

Control invasive alien species in nature reserves in China

China is a “megadiversity country”. The most effective and economic way of conserving biodiversity is by maintaining self-sustaining populations of native species *in situ* in their natural habitats. China has already made important progress in *in situ* conservation by establishing over 1550 Nature Reserves (NRs) and 690 Scenic Spots, which cover around 14% of total terrestrial land of China.

Invasive Alien Species (IAS) occur in almost every watershed and ecosystem, and represent many taxonomic groups, including mammals, birds, reptiles, amphibians, fishes; arthropods and crustaceans; algae, ferns and seed plants; and fungi, viruses, bacteria, and other micro-organisms. IAS has been considered as the second important threat to biodiversity in China. Under the situation, it becomes important to reduce their impact on local biodiversity by ensuring security for precious and endemic species at key sites. Such sites include the national system of protected areas and other geographically critical areas such as areas of local endemism, isolated lakes, mountains, mangroves, islands etc.

Invasive Alien Species problem in nature reserves in China

IAS problems in the Nature Reserves of China have become a big concern. IASs have been reported everywhere, except in a few remote reserves in Qinghai-Tibet Plateau, Hengduan Mountain, Xinjiang and Inner Mongolia. Many NRs in China have been heavily threatened by IASs. However, no efforts have been made to remove them. On the contrary, a lot of activities in NRs are encouraging IAS spreading.

Many Nature Reserves in China have plans to restore vegetation with alien species. In the master plan of Dafeng Milu NR, which was established for reintroduction of Pere David's Deer (Milu) in Jiangsu Province and is severely threatened by *Spartina* (fig. 1), most of the suggested tree species for restoration are alien to the region (such as Italian *Populus*, Japan cedar, conifer trees, ginkgo, *Metasequoia*). It is planned to increase 20% ~ 30% of forest coverage by planting these trees. It is also planned to introduce alien pasture species to provide forage for Milu. In Ruoergai NR, which was established to protect an important grassland marsh that provides water to the two main rivers of China (Yangtze River and Yellow River), there are plans to plant high productive alien grass and even trees for reducing grazing pressure or abating desertification.

Dafeng NR has a plan to establish a garden that will introduce magnolia, cherry blossom, rose, peony, lilac, redbud, trees, climbers and aquatic plants. In the plant species list in its master plan, there are 13 species listed in the booklet of *Invasive Alien Species in China* and many more are alien species to this region.

Establishing wildlife rescue centers to breed water deer, pheasants, cranes, swans and other endangered species has been recognized as a key conservation action in most NRs in China. For example, research in Yancheng NR has focused on the red crowned crane. The research is to breed the species to enlarge wild population and establish a non-migrating population. The NR is a wintering area for red crowned crane and it doesn't naturally breed there. The researchers are attempting to change the behavior of the species but this may pose a threat to the wild population. If the artificially bred population is mixed

with the wild population it may bring diseases from the human area to the wild population. Red-crowned cranes, ostriches, peacocks and other birds are also kept in pens at the edge of the core area (fig. 2).

The problem of invasive species in lakes (such as Louisiana crayfish in Dongting Lake and Poyang Lake) affect every corner of lakes and actions within NRs can do little to reduce the threat. Even duck farming causes disease risks of transferring new diseases to wild duck populations. Reduction of invasive alien species introductions requires new legislation and coordination between several agencies.

Recommendations to IAS control for NRs

Following recommendations provided for combating IAS in NRs by the Ecoscurity Task Force of China Council for International Cooperation on Environment and Development;

- Information on alien species, and their effects on natural ecosystems and local economies to be made available to all staff
- Introduction of alien species anywhere inside the protected area, including any animal and plant collections and staff residential areas to be prohibited, except for approved biological control purposes
- Sensible and adequate precautions to be taken in the import of any supplies including foods and building materials
- Inventories of alien species and hybrids with local species in the protected area to be made and the risks to the protected area values to be assessed
- Assessment of threats to protected area values from alien species and appropriate actions to be included in all management plans
- Monitoring and research programmes to include work on trends in range and population sizes for alien species
- Sound ecological principles to be followed during restoration and eradication programmes
- The practice of releasing confiscated and “rescued” wildlife into protected areas without proper assessment to be stopped. Only healthy local species should be released into protected areas.
- Captive breeding and keeping animal and plant collections within protected areas to be discouraged to reduce chances of bringing in new alien species (such as diseases)
- Local people and visitors to be aware of regulations and the dangers of introductions (including for example discarding fruit seeds) through outreach programmes
- All information displays for the general public to cover alien species and dangers they pose to natural ecosystems
- IAS issue to be included into national policies to ensure operation funding
- To make links with and work together with other relevant organizations, governmental and non-governmental
- Careful planning of surrounding land-use adjacent to be made to NRs
- Aggressive control and eradication programmes for alien species to be found in NRs or surrounding areas.

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