Simultaneous ground count of the Asiatic wild ass in the Great Gobi B Strictly Protected Area

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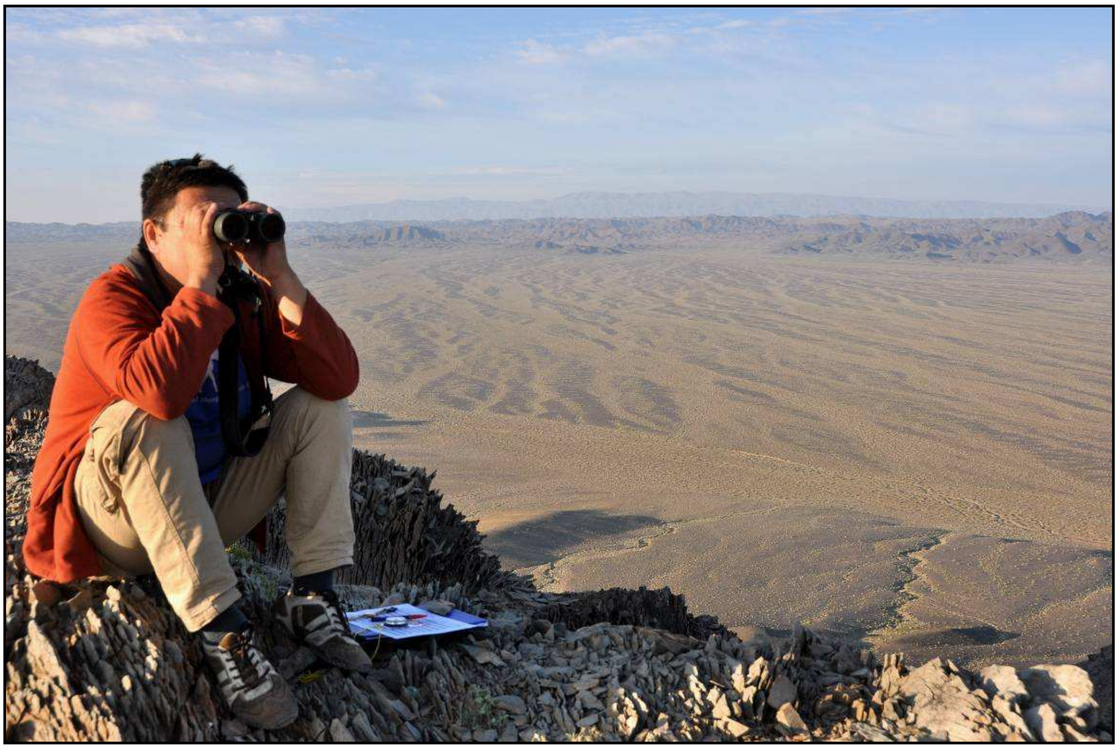

Photo: P. Kaczensky

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Background

The Mongolian Gobi is the last stronghold of the Asiatic wild ass (*Equus hemionus*; Reading et al. 2001). Anecdotal evidence suggests that the species may have lost as much as 70% of its range since the 19th century due to direct persecution and competition with humans and their livestock over water and pasture use. Although fully protected, wild asses are actively chased away or illegally killed by people and the mere presence of people and their livestock at water points can limit or block access for Asiatic wild asses (Kaczensky et al. 2006). Accurately estimating abundance of Asiatic wild ass is an essential step towards implementing a species conservation plan and to managing human-wildlife conflicts in the region (Kaczensky et al. 2006, Kaczensky et al. 2007).

Assessment of the wild ass population trends is challenged by the huge expanse of the distribution range (~250,000 km²), large-scale movements, long flight distances, uneven distribution, and large variations in-group sizes. Abundance estimation by researchers and managers is complicated by the unavailability of suitable fixed-winged aircraft. Past population estimates were either plagued by a high variance of the estimate (Reading et al. 2001) or a lack of statistical rigor in the analysis (Lhagvasuren 2007). The latest survey, conducted in December 2009, used a large scale DISTANCE sampling design but again had a rather low precision (B. Lkhagvasuren & S. Strindberg unpubl. data).

In the western part of the distribution range, mountainous terrain makes it difficult to drive systematic transects. However, we have been driving monthly transects counting wild- and domestic ungulates from existing dirt tracks using DISTANCE sampling methods in the Great Gobi B Strictly Protected Area (9,000 km²) since 2001. The surveys provide valuable qualitative data on animal distribution and allows for minimum population estimates. However, these surveys also have a low precision and vary dramatically from survey to survey (Kaczensky et al. 2007, P. Kaczensky & O. Ganbaatar unpubl. data).

Visibility of ungulates can vary tremendously from survey to survey depending on transect spacing and sighting factors such as snow cover, group size, activity of the animals, vegetation cover, and experience of the observers. Population estimation methods that employ statistical sampling theory and models in an attempt to correct for sighting biases fall into three categories: sightability bias correction models, line-transect distance sampling, and mark-recapture sampling. All of these methods have inherent limitations and assumptions that can often not be met in a real-world application, but combining methods can have a synergistic effect providing a more powerful tool for estimating animal abundance (Lubow and Ransom 2009).

Survey design

This summer we used an adaptation of an aerial technique previously developed at Colorado State University, USA, for wild mustangs: a simultaneous double-point-count survey combined with a sightability bias correction model. The simultaneous double-count technique is a form of mark-recapture which involves two observers collecting observation data independently. The premise is that highly visible groups are easily seen by both observers, but more difficult to detect groups are often only seen by one observer. Additional covariate data collected may then be used to build a sightability model that reflects which observation conditions may influence the ability of observers to see or miss groups. These data will consist of species, group size, distance and direction from observer, vegetation type and percent cover, animal behaviour (still or moving), time of day, and terrain type. We used this method in the context of a point survey design since random transects are not possible due to limited motorized vehicle access and the size of the study area.

To cover the entire park we selected 50 elevated points, more or less evenly distributed over the entire park. During the first session we surveyed the eastern part of the park and during the second session the western part of the park. Assuming wild ass can be reliably detected up to a distance of 5 km, we thus covered about 33% of the park (Fig. 1).

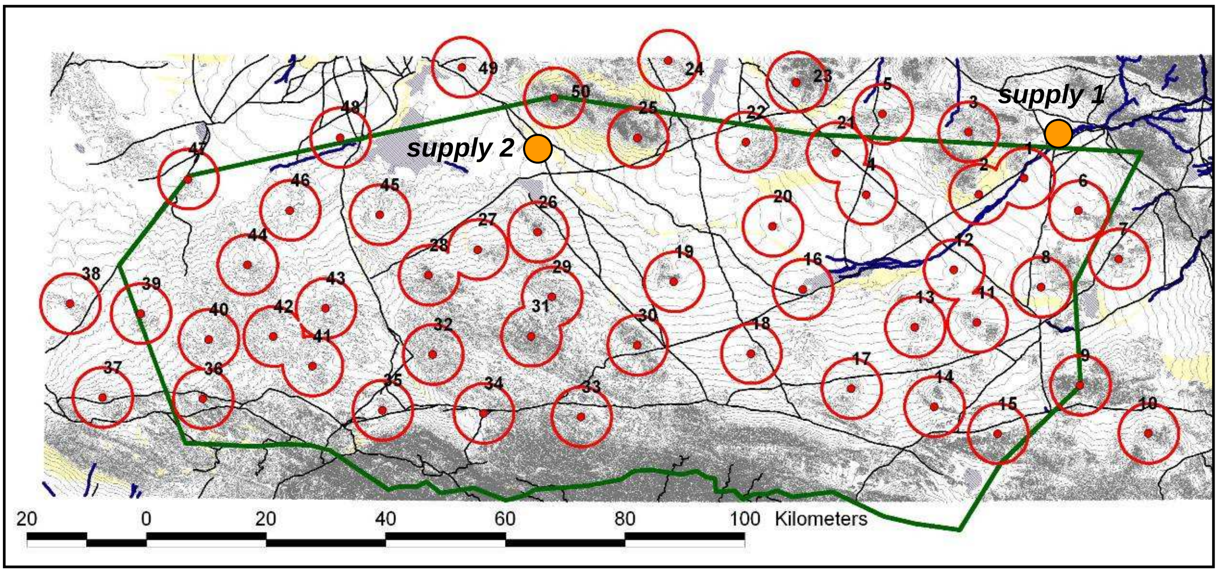


Fig. 1: Survey points for the simultaneous point count of wild asses in the Great Gobi B SPA in August 2010. The orange circles mark the two supply points (supply 1 = Takhin Tal camp, supply 2 = Takhin us).

Survey organization

Our approach involved 50 people for the actual counting. It was necessary to supply them with sufficient water and food, as well as transport them to and from their respective survey point. The entire survey was performed over a 5 day period, followed by a celebration on the 6th day:

- **4 August:** training (PowerPoint on background and past efforts; field training on how to use a compass, fill in data sheets and use the range finder)
- **5 August**: distribution to points, evening count at 20:00
- **6 August**: count at 7:00, 9:00, 11:00, 13:00, 15:00 and transfer to Takhi us supply point
- **7 August**: distribution to points, evening count at 20:00
- **8 August**: count at 7:00, 9:00, 11:00, 13:00, 15:00 and transfer to Takhi us supply point
- **9 August**: chorchog celebration at Takhi us and subsequent debriefing at Takhin Tal camp

For the survey, we (4 people) recruited people from the Great Gobi B SPA staff (7 people), the Shargen Gobi Saiga Reserve (3 people), the local communities (24 people), and a Mongolian-German student excursion organized by the Senkenberg Museum Görlitz and the National University of Mongolia (12 people). The 50 people of the survey crew were organized in 6 teams of 6 to 12 people (Tab. 1, Fig. 2). In addition, we hired a supply team of 3 cooks and 2 truck drivers.

Tab. 1: Survey team composition and location.

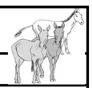
Teams*		Point 1	Point 2
Bus - 1 team			
Buyanbat -R	Davasuren-S	4	35
Batsuuri-R	Nyamgerel-L	20	41
Amgalanbaatar-L	Ganbat-S	3	43
Batbuyan-L	Monkh-Erdene-S	5	42
Bambar-L	Saihanaa-L	23	40
Bunchin-L	Ulaanaa-L	21	36
Bus - 2 team	**Bus - 2 team**		
Petra Kaczensky-O	Orchon-S	6	27
Amgalan-R	Purevsuren-S	1	28
Prof. Hermann Ansorge-S	Margit Hanelt-S	2	29
Chinbat-R	Prof. Samja-S	12	26
Derem-L	Battsooj-L	7	32
Sebestian Moll-S	Prof. Willi Xylander-S	8	31
Aagii team	**Aagii team**		
Altansukh-O	Monkhtuul-S	11	45
Baasandash-L	Nasanbat-L	13	50
Ariunaa-L	Ganbataa-R	14	49
Baast-R	Uuganzaya-L	17	48
Saiga team	**Saiga team**		
Batsaikhan-L	Ganjoloo-L	19	47
Lkhagava-L	Bazgaa-L	18	44
Jason Ranson-O	Lkhagvasuren-S	16	46
Space team	**Space team**		
Nisehhuu-R	Hadbaatar-R	24	37
Toogoo-L	Ganbold-L	25	38
Bold-L	Borhuu-L	22	39
Takhi team	**Takhi team**		
Ganbaatar-O	Chinzorig-L	10	34
Oinbayar-R	Bayarmagnai-L	9	33
Batzaya-R	Purevdorj-L	15	30

*L=Local
O=Organizer
R=Ranger
S=Student excursion

Fig. 2: The 6 survey teams. From top left bottom right: Bus 1-, Bus 2-, Aagii-, Saiga-, Space- and Takhi team.

We equipped every pair of observers with 8 x 30 binoculars, a simple rangefinder with horse outlines (for distances of 100m, 500m, 1000m and 2000m), a digital watch, 10 datasheets (Fig. 3), a pencil and a plastic folder. Furthermore, people received water and food supplies for dinner, breakfast and lunch from the supply team (Fig. 4). People that did not have bedding material were supplied with sleeping bags.

Observer 1:_________________________ **Observer 2:**_________________________
Location:____ **weather:**________________________________



#	Start time	Species	Adult Count	Juvenile Count	Terrain		Behavior			Distance category			Compass Direction	Comments
										0-100	101-500	501-1000		
1	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		
										0-100	101-500	501-1000		
2	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		
										0-100	101-500	501-1000		
3	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		
										0-100	101-500	501-1000		
4	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		
										0-100	101-500	501-1000		
5	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		
										0-100	101-500	501-1000		
6	:				saxaul	open	laying	standing	running	1001-2000	2001-5000	>5000		

Fig. 3: English version of the survey datasheet.

Fig. 4: Supply teams at supply 2 camp north of Takhi us.

Preliminary survey results

Data screening and statistical analysis will take quite some time and thus the preliminary data presented here only provide some qualitative feedback to the many motivated people involved in this count. **The raw data does NOT allow for population estimates because it contains double counts within the teams as well as among teams and among counts and does not take into account any covariates** (e.g. terrain, actual visibility from an observation point, animal behaviour, group size etc.).

In total 25 groups of two people each counted all wildlife and domestic animals during two sessions consisting of six counts. Only four teams missed 1 count each at the start (1 team) or end (3 teams) of the second count. Thus out of 300 potential count events we realized 296; making for ~588 individual counts (some teams did not count independently but rather together).

Without accounting for repeatedly counting the same animals, double counts within groups and among groups, all individual observers together observed 1,239 groups, summing up to 14,255 animals. Wild asses were the most frequently observed species (Tab. 2). Wild assess were primarily seen at long-distances from the observation points. The ability to detect the much smaller gazelles seemed to decrease from distances of 2,000m onwards. During the jeep pick-up, people from several observation points that had not seen any gazelles, saw jeep-aroused gazelles previously invisible to the observers.

Species	Groups	Total
khulan	632	10,520
camel	62	1,833
gazelle	198	910
sheep/goat	4	800
takhi	23	163
cattle	2	44
argali	11	43
domestic horse	2	16
ibex	3	13
fox	3	9
wolf	4	4
total	**1,239**	**14,355**

Tab. 2: All observations during the ~588 individual count events.

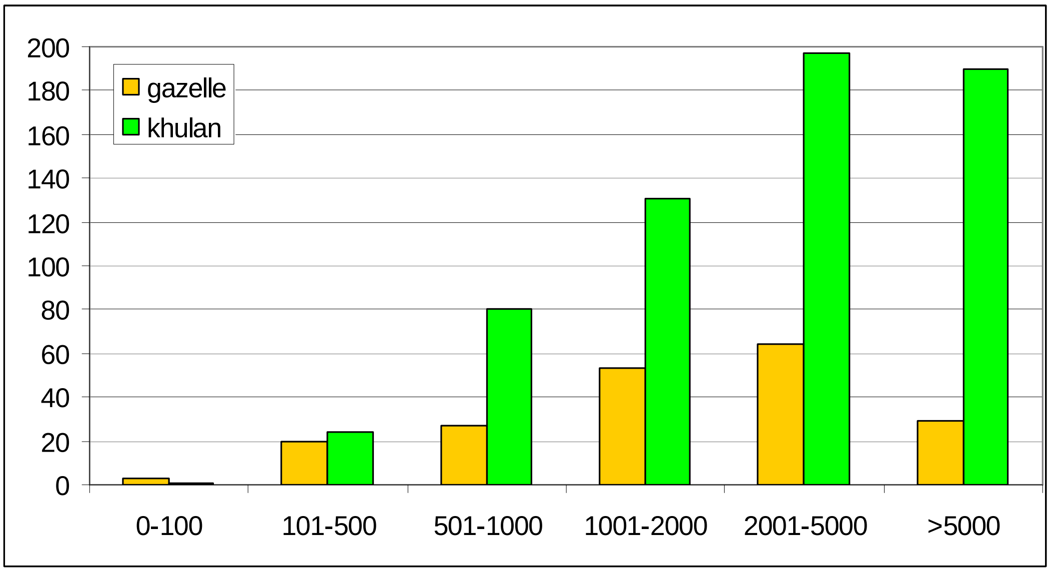


Fig. 4: Distance intervals of individual observations of the two key species of the survey: wild asses and goitered gazelles.

As usual wildlife was not evenly distributed throughout Great Gobi B SPA and while some people were busy counting, others had a rather quiet time. Most wild asses were seen by people at observation points in the central part of the park NW of Chonin us and Takhin us oasis (Fig. 5).

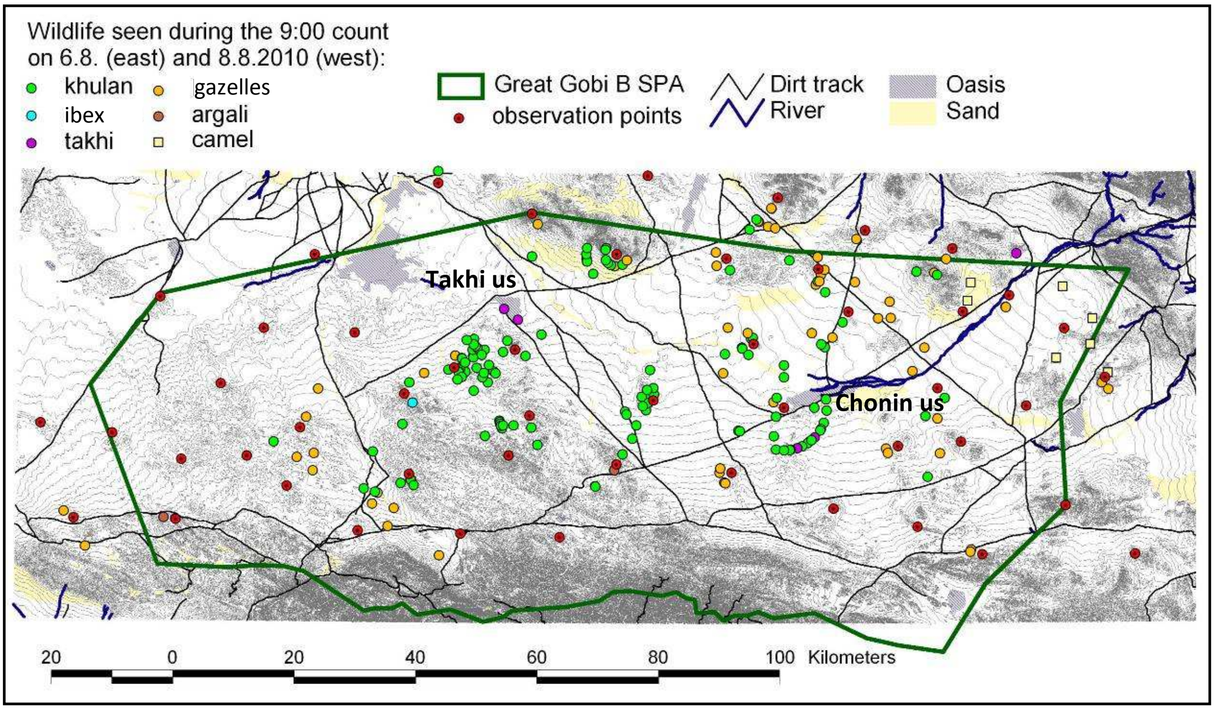


Fig. 5: Distribution of individual observations during the 9:00 count on 6 August 2010 in the eastern part of the park (point 1-25 see Fig. 1) and on 8 August 2010 in the western part of the park (points 26-50).

With the survey completed, we will try different statistical methods, e.g. using the **s**tatistical program MARK (White and Burnham 1999) to perform analyses with likelihood-based closed-capture population models, as described by Pledger (2000), the program DISTANCE, and geostatistical density estimates. We hope to evaluate a set of candidate models that include the covariates in interactive and additive relationships. The models will be selected by corrected Akaike's Information Criterion (AICc) weight and supported effects will be evaluated by model averaging. Average group size will be computed by weighting the observed group size by the inverse of the probability that groups of that size would be observed at least once during the survey. This procedure adjusts for the bias that would otherwise result from the average of observed groups being smaller than the true average of group sizes in the population, due to lower sighting probability for smaller groups. We will estimate the population as the product of the estimates of number of groups and bias-adjusted group size.

This integration of local residents into this effort, directly engaged the local community with the science process and provided a foundation for on-going and subsequent conservation efforts and management. We hope that our approach will further strengthen the cooperation of the park with local communities and that it will help raise awareness for the conservation of wildlife in Great Gobi B SPA.

Acknowledgements

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Photo: P. Kaczensky