for heterogeneity in sighting probability between individuals but assumes that the population is closed and that sighting probability does not vary between samples (i.e. between days one and two). These assumptions are likely to be true over the two-day period of the survey. Over this time, it is unlikely there was substantial movement of animals into or out of the survey area. The survey area is a discrete area surrounded by habitat that is less suitable for horses. Other areas of suitable horse habitat in the broader landscape were searched and no horses were detected.

Results

Horse sightings

Bogong High Plains block

A total of 121 individual feral horses were observed in the Bogong High Plains block. Of these 121 horses, 90 were sighted only once (either on day 1 or day 2 of the survey) and 31 were sighted twice (i.e. on both day 1 and day 2 of the survey) (Table 1). The size of groups observed ranged from 1 to 19 with an average group size of 8.4 horses. The proportion of individuals in each group that were juveniles ranged from 0 to 33% with an average of 21.5%. Consistent with the 2015 and 2018 surveys, most of the horses seen in the Bogong High Plains block were in the southern portion of the Bogong High Plains, in the more open grassy plains of the national park.

Table 1 Horse sighting numbers – Bogong High Plains

Sighting Detail	Value
Number of observations recorded	152
Number individual horses sighted	121
Number of horses sighted on day 1	78
Number of horses sighted on day 2	74
Number of horses sighted once	90
Number of horses sighted twice	31

Mt Nelse and Cobungra blocks

No horses or evidence of horses were observed in the Mt Nelse and Cobungra blocks during the during reconnaissance flights over these areas. In the Cobungra area horse dung was observed. Trampled vegetation was also observed in this area, although from the air it was not possible to be certain this was caused by feral horses.

Feral Horse Abundance

The estimated size of the feral horse population in the Bogong High Plains survey block at the time of the survey was 252 (95% confidence interval: 195-350) and the density of feral horses was 1.1 horse/km². The abundance of feral horses in the Bogong High Plains block at the time of each of the surveys from 2005 to 2021, along with the number of feral horses removed each year, is shown in Figure 1. Details of previous surveys are contained in separate reports.

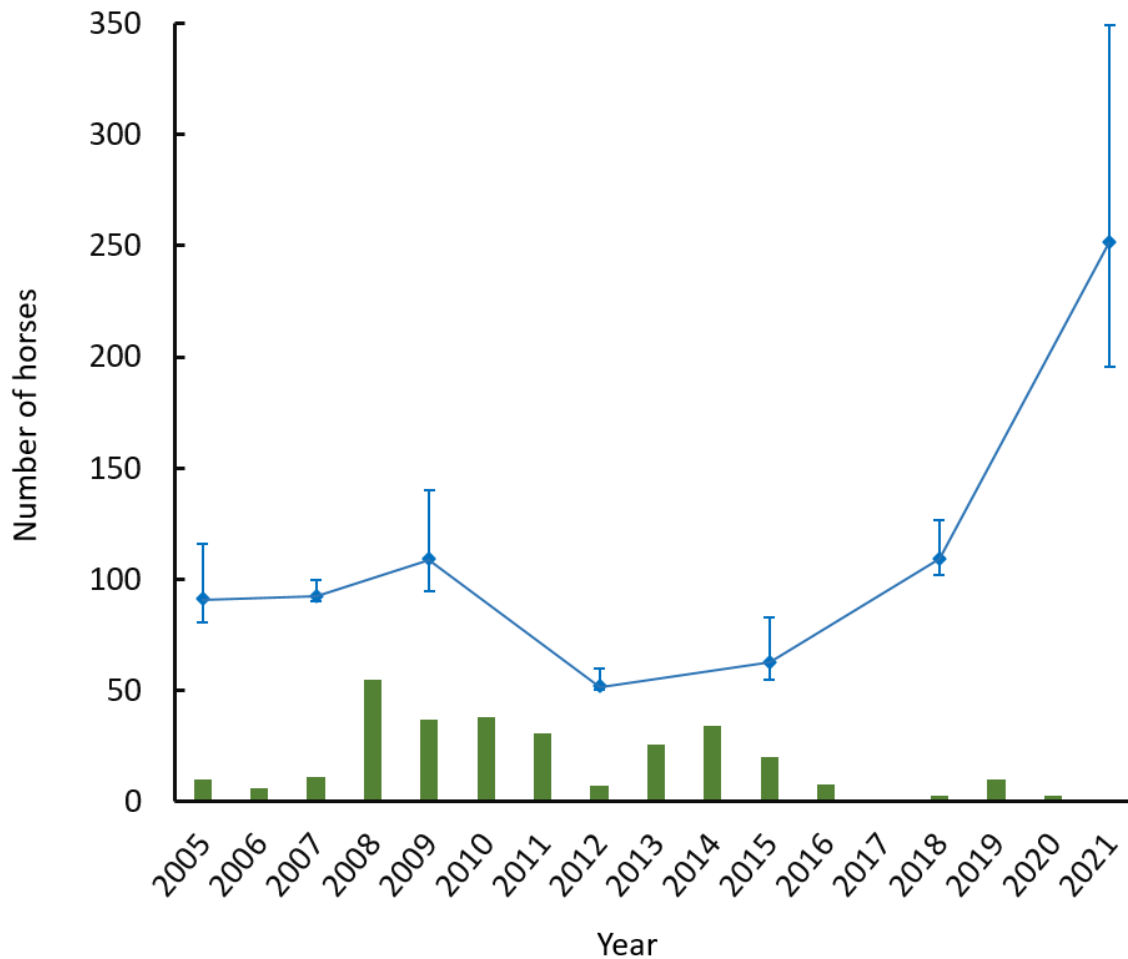


Figure 1. Feral horse abundance and feral horse removal on the Bogong High Plains from 2005 to 2021. Blue diamonds show feral horse abundance. Error bars are 95% confidence intervals. Green bars show number of horses removed by Parks Victoria each year.

Discussion

The methods used and the area and transects surveyed in the 2021 survey are consistent with those of surveys of feral horses on the Bogong High Plains since 2005 (see Dawson 2005, Dawson & Miller 2008 for details). As such, results can be compared to those from previous surveys to assess how feral horse abundance on the Bogong High Plains has changed over time.

The estimated abundance of 252 (95% CI 196 – 349) feral horses on the Bogong High Plains at the time of the 2021 survey is the highest that has been recorded since the monitoring program began in 2005. This estimate is four times greater than the estimated abundance of 63 (95% CI 55 – 83) in 2015. This increase in abundance coincides with a period of little feral horse removal, with only 11 feral horses removed from the Bogong High Plains survey area between 2015 and 2021 and no animals were removed in four of the six years. In contrast to this, over the 10 years prior to the 2015 survey feral horse abundance declined. This coincides with a period of greater management activity, with 265 feral horses removed from the Bogong High Plains between the 2005 and 2015 surveys.

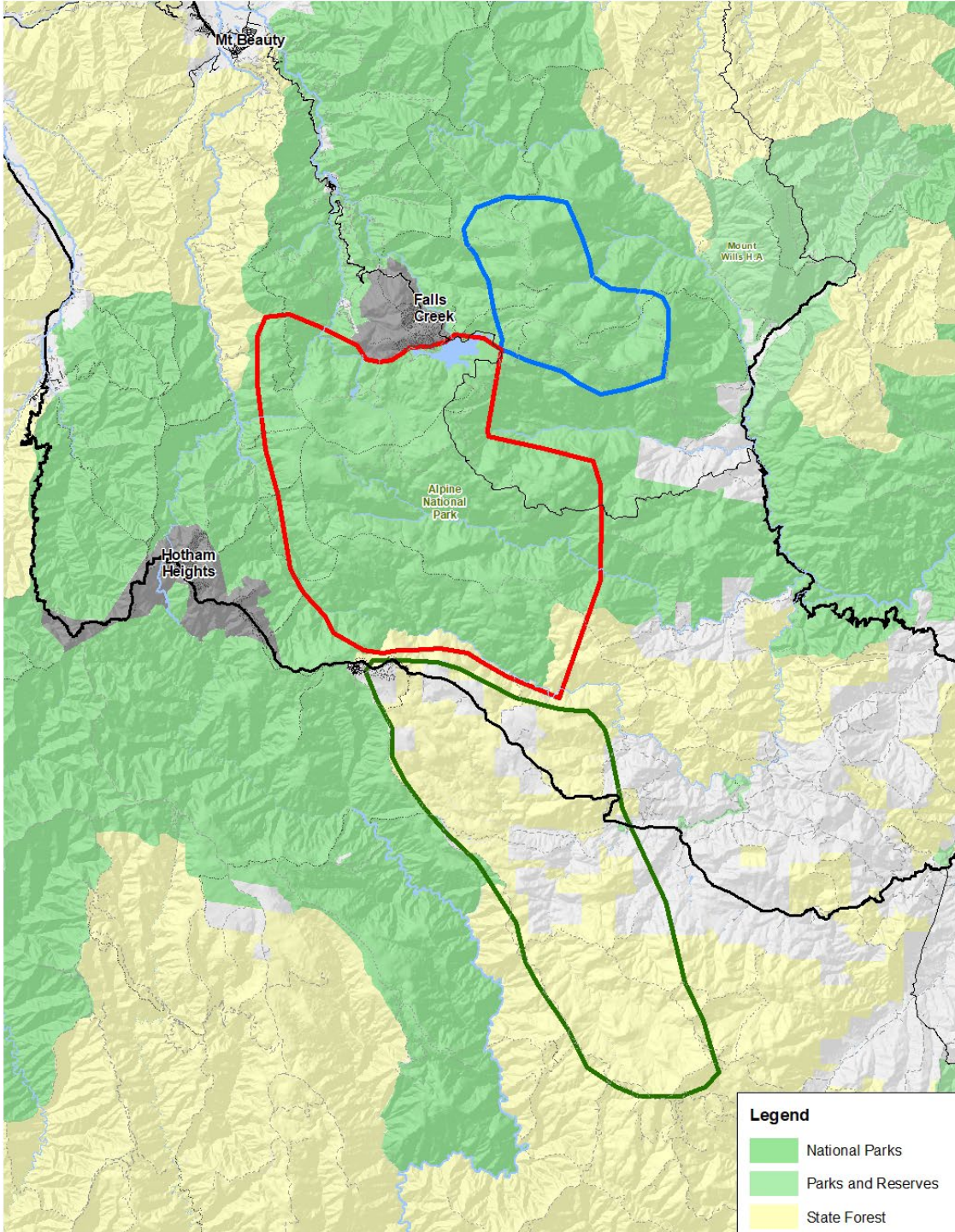
Between 2015 and 2021, the average annual rate of increase was approximately 29%. The rate of removal over this period was much lower than that. The average annual rate of increase between 2005 and 2015 was similar at approximately 26% per annum, but over this period, the average annual rate of removal exceeded the rate of increase. Clearly, if the rate of removal of individuals from a population is lower than the rate of recruitment, that population will grow. The differences in removal rates and trends in feral horse abundance between the 2005 – 2015 and 2015 – 2021 periods demonstrate this. They also demonstrate that sustained effort is required to achieve ongoing reduction in abundance. Furthermore, the results of the survey program highlight how interruptions to the removal program result in inefficiency. Because the population was left effectively unchecked since 2015, far greater effort is now required to remove feral horses on the Bogong High Plains than would have otherwise been required if the removal program had been able to continue uninterrupted.

Further monitoring is important for understanding how feral horse abundance change in response to any further management action. In designing future surveys, it may be important to consider the potential for horses to occur outside the survey area, particularly on public land to the east of Mt Battery or on private land in the Bundara and Cobungra valleys. Future surveys could be designed to allow estimation of abundance across a larger landscape that incorporates these additional areas. If this is to be done, data collection and recording should be done in a way that will allow observations from the current survey area to be identified and that subset of observations should also be analysed separately to enable comparison with previous surveys.

References

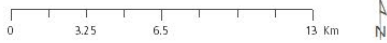
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- Dawson, M. (2005). Bogong High Plains Horse Survey: Final Report. Unpubl. Report to Parks Victoria
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Appendix 1: General survey area



Feral Horse Survey - Alpine National Park + adjoining State Forest Survey Blocks

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator



Disclaimer: Parks Victoria does not guarantee that this data is without flaw of any kind and therefore disclaims liability which may arise from you relying on this information.
Data source acknowledgements: State Digital Mapbase, The State of Victoria and the Department of Environment, Land, Water and Planning.

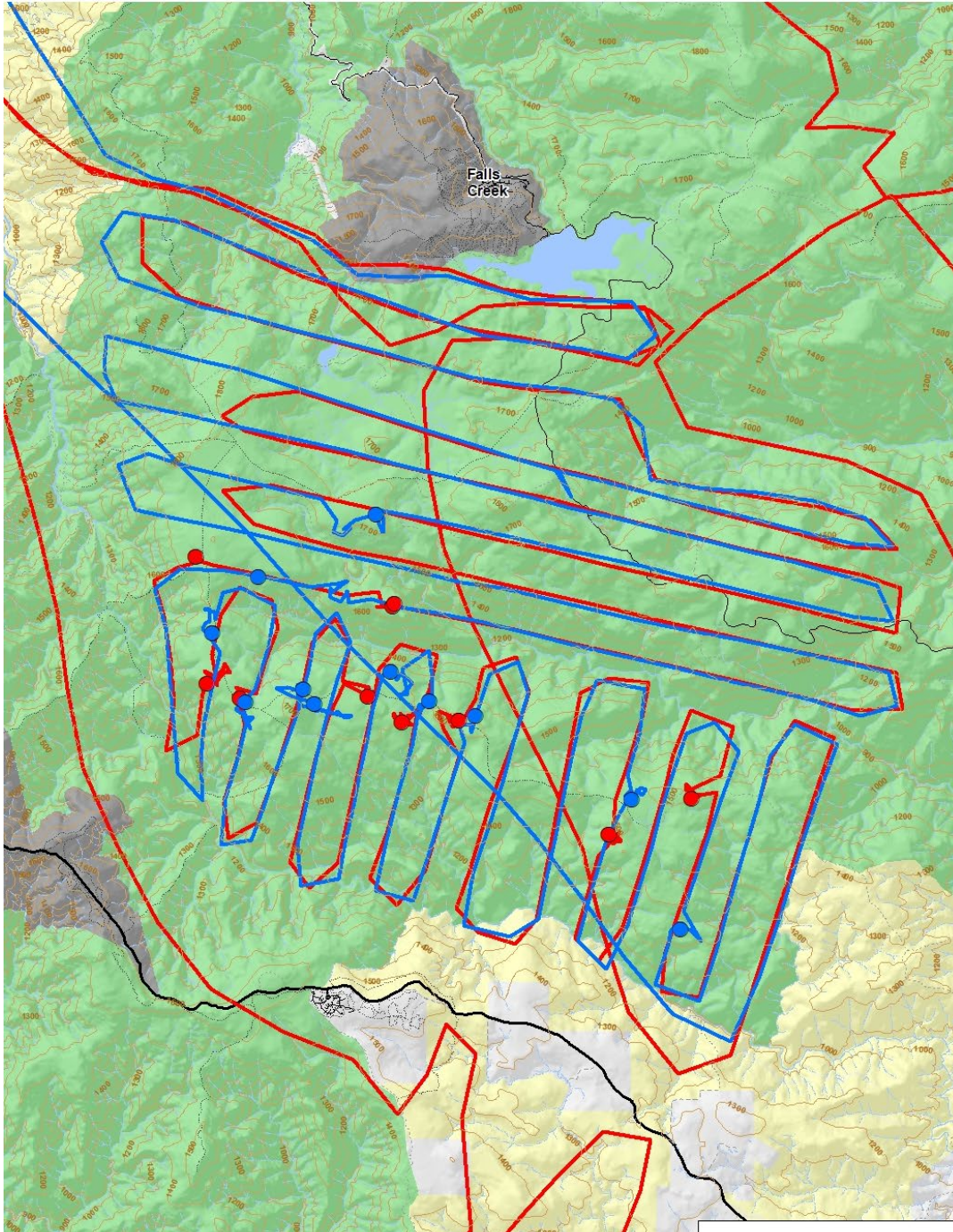
Legend

- National Parks
- Parks and Reserves
- State Forest
- Alpine Resort

Survey Blocks

- 1. Mt Nelse
- 2. Bogong High Plains
- 3. Cobungra

Appendix 2: Transects flown with horses sighting locations - Day one and Day two



Feral Horse Survey - Bogong High Plains, Alpine National Park Flightpath / Transects

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

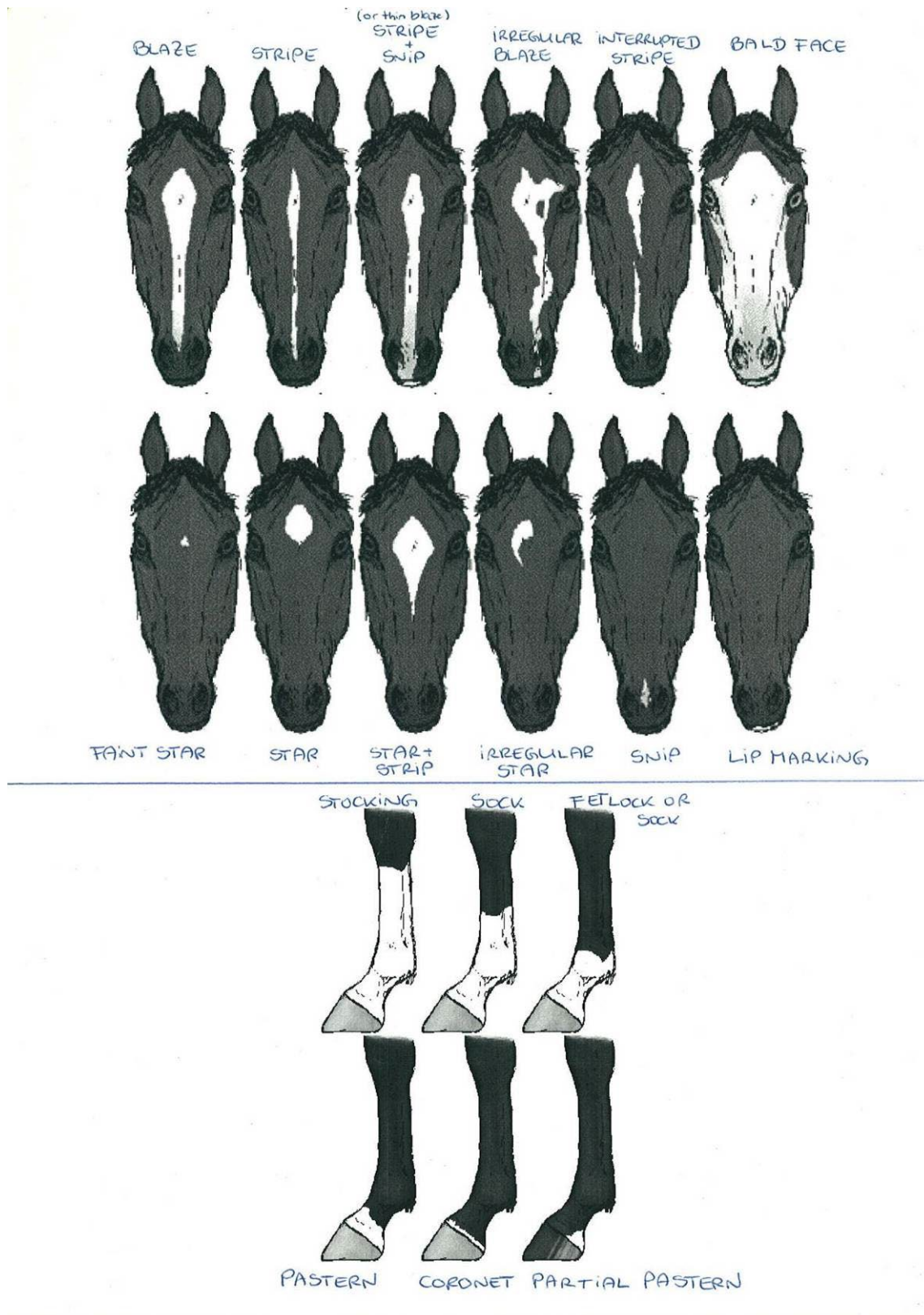


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Legend

- Transect Day1
- Horse Group Sighting Day 1
- Transect Day2
- Horse Group Sighting Day 2

Appendix 3. Horse Markings Identification Chart



Appendix 4. Horse Colour Identification Chart



Black

Black horses have pure black coats with no signs of brown or any other color. Many horse-people mistake dark bays or liver chestnuts for black. If you can see any other color (with the exception of white markings) on the horse's coat in the winter, he is not a true black. The reason I say "in the winter" is because the sun tends to lighten a dark horse's coat in the summer, and the exception is when the hair has been sun-burnt.



Bay

Bay horses run from light reddish or tan shades to dark brown and mahogany/auburn shades. Bay horses **always** have black points (legs, muzzle, mane and tail, and the tips of their ears are black). Many bay horses have black legs that are covered by white markings.



Dark Bay

Dark brown coat, reddish or black highlights, black points.



Pinto



Chestnut

Chestnut, (also known as "sorrel"), is reddish brown. The points (mane, tail, legs and ears) are the same color as the horse's body (other than white markings). Chestnuts range from light yellowish brown to a golden-reddish or dark liver color. All chestnuts have shades of red in their coats