

Nr. 17 | May 2022

Wild again

The takhi's doom and rebirth – a lesson for our century.

30

Years of Reintroduction



Photo: Dalaitseren Sukhbaatar

Let's protect the Primordial Wild Horse and its environment.

Dear friends of the Wild Horse



What a great success of conservation! This year it is exactly 30 years since the first Primeval Wild Horses arrived by plane for release in the Mongolian sanctuary Great Gobi B – precisely where a quarter-century earlier the last conspecifics living in the wild had been sighted. Indeed, the survival of the species in the wild is not yet guaranteed; its populations are small and fragile. However, it verges on a

miracle that the Primeval Wild Horses (“takhi” in Mongolian, *Equus ferus przewalskii* or “Przewalski’s horse” scientifically) could be saved right before their irrevocable extinction.

It took decades of build-up to reconstruct a small population in the wild from the puny remains of a once flourishing life form. The rescue was enormously laborious, succeeded only through the tireless efforts of people who were not indifferent to the Primeval Wild Horses, and it took more than a modicum of luck.

This story proves that even demanding species can be saved from their imminent extinction and even returned from zoos to their ecosystem. But actually it should not come to this. It is alarming that protected areas and even zoos increasingly have to act as an ark because the ecological footprint of the one species of humans is pushing countless wild life forms to the brink of existence. Saving individual species is important; but we must also preserve their homes.

The reintroduction of extinct species into the wild requires that their original ecosystem is still reasonably intact and large enough to function in the long term. For the takhi of the Eurasian cold steppe, this is still true in some areas. For many other species, it is a pipe dream. They collide with the growing needs of the ever-increasing number of people. The habitats of many species are fragmented, overused, overdeveloped, polluted, conquered by invasive species (including pathogenic microbes) or wiped out. Populations and habitats are shrinking at a rapid pace, including ecologically central ones like sharks or corals and even insects, the backbone of many terrestrial ecosystems.

We are in the midst of the sixth mass extinction of the biosphere, the "Great Decline", the worst crisis of planetary life in 66 million years. The loss is a reflection of the "Great Rise" of our own life form, which is displacing and destroying others worldwide. In this situation, the joyous 30th anniversary of the successful takhi reintroduction gives hope for other critically endangered species. But it is also a wake-up call to do all we can now to promote the conservation of important ecosystems. If this is to succeed, we must protect much larger areas than before, from and for ourselves. This is an enormous task. Probably the most important task our species has ever faced in its evolutionary history. Will you lend a hand?

A handwritten signature in black ink, which appears to read "Schnidrig".

Dr. Reinhard Schnidrig, President of ITG

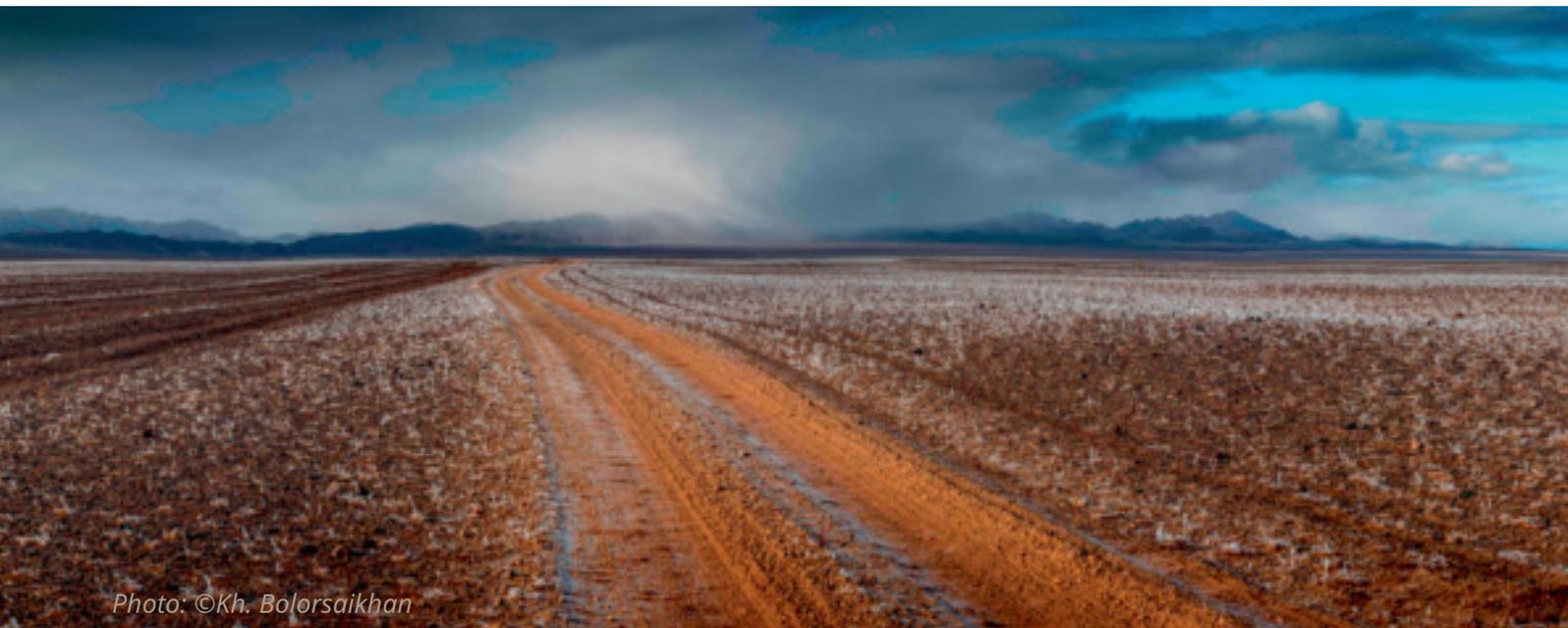


Photo: ©Kh. Bolorsaikhan

The 30th anniversary of the takhi reintroduction gives hope for other highly endangered species. But it is also a wake-up call to promote the conservation of important ecosystems now.

Takhi: ecological keystone species

Whether wild horse, donkey or zebra: the equid family is unmistakable. As a counter-design to the ruminants, its members became highly specialised inhabitants of open landscapes in 56 million years of evolution. This opened up vast stretches of land in Eurasia and Africa to them. Whereas ruminants have a multi-part stomach, equids digest food as hindgut fermenters in the caecum and large intestine. This forces them to eat almost constantly. In return, they do not need resting periods to ruminate. They can cope with sparse habitats where ruminants reach their limits. Equids are keystone species for such habitats. Their powerful teeth crush hard vegetation, the seeds of which the highly mobile herds spread over a wide area after digestion. Fertiliser included. The fact that almost all equid species are threatened and the remnants of their once huge populations continue to dwindle is therefore an underestimated problem. Their disappearance from savannahs and semi-deserts affects

the ecological structure and carrying capacity of those landscapes. Thanks to millions of years of adaptation, wild equids use such habitats much better than livestock. For this reason alone, the protection of the existing remaining equid populations is urgent: their reintroduction can restore degraded habitats.

The Great Gobi B reserve is home to khulan and takhi. Both need enormous grazing areas with suitable springs, for which they compete with the sheep, goats, cattle, yaks and camels of nomadic herders. Huge herds of small livestock overuse the livelihoods of the wild animals; moreover, the fear of human beings forces khulan and gazelles in particular to make strenuous escapes even at long distances. Undisturbed khulan and wild horses would also be more interesting for tourists than dust clouds on the horizon: a conflict of use that must be carefully weighed.

As a counter-design to the ruminants, the fast equids became highly specialised inhabitants of open landscapes over 56 million years of evolution. Photo ©Cyril Ruoso



The Great Gobi B reserve is an important habitat for around 10,000 khulan (Asiatic wild ass) and about 350 takhi. While takhi enjoy a high level of protection as a national icon, the khulan, which are also protected, continue to be poached occasionally'. They are correspondingly shy and avoid the camps of migrant herders, which are usually located in grassy steppes. They therefore tend to be displaced into sub-optimal small shrub vegetation. As evidenced by isotope measurements of tail hairs from Takhi skins in museums, this was also true for the Takhi in the final phase of their hunting². Today's takhi, in contrast, feed purely as grazers, as they are no longer hunted. Photo Rebekka Blumer



¹Wingard J.R. & Zahler P., Mongolia Discussion Papers, World Bank, 2006

²Kaczensky P. et al., Scientific Reports, 7, 5950, DOI: 10.1038/s41598-017-05329-6

Doom

That a species "goes extinct" seems at first glance fated, an inevitable consequence of evolutionary incompetence. But there are usually clear causes, and nowadays these are mostly man-made. The fact that the current extinction rate is a thousand to ten thousand times higher than before the human age is no coincidence.

The Primeval Wild Horse is no exception. One often reads that its home is Central Asia. But the Eurasian steppe stretches 8000 km long and 1000 km wide across the continent, from Manchuria to the Danube delta, and during the last ice age even to the Atlantic. For decades, it was teeming with Primeval Wild Horses, bison, woolly rhinos, mammoths, aurochs, lions and cave bears. They "died out" when early man appeared. Primeval Wild Horses were his main prey, as



After the sensational "discovery" of the wild horses by N. Przewalski, European zoos sent expeditions to Dzungaria to secure specimens. They shot whole herds to get hold of the foals. Only these could be transported on camel backs out of the remote area. Half of the unfortunate orphans perished during the transport, and the survivors - here foals from Hamburg's Hagenbeck Zoo - were scarred by the hardships.

more than 30'000-year-old cave paintings from Western Europe testify. With cooperation, cunning, ambushes and fire, the people of the Neolithic and Bronze Age succeeded in killing the fast, shy steppe animals en masse. And for decades the hunting pressure never abated. Eventually, the hunters themselves sat on horseback. Spears became bows, bows became rifles, rifles became automatic firearms. Kazakhs, Kalmyks, Huns, Xiongnu, Mongols, Chinese and Russians stalked the Takhi. Whatever did not fall victim to their weapons was displaced by their livestock.

When Nikolai Przewalski, a Polish-born adventurer in Russian service, "discovered" the species in 1879 in the form of a skull and skin of a hunted animal, the takhi was no longer numerous.

Catching expeditions by zoos, which wanted to get hold of the sensational discovery, further harmed the threatened species. Seventy years and two world wars later, only scattered groups survived in the Dzungarian Gobi. Twenty years later, they too were extinct.

A classic extinction story, then, traced in a gripping book³. Did climatic changes also contribute to this? Possibly. But the data is thin, direct persecution and displacement much more plausible. If a species can no longer regenerate, factors that a healthy population would survive can also contribute to its demise. This is true for many endangered species today: they still exist, but are wilting towards their end in fewer and fewer populations with smaller and smaller numbers.

³ Stefan Schomann: Auf der Suche nach den wilden Pferden. Galiani, Berlin, 2021, 464 S.

The Primeval Wild Horses of the Eurasian steppe belt have been hunted for over 30'000 years with increasingly sophisticated means, and later additionally displaced by cattle herds. A classic story of extinction.

The rebirth: species conservation needs lifeblood

Paradoxically, the Primeval Wild Horse survived because of the zoos' catching expeditions. In the zoos and thanks to some private breeders like the Swiss couple Stamm, at least the few individuals from which all today's Primeval Wild Horses are descended survived. Otherwise, the takhi would have become extinct like its cousin, the Primeval Wild Horse of the tarpan type. In the late 19th century, zoos were still menageries. Today, their internationally coordinated breeding programmes are indispensable for the preservation of a gene pool of a small selection of endangered species, here to outlive destructive human influences.

But this is no more than a seed bank. If a species that has become extinct in the wild is to be ecologically resurrected, much more is needed. Indispensable: an ecologically functional (i.e. sufficiently large, non-fragmented) habitat. Also essential is the commitment of volunteers who put their heart and soul, their money and a lot of manual labour into the reintroduction. Whether California condor, China alligator, brush-tailed rat kangaroo or takhi: often a few people were decisive for success – especially in the first project phase.

The pioneers of the three takhi resettlement programmes in Mongolia were the Dutch couple Ingrid and Jan Bouman in Hustai Nuruu, the Swiss biologist Claudia Feh in Khomyn Tal, and in the Great Gobi B reserve the then Mongolian Prime Minister Mairdar, the German businessman Christian Oswald, the Swiss couple Werner and Dorothee Stamm, the Swiss veterinarian Jean-Pierre Siegfried and the then director of the Mongolian Species Conservation Committee, Ochir Dorjraa.

Other people were essential for turning the pioneers' ideas into functioning projects: for Great Gobi B, where activities were closely coordinated with the European Endangered Species Programme (EEP), Tshednesodnom Sukhbaatar and Ganbaatar Oyunsaikhan, Christian Stauffer, Jiri Wolf, Chris Walzer and Petra Kaczensky, Ravchig Samiya, Ruth Baumgartner, Thomas Pfisterer and Heinz Zweifel.

Today, with countless hours of voluntary work, other species conservationists are running the three programmes which are now cooperating. All in all, we owe the reintroduction of this unique wild animal species in Mongolia to the often unpaid efforts of a few dozen people. In addition, there is the central role of institutions. In Great Gobi B, this is ITG (International Takhi Group). It addresses transnational obstacles, guaranteed international standards and processes for reintroductions, and defines the vision and tasks of the programme as well as the specifications for the implementation of research and conservation projects. Securing funding for these projects was and is essential, especially during the first two decades of the resettlement, including for the creation of essential infrastructure for managing the sanctuary.

Central to the promotion of species is the awareness of what is at stake: the genome of a species, the result of millions of years of evolution, which provides the basis for survival in the ancestral habitat. The knowledge of this preciousness drives us to dedicate ourselves wholeheartedly to its preservation.



Breathing a sigh of relief after the release of takhi in the Great Gobi B acclimatisation enclosure in Takhin Tal. The pioneers of this action include Christian Stauffer (1st from left), Petra Kaczensky (3rd from left), Jean-Pierre Siegfried and Bandi (centre, in conversation), Simon Rüegg (4th from right) and Heinz Zweifel (2nd from right).

To reintroduce into the wild a species that has become extinct in the wild requires an ecologically functional habitat, staying power, a lot of brainwork and field work, and financial resources.



Transporting the zoo takhi to Mongolia was a major logistical challenge and required meticulous planning. The Primeval Wild Horses were flown under veterinary care from Switzerland to Ulaanbaatar, where they were reloaded and flown directly to the Great Gobi B reserve, where they were released in an acclimatisation enclosure to the cheers of the population.

First sigh of relief: the takhi have landed!

The short transport to the acclimatisation enclosure was by truck. The old field name of this area is Takhin Tal (takhi steppe). Today, the administration of the reserve is located here.



The big moment: after a 48-hour trip, a takhi storms out of the transport crate safe and sound. Mongolia has its national symbol back!



The remote headquarters of the Great Gobi B reserve is located in Takhin Tal. Acclimatisation enclosures in the foreground, the administration's multi-purpose building in the middle ground, living and working containers and yurts on the right. Alagkhairkhan towers in the background. The mountain has also been part of the protected area since 2019.



Today, internationally coordinated breeding programmes are indispensable for preserving in zoos a gene pool of a small selection of threatened species to outlive destructive human impacts.

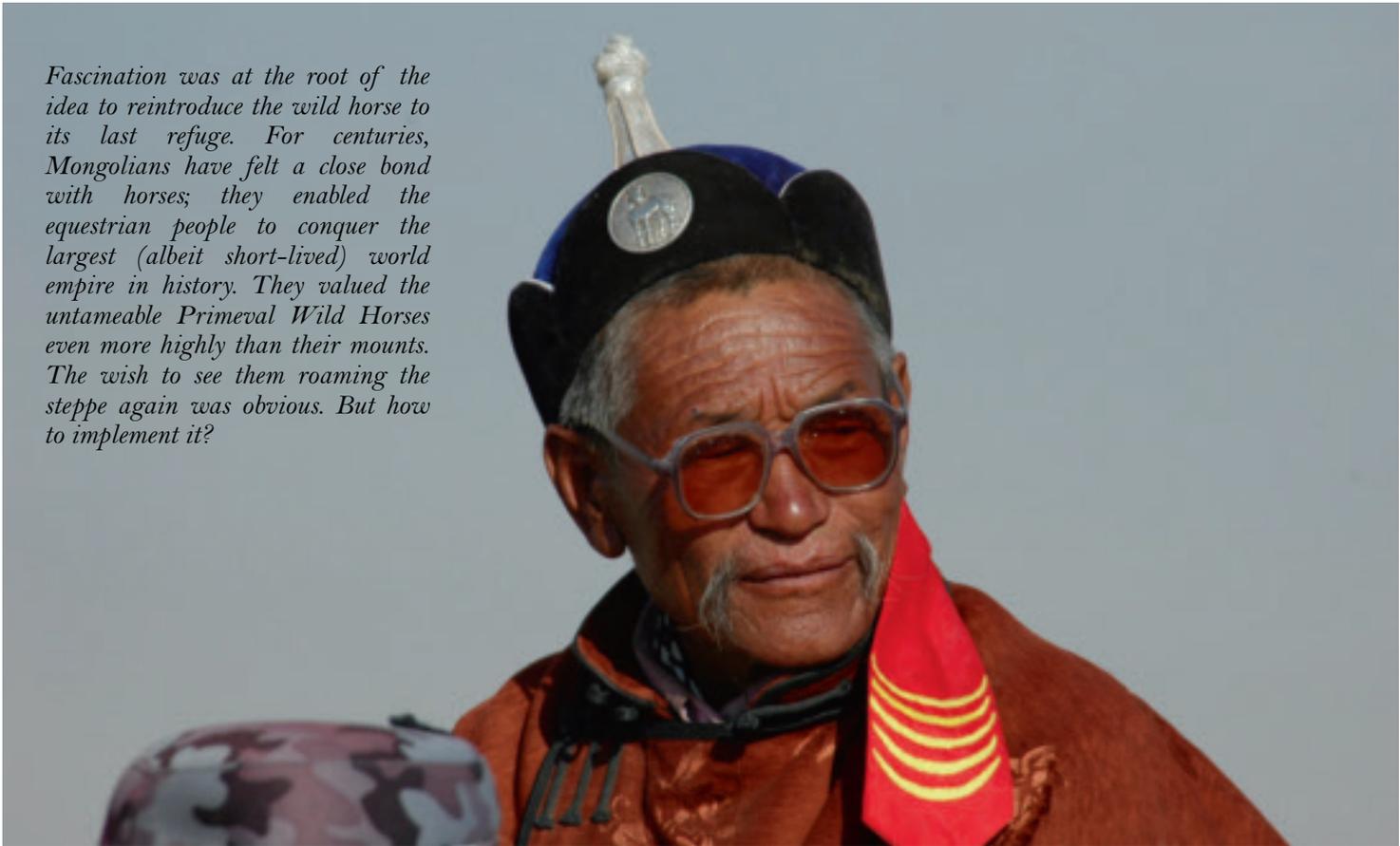


For many years, the "ghost horse" and national animal of Mongolia galloped all hooves aloft only on belt buckles and in people's heads - but since 1992, it has also been back on the Mongolian steppe! Upper photo: ©Cyril Ruoso. Bottom picture: Dalaitseren Sukhbaatar



Fascination is not enough

Fascination was at the root of the idea to reintroduce the wild horse to its last refuge. For centuries, Mongolians have felt a close bond with horses; they enabled the equestrian people to conquer the largest (albeit short-lived) world empire in history. They valued the untameable Primeval Wild Horses even more highly than their mounts. The wish to see them roaming the steppe again was obvious. But how to implement it?

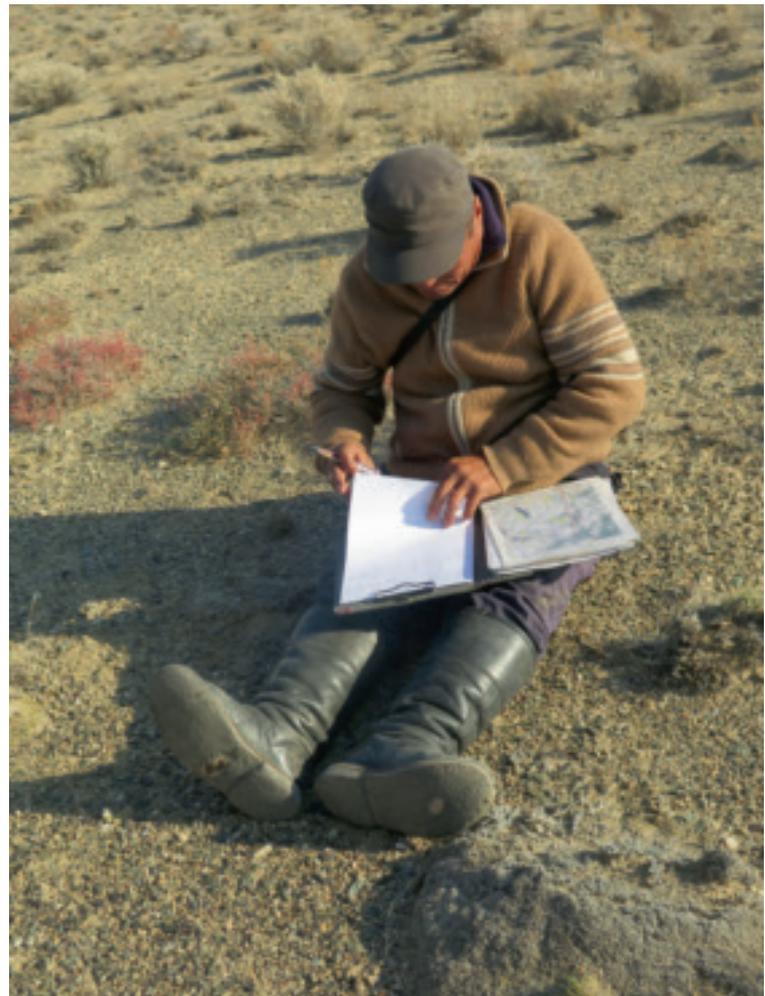


Takhi existed only in enclosures. What would such zoo horses face in the Gobi, without any experience of this extreme habitat? In the scorching summer with 40 degrees heat? In the freezing cold winter at 50 degrees below zero? In dust storms and snow drifts? Where would these "enclosure squatters" find water and the meagre food? Would their instincts be enough to brave the brutal continental climate?

Such questions are big challenges. Not only for the species to be released, but also for conservationists. For the majority of species - even charismatic ones like the takhi - we usually know little about their lives before extinction. Their native ecological system, its dynamics, the influence of other species (e.g. predators or species with a similar ecological niche), the potential for conflict and benefit when coexisting with humans: all these are big question marks!

A reintroduction ultimately tries to restore the natural interplay. To do this, we need to understand the ecosystem, at least in basic terms. The reserve in the Dzungarian Gobi, surrounded by mountain ranges, is home to a fauna and flora that is unique in the world. It is very different from other parts of the Gobi or from the hills of Hustai Nuruu, where takhi have also been reintroduced.

Ranger Batsuri during the big game animal census conducted every few years. It is used to scientifically record long-term population trends.



For ITG, multidisciplinary research into veterinary, ecological and social aspects has always been a high priority.

The semi-desert habitat is very dynamic and unstable, shaped by the amount of rainfall in summer and the intensity of grazing by nomadic herds.

For ITG, multidisciplinary research into veterinary, ecological and social aspects has always been a high priority. For there were surprises aplenty. Established methods and protocols quickly proved unsuitable. Thus, the air transport of wild horses had to be redesigned from scratch, continuously adapted and optimised. Released takhi died of blood parasites transmitted by ticks. An immunisation against this had to be specially developed. And the zoo horses hardly explored their surroundings. They tried to survive dangerous weather on the spot instead of avoiding it in time like Asiatic wild asses. The consequences were fatal. In short, there was much to learn not only for the takhi, but also for the programme managers.

The results of the long-term research, which ran parallel to the reintroduction, flowed directly into the project management. ITG continues to attach great importance to the scientific monitoring and management of the reintroduction. The programme defined for this purpose is part of the management plan. It is very important to record the long-term population trends of large ungulates in the reserve as a measure of the effectiveness of the conservation measures. But there are many other open questions, ranging from genetic and behavioural ecology aspects to habitat suitability for different species, networking of the reserve with neighbouring protected areas, optimisation of water management, or socio-economic programmes. The fascination is drive, but scientific data are the foundation of successful reintroduction.

A reintroduction ultimately tries to restore the natural interplay. To do this, we need to understand the ecosystem, at least in basic terms. The research necessary for this has high priority in ITG's science-based programme. Vegetation analyses should help the reserve administration and the local herders to jointly optimise pasture management.



Does a wild horse go through the eye of a needle?

The European Conservation Programme EEP - the most intensive methodology for the conservation of a species gene pool within the Association of European Zoos and Aquariums (EAZA) - always guaranteed access to the world's best genetic representation of the species and allowed the individual testing of each takhi released in the Great Gobi B reserve. Photo: ©Kh. Bolorsaikhan



The tarpan was unlucky. The quagga too. Persecution and displacement had strained their ability to survive too much. They "died out". If the average mortality rate is higher than the birth rate, a species dries up - like a well whose outflow exceeds the inflow. With equids, with their low reproduction rate, this happens quickly. The African wild ass? Almost dried up: 20-200 individuals still alive in the wild; reintroduction does not succeed. The Grévy zebra, the largest equid? Within 30 years, more than half of the population has been lost and the remaining 3000 continue to be hunted. The Asiatic wild ass (khulan)? Ten times more common, but also down by over 50% - in just 20 years! Cape and Hartmann's mountain zebra? Both rare, the former once hunted almost to extinction. Only the Tibetan wild ass and the plains zebra seem to be doing better. But most zebra populations are also declining.

The takhi has just barely escaped extinction. At least, that's how it seems, since in Mongolia around 750 takhi are living in the wild again today. Nevertheless, their survival is not guaranteed. The species went through a genetic bottleneck: all of today's Primeval Wild Horses are descended from only 13 reproductively capable animals, the very last of what were once millions of individuals from hundreds of thousands of generations

of horses. A lot of genetic information has been lost. Perhaps also vital information.

Takhi from today's zoos are mated according to the studbook of the European Endangered Species Programme (EEP), which is kept in Prague, in order to maintain the highest possible genetic diversity. But genetic impoverishment due to the eye of the needle is irreversible, and inbreeding can cause the small gene pool to drift in undesirable directions. The same is true for many other species, such as the bison, the cheetah, the golden hamster, the northern elephant seal or the Sumatran rhinoceros. On the positive side, the last survivors of a species may have the highest genetic fitness. Their resilience to threats other than those they faced at the time could nevertheless be low. For takhi in particular, this cannot be ruled out - especially in view of the rapid change in an already extreme local climate.

That is why we must remain vigilant about the takhi. And let's not forget that countless endangered species are now on the brink of or in the middle of the genetic bottleneck. Not only is their number of individuals decreasing dramatically, but also the number of viable populations. They are in danger of drying up. Action is urgent. Because prevention is much, much less costly than cure. The takhi is proof of this.

Similar to other highly endangered species, takhi went through a genetic bottleneck: all of today's Primeval Wild Horses are descended from just 13 reproductively capable animals.

Mission accomplished?

The three takhi resettlements in the Great Gobi B Biosphere Reserve, Hustai Nuruu National Park and Khomyn Tal National Park can look back with pride on what they have achieved. But there is no room for complacency. For the populations of Primeval Wild Horses at the three widely separated sites are tiny: in the Great Gobi B there are currently about 350 animals on 18,000 km², in Hustai Nuruu about 300 animals on 500 km² and in Khomyn Tal about 100 animals on 4100 km².

Such small groups - especially populations as conservative as the takhi of the Great Gobi B - are vulnerable to random or extreme events, such as an extreme winter (known as dzud in Mongolia), a drought or an infectious disease spread through water points. These are realistic scenarios, as experience has taught us. In addition, there is constant competition from small livestock (especially cashmere goats, but also sheep, cattle, yaks and camels), which threatens to overuse the fragile ecosystem. Excessive livestock numbers exacerbate the problem, as do longer-term changes in local winter temperatures and seasonal rainfall.

Another risk for the takhi's small, precious gene pool is hybridisation with domestic horses, as the majority of these move freely and are only cared for sporadically. Hybrids of wild and domestic horses are fertile, making a few breeders believe that they can improve the charac-

teristics of their horses by crossbreeding with takhi. So far, this risk has not been serious, but this may change as populations increase.

Such matings also transmit diseases that can be fatal for the small takhi population. Infections can also come from cattle, which are often carriers of babesiosis (a malaria-like parasitosis). Waterholes have also been shown to be reservoirs for viral infections⁴. Infections are generally a risk when releasing animals from enclosures. Therefore, the released takhi must be monitored intensively and permanently, and cases of disease must be carefully diagnosed and protocolled. In addition, the local population must have access to health measures for their livestock. Finally, regulations on the presence of livestock in a protected area must be rigorously enforced.

Frequent disturbance significantly reduces the condition of wild animals. Displacement into sub-optimal habitats already played a major role in the extinction of the takhi; they even had to change their diet and compete for food with khulan in winter⁵. Disturbances at water points, which are a critical resource for equids and determine their migrations⁶, are particularly damaging.

⁴ Dayaram A et al., Sci of the Total Environment 773, 2021, DOI:10.1016/j.scitotenv.2021.145446

⁵ Kaczensky P. et al., Scientific Reports 7:5950, 2017, DOI:10.1038/s41598-017-05329-6

⁶ Nandintsetseg D. et al., Biological Conservation, Vol. 204, Part B, Dec. 2016, 313-321

Often the sheer presence of livestock herds and pastoralists displaces the shy native wildlife. Khulan usually flee when approached to within a kilometre. Gazelles also usually show panic flight - probably an indication of occasional poaching (outside or inside the reserve, e.g. by gold prospectors). Photo: Rebekka Blumer





The monitoring of the reintroduced wild horses includes not only game management (picture) but also aspects such as the prevention and early detection of infectious diseases, the prevention of hybridisation with domestic horses and the enforcement of grazing regulations for migratory herds. Another challenge is the takhi's reluctance to migrate, which is untypical for steppe animals, no doubt a result of the destruction of all experienced animals during the extinction phase. The migration tradition has to be learned all over again. Without it, the risk of falling victim to extreme weather conditions, which experienced animals would avoid, increases. Photo: Dalaitseren Sukhbaatar



Waterholes are a critical resource for both wildlife and small livestock migratory herds. Their use must be clearly regulated to minimise disturbance to shy wildlife. Photo: Rebekka Blumer

There is no room for complacency, because the small original takhi populations in three widely separated locations are vulnerable to e.g. weather extremes, infectious diseases and hybridisation.

Coexistence in the biosphere reserve: the role of nomads

As empty as the Mongolian outback may appear to the naïve visitor: it has been populated for thousands of years. Here, one of the world's last nomadic cultures is alive and well, impressing in equal measure with its wealth, its adaptation to the harsh climate and its hospitality. The fact that Mongolia has already placed more than 20% of its land under protection (and is thus on track, unlike most other countries, to protect 30% of its land area by 2030) is not a matter of course. But many protected areas may also be used by people in moderation. Even in a strictly protected reserve like the Great Gobi B, 100 nomadic families with over 60'000 head of livestock migrate seasonally. This traditional, extensive use meets the criteria of a UNESCO biosphere reserve. Together with Gobi A, the Great Gobi is the fourth largest biosphere reserve in the world and the largest in Asia.

But this coexistence is not entirely without problems. If the nomads operated a sustainable cycle economy in the past, today they have iPads, smartphones and freezers. And their cashmere goats are in the middle of a profitable global market. The number of goats is growing relentlessly, and grazing pressure is steadily increasing. If this is to work, it is essential to regulate the coexistence of wild nature and human influences.

Mongolia impresses with a rich, colourful culture that is also interesting for tourists.
Photos Rebekka Blumer



The Mongolian population is currently growing at a rate of about 1.5% per year (2021: 1.56%, total population about 3.3 million⁷). Nature reserves can help to provide opportunities for good education and professional opportunities through associated activities and cooperation. Involving and informing the local population is a core task of the takhi sanctuaries. Information events and materials are part of the regular exchange of information with the residents.

⁷ <https://worldpopulationreview.com/countries/mongolia-population>



For the wild equids of the Mongolian steppes to have a future, they must be even better protected from excessive competition, disturbance and poaching. To this end, the sustainability of the use of the biosphere reserves by pastoral nomads must be reviewed. A central question here is how the protected areas can create benefits for residents. Cashmere wool with moderation is one answer. Another is an activity for the reserve. In the Great Gobi B, some herders successfully act as additional park rangers. They help monitor the vast area and report observations. This is just the beginning. As part of socio-economic research, an ITG project is looking for solutions for alternative or additional sources of income⁸.



One option is a soft tourism development. It would offer the local population many business opportunities in relevant trades, from travel, vehicle rental, refuelling, accommodation, hospitality, information, cultural mediation and souvenirs to foreign language courses, financial and other services. Hustai Nuruu National Park, located near the capital Ulaanbaatar, can serve as a model for the more remote takhi sanctuaries on how to make this transition, and can provide expertise to help.

For this, it is indispensable to prepare for the expectations of global tourism as far as is reasonable. To this end, ITG in the Great Gobi B reserve promotes relevant training for the local population. The tourists, in turn, can act as a deterrent to poachers and make other uses of the region (such as mining) less attractive through their presence in the reserves and their local value creation.

Takhi sanctuaries are thus intended to preserve not only the Primeval Wild Horse and the region's unique range of species, but also the equally unique, traditional way of life of the nomads.



Centre: The local semi-nomads are very interested in the reintroduction of their national animal. The information bulletin "Takhi Post" is also published in Mongolian. Photo ©Anita Fahrni

Bottom: If the local population finds a livelihood through a reserve, they do not need to move to Ulaanbaatar. Then nature conservation does not become an exclusion for them, but a joint venture. Photo ©Petra Kaczensky

⁸ Michler L et al., Journal for Rangeland Ecology and Management Moving, 2022.

Takhi sanctuaries aim to preserve not only the Primeval Wild Horse and the region's unique range of species, but also the equally unique way of life of the nomads.

Wild again? Very much so!

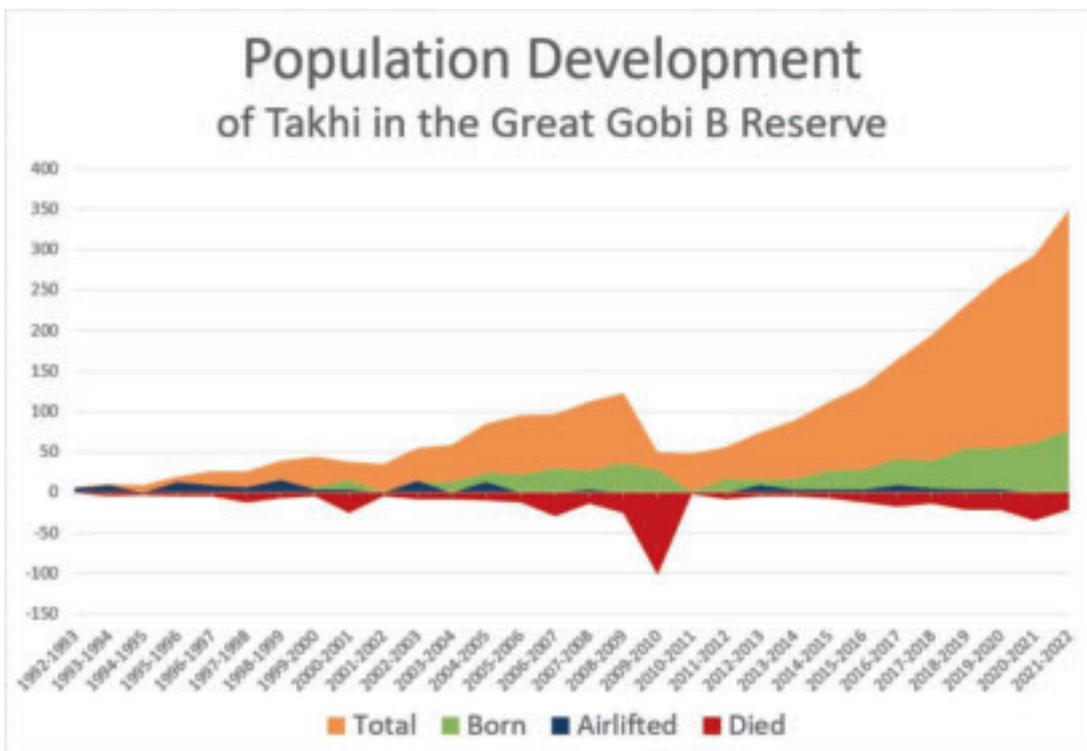
Since the beginning of the reintroduction, the takhi population in Mongolia has developed very positively and, 30 years after the return, has cracked the mark of around 750 wild horses living in the wild. The massive expansion of the Great Gobi B (2019) and Khomyn Tal (2020) reserves will open up additional habitats and thus opportunities for the endangered species.

Nevertheless, we cannot sit back and relax. Firstly, the species is far from being out of the woods. Secondly, there is still a lot to do. Currently, the following tasks are on the table, in addition to everyday wildlife management:

- Genetics study
- Scientific ungulate point count
- Re-zoning of the enlarged protected area
- Launch of the Mongolian National Takhi Programme
- Construction of a new administration building in Altai (Khovd province)
- Pathology workshop with veterinarians and game rangers for disease detection
- Creation of a biodiversity database including occurrences of the endangered saxaul shrub
- Establishment of a student exchange programme with local universities

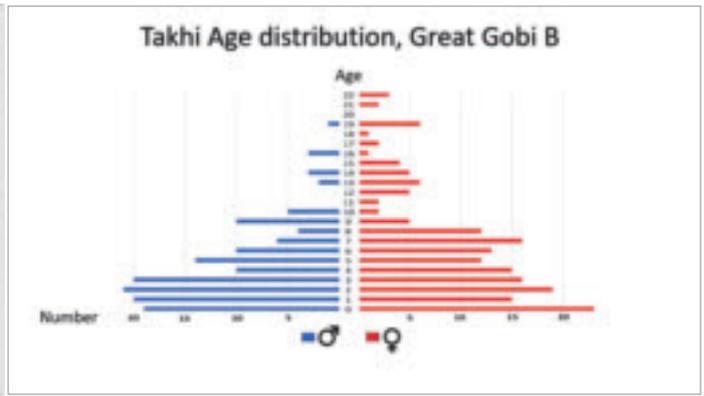
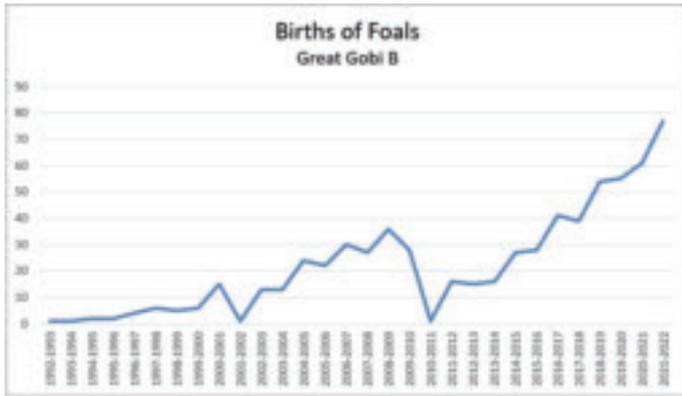
Funding such activities through contributions from foundations and donations from private individuals requires unwavering commitment.

The successful reintroduction is also a model for other efforts to reintroduce species that have become extinct or extremely rare. It also provides a wealth of exciting data on the population development of wild takhi, their harem dynamics and way of life, e.g. the development of space use and behavioural adaptations to predators. In this way, we are rebuilding a body of knowledge that perished along with the species during its extinction.



The population of Primeval Wild Horses (takhi) in reserves in Mongolia is currently around 750 animals. Around 350 of these currently live in the Great Gobi B reserve. After an initially hesitant development, the population there has recently grown very encouragingly. The graph shows the development of their population since the return of the species in 1992 until November 2021. The massive collapse in 2009/2010 shows the high risk that extreme events (here a "dzud", i.e. an extreme winter) continue to pose for the species.

The successful reintroduction of the takhi is also a model for other efforts to reintroduce species that have become extinct or extremely rare.



As the takhi population size increased, the number of births per year increased significantly (left) and reached a new all-time high in the programme in 2021. In the Great Gobi B reserve, population monitoring of the takhi is done at the individual level. These excellent data allow the representation of an age pyramid (right). This shows important population events such as the extreme winter 11 years ago and the dangerous and strenuous life of the stallions, which have to conquer or defend a harem, which ultimately leads to relatively early death.



As recently as 2015, 2/3 of the Takhi in the Great Gobi B were females, as many more mares than stallions had been airlifted. Since then, the gender distribution is rapidly approaching parity, as around 50% of wild born foals are male. The pressure of young stallions on established harem stallions is likely to lead to more and/or smaller harems. However, this does not increase the reproduction rate. Photo Rebekka Blumer

How must a transport crate be designed so that a large, defensible and skittish escape animal can be airlifted and transported by lorry from Western Europe to Central Asia during a journey of 24 to 48 hours, without perishing in the process? And how do you get it into this crate in the first place? These are only two of countless conceptual and practical considerations that have to be answered for a reintroduction project after breeding in zoos has been successful (anything but a matter of course!).

The suitability and ecological functionality of the habitat in which the release takes place are also central. This is directly related to its size: the smaller, the lower the number of species and the higher the extinction risk per species. Highly mobile steppe animals like equids need huge areas to survive, where they can follow the weather-related change of pastures and water points. The battle for the world-famous Serengeti steppe in East Africa made it clear that the size and boundary of a protected area are central to its success.

This also applies to the reintroduction of the Takhi in Mongolia, but it is an eminently political issue.

Rebuilding a viable population requires political will and acceptance among the population of the target country. In Mongolian democracy, decision-makers at local, regional and national level had to be convinced to agree to the request. This is not a matter of course when one thinks of the interests of the local electorate. The doubling of the already huge area of the Great Gobi B in 2019 can therefore hardly be overestimated.

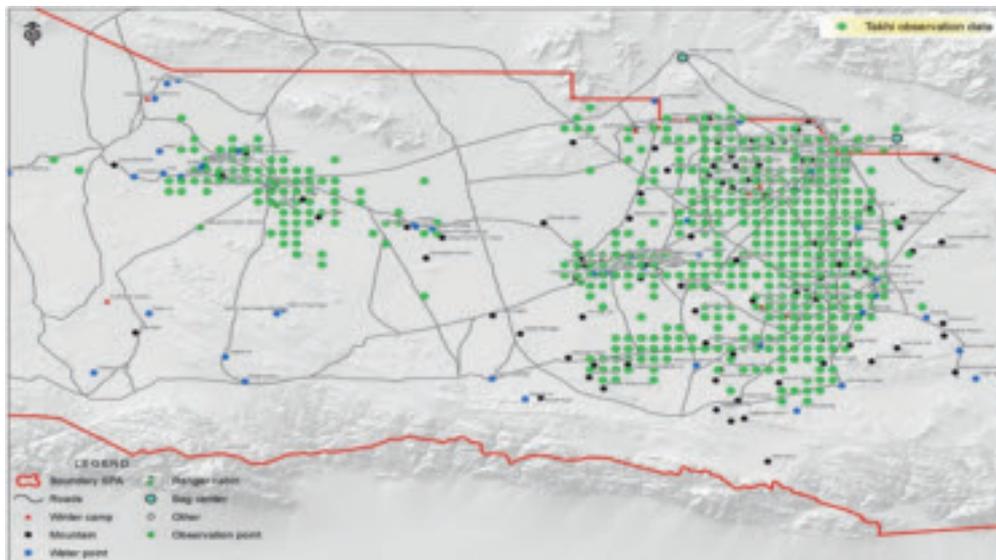
Implementing this political decision in the field is a task for the organs of the reserve. Due to the enormous size of the area, this also has unexpected practical implications with political explosive power, such as cooperation across provincial borders. A topic such as the location of the administration and its centre ("House for the Gobi"), planned in 2021, may well lead to discussions.

The smaller the habitat, the lower the number of species and the higher the extinction risk per species.

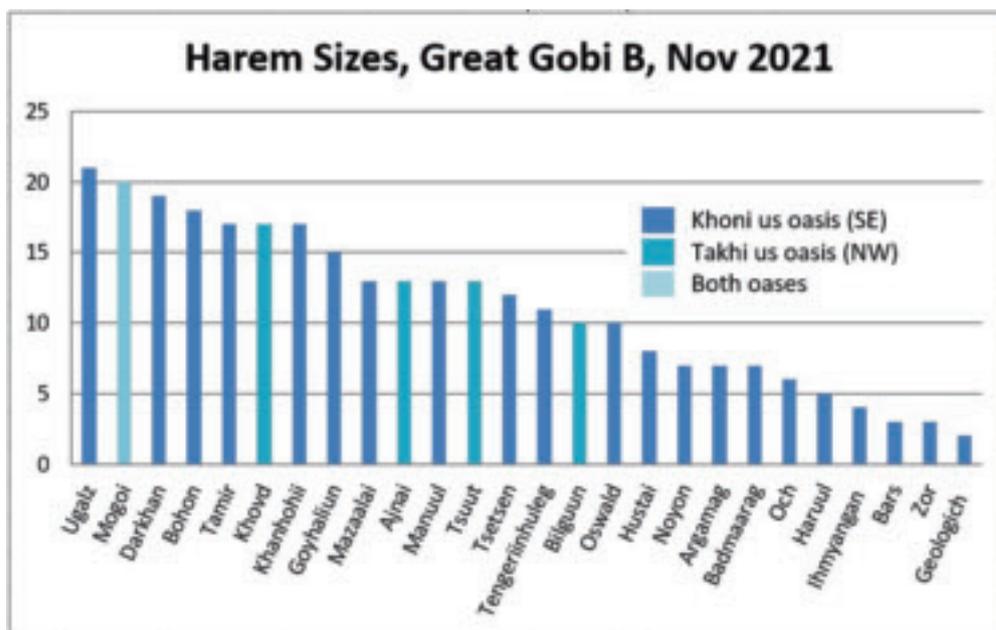
Another important topic for species conservation are future scenarios such as the identification of further release sites as well as possibilities for habitat connectivity. The more sites and the better their connectivity, the higher the resilience of the endangered species and the higher the chance of its permanent recovery. This applies generally to endangered species, not only to those already extinct in the wild.



Map of the Great Gobi B reserve in southwest Mongolia. The green line indicates the original size of the reserve. In 2019, the Mongolian parliament approved a doubling to now 18'000 km² (blue line), placing important additional habitats and migration routes under protection. The black line corresponds to the national border with China.



Whereabouts of takhi harems in Great Gobi B reserve, 2019. Currently 86 takhi (5 harems plus a group of young stallions) use the western region, 263 the eastern region.



In 2021, there were 26 harems in Great Gobi B with an average of 11.2 (median 10.5) individuals. 21 harems lived only in the south-eastern area around the Khoni us oasis (about 45 km from the main camp Takhin Tal). 4 harems lived only in the western area around Takhi us oasis (about 100 km as the crow flies from Takhin Tal). Only one harem used both focal areas. So, in 30 years (3 generations), the takhi have hardly developed a tradition of migration. This would, however, be important for their resilience, e.g. to weather extremes. However, with increasing population density and frequency of young stallions without mares, space use could become more dynamic. There are first signs of this.

The more sites and the better their connectivity, the higher the resilience of an endangered species, and the higher its chance of lasting recovery.

The takhi is and remains a Primeval Wild Horse

In 2018, the journal "Science" caused a stir with the claim that takhi (Primeval Wild Horses) descended from domesticated horses. This thesis⁹ is based on the overinterpretation of thin facts that can be explained much more plausibly without questioning the takhi as a wild animal species^{10, 11, 12, 13, 14}.

In the Late Stone Age settlement of Botai (northern Kazakhstan), archaeologists found the bones of thousands of so-called Botai horses, which are clearly genetically distinct from domesticated horses. They also found remains of stakes, which they interpreted as corrals where captured wild horses had been kept and slaughtered. Traces of horse fat on clay shards are supposed to prove that mares were milked. And from traces of wear on individual horse teeth, they even concluded that these horses had been ridden and domesticated.

Given the paucity of evidence, such claims are far-fetched. They are now considered disproven. For example, the age and sex distribution of the horse bones in Botai does not fit at all with a population controlled by herders¹⁵; the same applies to the arrowheads found in some horse skeletons. Moreover, calculus on human teeth from Botai shows no traces of milk fat¹⁶. And identical looking wear marks on horse teeth are also found on horse fossils of the Pleistocene¹⁴. One thing is certain: at the Botai ford, wild horses were repeatedly rounded up and slaughtered en masse. However, there is no reliable evidence for their keeping or even domestication.

In addition, there are important methodological weaknesses in the study. The authors constructed pedigrees from individual genetic data, according to which takhi are descendants of Botai horses. But their methodology is unsuitable for determining the ancestry of populations. Moreover, their data fit several alternative ancestry scenarios. And they cannot even distinguish a wholly wild takhi ancestry from a wholly "domesticated" one¹⁷.

The fact that Botai horses, according to the study, are genetically very similar to a 19th century takhi is not surprising: they were takhi themselves! But to claim that all takhi today are descended from "domesticated" Botai horses is absurd. 5000 years ago, wild horses in Central Asia, where vast areas were climatically suitable for them¹⁸, must still have been very numerous¹⁹. Accordingly, the Botai tribe must therefore have captured all the Primeval Wild Horses in its range during the 500 years of its existence, so that no specimen outside the corral could have had offspring. All the other wild horses that roamed the Eurasian steppe belt from Europe to Manchuria and from the Gobi to southern Siberia at that time must also have died out sooner or later without offspring. And after that, escaped Botai horses must have succeeded in reproducing in such a way that from 1700 BC (Shang culture) until the 18th century they were once again to be found from southern Siberia across the whole of Mongolia and large parts of China (Xinjiang, Shaanxi, Ordos and Gansu) as far as Manchuria — because there are accounts or reports of

(Continued on p. 20)



Today's takhi (left) are genetically less similar to the takhi of the 19th century than these are to the Botai horses. But all three undoubtedly belong to the same species. And today they still look confusingly like the wild horses that were hunted and painted on cave walls 32'000 years ago (right: a 15'000-year-old cave painting in Lascaux, southern France). No wonder: takhi are their descendants and the last surviving true wild horses. More urgently than archaeological speculation, they need consistent protection so that their narrow rescue from extinction is not in vain.

⁹ Gaunitz C et al., Science 10.1126/science.aaa3297 (2018)

¹⁰ Feh C et al., Science e-letters (2018), <https://science.sciencemag.org/content/360/6384/111/tab-e-letters>

¹¹ Walzer C et al. (2018), <https://science.sciencemag.org/content/360/6384/111/tab-e-letters>

¹² Leimgruber P et al. (2018), <https://science.sciencemag.org/content/360/6384/111/tab-e-letters>

¹³ Boyd L et al. (2018), <https://science.sciencemag.org/content/360/6384/111/tab-e-letters>

¹⁴ Taylor WT & Barrón-Ortiz CI, Scientific Reports 2021;11:7440, <https://doi.org/10.1038/s41598-021-86832-9>

¹⁵ Olsen SL, in Horses and Humans: The Evolution of Human-Equine Relationships (eds. Olsen SL et al.), Vol. 1560, 81 (Bar International Series, 2006)

¹⁶ Wilkin S et al., Nature 598, 629–633 (2021), <https://doi.org/10.1038/s41586-021-03798-4>

¹⁷ Vogl C et al., in prep.

¹⁸ Leonardi M et al., Sci Adv 2018;4:eaar5589

¹⁹ Boyd L et al., Science e-letters (2018), <https://science.sciencemag.org/content/360/6384/111/tab-e-letters>

A lesson for our century: Great Decline



The critically endangered Bogeda snow lotus numbers less than 600 plants in total and is found in only two locations worldwide. One of these is the Great Gobi B reserve. Photo ©Shukerdorj Baasanmunkh

(Continued from p. 19)

takhi as hunting game from all these areas²⁰. That assumption is absurd.

And even if this scenario were true, today's Takhi could not be considered feral domestic horses. After all, there is no evidence of domestication whatsoever. Captivity, even tethering or riding, does not prove the domestication of a wild horse species. Neither are dancing bears or working elephants domesticated animals; they are captive and tamed.

²⁰ There are accounts or reports of takhi as game from the Shang culture in China (c. 1700-1100 BC), the Han period (206 BC-220 AD), the Tan dynasty (618-907) from Shaanxi, Ordos and Gansu provinces and present-day Mongolia (Ruth I. Meserve, in *Journal of Asian History*, 1995), from the 11th century and 13th century also from Mongolia and Ordos (Urgunde Onon, Curzon, 2001). In the 18th century, they were found in southern Siberia (John Bell 1763) and Manchuria, where the Manchurian Emperor Qianlong is said to have killed 200-300 takhi in a single day.

Should we prevent the extinction of the giant panda or the Siberian tiger? Sure - both are public favourites with a lot of charisma. And the Primeval Wild Horse? How are you supposed to convey its uniqueness? Doesn't it look almost like an "ordinary horse"?

And what is the argument for answering the question in the affirmative in the case of other species? In the case of the magenta petrel? In the Chinese giant salamander? The European sturgeon, the peacock tarantula, the tree snail *Partula gibba*, the Bermuda cedar or the fungus *Destuntzia rubra*? They are all critically endangered.

The list of species on the brink of extinction alone fills pages²¹. The list of "only" threatened or vulnerable species is many times longer. And it includes only species that have been assessed by researchers. That is a fraction of the actual threatened species diversity.

The fact that we are devoting ourselves to the Primeval Wild Horse may seem coincidental. But it is a unique life form, the result of millions of years of evolution. And above all, it belongs to the one percent of all species that have survived until today, while the other 99% disappeared or evolved before the human age. In other words, the Primeval Wild Horse is something uniquely precious.

And this also applies to all the other species that make up today's biodiversity. However, this diversity - viewed in biological time frames - is in free fall worldwide.

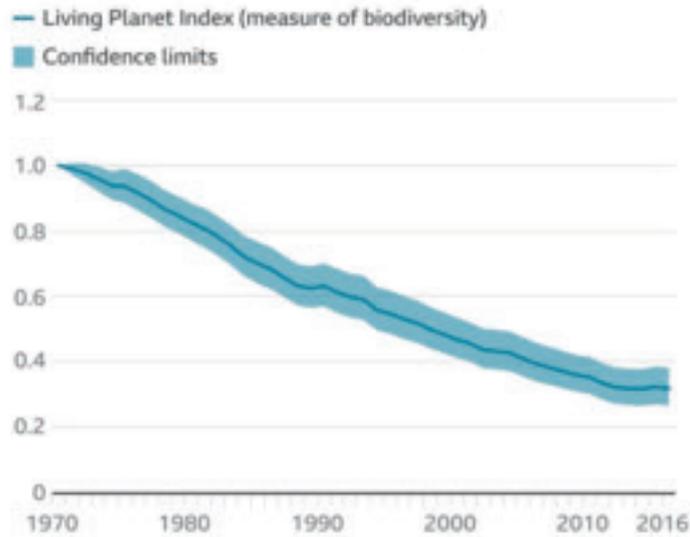
It is man's "Great Rise" that is displacing wild life forms worldwide and destroying them at a horrendous rate. Their "Great Decline" is only partly intentional. It is based more on indifference. And it literally fatally overestimates the resilience of nature. As in business life, the inflow must exceed the outflow, otherwise bankruptcy is inevitable.

The fact that 8 billion of the most successful predators (humans) turn this equation on its head in nature was first seen in an increasing impoverishment of species diversity in the industrialised countries, then also in the tropics, which are particularly rich in species. However, these quantitative effects are increasingly developing into qualitative ones. When key species disappear (functionally through sharp decline or even totally), this leads to devastating effects in ecosystems in which they play a central role.

²¹ https://en.wikipedia.org/wiki/Lists_of_IUCN_Red_List_critically_endangered_species

The basic rule of evolution is optimisation - not maximisation.

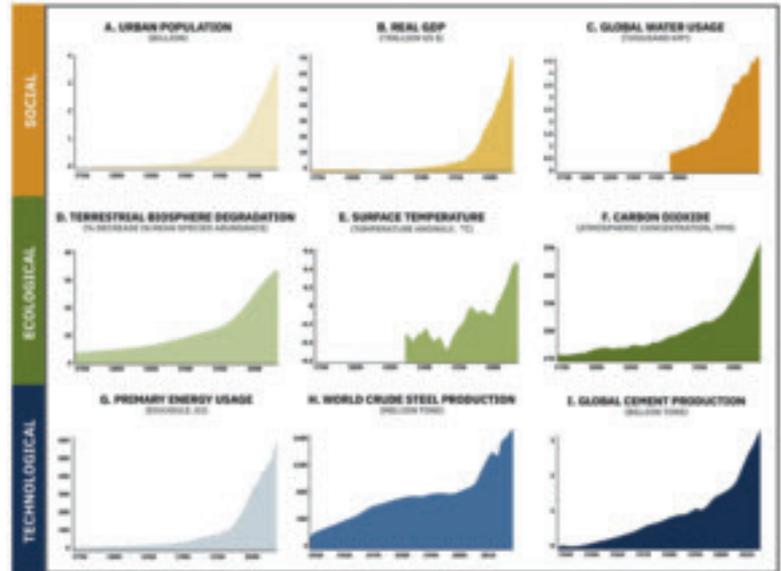
How wildlife has declined, 1970-2016



Source: ZSL

BBC

The worst crisis of planetary life in 66 million years is called the Great Decline. The 200'000 years of our existence on the planet are a disaster for our fellow creatures. It is causing the sixth mass extinction in 3.5 billion years of planetary life. A truly monstrous event.



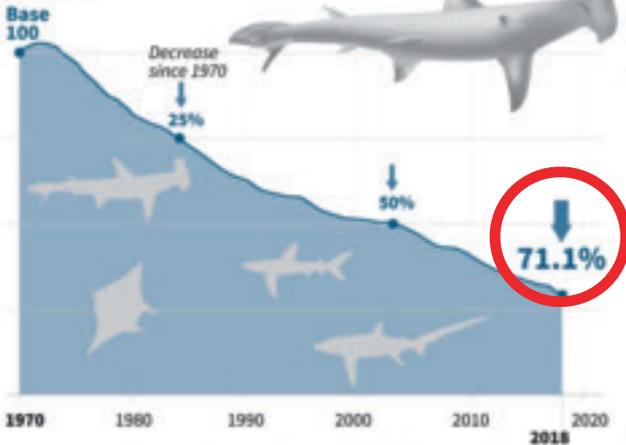
The "Great Decline" is a mirror image of the "Great Rise" of our own way of life - the exponential increase in the number of people and a multitude of metrics that have been developing in lockstep for 150 years due to our mastery of technology.

Sharp drop in shark numbers

The global abundance of 18 species of oceanic sharks has declined by 71% since 1970, according to a new study published in Nature journal on January 27

Change in estimated population size

18 oceanic sharks and rays
1970 - 2018



Species examples

Great Hammerhead

Sphyrna mokarran

Critically endangered

↓ 13%

Oceanic whitetip

Carcharhinus longimanus

Critically endangered

↓ 75%
Since 1990s

Bigeye thresher

Alopias superciliosus

Vulnerable

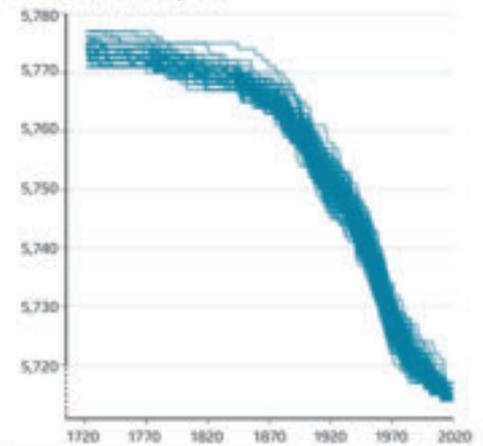
↓ 65%

Source: Paccoureau, Rigby, Klyne, Dulvy et al. Half a century of global decline in oceanic sharks and rays - nature, Jan 27, 2022

AFP

Mammal species lost in the past 300 years

Number of mammal species



Source: Gothenburg Global Biodiversity Centre

BBC

A particularly glaring example of the extinction of key species is the destruction of sharks, which as apex predators are essential for the functioning of many marine ecosystems. In the last 50 years, we have lost over 70% of them! The fact that the causes are the most banal culinary (and economic) desires of East Asia adds a bitter punchline to the insane events. The ecological effects of such an intervention are delayed, but will be devastating.

On a longer time axis of 300 years, the speed of species loss - here using the example of mammals - becomes clear. Extinction is irreversible, and there is no quick replacement either: the emergence of a new species takes tens of thousands of years.

To stop the collapse of biodiversity, we need to stop the monstrous growth and action of our population and put at least 30% of the planet under protection or "go wild" again.

But the basic rule of evolution is optimisation – not maximisation. Ecosystems have been continuously optimised over millions of years. That is why any drastic intervention, quantitative or qualitative, has a negative effect. Our exponentially increasing influence not only damages ecosystems, it mutilates them beyond recognition – with slow but fatal consequences. For us, too. For it is biodiversity that nourishes the global network of life. It is also our life insurance. That is why the rampant destruction of this diversity must be stopped.

To do this, we need to stop the monstrous growth and action of our population and at the same time preserve populations of interacting life forms of sufficient size and viability. This requires sufficiently large and interconnected habitats, protected areas and other near-natural areas, with different types of habitats. This is the only way to ensure the long-term adaptability of their species. If we want to preserve the vitality of this planet in the long term, we need to preserve the original biodiversity in much larger habitats – 30–50% of the land and sea area – as the High Ambition Coalition for Nature and People is striving for²². To achieve this, impoverished habitats will even have to be "rewilded".

For the time being, however, it is a matter of keeping ecosystems functioning. Species conservation can make a significant contribution to this. If we protect umbrella species like the takhi, we also preserve remnants of the Central Asian steppes with viable populations of their flora and fauna.

But the takhi^{23, 24} is also a precious natural and cultural heritage. It is a symbol not only for Mongolians, but for humanity as a whole. In the first cultural expressions of mankind – the magnificent cave paintings of the Cro Magnon – Primeval Wild Horses played the central role. They were by far the most common object of worship or at least desire. Finally, horses played an equally central role in the history of mankind. We have exterminated the wild ancestors of these horses; only the Primeval Wild Horse has survived to this day, albeit more by serendipity than design. To lose it would be unforgivable.

²²<https://www.hacfornatureandpeople.org/home>

²³Volf, J.: Das Urwildpferd *Equus Przewalskii*. Die Neue Brehm Bücherei, 1996, Bd. 249, 4. Aufl., Westarp Wissenschaften, Magdeburg

²⁴Isenbügel E. & Stauffer C.: Das Urwildpferd. Infodienst Wildbiologie & Oekologie, Biologie einheimischer Wildtiere (1998), 1/48: 1-15



Photo ©Cyril Ruoso

Besides its role as a key and umbrella species of steppe habitats, the takhi is also a precious natural and cultural heritage - not only for Mongolians, but for humanity as a whole.



The ecosystem of the Dzungarian Gobi counts around 100 bird species, several reptile and amphibian species, many small mammals (including 25 rodent species) and various large mammals. Plants are represented by 70 families and over 900 species, of which 6 are critically endangered, 26 are endangered and another 57 are vulnerable. 23 plant species are endemic, i.e. only found here in the world.

The ecosystem of the Dzungarian Gobi has a high level of biodiversity that is unique in the region.



We look back with satisfaction and pride on 30 years of reintroducing the Primeval Wild Horse to Mongolia. The reintroduction proves that even critically endangered species of megafauna, even those that are extinct in the wild, can be saved. However, this rescue can succeed only if their original ecosystems are preserved and remain functional.

This is the real mission for biodiversity conservation: let us preserve our natural treasures – not in a museum, but where they thrived before the first human set foot there.

Together, let's secure the future of the Primeval Wild Horse



"The resettlement of the takhi in the Great Gobi B has always been a task of the heart for me. These years have been incredible, full of unresolved questions and great challenges. The fact that we have mastered them fills me with great joy. If we keep at it, the number of takhi here will eventually reach into the thousands again."

Ganbaatar Oyunsaikhan, M.Sc., Director of Great Gobi B

ITG works in an honorary capacity.

Every donation goes directly to the protection of the wild horses and their habitat.

This is how your donation helps us - thank you very much!

USD/CHF 50.-

You finance 100 bricks for the new reserve centre ("House for the Gobi").

USD/CHF 75.-

You contribute to the identification and preservation of important resting and breeding sites for the bird fauna (with 22 globally threatened species!)

USD/CHF 100.-

You contribute to the cost of personal equipment for the newly hired rangers.

USD/CHF 200.-

You finance a window of the meeting and recreation room of the House for the Gobi.



Photo ©Cyril Ruoso

With any other amount you also help to preserve this unique wildlife species and the rest of the flora and fauna of the Central Asian steppe.

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Become a member of the 'Friends of the Wild Horse'!

Annual membership fee for private individuals **USD/CHF 50.-**

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CH-5001 Aarau

Account number (IBAN): CH07 0076 1016 0117 6052 3

Account 50-6-9

Beneficiary "Freunde des Wildpferdes"



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30 Years of Takhi Reintroduction 1992 - 2022



Photo © Cyril Ruoso