

Monitoring of Przewalski's horses and other plains ungulates in the Great Gobi B Strictly Protected Area in SW Mongolia in 2014/2015

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1. Przewalski's horse population size

At the end of December 2014, the Przewalski's horse population in the Great Gobi B SPA consisted of 113 animals in 9 harems, 2 bachelor groups, and one captive mare group (Fig. 1, Table 1).

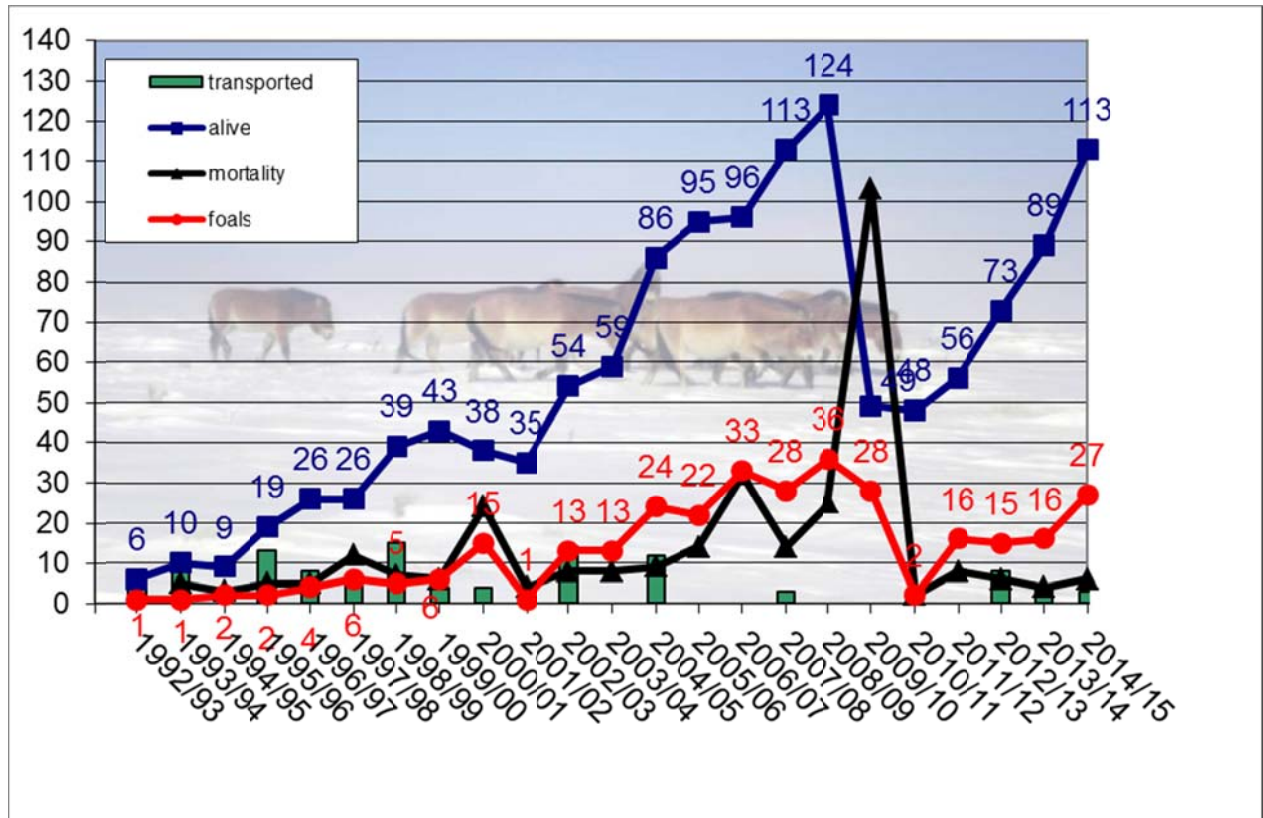


Fig. 1: Przewalski's horse population dynamics 1992-2014.

Between 16 April and 13 August 2014, 27 foals were born of which 22 have survived until the end of December. The foals of Shandas, Mandhai, Shuudan, Surguuli, and Baigali died, they either disappeared or were suspected of having been eaten by wolves. Adult survival has been excellent again and only one stallion (Sooton, ZB-Nr. 4593) died.

Until end of May 2015, over 10 foals were already born.

Table 1: Przewalski's horse groups in Great Gobi B SPA by the end of December 2014. [Origin = Last captive facility before transport or place of birth in Mongolia, Takhin Tal = enclosure, Gobi B = born to free ranging mare]

Nr.	Sex	Name	ZB-Nr.	Birth date	Origin	Dam	Sire	Group December 2014
281	stallion	Aptek	5161	01.06.2008	Gobi B	3047	3055	Aptek
144	mare	Zur	3301	06.06.1999	Köln (D)/WPL	1022	1852	Aptek
154	mare	Mandhai	3730	13.05.2002	Winterthur (CH)	1897	1742	Aptek
211	mare	Suvd	4778	30.05.2006	Gobi B	3807	3055	Aptek
400	mare	Zur's foal	6578	11.05.2014	Gobi B	3301	5161	Aptek
410	stallion	Suvd's foal	6588	03.06.2014	Gobi B	4778	4856	Aptek
187	stallion	Azaa	4529	21.05.2005	Gobi B	3230	3069	Azaa
149	mare	Zuram	4234	02.06.2002	Karlsruhe (D)	2638	2397	Azaa
170	mare	Huvhar	4383	06.06.2004	Gobi B	2141	1818	Azaa
175	mare	Tsovoov	4398	16.06.2004	Gobi B	2398	1818	Azaa
365	mare	Biger	6035	11.06.2012	Gobi B	3758	3717	Azaa
375	stallion	Soyombo	6215	15.05.2013	Gobi B	4234	4529	Azaa
377	mare	Irmuun	6227	18.05.2013	Gobi B	4398	4529	Azaa
380	mare	Silvia	6249	26.05.2013	Gobi B	4383	4529	Azaa
397	mare	Zuram's foal	6575	05.05.2014	Gobi B	4234	4529	Azaa
406	mare	Huvhar's foal	6584	23.05.2014	Gobi B	4383	4529	Azaa
416	mare	Tsovoov's foal	6594	07.07.2014	Gobi B	4398	4529	Azaa
253	stallion	Khaan	5054	25.06.2007	Gobi B	3312	3055	Bachelor 1
349	stallion	Khovd	4963	11.05.2007	WHCB Jimsar China	1251	1662	Bachelor 1
351	stallion	Oidov	5094	06.09.2007	WHCB Jimsar China	4107	3311	Bachelor 1
352	stallion	Chimbaa	5301	02.05.2008	WHCB Jimsar China	3001	3015	Bachelor 1
166	stallion	Doroo	4356	27.05.2004	Gobi B	3375	3066	Bachelor 2
337	stallion	Mazaalai	5769	09.05.2011	Gobi B	4234	4529	Bachelor 2
340	stallion	Tamir	5782	13.05.2011	Gobi B	3758	3717	Bachelor 2
341	stallion	Goyhaliun?	5818	20.05.2011	Gobi B	5018	3717	Bachelor 2
345	stallion	Handgai	5872	17.06.2011	Gobi B	3391	3881	Bachelor 2
339	stallion	Tsesen	5779	12.05.2011	Gobi B	4398	4529	Bachelor 2
344	stallion	Tanan	5866	14.06.2011	Gobi B	4751	4404	Bachelor 2
360	stallion	Khanhohli	5962	04.05.2012	Gobi B	4383	4529	Bachelor 2
364	stallion	Argamag	6011	27.05.2012	Gobi B	2645	4404	Bachelor 2
185	stallion	Bars	4511	09.05.2005	Gobi B	3430	3069	Bars
183	mare	Buman	4503	29.04.2005	Gobi B	2748	3069	Bars
208	mare	Khatan	4751	21.05.2006	Gobi B	3230	3069	Bars
280	mare	Suld	5160	01.06.2008	Gobi B	3823	3166	Bars
357	mare	Salhich	5950	27.04.2012	Gobi B	3755	4404	Bars
387	mare	Soyolj	6366	01.09.2013	Gobi B	5160	4404?	Bars
407	mare	Buman's foal (Hangarid)	6585	23.05.2014	Gobi B	4503	4404? or 4593	Bars
408	stallion	Khatan's foal (Noyon)	6586	23.05.2014	Gobi B	4751	4404?	Bars

177	stallion	Bundan	4404	02.07.2004	Gobi B	3391	2911	Bundan
61	mare	Imj	2748	02.08.1994	Schwerin	1436	1236	Bundan
79	mare	Dorothee	3230	06.06.1999	Tachin Tal	3035	2503	Bundan
87	mare	Maral	3387	23.05.2000	Tachin Tal	3038	2363	Bundan
111	mare	Oroo	3755	24.05.2002	Gobi B	2787	1818	Bundan
132	mare	Saran	3823	09.04.2003	Tachin Tal	2645	2363	Bundan
366	mare	Amgai	6038	13.06.2012	Gobi B	3230	4404	Bundan
367	mare	Argai	6045	16.06.2012	Gobi B	3387	4404	Bundan
369	stallion	Oswald	6052	24.06.2012	Gobi B	2748	4404	Bundan
370	stallion	Uranshuvuu	6058	05.07.2012	Gobi B	3823	4404	Bundan
393	stallion	Maral's foal (Geologich)	6571	25.04.2014	Gobi B	3387	4404?	Bundan
394	mare	Oroo's foal (Sentii)	6572	25.04.2014	Gobi B	3755	4404?	Bundan
395	mare	Saran's foal (Erchim)	6573	25.04.2014	Gobi B	3823	4404?	Bundan
411	mare	Dorothee's foal (Anu)	6589	07.06.2014	Gobi B	3230	4404?	Bundan
238	stallion	Erhes	4932	03.05.2007	Tachin Tal	2786	2363	Erkhes
353	mare	Tsagaanaa	5341	07.06.2008	Doebritzer Heide	2958	2928	Erkhes
354	mare	Boroo	5372	03.05.2009	Doebritzer Heide	2638	3852	Erkhes
355	mare	Bulgan	4943	05.05.2007	Hutweide Lüneburg	2187	3107	Erkhes
356	mare	Alag	5719	01.06.2009	Dobrejov, CZ	3251	2324	Erkhes
417	mare	Alag's foal (Dodo)	6595	29.07.2014	Gobi B	5719	4932	Erkhes
153	mare	Nergui	3708	26.04.2002	WPL	2018	2805	mares 1
316	mare	Angarag	5470	21.05.2009	Gobi B	3708	3055	mares 1
358	mare	Bozlog	5951	27.04.2012	Gobi B	4234	4529	mares 1
359	mare	Tsolog	5961	04.05.2012	Gobi B	4398	4529	mares 1
384	mare	Anar	6311	22.06.2013	Gobi B	3708	4856 or 3055	mares 1
419	mare	Gretel	5632	21.05.2010	Han-sur-Lesse, Belgium	2958	2928	mares 1
420	mare	Bayan	5643	03.06.2010	Givskud, Denmark	2700	3053	mares 1
421	mare	Ulla	5873	18.06.2011	Langenberg, Switzerland	2254	3341	mares 1
242	stallion	Mogoi	4961	11.05.2007	Tachin Tal	2586	2363	Mogoi
388	mare	Baigali	4708	29.04.2006	Hornbostl	2187	3107	Mogoi
389	mare	Tsakhan	4990	21.05.2007	Hortobagy NP	3514	3283	Mogoi
390	mare	Bumbat	5384	12.05.2009	Hortobagy NP	3514	3535	Mogoi
391	mare	Gunj	5499	21.05.2009	Berlin TP	5487	2040	Mogoi

106	stallion	Nomkhon	3717	07.05.2002	Gobi B	2141	1818	Nomkhon
73	mare	Od	2645	23.04.1994	Prag	1874	1135	Nomkhon
88	mare	Kherlen	3391	26.05.2000	Tachin Tal	3035	2363	Nomkhon
112	mare	Mandal	3758	26.05.2002	Gobi B	2940	2866	Nomkhon
197	mare	Holog	4561	30.06.2005	Gobi B	2398	1818	Nomkhon
247	mare	Taniya	5018	30.06.2007	Gobi B	4234	3361	Nomkhon
250	mare	Otgonbor	5038	15.06.2007	Gobi B	2398	1818	Nomkhon
333	mare	Huder	5753	04.05.2011	Gobi B	3230	4404	Nomkhon
361	stallion	Tengeriinhuileg	5963	06.05.2012	Gobi B	5038	3717	Nomkhon
363	mare	Huselt	6006	26.05.2012	Gobi B	4561	3717	Nomkhon
372	stallion	Dol	6177	28.04.2013	Gobi B	5018	3717	Nomkhon
376	stallion	Darhan	6218	16.05.2013	Gobi B	3391	3717	Nomkhon
378	stallion	Bidert	6228	18.05.2013	Gobi B	5038	3717	Nomkhon
382	mare	Myangalan	6303	16.06.2013	Gobi B	3758	3717	Nomkhon
385	mare	Hishigt	6317	24.06.2013	Gobi B	4561	3717	Nomkhon
392	mare	Ods foal (Odod)	6570	16.04.2014	Gobi B	2645	3717	Nomkhon
399	stallion	Tanyia's foal (Dagva)	6577	09.05.2014	Gobi B	5018	3717	Nomkhon
402	mare	Kherlen's foal (Balj)	6580	15.05.2014	Gobi B	3391	3717	Nomkhon
403	stallion	Holog's foal (Haiguulchin)	6581	16.05.2014	Gobi B	4561	3717	Nomkhon
414	mare?	Mandal's foal (Namuun)	6592	16.06.2014	Gobi B	3758	3717	Nomkhon
415	mare	Otgonbor's foal (Haruul)	6593	18.06.2014	Gobi B	5038	3717	Nomkhon
229	stallion	Shandast	4856	01.09.2006	Gobi B	3301	3055	Shandast
146	mare	Shandas	3312	11.06.1999	Ahaus (D)/WPL	2948	1852	Shandast
148	mare	Zolboo	3811	19.10.2002	Stuttgart (D)	1767	2480	Shandast
152	mare	Tolbo	3807	30.06.2002	Wien (A)	2173	2444	Shandast
203	mare	Audi	4688	09.04.2006	Gobi B	3047	3055	Shandast
204	mare	Altai	4690	16.04.2006	Gobi B	3312	3055	Shandast
254	mare	Shuudan	5055	25.06.2007	Gobi B	3807	3055	Shandast
292	mare	Surguuli	5190	01.07.2008	Gobi B	3708	3055	Shandast
299	mare	Altaiayan	5201	15.07.2008	Gobi B	3807	3055	Shandast
405	mare	Tolbo's foal (Tsolmon)	6583	21.05.2014	Gobi B	3807	4856	Shandast
409	stallion	Altai's foal (Moriton)	6587	29.05.2014	Gobi B	4690	4856	Shandast
412	mare	Zolboo's foal (Mergen)	6590	06.08.2014	Gobi B	3811	4856	Shandast
413	mare	Altaiayan's foal (Togoldor)	6591	10.06.2014	Gobi B	5201	4856	Shandast

269	stallion	Ugalz	5120	05.05.2008	Gobi B	3758	3750	Ugalz
246	mare	Erhsaran	5017	03.06.2007	Gobi B	3084	3166	Ugalz
275	mare	Setgel	5148	20.05.2008	Gobi B	2948	2363	Ugalz
343	mare	Emeelzeg	5835	27.05.2011	Gobi B	4561	3717	Ugalz
368	mare	Songuuli	6047	18.06.2012	Gobi B	5017	4404	Ugalz
373	mare	Tolinhul	6193	06.05.2013	Gobi B	4503	4404? or 4593	Ugalz
381	mare	Hors	6262	01.06.2013	Gobi B	5148	4404? or 4593	Ugalz
386	mare	Buyant	6331	07.07.2013	Gobi B	5017	4404?	Ugalz

2. Przewalski's horse space use

2.1. Ranger monitoring

Between January and December 2014, rangers located the different Przewalski's horse groups on 188 different days. The animals are still separated in two distinct populations, one (2 harems and 1 bachelor group totaling 23 animals) in the west around Takhi us and one (7 harems and 1 bachelor group totaling 90 animals) in the east between Takhin Tal and Chonin Us. The western population covers an area of 650 km² and the eastern population an area of 1,890 km² (Fig. 2). In addition, one stallion was seen by the border guards in Takhiin shar nuruu mountains in the south on June 28.

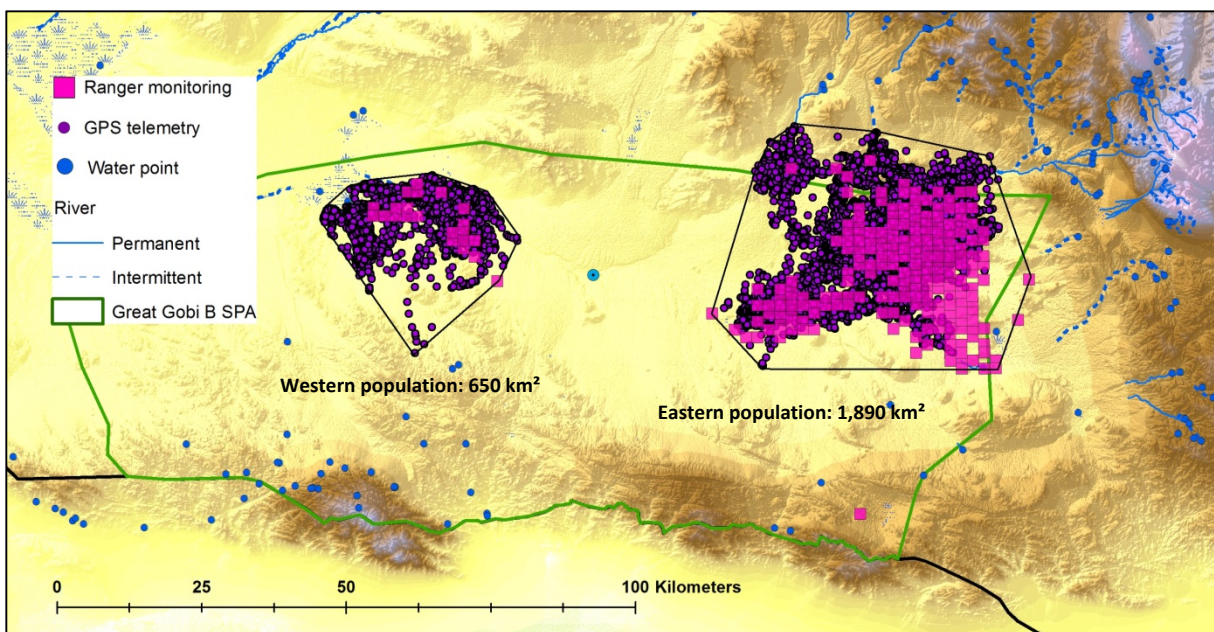


Fig. 2: Przewalski's horse population distribution in the Great Gobi B SPA, January-December 2014.

2.2. Iridium-GPS telemetry

In June 2013 we collared 5 Przewalski's horses from 3 different groups: Tsagaanaa and Boroo in Erhes group, Khatan in Bundan group, and the stallions Oidov and Khovd from the western Bachelor group (see report Kaczensky et al. 2013). The collar of stallion Khovd had to be removed in November 2013 (Ganbaatar et al. 2013), but all other collars worked as expected and did not cause any problems. The camera collar of mare 13155 dropped as expected on 1 May 2014 and the collars on mare 7215 and 7209 as expected on 1 May 2015. The stallion 6092 died by the end of March 2015 due to complications caused by management interventions.

The collars collected a total of 59,514 GPS locations at hourly intervals. Individual home range sizes (expressed as 100% minimum convex polygon (MCP)) of animals monitored over at least 10 months varied from 611-1,516 km². For animal monitored over two seasons, annual ranges varied from 367-1,482 km² in 2013/14 and from 601-867 km² in 2014/15 (Table 2, Fig. 3).

Table 2: Overview of GPS locations and range size of the five Przewalski's horses collared in June 2013.

Name	ID	Sex	Born	Monitoring period		N	01.06.2013	01.06.2014	MCP			Group	Fate
				from	to		31.05.2014	01.05.2015	all	2013/14	2014/15		
Boroo	7215	mare	2007.06.08	07.06.2013	01.05.2015	16,535	8,532	8,003	835	787	614	Erkhes	collar dropped
Tsagaanaa	13155	mare	2003.05.09	13.06.2013	02.05.2014	7,704	7,704		715	715		Erkhes	collar dropped
Khatan	7209	mare	2021.05.06	08.06.2013	01.05.2015	16,581	8,561	8,020	1,516	1,482	867	Bundan / Bars*	collar dropped
Khovd	7213	stallion	2011.05.07	10.06.2013	10.11.2013	3,673	3,673		309	309		Bachelor W	collar removed
Oidov	6092	stallion	2006.09.07	10.06.2013	26.03.2015	15,021	8,506	6,515	611	367	601	Bachelor W	died
Sum				07.06.2013	01.05.2015	59,514							

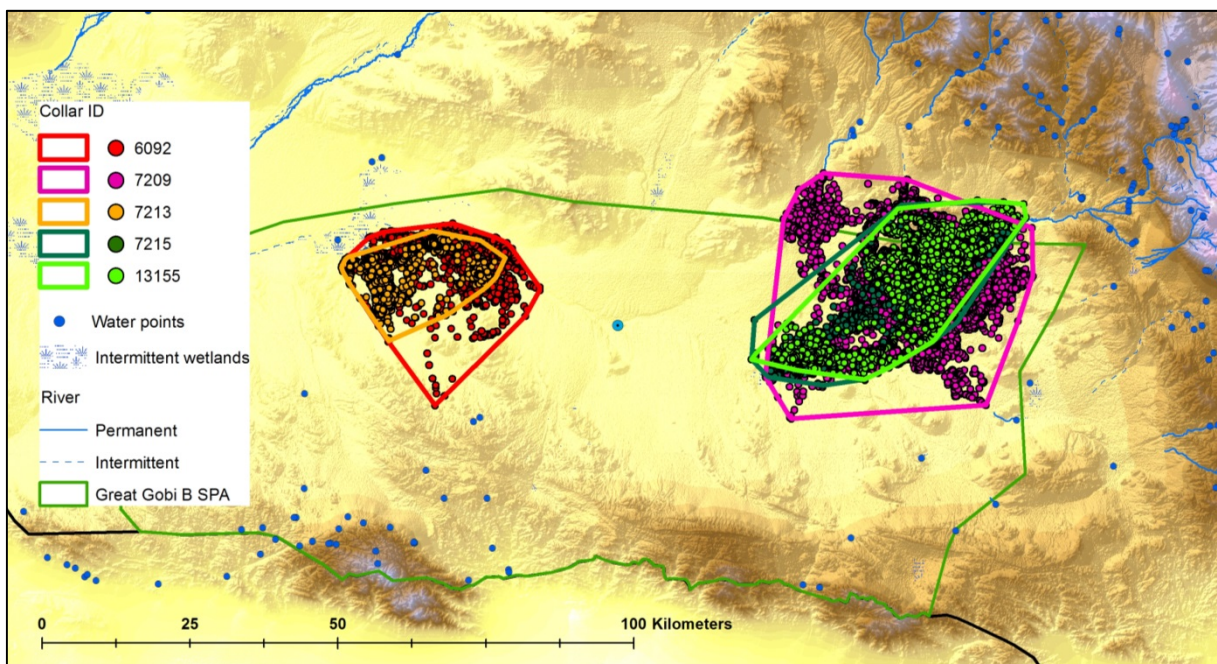


Fig. 3: Locations and total home ranges of the five Przewalski's horses collared in June 2013.

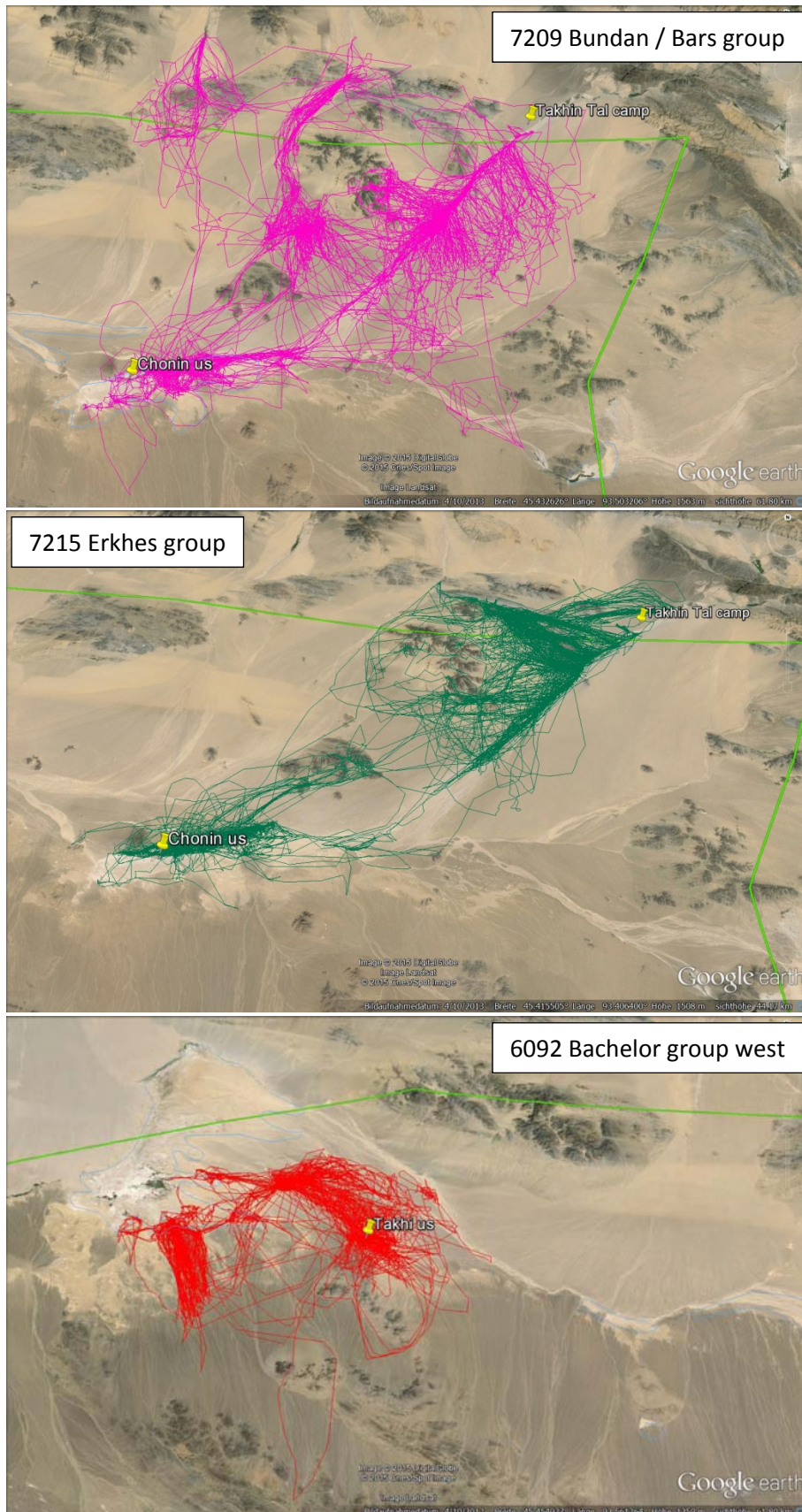


Fig. 4: Movements paths of the three independent Przewalski's horse groups monitored from June 2013 to April/May 2015.

Movement paths of the three groups monitored nicely show how intensively the two groups in the east use the Bij river valley all the way to Chonin us and how they move around the higher mountains. The stallions in the west, on the other hand, heavily use the oasis vegetation around Takhi us and adjacent smaller water points (Fig. 4).

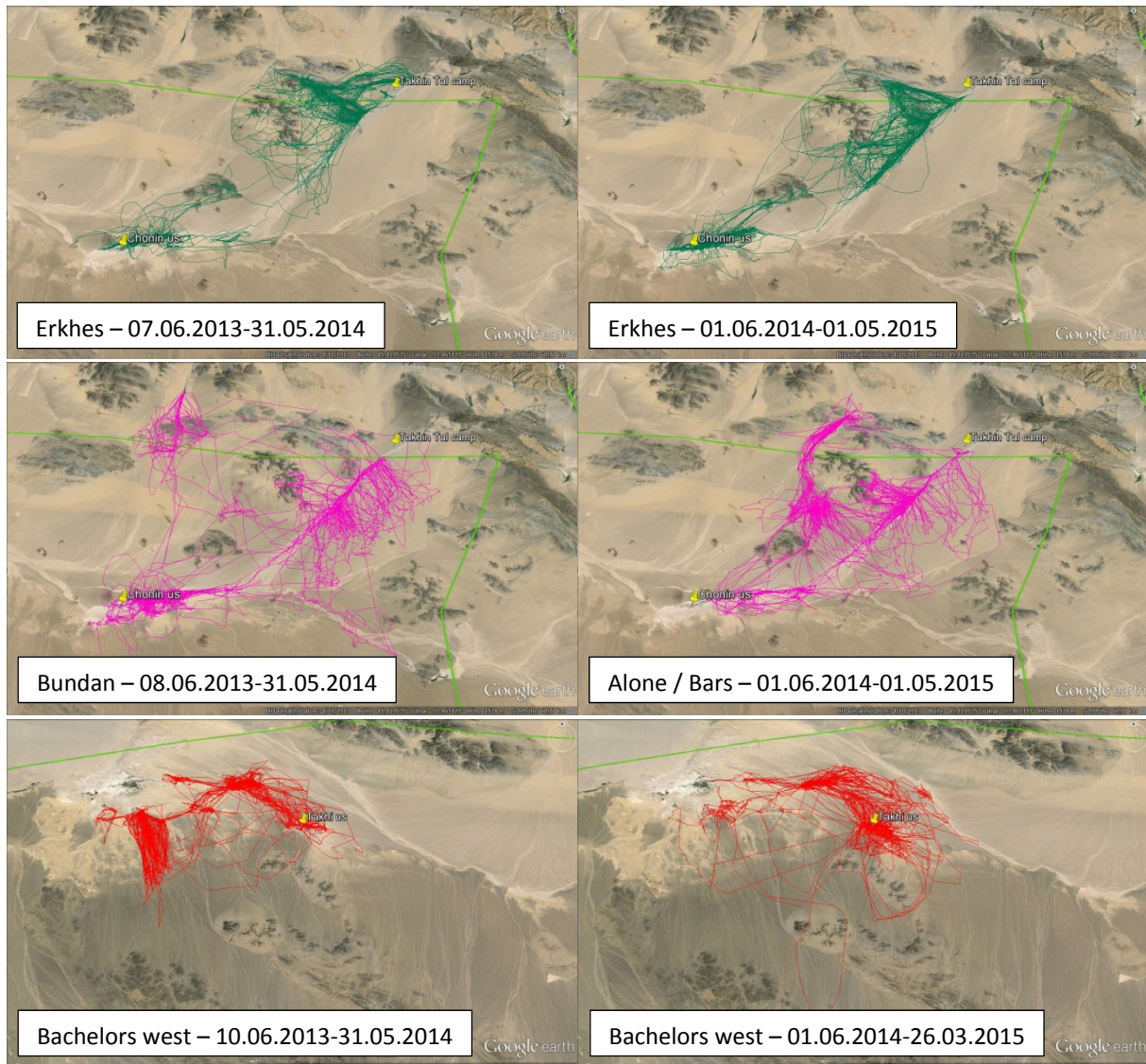


Fig. 5: Movements paths of the three independent Przewalski's horses during the two monitoring years 2013/14 and 2014/15.

Locations and movements paths shifted somewhat between the two different monitoring periods: 1) Boroo in Erkhes group made even more intensive use of the Bij river valley in 2014/15, 2) Khatan in Bundan group switched to Bars group in 2014/15 and although the pattern of in 2013/14 and 2014/15 are very similar, the area SW of Khundlung mountains got more use in 2014/15, 3) Oidov shifted his use more to the east in 2014/15 (Fig. 5).

The mare Khatan 7209 was in Bundan group until end of May 2014, when she switched to Bars group. Between June 18-22 Khatan and her foal got separated from Bars group and stayed alone. On June 22 she joined Erkhes group in the course of which she got separated from her foal and rangers pushed her and the foal to the enclosure. Both stayed in the enclosure until 30 June. From July 11 on Khatan and her foal were again part of Bars group. Interestingly, Khatan had already visited the enclosure (she was inside) on June 12 and 15. In addition, Boroo of Erkhes group also visited the enclosure (she was also inside) on June 7, 10, 12, 14, 18, 23, 24, and 26; thus both mares did meet within the enclosure (Fig. 6).

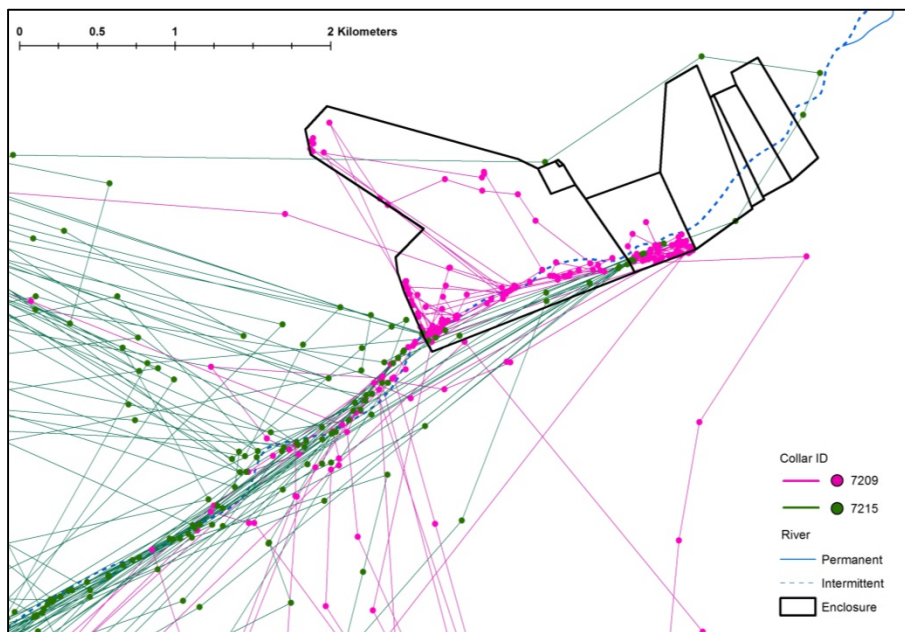


Fig. 6: Collared mares 7209 and 7215 use of the enclosure in June 2014.

Mare 13155 collar not only collected GPS locations, but also took photographs during daytime (8:00 – 19:00 local time) at hourly intervals. The camera collar worked perfectly for 3 months (13.06.2013 19:00 until 12.09.2013 19:00) but then stopped 9 month early because of a prematurely drained battery. Over the 3 months during which the camera operated we obtained a total of 1,079 images. Many images depict the other Przewalski's horses in the group, others give inside into the surrounding landscape and the pasture condition. It is also obvious that the horses are pestered by insects quite frequently and that they like to stand rather close to each other (Fig. 7 & 8).



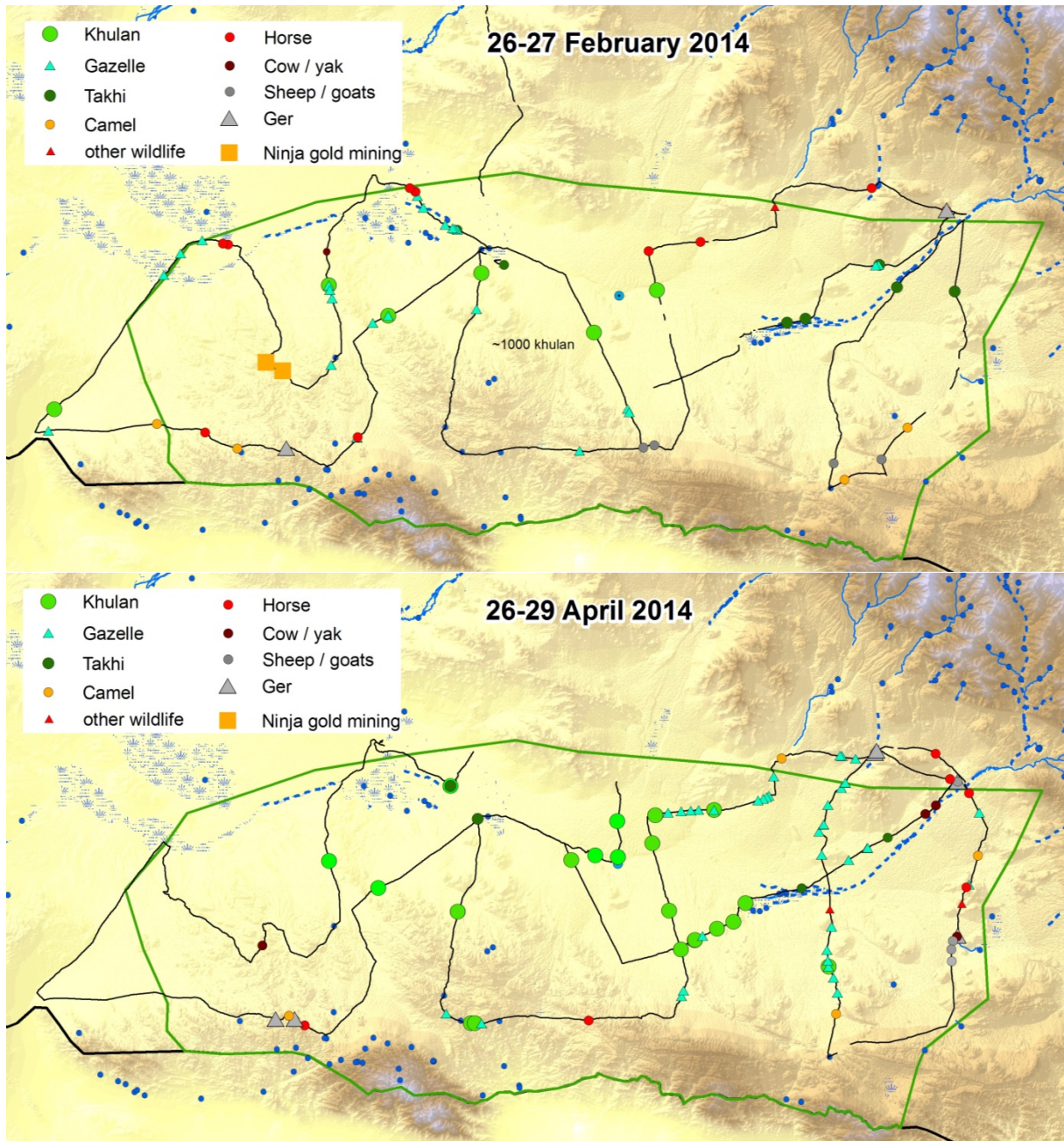
Fig. 7: Some “highlights” from mare 13155 camera collar.

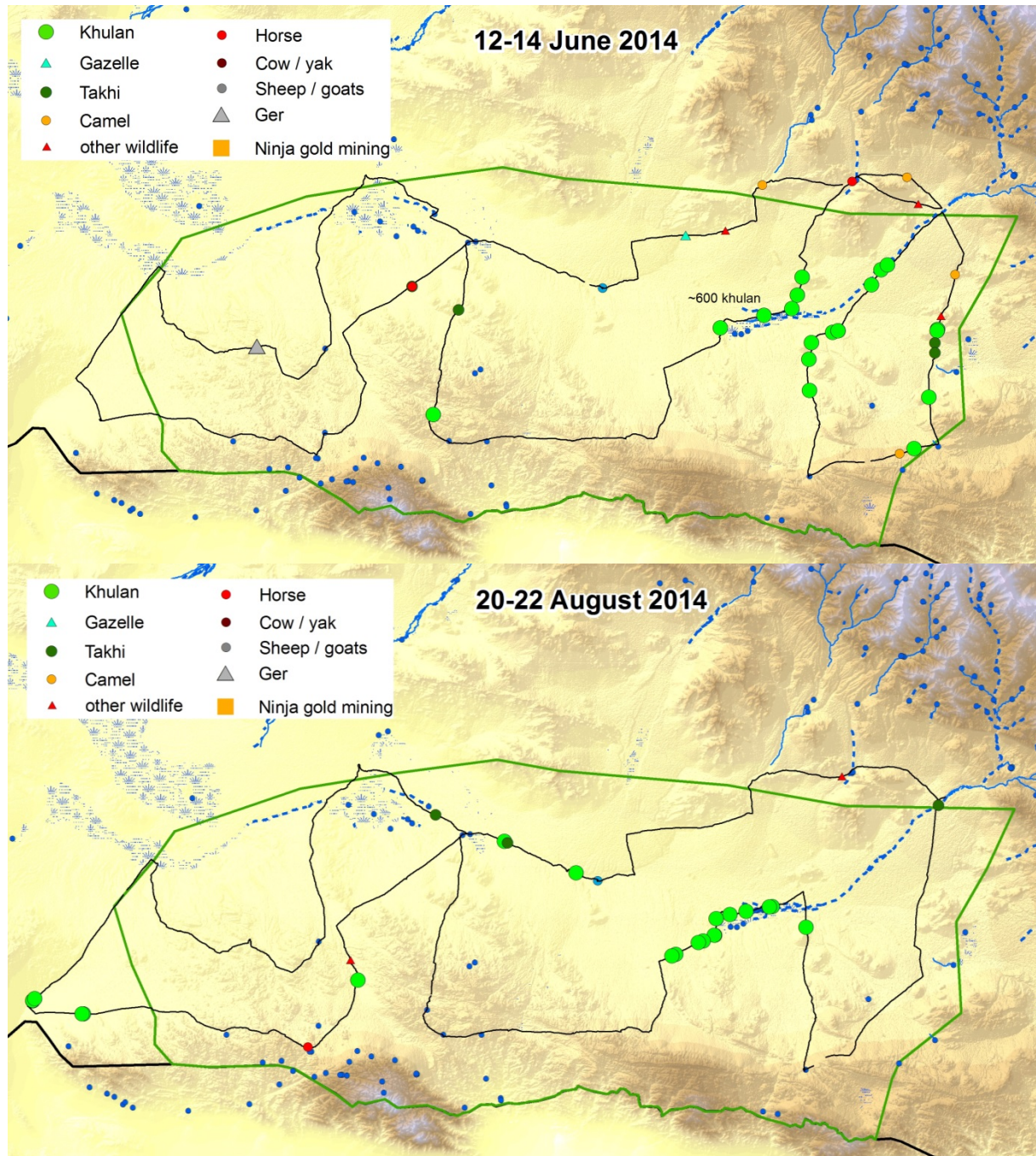


Fig. 8: More “highlights” from mare 13155 camera collar.

2. Steppe ungulate monitoring

Great Gobi B SPA staff conducted 6 wildlife monitoring surveys in February, April, June, August, October, and December 2014 (Fig. 9; Table 4). Most surveys were conducted simultaneously by two teams, one in the east (starting from Takhin Tal research station) and one in the west (starting from Takhi us).





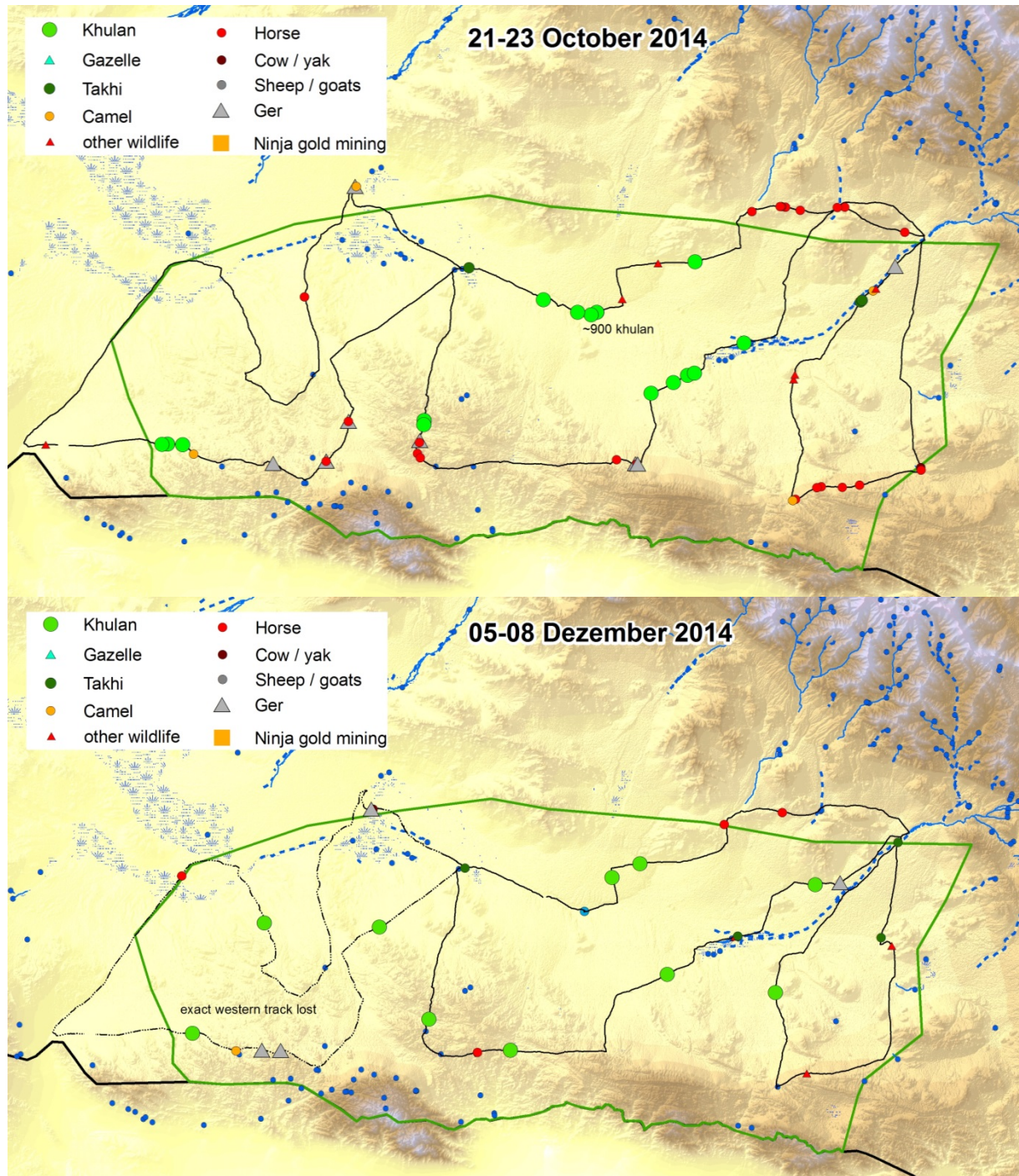


Fig. 4: Location of steppe ungulates and livestock during 6 wildlife surveys in Great Gobi B SPA between April and December 2013.

*Table 3: Overview of wild and domestic ungulates encountered during the 6 surveys in Great Gobi B SPA from April – December 2014. **!!!THIS IS RAW DATA – NOT POPULATION ESTIMATES!!!***

Survey period		Wild ungulates			Domestic ungulates			
Start	End	Khulan	Gazelles	Takhi	Horses	Camels	Sheep / goat	Cow & Yak
26.02.2014	27.02.2014	1,248	394	84	314	35	2,400	118
27.04.2014	29.04.2014	408	364	31	89	50	4,620	47
12.06.2014	14.06.2014	726	228	29	29	72	450	0
20.08.2014	22.08.2014	173	218	9	3	0	0	0
21.10.2014	23.10.2014	1,084	462	59	396	95	15,070	104
05.12.2014	08.12.2014	103	186	38	81	4	2,200	24

Determining foal rates for khulan remains challenging, as in larger groups it is impossible to count foals. In June only 1 foal was counted, in August 23 foals and in October 7 foals.

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