

First assessment of Nomrog and Dornod Mongol Strictly Protected Areas for the re-introduction of Przewalski's horses in the Eastern Steppe of Mongolia

By Petra Kaczensky

International Takhi Group

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Background

The Przewalski's horse (*Equus ferus Przewalskii*), called takhi in Mongolian, became extinct in the wild and has only survived due to captive breeding (Wakefield et al. 2002). The last recorded sightings of takhi in the wild occurred in the 1960s in the Dzungarian Gobi of Mongolia (Sokolov and Orlov 1986, Sokolov et al. 1992). The reasons for the extinction of the takhi are seen in the combined effects of pasture competition with livestock and overhunting. Although the historical range of the species has been frequently debated (Ryder 1993, Bouman and Bouman 1994), hard facts are largely missing. Historical evidence suggests that takhi occurred in the Gobi as well as the Dornod steppe (Eastern Steppe) of Mongolia (Mongolian Takhi Strategy and Plan Work Group [MTSPWG] 1993). Sokolov and Orlov (1986) cite old records in which a wild takhi mare was caught in the interfluvial area of the Onon and Kerulen rivers in 1637 and later given as a gift to the Manchurian Emperor. Plans to return takhis to the Eastern Steppe date back to the 1980s, but were never realized. In October 2004 we visited two protected areas for a first assessment of their suitability as future takhi re-introduction sites.

In reaction to the extinction of the Przewalski's horse in southwestern Mongolia and northwestern China, the Food and Agricultural Organization (FAO) of the United Nations and the United Nations Environmental Program (UNEP) organized an expert consultation. The group passed a general resolution to reintroduce Przewalski's horses to their former range in Mongolia and China as the main method of recovery (FAO 1986). Subsequently, a global management plan for Przewalski's horse reintroductions was proposed (Seal 1992). Mongolian Government–UNEP-sponsored recommendations for the reintroduction of the Przewalski's horse suggested establishing multiple sites with a primary free-ranging, self-sustaining population in the Dzungarin basin of the greater Gobi Desert (MTSPWG 1993).

Fig. 1: Re-introduction sites for Przewalski's horse in Mongolia.



Starting in 1992 takhis have been re-introduced in Central Mongolia (Hustain Nuruu; Bouman 2000) and in the Dzungarian Gobi (Takhin Tal; Slotta-Bachmayr et al. 2004). A third project

started to re-introduce takhis in the depression of Great Lakes (Khomín Tal) in September 2004 (Walzer pers. comm.). The Eastern Steppe of Mongolia had also been considered previously for takhi re-introduction and in the 1980s an adaptation enclosure was built on the Russian side of the Daurian steppe. With the breakdown of the Soviet Union the project was abandoned and the requested horses from Askania Nova (Ukraine) were sent for re-introduction to Hustain Nuruu instead (Tseveenmaydag, the former Director of Eastern Mongolia's Protected Areas pers. comm. to D. Lkhagvasuren).

The Eastern Steppe of Mongolia represents one of the largest intact grazing ecosystems worldwide (Fig. 2). Besides the Gobi region, the Eastern Steppe is one of the least populated regions of Mongolia. The two eastern provinces, Sukhbaatar and Dornod, stretch over 205,900 km² of grasslands, pristine wetlands and rolling hills. Human population averages only 0.63 inhabitants / km² and livestock numbers are also relatively low (average 11 animals / km²).

*Fig. 2: Location of the Eastern Steppe ecosystem in Mongolia.
(1 = Menegiin plain; 2 = Foothills of Khyangan)*



During the period 1987-1991 the Russian-Mongolian Complex Biological Expedition (RM-CBE) of the Russian Academy of Science (RAS) and the Mongolian Academy of Science (MAS) identified and evaluated 17 areas in 8 natural regions of Mongolia for their potential as re-introduction sites for Przewalski's horses (MTSPWG 1993). Two of these sites were located in the Eastern Steppe: the Mengiin plain and the foothills of Khyangan (Fig. 2). Both sites were judged minor in suitability to the Dzungarian Gobi largely because of high risk factors associated with: number of livestock in the area, limited water sources, concentration of blood-sucking insects, absence of natural shelters, harsh winter conditions and the absence of protected terrain (MTSPWG 1993; also see Table 3).

Although the Eastern Steppe appears to be a large area of largely similar habitat, conditions are actually quite variable. Therefore, the goal of this mission was to make a first assessment of two new areas, Nomrog SPA and Mongol Dornod SPA, as potential takhi re-introduction sites. The Wildlife Conservation Society (WCS) had selected these sites based on previous work in the Eastern Steppe.

Material and Methods

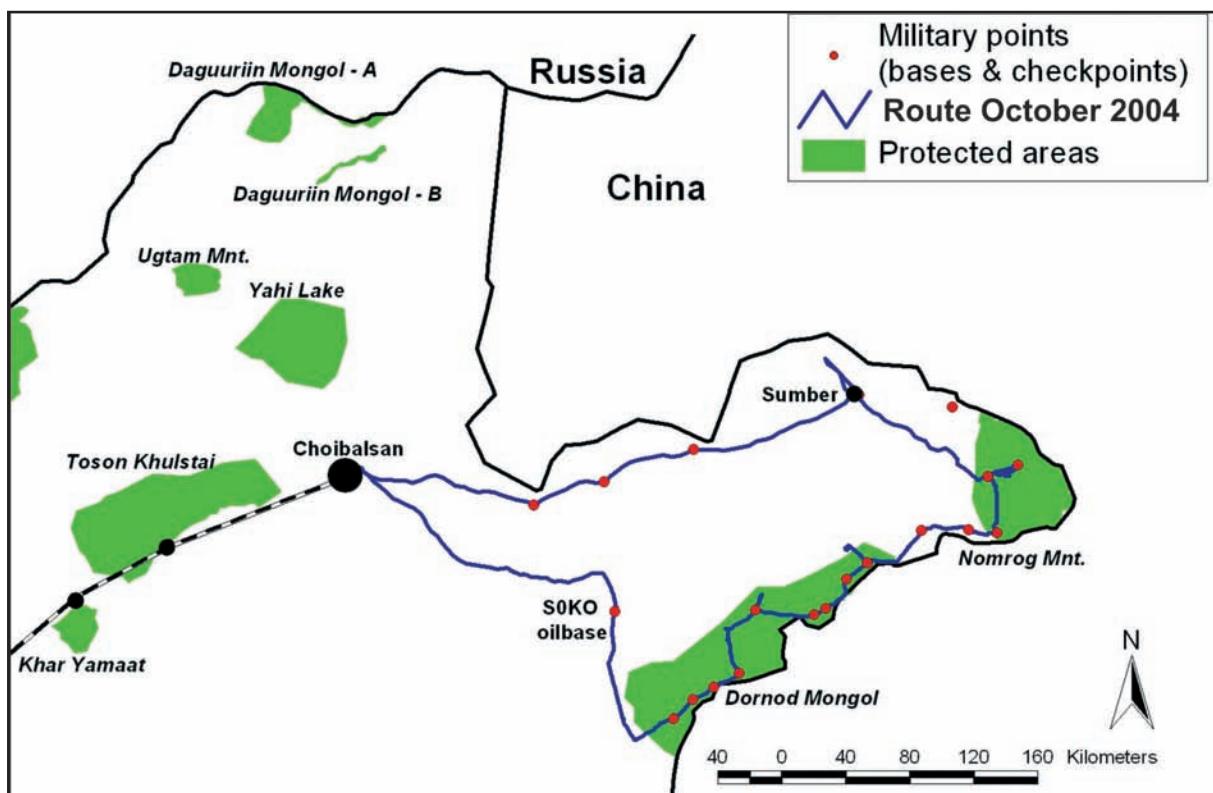
General Approach

The time-frame for the field trip was one week in the period 24-30 October, 2004. Our field crew consisted of: Petra Kaczensky, wildlife biologist with the International Takhi Group; D. Lkhagvasuren, mammal biologist at the National University of Mongolia who also acted as translator; and Tume, a local from Choibalsan, who was hired as a driver.

Given the tight time schedule we interviewed Strictly Protected Area (SPA) staff and military personnel about the area and conditions critical for takhi re-introductions. Criteria were based on our experiences from the re-introduction project in the Dzuungarian gobi (Takhin Tal) and the criteria listed in the “Recommendations for Mongolia’s takhi strategy and plan” (MTSP-WG 1993).

We left Choibalsan in the morning of 24 October and returned in the evening of 30 October. In total we drove ~1,200 km, which led us into Nomrog and through Dornod Mongol SPA (Fig. 3). We documented our route and all waypoints with a handheld GPS unit (Garmin II plus) and for visualization transferred the data into our GIS (ArcView 3.2, ESRI). We used digital Russian military maps, scale 1:500,000 as background images (QV Navigator Mongolia; Burgert PC-Service, Seligenstadt, Germany; <http://www.ttqv.com>).

Fig. 3: Trip through the Eastern Steppe to Nomrog and Dornod Mongol Strictly Protected Area in October 2004.



Assessment Criteria

(1) Size of re-introduction area:

To support a viable and self-sustaining takhi population, a re-introduction site needs to house several hundred takhis in multiple harems (Slotta-Bachmayr et al. 2004). Takhis live in harems with one harem stallion and several mares with their offspring (foals + 1- and 2-year-olds). In the Gobi region at Takhin Tal, individual harems have annual home ranges of up to 1,500 km². Because Przewalski's horses are not territorial, home ranges are shared with other takhi harems. However, at least during the breeding season in June-August, harems separate in space and/or time. In Hustain Nuruu annual ranges are much smaller ranging from 9-44 km² for harem groups and up to 64 km² for a bachelor group (Anonymous 2003). Re-introduced takhi seem to be rather conservative in range use which they initially expand only slowly. However, movements of up to 40 kilometers from the release site have been documented in Takhin Tal and further expansion is expected there. Ideally natural boundaries restrict takhi movements to the suitable re-introduction area and reduce the risk of dispersal into adjacent less suitable areas.

The minimum size required for a suitable re-introduction site will most likely depend on pasture quality and the distribution of water points.

(2) Forage resources:

The pasture needs to be sufficiently productive to feed several hundred takhi year-round. The estimated daily need of an adult takhi is 10 kg dry weight of forage per day and thus the annual need amounts to 3,650 kg of forage/takhi/year (MTSPWG 1993, O. Ganbataar, Great Gobi B SPA administration, pers. comm.).

(3) Water resources:

Takhis need to drink daily and generally graze on nearby pastures, normally not traveling more than 10 km from the water point to the pasture area. In winter, water requirements can be covered by snow.

(4) Human presence / attitude / poaching:

Takhis were eradicated not due to changes in their habitat, but because of pasture competition with livestock and persecution by human. Thus local people have to be in favor of the re-introduction program. Poaching and disturbance (active chasing) by humans could very quickly result in the destabilization of harems, reduced fitness and reproduction, and would eventually exterminate the species a second time.

(5) Livestock:

Pasture competition with livestock was one reason for the extinction of the takhi in Central Asia. Thus the area selected for re-introduction should have a low density of livestock. Reduced pasture productivity might also result from high densities of other wild ungulates and/or outbreaks of small mammals (e.g., Brandt's vole).

Interbreeding with domestic horses and takhis is possible and has occurred in the past – in captivity as well as in the wild prior to extinction (Bowling et al. 2003). With the small population size of the free-ranging takhis in Mongolia and the limited gene pool, interbreeding of domestic and wild horses poses a serious threat to the conservation of the Przewalski's horse and needs to be avoided at all costs (Wakefield et al. 2002).

(6) Winter severity:

Takhis seem to be quite capable to cope with cold temperatures. Although there is a general belief that takhis need to be able to seek shelter from wind-chill in hill country (MTSPWG 1993), most groups in Takhin Tal spend the winter in a large flat marsh area. Apparently bushes or small depressions are sufficient for thermal protection.

Snow cover in the winter reduces takhis' dependency on open water and allows them to make use of pastures unavailable to them in the summer due to the lack of open water. On the other hand, deep snow makes traveling strenuous and eventually covers up the fodder. High snow in combination with an icy ground layer can completely block access to the pasture (white dzud) and ultimately leads to starvation.

(7) Predation

Predation on takhis by wolves has been documented mainly in foals both in Takhin Tal and Hustain Nuruu. However, experience from Takhin Tal show that even naïve takhis are quite capable of fighting off wolves. Predation by snow leopards, brown bear and golden eagle may occasionally occur, but most likely would be restricted to very young or weak animals. Thus the wolf is the only important predator for takhis. Wolves are capable of reducing large ungulate populations and/or holding them at low densities. Especially in the initial phase of a re-introduction program wolf predation could be a serious threat.

(8) Blood-sucking insects

High loads of blood-sucking insects reduce the time spend grazing and often result in displacement and insect avoidance behavior (permanent head nicking, rolling, rubbing, etc.). Because the peak of the insect season also coincides with the peak growing season, takhis may not make optimal use of high quality pasture and might even lose weight during this period.

In addition, very high insect loads may result in serious blood loss, cause skin irritations and injuries that can become infected. Animals that are already weak might be further weakened and actually die.

Certain blood-sucking insects might also act as diseases vectors. In Hustain Nuruu and Takhin Tal a significant number of naïve takhis were lost to piroplasmosis, a tick-transmitted blood parasite (Robert et al. in print). This strain of piroplasmosis is endemic in equids of Central Asia, but is not present in Europe, Australia or North America. Thus newly re-introduced takhis do not have antibodies and in combination with a high stress level are at risk to develop clinical symptoms and subsequently die.

(9) Environmental risks

Certain environmental factors might pose an additional risk for naïve re-introduced takhis. Possible factors are: large-scale fires, volcanic activities, poisonous plants, disposal of hazardous waste, radioactivity, land mines, etc.

(10) Political situation / protection status

There needs to be the political will and the support of the government for a re-introduction program. The proposed area should be committed to long-term protection and thus ideally be a protected area of a status that does not allow any future development compromising the protected status or negatively impacting the area. Ideally the area should be within the territory of as few administrative units as possible and well away from international borders. If this is not the case, there needs to be proven co-operation between responsible agencies, provinces or countries.

(11) Developmental plans

Developmental plans in or around the proposed release site can result in changed land use patterns and need to be evaluated with respect to their potential impact on the re-introduced takhi population and their habitat.

(12) Other

There might be additional site-specific aspects that are relevant for a potential takhi re-introduction project.

Recent History of the Eastern Provinces

When travelling to the east it is somewhat striking that there are so few herders, especially when seeing the productive pastures (when compared to the Gobi areas) and the locally abundant water.

The reason for this goes back to the 1930s, when with the creation of Manchuguo, Mongolia acquired a new neighbor and its eastern provinces were of interest not only for Russia and China, but also for Japan. On May 11, 1939 Japanese troops seized Mongolian territory up to the left bank of the Halhyn gol (Halkhiin gol), which resulted in a major border confrontation between Russia and Mongolia on the one side and Japan on the other. The initial border incident turned into an actual war and involved ~200,000 troops on both sides, heavy war machinery and aircraft support (Baabar 2004). The local population in the eastern province was evacuated or fled.

After the war, the border areas became military zones, whereas other parts of Dornod and Sukhbataar province were re-settled with people from the northern provinces (especially from Khuvsgul). With the breakdown of the Soviet Union and Mongolia's independence in 1990, large portions of the Soviet-supported infrastructure broke down and many people went back to their homelands in the northern provinces (Prof. Samjaa, National University of Mongolia, Ulaanbaatar, pers. Comm.). Thus the areas around Nomrog and Dornod Mongol SPAs experienced a population decline and several villages (bags) ceased to exist. Nowadays, high unemployment rates and the long distances to the nearest provincial centers and the capital Ulaanbaatar make the area very unattractive for re-settlement.

Nomrog SPA

Nomrog Strictly Protected Area (SPA) was established in 1992 and spreads over 3,112 km² of rolling hill country, dissected by several river valleys (Photo 1, Fig. 4). The area is the eastern-most corner of Mongolia, surrounded by China in the north, east and west. The area is rather wet and on average receives 300 mm of precipitation and has 100 days of snow cover. Temperature extremes range from -47°C in winter to +40°C in summer, with an annual average of -2°C (Atlas of Mongolia 2004). Elevations range from 900 m in the river valleys to almost 1500 m in the south (Fig. 4).

Nomrog SPA is located 80 km from Sumber (~3,800 inhabitants) the next soum center and 400 km from Choibalsan (~50,000 inhabitants) the next provincial capital. Nomrog SPA is a military zone and special entry permits are required from the military headquarter in Ulaanbaatar. There are 3 checkpoints on the road from Choibalsan to Sumber, 1 military base in Sumber, 1 military base north of the park, and 2 military bases and several small checkpoints within the park (Fig. 3). There are no herders or any other civilians in Nomrog SPA.

Fig. 4: Our route through Nomrog Strictly Protected Area in eastern Mongolia. From the small military camp we climbed Hanshan Mountain (Khanchandan Uul) for an overview of the area.





Photo 1: Nomrog SPA provides a mix of rolling hills, riverside vegetation and small forest patches.

(1) Size of re-introduction area:

Given the highly productive pastures and the abundance of water, the 3,112 km² sized Nomrog SPA seems adequate to house a population of several hundred takhis.

(2) Forage resources:

No quantitative data was available. Judging from the conditions in October, the pastures of Nomrog SPA are dominated by various grass species and showed little signs of grazing. Productivity is much higher than in the Gobi region of Takhin Tal and seems similar or even more productive than in Hustain Nuruu. Shrubs and deciduous trees along rivers and in forest patches provide additional browse.

(3) Water resources:

There are several creeks and rivers in the area that are spaced in a fashion that would allow takhis to make use of all available pastureland.

(4) Human presence / attitude / poaching:

Nomrog SPA is a military zone and there are no local herders or communities in the area.

All military personnel were in favor of a possible takhi re-introduction. The motivation for the support seems to be a combination of the following factors: recognition of the importance of the army in Nomrog SPA, financial support and infrastructure.

Poaching seems to be a major problem in Nomrog, both by the military and illegal Chinese intruders. D. Lkhagvasuren was on a two-week research expedition to the area in September

2004 and observed that almost all soldiers have fishing nets and hunt wildlife, mainly roe deer and wild boar. His statement was supported by the local ranger. On our October trip we were invited for wild boar meat, an animal purportedly killed by the military camp dog. The main motivation for poaching by the military seems boredom – the camps are extremely remote with minimal infrastructure and no recreational facilities (e.g., no TV, no books). Given the highly positive attitude towards a possible takhi re-introduction program, it seems unlikely that soldiers would shoot takhis.

Poaching by Chinese intruders seems to have a long history in the region (Prof. Samijaa, National University of Mongolia, Ulaanbaatar 2004) and is still going on. Soldiers reported frequently observing Chinese intruders; often they are spotted on the daily supervision of the area via spotting scope from Hanshan (Hanchandman) Mountain. Chinese intruders mainly access on foot or horse and use neck snares for moose, deer and wild boar and fishing nets for taimen. Chadd Fitzpatrick, who went with a small crew on a six-week wildlife survey into Nomrog SPA in October and November 2004, came upon an old poacher's camp, an active poacher's camp, and encountered three poachers with a spare horse on which what appeared to be a small deer was slung (Chadd Fitzpatrick, Fort Collins, USA, pers. comm. 2005). Most disturbing, military personnel seem to be unable or unwilling to address this well-known problem.

Neck snares set for moose would also catch takhi, whereas neck snares set for roe deer or wild boar might result in serious leg injuries. In addition, recently released takhi will initially be rather tame towards people and will make easy prey for poachers. All other ungulates of the park are extremely shy and apparently occur at low densities (Chadd Fitzpatrick, pers. comm. 2005). On our trip in October 2004, we only encountered several groups (2-7 animals each) of roe deer.

(5) Livestock:

There is only military livestock present – about 200 horses and 100-150 cows – mainly within 5 km of the military bases 1 and 2. The smaller military camps only have a few riding horses. Thus pasture competition between takhi and livestock is presently not an issue.

Due to the abundance of water and forage, and given full cooperation by the military, it should also be possible to effectively separate wild and domestic horses to avoid hybridization.

(6) Winter severity:

Nomrog is located in a similar climatic zone as Hustain Nuruu, but generally seems to get more snow. The topography and forest patches provide good thermal cover. Harsh winters with heavy snow occur and this may cause problems to the takhis. Emergency hay and means of transportation to reach the takhi groups needs to be available in case of severe winter condition.

(7) Predation:

According to the military wolves are abundant, but predation on livestock is not an issue. Apparently the natural prey base is so good that wolves do not key in on livestock.

(8) Blood-sucking insects:

The overabundance of mosquito and black flies from June to August seem almost legendary and was mentioned by everyone. Domestic stock and wildlife seem to be able to cope with the pressure. Given the abundance of food it should be possible for takhis to compensate for any weight loss during the summer in the autumn. However, the drain blood-sucking insects cause might be too much for stressed and naïve takhis in the initial phase of the reintroduction. New

information can be expected from the most recent takhi re-introduction in Khomin Tal, another area known for its overabundance of blood-sucking insects. Because of insects, takhis were initially brought to Khomin Tal in early fall, after the insect season.

(9) Other environmental risks:

Steppe and forest fires occur, but the scale of such events seems generally small. We are unaware of any further specific environmental risks for takhis in this area.

(10) Political situation / protection status:

The area has the highest protection status (SPA) in Mongolia, but so far law enforcement seems weak and ranger presence minimal (the only ranger lives in Sumber).

The military is the key stakeholder in the park and is highly motivated to cooperate in a takhi re-introduction program. However, cooperation between the park administration and the military seems minimal at the moment. In the past, the military received funds to observe wildlife and control the area. This has ceased and presently there seems very little incentive for the military to support the SPA administration.

The area is surrounded by China on three sides and there are few natural barriers to suppress takhi movements into China. There is a border fence in some areas (which we were unable to visit), but if it looks like the fence along the border in Dornod Mongol it does not pose a serious obstacle to takhis.

Habitat quality on the Chinese side is largely unknown, but large tracts of land adjacent to the park seem to have been converted into agricultural land. Cooperation with the Chinese side seems to be minimal and protection of takhi that cross into China cannot be guaranteed.

Cooperation between the park administration and the Eastern Steppe Biodiversity Project (ESBP) also seems to be weak and support by the ESBP for our mission was poor. On the other hand, the ESBP has detailed data on habitat and wildlife of the Eastern Steppe, most of which is apparently integrated in a GIS database.

(11) Developmental plans:

We were told there are plans for a glass factory halfway between Sumber and Nomrog.

There are pending plans for construction of the so-called “Millennium Road” which is supposed to span the country from west to east and according to the original plan will touch the northernmost tip of Nomrog SPA. The road would greatly facilitate access to the park. On the positive side, it would reduce the efforts and costs for bringing takhis and research equipment to the park, but on the negative side it might result in even more poaching.

Fig. 5: Track of the planned “Millennium Road” in the Eastern Steppe
(Source: The Economist 29.01.2004).



(12) Other

The area is very remote and establishing re-introduction facilities and guaranteeing year-round presence will be a similar challenge as in Takhin Tal in the Dzuungarian Gobi. Establishing a base camp that can operate year-round and that is equipped with adequate communication facilities will be most critical. Traveling by jeep in Nomrog SPA is extremely slow and back-wrenching due to the bumpy permafrost and the lack of bridges for crossing the multiple rivers and creeks. There are only few jeep tracks available and most field work will have to be done on foot or horseback.



Photo 2: Images of Nomrog SPA habitat taken during summer 2004 PA Assessment project.

Dornod Mongol SPA

Dornod Mongol SPA was established in 1992 and spreads over 5,705 km² of mainly flat steppe habitat. The area is located along the Mongolian-Chinese border in eastern Mongolia. In respect to climatic conditions the area shows a clear west-east gradient, with more precipitation and colder temperatures in the east (average precipitation: 250 mm, average snow cover 100 days, average annual temperatures -2°C) and less precipitation and warmer temperatures in the west (average precipitation: 200 mm, average snow cover 50 days, average annual temperatures 0°C; Atlas of Mongolia 2004). Elevations range from 750 m to 1089 m in the SE (Fig. 6).

Dornod Mongol is located about 100 km from Sumber, about 90 km from Matad the next sum centers and 250 km from Choibalsan. Like Nomrog, Dornod Mongol is a military zone and special entry permits are required from the military headquarter in Ulaanbaatar. There are 4 military bases and multiple small checkpoints within the park (Fig. 6). There are no herders or any other civilians in Dornod Mongol.

Fig. 6: Our route through Dornod Mongol Strictly Protected Area in eastern Mongolia. We climbed Wantan Zagan Uul (Vangiin Tsagaan Uul) for an overview of the area.

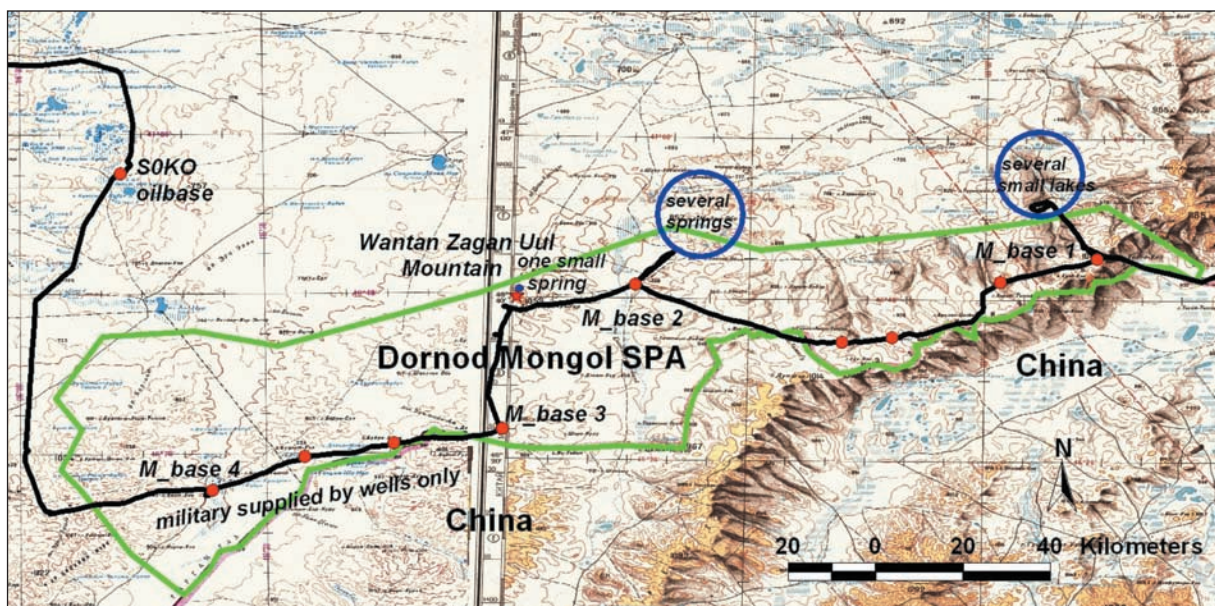




Photo 3: Dornod Mongol SPA consists mainly of flat steppe habitat, intermingled with rolling hill country.

(1) Size of re-introduction area:

With its 5,704 km² Dornod Mongol is relatively large. However, given the scarcity of water and the long-stretched form, the park might prove too small to house several hundred free-roaming and self-sustaining takhi.

(2) Forage resources:

Forage is not as abundant as in Nomrog, but in most areas the steppe vegetation is rather dense, grass dominated and only with moderate signs of grazing.

(3) Water resources:

We visited the area during the driest season of the year and after two successive dry summers – thus conditions might have been the worst-case scenario. Still, the lack of surface water seems to be the most critical issue in Dornod Mongol. From the military we learnt that there are only two areas with permanent open water in or near the SPA, one in the northeast (a chain of small lakes) and one in the north-central part (a chain of several springs and small creeks). Both areas are more or less north of the park boundary.

There is apparently also a small spring on the north side of Wantan Zagan Uul ((Vangi-in Tsagaan Uul; Fig. 6) and there may be additional springs and puddles during parts of the year. There is also a large wetland at the southwestern corner, which normally has fresh water. However, in fall 2004 the whole area only contained salt water. All military bases had access to wells and some watered all livestock from there.

(4) Human presence / attitude / poaching:

Dornod Mongol SPA is a military zone and there are no local people in the area.

All military personnel were in favor of a takhi re-introduction. The motivation for the support again seems to be a combination of the following factors: recognition of the importance of the army in Nomrog SPA, financial support and infrastructure.

Poaching seems to be a moderate problem in Dornod Mongol. The military and to some degree illegal Chinese intruders chase and shoot Mongolian gazelles. We encountered multiple herds of Mongolian gazelles of up to 1,000 individuals in the western part of the park

(5) Livestock:

There is only military livestock present. From the military we learnt that there are about 700 horses and 250 cows. The smaller military camps only have a few riding horses. Due to the lack of water, takhi and livestock pastures might be seasonally restricted to the vicinity of the two access points to open water. There pasture competition might become an issue, as well as hybridization between domestic and wild horses. Insisting on a strict separation of military horses from important takhi areas can be expected to dampen military support for takhi re-introduction.

(6) Winter severity:

Dornod Mongol is located along a climatic gradient from east to west, with conditions similar to Nomrog in the east and a slightly drier and warmer climate in the west. Due to the mainly flat topography thermal cover is less easily available than in Nomrog, but the small depressions and gullies are probably sufficient. As in Nomrog, harsh winters with lots of snow occur and this might cause problems to the takhis. Emergency hay and means of transportation to reach the takhi groups needs to be available in case of severe winter condition.

(7) Predation:

According to the military wolves are abundant, but predation on livestock is not an issue. Apparently the natural prey base is so good, that wolves do not key in on livestock. We saw a single wolf.

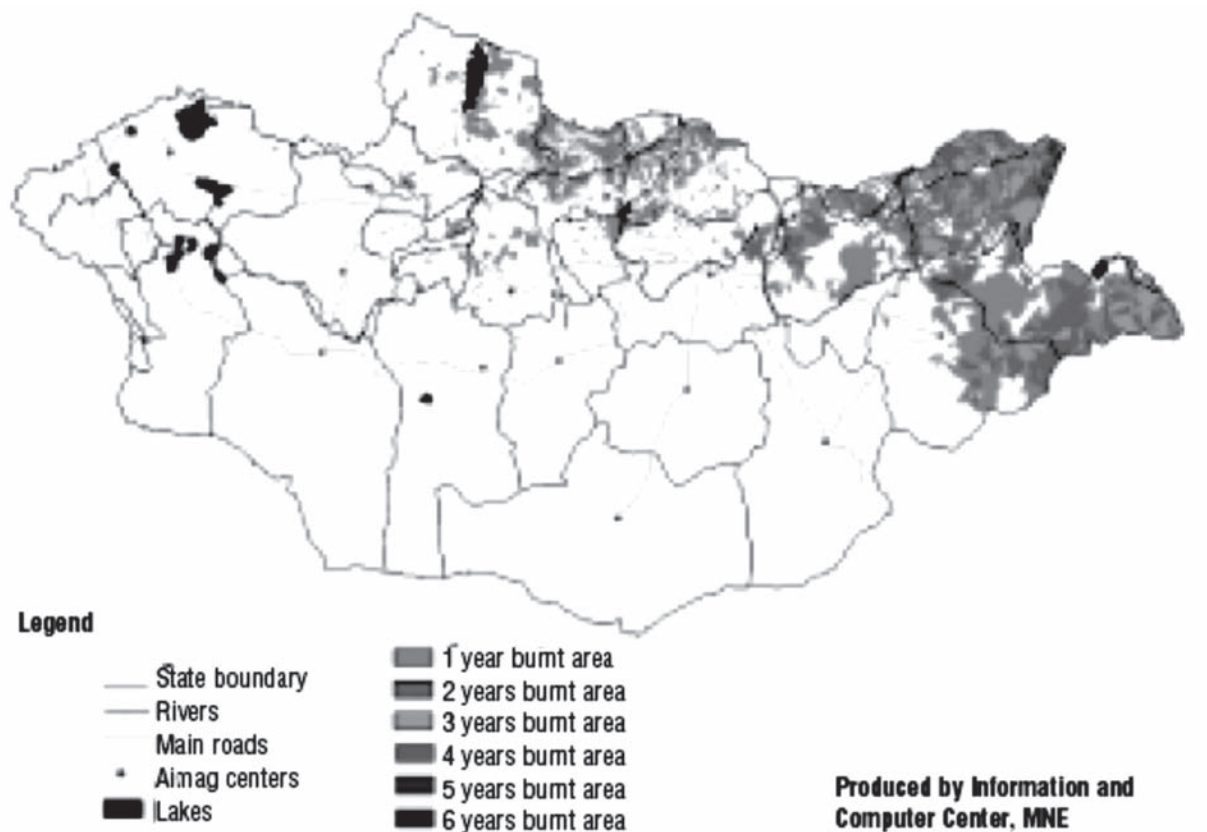
(8) Blood-sucking insects:

Due to the general lack of water, blood-sucking insects are not a big concern and are restricted to the vicinity of wetlands.

(9) Other environmental risks:

Large-scale steppe fires regularly occur in and around Dornod Mongol (Fig. 7). Military personnel claim that wild animals are usually able to outrun the flames or jump the line of fire and thus takhis might not be at risk of getting killed by the fire. However, the fire burns down the forage and when occurring in fall, the vegetation does not regenerate for the given season. Mongolian gazelles are known for their large-scale movements and seem able to track areas of high plant productivity (Leimgruber et al. 2001), but re-introduced takhis naïve to the area are most likely not able to do so.

Fig. 7: Fire frequency map of Mongolia, Spring 1996-2001
(Source: Khudulmur and Erdenetuya 2002).



(10) Political situation / protection status:

The area has the highest protection status (SPA) in Mongolia, but so far law enforcement seems weak and ranger presence minimal.

As in Nomrog, the military is the key stakeholder in the park and is highly motivated to cooperate in a takhi re-introduction program. However, cooperation between the park administration and the military seems minimal at the moment. In the past, the military received funds to observe wildlife and control the area. This has ceased and presently there seems very little incentive for the military to support the SPA administration.

Dornod Mongol SPA shares ~250 km of borderline with China and there are few natural barriers to suppress takhi movements into China. There are two lines of border fence, on the Mongolian side more of a symbolic fence, on the Chinese side a more solid fence. Both probably do not pose a serious obstacle to takhis.

Habitat quality on the Chinese side is largely unknown, but large tracts of land adjacent to the park seem to have been converted into agricultural or industrial land (mining, iron power plants). Cooperation with the Chinese side seems to be minimal and protection of takhi that cross into China cannot be guaranteed.

Cooperation between the park administration and the Eastern Steppe Biodiversity Project (ESBP) also seems to be weak and support by the ESBP for our mission was poor. On the other hand, the ESBP has detailed data on habitat and wildlife of the Eastern Steppe, most of which is apparently integrated in a GIS database.

(11) Developmental plans:

We are not aware of any developmental plans. There are oil explorations going on by SOCO oil near the northwestern corner of the park. The oil production is still in the exploration phase, but there seems to be potential for a large production (SOCO official, pers. comm.). The camp has a very good infrastructure, including an airstrip. Local SOCO managers were very cooperative and helpful in the past and would also be likely to support a takhi re-introduction initiative (P. Zahler pers. comm.).

A well-graded road connects the SOCO oil base with China and allows relatively fast and comfortable traveling between Choibalsan and the eastern part of Dornod Mongol. On a negative side, the roads also allow easy access for poachers.

(12) Other:

Traveling by jeep is very easy in Mongol Dornod and all areas can be reached without problems (Photo 3).

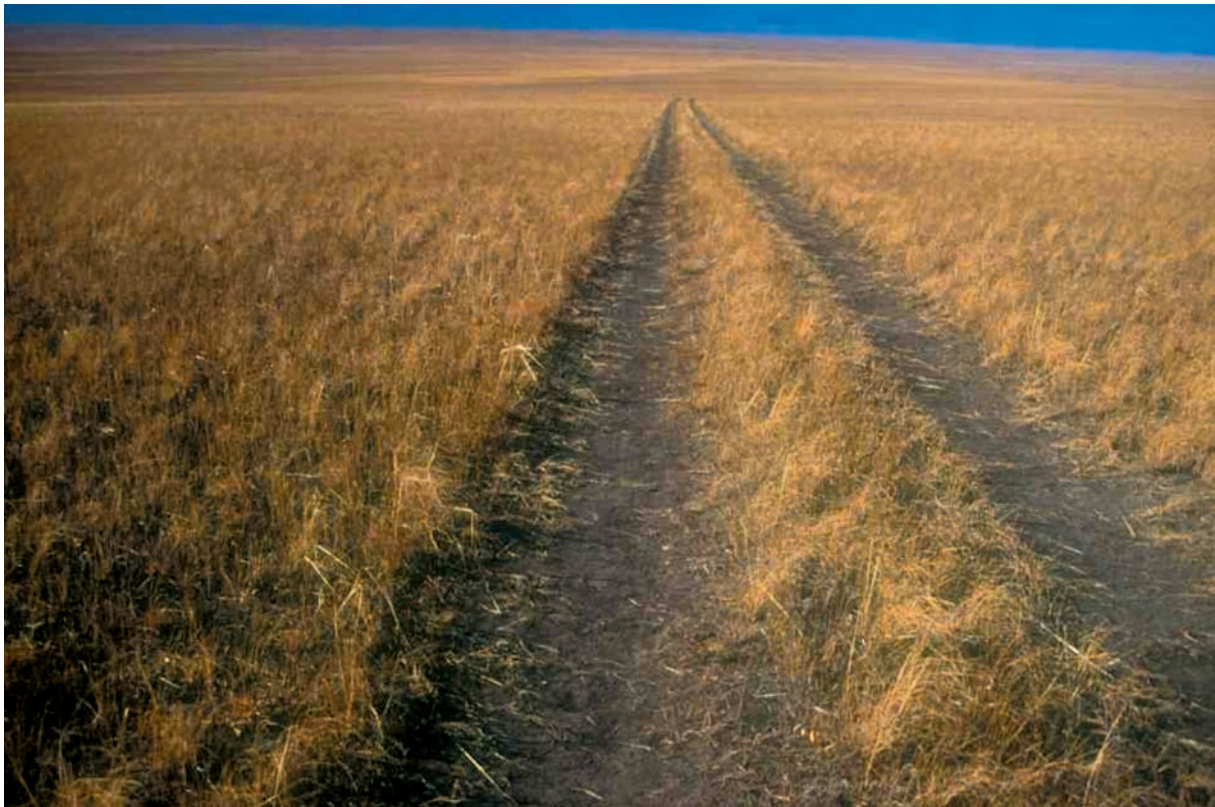


Photo 4: The largely flat steppe makes traveling easy in Dornod Mongol SPA.

Summary

From this first assessment of the two areas, I would conclude that Nomrog SPA has the better potential as a re-introduction site (Table 1 and 2).

When roughly comparing Nomrog and Mongol Dorod SPAs with the 17 areas assessed in the period 1987-1991 by the Russian-Mongolian Complex Biological Expedition (RMCBE) of the Russian Academy of Science (RAS) and the Mongolian Academy of Science (MAS), Nomrog SPA receives a similar risk factor score as Hustain Nuruu, whereas Dornod Mongol SPA scores much higher. However, the comparison has to be treated with caution because the spatial scale of the original assessments was often rather small (e.g., instead of assessing the whole of the Great Gobi B SPA, only the foothills of the Takhin Shar Nuruu mountains were assessed) and our knowledge of takhi behavior and habitat requirements in the meantime has greatly improved.

Both SPAs have the huge advantage that the only land user is the military and that livestock numbers are low. Pasture productivity is moderate to good. The military is in favor of a takhi re-introduction project. Predation by wolves on livestock is not an issue. Both SPAs share the disadvantage that cooperation between the SPA administration and the military is presently minimal, no natural barriers separate the SPAs from neighboring China and international co-operation in protected area management has been minimal so far. In addition, both areas have the potential for harsh winters with lots of snow, which can be detrimental for takhis.

In Dornod Mongol SPA, the lack of water, the long border to China, the fire hazard and the expected difficulties in separating takhi from domestic horses at the few permanent water points result in a high risk potential.

In Nomrog SPA the abundance of water would allow takhis to make use of the whole park and would facilitate the separation of takhis from domestic horses. However, before starting any re-introduction program the following risk factors need to be addressed:

1. The abundance of water results in an abundance of blood-sucking insects. The severity of this risk factor can be better assessed in 2-3 years from the takhi re-introduction project in Khomin Tal.
2. Poaching is a major concern and the problem needs to be solved before starting a takhi re-introduction program. (Note that in 2005 WCS will be starting an initiative to train border guards to control poaching within Nomrog SPA.)
3. A strong and proven cooperation between the SPA administrations, other projects (e.g., ESBP) and the military is a prerequisite before starting a takhi re-introduction program.
4. International cooperation with China has to be established and the protection of takhis dispersing into China needs to be guaranteed.

There are several other protected areas in the Eastern Steppe and it would be good to assess their suitability as potential takhi re-introduction before any steps are taken towards a planning takhi re-introduction program in eastern Mongolia.

Table 1: Answers of people, familiar with Nomrog and Dornod Mongol SPA, to my assessment criteria.

Interview partner	food	water	local people	attitude	poaching	domestic stock	winter severity	predation	parasites	border / international cooperation	developmental plans	other
Nomrog SPA (3,112 km²)												
Military base 1	very good	very good, about 10 rivers in the park	none	support takhi reintroduction	not a problem for takhi, but big problem for roe deer, moose and fish (snares + nets)	military stock in the river valley within 5 km of base	some winters up to 40 cm of snow	wolf predation no problem, lots of wild game	many mosquitos, but no problem for domestic horses	all fenced, but Chinese open gates during breeding season; little contact with Chinese side	glas fabric planned between Sumber and Nomrog; Milenium road; agriculture on Chinese side N of park	main tourists Germans
small military point	very good	very good	none	support takhi reintroduction	poaching with snares and traps; poachers come from China on foot or horse and go for roe deer, moose and fish	only riding horses		in 2004 many wolves, but also many moose - predation not a problem	mosquitos in the valley, black flies on the tops; in summer really bad			scann area from Hanshan Mountain for signs of human presence every day for 1 hour
Military base 2	very good	2004 very dry, creek dried up	none	support takhi reintroduction	around this base not many poachers, very few moose nearby	military stock is watered from well	in some winters a lot of snow which is a problem for domestic horses	many wolves, but predation no problem	here only few mosquitos	fence not finished, but under construction		
Enkbuir SPA director (Nomrog)	very good	very good	none	support takhi reintroduction	poaching by army	none	lots of snow	many wolves	many mosquitos	fence not everywhere		
Jasen (Peace Corps Volunteer)	very good	very good								maybe fence, only in the Dalai Nuur area cooperation with the Chinese side	on Chinese side agriculture + development	interesting for tourists; difficult access
Mygmasuren (ranger)	very good	very good	about 100 families at rivers and lakes near Sumber		poaching mainly by Chinese for moose, deer, fox and fish	military livestock			mosquitos very bad from July-August, domestic horses have a problem	takhi breeding at Wantan Zagan Ului (Dornod) 1700/1800 by king; also khulan there until 1920		
Dornod Mongol (5,702 km²)												
Military base 1	very good	several small lakes north of base	50-60 families in wetter area north of park	support takhi reintroduction, soldiers can look for takhi	poaching no problem	military stock	~160 horses			fenced, Mongolian fence poor, Chinese fence high	On Chinese side lots of livestock	tourists come for birds
Military base 2	very good	band of small springs and wetlands (~10)	1 military herding family	does not know takhi	poaching of gazelles by chasing and shooting	lots of livestock at first spring, apparently others without livestock	~100 horses, 50 cows	many wolves				
Military base 3	very good	only well	in W-part 3-5 families	support takhi reintroduction		military livestock	~200 horses, 50 cows					
Military base 4	very good	only well, wetland turned salty		support takhi reintroduction		near SOKO road 3 families	~200 horses, 70 cows		lots of mosquitos			
Enkbuir SPA director (Dornod)	good	poor	none	support takhi reintroduction	poaching by army	increasing in wetland area north of park, especially goats	lots of snow	many wolves				until 1920 khulan in Dornod Mongol
Uizitumor (ranger)	very good	only 3 permanent water points	5 military bases with livestock, no local herders		poaching by army for meat	military stock	150-300 livestock	many wolves				
Jasen (Peace Corps Volunteer)		very dry								fenced on both sides		

Table 2: Summary of assessment criteria based on local people's knowledge and own assessment.

	size	forage	water	humans	attitude	poaching	livestock	winter severity	predation	parasites	environ. risks	political situation / protection status	developmental plans	other	sum
Nomrog	3,112 km ²	very good	no problem	no locals, only military	very positive among military personal	major problem	military livestock ~200 horses ~100-150 cows	potential for lots of snow	minor concern	many blood-sucking insects from June-August	non known	sufficiently large SPA, but high potential for cross-border movements, access permits needed, insufficient cooperation	Millenium road gas fabric	difficult access and difficult travelling	21
	0	0	0	0	0	5	0	4	1	4	0	2	3	2	21
Dornod Mongol	5,704 km ²	good	seasonally very restricted	no locals, only military	very positive among military personal	problem	military livestock ~700 horses ~250 cows high potential for interactions at limited water points	potential for lots of snow	minor concern	no concern	large scale steppe fires	sufficiently large SPA, but due to shape very high potential for cross-border movements, access permits needed, insufficient cooperation	oil exploration	easy access for research	28
	3	2	5	0	0	3	3	4	1	0	4	4	2	0	28

Table 3: Qualitative comparison of Nomrog and Dornod Mongol SPAs with the 17 areas assessed in the period 1987-1991 by the Russian-Mongolian Complex Biological Expedition (RMCBE) of the Russian Academy of Science (RAS) and the Mongolian Academy of Science (MAS). The areas were given risk factors for each variable: 0 = no risk potential; 5 = very high risk potential. Takhin Tal area and Hustain Nuruu with ongoing takhi re-introductions are marked gray. The third area with an ongoing takhi re-introduction, Khomin Tal, was not specifically evaluated by that group.

Variable \ Area	Depression of great lakes			Valley of lakes		Alashan gobi		Transaltai Gobi		Jungarian Gobi		Khangai Mountains		Central Mongolia		Eastern Mongolia		Nomrog	Dornod Mongol
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Number of domestic animals	5	2	3	4	4	4	4	5	2	0	0	5	5	3	5	5	3	0	1
number of feral horses	0	0	3	2	0	5	5	0	0	0	0	0	0	0	2	0	0	0	3
Number of water sources	3	3	2	2	4	0	0	2	2	0	0	3	2	2	2	5	4	0	5
Concentration of blood-sucking insects	3	0	3	0	4	2	2	0	0	0	0	3	3	1	0	5	5	4	0
Appearance of dangerous geochemical anomalies	0	0	0	4	3	0	0	5	4	0	5	2	0	0	0	0	3	0	0
Yield of pasture	3	2	3	2	3	4	4	3	4	3	4	0	0	0	4	0	0	0	2
Absence of natural shelters	2	0	5	4	5	0	0	0	5	0	5	0	0	0	3	5	3	0	2
Winter temperatures	5	5	5	4	4	3	3	4	1	2	2	5	5	4	4	4	4	4	4
Snow cover capacity	3	1	2	3	4	4	4	3	2	2	1	5	5	4	3	5	5	4	4
Absence of protected territories	5	5	5	5	5	5	5	0	5	0	3	5	5	0	5	5	5	1	3
Sum	29	18	31	30	36	27	27	22	25	7	20	28	25	14	28	34	32	13	24

1 = Uvs nuur depression

2 = Zavkhan-Khun gui inter

3 = Kharnuur-Zavkhan plain

4 = Shargiin depression

5 = Boon-tsagannuur depression

6 = Borzon gobi

7 = Galbiin gobi

8 = Edrengeen nuruu

9 = Ingenii khoooli

10 = foothills of Takhiin nuruu

11 = Baruun-Khuurai depression

12 = Tarbagatai nuruu

13 = South slope of Khangai

14 = Khustain Nuruu

15 = Mandal gobi

16 = Menengiin plain

17 = Foothills of Khyangan

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Nomrog SPA (from top left to bottom right): (1) The entrance sign to Nomrog SPA, (2) near the entrance, (3) Military base 1, (4) Cows near military base 1, (5) Soldiers with spotting scope on top of Hanshan Mountain, (6) View to the east from Hanshan Mountain. [all pictures P.Kaczensky]

Nomrog SPA



Nomrog SPA (from top left to bottom right): (1) River valley at the small military camp, (2) near the entrance, (3) pasture, (4) Near the Three-river point, (5) In the Three-river valley, (6) Military horses at the military base 2. [all pictures P. Kaczensky]

Nomrog SPA



Dornod Mongol SPA (from top left to bottom right): (1) Chain of small lakes in the NE near military camp 1, (2) Well near military base 1, (3) Hill near military base 1, (4) On the road to military base 2 (5) Chain of small springs & creeks near military base 2, (6) Chain of small springs & creeks near military base 2. [all pictures P. Kaczensky]

Dornod Mongol SPA



Dornod Mongol SPA (from top left to bottom right): (1) D. Lkhagvasuren next to Mongolian border fence, (2) View from Wantan Zagan Uul, (3) Salt marsh next to military base 4, (4) Mongolian gazelles (5) The SOCO road, (6) The SOCO oil fields. [all pictures P. Kaczensky]

Dornod Mongol SPA