

Management and Coexistence of Urban and Nature Systems

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About MWG

A zoological institution dedicated to caring for the planet, protecting animals and nature.

Steward of the Mandai Wildlife Reserve in Singapore that provides a 'window into the wild', celebrating and building empathy for biodiversity by connecting people to nature.



Our Purpose

Building a world where
people and wildlife
thrive together

Our Vision

We create meaningful
connections and
experiences that inspire
people to protect nature
and wildlife.

- **~21,000** Animals
- **1,000** Species
- **25 %** Classified as Threatened
- **160** *Ex-situ* Managed Breeding Programmes



Sustainability at Mandai

Mandai Wildlife Group commits to 8 out of 17 the United Nations Sustainable Development Goals (SDGs)



MWG Environmental Sustainability Strategy

Deliver the highest quality of animal care and guest experience with the least ecological and climate impacts



Conserve our environment and enhance biodiversity for an ecologically connected Mandai



Champion sustainability best practices to inspire and enable positive outcomes within and beyond



Protecting Nature and Supporting a Low Carbon Future

From Development to Operations

- Responsible developer
- Operating sustainably

A vibrant red and blue macaw is captured in flight, its wings spread wide, against a blurred green background of foliage. The bird's feathers are a mix of bright red, blue, and white, with a white patch on its face. The background is a soft-focus green, suggesting a natural habitat.

Mandai Rejuvenation Project

Our role as a responsible developer

The Mandai Wildlife Reserve

Home to Singapore's wildlife parks and unique nature-based experiences

Overall Total Area: 126 Ha



Environmental Impact Assessment (EIA)



Mandai Park Holdings
Environmental Impact Assessment
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
20th September 2016



EIA Report

Purpose of the EIA

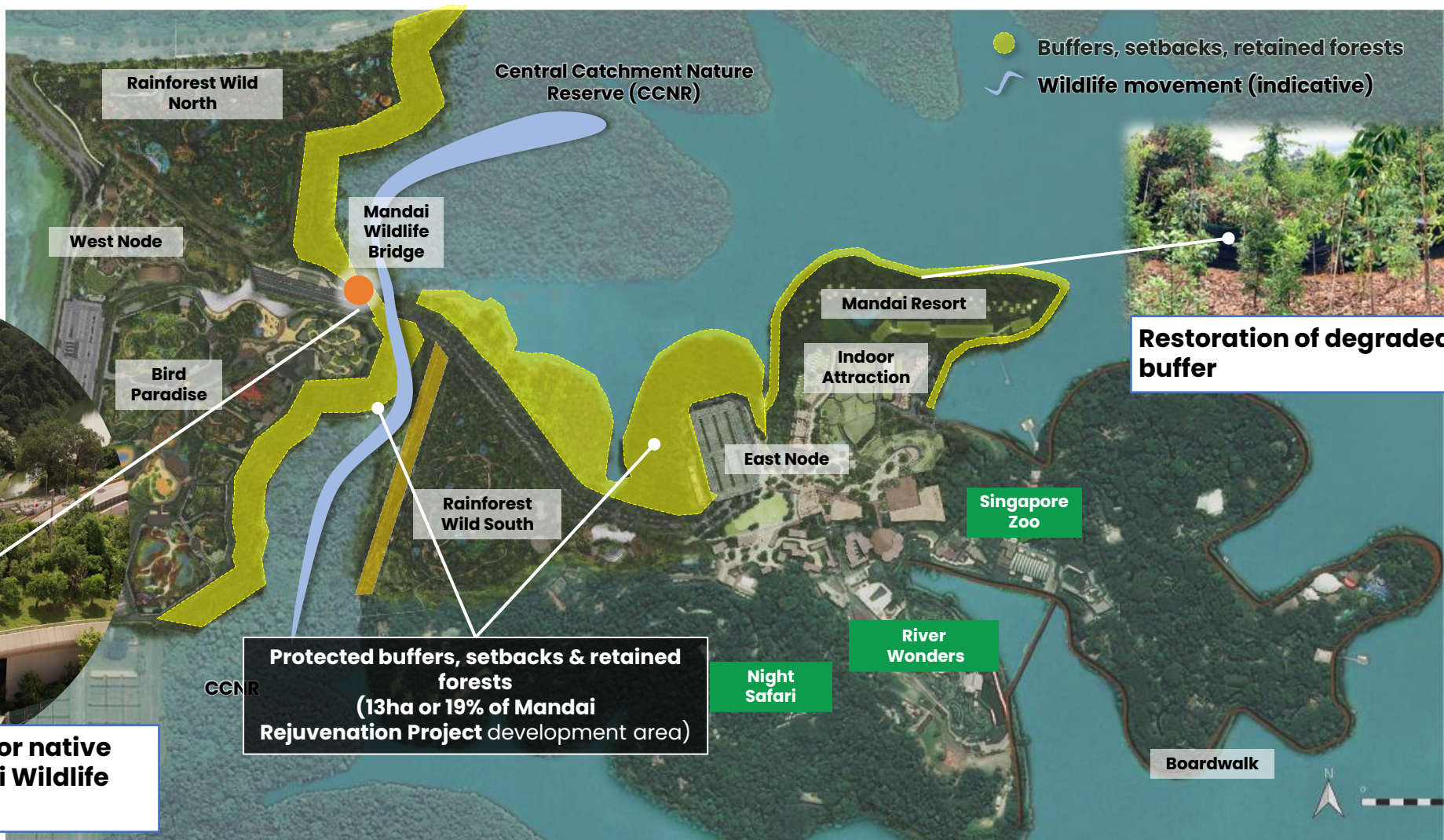
- Evaluates **significance of potential impact** of Mandai Rejuvenation Project (64ha) to various **environmental receptors** such as native wildlife, trees, vegetation, water bodies and air quality of CCNR and surroundings
- A collaborative journey with multiple stakeholders, including nature groups and government agencies; National University of Singapore provided technical advice
- Documents available for download on our website



Key Planning Considerations Adopted

- Connectivity for wildlife – Mandai Wildlife Bridge
- Buffer zones (19% of development area)
- Design boardwalk to avoid impacts to water edge vegetation
- Tree Protection Zones
- Construction and operation hours

Biodiversity Protection: Preserve and Restore



Create new connectivity for native fauna through the Mandai Wildlife Bridge

Environmental Management and Monitoring Plans (EMMPs)



Wildlife shepherding at Bird Paradise site before the start of construction activities



Wildlife Management Officers rescuing a snake from a construction site



Wildlife shepherding at Rainforest Wild Asia site before the start of construction activities



Biodiversity awareness training are conducted regularly for construction workers

EMMP: A tool to **adaptively manage and monitor the impacts** during the construction and operation phase

- All contractors to adhere to EMMP requirements

Key mitigation measures to protect biodiversity

- Dedicated Environmental Managers supported by ecologists, arborists, environmental control officers
- Regular biodiversity awareness training
- Wildlife management plan
- Tree protection zones
- Forest restoration plan



Restoring a weed infested area in the buffer zone into a forest habitat with 90% canopy cover

Operating Responsibly



Championing Environmental Stewardship during the Mandai Rejuvenation Project



Camera traps on the Mandai Wildlife Bridge help monitor wildlife movement, including Sunda Pangolins.



The Mandai Rejuvenation Project represents a significant effort to transform the Mandai precinct into a unique 'window into the wild', inspiring our guests through the fascinating world of wildlife. The project will integrate five wildlife parks with nature-themed experiences, green public spaces and an eco-friendly resort. In our commitment to being a responsible steward of the Mandai Wildlife Reserve, careful planning from the concept stage of the project ensured the successful execution of mitigation measures to minimise the impact on the nature around us.

Environmental Impact Assessment (EIA) Study

We commissioned a comprehensive Environmental Impact Assessment (EIA) study which documented environmental risk and protection measures from the outset as the Mandai Rejuvenation Project was being conceptualised.

Following the mitigation hierarchy of "avoid, minimise, manage and compensate", key measures were integrated

into the concept design. The EIA study is made available on our [website](#).

The mitigation measures were captured in the Environmental Management and Monitoring Plan (EMMP) which the Group continues to implement. To ensure effective implementation of the measures, the Environmental Advisory Panel was set up to monitor progress and advise on necessary modifications throughout the project. Key achievements from the EMMP include:

Mandai Wildlife Bridge

- The 44m-wide, 110m-long Mandai Wildlife Bridge is a dedicated wildlife crossing that links forest fragments on either side of our precinct, providing a safe passage for the native wildlife surrounding our park grounds. The bridge is central to the green stitching of the Mandai precinct. It connects the buffers of Rainforest Wild Asia and the new Bird Paradise, to the forest patches of the nature reserve on both sides of the Mandai Lake Road.

- Through camera-trap monitoring, we know that it has been used by more than 80 native vertebrate species. Together with other connectivity measures, road mortality along Mandai Lake Road involving threatened species has decreased drastically since its opening in November 2019.
- To encourage forest-dependent fauna species to use the bridge, we aim to achieve a multi-layered forest structure atop the bridge, similar to the surrounding forest. Over 31,000 plants have been planted onto the bridge including more than 1,000 native trees and more than 30,000 shrubs. In FY2023/24, we successfully maintained canopy coverage of over 85% for the first time. This achievement was validated by our very first record of the Sunda Pangolin in July 2023. Moreover, during this FY, we recorded 51 detections of lesser mousedeer using the bridge, a record high for us. With two threatened, forest-dependent, and typically elusive species using the bridge, we are encouraged that it is fulfilling its intended purpose as a wildlife corridor. We are encouraged that the bridge is fulfilling its intended purpose as a wildlife corridor.

Buffer Areas

- One of our key measures to protect biodiversity around our development land was setting aside 19% of our development area (equivalent to 13ha) as protected buffers, setbacks, and retained forests, where no construction or public access is permitted. These buffer areas help cushion the surrounding biodiversity from the impacts of construction activity.
- To ensure that the biodiversity within the buffer areas is thriving, we have an ongoing fauna monitoring programme. In FY23/24, we recorded 13 mammal species, 28 amphibian and reptile species, and 67 bird species.

Tree Protection Zones – Incorporating Existing Trees into the Design

- We aim to preserve as many trees as possible within our development zone, especially large and locally threatened species.
- In areas with many large trees and locally threatened species that are of conservation and ecological value, we set up Tree Protection Zones (TPZs) around these clusters to retain and protect them from the surrounding development works.

- These TPZs are hoarded to prevent damage and are monitored monthly to ensure that our retained trees remain in good condition and health.
- The Heart of Africa in Bird Paradise is the largest aviary in Bird Paradise and features many retained trees, including the critically endangered Marsh Ubah tree (*Glochidion obscurum*) and the large fig tree, *Ficus benjamina*, visible at the start of the Heart of Africa boardwalk.
- In addition to ensuring connectivity in the natural area surrounding our parks, we aim to facilitate animal connectivity within our parks as well. The forest corridor in Bird Paradise consists of both retained and planted trees, leading to the adjacent buffer forests and connecting our parks to these areas.
- About 540,000 trees, shrubs and plants, of which over 80 per cent are native to South-east Asia was planted in the development area in an effort to boost eco-connectivity between the green spaces, allowing biodiversity to thrive.

Mandai Ecological Restoration Plan

- The Mandai Ecological Restoration Plan is a 10-year roadmap aimed at assisting the recovery of 2.7ha of degraded areas within the buffers, setbacks, and retained forests by FY2030, to enhance biodiversity and wildlife connectivity in the Mandai precinct.

Rescue and release

Mandai Wildlife Group's Wildlife Healthcare and Research Centre admitted 1,198 rescued wildlife animals in FY23/24, demonstrating our strong commitment to the rescue, rehabilitation and release of native species. These animals are treated at our dedicated wildlife hospital, where they undergo comprehensive health assessments by the veterinary team to ensure they meet all health requirements before being released back into the wild. With our partners, the release of these animals is meticulously managed and guided, ensuring that every step aligns with the highest standards of animal welfare and conservation efforts. This rigorous process underscores our dedication to supporting wildlife conservation and restoring native species to their natural habitats.

Mandai Nature contributes to Mandai Wildlife Group's wider environmental sustainability strategy to meet the Group's core objectives of protecting nature and supporting a low carbon future.



The biodiversity protection pillar focuses on conserving the environment and enhancing biodiversity for an ecologically connected precinct.

Source: Mandai Nature Impact report 2022/2023

One of the initiatives include joint biodiversity surveys between Mandai Nature and Mandai Wildlife Group to better understand and determine the status of wildlife present in the Group's wildlife parks and its surroundings. This data also helps inform researchers on conservation and management actions such as rescue and rehabilitation, ex situ protection, as well as further research and monitoring.



Mandai Nature led a team supported by staff from Mandai Wildlife Group and members from the Herpetological Society Singapore to conduct a herpetofauna survey across Mandai Wildlife Reserve's four parks. A total of 29 species were spotted, including the Red-tailed Racer, Malaysian Giant Frog (above right) and Copper-cheeked Frog.



Mandai Nature joined a team led by the Freshwater and Invasion Biology Lab and Lee Kong Chian Natural History Museum, National University of Singapore, to assess aquatic fauna within a freshwater stream at Night Safari. Species found included two crustaceans of local conservation significance, including the Johnson's Freshwater Crab (above).



Sunda colugo with young on a trek to the Mandai Wildlife Reserve.

BIODIVERSITY PROTECTION IN OUR BACKYARD the Mandai Wildlife Reserve

With its verdant landscape, the Mandai Wildlife Reserve - currently home to the Singapore Zoo, Night Safari, River Wonders and Bird Paradise - has also become a habitat for the native wildlife in the area. To ensure that the native biodiversity continues to thrive within the precinct for the long-term, Mandai Nature and Mandai Wildlife Group collaborate on biodiversity conservation and management across the Mandai Wildlife Reserve. By working together, the two organisations combine their expertise, resources and efforts to address various conservation challenges and ensure the sustainability of the ecosystems within the precinct.

To implement the plan, a comprehensive understanding of the status

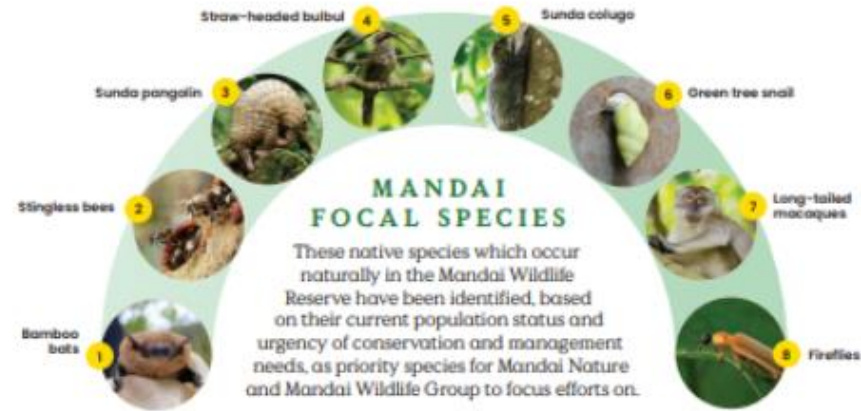
of native wildlife populations in the parks is essential. This information is gathered through regular biodiversity surveys.

Assisted by more than 70 staff and volunteers from local nature groups and species experts, the bi-annual herpetofauna and avifauna surveys conducted across the parks in 2023 recorded a total of 230 sightings of 23 species of amphibians, lizards, snakes and other species, along with 398 sightings across 55 species of birds.

These surveys provide valuable insights into the status and diversity of species, allowing researchers to assess the health of microhabitats within the parks. Based on these findings, mitigation measures can be developed to safeguard existing biodiversity in the area, if necessary.



Native species observed during the surveys included (top to bottom) the blue-winged kingfisher, common greenback and mangrove cat snake.



Source: Mandai Nature Impact report 2023/2024

SPOTLIGHT

Fostering co-existence with macaques



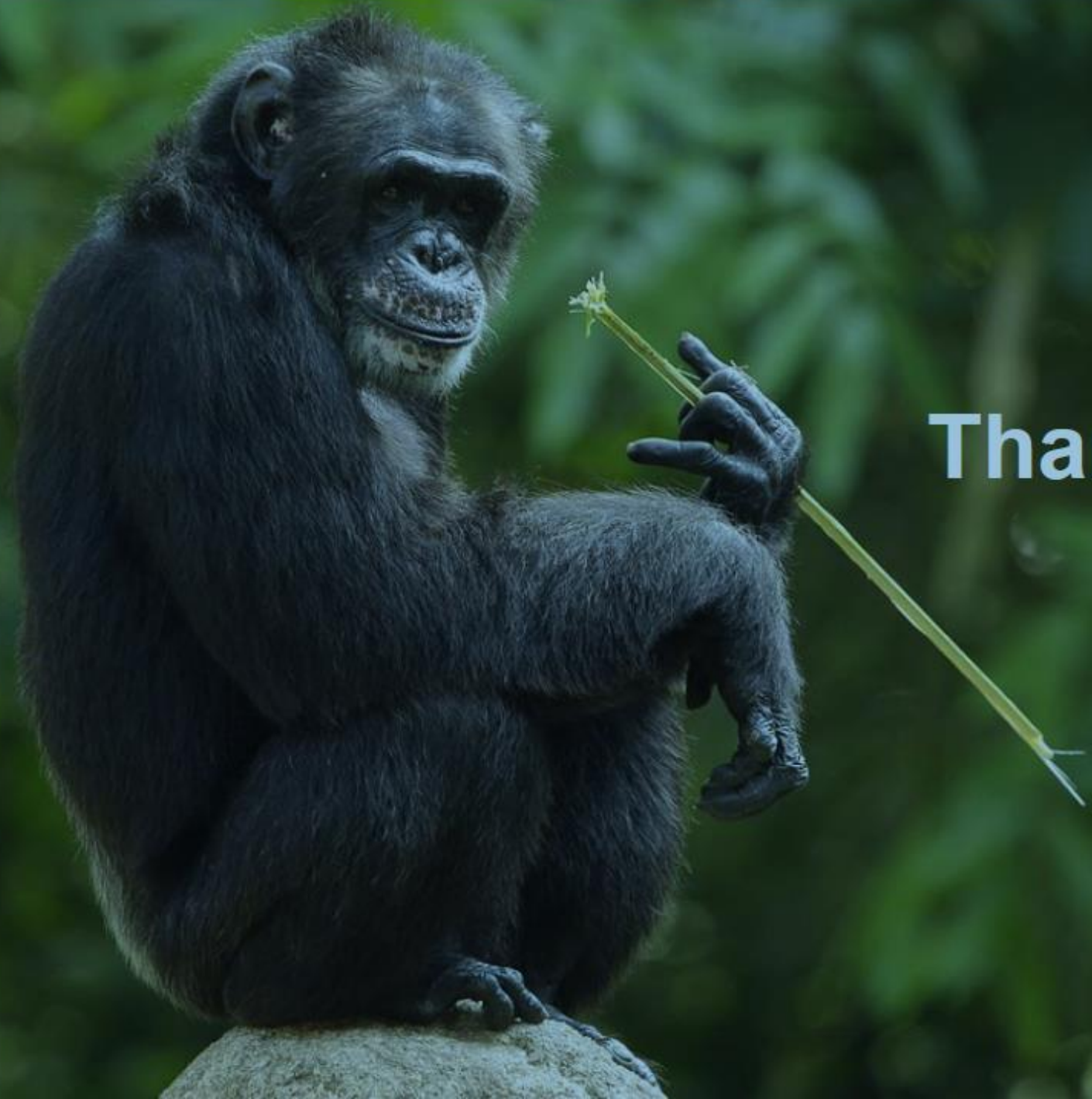
Wildlife rangers guiding wild macaques away from areas with high human activity in the wildlife parks.

DUE TO THEIR highly adaptable nature, long-tailed macaques are frequently seen in close proximity to park visitors and staff. For the welfare of the macaques and the safety of visitors, we are working to implement a long-term management approach to promote human-wildlife co-existence through:

- Monitoring troop activities
- Managing human-wildlife interfaces
- Capacity building and awareness efforts
- Training wildlife rangers, staff and volunteers to carry out monkey-guarding, a technique which safely guides macaques away from areas with high human activity and encourages them to use arboreal crossings



Specially designed monkey-proof bins have been placed in the parks to reduce access to human food waste.



Thank You