

MEDIA FACTSHEET A

Factsheet on species recovery efforts

The National Parks Board (NParks) has identified 46 species of flora and fauna for species recovery efforts, which encompasses 31 plant species, seven terrestrial fauna species and eight marine species.

Target species are first identified based on their conservation status and distribution. Priority will be given to threatened, endemic species found in one location and rediscovered species previously thought to be extinct. Their population presence and status are then recorded. Field studies are conducted to understand the ecology of the species' habitat as well as its biology. This information will serve as a guide to select suitable techniques and strategies for reintroduction, which may entail *in situ* or *ex situ* repopulation. To ensure that the reintroduction of species is self-sustaining, it will only be carried out when ecosystems essential for species thought to be locally extinct still exist. Suitable adaptive management steps will be applied as NParks monitors the progress of conservation efforts for these individual species recovery projects.

Category		Criteria
Threatened	Critically Endangered (CR)	There are less than 50 mature individuals, or there are between 50 and 250 mature individuals left with some evidence of decline or fragmentation.
	Endangered (EN)	There are less than 250 mature individuals, and no other evidence of decline or fragmentation.
	Vulnerable (VU)	There are less than 1,000 mature individuals but more than 250 mature individuals, and there may or may not be any other evidence of decline, small range size or fragmentation.

Table A. Criteria for category classification under Singapore's Red Data Book

Newly identified targets

Species	Description of species recovery efforts
<p>Raffles' Banded Langur (<i>Presbytis femoralis femoralis</i>)</p>  <p>Photo credit: Adrian Loo, National Parks Board</p>	<p>First described from Singapore in 1838, this subspecies was once widely distributed in Singapore, but the population declined rapidly due to habitat loss. It is currently only found in the Central Catchment Nature Reserve. In 2010, population surveys recorded at least 40 individuals, including the first documented evidence of breeding females. However, due to its small population size and a restricted distribution, the Raffles' Banded Langur is listed as nationally critically endangered.</p> <p>NParks is working with the Raffles' Banded Langur Working Group to take a multi-pronged approach that includes regular monitoring of the population and research on behaviour and demographics for the Raffles' Banded Langur. Improvement of the rainforest habitat through reforestation and enrichment planting will also continue. The provision of additional forested habitats, in the form of new nature parks, would also help to sustain and possibly increase the population of Raffles' Banded Langur.</p>

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Species	Description of species recovery efforts
<p>Sunda Pangolin (<i>Manis javanica</i>)</p>  <p>Photo credit: Norman Lim</p>	<p>The Sunda Pangolin (<i>Manis javanica</i>), also known as the scaly anteater, is a solitary mammal found throughout Singapore's nature reserves and forested areas. NParks is part of the Sunda Pangolin Working Group, which is involved in various initiatives including pangolin tracking, rescue and translocation, genetics research, and a captive breeding programme.</p> <p>Singapore is one of the few countries in Southeast Asia where the Sunda Pangolin's populations are reported to be stable. The community of pangolin researchers in Singapore has developed effective tracking methods and provided valuable information on the pangolin's population size and habits, supporting both local and regional research and conservation efforts.</p>
<p>Giant Clam (<i>Tridacna gigas</i>)</p>  <p>Photo credit: National Parks Board</p>	<p>Giant clams are the world's largest living bivalves and can grow up to 1.2 m in size and weigh over 200 kg. Two out of five species of giant clams are now locally extinct while the remaining are critically endangered, due to over-harvesting and habitat loss.</p> <p>Juvenile giant clams are bred and raised <i>ex situ</i> to be transplanted onto local coral reefs. Mariculture protocols have been established to optimise their spawning, fertilisation, larval and juvenile rearing, and transplantation. To date, the clam hatchery has cultured five successful batches of juvenile giant clams and restocking is underway at various coral reefs, including those at the Sisters' Islands Marine Park.</p> <p>Some individuals have been transplanted to Sisters' Islands Marine Park, Kusu Island and the vicinity of Raffles Lighthouse.</p>

Species	Description of species recovery efforts
<p>Neptune's Cup Sponge (<i>Cliona patera</i>)</p>  <p>Photo credit: National Parks Board</p>	<p>The Neptune's Cup sponge was so highly sought after by collectors that it was thought to have gone extinct by the early 1900s, until its rediscovery in 2011 off the coast of Singapore. It is the first sponge species to be described from Singapore in 1820.</p> <p>NParks officers, together with partners at the Sisters' Islands' Marine Park, discovered three new individuals of the Neptune's Cup sponge on a recent survey dive. This puts the total number of locally known individuals at five. This is the largest known population of the Neptune's Cup sponge in the world.</p> <p>In 2015, the first transplantation of a Neptune's Cup Sponge took place at the Marine Park. By transplanting several individuals to a suitable location, we hope to better safeguard the species and increase opportunities for the sponge to reproduce sexually.</p> <p>NParks will be working with academic partners to experiment and find the best solutions to propagate the sponge. Successful propagation will increase the sponge's population in Singapore.</p>
<p>Hawksbill Turtle (<i>Eretmochelys imbricate</i>)</p>  <p>Photo credit: National Parks Board</p>	<p>Singapore's first sea turtle hatchery will be set up at the southern lagoon on Small Sister's Island through a \$500,000 donation from HSBC. The Green Turtles and Hawksbill Turtles will be the key species covered under the project.</p> <p>The hatchery would provide research opportunities to study local sea turtle populations. Education and outreach programmes will be developed to create awareness of our local marine biodiversity. These include visits to the turtle hatchery, involvement in egg collection and transfer to the hatchery, and habitat maintenance.</p>

Ongoing species recovery efforts

Recovery efforts for some plant groups including the orchids, gingers, ferns and Dipterocarp species have commenced prior to 2014 and ongoing monitoring efforts and surveys are being carried out to ensure the successful reintroduction of these critically endangered species back into the nature reserves.

A number of these critically endangered native plant species are being propagated by cuttings and division or with tissue culture at Pasir Panjang Nursery and the Singapore Botanic Gardens before they are reintroduced into parks and nature reserves for the public to appreciate. Examples include three endemic plant species, the *Hanguana triangulata*, *Hanguana rubinea* and Singapore Ginger (*Zingiber singaporense*), which have been planted in parts of the Singapore Botanic Gardens and the Istana. In addition, NParks has also found the only local wild population of the rare Sealing Wax Palm (*Cyrtostachys renda*) and are recovering its saplings to be propagated.

NParks has also been working with partner agencies on species recovery programmes for various animals. For example, JTC Corporation and Butterfly Circle, a group of butterfly enthusiasts, in implementing a breeding and translocation programme for the Harlequin butterfly (*Taxila haquinus haquinus*). Students from ITE East have also collaborated with NParks to build nest boxes for the Blue-throated Bee-eater (*Merops viridis*), as part of species recovery efforts for the birds on Pulau Ubin. The bee-eater nest boxes will eventually be installed in sand mounds at Ketam Quarry.

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Species	Description of species recovery efforts
<p>Broad-Leaf Fern (<i>Dipteris conjugata</i>)</p>  <p>Photo credit: Ang Wee Foong, National Parks Board</p>	<p>This fern was once widespread in the coastal regions of Singapore, but its population has declined significantly due to habitat loss. A healthy population still survives within a densely forested area in the Western Catchment Area.</p> <p>Attempts to propagate the plant have also been initiated. The fern has been translocated to Labrador Nature Reserve, where it once grew, and subsequent monitoring has found the specimens to be thriving.</p>
<p>Sealing Wax Palm (<i>Cyrtostachys renda</i>)</p>  <p>Photo credit: National Parks Board</p>	<p>The Sealing Wax or Lipstick Palm is native to Southeast Asia and is also a popularly cultivated ornamental palm throughout the tropical regions of the world. This plant is well known for its bright red crown-shaft and leaf sheaths, which give rise to its common name and is a distinguishing feature compared to its other relatives.</p> <p>The Sealing Wax Palm is featured on the Singapore Botanic Gardens' logo.</p> <p>A clump of the palms was discovered in 2007 at the Western Catchment area and is the only wild population that exists in Singapore. NParks officers regularly monitor the condition of the small native population, where material for propagation is also collected. Currently, some saplings have been recovered from the wild and are being propagated in NParks nurseries.</p>

Species	Description of species recovery efforts
<p>Singapore Ginger (<i>Zingiber singaporense</i>)</p>  <p>Photo credit: Jana Leong-Škorničková</p>	<p>This critically endangered and endemic ginger was first collected in 2012 by NParks staff in the Central Catchment Nature Reserve. Unless the plant is flowering, it is fairly hard to spot, which is likely the reason why it was only recently discovered.</p> <p>Only three populations of the <i>Zingiber singaporense</i> have been discovered at the Nature Reserve. Saplings have been collected for propagation by cuttings and division, as well as in the lab by employing tissue culture techniques.</p> <p>To date, about 20 plants have been propagated and successfully established in the <i>ex situ</i> native gingers germplasm collection at the Singapore Botanic Gardens. Some of the gingers have been transferred to NParks' Pasir Panjang Nursery for further propagation and a few more have been planted within the Istana's grounds.</p>
<p><i>Hanguana rubinea</i> (left) and <i>Hanguana triangulata</i> (right)</p>  <p>Photo credits: National Parks Board</p>	<p>Among the four <i>Hanguana</i> species native to Singapore, two discovered in the nature reserves are species new to science and endemic to Singapore. <i>Hanguana rubinea</i> has beautiful bright ruby-red fruits while <i>Hanguana triangulata</i> has white fruits.</p> <p>Researchers from the Singapore Botanic Gardens have started establishing tissue cultures in laboratories and have so far been successful with the two species. Little is known about the pollination or seed dispersal of the <i>Hanguana</i> species. The Critically Endangered <i>Hanguana</i> plants have germinated and have been planted in the Singapore Botanic Gardens for visitors to appreciate.</p> <p>Upon successful establishment of the species in forest-like habitats, these species will then be considered for reintroduction to suitable shady roadside locations. There is also potential for the species to be used in the horticultural industry as ornamentals due to their attractive foliage and long-lasting clusters of red, white or black fruits.</p>

Successful species recovery efforts

Species recovery efforts for plants and animals are deemed successful when there is a viable breeding population and they are able to be found in locations others than where they were discovered. Genetic diversity is also a key factor in measuring success of recovery efforts for a particular species. While it can be challenging to determine when species recovery efforts can be completed as the environment changes and new threats surface or as new species are being discovered and rediscovered, NParks has seen considerable success in species recovery efforts.

i. Orchid Conservation Programme

Also part of species recovery plans is the Orchid Conservation Programme, initiated in 1995 to monitor threatened native orchids and explore ways to conserve their germplasm. Singapore has some 228 species of native orchids, of which 170 are considered extinct, 50 are critically endangered, three are vulnerable and only five are common. Most of our orchids have disappeared due to deforestation for the cultivation of plantation crops in the 19th century. By 2009, NParks had successfully propagated and introduced five epiphytic native orchids, including the Tiger Orchid (*Grammatophyllum speciosum*). Since then, reintroduction efforts have expanded to over 20 species across Singapore.

ii. Faunal Species

Faunal species that have benefitted from efforts to increase their natural populations include the Oriental Pied Hornbill (*Anthracoceros coronatus*).

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