

IUCN TECHNICAL GUIDELINES ON THE MANAGEMENT OF *EX SITU* POPULATIONS FOR CONSERVATION

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PREAMBLE

IUCN affirms that a goal of conservation is the maintenance of existing genetic diversity and viable populations of all taxa in the wild in order to maintain biological interactions, ecological processes and function. Conservation managers and decision-makers should adopt a realistic and integrated approach to conservation implementation. The threats to biodiversity *in situ* continue to expand, and taxa have to survive in increasingly human-modified environments. Threats, which include habitat loss, climate change, unsustainable use, and invasive and pathogenic organisms, can be difficult to control. The reality of the current situation is that it will not be possible to ensure the survival of an increasing number of threatened taxa without effectively using a diverse range of complementary conservation approaches and techniques including, for some taxa, increasing the role and practical use of *ex situ* techniques.

If the decision to bring a taxon under *ex situ* management is left until extinction is imminent, it is frequently too late to effectively implement, thus risking permanent loss of the taxon. Moreover, *ex situ* conservation should be considered as a tool to ensure the survival of the wild population. *Ex situ* management should be considered only as an alternative to the imperative of *in situ* management in exceptional circumstances, and effective integration between *in situ* and *ex situ* approaches should be sought wherever possible.

The decision to implement an *ex situ* conservation programme as part of a formalised conservation management or recovery plan and the specific design of and prescription for such an *ex situ* programme will depend on the taxon's circumstances and conservation needs. A taxon-specific conservation plan may involve a range of *ex situ* objectives, including short, medium and long-term maintenance of *ex situ* stocks. This can utilise a variety of techniques including reproduction propagation, germplasm banking, applied research, reinforcement of existing populations and re-introduction into the wild or controlled environments.

The objectives and overall purpose should be clearly stated and agreed among organisations participating in the programme, and other relevant stakeholders including landowners and users of the taxon involved. In order to maximise their full potential in conservation, *ex situ* facilities and their co-operative networks should adopt the guidelines defined by the Convention on Biological Diversity (CBD), the International Agenda for Botanic Gardens in Conservation, Center for Plant Conservation and

the World Zoo Conservation Strategy, along with other guidelines, strategies, and relevant legislative requirements at national and regional levels. IUCN recognizes the considerable set of resources committed worldwide to *ex situ* conservation by the world's zoological and botanical gardens, gene banks and other *ex situ* facilities. The effective utilisation of these resources represents an essential component of conservation strategies at all levels.

VISION

To maintain present biodiversity levels through all available and effective means including, where appropriate, *ex situ* propagation, translocation and other *ex situ* methodologies.

GOAL

Those responsible for managing *ex situ* plant and animal populations and facilities will use all resources and means at their disposal to maximise the conservation and utilitarian values of these populations, including:

- 1) increasing public and political awareness and understanding of important conservation issues and the significance of extinction;
- 2) co-ordinated genetic and demographic population management of threatened taxa;
- 3) re-introduction and support to wild populations;
- 4) habitat restoration and management;
- 5) long-term gene and biomaterial banking;
- 6) institutional strengthening and professional capacity building;
- 7) appropriate benefit sharing;
- 8) research on biological and ecological questions relevant to *in situ* conservation; and
- 9) fundraising to support all of the above. *Ex situ* agencies and institutions must follow national and international obligations with regard to access and benefit sharing (as outlined in the CBD) and other legally binding instruments such as CITES, to ensure full collaboration with all range States.

Priority should be given to the *ex situ* management of threatened taxa (according to the latest IUCN Red List Categories) and threatened populations of economic or social/cultural importance. *Ex situ* programmes are often best situated close to or within the ecogeographic range of the target taxa and where possible within the range State. Nevertheless a role for international and extra regional support for *ex situ* conservation is also recognised. The option of locating the *ex situ* programme outside the taxa's natural range should be considered if the taxa is threatened by natural catastrophes, political and social disruptions, or if further germplasm banking, propagation, research, isolation or reintroduction facilities are required and

cannot be feasibly established. In all cases, *ex situ* populations should be managed in ways that minimize the loss of capacity for expression of natural behaviours and loss of ability to later again thrive in natural habitats.

TECHNICAL GUIDELINES

The basis for responsible *ex situ* population management in support of conservation is founded on benefits for both threatened taxa and associated habitats.

- The primary objective of maintaining *ex situ* populations is to help support the conservation of a threatened taxon, its genetic diversity, and its habitat. *Ex situ* programmes should give added value to other complementary programmes for conservation.

Although there will be taxa-specific exceptions due to unique life histories, the decision to initiate *ex situ* programmes should be based on one or more of the appropriate IUCN Red List Criteria, including:

1. When the taxa/population is prone to effects of human activities or stochastic events or

2. When the taxa/population is likely to become Critically Endangered, Extinct in the Wild, or Extinct in a very short time. Additional criteria may need to be considered in some cases where taxa or populations of cultural importance, and significant economic or scientific importance, are threatened. All Critically Endangered and Extinct in the Wild taxa should be subject to *ex situ* management to ensure recovery of wild populations.

- *Ex situ* conservation should be initiated only when an understanding of the target taxon's biology and *ex situ* management and storage needs are at a level where there is a reasonable probability that successful enhancement of species conservation can be achieved; or where the development of such protocols could be achieved within the time frame of the taxon's required conservation management, ideally before the taxa becomes threatened in the wild. *Ex situ* institutions are strongly urged to develop *ex situ* protocols prior to any forthcoming *ex situ* management. Consideration must be given to institutional viability before embarking on a long term *ex situ* project.

- For those threatened taxa for which husbandry and/or cultivation protocols do not exist, surrogates of closely related taxa can serve important functions, for example in research and the development of protocols, conservation biology research, staff training, public education and fundraising.

- While some *ex situ* populations may have been established prior to the ratification of the CBD, all *ex situ* and *in situ* populations should be managed in an integrated, multidisciplinary manner, and where

possible, in accordance with the principles and provisions of the CBD.

- Extreme and desperate situations, where taxa/populations are in imminent risk of extinction, must be dealt with on an emergency basis. This action must be implemented with the full consent and support of the range State.

- All *ex situ* populations must be managed so as to reduce risk of loss through natural catastrophe, disease or political upheaval. Safeguards include effective quarantine procedures, disease and pathogen monitoring, and duplication of stored germplasm samples in different locations and provision of emergency power supplies to support collection needs (e.g. climate control for long term germplasm repositories).

- All *ex situ* populations should be managed so as to reduce the risk of invasive escape from propagation, display and research facilities. Taxa should be assessed as to their invasive potential and appropriate controls taken to avoid escape and subsequent naturalisation.

- The management of *ex situ* populations must minimise any deleterious effects of *ex situ* management, such as loss of genetic diversity, artificial selection, pathogen transfer and hybridisation, in the interest of maintaining the genetic integrity and viability of such material. Particular attention should be paid to initial sampling techniques, which should be designed to capture as much wild genetic variability as practicable. *Ex situ* practitioners should adhere to, and further develop, any taxon or region-specific record keeping and genetic management guidelines produced by *ex situ* management agencies.

- Those responsible for managing *ex situ* populations and facilities should seek both to increase public awareness, concern and support for biodiversity, and to support the implementation of conservation management, through education, fundraising and professional capacity building programmes, and by supporting direct action *in situ*.

- Where appropriate, data and the results of research derived from *ex situ* collections and *ex situ* methodologies should be made freely available to ongoing in-country management programmes concerned with supporting conservation of *in situ* populations, their habitats, and the ecosystems and landscapes in which they occur.

NB. *Ex situ* conservation is defined here, as in the CBD, as "the conservation of components of biological diversity outside their natural habitats". *Ex situ* collections include whole plant or animal collections, zoological parks and botanic gardens, wildlife research facilities, and germplasm collections of wild and domesticated taxa (zygotes, gametes and somatic tissue).