

DETERMINING ANIMAL NUMBERS AN INTRICATE TASK

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Introduction

The complexities of determining free ranging animal numbers are unlimited and often not understood or appreciated. Managers need information on the carrying capacity of an area and stocking rate of animals and without any idea of animal numbers on the ground reserve management becomes nigh impossible. We use recent ungulate surveys employing different techniques and analyses thereof in the Uruq bani M'arid Protected Area - located approximately 750 km southwest of Riyadh and 12 500 km² in size with a Core Area of 2400 km² - as a case study.

Methods

Four techniques for estimating ungulate numbers from sample counts were used for comparative purposes. The counts were vehicle and aerial based. The vehicle surveys were conducted using three vehicles with one driver and two observers. All animals were counted although a strip width was determined for each transect depending on the general visibility along the various transects and varied between 400 m to 800 m. The counts were conducted over two days in March. An aerial survey (flying height - 500 ft & speed - 100 knots) using a predetermined strip width of 300 m was conducted in May for comparative purposes. The techniques used to analyse the data were:

- 1- Road Strip Count.
- 2- Strip Count using correction factors (area & species).
- 3- Drive Count (adapted for vehicles).
- 4- Aerial Survey using Strip Count.

Results

The vehicle survey covered 1166 km along six predetermined transects sampling 719 km² at four hours/transect while the aerial survey covered 749 km along 15 fixed transects sampling 449 km² at 4 hours and 41 minutes. The various techniques used resulted in the following extrapolated ungulate numbers:

- 1- Road Strip Count

Table 1. Road Strip Count Results.

Species	Total number seen	Calculation	Estimated number
Reem gazelle	36	36 x 7600 km ² ÷ 719 km ²	380
Arabian oryx	19	19 x 7600 km ² ÷ 719 km ²	200
Mountain gazelle	20	29 x 1200 km ² ÷ 144 km ²	242 or 121 [50% of habitat]

- 2- Strip Count using correction factors (area & species)

Table 2. Strip Count Results using Correction Factors.

Species	Total number seen	Total under <500 m	Area corr. Factor	Species corr. factor	Calculation	Estimated number
Reem	36	33	11.8	1.9	33 x 11.8 x 1.9	740
Oryx	19	7	11.8	2.9	7 x 11.8 x 2.9	240
idmi	20	22	10	1	22 x 10 x 1.1	242

- 3- Drive Count (adapted for vehicles)

Table 3. Drive Count Results.

Species	Total number seen	Fixed Factor	Estimated number
Reem	36	10.6	282
Oryx	19	10.6	201
idmi	20	10.6	307

- 4- Aerial Survey using Strip Count

Table 4. Strip Count Results – Aerial Survey.

Species	Total number seen	Calculation	Estimated number
Reem	5	5	n/a
Oryx	23	23 x 2400 km ² ÷ 449 km ²	123
idmi	3	3	n/a

Table 5. Summary of the census results conducted in March (vehicle) and May (aerial) 2008 in the Uruq bani M'arid Protected Area.

	Reem		Idmi		Oryx	
	Ground	Air	Ground	Air	Ground	Air
Total groups seen	19	3	19	3	8	12
Total individuals seen	36	5	29	3	19	23
Average group size	1.89	1.67	1.53	1	2.38	1.92
Range in group size	1-7	1-2	1-5	1	1-9	1-9
% Calves & sub adults	6	20	3	-	15.8	8
Estimated numbers	380	n/a	121	n/a	200	123
Sightings/100km	3.1	0.67	2.5	0.4	1.6	3.07

Discussion

Depending on the technique and consequent calculations used, extrapolations vary between 380-382-740 for Reem Gazelle, 121-242-307 for Idmi (Mountain Gazelle) and 123-200-201-240 for Arabian Oryx. These numbers are estimates based on extrapolations only with the value of this lying in regular – i.e. biannual – follow-up surveys to determine population trends over time. The advantages of such surveys are legion with numerous other data able to be collected at the same time – e.g. animal distribution & movement, animal and vegetation condition assessment, population structure, calving/lambing percentage, mortalities, etc. Aerial surveys are quicker – i.e. cover more ground, but have other problems, the biggest being the flying height (300 ft is recommended for smaller ungulates) and observer experience.

Although time consuming and often fraught with environmental problems, such monitoring is imperative for the efficient management of Protected Areas as ungulate stocking rates and determining a sustainable carrying capacity are based on such numbers and population trends. This underscores the importance of regular monitoring for effective management.

Acknowledgements

We acknowledge H.R.H. Prince Bandar bin Saud bin Mohammed Al Saud, Secretary General, NCWCD for his support towards conservation efforts in Saudi Arabia. Our appreciation is expressed for our intrepid pilot, Captain Jodeat and all the Uruq Bani M'arid rangers and staff. We also thank Ernest Robinson (Director KKWRC, Thumamah) for commenting on a draft of this note.

A full version of this paper is available for download at the WME News website



Fig1. A fixed wing Maule as used during the aerial survey (©Peter Cunningham).