



Global Reintroduction Perspectives: 2018

Case studies from around the globe

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IUCN/SSC Reintroduction Specialist Group (RSG)



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Reintroduction of addax to Djebil National Park, Tunisia

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Introduction

The addax (*Addax nasomaculatus*) was once widespread and abundant across the dunes and gravel plains of the Sahara, but suffered catastrophic declines due to unsustainable hunting, habitat degradation, competition with domestic livestock, regional insecurity, and impacts of oil exploration. As a result the addax is Critically Endangered (IUCN/SSC Antelope Specialist Group, 2016) and is thought to be on the verge of extinction in the wild (Stabach *et al.*, 2016). The addax is listed in Appendix I of the Convention on Migratory Species (CMS) and Appendix I of Convention on the International Trade of Endangered Species (CITES). It is specifically protected under national legislation across some of its range including Tunisia (IUCN/SSC Antelope Specialist Group, 2016). Historically, addax occurred within the Grand Erg Oriental in Tunisia. Whilst it has persisted south of the Sahara, albeit in very small numbers, it disappeared in Tunisia in 1932. However, in the last 25 years addax have been introduced to one National Park and returned to an additional two National Parks in Tunisia, including this latest project in Djebil National Park (NP). Designated in 1994, the park is located 40 km south of Douz on the edge of the Grand Erg Oriental.

Goals

- Goal 1: Short-medium term - Create a founder population of addax in Djebil National Park, as part of a protected Tunisian meta-population.
- Goal 2: Medium-term - Enhance capacity for antelope reintroductions and monitoring through provision of training.
- Goal 3: Long-term - Create a free-ranging population of addax in the Grand Erg Oriental from dual release sites in Djebil National Park and Senghar National Park.
- Goal 4: Establish long-term monitoring of reintroduced addax populations.

Success Indicators

- Indicator 1: Addax population established and growing in Djebil National Park.
- Indicator 2: Addax maintained in good health.
- Indicator 3: Locally collected biological data informing management decisions.
- Indicator 4: Increase in the number of trained protected area personnel and wildlife veterinarians.
- Indicator 5: Addax free-ranging in the Grand Erg Oriental.

Project Summary

Feasibility: The addax is on the brink of extinction in the wild with the last remaining population distributed unevenly along a narrow 600 km band between Termit /Tin Toumma in Niger and the Djourab sand sea in Chad (Newby, 2013). A survey in April 2017 in core addax habitat in the Termit and Tin Toumma National Nature Reserve area found just six individuals (Rabeil, 2017), and there are probably fewer than 100 addax remaining in the wild (Stabach *et al.*, 2017).



Addax in its natural habitat

Despite the precarious position of addax in nature, there is an abundant *ex situ* population, with available animals in the Species Survival Plan (SSP) under the auspices of the Association of Zoos and Aquariums (AZA), and the European *Ex situ* Program (EEP) under the auspices of the European Association of Zoos and Aquaria (EAZA). A conservation introduction of addax to the fenced Bou Hedma NP in Tunisia had previously been undertaken. Hence the project to re-establish the species in Djebil NP was able to utilize addax born within the country, genetically augmented with animals selected from the SSP and EEP populations. Tunisia has long established legal, strategic and institutional frameworks to support the reintroduction and protection of addax. This initiative was therefore undertaken as part of a national plan for the restoration of Sahelo-Saharan antelopes and their habitats, and contributed to the country's national biodiversity strategy. It was led by the Direction Générale des Forêts (DGF), the statutory authority responsible for the management of protected areas. Djebil NP comprises major dune systems and gravel plains and is situated 40 km south of the Oasis town of Douz on the margins of the Grand Erg Oriental, and within the species' indigenous range. Previously utilized opportunistically by nomads, a 7,700 ha section of the park has been fenced to exclude domestic livestock from the addax release site and to enable habitat regeneration. There are two permanent ranger posts on the northern and southern edge of the park boundary and one at the main entrance in the North.

Implementation: Two operations took place to bring Addax to Djebil NP. In February 2007, 15 addax were translocated from Bou Hedma NP by DGF assisted by the Fondation Internationale pour la Sauvegarde de la Faune and supported by Fond Français pour l'Environnement Mondial, and the Convention on Migratory Species. A second group of 13 animals arrived from the USA and Europe in December 2007 in a joint international operation by EEP and SSP representatives. Animal selection was based on genetic contributions through pedigree analysis using data from the International Studbook and aimed to create



Habitat at the Djerbil release site

a more genetically diverse population. Veterinary health screening was undertaken in accordance with Tunisia's statutory requirements, guidelines for best practice, and informed by previous experience. Holding enclosures were already present within the park to enable quarantine and acclimatization of addax prior to their release. Husbandry of the animals during this phase followed established guidelines (Engel & Brunsing, 1999).

Post-release monitoring: The addax were released from the acclimatization enclosures in February 2008. Following training, local NP personnel monitored the addax, including recording behavior, body condition and significant life history events. This process was supported by visiting ecologists and veterinarians providing ongoing staff training and undertaking supplementary surveys of addax numbers, distribution and health.

The first calves were born in the acclimatization enclosures, with further births recorded steadily thereafter. Body condition of the addax improved post-release with increased grazing in the park, although heavy tick burdens were also observed before and after release. Provision of supplementary feed as a management intervention during periods of drought had mixed results with cases of competitive aggression, and both acute and chronic acidosis necessitated changes in protocols. Behaviorally, the addax formed stable social systems, were observed exploiting a wide range of food plants, and sought artificially provided water during the dry hot seasons. Body scores indicated that animals generally remained in good health with expected seasonal variations in their condition. Addax mortalities have been recorded throughout the decade since their release but without timely post-mortem examination, specific causes of death were difficult to determine. NP personnel reported some losses of young calves to apparent predation, but no direct evidence was available to ascertain whether these animals were directly preyed upon or opportunistically scavenged.

By 2011, the minimum observed population size peaked at around 60 animals, representing a net doubling of the founder population within five years. However, lack of fence maintenance and accumulation of sand allowed animals to disperse beyond the perimeter of the park confounding the ability to monitor them, although a core population still remains and reproduction continues.

In 2017, a joint project was initiated by DGF, Marwell Wildlife and partners to undertake a comprehensive assessment of the addax population in Djebel NP,

including acquisition of tissue samples for genetic analyses. Further work will be undertaken to survey the Grand Erg Oriental to determine the outcome of the unplanned dispersal of addax into this area.



Researchers monitoring addax in the field

Major difficulties faced

- Unforeseen economic constraints and political reform in Tunisia, and regional insecurity inevitably affected the continuity of the project and ability to meet the original goals within the expected timeframes.
- Transporting addax from the USA and Europe proved to be administratively and logistically complex, and expensive.
- Although eventually overcome, international restrictions on livestock movements due to outbreaks of foot & mouth disease and bluetongue threatened the export of addax from the USA and Europe.
- The challenging environment, lack of infrastructure and ability to acquire essential resources hampered husbandry of addax during the acclimatization phase.
- Poor retention of trained national park personnel led to inconsistent monitoring and management.

Major lessons learned

- Given the shifting socio-economic and political backdrop in Tunisia over the last decade, persistence, flexibility and adaptive management were critical factors in sustaining the project.
- Captive-bred and translocated addax integrated seamlessly on release and proved equally adaptable to their new environment with similar survivorship recorded between groups.
- Management intervention need to be considered carefully because of the risk of unintended consequences on the behavior and health of animals.

Success of project

Highly Successful	Successful	Partially Successful	Failure
		√	

Reason(s) for success/failure:

- International cooperation along with national & local commitment to the project was critical for fund raising and ensuring the requisite breadth of expertise was available.
- Lengthy period of protecting and allowing vegetation to re-establish within the park provided adequate grazing resources to sustain the addax post-release.
- A genetically diverse founder population of addax was established and stable population growth occurred during the first five years.
- Dispersal of addax outside of the fenced protected area resulted in the species returning to the Grand Erg Oriental, albeit in an unplanned way and efforts are now needed to assess this outcome.

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