

Seeking to rewind mammalian extinction

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In December 2015 an international group of scientists convened in Austria to discuss the imminent extinction of the northern white rhinoceros and the possibility of bringing the species back from brink of extinction. The discussions of this historic meeting appear in the international Journal *Zoo Biology*. The publication of this work is designed as part of the ongoing effort to raise awareness for the extinction crisis facing rhinos and many other species while also reaching out to the scientific community to share and gather information.

"The effort to save the northern white rhinoceros will need new technologies, new approaches and problem-solving in order to avert its imminent extinction." Said Joseph Saragusty, D.V.M., Ph.D., andrologist from the Leibniz Institute for Zoo and Wildlife Research (IZW) in Berlin, Germany. "The productive engagement of an international multidisciplinary team of experts will be essential to accomplish the ambitious goal of bringing back the northern white rhinoceros from its otherwise certain path to extinction."

The discussion to save the northern white rhinoceros touches on genetics and cell biology, scientific ethics and the importance of long term strategic thinking and ongoing communications. A key element of these discussions was the need to maintain genetic banks of frozen tissue, spermatozoa and oocytes to use as materials in this fight against extinction.

"Cryobanked [genetic resources](#) from this unique form of rhinoceros

have been saved in San Diego and in Europe." Said Oliver Ryder, Ph.D., geneticist for San Diego Zoo Global. "The genetic resources in the form of banked viable cell cultures, tissues and spermatozoa, together with the capability to establish induced pluripotent stem cells are the basis for hope that a viable population of northern white rhinoceros can be produced."

With some genetic tissue from northern white rhinos available the group is looking at advanced [reproductive technologies](#) as the hope for the future of the species.

"It was a long way from the idea to the roadmap created in Vienna. I am glad that we found so many competent supporters in the [scientific community](#) who believe in the application of advanced cellular and reproductive technologies for the genetic rescue of the northern white rhinoceros. Now we have to demonstrate that this novel strategy can make a difference" Said Thomas Hildebrandt, Prof. Dr., head of the Reproduction Management department at IZW.

The last three northern white rhinoceroses reside in Ol Pejeta Conservancy in Kenya where they were transported from ZOO Dv?r Králové, Czech Republic. "Although we were able to breed the northern white rhinoceroses in our zoo, their health status does not allow them to breed naturally anymore. We are now optimistic that the cutting-edge research outlined in Vienna will give these very last specimens a chance to see an offspring of their own kind." Said Jan Stejskal, Director of International Projects of ZOO Dv?r Králové.

In addition to sharing information about reproductive technologies the group of experts discussed the ethics of spending resources to save one species. The paper voices the hope that the information gathered through this effort would be applied towards other species facing the threat of extinction in the future.

The Leibniz Institute for Zoo & Wildlife Research (IZW) is an internationally renowned research institute of the Leibniz Association. With the mission of "understanding and improving adaptability" it examines evolutionary adaptations of wildlife and its resilience to global change, and develops new concepts and measures for conservation. To achieve this, the IZW uses its broad interdisciplinary expertise in evolutionary ecology and genetics, wildlife diseases, reproductive biology and management in a close dialogue with stakeholders and the public.

Bringing species back from the brink of extinction is the goal of San Diego Zoo Global. As a leader in conservation, the work of San Diego Zoo Global includes on-site wildlife conservation efforts (representing both plants and animals) at the San Diego Zoo, San Diego Zoo Safari Park, and San Diego Zoo Institute for Conservation Research, as well as international field programs on six continents. The work of these entities is made accessible to children through the San Diego Zoo Kids network, reaching out through the Internet and in children's hospitals nationwide. The work of San Diego Zoo Global is made possible by the San Diego Zoo Global Wildlife Conservancy and is supported in part by the Foundation of San Diego Zoo Global.

ZOO Dv?r Králové has been one of the most important breeders of African ungulates in the world since the late 1970s. The zoo is dedicated to conserving African wildlife through both ex situ and in situ efforts as well as promoting African culture and wildlife conservation. Four northern white rhinos have been born in the [zoo](#) and in 2009 it collaborated with its partners to transfer then four northern white rhinos from Dv?r Králové to Ol Pejeta Conservancy, Kenya, in hope to further prompt their breeding.

More information: Saragusty J1, Diecke S2, Drukker M3, Durrant B4, Friedrich Ben-Nun I5, Galli C6,7,8, Göritz F1, Hayashi K9, Hermes

R1, Holtze S1, Johnson S10, Lazzari G6,8, Loi P11, Loring JF5, Okita K12, Renfree MB13, Seet S1, Voracek T14, Stejskal J15**, Ryder OA4*, Hildebrandt TB1* (2016): Rewinding the process of mammalian extinction. *ZOO BIOL*; [DOI: 10.1002/zoo.21284](https://doi.org/10.1002/zoo.21284)

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