Camel Survey

2005

Proposal for a Pilot Broad-scale Aerial Camel Survey – Gibson Desert 2005

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Background

Current census of feral Camels have put numbers at around 600,000 to 750,000 in Australia and that for large areas of the desert they may out number red kangaroos by about 100 to 1 (Woodford 2002). Edwards et al (2004) from surveys in the Northern Territory suggest that the minimum camel population for Australia in 2001 was of the order of 300,000 camels with about a 10% increase annually and a doubling of the population every 8 years. The estimate was based on an extrapolated distribution for all of Australia, which was placed as 30% of the camel population is in the Northern Territory, 50% in Western Australia, 18% in South Australia and the remainder in Queensland (Short et al 1988, Palmer 1994).

Indications are that the camel population dynamics are following an active growth trajectory typical of an establishing population (Caughley and Sinclair 1994). At what level camel populations will stabilise is not yet known, however, it is likely that camel populations will continue to increase for some time to come. This flags a looming environmental problem particularly as camels are known to browse on more than 80% of available plants in central Australia (Dorges and Heucke 2003) and observations have shown that serious impacts are evident where camel density exceeds 2/km^2. Much of the area surveyed by Edwards et al (2004) had camel densities equivalent or greater than this level.

Aerial Surveys

Broad scale aerial survey techniques have been developed to monitor kangaroo populations and still remains the only practical method for large-scale surveys in remote areas. This has become an established method and has been adopted by most states of Australia including Western Australia. Edwards et al (2004) adopted this same procedure to measure camel density over a broad area for the southern portion of the Northern Territory. Included in their data were counts of camels, emus, red kangaroos, feral horses and donkeys, which value adds to their data. This also sets baseline numbers and distribution for a range of species, which over time can show shifts in these patterns.

It is generally recognised that this strip-transect method contains several sources of errors, which need to be corrected for. One is observer bias and a correction can be determined by having two counters, a front and rear observer, count the same transect independently. Maintaining a constant height and ground speed can also introduce errors.

This and other factors such as temperature, time of day, cloud cover and season can all affect the repeatability of the method (Pople et al 1998).

Proposal for camel survey

While aerial surveys have been regularly undertaken by CALM in the pastoral/agricultural zone as part of the kangaroo survey program, there have been no systematic benchmark aerial surveys of feral camel populations in Western Australia outside these areas. CALM has large areas of conservation estate in the arid zone, east of the pastoral areas, and has some responsibilities for fire management and feral animal control on unallocated crown land. It is proposed to undertake a pilot benchmark aerial survey of feral camels (and other fauna). The aims of the pilot survey are to:

- Test the survey technique (described below) and to familiarise staff with the technique.
- Establish a benchmark (for the survey area) of feral camel density and distribution as a first step to quantifying the problem and developing control measures if deemed necessary.

It is proposed to run the pilot survey out of Lorna Glen in August 2005.

The standard aerial strip-transect method developed for wildlife populations will be adopted. This method requires that an aircraft with three observers are flown in an east west grid pattern at a height of 250ft (76m) and at a ground speed of 100kts (185km/hr). The aircraft will be set up with markers on the aircraft wing that will delineate the 200m strip width. Only animals that fall between these markers will be recorded.

Specifications for the aircraft include:

- Must be fitted with radar altimeter to maintain a constant height above ground level.
- Fitted with GPS (Global Position System) to maintain constant ground speed.
- Capable of greater than 5 hours duration
- High wing aircraft with 4-6 place seating arrangement
- Capable of safely maintaining 100kts airspeed
- Pilot must be suitably qualified with low level endorsement and experienced enough to maintain accuracy required.

Target area

The area selected for the initial survey is 45,000 km^2 to the north east of Lorna Glen station and includes eastern pastoral area and desert (Fig 1).

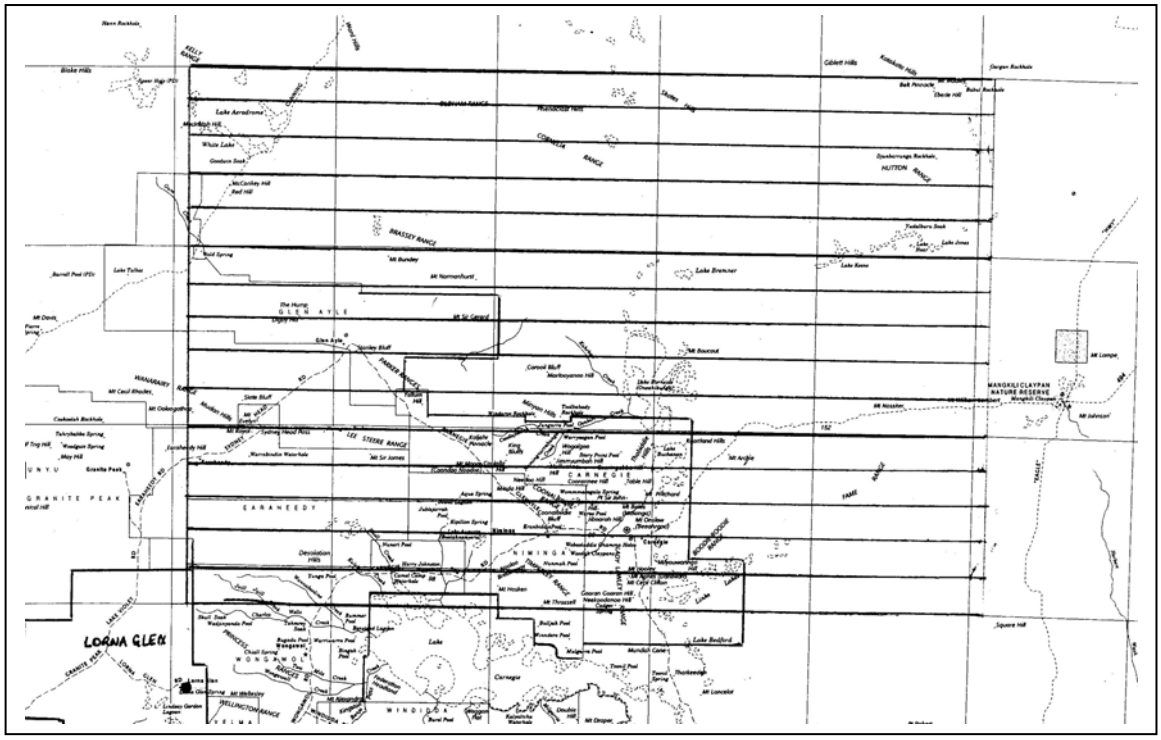

Figure 1 Showing the east-west transect starting on the 26^{o} parallel with lines 6' apart.

This arrangement provides for 16 lines each 250km long approximately 2.5 degrees of longitude and 11.1km apart (6' of latitude). Each line will take 1hour and twenty minutes or 2 hours and forty-five minutes return plus ferry time to and from the airstrip. Eight flights will be needed to complete the survey requiring around 33 hours of flight time. This will over run the pilots allowed duty and flight times requiring at least 1 day rest time.

Species to be counted will include; camels, goats, red kangaroos, horses, emus, bustard, dingo and cats. The protocol for this technique requires counters to count for 97.5 seconds and followed by a 7 second gap where data is recorded onto specially prepared data forms. Each counting period is equivalent to 1km^2. For camels their individual numbers and group size will be recorded.

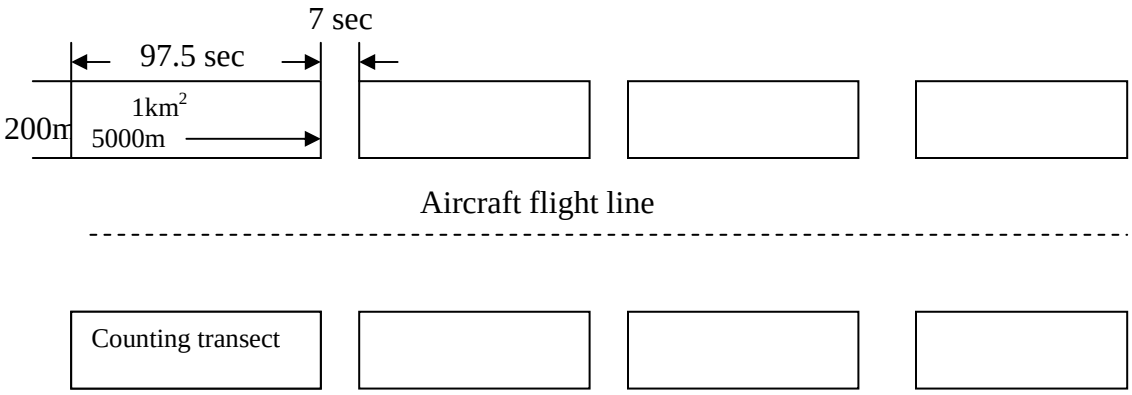

Figure 2 Schematic diagram of aerial strip-transects

Analysis

For comparison with Edwards et al (2004), data collected on the survey will be analysed using the same procedure.

Camel Density –

- Overall density uncorrected and corrected for perception bias
- Map of grid cell density

Population estimate –

- Mean group size for the whole area. Precision (Vg = std error/mean)
- Total number of groups per transect left and right sides. Right side includes front and rear counts combined.
- Calculate perception bias correction factor – right and left hand sides
- Calculate population estimates and corrected population estimate.

Costing

Aircraft cost	ferry to and from Lorna Glen 6 hours	$ 1650
	16 lines allow 33 hours	$ 9075
Counting team and ground crew		
	Vehicles ex manjimup	$ 2400
	Ex Kalgoorlie	$ 1500
	Travel /camping costs	$ 3982
	(inc Kal staff)	**Total $18607**

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