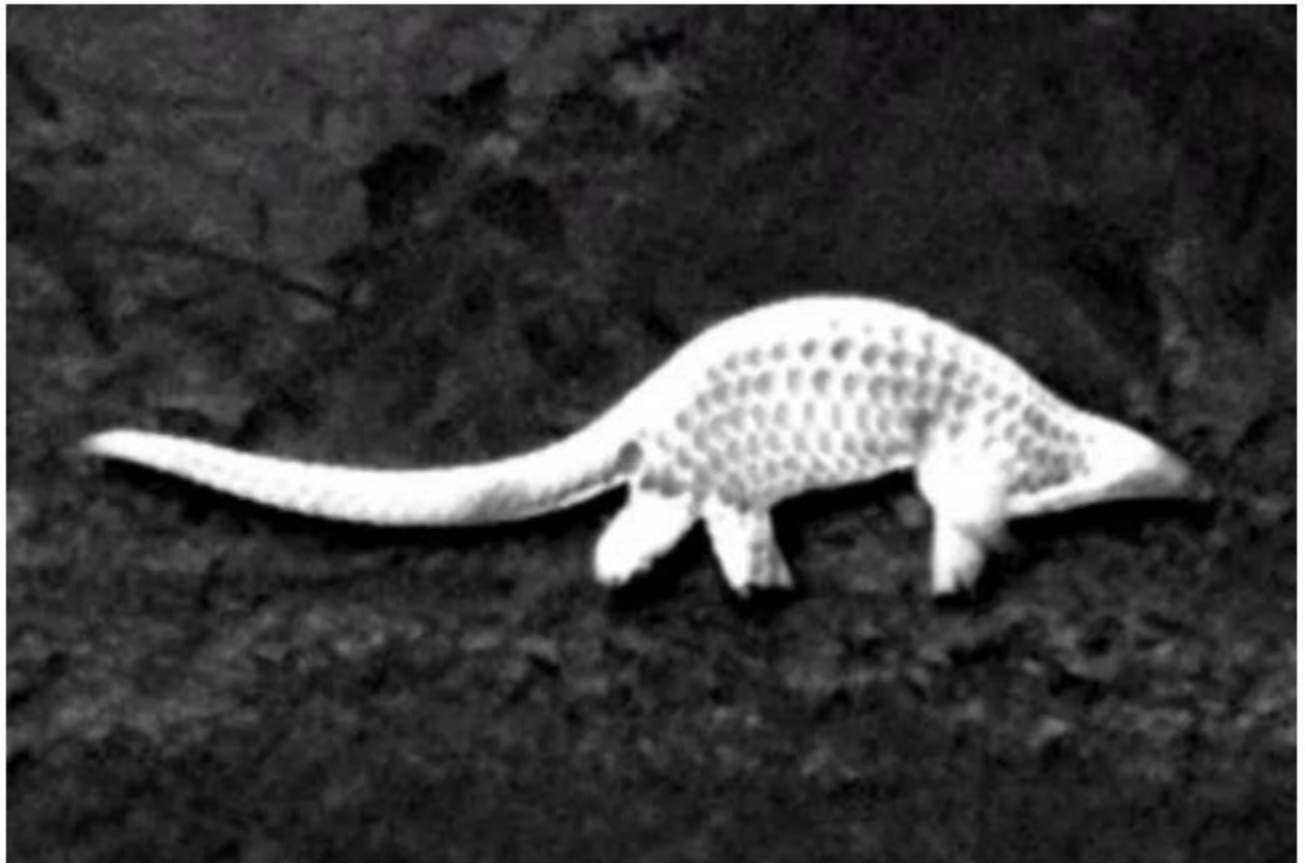


## Call of the wild

The use of technology can help conservationists better respond to the needs of wild animals on the brink of extinction.

In more than 30 years of exploring Singapore's forests, Dr Adrian Loo, group director of NParks' wildlife management division, has come across the critically endangered Sunda pangolin just twice.

The nocturnal mammal, which is native to Singapore, is reclusive, and if estimates about its population were to be made solely based on human observation, the Republic's pangolin count would be much lower than it really is.



A pangolin seen through a night vision camera. PHOTO: COURTESY OF NPARKS

"But NParks is now harnessing more tools that will help provide a better understanding of Singapore's wildlife," said Dr Loo.

In 2019, for instance, NParks started using drones to explore tree canopies - allowing researchers to capture records of flowering specimens or other plants, such as rare mistletoe, that grow only at the very tops of trees.



Mistletoe, seen in a slightly different shade of green in the middle of this drone photograph, growing atop a tree at the Singapore Botanic Gardens. PHOTO: COURTESY OF NPARKS

NParks also recently embarked on a research project that involves collecting environmental samples - such as from seawater, air or soil - and analysing them for traces of genetic material from animal species, and to detect pathogens that impact animal health.

The board is also working with researchers from the National University of Singapore's (NUS) Tropical Marine Science Institute (TMSI) to develop a monitoring system that can identify birds solely based on their calls.

The country's efforts to use technology in wildlife conservation, coupled with easy access to its forested areas, have made the Republic the ideal venue for the semi-finals of an international competition in 2023.



An aerial view of the Bukit Timah Nature Reserve, located right in the heart of Singapore. PHOTO: ST FILE

XPrize Rainforest was launched in 2019 with a US\$10 million (S\$14 million) prize sponsored by Alana Foundation, an independent philanthropic organisation founded in the United States.

The competition aims to identify technologies that can be used for real-time monitoring of rainforests and their rich treasure troves of biodiversity.

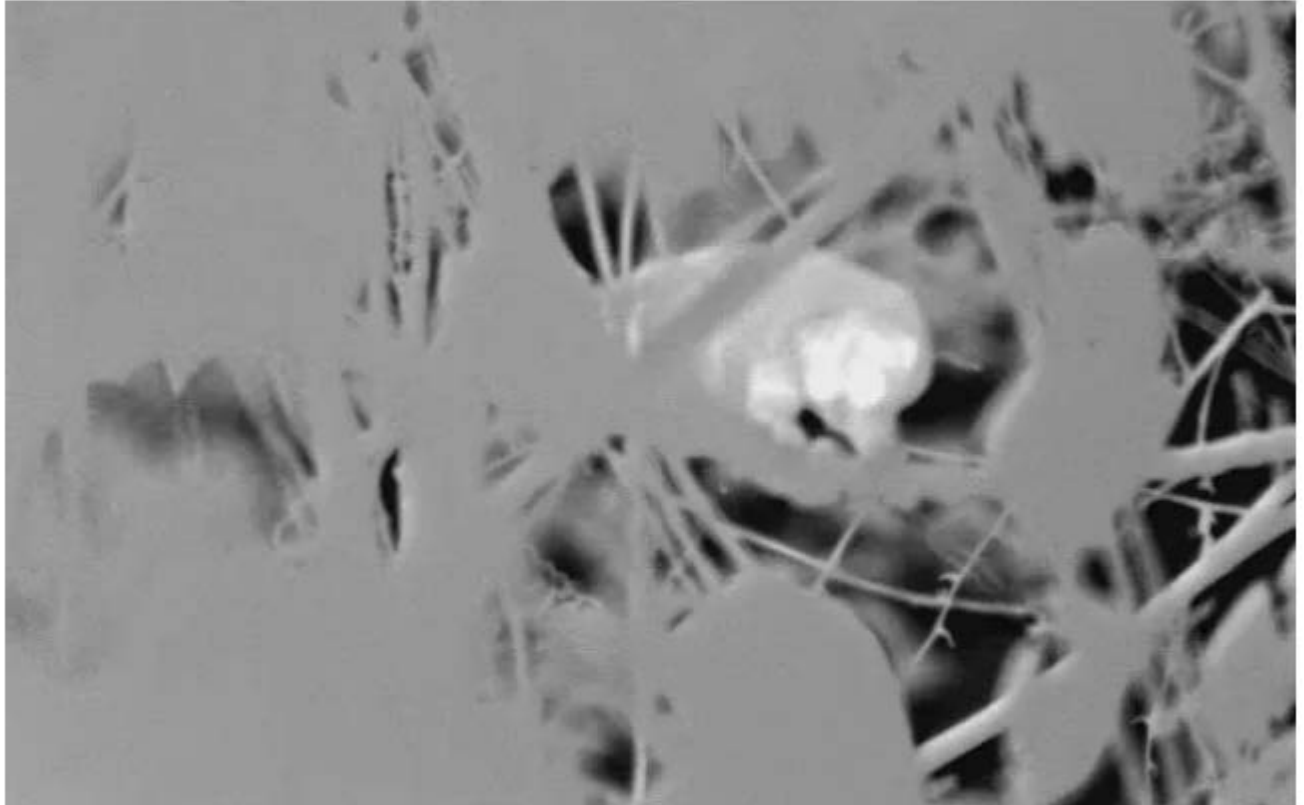
XPrize's executive vice-president for biodiversity and conservation Peter Houlihan told The Straits Times that in the past, wildlife survey methods had been time- and labour-intensive, and that it could take decades to document or survey species through human observation.

"Nowadays, we are losing ecosystems and species faster than we can fully understand them," he said. "This urgency has driven that change and demand for more rapid tools to aid and assist humans, not to replace them, in making more effective management decisions with improved data."

## Out of sight but not out of mind

Using technology to "spy" on animals allows researchers to observe their natural behaviour.

In 2019, for example, Ms Li said the use of the night vision camera enabled her to catch sight of a slow loris feeding on the nectar of a flower from a durian tree. It was the first time this creature was seen feeding on a durian tree flower.



A slow loris seen through night vision equipment. PHOTO: COURTESY OF NPARKS

The slow loris is known to consume mainly fruit and small insects.

Information like this can be useful for conservation efforts, as it could help NParks determine what trees to plant in the known habitats of these animals, said Dr Loo.

"Nectar doesn't show up in animal poop - only seeds or remnants of insects do," he added. "So if not for the sighting, we would not know that durian trees could be a food source for the slow loris."

Technology can not only help remove the cloak of darkness that hides nocturnal animals, it can also help bring into focus creatures that are more easily heard than seen.

NParks and TMSI are developing a monitoring system that can identify birds through their calls - similar to how mobile app Shazam can identify songs based on a snippet of music played over the radio.



Dr Matthias Hoffmann-Kuhnt, from the Acoustic Research Laboratory at the National University of Singapore's Tropical Marine Science Institute, demonstrating how microphones were set up to record bird calls at the Singapore Botanic Gardens. ST PHOTO: MARK CHEONG

NParks started discussions with TMSI on the project in 2019, said Mr Low Bing Wen, a senior manager at NParks' National Biodiversity Centre.

The pilot phase of the study was done at the Singapore Botanic Gardens, and to date, the software is able to reliably identify the calls of 38 birds, including the banded woodpecker and greater racket-tailed drongo.

Dr Mandar Chitre, head of TMSI's Acoustic Research Laboratory, said the software is "trained" to associate certain bird calls with specific species, with audio recordings from multiple sources, including those on Xenocanto, a database where bird watchers from all over the world upload snippets of birdsong.

"We are still refining the algorithm to identify more bird species and with higher accuracy," said Dr Chitre.

Said NParks' Mr Low: "The greater racket-tailed drongo, for example, tends to mimic other birds, so the team needs to manually go through the recordings to ensure that it identifies the right birds."



A greater racket-tailed drongo in flight. ST PHOTO: LIM YAOHUI

The lack of recordings for certain species, especially those often poached for the songbird trade, is another challenge.

The calls of the straw-headed bulbul and hill mynah, popular in the caged bird trade, are redacted from Xenocanto, to prevent poachers from using these calls to lure wild birds into traps.



Straw-headed bulbuls and hill mynahs are popular birds in the songbird trade. Their songs have been redacted from Xenocanto to reduce poaching. PHOTOS: COURTESY OF LEE TIAH KEE, LIM YONG

But when ready for deployment around 2025, this tool could help NParks better detect the presence of rare birds that, like the pangolin, would prefer to stay out of sight of humans.

Said Mr Low: "It is an unobtrusive way of monitoring our birdlife even in remote areas with minimal disturbance."

## Keeping tabs on the underdog

With large carnivores like tigers now extinct in Singapore, it is two of the nation's three remaining hoofed mammals - the sambar deer and wild boar - that measure up as the next largest mammals to roam the forests on the mainland.